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Analysis of the psychometric properties of the Death Anxiety Scale (Spanish-Colombian version) for general population

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Abstract | **Introduction:** Death anxiety is a commonly experienced emotional response that emerges from the perception of danger inherent in existence, an area that has received limited research attention in Colombia. **Method:** The aim of this study was to analyse the psychometric properties of the DAS within the Colombian general population. The cross-cultural adaptation of the scale was conducted. Validity and reliability calculations, as well as Rasch Analysis was carried out. The EFA revealed a three-factor structure, validated by Confirmatory Analysis, demonstrating an appropriate model fit. **Results:** The results indicate that the Colombian-Spanish version of the DAS is a valuable tool (with KR-20 0.66, Cronbach Alpha: 0.66; McDonald's Omega: 0.7; Guttman's Lambda: 0.68; and GLB: 0.77) for assessing levels of death anxiety in the Colombian non-clinical population. **Conclusion:** The Colombian background of DA is shaped by a history of armed conflict and violence marked by systematic breaches of human rights. DA worsens when individuals believe that their personal safety is in risk, which happens frequently in this country. Therefore, validating a scale that allows for the assessment of DA in both clinical and non-clinical groups is pertinent and coherent.

Keywords: Death anxiety, general population, non-clinical population, psychometric properties

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Análisis de las propiedades psicométricas de la Escala de Ansiedad ante la Muerte (versión español-Colombia) para población general

Resumen | **Introducción:** La ansiedad ante la muerte es una experiencia emocional común dada por la percepción de peligro, acerca la existencia misma, que ha sido poco estudiada en Colombia. **Método:** El objetivo de este estudio fue analizar las propiedades psicométricas de la Death Anxiety Scale en población general colombiana. Se llevó a cabo la adaptación transcultural de la escala. Se realizaron estimaciones de validez, confiabilidad y análisis de Rasch. El Análisis Factorial Exploratorio determinó una estructura de tres factores soportados por el análisis factorial confirmatorio con un ajuste aceptable del modelo. **Resultados:** Señalan que la versión español-Colombia de la DAS es útil (KR-20: 0.66; Alfa de Cronbach: 0.66; Omega de McDonald: 0.7; Lambda de Guttman: 0.68; y GLB: 0.77) para evaluar el nivel de ansiedad ante la muerte en población colombiana no clínica. **Conclusión:** La ansiedad ante la muerte en Colombia está configurada por una historia de

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conflicto armado y violencia, marcada por violaciones sistemáticas de los derechos humanos. La ansiedad ante la muerte empeora cuando los individuos creen que su seguridad personal está en riesgo, lo cual sucede de manera frecuente. Por tanto, validar una escala que permita evaluar la ansiedad ante la muerte en población clínica y no clínica es pertinente y coherente.

Palabras clave: Ansiedad ante la muerte, población general, población no clínica, propiedades psicométricas

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Death anxiety (DA) is a common human experience (Sharif Nia et al., 2019), defined as "a negative and apprehensive feeling that one has when thinking about death and dying" (Anitha & Chaitanya, 2014, p. 632).

Söğütlü and Göktaş (2021) affirm that DA emerges from birth and persists throughout the human lifespan. However, the understanding of death as universal, inevitable, and irreversible typically begins at around the age of 11 when abstract reasoning, imagination, and hypothesis testing develops (Kreitler et al., 2012; Papalia & Martorell, 2017). Concerns about death and its future implications often arise during adolescence (López et al., 2004). And DA initiates in young adulthood, intensifies during middle adulthood, and persists into late adulthood (Greene, 2023).

DA has been studied in non-clinical populations in relation to personality, quality of life and life satisfaction (Özdemir et al., 2019), self-esteem (Akanni & Koleoso, 2022; Özdemir et al., 2019), suicidal behaviour, attachment, loneliness (Aisenberg-Shafran et al., 2022; Harvell-Bowman et al., 2022), religion (Akanni & Koleoso, 2022; Krause et al., 2018; Kumari & Vijayan, 2023; Lamba et al., 2021), sleeping quality (Kumari & Vijayan, 2023), exposure to death in funerary contexts, age, and gender (Harrawood et al., 2009).

One of the initial instruments designed to assess DA in the general population was created by Templer (1970), the Death Anxiety Scale (DAS). It comprises 15 dichotomous items (true-false), providing a scoring range between 0 and 15, with higher scores indicating greater DA (Moral de la Rubia & Miaja, 2014). In an early factor analysis, Warren and Chopra (1979) identified a three-factor structure: (1) pure DA, (2) general concern, and (3) pain and operations. The DAS has been translated into various languages (Donovan, 1993; Hoogstraten et al., 1998; Saggino & Kline, 1996; Sharif Nia et al., 2014; Tomás-Sábado & Gómez-Benito, 2002) and administered in diverse populations across different age groups (Abdel-Khalek et al., 1993; Abdel-Khalek, 1986, 1991; Abdel-Khalek & El Nayal, 2018; Abdel-Khalek & Omar, 1988; Lester & Castromayor, 1993; Lonetto et al., 1980; McLennan et al., 1993; Sanders et al., 1980; Schell & Zinger, 1984; Schumaker et al., 1988, 1991; Tang et al., 2002; Tomás-Sábado & Gómez-Benito, 2004; Wu et al., 2002), indicating that DA is a cross-cultural phenomenon (Sharif Nia et al., 2019).

