



Multidimensional emotional disorders inventory: Reliability and validity in a Spanish clinical sample

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ARTICLE INFO

Keywords:

Dimensional assessment
Emotional disorders
Transdiagnostic
Psychometric properties
Evidence of validity

ABSTRACT

Background: The categorical approach to diagnosing mental disorders has been criticized for a number of reasons (e.g., high rates of comorbidity; larger number of diagnostic categories and combination). Diverse alternatives have been proposed using a hybrid or totally dimensional perspective. Despite the evidence supporting use of the Multidimensional Emotional Disorders Inventory (MEDI) for assessing the transdiagnostic dimensions of Emotional Disorders using a dimensional-categorical hybrid approach, no data exist on Spanish clinical samples. The present study explores the validity and reliability of the 49-item MEDI in a clinical sample and provides data for its use.

Methods: A total of 280 outpatients with emotional disorders attended in different Spanish public Mental Health Units in Spain filled out all questionnaires during the assessment phase and the MEDI again one week after. The instruments used evaluate four main constructs: personality, mood, anxiety and avoidance.

Results: The nine original factors were confirmed and showed adequate reliability (α : 0.66–0.91) and stability ($r = 0.76$ – 0.87). No differences in mean scores by sex were presented in any subscale ($p \geq .07$). The MEDI subscales correlated significantly with the scales of each of the selected constructs ($0.45 < r < 0.76$).

Limitations: The main limitations of this study were the limited sample size and not being able to count on MEDI scores post-transdiagnostic intervention.

Conclusions: The MEDI demonstrates adequate reliability and validity. It allows to assess diverse symptoms efficiently, thus being of interest for clinical studies and practice.

1. Introduction

The diagnostic systems currently used in the field of mental health (i.e., DSM-5 [American Psychiatric Association, 2013] and ICD-11 [World Health Organization, 2017]) are categorical, dividing psychopathology into as many different diagnoses as can be reliably established (Boettcher et al., 2020). However, many diagnoses differentiated by the categorical system actually share biological and psychological mechanisms associated with their development and maintenance (Boettcher et al., 2020). Failing to account for these shared mechanisms has led to many limitations in our psychiatric nosology: an increasingly number of

categories; significant overlap of the characteristics that define different diagnoses; high comorbidity between different disorders; the overuse of “not otherwise specified disorder” categories; or lack of diagnostic agreement between professionals (Barlow et al., 2014).

Given the limitations of the categorical approach, many alternatives for mental health nosology have been proposed. These include many different dimensional classification systems (e.g., HiTOP model, RDoC); complex network (Hofmann et al., 2016) and personalized psychopathology conceptualizations (Wright and Woods, 2020); and the rethinking of psychological problems in contextual terms (Pérez-Álvarez and Fernández-Hermida, 2008). Brown and Barlow (2009) proposed a

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<https://doi.org/10.1016/j.jad.2022.09.140>

Received 8 April 2022; Received in revised form 21 September 2022; Accepted 27 September 2022

Available online 29 September 2022

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hybrid dimensional-categorical approach for emotional disorder classification. This model proposes to assess different dimensions in relation to the development and maintenance of emotional disorders (hereafter, EDs), differentiating between higher and lower order dimensions, which provides with greater parsimony and specificity (Brown and Barlow, 2009). The former are central dimensions of temperament with a genetic basis that are fundamental in the etiology and course of EDs (neurotic and positive temperament). The latter take into account the mood state (depressed mood), the focus of the anxiety (somatic anxiety, autonomic arousal, social anxiety, intrusive cognitions, traumatic re-experiencing), and the emotion-driven behaviours (avoidance).

The Multidimensional Emotional Disorders Inventory (hereinafter, MEDI) was developed to evaluate the dimensions included in the hybrid approach to classification, with the aim of facilitating research and its use in clinical settings (Rosellini and Brown, 2019). The MEDI is made up of 49 Likert-type items (0: *nothing characteristic of me*; 8: *totally characteristic of me*) that evaluate 9 dimensions: (1) Neurotic temperament [NT]; (2) Positive temperament [PT]; (3) depressed mood [DM]; (4) Autonomic arousal [AA]; (5) Somatic anxiety [SOM]; (6) Social anxiety [SOC]; (7) Intrusive cognitions [IC]; (8) Traumatic re-experiencing [TRM]; and (9) Avoidance [AVD].

The MEDI showed evidence of reliability and validity in the original article that was carried out with a clinical and outpatient sample (Rosellini and Brown, 2019). Subsequently, these analyzes were replicated in a study with a Spanish community sample, also showing good reliability and validity data (Osma et al., 2021a). In the original article, the MEDI shows a 9-factor structure, while in a recent study exploring the MEDI internal structure in a Spanish sample from the community an alternative 4-factor structure emerged (Osma et al., 2021a). The description of both structures is described in Osma et al. (2021a). Thus, the present study will test both structures in a clinical sample to shed more light on the optimal configuration of the measure within a Spanish context.

