

Cross-cultural adaptation and psychometric validation of the Cognitive Distortions Questionnaire for Adolescents (CD-Quest-T) in European Portuguese

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ABSTRACT

Background: Cognitive distortions are maladaptive thought patterns associated with emotional disorders during adolescence. Valid and culturally adapted instruments are needed to support adolescent mental health assessment and promotion in educational, primary care, clinical, and nursing settings.

Objective: This study aimed to translate, culturally adapt, and validate the European Portuguese version of the Cognitive Distortions Questionnaire for Adolescents (CD-Quest-T) and examine its psychometric properties in a school-based adolescent sample.

Methods: A total of 851 adolescents aged 14 to 19 years completed the CD-Quest-T, the Generalized Anxiety Disorder-7 (GAD-7), and the Patient Health Questionnaire-9 (PHQ-9). Translation and cultural adaptation followed International Test Commission guidelines. The sample was randomly split for exploratory factor analysis (EFA; $n = 425$) and confirmatory factor analysis (CFA; $n = 426$). Internal consistency and convergent validity were examined.

Results: EFA supported a unidimensional structure, with the first factor explaining 54.58% of the variance. CFA indicated adequate model fit: $\chi^2(20) = 31.69$, $p = .047$, CFI = 0.931, TLI = 0.904, RMSEA = 0.037, and SRMR = 0.024. CFA standardized factor loadings ranged from 0.420 to 0.752. Internal consistency was good, with Cronbach's $\alpha = 0.87$. Positive correlations with anxiety ($r = 0.58$, $p < .001$) and depression ($r = 0.54$, $p < .001$) supported convergent validity.

Conclusions: The European Portuguese CD-Quest-T demonstrated adequate psychometric properties and may support adolescent mental health screening, psychoeducation, referral, and nursing practice.

Introduction

Adolescence, defined by the World Health Organization (WHO) as the period between ages 10 and 19, is a unique stage of human development characterized by rapid physical, cognitive, and psychosocial growth (WHO, 2025). This developmental period is particularly relevant for mental health, as approximately one in seven adolescents aged

10–19 years experiences a mental disorder globally, with depression and anxiety among the leading causes of illness and disability in this age group (WHO, 2025). In addition, evidence from a large-scale meta-analysis indicates that the onset of mental disorders frequently occurs early in life, with approximately one third of cases beginning before age 14 and nearly half before age 18 (Solmi et al., 2022). These findings highlight adolescence as a critical window for mental health promotion,

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prevention, and the early identification of risk and protective factors aimed at improving youth well-being (Solmi et al., 2022; WHO, 2025).

Cognitive distortions, defined as systematic and often unconscious errors in information processing, play a central role in the onset and maintenance of emotional disorders (Beck & Haigh, 2014; Eysenck et al., 2007). During adolescence, these distorted thinking patterns may become particularly salient in the context of ongoing cognitive and psychosocial development. Although certain cognitive biases are common in early adolescence (Leitenberg et al., 1986; Slavny et al., 2019), persistent distortions such as catastrophizing, overgeneralization, and mind reading are associated with anxiety and depression (Orchard & Reynolds, 2018; Tairi et al., 2016; Weems et al., 2001). These thought patterns foster negative interpretations of experiences, increase hopelessness, and contribute to maladaptive coping strategies (Orchard & Reynolds, 2018; Tairi, 2020). From a cognitive-behavioral perspective, identifying and modifying these thought patterns is central to effective intervention, as cognitive biases in interpretation and judgment are clinically relevant and constitute meaningful therapeutic targets in adolescent anxiety (Beck & Haigh, 2014; Cannon & Weems, 2010).

Despite their clinical importance, most available instruments for assessing cognitive distortions were developed for adults and lack developmental sensitivity. In Portugal, the Children's Negative Cognitive Errors Questionnaire (CNCEQ) (Freitas et al., 2012; Leitenberg et al., 1986) is one of the few measures adapted for youth. The CNCEQ consists of 24 items distributed across four subscales, each representing a specific type of cognitive distortion. Although psychometrically sound, the CNCEQ captures only four types of distortions and may be too lengthy for routine screening in schools or large-scale surveys.

