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Preliminary Evidence of Validity of the Persistent Depressive Disorder Scale (PDD) in Peruvian University Students

Evidencias preliminares de validez de la Escala de Trastorno Depresivo Persistente (TDP) en estudiantes universitarios peruanos

Evidências preliminares de validade da Escala de Transtorno Depressivo Persistente (PDD) em estudantes universitários peruanos

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Abstract: Persistent Depressive Disorder (PDD), also known as dysthymia, has a chronic course and a negative impact on people's quality of life, even more so in young university students. This disorder is one of the least studied types of mood disorders and lacks instruments for its proper evaluation. Therefore, the main objective of the study was to build a scale to measure PDD and preliminarily evaluate its psychometric properties. The total sample of the study was 868 university students aged 18 to 34 years. The results of the exploratory factor analysis showed the presence of a single factor. Likewise, the confirmatory factor analysis reported adequate goodness-of-fit indices (CFI = .98, TLI = .97, SRMR = .06, RMSEA [90 %CI] = .09 [.08 - .10]) for a single-factor structure. In addition, the scale proved to be invariant according to the sex of the participants. Regarding convergent validity, PDD showed significant covariances with anxiety, depression, and life satisfaction. Finally, the scale showed high reliability (α = .88; ω = .88). In conclusion, the PDD scale preliminarily presents adequate psychometric properties to measure the presence of patterns of persistent depressive disorder in university students.

Keywords: persistent depressive disorder; factor analysis; factor invariance; reliability

Resumen: El Trastorno Depresivo Persistente (TDP), también conocido como distimia, tiene un curso crónico y un impacto negativo en la calidad de vida de las personas, más aún en jóvenes universitarios. Este trastorno es uno de los tipos de trastornos del estado de ánimo menos estudiado y carece de instrumentos para su adecuada evaluación. Por tanto, el objetivo principal del estudio fue construir una escala para medir el TDP y evaluar preliminarmente sus propiedades psicométricas. La muestra total del estudio fue de 868 estudiantes universitarios de 18 a 34 años. Los resultados del análisis factorial exploratorio evidenciaron la presencia de un único factor. Asimismo, el análisis factorial confirmatorio reportó índices de bondad de ajuste adecuados (CFI = .98, TLI = .97, SRMR = .06, RMSEA [90 %CI]= .09[.08 - .10]) para una estructura unifactorial. Además, la escala demostró ser invariante según el sexo de los participantes. Respecto a la validez convergente, el TDP mostró covarianzas significativas con la ansiedad, depresión y satisfacción con la vida. Por último, la escala presentó elevada fiabilidad (α = .88; ω = .88). En conclusión, la escala TDP presenta preliminarmente adecuadas propiedades psicométricas para medir la presencia de patrones del trastorno depresivo persistente en jóvenes universitarios.

Palabras clave: trastorno depresivo persistente; análisis factorial; invarianza factorial; confiabilidad

Resumo: O Transtorno Depressivo Persistente (PDD), também conhecido como distimia, apresenta um curso crônico e um impacto negativo na qualidade de vida das pessoas, especialmente em jovens universitários. Esse transtorno é um dos tipos de transtornos do humor menos estudados e carece de instrumentos para sua avaliação adequada. Portanto, o principal objetivo do estudo foi construir uma escala para medir o PDD e avaliar preliminarmente suas propriedades psicométricas. A amostra total do estudo foi por 868 estudantes universitários, de 18 a 34 anos. Os resultados da análise fatorial exploratória evidenciaram a presença de um único fator. Da mesma forma, a análise fatorial confirmatória apresentou índices de ajuste adequados (CFI = .98, TLI = .97, SRMR = .06, RMSEA [IC90 %] = .09[.08 - .10]) para uma estrutura unifatorial. Além disso, a escala se mostrou invariante em relação ao sexo dos participantes. Quanto à validade convergente, o PDD apresentou covariâncias significativas com ansiedade, depressão e satisfação com a vida. Por fim, a escala apresentou elevada confiabilidade (α = .88; ω = .88). Em conclusão, a escala PDD apresenta, preliminarmente, propriedades psicométricas adequadas para medir a presença de padrões do transtorno depressivo persistente em jovens universitários.
Palavras-chave: transtorno depressivo persistente; análise fatorial; invariância fatorial; confiabilidade

Persistent depressive disorder, also called dysthymia, is a type of mood disorder (González-Forteza et al., 2015) that follows a chronic course (Halverson, 2015). In the Diagnostic Manual of Mental Disorders DSM-5 (American Psychiatric Association [APA], 2014) is found within depressive disorders, with the name of Persistent Depressive Disorder (PDD) or dysthymia (300.4) and in the ICD-11 is found in persistent (affective) mood disorders, (dysthymia, 6A70.0) (World Health Organization [WHO], 2019); however, both manuals maintain similar diagnostic criteria (Morocho, 2018). Jiménez-Maldonado et al. (2013) suggest that this affective disorder is one of the least studied; however, it has a high negative impact on people's quality of life.

The DSM-5 (APA, 2014) reports that the prevalence of persistent depressive disorder in 2013 in the United States was approximately 0.5%. On the other hand, a systematic review study analyzed 38 studies spanning 30 countries worldwide and found a prevalence of 1.6%. Likewise, this prevalence increased in young people, reaching a maximum of symptoms around the age of 50. The study also found that there is a higher prevalence of dysthymia in women than in men (Charlson et al., 2013). Regarding the countries of Latin America and the Caribbean, in 2017, a prevalence of 13.3 % of dysthymia was found in people over 15 years of age (Tapia, 2017). Of equal importance, in Peru, Melendres (2019) found a prevalence of 6.8 % of PDT in university applicants.