The MEDI was designed to create profiles of the participants according to the dimensions of the hybrid approach of the EDs, allowing planning more individualized treatments by taking into account the dimensional profile of the patient, and monitoring their change (or not) over treatment (Rosellini and Brown, 2019). Furthermore, since it comprised only 49 items for assessing the nine hypothesized ED dimensions, it represents a much more efficient assessment compared to administration of a distinct questionnaire for each dimension of interest (Osma et al., 2021a). This is a very important advantage in public health systems, due to the short time available for consultations and the high pressure of care (Osma et al., 2021b).

In Spain, EDs are the most prevalent mental disorders, affecting approximately 4.5 million people, which is 5.2 % of the population (World Health Organization, 2017). In addition to the high prevalence EDs mainly affect women (World Health Organization, 2017). According to the 2017 Spanish National Health Survey, in the population aged 15 and over, depression was more than double as prevalent in women (9.2 %) than in men (4.0 %), and this same is observed if we analyze the data for chronic anxiety (9.1 % in women and 4.3 % in men) (National Institute of Statistics, 2017).

Different transdiagnostic interventions have been developed to solve the greater demand of psychological treatments, such as the Unified Protocol for transdiagnostic treatment of EDs (Barlow et al., 2018). The Unified Protocol, a cognitive-behavioral intervention, have demonstrated its effectiveness applied in group format in the Spanish National Health System (Osma et al., 2021b). Although some dimensional instruments such as the Overall Anxiety Severity and Impairment Scale (OASIS; Norman et al., 2006) and the Overall Depression Severity and Impairment Scale (ODSIS; Bentley et al., 2014) scales have been adapted for use with clinical Spanish sample (Osma et al., 2019), these tools are used for the evaluation of anxiety and depression symptoms throughout the Unified Protocol intervention, there are no scales that evaluate all the constructs of the EDs in a dimensional way. This fact implies that

interventions based on the hybrid approach for EDs are not dimensionally evaluated, because evidence for MEDI has been only provided in community samples so far (Osma et al., 2021a). Thus, having a Spanish version of the MEDI could save time and costs, and reduce the burden of clinicians, researchers and participants who carry out this type of studies and interventions.

The main objective of this study is to explore the reliability and validity of the Multidimensional Emotional Disorders Inventory in a Spanish clinical sample who attends the Spanish Public Mental Health System. The specific objectives are: to confirm the internal structure of the scale and subscales' reliability, both original version and of the 4-factor structure previously identified in a community sample in Spain; to explore sex differences in severity; and to offer data in clinical population.

2. Method

2.1. Participants

The sample consisted of 280 outpatients ($n = 215$, 76.8 % women) from different Mental Health Units of the Spanish National Health System who met criteria for at least one diagnosis of ED (major depression disorder, dysthymic disorder, panic disorder, agoraphobia, obsessive-compulsive disorder, generalized anxiety disorder, posttraumatic stress disorder, social anxiety disorder, hypochondria, adjustment disorders, and unspecified anxiety and depressive disorders). The mean age was 35.99 years ($SD = 12.21$; range = 18–69). Table 1 shows the rest of the sociodemographic characteristics. The inclusion criteria were: (1) being over 18 years old, legal age in Spain; (2) have a primary anxiety, mood, or related diagnosis; (3) speak Spanish fluently, in order to understand the MEDI questionnaire; (4) accept informed consent by signing it.

2.2. Instruments

2.2.1. Sociodemographic data

Different data such as age, sex, marital status, educational level, employment situation, main diagnosis, secondary diagnosis, and pharmacological treatment were evaluated through an interview with their clinicians.

2.2.2. The Multidimensional Emotional Disorder Inventory (MEDI; Rosellini and Brown, 2019)

The MEDI is composed of 49 items, which evaluate nine dimensions: (1) Neurotic temperament [NT]; (2) Positive temperament [PT]; (3) Depressed mood [DM]; (4) Autonomic arousal [AA]; (5) Somatic anxiety [SOM]; (6) Social anxiety [SOC]; (7) Intrusive cognitions [IC]; (8) Traumatic re-experiencing [TRM]; and (9) Avoidance [AVD]. It uses a Likert-type response scale (0: not at all characteristic of me; 8: totally characteristic of me). In this study was used the Spanish version, that was obtained following the recommendations of the International Test Commission (see Osma et al., 2021a for further details).

2.2.3. The NEO Five-Factor Inventory (NEO-FFI; Costa and McCrae, 1999)

The NEO-FFI is made up of 60 items that assess the personality dimensions included in the Big Five Model: Neuroticism, Extraversion, Openness to experience, Conscientiousness and Agreeableness. The items use a 5-point Likert-type scale from 0 (*totally disagree*) to 4 (*totally agree*). In the present study, only the Neuroticism (N; 12 items; $\alpha = 0.82$) and Extraversion (E; 12 items; $\alpha = 0.87$) subscales are used.