In Latin America, there are three Spanish translations of the DAS: two in Mexico (Moral de la Rubia & Miaja, 2014; Rivera-Ledesma & Montero-López, 2010) and one in Argentina (Resett et al., 2021). Despite the existence of cross-cultural adaptations of the DAS, research on this phenomenon in Latin America remains scarce (Resett et al., 2021; Rivera-Ledesma & Montero-López, 2010). These psychometric studies and others have measured DA in the Latin American population (e.g., in health professionals; Abeldaño Zuñiga et al., 2021).

To our knowledge, in Colombia, there is an empirical absence of measurements for DA in the general population. Conditions prevalent in Colombia, such as exposure to war (Russell & Russell, 2021; Sharif Nia et al., 2014, 2015), domestic violence (Pan American Health Organisation, s.f.; World Health Organisation, 2023), and mental disorders (Letzner, 2023; Menzies & Menzies, 2018), along with the mental health repercussions resulting from the COVID-19 pandemic (Asghari Ebrahim Abad et al., 2021; Hajek et al., 2022; Söğütlü & Göktaş, 2021), are all associated with DA and contribute to its cultural shaping.

Colombia's Centro Nacional de Memoria Histórica (2013) states that the Colombian armed conflict has been one of the bloodiest in the contemporary history of Latin America, characterised by outbreaks of warfare, the presence of paramilitary groups in conflict with the state, drug trafficking, among others. In July 2023, the Unique Record of Victims reported 9 555 446 victims of the armed conflict (Unidad para las Víctimas, 2023). Moreover, in same year, according to the Forensic Sciences and Legal Medicine National Institute, there was an increase in homicides and domestic violence (4.46% and 5.41% respectively) compared to 2022 (Grupo Centro de Referencia Nacional sobre Violencia-GCERN, 2023).

Accordingly, violence and armed conflict shape the perception of death, particularly within the Colombian context. As noted by Sharif Nia et al. (2015) Iranian veterans exposed to war exhibit apprehension regarding aspects of dying, such as the manner of death (e.g., bomb blasts), beliefs about the afterlife, physical decay, and burial. Although DA is present in every human being, it intensifies in situations where individuals feel that their own lives are at risk (Russell & Russell, 2021; Sharif Nia et al., 2015). This highlights the importance of studying this topic, not only for basic research but also for the development of prevention/intervention strategies in mental health (Resett et al., 2021). Therefore, having a validated and tailored instrument is fundamental. The aim of this study was to analyse the psychometric properties of the DAS in a non-clinical population in Colombia. We sought to do the transcultural adaptation of the DAS to obtain a Colombian Spanish version and determine its reliability and validity under the hypothesis that the DAS will show adequate psychometric properties for its use in a non-clinical Colombian population.

Method

A cross-sectional study was conducted to analyse the psychometric properties of the DAS developed by Templer in a Colombian non-clinical population.

Participants

Four hundred adult individuals were conveniently selected from Bogotá (the capital of Colombia) and invited to participate in the study, using a non-probabilistic, consecutive, convenience sampling. The sample only included Colombian people, of legal age who declare not having chronical illnesses and gave their consent. People who did not have the time required to respond to the instruments were excluded.

To calculate the sample size different components of the analysis were considered. For factorial analyses a sample of 309 observations was taken having in consideration 20:1 subjects-to-variables ratio recommendations (MacCallum et al., 2001), and the necessity of at least 300 cases when factor numbers are low (Tabachnick & Fidell, 2019). The same sample was taken (309) for Rash analyses given that samples from 250 to 500 can show adequate balance for interpretations of model fit statistics (Hagell & Westergren, 2016). For the other analyses non-probabilistic subsamples were taken, sequentially of the sample of 309 participants.

Regarding test-retest reliability a sample of 135 observations was calculated expecting Lin's concordance correlation coefficient (CCC) of 0.85 for the Ho and 0.9 for the Ha. Concurrent criterion validity was calculated using a sample of at least 156 subjects to spot correlation coefficient differences between Ho of 0.5 and alternative one of 0.65, considering an 80% of power and 5% significance level. For internal consistency analyses Cronbach's alpha coefficients was used, 0.8 values for Ho and 0.85 Ha were accounted applying a 15 items test with which the minimum sample size was 199 subjects. Convergent validity was assessed through an expected difference in means between the three groups of the BAI scale (4, 6, and 8) and a mean standard deviation of 1.6, estimating a size sample of 21 participants per severity group of the scale (total of 63).

Size sample calculations were performed using PASS 12®. Out of these, 309 Colombian adults willingly chose to participate and completed the entire test.

Instruments

Death Anxiety Scale (DAS). The self-reported test comprises 15 items (e.g., "I am very much afraid to die", "I often think about how short life really is", "I fear dying and a painful death"), using a true-false response format (9 true and 6 false), with higher scores indicating greater DA (Templer, 1970). It has a Test-Retest reliability of 0.83, a Kuder-Richardson reliability 20 of 0.76, and has construct validity (Templer, 1970). It is worth mentioning, the cross-cultural Spanish-Colombian version of the instrument was administered for the study. For further details, refer to Palacios-Espinosa et al. (2025).