Faced with this situation, an early diagnosis is important and should not be taken lightly, since in many cases it triggers a highly chronic depression (Aparcana, 2017). People with PDD are more likely to commit suicide and be hospitalized than those with major depression (Klein et al., 2000). In addition, it leads to significant social and/or personal consequences, such as incapacity for work; therefore, they require greater clinical attention (Castro-Díaz et al., 2013; Klein et al., 2000). Regarding the workplace, a worker with this disorder may feel overworked and even discriminated against by their superiors, as well as being involved in continuous conflicts with their work collaborators (Halverson, 2015). Likewise, this disorder influences life satisfaction, as it is framed in the analysis of cognitions and feelings about lifestyle (Moreta-Herrera et al., 2018). When a person presents with PDD, sometimes alterations are seen in their life in the social and family environment due to hopeless feelings, which induce them to see situations as contrary to themselves or their plans (Ortiz, 2023). Likewise, PDD is related to anxiety, since it appears when the person is in a threatening situation, and depression appears in situations of helplessness and loss (Gutiérrez, 2020). Therefore, when the person encounters depressive symptoms, they may develop anxiety when faced with pressure in such situations. In addition, the presence of an anxiety disorder preceding or associated with depression increases its severity and the risk of relapse (García-Herrera & Nogueras, 2013).

On the other hand, persistent depressive disorder is the most prevalent in comorbidity with personality disorders such as borderline, avoidant, narcissistic, antisocial, dependent, and obsessive-compulsive disorder (Irastorza, 2012; The Government of Canada, 2006);

Several instruments measure PDD from various theoretical perspectives. Among the most used instruments, the Hospital Anxiety and Depression Scale (HADS) and the General Health Questionnaire (GHQ) have some limitations: (a) they do not exclusively measure dysthymia, and (b) their items measure less than 50% of the symptoms (Sanz et al., 2013). Similarly, the Dysthymia-D subscale, also

called depressive neurosis (Condorcallo & Alvarez, 2016) in the Million III Multiaxial Clinical Inventory, in no case exceed 50 % of the symptoms, and the Depression Scale of the 90-Symptom Questionnaire - Rating Scale (SCL-90-R), composed of 90 items, of which only 13 items measure depression; however, it did not exceed half of the symptoms of dysthymia according to the DSM IV (Sanz et al., 2013).

Also, the State/Trait Depression (IDER) scale, Spielberger et al. (2008), makes a difference between the frequency of onset of symptoms (trait) and the affectation that the person has according to said symptomatology (state) (Sotelo et al., 2012). However, Agudelo (2009) mentions that there is a high probability of confusion due to this distinction of measures between intensity and frequency, as well as symptoms characteristic of this clinical entity (dysthymia). In addition, his items fail to measure all indicators according to the diagnostic criteria of PDD according to the DSM-5.

Various studies have shown that university students are a particularly vulnerable population to the development of mood disorders, such as PDD (Moreta-Herrera et al., 2018). This group faces multiple stressors, such as academic pressure, uncertainty about the future of work, adaptation to new environments, and lack of family or social support, which can contribute to the deterioration of their mental health (Sotelo et al., 2012). In the Peruvian context, these factors are intensified by structural conditions such as social and economic inequality (Tapia, 2017), limiting access to mental health services and increasing the risk that these symptoms are not detected or treated in time (Melendres, 2019). Despite this, research on PDD in this population remains scarce, which highlights the need to have specific and culturally adapted instruments for its evaluation (Condorcallo & Álvarez, 2016). From the above, it can be seen that most of the current instruments do not adequately measure the PDD construct; therefore, the main objective of the study is to build a scale to measure the presence of PDD patterns in Peruvian university students. The specific objectives are: 1) to analyze the content validity of the items through expert judgment, 2) to evaluate the scale's internal structure through exploratory and confirmatory factor analysis, 3) to show the intergroup factor invariance according to sex, 4) to examine the criterion validity related to other variables, and 5) to estimate the scale's reliability through the alpha and omega coefficient.

Conceptual delimitation of the construct

PDD is a disabling and chronic type of depression, which refers to constant low-level depressive feelings. Among the characteristics of dysthymia, it is worth mentioning the prolonged lack of interest in anything, low self-esteem, and the tendency to self-criticism, as well as anhedonia, fatigue, irritability, and poor concentration (Argoff & McCleane, 2011; Jiménez-Maldonado et al., 2013).

On the other hand, CIE-11 (OMS, 2019) defines it as a chronic depression of the mood with duration of at least several years and not severe enough, or whose individual episodes are not prolonged enough to justify the diagnosis of moderate to severe depression or to diagnose a major depressive disorder. In the manual DSM-IV TR (1998), this disorder is known as dysthymic disorder, which DSM-5 (APA, 2014) later renamed to PDD. It is also classified into two subtypes: early onset, before age 21, and late onset after age 21.

Given the above, PDD is characterized by a depressed mood most of the day and almost every day. From this perspective, a one-dimensional model of the construct was proposed, considering the eight criteria for the diagnosis of PDD according to the manual DSM-5 (APA, 2014).