2.2.4. The Anxiety Sensitivity Index-3 (ASI-3; Spanish validation by Taylor et al., 2007)

The ASI-3 is made up of 18 items that assesses three components of anxiety: physical, cognitive and social anxiety. The items have a 5-point

Table 1
Sociodemographic data and participants' clinical diagnoses.

	n (%)
Marital status	
Single	107 (38.2)
Married/living with partner	146 (52.1)
Separated/widowed	27 (9.6)
Educational level	
Primary studies	55 (19.6)
Intermediate studies	90 (32.1)
Superior studies	135 (48.2)
Employment situation	
Working	110 (39.3)
Not working	113 (40.4)
Student	57 (20.4)
Main diagnosis	
Anxiety disorders	126 (45.0)
Non-specific anxiety disorder	36 (12.9)
Panic disorder without agoraphobia	22 (7.9)
Generalized anxiety disorder	21 (7.5)
Obsessive-compulsive disorder	13 (4.6)
Hypochondria	10 (3.6)
Panic disorder with agoraphobia	8 (2.9)
Agoraphobia	6 (2.1)
Social phobia	6 (2.1)
Posttraumatic stress disorder	5 (1.8)
Mood disorders	51 (18.2)
Major depressive disorder	29 (10.4)
Dysthymia	15 (5.4)
Unspecified mood disorder	7 (2.5)
Mixed disorders	102 (36.4)
Adjustment disorder	102 (36.4)
Secondary diagnosis	
Anxiety disorders	34 (12.1)
Non-specific anxiety disorder	9 (3.2)
Posttraumatic stress disorder	6 (2.1)
Generalized anxiety disorder	5 (1.8)
Obsessive-compulsive disorder	5 (1.8)
Panic disorder with agoraphobia	3 (1.1)
Social phobia	3 (1.1)
Hypochondria	2 (0.7)
Agoraphobia	1 (0.4)
Mood disorders	13 (4.6)
Unspecified mood disorder	6 (3.2)
Major depressive disorder	4 (1.4)
Dysthymia	3 (1.1)
Mixed disorders	3 (1.1)
Adjustment disorder	3 (1.1)
Pharmacological treatment	
Taking pharmacological treatment	148 (52.9)

Likert scale from 0 (*Nothing applies to me*) to 4 (*Very much*). In this study, only the physical anxiety subscale (6 items) was used. The Cronbach's alpha for this subscale was $\alpha = 0.90$.

2.2.5. The brief version of the Fear of Negative Evaluation Scale (BFNE; Spanish validation by Pitarch, 2010)

The BFNE is made up of 12 items that evaluate fear of negative evaluation. In this study, only the direct scale (8 items; $\alpha = 0.93$) was used, which is answered on a 5-point Likert scale that ranges from 1 (*Nothing characteristic of me*) to 5 (*Extremely characteristic of me*).

2.2.6. The Depression, Anxiety and Stress Scale (DASS-21; Spanish validation by Bados et al., 2005)

It is made up of 21 items that assess depression, anxiety and stress using a 4-point Likert-type scale that ranges from 0 (*does not apply to me at all*) to 3 (*it applies to me a lot or is applicable most of the time*). In this study, only the Depression (DASS-14-D, 7 items; $\alpha = 0.87$) and Anxiety (DASS-14-A, 7 items; $\alpha = 0.82$) subscales have been used.

2.2.7. The Obsessive Compulsive Inventory-Revised (OCI-R; Spanish validation by Fullana et al., 2005)

It is made up of 18 items assessing different dimensions of the

obsessive-compulsive disorder: cleaning / washing, control, order, obsessions, hoarding and neutralization. The items are answered on a 5-point Likert-type scale from 0 (*Absolutely/ None / Nothing*) to 4 (*A lot*). The internal consistency in the present study was $\alpha = 0.89$.

2.2.8. The Davidson Trauma Scale (DTS; Spanish validation by Bobes et al., 2000)

It is made up of 18 items that assess the frequency and severity of symptoms of post-traumatic stress disorder, with a 5-point Likert-type scale from 0 (*Never / Nothing*) to 4 (*Daily / Extreme*). An internal consistency of $\alpha = 0.93$ for frequency and $\alpha = 0.96$ for severity was obtained.

2.2.9. The Brief Experiential Avoidance Questionnaire (BEAQ; Spanish validation by Vázquez Morejón et al., 2019)

It is made up of 15 items that evaluate Experiential avoidance with a 6-point Likert scale, from 1 (*Totally disagree*) to 6 (*Totally agree*). The internal consistency was $\alpha = 0.74$.