Cross-cultural adaptation

The translation/back-translation process involved four bilingual experts to ensure linguistic, conceptual, and cultural equivalence of the instrument, first translated into Colombian Spanish and then into English. An expert committee assessed the content equivalence including meaning, expression, and grammar. Subsequently, an expert group determined the final version utilised in the pilot test. For more details, refer to Palacios-Espinosa et al. (2025).

Pilot test

Fifty individuals over 18 years old, predominantly women (57.89%), participated in the pilot test (mean age: 39.12 years). Most participants (84%) live in middle (64%) and low (20%) socioeconomic strata, primarily in urban areas (92%), residing with their nuclear family (58%) or their partner (20%). Over half of the participants reported being single (54%) or married/cohabiting (36%), with one or two children (48%) or none (42%). The majority (80%) are actively employed. In terms of religious affiliation, Catholicism is predominant, with a few individuals identifying themselves as agnostic or atheist (24%). Following the pilot test results, adjustments were made to four items.

Death Anxiety Inventory (DAI). DAI is a 20 item self-reported instrument (e.g., "I frequently think of my own death", "The idea of death troubles me", "I am worried about what is after death"), employing a 6-point Likert format (Tomás-Sábado & Gómez-Benito, 2005). It evaluates five factors: (1) externally generated anxiety, (2) meaning and acceptance of death, (3) thoughts about death, (4) life after death, (5) brevity of life. And, it has internal consistency (0.90), Test-Retest reliability (0.94), and exhibits a positive correlation with the DAS (0.79; Tomás-Sábado & Gómez-Benito, 2005).

Beck Anxiety Inventory (BAI). BAI is a 21 item self-reported measure (e.g., "Nervous", "Fear of dying", "Fear of losing control") using a 4-point Likert format (0 = not at all; 3 = severely - it bothered me a lot), yielding a score range between 0 - 63. The questionnaire measures general clinical anxiety and demonstrates good internal consistency (α = 0.9; Beck & Steer, 2011).

Procedure

An independent Research Ethics Committee (code: DVO005-1-181-CEI903) from the Universidad del Rosario evaluated and approved the study protocol. The first phase involved cross-cultural adaptation of the DAS, following translation/back-translation protocols. In the second phase, the scale was applied in various settings within the capital to ensure the best representation of the Colombian population. Participants were approached by research assistants in public places (e.g., transport stations, malls, parks, and others), who informed them about the aims of the study and invited them to participate. Those who accepted the invitation to participate consented verbally after having been provided with the necessary information about the

study and any question thereof. Once informed consent was given, the scale was administered.

Statistical analysis

For the descriptive analysis of continuous variables, means and standard deviations (SD) were used to summarise symmetrical variables, and medians and interquartile ranges (IQR) in other cases. An exploratory factor analysis (EFA) was conducted to establish the DAS' factorial structure and explore the item distribution among the factors using a Tetrachoric Correlation Matrix. Barlett and Kaiser–Meyer–Olkin tests were conducted to confirm the factorisability of the Correlation Matrix. The optimum coordinate method was employed to ascertain the number of factors for assessment. Due to the dichotomous nature of the items, exploratory factor analysis was performed using the Robust Weighted Least Squares Method on the 309-sample size. The most interpretable factorial structure was determined using both Orthogonal and Oblique Rotations. For confirmatory factor analysis (CFA), goodness-of-fit and error estimators were calculated, taking the following as indicators of adequate fit: ratio χ^2/degrees of freedom (*df*) < 3, incremental fit index (IFI) > 0.9, Tucker-Lewis index (TLI) > 0.9, comparative fit index (CFI) > 0.9, and standardised root mean squared residual (SRMR) < 0.08, and root mean square error of approximation (RMSEA) < 0.08.

Kuder-Richardson coefficient, Cronbach's Alpha, McDonald's Omega, Guttman's Lambda, and GLB were calculated to establish the scale's reliability (see Appendice 1). Concurrent Criterion Validity was established using Pearson's Correlation Coefficient between the DAS and the DAI. Convergent validity was assessed by simultaneously applying the DAS and BAI scales. If both instruments measure anxiety levels, an indicator of validity is expected to be that patients with higher strata on the BAI scale have higher means or medians on the DAS scale; this was statistically assessed using Kruskal-Wallis tests and Dunn's post hoc tests.

Test-Retest Reliability was evaluated with Signed Rank-Sum Tests. Lin's Concordance Correlation Coefficients were estimated, along with Bland–Altman limits of agreement plots. Hypothesis tests considered a significance level of 5% and utilised the 2-tailed hypothesis (refer to Appendice 2). All statistical analyses were performed using R statistical software.

In the Rasch Analysis, a dichotomous model using Winsteps (version 5.2.2) was employed. Unidimensionality was determined using a Principal Component Analysis of Residuals (PCAR), considering mean squared infit and outfit values, as well as the explained variance by measurements. Local Independence was assessed through correlations of standardised residuals. Descriptions were made on the Logit Metric Scale (log odds) based on person and item measures. Infit and Outfit Mean-Square Values (MNSQ) criteria were used for person and item adjustment. The targeting and ranking of items were evaluated using the Wright map. Additionally, reliability and separation indices for both person and item were calculated to assess reliability.