From a methodological point of view, the construction of a specific instrument to measure PDT is relevant since this clinical condition has been recognized for decades, although with different names such as "depressive neurosis" or "dysthymia" (González-Forteza et al., 2015). However, it is striking that, despite its formal inclusion in diagnostic manuals such as the DSM and the ICD, a widely validated scale that comprehensively measures its symptoms according to updated criteria has not been developed (Sanz et al., 2013). This gap can be explained by the tendency of existing instruments to focus on major depressive disorders or on general dimensions of depression and anxiety, which has led to an underrepresentation of PDD as a specific construct (Condorcallo & Álvarez, 2016). Having a psychometrically solid scale would improve the differential diagnosis, identify clinical cases early, and design more appropriate interventions in at-risk populations, such as university students (Sotelo et al., 2012). In addition, it would facilitate research on the prevalence and characteristics of PDD, overcoming the current clinical and academic invisibility of this entity (Agudelo, 2009).

Materials and Methods

Design

This study is of an instrumental type, focuses on the development of a psychological measurement instrument, and analyzes its psychometric properties (Ato et al., 2013).

Participants

A total of 868 university students participated in this study, divided into two samples. Exploratory factor analysis (EFA) was performed on the first sample (n = 302) and confirmatory factor analysis (CFA) on the second sample (n = 566). Both samples were obtained through non-probabilistic convenience sampling (Otzen & Manterola, 2017).

Table 1 details the sociodemographic characteristics of the samples. The age range of the participants ranges from 18 to 34 years in both samples; the average age in the confirmatory analysis sample was 22.34 (*SD* = 2.86). There is a higher percentage of participation by women who reside in the coastal and mountain regions.

Table 1

Sociodemographic characteristics of the participants

Sociodemographic variables	Exploratory Analysis (n = 302)		Confirmatory Analysis (n = 566)	
	n	%	*n*	%
Sex				
Female	194	64.5	287	50.7
Male	108	35.5	279	49.3
Residence				
Coast	82	27.1	270	47.7
Mountain	153	50.6	248	43.8
Jungle	67	22.1	48	8.5
Faculty				
Health Sciences	119	39.4	226	39.9
Engineering and Architecture	68	22.5	91	16.1
Business Sciences	--	--	130	23
Human Sciences and Education	53	17.5	80	14.1
Theology	--	--	39	6.9
Other	62	20.5	--	--
Are you in psychological treatment?				
Yes	84	27.8	26	4.6
No	218	72.1	540	95.4

Instruments

The *Persistent Depressive Disorder Scale* (PDD) has been developed by the authors of this study to identify the presence of PDD traits following the clinical diagnosis criteria of DSM-5 (APA, 2014) in university students over 18 years of age. The initial proposal of the scale was one-dimensional and consisted of 12 items (Appendix A). For the evaluation of criterion A, item number 1 was established: "In the last two years, I have felt melancholic and/or sad". For criterion B, items 2 "In recent weeks, my appetite has decreased or increased", 3 "In recent weeks, I have slept less than normal or usual", 4 "In recent weeks, I have slept more than normal", 5 "In recent weeks, I have felt tired for most of the day", 6 "In recent weeks, I have thought that I am worthless", 7 "In recent weeks, I have thought that I have more defects than qualities", 8 "In recent weeks, I have felt that I do not have many reasons to feel unique and valuable", 9 "In recent weeks, I have had difficulty maintaining my concentration", 10 "In recent weeks, I have had difficulty making decisions", 11 "In recent weeks, the future seems uncertain and uncertain to me" and 12 "In recent weeks, I have felt abandoned by the people around me." The responses of item 1 were structured using frequency-type ordinal scales: 0: *No day*; 1: *Some days (1 to 2 days)*; 2: *Several days (3 to 4 days)*; 3: *Most days (5 to 6 days)*; 4: *Every day*. Items 2 through 12 presented Likert-type responses: 0: *Never*, 1: *Almost never*, 2: *Sometimes*, 3: *Almost always*, and 4: *Always.*

General Anxiety Disorder-7 (GAD-7). The GAD-7 scale was developed by Spitzer et al. (2006) and adapted to Peru by Franco-Jimenez and Nuñez-Magallanes (2022). This instrument evaluates seven symptoms of anxiety that are defined in the DSM-IV, related to the continuity or level of discomfort present in the last two weeks. The items respond to a Likert-type rating scale from 0: N*ot at all* to 3: A*lmost every day*. Higher scores suggest high levels of anxious symptomatology. The Peruvian version of the GAD-7 presents adequate fit indices (χ^2 = 31.717, *df* = 14, CFI = .995, TLI = .992, RMSEA = .056, SRMR = .026) showing a univariate structure according to the original model, as well as high reliability using the McDonald's omega coefficient (ω = .89) (Franco-Jimenez & Nuñez-Magallanes, 2022).

Patient Health Questionnaire-9 (PHQ-9). The Patient Health Questionnaire, PHQ-9, was prepared by Spitzer et al. (1999). In Peru, Calderón et al. (2012) evaluated the content of the Spanish version of the instrument, elaborating the Peruvian version that was subsequently used in subsequent investigations for depression screening. This instrument makes diagnoses based on the criteria for depression and other disorders that commonly occur in primary care. The items are rated from 0 to 3, where 0 is *not at all* and 3 *almost every day*. A research conducted with university medical students in Lima found adequate indices of fit in the bifactorial model in the AFC (χ^2= 26.451, *df* = 17, *p* = .067; CFI = .991; GFI = .969; RMSEA = .056) compared to the one-dimensional and two-dimensional models, and an adequate internal consistency (α = .903) (Huarcaya-Victoria et al., 2020).