The Cognitive Distortions Questionnaire (CD-Quest) was initially developed within the framework of Trial-Based Cognitive Therapy (TBCT), a structured approach derived from Beck's cognitive model, emphasizing the identification and restructuring of maladaptive beliefs (de Oliveira et al., 2015). The adolescent version, the Cognitive Distortions Questionnaire for Adolescents (CD-Quest-T), was validated in Brazil, demonstrating good reliability and validity (de Souza et al., 2023). The CD-Quest-T evaluates both the frequency and intensity of eight cognitive distortions using concise, age-appropriate language, making it particularly suitable for educational, community, clinical, and primary care contexts.

Prior to this study, no validated European Portuguese version of the CD-Quest-T was available. This gap limits clinical practice and research on cognitive vulnerability in Portuguese adolescents. Considering that adolescents spend a large portion of their time in school, the educational setting offers a privileged context for the early identification of cognitive and emotional difficulties. Teachers and school health professionals are well-positioned to recognize subtle cognitive and behavioral changes. Integrating brief, culturally adapted instruments such as the CD-Quest-T into school-based mental health and socioemotional learning initiatives may enhance early detection, referral, and intervention. Evidence indicates that preventive and targeted mental health strategies can reduce symptoms of anxiety and depression and promote positive mental health outcomes (Thingbak et al., 2024; Zbukvic et al., 2024).

The present study aimed to translate, culturally adapt, and validate the CD-Quest-T for use among European Portuguese-speaking adolescents. Specifically, it examined the instrument's factorial structure through exploratory and confirmatory factor analyses, as well as its internal consistency and convergent validity with established measures of anxiety (GAD-7) and depression (PHQ-9). This validation strengthens evidence-based mental health assessment in school health, primary care, community, and clinical nursing practice.

Methods

Study design

This quantitative, cross-sectional methodological study evaluated the psychometric properties of the European Portuguese version of the CD-Quest-T in a school-based sample of Portuguese adolescents. As this was a non-experimental validation study, no variables were manipulated, and data were collected at a single time point. The study assessed adolescents' cognitive distortions, sociodemographic characteristics, and symptoms of anxiety and depression.

Participants and procedures

A convenience sample of 851 adolescents aged 14 to 19 years ($M = 16.27$, $SD = 1.00$) was recruited from public secondary schools located in the Central Region of Portugal during the 2024–2025 academic year. Inclusion criteria were enrollment in public secondary education, fluency in Portuguese, and the ability to understand and complete the questionnaires independently. Adolescents with diagnosed cognitive impairments that could hinder comprehension of the questionnaire items were excluded. This exclusion criterion was verified by the class teacher, who identified students whose known cognitive difficulties or educational records indicated that they might not be able to understand or complete the instruments autonomously.

Participation was voluntary. Informed consent was obtained from participants aged 18 years or older. For minors, informed assent was obtained from the adolescents, and informed consent was obtained from their legal guardians.

Data collection occurred after formal authorization by the Directorate-General for Education, through the School Survey Monitoring Platform, and by the school management boards. The questionnaires were completed anonymously during class time, under teacher supervision, using a secure online platform. Students used their personal mobile phones to complete the survey. The average completion time was approximately 15–20 min.

No financial or material compensation was provided to participants. The absence of incentives was deemed appropriate given the voluntary nature of participation, the minimal burden associated with questionnaire completion, and the context of data collection within regular school activities.