2.3. Procedure

The sample was obtained from 14 Public Mental Health Units in Spain (form Alicante, Castellón, Córdoba, Badajoz, Huesca, Lleida, Mérida, Pamplona, San Sebastián, Valencia, Valladolid, and Zaragoza). The selected participants were all of legal age who had come to the National Health System searching of psychological assistance.

The study participants were evaluated by their clinicians during the assessment period before treatment. Clinicians had between 8 and 20 years of experience in the evaluation, diagnosis and treatment of mental disorders, and who were collaborating in the present study to ensure that they met the inclusion criteria. Those who were eligible were asked to participate in the study, offering them a sheet with all the information in this regard. Of the 387 eligible participants, 72.3 % agreed to participate ($n = 280$). If they agreed, they had to sign the informed consent. Afterwards, the clinicians collected the sociodemographic data of the participants together with their email, attaching an alphanumeric code to guarantee the security and confidentiality of the data. A member of the research team with access to the participant's information send them a link to the Qualtrics platform (Qualtrics, 2017) to fill in all the assessment protocol of the study online. The procedure was repeated a week later only with the MEDI to check the temporal stability of the instrument.

With those participants who did not have the option of filling in the questionnaires online, the clinician gave them the option of filling it in pencil and paper format in their office, and subsequently sent it to the research team with an alphanumeric code. This procedure was carried out with the approval of the different ethics committees of all the collaborating centers.

2.4. Data analysis

Differences in sociodemographic variables and total scores of the included questionnaires between participants according to the assessment format (online or pencil-paper) were calculated with ANOVA and the Chi square tests. Confirmatory factor analysis (CFA) in the 280 participants were performed using the software Mplus 8.0 (Muthén and Muthén, 2010) using Maximum Likelihood (ML) estimation. Goodness of fit was examined with the Comparative Fit Index ($CFI > 0.90$; Hu and Bentler, 1999), the Standardized Root Mean Square Residual (SRMR), and the root mean square error of approximation (RMSEA < 0.08), and the χ^2/df (cut-off < 2). Modification index were used in case of needing to improve the fit of the model. These index show correlations between items' errors and the magnitude of the reduction based on chi-square. Both structures were compared by means of the CFI, χ^2/df , the Akaike Information Criteria (AIC) and the sample-adjusted Bayesian Information Criteria (SABIC). Localized areas of model strain were

inspected using modification indices (Brown, 2015). The reliability of the factors was estimated using the Cronbach's alpha estimate.

Pearson's zero-order correlations were calculated between each MEDI factor and NEO-FFI Neuroticism and Extraversion subscales, together with the ASI-3, the BFNE, the DASS-14 subscales, the OCI-R, the DTS, and the BEAQ. Sex differences in the MEDI subscales were explored using a Multivariate Analysis of Variance with the Pillai's Trace test. One-week temporal stability was calculated via Pearson's, canonical and intraclass correlations for absolute agreement (ICC; two-way-mixed). Effect sizes were calculated via partial eta squared and Cohen's *d*. To provide clinically relevant scaling, percentiles and T-scores ($M = 50$; $SD = 10$) were also calculated.

3. Results

3.1. Preliminary analysis

A total of 54 participants (19.3 %) completed the assessment battery in pencil-paper format, while 80.7 % ($n = 226$) did so in online format. No statistically significant differences ($p > .05$) were found in the sociodemographic variables, nor in any of the MEDI subdimensions. Finally, statistically significant differences were only observed in the DTS ($F = 5.81$, $p = .017$, Cohen's $d = 0.41$) and BEAQ ($F = 6.86$, $p = .009$, Cohen's $d = 0.40$), with the highest scores being obtained in those participants who had completed the questionnaires in pencil-paper format. Specifically, the mean score obtained by the participants who completed the questionnaires in pencil-paper format was 27.45 ($SD = 17.60$) in the DTS and 61.09 ($SD = 18.53$) in the BEAQ, while the participants who completed the questionnaires in online format obtained a mean score of 20.38 ($SD = 17.36$) in the DTS and 55.46 ($SD = 12.71$) in the BEAQ.

3.2. Validity evidence based on the internal structure and sex differences

The results support the superiority of the original 9-factor structure ($\chi^2/df = 1.69$, CFI = 0.868; SRMR = 0.066; RMSEA = 0.047, 95 % confidence interval (95%CI) = 0.043–0.051) over the exploratory alternative 4-factor structure ($\chi^2/df = 2.36$, CFI = 0.732; SRMR = 0.090; RMSEA = 0.070, 95%CI = 0.066–0.073). Also, the AIC and the SABIC suggested the original structure to be more parsimonious than the alternative one (AIC: 61,687.182 vs 62,477.163; SABIC: 61,772.068 vs 62,548.132). Despite the clear better performance of the original structure, the CFI value was slightly below the recommended threshold.

The addition of correlations between the errors of items 6 and F5 (modification index = 39.965), and items 9 and 31 (modification index = 27.833) slightly improved CFI (CFI = 0.881; $\Delta CFI = 0.013$).