Results

Sample's characteristics

309 adults participated (median age = 34.5 years; IQR = 24.5) and completed the entire test. The majority identified as female (53.75%) and resided in urban areas (96%). They belonged to various socioeconomic strata (low: 33.1%; middle: 48.5%; high: 18.36%), were either single (47.37%) or married/cohabiting (45.72%), with approximately half having no children (48.48%) and the remainder having one or two children (39.73%). Most lived with their nuclear family (72.4%) and had professional (34.67%), secondary school (26.67%), or postgraduate degrees (19.67%). A majority were employed (57.57%), while a small percentage were retired (4.93%); of those employed, a significant number were actively working (36.51%). The individuals identified themselves as Christians (96.77%), primarily Catholics (88.48%), and were actively practicing their religion (80.10%).

Content validity

The EFA, using oblique rotation (Promax) showed a three-factor structure that accounted for 38% of the variance (Factor 1: 17%, Factor 2: 12%, Factor 3: 9%) (refer to Table 1). Factor 1 (TMM) is associated with emotional aspects related to the fear of death (items 1, 5, 6, 7, 15). Factor 2 (VDM) is linked to concerns about life before death (items 4, 8, 9, 12, 13). Factor 3 (NGM) is associated with denial aspects concerning death (items 2, 3, 10, 11, 14).

Table 1. DAS Factor Structure (Spanish-Colombian Version)

Items	F1	F2	F3	u2
1. Tengo mucho miedo de morir	0.64	0.11	0.10	0.45
2. La idea de la muerte casi nunca entra en mi mente	0.13	-0.09	0.30	0.88
3. No me pone nervioso que la gente hable sobre la muerte	0.21	0.02	0.36	0.75
4. Me aterra pensar que me tengan que operar	0.21	0.37	0.11	0.70
5. No tengo ningún temor de morir	0.73	-0.03	0.14	0.37
6. No le tengo especial miedo a tener cáncer	0.76	0.35	-0.60	0.29
7. No me molesta la idea de la muerte.	0.79	-0.16	0.11	0.37
8. Con frecuencia me siento preocupado(a) por lo rápido que pasa el tiempo	-0.16	0.69	0.07	0.54
9. Me da miedo morir dolorosamente	0.06	0.39	-0.03	0.84
10. Me perturba mucho el tema de la vida después de la muerte	0.17	0.17	0.51	0.53
11. Tengo mucho miedo de tener un infarto	0.10	0.28	0.29	0.72

(*Continued*)

Items	F1	F2	F3	u2
12. Con frecuencia pienso en lo corta que es la vida	-0.13	0.76	-0.10	0.51
13. Me estremezco cuando escucho hablar de una 3a guerra mundial.	-0.06	0.26	0.15	0.90
14. Ver un cadáver es espantoso para mí	-0.13	0.08	0.63	0.62
15. Siento que no tengo nada que temer con respecto al futuro	0.35	-0.13	0.06	0.88

Note. The factorial structure found corresponds to a principal factor solution with Promax Rotation.

The Robust Weighted Least Squares Estimation Method (see Figure 1) was employed for Confirmatory Factor Analysis, indicating an appropriate fit of the model (χ^2 = 122.45; *df* = 87; IFI = 0.958; TLI = 0.948; CFI = 0.957; RMSEA = 0.036; and SRMR = 0.092).

Additionally, the original theorical fit model proposed by Warren and Chopra (1979) was assessed, finding the following fit and error estimators χ^2 = 155.629; *df* = 87; IFI = 0.918; TLI = 0.899; CFI = 0.916; RMSEA = 0.051; and SRMR = 0.102 (Figure 2).

It can be observed that both fit as well as error estimators show a better performance of the empirical model than the theorical one.

Internal consistency

The analysis was based on 308 observations. Reliability estimators revealed KR-20 (0.66), α = (0.66), McDonald's Omega (0.7), Guttman's Lambda (0.68), and GLB (0.77). None of the coefficient values increased upon removing any of the scale's items (Appendice 2).

Concurrent criterion validity

241 participants were assessed to determine Pearson's Correlation Coefficient between the total scores of both scales (0.6071, significantly different from 0), as well as between the DAS domains and the total DAI score (all coefficients were positive, exceeding 0.4; appendice 3).

Convergent validity

The medians in each of the BAI scale strata were as follows: Low anxiety: *n* = 2; median DAS = 4, (RIC = 4); moderate anxiety: *n* = 54; median DAS = 7, (RIC = 4.5); severe anxiety: *n* = 12, median DAS = 7 (RIC = 4.5). The Kruskal-Wallis test showed no statistically significant differences between the location measures of the three groups. ($\chi^2_{(2)}$ = 3.01, *p* = 0.22).