Sample characteristics

Most participants were between 15 and 17 years old ($n = 721$, 87.7%). Regarding sex assigned at birth, 479 participants reported female sex assigned at birth (56.6%) and 349 reported male sex assigned at birth (41.2%). Most participants identified as cisgender ($n = 760$, 92.7%). Nearly half were enrolled in the 10th grade ($n = 400$, 48.8%), followed by the 11th grade ($n = 238$, 29.0%) and the 12th grade ($n = 182$, 22.2%). Academic performance was self-rated as "good" or "very good" by 585 participants (71.6%). Regarding parental education, 526 mothers (64.2%) and 412 fathers (50.4%) had completed secondary education or higher. In terms of socioeconomic indicators, 315 students (38.6%) received school-based social support, and 498 participants (61.0%) reported participating in at least one extracurricular activity (see Table 1).

Instruments

Sociodemographic questionnaire

The sociodemographic questionnaire collected information on age, sex assigned at birth, gender identity, school grade, academic performance, parental education, school-based social support level, and extracurricular activities.

Table 1
Demographic characteristics of participants ($N = 851$).

Variable	Category	Frequency (n)	Percentage (%)
Age	14 years	1	0.1
	15 years	217	26.4
	16 years	273	33.2
	17 years	231	28.1
	18 years	94	11.4
	19 years	7	0.9
Sex assigned at birth	Female	479	56.6
	Male	349	41.2
	Intersex	4	0.5
Gender identity	Cisgender	760	92.7
	Non-binary person	6	0.7
	Trans person	12	1.5
	I prefer not to answer	42	5.1
Year of schooling	10th grade	400	48.8
	11th grade	238	29.0
	12th grade	182	22.2
Self-rated academic performance	Very good	155	19.0
	Good	430	52.6
	Satisfactory	213	26.1
	Unsatisfactory	17	2.1
	Very unsatisfactory	2	0.2
Performance satisfaction	Very satisfied	101	12.3
	Satisfied	426	52.1
	Neither satisfied nor dissatisfied	212	25.9
	Unsatisfied	66	8.1
	Very dissatisfied	13	1.6
Mother's education	No schooling	2	0.2
	1st cycle	24	2.9
	2nd cycle	79	9.6
	3rd cycle	142	17.3
	Secondary	264	32.2
	Higher education	262	32.0
	I prefer not to answer	46	5.6
Father's education	No schooling	2	0.2
	1st cycle	39	4.8
	2nd cycle	127	15.5
	3rd cycle	168	20.5
	Secondary	236	28.9
	Higher education	176	21.5
	I prefer not to answer	70	8.6
School social support level	Level A (highest financial support)	62	7.6
	Level B	120	14.7
	Level C	133	16.3
	No assigned level	501	61.4
Extracurricular activities	Yes	498	61.0
	No	318	39.0

Note. Percentages are based on valid responses; missing responses varied across variables.

Cognitive Distortions Questionnaire for Adolescents (CD-Quest-T)

The CD-Quest-T (de Souza et al., 2023) is an eight-item self-report instrument adapted from the adult CD-Quest (de Oliveira et al., 2015), designed to assess the frequency and intensity of cognitive distortions experienced during the previous week. The items assess common cognitive distortion patterns, including all-or-nothing thinking, fortune-telling, discounting the positive, labeling, mind reading, over-generalization, jumping to conclusions, and blaming. Each item is rated on a scale ranging from 0 to 5, with higher scores indicating greater cognitive distortion.

In the original Brazilian validation study, conducted with 299 adolescents aged 11 to 17 years, exploratory factor analysis supported a unidimensional structure. The sample showed adequate factorability, with a Kaiser–Meyer–Olkin value of 0.83 and a significant Bartlett's test of sphericity. Factor loadings ranged from 0.35 to 0.69, communalities ranged from 0.12 to 0.48, and item-total correlations ranged from 0.52 to 0.86. The single-factor solution explained 31% of the variance and was further supported by the scree plot. The Brazilian version showed

adequate internal consistency, with Cronbach's $\alpha = 0.77$ for the total scale, $\alpha = 0.75$ for the frequency subscale, and $\alpha = 0.73$ for the intensity subscale (de Souza et al., 2023). In the present study, the European Portuguese version demonstrated good internal consistency, with Cronbach's $\alpha = 0.87$. Prior to this study, no validated version of the CD-Quest-T was available for European Portuguese adolescents.