Item factor loadings and discrimination indices are shown in Table 2. The improvement of model fit when errors between item 6 (“Unexpected physical sensations scare me”) and F5 (Somatic Anxiety) are freely estimated.

Although the omnibus test in the MANOVA showed overall statistically significant differences between sex ($F(18,538) = 1.64$, $p = .046$, $\eta^2_{\text{partial}} = 0.05$). Nonetheless, there were not significant differences between any specific scales (all $p \geq .07$).

3.3. Validity evidence based on relationships with NEO-FFI, ASI-3, BFNE, DASS-14, OCI-R, DTS and BEAQ

All MEDI scales were significantly and positively correlated with the expected questionnaires (see Tables 3 and 4), showing evidence of convergent validity. The associations between variables were moderate in magnitude. The largest convergent associations were found between DM and DASS-14-D ($r = 0.76$, $p < .001$) and AA and the DASS-14-A ($r = 0.70$, $p < .001$). The lowest association between a MEDI subscale and its convergent validity scale was found in the SOC-BFNE ($r = 0.45$, $p < .001$) and IC-OCI-R ($r = 0.50$, $p < .001$) associations. Unexpectedly, the correlations between SOC-E ($r = -0.67$, $p < .001$), IC-N ($r = 0.61$, $p < .001$) and TRM-N ($r = 0.62$, $p < .001$) were greater than SOC-BFNE ($r = 0.45$, $p < .001$), IC-OCI-R ($r = 0.50$, $p < .001$) and TRM-DTS ($r = 0.56$, $p < .001$). The remaining correlations were all $r > 0.55$. In addition, we found evidence of discriminant validity in the Somatic Anxiety subscale (SOM) which does not show significant correlations with the variables E ($r = -0.11$, $p = .056$) or DASS-D ($r = 0.54$, $p = .440$), since the SOM dimension refers to physical sensations, and therefore is not so closely related to those variables.

3.4. Reliability, temporal stability and scaling

MEDI dimensions showed an adequate level of reliability, the internal consistency in the present study was $\alpha_{\text{NT}} = 0.66$; $\alpha_{\text{PT}} = 0.72$; $\alpha_{\text{DM}} = 0.81$; $\alpha_{\text{AA}} = 0.80$; $\alpha_{\text{SOM}} = 0.83$; $\alpha_{\text{SOC}} = 0.91$; $\alpha_{\text{IC}} = 0.84$; $\alpha_{\text{TRM}} = 0.87$; and $\alpha_{\text{AVD}} = 0.73$ (see Table 2 for estimations of reliability based on Cronbach's Alpha). Regarding the temporal stability, all correlations between the baseline and 1-week follow-up scores were statistically significant and high in magnitude ($r \geq 0.764$), with SOC showing the greatest and NT the lowest stability (see Table 3). Consistently, intra-class correlations ranged ICC = 0.86 to 0.93, with SOC presenting the highest and NT the lowest magnitudes. The canonical correlation between subscales in both assessments (baseline and 1-week follow-up) was 0.89 ($p < .001$). The redundancy coefficient was 0.26 (explained variance = 26.4 %). In an exploratory way, Table 5 shows MEDI total scores associated to percentiles and their transformations in T-scores.

4. Discussion

The MEDI is a self-report inventory that has been uniquely and specifically designed to evaluate the dimensions of the hybrid dimensional-categorical model proposed by Brown and Barlow (2009). To date, we only know of two studies that test its psychometric properties: the original development study, which was carried out in an American outpatient clinical sample (Rosellini and Brown, 2019), and the Spanish adaptation in non-clinical university students (Osma et al., 2021a). Thus, this is the first study that replicates the validity of the MEDI and provides data on their psychometric properties in a clinical sample out of the USA.

Notably, all three studies confirm the original 9-factor structure with adequate to very good levels of internal consistency across dimensions. It is important to note the CFI was slightly below conventional thresholds (Hu and Bentler, 1999), probably due to the small sample size compared to the number of items. Along these lines, it is rare for questionnaires with a large number of items and subscales to achieve excellent CFA model fit by conventional standards (Marsh et al., 2004). For these reasons, psychometricians have begun to use alternate modeling strategies, including exploratory structural equation modeling and Bayesian CFA, to evaluate the psychometric properties of omnibus psychopathology measures such as the MEDI (Rosellini and Brown, 2019). Regarding the modification indices, the importance of the correlation between item 6 and factor 5 (SOM) is noteworthy, since item 6 refers specifically to physical sensations, in contrast to the rest items of this factor, which refer to concerns about health in general. The same happens in regards to items 9 (“I cope with unpleasant thoughts, feelings, or images by trying to distract myself”) and 31 (“If something upsets me, I try very hard to not think about it”), since both refer to cognitive avoidance. Future psychometric validation work of the MEDI should consider using such alternate strategies.