Test-retest reliability

The analysis included 81 repeated measurements taken at intervals ranging from 5 to 8 days (mean of 5 days, IQR = 1 day). Paired t-tests and two-tailed hypothesis

Figure 1. DAS Structural Equation System (circles: domains; rectangles: items; arrows in single direction: causal relations; 2-way arrows: correlation between factors)

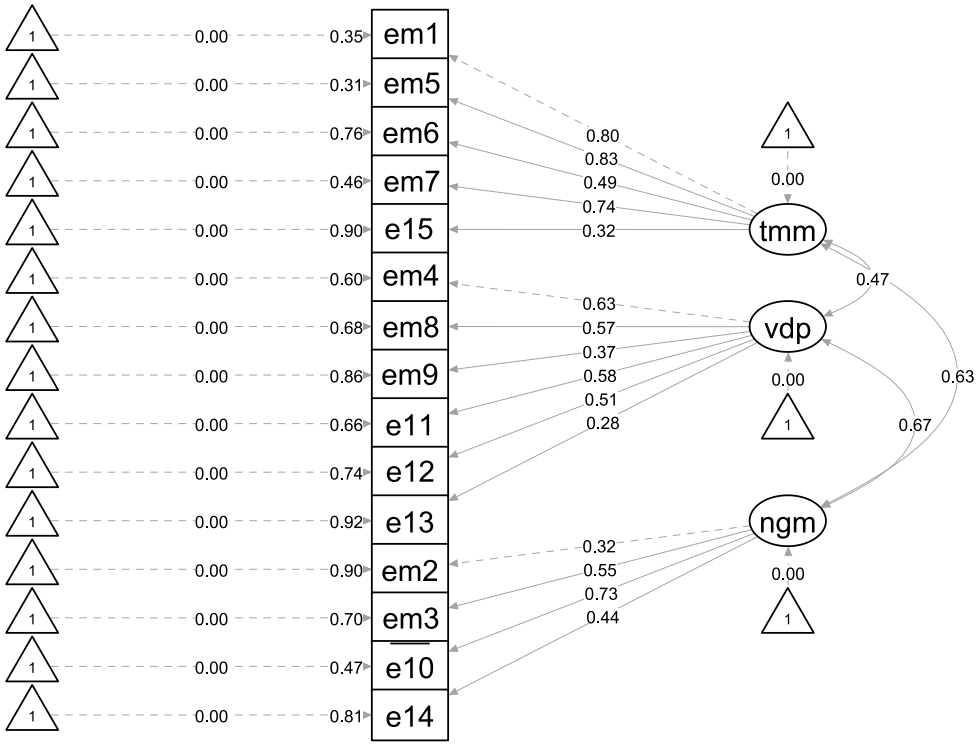
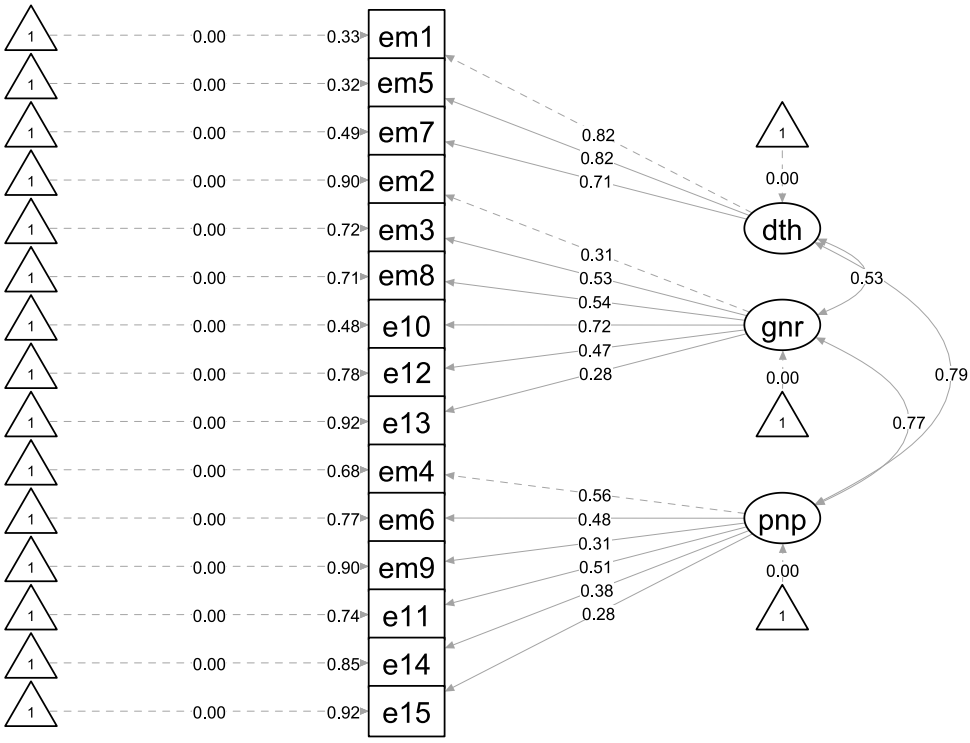


Figure 2. DAS Structural Equation System. Empirical model



tests were utilised to compare measurements between the two moments. Total scores and those of each domain exhibited stability (Appendice 4), showing no statistically significant differences between pre and post measurements.

In the Correlation Matrix (Pearson's Correlation Coefficient), all correlation values differed significantly from 0 ($p < 0.00001$) (see Appendice 5). Lin's Correlation-Concordance Coefficient values indicated an acceptable level of concordance among the three domains, although the third domain exhibited a lower concordance level. Additionally, the Bland-Altman Goodness-of-fit plots showed no evidence of correlations in the scale scores or its domains (see Appendice 6).