Satisfaction with Life Scale (SWLS) The scale was developed by Diener et al. (1985); being one of the most used instruments in the field of research (Pavot & Diener, 2008) since the SWLS focuses clearly on the evaluation of global life satisfaction and does not relate to other factors, such as positive affect or loneliness. It consists of five items that evaluate the person's overall feeling of satisfaction with their life (Diener et al., 1985). The items are answered with a Likert-type scale of five alternatives ranging from 1: *Strongly disagree* to 5: *Strongly agree*. The scale was adapted to the Peruvian context by Oliver et al. (2018). His results in a sample of Peruvian university students provided adequate fit indices (χ^2 = 19.464, *df* = 5, *p* = .001, CFI = .985, RMSEA = .075 [.042-.111]). Additionally, he presented adequate reliability (α = .78).

Procedure and ethical considerations

The data was collected in two phases. The first data collection for the AFE was in June 2021. The second collection for the AFC was carried out from October to November 2022. Data collection was through virtual forms (Google Forms). The form link was shared across various media outlets and social networks, including WhatsApp, Instagram, Facebook, and QR codes. The survey exposed the objective of the research. It required the informed consent of each participant, where it was noted that the information would be anonymous, confidential, and its use would be for research purposes only. It was also indicated that participation would be voluntary and could be abandoned at any time if they wished. If any of the participants wanted more information about the research, they could contact the researchers through an electronic address.

The ethical guidelines of the Declaration of Helsinki were considered (World Medical Association, 2013). This research obtained the approval of the Ethics Committee of the Faculty of Health Sciences of the Peruvian Union University with approval reference No.1926-2022/UPEU-FCS-CF.

Data analysis

The analysis was carried out in six phases. In the first phase, the content validation was carried out using expert criteria (five clinical psychologists with a minimum of five years of experience), who reviewed the clarity, relevance, and representativeness of each item. The V-Aiken coefficient > .70 was considered to guarantee the content validity of the items. In the second phase, the AFE was performed to check the theoretical and dimensional nature of the construct. For the fulfillment of the assumptions, the Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity were used. Next, the Parallel Analysis (PA) was used to determine the number of factors. For the AFE, the Residual Minimum Method was used because ordinal variables were treated, with Oblimin rotation. After all, related dimensions were proposed. In the third stage, the CFA was carried out to corroborate the internal structure of the scale. First, the assumption of multivariate normality was tested with the Mardia test, for which the Diagonal Weighted Least Squares (DWLS) estimator was used because it is a robust estimator that does not assume normality and is recommended for ordinal and categorical data (Brown, 2008). To evidence a

good fit of the model, the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI) indicators were analyzed, which must be > .90 as an acceptable fit and > .95 as an optimal fit. It was also used the Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR), which must be < .06 or .08 for an acceptable fit (Hu & Bentler, 1999; Mueller & Hancock, 2008; Schreiber et al., 2006). In the fourth stage, reliability was evaluated using McDonald's omega coefficient, whose appropriate value is ω > .80 (Raykov & Hancock, 2005) and Cronbach's Alpha coefficient α > .70 (Oviedo & Campos-Arias, 2005). In the fifth stage, convergent validity was analyzed by Structural Equation Modeling (SEM). To evaluate the proposed model, the Maximum Robust Likelihood (MLR) estimator was used because it is a robust estimator, recommended for analysis of covariance in latent variables (Brown, 2008). In addition, to evidence a good fit of the model, the CFI and TLI indicators were analyzed, which must be > .90 as an acceptable fit and > .95 as an optimal fit. It was also used the RMSEA and SRMR, which must be < .06 or .08 for an acceptable fit (Hu & Bentler, 1999; Mueller & Hancock, 2008; Schreiber et al., 2006). In the sixth stage, factorial invariance by sex was evaluated using a multigroup AFC, applying progressive hierarchical models: configural, metric, scalar, and strict. Acceptable invariance indicators were considered when the difference in CFI (ΔCFI) between successive models was less than .01, following the recommendations of Cheung and Rensvold (2002).

Statistical analyses were performed in the free-access R version 4.2.2 program (R Studio Team, 2021). The AFE and AFC were performed with the Lavaan package version 0.6-8 and the reliability with the SemTools package version 0.5-5.

Results

Content validity

The content validity of the instrument was assessed using Aiken's V test. Values close to 1 indicate perfect agreement between judges, but the minimum cut-off point required is .70 (Ventura-León, 2022). Table 2 shows that item 3 was observed by one or more judges for clarity. Following these observations, item 3 ("In recent weeks, it has been difficult for me to fall asleep") was modified to "In recent weeks, I have slept less than usual" The other items presented values greater than .70, indicating agreement among most of the judges regarding the relevance, coherence, clarity, and content of the items.