Patient Health Questionnaire-9 for Adolescents (PHQ-9)

The PHQ-9 (Johnson et al., 2002) is a nine-item scale that measures depressive symptoms during the previous two weeks. Items are rated from 0 ("not at all") to 3 ("nearly every day"), with total scores ranging from 0 to 27. It has demonstrated good reliability and validity in adolescent populations (Andreas & Brunborg, 2017; Anum et al., 2019; Fonseca-Pedrero et al., 2023; Ganguly et al., 2013; Tsai et al., 2014). In the present sample, the PHQ-9 showed excellent internal consistency, with Cronbach's $\alpha = 0.91$.

Generalized Anxiety Disorder-7 (GAD-7)

The GAD-7 (Spitzer et al., 2006) assesses anxiety symptoms during the previous two weeks, using a 4-point scale ranging from 0 ("not at all") to 3 ("nearly every day"). The Portuguese adolescent version has shown excellent internal consistency, with Cronbach's $\alpha = 0.93$, and is widely used in clinical and community samples (Gonçalves & Santiago, 2019). In the present sample, the GAD-7 also showed excellent internal consistency, with Cronbach's $\alpha = 0.91$.

Translation and cultural adaptation

The CD-Quest-T was translated and culturally adapted from Brazilian Portuguese into European Portuguese following the International Test Commission Guidelines for Translating and Adapting Tests (International Test Commission, 2017). This adaptation was considered necessary because linguistic, idiomatic, and cultural differences between Brazilian and European Portuguese could affect item comprehension and conceptual equivalence among adolescents.

The process was conducted in several sequential stages. First, two bilingual experts, one with a background in psychology and one in nursing, independently translated the instrument from Brazilian Portuguese into European Portuguese. Translators were instructed to focus not only on literal translation but also on semantic equivalence, linguistic naturalness, and suitability for adolescents in the Portuguese cultural context. The two translated versions were then compared item by item, and discrepancies in wording, terminology, or cultural adequacy were discussed until a single consensus version was produced.

Second, two independent translators, who had not participated in the initial translation and were blinded to the original version, back-translated the consensus European Portuguese version into Brazilian Portuguese. The back-translations were compared with the original instrument to identify possible shifts in meaning, conceptual inconsistencies, or loss of nuance. Discrepancies identified during this stage were reviewed and discussed by the research team, leading to further refinement of the preliminary adapted version.

Third, an expert panel reviewed the preliminary version. The panel consisted of five members: one psychologist, one psychiatrist, two nurses, and one linguist. Of the two nurses, one specialized in mental health and psychiatric nursing, and the other specialized in child health and pediatric nursing. The experts evaluated each item regarding semantic equivalence, conceptual relevance, clarity, cultural appropriateness, and adequacy for the target age group. Suggested modifications were discussed collectively, and item wording was revised as needed to improve comprehensibility and cultural fit while preserving the original instrument's meaning.

Finally, the pre-final version was pilot-tested with 30 adolescents from the target population. This stage aimed to examine the clarity, comprehensibility, and perceived relevance of the items and response format. Feedback from the adolescents was reviewed by the research

team, and minor wording refinements were introduced to enhance linguistic naturalness and ensure that the final European Portuguese version was culturally appropriate and easily understood by adolescents.

Statistical analysis

Data analyses were performed using IBM SPSS Statistics, Version 29.0 (IBM Corp., 2023) and JASP, Version 0.95.4 (JASP Team, 2025). To reduce the risk of overfitting, the total sample was randomly divided into two independent subsamples. The first subsample was used for exploratory factor analysis (EFA; $n = 425$), and the second for confirmatory factor analysis (CFA; $n = 426$).

Preliminary analysis

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to characterize the sample and examine item distribution. Percentages were reported together with absolute frequencies whenever applicable. The suitability of the data for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett’s test of sphericity.