Rasch analysis

The PCAR demonstrated that 27.9% of the variance was explained by the measurement model, with a first residue component value of 1.9, contributing to a total of 9.1% of the non-explained variance. The Unidimensionality hypothesis was met (indicated by Mean Squared Infit and Outfit values within the range of 0.6 to 1.5). Additionally, the Local Independence hypothesis was supported with correlations below 0.3, the highest being between the 6th and 14th items ($r = 0.28$).

Description of scores in the Logit Metric Scale. The difficulty level of the items ranged between -2.73 logits and 1.95 logits (mean = 0; *SD* = 1.04), while the subjects' ability level ranged between -4.55 logits and 4.3 logits (mean = -0.12; *SD* = 1.23). The item with the lowest difficulty was 9 ("I fear dying a painful death"), whereas item 10 ("The subject of life after death troubles me greatly") had the highest difficulty. Logit units were transformed to a 0-100 scale to compare DAS scores among different variable groups. No statistically significant differences were found among the strata variables' measurements (see Appendice 7).

Measures of items and persons fit. Infit and Outfit Mean-Squares values show a good fit of the Rasch model (ranging between 0.5 and 1.5).

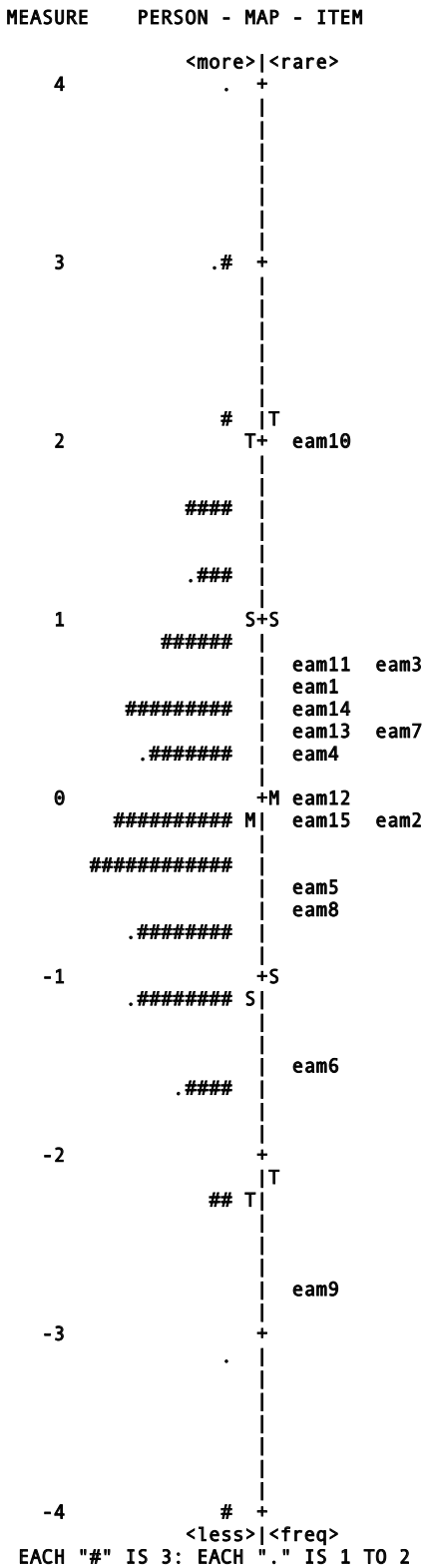
Outfit ZSTD values > 3 indicate poor Rasch model adjustment in one person (which accounts for 0.42% of the total sample). Measurement variability is higher among persons than items, despite both being close to 0. We observed 3 pairs of overlapping items (eam11-eam3, eam13-eam7, eam15-eam2) (Figure 3). Item 9, with the lowest difficulty level, has an approximate distance of 1.5 logits from the following item. To better encompass the construct, items from the lower (e.g., the distance between eam6 and eam9) and higher end of the difficulty spectrum (e.g., the distance among eam3 and eam10) could be included. It is noteworthy that the scale's items do not cover the level of DA in 11 individuals.

Reliability of persons and items. Reliability estimators (person $\alpha = 0.69$; item $\alpha = 0.98$) and the separation index (person $\alpha = 1.50$; item $\alpha = 7.17$) suggest adequate reliability for both items and persons.

Discussion

DA in the Colombian context is influenced by a history of violence and armed conflict characterised by systematic violations of human rights, resulting in diverse

Figure 3. Wright map



harm to the victims, including impacts on their mental health (Observatorio Nacional de Salud, 2018). This emotional experience has been considered a phenomenon associated with emotional distress, playing a transdiagnostic role in the development and maintenance of various psychopathologies, such as schizophrenia, obsessive-compulsive disorder, substance abuse, anxiety disorders, and depressive disorders (Letzner, 2023). According to a report by Human Rights Watch (2023), violence in Colombia has escalated due to the actions of armed groups, leading to increased numbers of murders. Reports have also surfaced regarding abuses committed by public force agents. Moreover, high poverty levels, especially among indigenous and Afro-descendant communities, have resulted in deaths due to undernutrition and limited access to drinking water.