Table 2

Content validity of the PDD scale by inter-judge agreement V of Aiken

Item	Relevance	Coherence	Clarity	Content
Item 1	.89	.89	.78	1.00
Item 2	.89	1.00	1.00	.89
Item 3	1.00	1.00	.67	1.00
Item 4	.89	1.00	1.00	1.00
Item 5	1.00	1.00	1.00	1.00
Item 6	1.00	1.00	1.00	1.00
Item 7	1.00	1.00	1.00	1.00
Item 8	1.00	0.89	.89	.78
Item 9	1.00	1.00	.89	1.00
Item 10	1.00	1.00	1.00	1.00
Item 11	.89	1.00	.78	1.00
Item 12	1.00	1.00	1.00	1.00

Exploratory factor analysis

First, compliance with the Kaiser-Meyer-Olkin (KMO) sampling adequacy assumptions and Bartlett's test of sphericity was verified (Table 3). Secondly, the Parallel Analysis (AP) method shows that the 12 items proposed form a single factor (Figure 1), which coincides with the theoretical planning of the scale based on the one-dimensional model of the construct according to the DSM-5. Also, it is observed that all items enter the corresponding component with a high factorial weight (λ > .60). Likewise, the factor manages to explain the 63 % variability of the set of items.

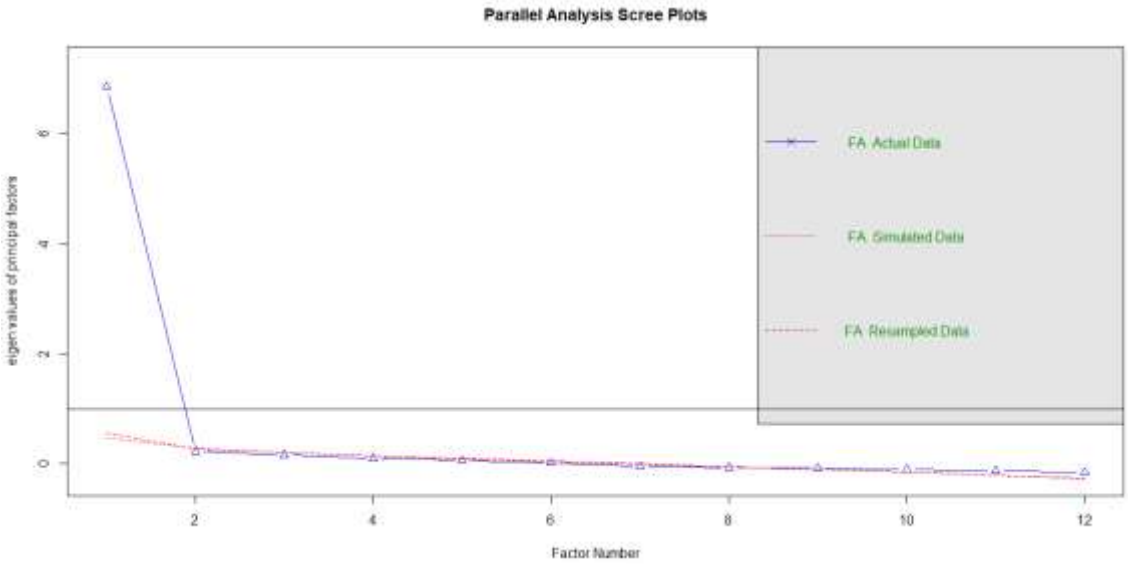
Table 3

Exploratory factor analysis of the PDD scale

Items	λ
T1	.71
T2	.70
T3	.65
T4	.67
T5	.77
T6	.82
T7	.88
T8	.85
T9	.84
T10	.80
T11	.84
T12	.87
% Total explained variance	63%
KMO test	0.96
Bartlett's test	χ^2 (11) = 2221.93 (66) p < .001

Figure 1

Parallel Analysis



Descriptive analysis of the items

A descriptive analysis of each of the items was performed to establish the distribution of the sample, evaluating the mean, standard deviation, skewness, and kurtosis. In Table 4, it is observed that item 5 has a higher mean score (M = 1.80; SD = .75), and item 6 has the lowest mean score (M = 1.46; SD = .84). Regarding skewness and kurtosis, the values remain within the recommended limits of +/- 1.5 (Forero et al., 2009). The results of the Mardia test indicate that the assumption of multivariate normality is not met (asymmetry = 5694.67, p < .001; kurtosis = 62.81, p < .001). These findings suggest that the data analyzed deviate from the expected multivariate normal distribution.

Table 4

Preliminary analysis of the items of the PDD scale

Items	*M*	*SD*	g1	g2
1	1.59	0.69	0.35	0.11
2	1.59	0.76	-0.06	0.30
3	1.67	0.75	-0.10	0.05
4	1.60	0.76	-0.08	0.28
5	1.80	0.75	-0.01	0.81
6	1.46	0.84	-0.07	-0.19
7	1.59	0.79	-0.25	0.17
8	1.54	0.84	-0.28	-0.12
9	1.70	0.72	-0.24	0.67
10	1.67	0.76	-0.26	0.43
11	1.70	0.80	-0.24	0.45
12	1.62	0.79	-0.28	0.20

Notes. M: Medium; *SD:* Standard Deviation; g1: Asymmetry; g2: Kurtosis.