Exploratory factor analysis (EFA)

EFA was conducted using principal axis factoring to examine the underlying dimensionality of the CD-Quest-T. Factor retention was guided by eigenvalues greater than 1, inspection of the scree plot, and theoretical interpretability. Factor loadings ≥ 0.30 were considered acceptable, following commonly used recommendations for interpreting factor solutions (Hair et al., 2019).

Confirmatory factor analysis (CFA)

CFA was conducted in the second randomly selected subsample to test the unifactorial model previously reported in the Brazilian validation study. Given the ordinal nature of the items, the Diagonally Weighted Least Squares (DWLS) estimator was used. Model fit was evaluated using the chi-square statistic (χ^2), the Comparative Fit Index (CFI), the Tucker–Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). Following commonly accepted recommendations for CFA model evaluation, model fit was considered adequate when CFI and TLI values approached or exceeded 0.95, RMSEA was ≤ 0.08 , and SRMR was ≤ 0.05 (Brown, 2015).

Reliability and validity

Internal consistency was assessed using Cronbach’s alpha. Values of $\alpha \geq 0.70$ were considered satisfactory, following commonly used recommendations for scale reliability (DeVellis & Thorpe, 2022). Convergent validity was examined through Pearson correlations between the CD-Quest-T, PHQ-9, and GAD-7 total scores, based on the assumption that theoretically related constructs should show meaningful associations (DeVellis & Thorpe, 2022). Statistical significance was set at $p < .05$.

Ethical considerations

This study was approved by the institutional ethics committee (Opinion No. 24064) and conducted in accordance with the principles of the Declaration of Helsinki. Participation was voluntary and anonymous, and confidentiality was strictly maintained. Written informed consent was obtained from participants aged 18 years or older. For minors, informed assent was obtained from the adolescents, and written informed consent was obtained from their legal guardians. Participants were informed of their right to withdraw from the study at any time without penalty or consequence.

All data were collected anonymously through a secure online platform and subsequently stored on password-protected institutional servers. No personally identifiable information was collected. Access to

the anonymized dataset was restricted to authorized members of the research team involved in data analysis and interpretation. Data were handled in accordance with applicable data protection regulations and will be securely retained for five years following publication, after which they will be permanently deleted.

Results

Sample adequacy for factor analysis

The Kaiser–Meyer–Olkin (KMO) measure and Bartlett’s test of sphericity were used to assess the suitability of the data for exploratory factor analysis. The KMO index evaluates sampling adequacy by examining whether the partial correlations among variables are small; values closer to 1 indicate that the data are appropriate for factor analysis, with values above 0.80 considered good and values above 0.90 considered excellent. Bartlett’s test of sphericity assesses whether the correlation matrix significantly differs from an identity matrix, indicating whether variables are sufficiently correlated. A statistically significant result ($p < .05$) indicates that factor analysis is appropriate (Bartlett, 1954; Hair et al., 2019; Kaiser & Rice, 1974).

These statistics were calculated using the randomly selected subsample used for EFA ($n = 425$). In the present study, the KMO value of 0.917 indicated excellent sampling adequacy, and Bartlett’s test was statistically significant, $\chi^2(28) = 2681.727, p < .001$, confirming that the data were suitable for exploratory factor analysis.

Exploratory factor analysis (EFA)

An exploratory factor analysis using principal axis factoring extraction revealed a unidimensional structure. The first factor had an eigenvalue of 4.37, accounting for 54.58% of the total variance, whereas all subsequent factors had eigenvalues below 1 (see Table 2). The scree plot confirmed this result, showing a distinct “elbow” after the first factor (see Fig. 1).

Factor loadings ranged from 0.55 for *Blaming* to 0.81 for *Mind reading*, supporting a single-factor solution (see Table 3). Communalities were generally satisfactory ($h^2 \geq 0.496$), except for *Blaming* ($h^2 = 0.306$), indicating a weaker representation of this item within the latent construct (see Table 3). Together with the eigenvalue and scree plot results, these findings provide empirical support for the unidimensionality of the CD-Quest-T.