Regarding the association between each MEDI's dimension with other questionnaires, we found evidence of convergent and discriminant validity, with each subscale being significantly related to the expected questionnaire and not showing significant correlations with those that were not expected. In addition, in the analysis of the correlations between its dimensions, we see how the hybrid dimensional-categorical model is confirmed, since higher order dimensions, NT and PT,

Table 2
Item factor loadings, discrimination indices and reliability for the MEDI subscales.

Items	NT	PT	DM	AA	SOM	SOC	IC	TRM	AVD
1.	0.57 (0.41)								
2.		0.55 (0.45)							
3.			0.66 (0.62)						
4.				0.61 (0.57)					
5.							0.60 (0.53)		
6.					1.16 (0.51)				
7.						0.82 (0.77)			
8.								0.77 (0.70)	
9.									0.22 (0.24)
10.	0.34 (0.38)								
11.			0.73 (0.64)						
12.							0.74 (0.61)		
13.				0.76 (0.66)					
14.						0.69 (0.66)			
15.									0.57 (0.49)
16.	0.68 (0.47)								
17.		0.60 (0.47)							
18.				0.67 (0.55)					
19.					0.69 (0.60)				
20.								0.70 (0.64)	
21.							0.73 (0.68)		
22.						0.82 (0.77)			
23.									0.48 (0.41)
24.		0.85 (0.65)							
25.			0.61 (0.56)						
26.				0.63 (0.57)					
27.									0.61 (0.47)
28.					0.82 (0.72)				
29.								0.88 (0.81)	
30.							0.72 (0.66)		
31.									0.40 (0.44)
32.	0.62 (0.48)								
33.		0.59 (0.54)							
34.									0.43 (0.37)
35.	0.36 (0.35)								
36.		0.30 (0.28)							
37.			0.75 (0.68)						
38.									

(continued on next page)

Table 2 (continued)

Items	NT	PT	DM	AA	SOM	SOC	IC	TRM	AVD
					0.86 (0.74)				
39.								0.78 (0.72)	
40.							0.74 (0.69)		
41.						0.81 (0.75)			
42.									0.54 (0.49)
43.			0.67 (0.55)						
44.				0.66 (0.56)					
45.					0.60 (0.55)				
46.							0.55 (0.51)		
47.						0.91 (0.86)			
48.								0.71 (0.65)	
49.									0.65 (0.44)
α	0.66	0.72	0.81	0.80	0.83	0.91	0.84	0.87	0.73

Note. NT: Neurotic temperament; PT: Positive temperament; DM: Depressed mood; AA: Autonomic arousal; SOM: Somatic anxiety; SOC: Social anxiety; IC: intrusive cognitions; TRM: traumatic re-experiencing; AVD: avoidance
Factor loadings (corrected item-test correlation). α: Cronbach's alpha.

Table 3

Pearson correlations between the baseline MEDI subscales and 1-week follow-up.

	2	3	4	5	6	7	8	9	FU
1. NT	-0.14*	0.48**	0.40**	0.42**	0.40**	0.51**	0.54**	0.49**	0.76**
2. PT	1	-0.41**	-0.05	0.05	-0.26**	-0.14*	-0.13*	-0.07	0.80**
3. DM		1	0.48**	0.16**	0.52**	0.60**	0.57**	0.48**	0.83**
4. AA			1	0.49**	0.41**	0.54**	0.53**	0.57**	0.77**
5. SOM				1	0.22**	0.34**	0.31**	0.40**	0.85**
6. SOC					1	0.42**	0.44**	0.55**	0.87**
7. IC						1	0.69**	0.59**	0.77**
8. TRM							1	0.58**	0.82**
9. AVD								1	0.78**

Note. MEDI: Multidimensional Emotional Disorder Inventory; NT: Neurotic temperament; PT: Positive temperament; DM: Depressed mood; AA: Automatic arousal; SOM: Somatic anxiety; SOC: Social anxiety; IC: Intrusive cognitions; TRM: Traumatic re-experiencing; AVD: avoidance; FU: Follow-up.

* $p < .05$.

** $p < .001$.

Table 4

Pearson correlations between the baseline MEDI subscales and comparison scales.