Confirmatory factor analysis and reliability

Subsequently, the CFA was performed considering the single latent factor model evidenced in the EFA. Table 5 presents the goodness-of-fit indices that were adequate (χ^2 = 318.72, *df* = 54, $p < .001$; IFC = .98, TLI = .97, RMSEA [90 %CI] = .09[0.8 - .10], SRMR = .06). Although the RMSEA is slightly higher, it can be taken with caution in conjunction with the other indicators that are within the range. In addition, the saturations (λ) of all items are greater than .50 (Raykov & Hancock, 2005). Finally, the reliability of the scale was evaluated using Cronbach's Alpha and McDonald's Omega coefficient, showing adequate reliability indices (α = .88; ω = .88).

Table 5

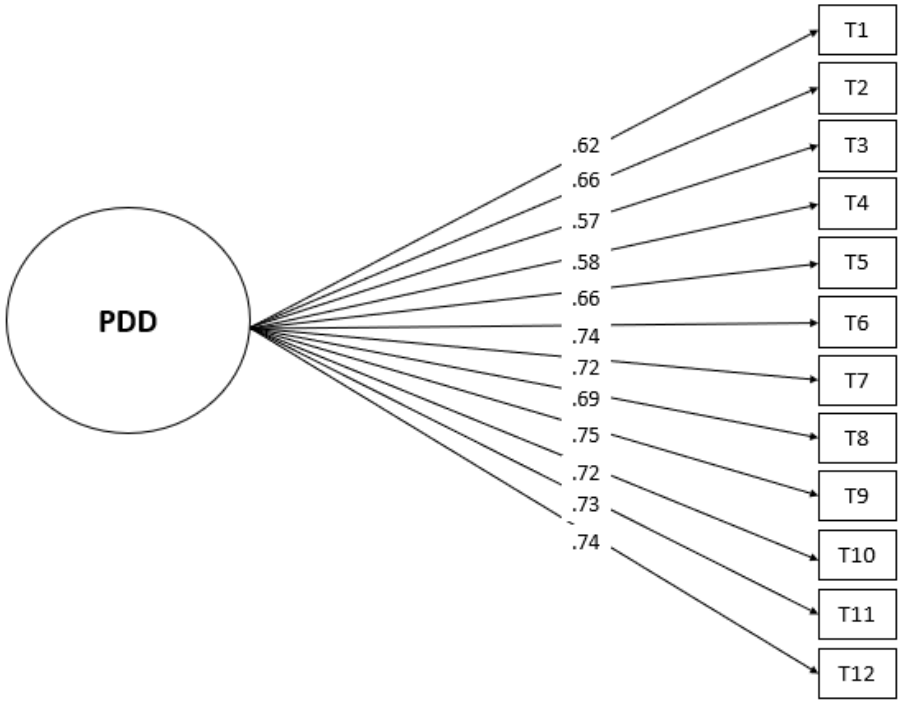
*Confirmatory factor analysis of the PDD scale (*N *= 566)*

Items	Factor 1 (λ)
T1	.62
T2	.66
T3	.57
T4	.58
T5	.66
T6	.74
T7	.72
T8	.69
T9	.75
T10	.72
T11	.73
T12	.74
α	.88
ω	.88
X^2	318.72
df	54
p-value	.000
CFI	.98
TLI	.97
SRMR	.06
RMSEA [90 % CI]	.09 [.08 – .10]

Notes. χ^2*:* chi square; *df:* degrees of freedom; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; SRMR: Standardized Root Mean Square Residual; RMSEA: Root Mean Square Error of Approximation; CI: Confidence Intervals.

Figure 2

Internal structure of the PDD scale



Convergent validity

Convergent validation was carried out through Structural Equation Modeling (SEM), which allows modeling and estimating all the relationships between the variables at the same time. The Persistent Depressive Disorder Scale was found to covariate significantly and in the expected direction with related constructs such as depression (PHQ-9), anxiety (GAD-7), and satisfaction with life (SWLS). In Table 6, SEM analysis shows adequate fit indices (RMSEA = .043; SRMR = .050; CFI = .91; TLI = .91).

Table 6

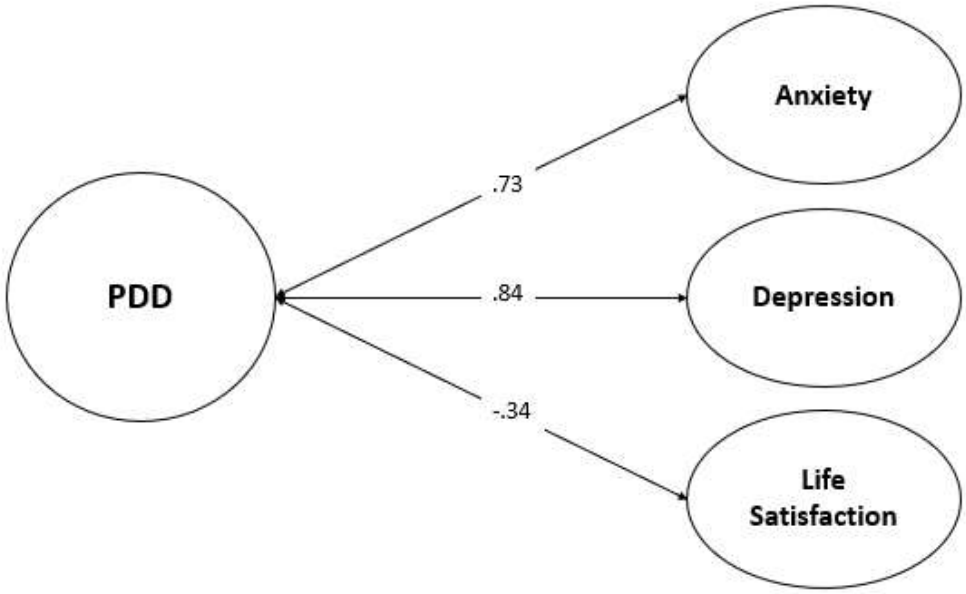
SEM analysis with variables of anxiety, depression, and life satisfaction