Indeed, as noted by Sharif Nia et al. (2015), the intensification of DA often arises in situations where there is a perceived threat to personal safety, as is frequently observed in the Colombian context. Hence, it is both coherent and relevant to validate an instrument that enables the assessment of DA, not only within clinical populations (Palacios-Espinosa et al., 2025) but also among the general populace, considering the historical, social, and cultural influences on perceptions of mortality. This validation is essential to develop preventive strategies for death anxiety and to contribute to the structuring of transdiagnostic treatment plans, which have demonstrated effectiveness in reducing symptoms associated with various psychopathologies (Letzner, 2023).

Our findings suggest that the cross-cultural adaptation of the Spanish-Colombian DAS version is effective in discriminating DA among non-clinical population. Factorial analysis showed a three-factor structure that measures emotional aspects associated with fear of death (TMM), concerns about life before death (VDM), and denial aspects about death (NGM). The internal consistency is deemed acceptable according to McDonald's Omega (0.7), and GLB (0.77); however, it appears lower for KR-20 (0.66), α = (0.66), and Guttman's Lambda (0.68). In comparison with validations by Moral de la Rubia and Miaja (2014) (α = 0.92), Rivera-Ledesma and Montero-López (2010) (α = 0.83/0.86) in Mexico, and Resett et al. (2021; α = 0.80) in Argentina, Internal Consistency values differ. This can be due to various reasons, these three validations used a Likert response format, whereas our study employed the original version in the dichotomous format. Another reason can be due to the size of the sample, leading to more variable values; for instance, Rivera-Ledesma and Montero-López (2010) utilised a similar sample size to ours, Moral de la Rubia and Miaja (2014) chose a considerably smaller sample, and Resett et al. (2021) used a larger one. Additionally, by being different demographic groups, the population's characteristics, and the sociocultural distinctions can impact the responses to the scale's items —this being the case for Rivera-Ledesma and Montero-López (2010), who gathered data from older individuals in a public hospital, focusing on a specific age group. Given the setting, it could be inferred that it represented a clinical sample—. This confirms the need for a validated and adapted instrument for certain populations, as illustrated in the recent validation study in Colombian clinical population (refer to Palacios-Espinosa et al., 2025). This does not imply that the Spanish-Colombian version of the DAS lacks reliability or stability in meas-

uring DA amongst general population; instead, it suggests that these variables might influence the construct stability.

In Warren and Chopra's (1979) original study, the factorial analysis was reported as a three-factor structure that explained the 38% of the original variance total and 36% of the reverse variance total, a lower percentage than what we found in the present study (38%). Although it is a low value, 40% of the explained variance is often recommended, low limits can be tolerated when instruments are new or measure non-precise constructs (Costello & Osborne, 2005; Fabrigar & Wegener, 2012). In our study we found low factor loadings in two items of the scale, even though these items did not show inadequate fit of the Rash model. This can be associated with the fact that dichotomous variables generate lower loading factor values than the ones that come from polytomous items. In the empirical model it can be observed that each of the factors has 5 items in line with the proposals of Comrey and Lee (1992), Hair et al. (2019), and Tabachnick and Fidell (2019), for whom it is required to have minimum three factors to obtain stable factor solutions.

Based on the results, concurrent criterion validity was deemed appropriate (> to 0.4, between the total DAI score and DAS domains), without significant statistical differences between pre and post measures. Regarding Rasch Analysis, both Unidimensionality and Local Independence hypotheses were confirmed. There were no significant differences observed in socio-economic strata. Items and persons had a good model fit and demonstrated appropriate reliability, the 10th item ("The subject of life after death troubles me greatly") displayed the highest specificity. There is a non-measured space between eam6 and eam9/eam3, and eam10. Additionally, 3 pairs of overlapping items were found (eam11-eam3, eam13-eam7, eam15-eam2). These findings point out that the redundant items in the scale might be associated with the construct variability. In light of this, some of the redundant items could be removed, or exploring additional items to perfect the instrument and evaluate whether it enhances stability and sensitivity in measuring levels of DA.

Finally, the limitations of this study can be highlighted in the absence of information about the participant's origin, since the majority of the sample resides in Bogotá or its vicinity with a comparatively low number in socio-economic high strata. Future research could be focused on studying the psychometric properties of the DAS in diverse demographic groups (e.g., regions, strata, age groups, religion), inasmuch as our sample represents a small percentage of the Colombian population. Moreover, it would be pertinent to study the psychometric properties among healthcare professionals and victims of armed conflict. Our research group recently developed the validation in clinical population (Palacios-Espinosa et al., 2025).

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Appendices

Appendice 1. Measures of internal consistency after removing each item

Items	raw_alpha	G6
das 1-	0.62	0.65
das 2-	0.66	0.68
das 3-	0.64	0.66
das 4-	0.64	0.66
das 5-	0.62	0.64
das 6-	0.65	0.67
das 7-	0.63	0.65
das 8-	0.65	0.67
das 9-	0.66	0.68
das 10-	0.64	0.66
das 11-	0.64	0.66
das 12-	0.65	0.67
das 13-	0.66	0.68
das 14-	0.65	0.67
das 15-	0.66	0.68

Note. DAS = Death Anxiety Scale; G6 = Guttman's Lambda 6 (G6).