	N	E	ASI	BFNE	DASS-14-A	DASS-14-D	OCI-R	DTS	BEAQ
NT	0.61**	-0.29**	0.22**	0.47**	0.31**	0.39**	0.47**	0.28**	0.39**
PT	-0.34**	0.58**	-0.09	-0.28**	-0.13*	-0.42**	-0.04	-0.18**	-0.26**
DM	0.68**	-0.49**	0.20**	0.45**	0.46**	0.76**	0.33**	0.42**	0.45**
AA	0.44**	-0.24**	0.50**	0.18**	0.70**	0.36**	0.37**	0.40**	0.36**
SOM	0.22**	-0.11	0.61**	0.15*	0.31**	0.05	0.31**	0.13*	0.19**
SOC	0.36**	-0.67**	0.22**	0.45**	0.43**	0.50**	0.28**	0.31**	0.39**
IC	0.61**	-0.25**	0.32**	0.24**	0.48**	0.45**	0.50**	0.40**	0.42**
TRM	0.62**	-0.29**	0.33**	0.30**	0.49**	0.49**	0.45**	0.56**	0.50**
AVD	0.42**	-0.41**	0.35**	0.33**	0.54**	0.40**	0.50**	0.33**	0.55**

Note. MEDI: Multidimensional Emotional Disorder Inventory; N: Neuroticism; E: Extraversion; ASI: Anxiety Severity Index, Somatic anxiety subscale; BFNE: Brief version of the Fear of Negative Evaluation Scale; DASS-14-A: Anxiety subscale of the Depression, Anxiety and Stress Scales-14; DASS-14-D: Depression subscale of the Depression, Anxiety and Stress Scales-14; OCI-R: Obsessing scale of the Revised Obsessive–Compulsive Inventory; DTS: Davidson Trauma Scale; BEAQ: Brief experiential avoidance questionnaire; NT: Neurotic temperament; PT: Positive temperament; DM: Depressed mood; AA: Automatic arousal; SOM: Somatic anxiety; SOC: Social anxiety; IC: Intrusive cognitions; TRM: Traumatic re-experiencing; AVD: avoidance; FU: Follow-up.

* $p < .05$.

** $p < .001$.

Table 5
Data for the MEDI scales in clinical populations.

	NT	PT	DM	AA	SOM	SOC	IC	TRM	AVD
PC 25									
Direct scores	22	15	14	11	12	11	14	9	24
T-scores	48	44	44	42	43	42	38	41	38
PC 30									
Direct scores	24	16	17	14	14	12	16	10	25
T-scores	50	45	47	45	44	43	40	42	38
PC 50									
Direct scores	29	20	23	20	20	20	23	17	32
T-scores	55	49	52	50	50	50	46	48	44
PC 60									
Direct scores	31	22	25	23	23	24	26	22	36
T-scores	57	51	54	53	52	53	48	52	47
PC 75									
Direct scores	34	25	30	28	29	30	33	28	41
T-scores	60	55	58	57	57	58	54	57	52
PC 90									
Direct scores	36	30	35	33	36	37	41	36	48
T-scores	62	60	62	61	63	64	61	63	57
PC 99									
Direct scores	40	35	40	39	40	40	47	40	58
T-scores	66	65	67	66	67	67	66	67	66

Note. NT: Neurotic temperament; PT: Positive temperament; DM: Depressed mood; AA: Automatic arousal; SOM: Somatic anxiety; SOC: Social anxiety; IC: Intrusive cognitions; TRM: Traumatic re-experiencing; AVD: Avoidance.

significantly inversely correlate with each other, and NT positively and significantly correlates with all lower order dimensions (mood, anxiety symptoms, and avoidance) (Brown and Barlow, 2009). Moreover, PT significantly inversely correlates with DM, SOC, IC and TRM. Brown et al. (1998) studied the structural relationship among DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect and autonomic arousal and found similar results.

Unexpectedly and despite the significant correlations found in this study, the dimensions SOC, IC and TRM showed greater correlations with the extraversion and neuroticism subscales than with the specific questionnaires (BFNE, OCI-R and DTS). This may be because the MEDI dimensions assess the core features of disorders (social-related anxiety, cognitive intrusions and reexperiencing), transcending diagnostic criteria (Conklin and Boettcher, 2017), while the specific questionnaires chosen to assess those dimensions explore characteristics associated to these problems but that not always discriminate against people who actually present an ED (social anxiety, obsessive-compulsive disorder, and post-traumatic stress disorder). This fact may make the MEDI subscales correlate more with the vulnerability variables neuroticism and extraversion in these cases, going in line with the explanative model proposed for EDs (Brown and Barlow, 2009).

We did not find statistically significant differences based on sex for any of the MEDI subscales, representing the first study in exploring this issue in the MEDI. Our results reveal that, despite EDs are more prevalent in women (World Health Organization, 2017), average severity on each subscale was similar for men and women. The sex differences obtained in the prevalence of EDs maybe are due to social and cultural aspects, for example, women are more likely to search for mental health than men (Arenas and Puigcerver, 2009) or clinicians are more likely to consider with higher severity the mental status of women (World Health Organization, 2001). Another interpretation could be related with the symptoms described in clinical questionnaires and scales which have been considered to reflect the women experiences more than men experiences (Nolen-Hoeksema, 2012).