Fit Index	X^2 (*df*)	*p*	X^2/df	CFI	TLI	SRMR	RMSEA [90 % CI]
Value	1005.75 (489)	.000	2.05	.91	.91	.050	.043 [.040; .047]

Notes. χ^2*:* chi square; *df:* degrees of freedom; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; SRMR: Standardized Root Mean Square Residual; RMSEA: Root Mean Square Error of Approximation; CI: Confidence Intervals.

Figure 3

Modeling of Structural Equations of the PDD with other variables



Factorial invariance according to sex

Table 7 shows the evaluation of factorial invariance by sex through a hierarchical sequence of models with progressive restrictions. As constraints are introduced (equal loads, intercepts, and error variances), the fit indices remain within acceptable ranges. CFI differences between consecutive models (ΔCFI) are minimal, all below the .01 threshold recommended by Cheung and Rensvold (2002), indicating that the imposition of constraints does not significantly deteriorate the model. This suggests that the items of the PDD scale work equivalently in men and women in terms of factorial structure, strength of relationship with the construct, and levels of error, allowing valid comparisons between groups. Although the CFI change between the metric and scalar models is close to the decision limit, its magnitude (−.003) is still acceptable. Taken together, the results support configural, metric, and strict invariance and provide partial evidence in favor of scalar invariance.

Table 7

Factorial invariance according to sex

Model	χ^2	*df*	CFI	TLI	RMSEA	SRMR	$\Delta\chi^2$	Δdf	*p*	ΔCFI
Configural	415.91	108	.880	.854	.100	.058	—	—	—	—
Metric	428.97	119	.879	.866	.096	.066	13.06	11	.289	-.001
Scale	448.26	130	.876	.874	.093	.067	19.29	11	.056	-.003
Strict	464.76	142	.874	.883	.090	.067	16.50	12	.169	-.002

Note. CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; RMSEA: Root mean square error of approximation; SRMR: Root mean square residual standardized. $\Delta\chi^2$ and *p* indicate the comparison with the previous less restricted model.

Discussion

PDD is an uncommon, chronic mood disorder, yet more disabling than episodic major depression. It occurs more frequently in the adult population between the ages of 18 and 44 (Gómez-

Restrepo, 2015). Patients with PDD describe their state of mind as sad or "feeling really down". (APA, 2014) Likewise, PDD can be difficult to detect in psychiatric contexts and primary care until it increases in the form of an overlapping major depressive episode (Schramm et al., 2020). The purpose of this study was to build and evaluate the psychometric properties of a scale to measure the presence of PDD patterns in Peruvian university students aged 18 to 34 years.

The construction of the PDD scale was based on the diagnostic criteria of the DSM-5 (APA, 2014) and was reviewed by clinical experts in mental health. The expert judgment allowed the items to be refined, especially in clarity and coherence, and provided initial evidence of content validity (Ventura-León, 2022). However, this type of evidence is limited to consistency with theoretical frameworks and cannot replace empirical analyses on the discriminant validity of the instrument (Rios & Wells, 2014).

Exploratory and confirmatory factor analysis showed a one-dimensional structure with adequate factor loadings (Raykov & Hancock, 2005). Theoretically, this one-dimensionality suggests that the measured construct corresponds to a global manifestation of persistent affective discomfort (Watson et al., 1988). However, PDD is a multidimensional condition, characterized by a variety of symptoms (sleep disorders, appetite, self-esteem, hopelessness) that could be structured in specific domains (González-Forteza et al., 2015). Therefore, the choice of a univariate structure implies a useful conceptual simplification for screening purposes, although it does not necessarily reflect the clinical heterogeneity of the disorder (Sanz et al., 2013).

About reliability, the coefficients obtained ($\alpha = .88$; $\omega = .88$) indicate a high internal consistency of the Persistent Depressive Disorder Scale. These values exceed the suggested minimum cut-off points for newly constructed instruments ($\alpha > .70$; $\omega > .80$) (Hayes & Coutts, 2020), supporting their use in research and initial screening contexts. A high internal consistency suggests that the items share a common semantic core and measure the same underlying dimension: the persistent affective discomfort typical of PDD. This strengthens the structural validity of the construct and allows its operationalization as a coherent unit of analysis (Raykov & Hancock, 2005). Considering that PDD is a historically underestimated disorder with limited clinical visibility, having a reliable measure represents an advance towards its empirical delimitation and its systematic study in non-clinical populations such as university students, a group in which studies are scarce at the international level (Auerbach et al., 2018; Ge et al., 2024). This finding invites us to rethink the approach to mental health in the university, overcoming generic models of depression to incorporate chronic dimensions such as PDD, whose timely detection can have decisive implications in the prevention of functional deterioration and suicide risk.