Appendice 2. Lin's correlation coefficients between pre- and post- Death Anxiety Scale (DAS) measurements

	ρ de Lin	IC 95%	Bias correction factor
Total pre-Total post	0.85	0.79 a 0.91	1
Domain 1 pre-post	0.76	0.66 a 0.85	1
Domain 2 pre-post	0.79	0.71 a 0.88	0.99
Domain 3 pre-post	0.67	0.54 a 0.79	1

Appendice 3. Concurrent criterion validity between DAS and DAI

	Total DAI Score	Domain 1	Domain 2	Domain 3	Total DAS score
Total DAI Score	1.0000				
Domain 1	**0.4017** 0.0000	1.0000			
Domain 2	**0.4638** 0.0000	0.2753 0.0000	1.0000		
Domain 3	**0.4691** 0.0000	0.2862 0.0000	0.3109 0.0000	1.0000	
Total DAS Score	**0.6071** 0.0000	0.7502 0.0000	0.7521 0.0000	0.6664 0.0000	1.0000

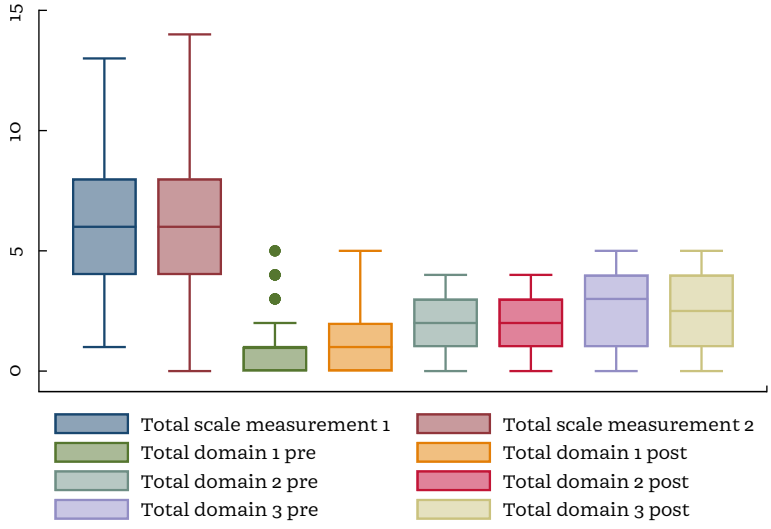
Appendice 4. Scores of the pre- and post-measures obtained on DAS

Variable	Mean	*SD*
Total DAS pre	6.691358	3.207967
Total DAS post	6.876543	3.083759
Total Domain 1 pre	2.407407	1.522972
Total Domain 1 post	2.407407	1.547399
Total Domain 2 pre	2.876543	1.452435
Total Domain 2 post	3.061728	1.469232
Total Domain 3 pre	1.407407	1.148671
Total Domain 3 post	1.407407	1.137737

Appendice 5. Correlation coefficients between pre and post DAS measurements

	Total pre	F1 pre	F2 pre	F3 pre	Total post	F1 post	F2 post	F3 post
Total pre	1.0000							
F1 pre	0.7859 0.0000	1.0000						
F2 pre	0.8234 0.0000	0.4412 0.0000	1.0000					
F3 pre	0.7096 0.0000	0.3112 0.0047	0.4501 0.0000	1.0000				
Total post	**0.8490** 0.0000	0.6603 0.0000	0.6887 0.0000	0.6249 0.0000	1.0000			
F1 post	0.6350	**0.7561**	0.3230	0.3626	0.7703	1.0000		
	0.0000	0.0000	0.0033	0.0009	0.0000			
F2 post	0.6273	0.2456	**0.8003**	0.4145	0.6997	0.2032	1.0000	
	0.0000	0.0271	0.0000	0.0001	0.0000	0.0688		
F3 post	0.6274	0.4441	0.3939	**0.6653**	0.7591	0.4655	0.3287	1.0000
	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0027	

Appendice 6. Total DAS scores and scores by domain



Appendice 7. Distribution of das scores

Variable	Observations	Mean	*SD*
Gender			
F	129	51.39	13.93
M	110	48.22	13.69
Setting			
Rural	7	52.13	14.86
Urban	227	49.84	13.86
Religious practices			
No	28	48.71	11.39
Yes	131	51.25	15.48
Socioeconomic strata			
1	12	60.61	14.08
2	77	49.01	10.65
3	63	49.86	14.79
4	47	47.8	15.59
5	18	48.53	
6	21	54.87	17.23
Relationship status			
Single	111	49.59	12.86
Married	74	49.68	15.51
Cohabiting	41	52.09	12.93
Widowed	5	43.96	17.33
Separated/divorced	8	51.57	17.61
Educational level			
Elementary	5	47.96	4.25
Middle school	7	53.35	10.88
High school	67	52.04	12.89
Technical degree	39	51.5	13.78
Undergraduate	76	47.52	14.57
Graduate	41	49.4	15.85
Lives alone			
No	223	50.24	14.23
Yes	18	47.2	8.16