Having data in Spanish clinical population has different implications, both at a clinical and research level and represent an important novel contribution of the present study. From a clinical perspective, clinicians can use norms to determine a patient's relative severity and foci of anxiety relative to an "average" outpatient. This information allows understanding of the transdiagnostic symptom profile of a patient with

ED diagnosis, ideally facilitating the personalization of the psychological intervention (with therapeutic objectives based on relative elevations/scores), and assessing change in the dimensions of interest over treatment. From a research perspective, researchers can use the MEDI as an efficient instrument for both clinical and implementation studies, fostering research on the hybrid dimensional-categorical approach to diagnosing and quantifying EDs. Finally, future epidemiological studies could improve use of the MEDI by collecting normative data in representative population samples, with the goal of using the measure for purposes of risk screening and preventive intervention (e.g., Ferreres-Galán et al., 2022; Martínez-Borba et al., 2022).

Transdiagnostic interventions are currently being applied at the intervention and prevention level, with the Unified Protocol being one of the most widely used interventions (Carlucci et al., 2021; Cassiello-Robbins et al., 2020; Osma et al., 2021a; Sakiris and Berle, 2019). In fact, in Spain there are currently different research projects underway that apply this transdiagnostic intervention in the National Health System (Osma et al., 2021b; Osma et al., 2021c). Having this dimensional evaluation tool would allow researchers to replicate these results in other contexts (social settings, university clinical units, etc.) and formats (online vs. offline). Researchers may be interested in studying the changes in the main ED's dimensions of their participants after a transdiagnostic intervention, the relationship of the MEDI's dimensions with other psychopathology constructs, or also the predictable power of these dimensions regarding different outcomes. Through this study we also expect a growing research interest using the MEDI to assess people with EDs in Spanish speaking countries, and the interest of the international research community to translate and adapt the MEDI to other languages and ages (children, adolescents, seniors).

5. Limitations

The present study also has limitations that must be taken into account in order to improve in future studies. We had a limited sample size ($n = 280$) compared to the number of items. Despite this, it must keep in mind that in Spain the National Health System has a high healthcare pressure (especially in the last two years as a consequence of the COVID-19 pandemic), which means that on many occasions clinicians cannot participate in clinical studies like this one. Future studies could replicate these analyzes in larger samples. The gender imbalance must also be considered, since 76.8 % of the sample were women. Is important to highlight that this is something that frequently occurs in studies with samples diagnosed with EDs due their higher prevalence among women (World Health Organization, 2017). In addition, the fact that all participants were recruited from outpatient centers (convenience sample) can influence the representativeness of these results. In this sense, it may be interesting that future studies replicate the analysis in different clinical settings, and also non-clinical such as community or educational, and of different nationalities and ethnicities, to increase the literature that supports the evidence of validity of the MEDI. Two formats have also been used to fill in the questionnaires, online or pencil-paper. No statistically significant differences appear in the dimensions depending on the format, but it could be interesting to have this variable controlled in future studies. Furthermore, it could be interesting to explore the psychometric properties by comparing the scale scores before and after a transdiagnostic psychological intervention, to specifically test its sensitivity to clinical change.

6. Conclusions

In sum, the Spanish validation of the MEDI in a clinical sample provides great advantages at the research and clinical level, allowing increasing research in the hybrid dimensional-categorical approach, opening new possibilities to classification systems, and facilitating the dimensional evaluation of patients, creating interventions with more individualized therapeutic plans that allow them to increase their

effectiveness.

CRedit authorship contribution statement

All persons who met authorship criteria are listed as authors. All authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. All authors contributed to and approved the final manuscript.

Funding

This work was supported by the PI20/00697 project integrated in Plan Estatal de I+D+I 2017-2020 and co-funded by the “ISCIII-Subdirección General de Evaluación y Fomento de la investigación del Fondo Europeo de Desarrollo Regional (FEDER). Otra manera de hacer Europa. Co-funding for this study was also provided by Gobierno de Aragón and FEDER 2014–2020 “Construyendo Europa desde Aragón” (Research team S31_20D).

Ethics approval

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of Aragón (No. CP.-C.I. PI20/053).

Consent to participant

Informed consent was obtained from all subjects involved in the study.

Conflict of interest

The authors declare no conflict of interest.

Acknowledgements

We thank all the Mental Health Units and their clinicians (Zaragoza, José A. Aldaz; Vinaròs, Castellón, Vanesa Ferreres and Jordi de Luna; Pamplona, Navarra, Jesús A. García and David Brugos; Córdoba, José F. Venceslá and Gloria Estebarez; San Sebastian, Gipúzcoa, María Á. Yañez; Lleida, Salvador Gallart; Valencia, Cristina Robert and Ana Sánchez; Alicante, María Á Torres; Valladolid, María A. Santos; Mérida, Badajoz, Juan C. Sanz; Zafra, Badajoz, Antonio Galán; Fraga, Huesca, Javier Prado; and Tarazona, Zaragoza, Miriam Sarasa and Alba Quilez) for their participation in this study and, above all, those participants who agreed to be part of the sample, since without them this study would not have been possible.

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