Regarding convergent validity, the SEM model showed expected relationships between the PDD scale and measures of anxiety, depression, and life satisfaction (Diener et al., 1985; Spitzer et al., 1999; Spitzer et al., 2006). These associations support the theoretical connection between PDD and other indicators of psychological well-being (Goodheart et al., 2006). However, they do not allow us to conclude on the diagnostic specificity of the instrument, since the symptoms evaluated may coincide with episodes of major depression or other affective disorders (Irastorza, 2012). It is particularly relevant that only one of the items explicitly includes the evaluation of the temporality of the depressive symptom, representing a substantive limitation if it is considered that this is the most crucial differential criterion of PDD (APA, 2014).

The analysis of factorial invariance showed that the scale works in a structurally equivalent way between men and women, which allows comparisons between groups to be made with confidence (Cheung & Rensvold, 2002). However, this finding is based on a non-clinical and homogeneous sample, composed exclusively of young Peruvian university students, which restricts the generalization of the results (Otzen & Manterola, 2017). In addition, the absence of data from clinical populations limits the possibility of recommending its use as a diagnostic tool or for individualized clinical decisions (Sotelo et al., 2012).

Although the findings of the present study provide relevant preliminary evidence on the validity and reliability of the Persistent Depressive Disorder Scale, they must be interpreted in light of certain methodological limitations. First, data were collected through non-probabilistic convenience sampling, which limits the generalization of the results to the national university population or other socio-cultural contexts (Otzen & Manterola, 2017). Likewise, the sample was composed exclusively of young university students, restricting the age range and leaving out potentially relevant populations, such as older adults or adolescents, in whom PDD can also present with different characteristics (Charlson et

al., 2013). Secondly, although the scale was designed based on diagnostic criteria of the DSM-5 and reviewed by expert judges, its diagnostic validity has not yet been established. In other words, its ability to differentiate PDD from other mood disorders, especially major depressive disorder, with which it shares significant symptoms, has not been determined empirically (Irastorza, 2012). The absence of clinical procedures such as structured interviews or control groups limits the interpretation of the scale as a screening tool or diagnostic support. Third, although evidence of convergent validity was obtained by SEM analysis, indicators of discriminant validity or diagnostic sensitivity/specificity were not evaluated, which are fundamental to assess the clinical use of any psychometric instrument (Goodheart et al., 2006; Rios & Wells, 2014).

The results obtained in the present study have relevant implications for both psychological practice and university mental health research. First, the Persistent Depressive Disorder Scale represents an initial instrument that allows a brief and structured evaluation of persistent depressive symptomatology in non-clinical contexts, particularly in university students, a population recognized for its vulnerability to affective disorders (Arrieta et al., 2014; Moreta-Herrera et al., 2018). Its univariate structure and adequate internal consistency make it useful as a preliminary screening tool to identify people who may be experiencing chronic emotional distress. Second, the evidence of factorial invariance by sex suggests that the instrument operates in an equivalent way in men and women, which allows valid comparisons between groups without measurement biases (Cheung & Rensvold, 2002). This contributes to the development of fairer and more sensitive psychometric evaluations for the analysis of gender differences in mental health. From the research field, the scale can be used as a self-report measure in epidemiological studies, mental health promotion programs, or psychological interventions aimed at addressing long-term depressive symptoms. It also paves the way for future research on comorbidities, protective factors, and longitudinal trajectories of PDD in young people, which would enrich the theoretical and clinical understanding of the construct.

In summary, the present study provides preliminary evidence on the psychometric properties of a scale designed to evaluate PDD in Peruvian university students. The scale showed a one-dimensional structure, adequate levels of internal consistency, and convergent relationships with theoretically associated variables such as anxiety, depression, and life satisfaction. In addition, the factorial invariance by sex was confirmed, which allows valid comparisons between men and women. However, due to the non-clinical nature of the sample and the absence of discriminant validity analysis, caution is recommended in interpreting the results. The scale can be useful as a screening tool in educational contexts, but it does not replace a specialized diagnostic evaluation. It is suggested to expand its validation in clinical samples and explore its applicability in longitudinal studies that evaluate the stability of the construct over time.

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G. E. P. has contributed in 1, 5, 7, 8, 13; M. E. C. in 1, 5, 7, 8, 13; I. A. C. R. in 1, 2, 6, 9, 10, 13; C. E. A. R. in 1, 3, 6, 9, 10, 14.

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Appendix A

Table A1

DEPRESSION SCALE OF PERSISTENT DEPRESSIVE DISORDER **Date:……. Age:…….. Sex:……** **Various hypothetical situations about mood are presented below. Check the answer that best describes you. Remember that there are no good or bad answers, and that it is not necessary to spend much time on each sentence.**						
		No day	**Some days (1 to 2 days)**	**Several days (3 to 4 days)**	**Most days (5 to 6 days)**	**Every day**
1	In the last two years, I have felt melancholic and/or sad.					
		Never	**Almost ever**	**Sometimes**	**Almost always**	**Always**
2	In recent weeks, my appetite has fluctuated.					
3	In recent weeks, I have found it difficult to fall asleep.					
4	In recent weeks, I have slept more than usual.					
5	In recent weeks, I have felt tired for most of the day.					
6	In recent weeks, I have thought that I am worthless.					
7	In recent weeks, I have had more defects than qualities.					
8	In recent weeks, I have not had many reasons to feel unique and valuable.					
9	In recent weeks, I have had difficulty maintaining my concentration.					
10	In recent weeks, I have had difficulty making decisions.					
11	In recent weeks, the future seems uncertain.					
12	In recent weeks, I felt abandoned by the people around me.					