Confirmatory factor analysis (CFA)

To further examine the factorial structure of the instrument, CFA was conducted using the Diagonally Weighted Least Squares (DWLS) estimator, which is appropriate for ordinal data, in JASP, Version 0.95.4 (JASP Team, 2025). The tested model assumed a unidimensional structure, consistent with the theoretical conceptualization of cognitive distortions as a single latent construct. To ensure methodological rigor and reduce the risk of overfitting, CFA was performed on an independent subsample ($n = 426$), corresponding to the second randomly split half of the total sample, while the first subsample had been used for EFA.

Table 2
Eigenvalues and explained variance of CD-Quest-T factors ($n = 425$).

Factor	Eigenvalue	% of variance	Cumulative %
1	4.367	54.581	54.581
2	0.777	9.712	64.293
3	0.641	8.007	72.300
4	0.593	7.411	79.711
5	0.520	6.496	86.208
6	0.430	5.376	91.584
7	0.369	4.608	96.192
8	0.305	3.808	100.000

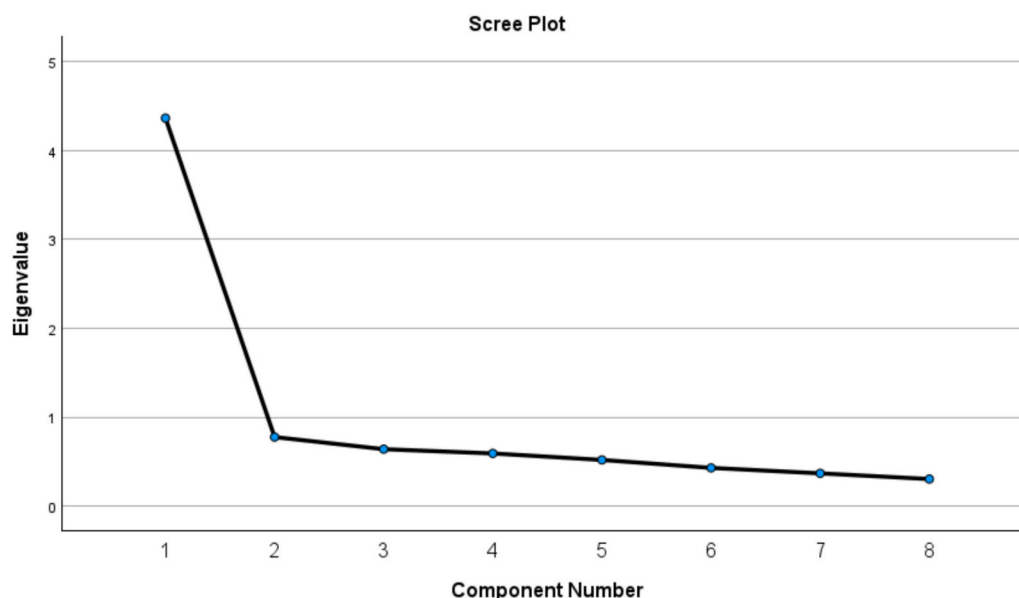


Fig. 1. Scree plot of the exploratory factor analysis of the CD-Quest-T. Note. The sharp “elbow” after the first factor indicates a unidimensional structure.

Table 3

Factor loadings and communalities of the CD-Quest-T items ($n = 425$).

	Factor	h^2
	1	
Mind reading	0.813	0.661
Fortune telling	0.810	0.655
All-or-nothing thinking	0.780	0.609
Overgeneralization	0.776	0.603
Labeling	0.733	0.537
Jumping to conclusions	0.707	0.499
Discounting the positive	0.704	0.496
Blaming	0.553	0.306

Note. Factor loadings are unrotated because a single-factor solution was retained. h^2 = communality.

Global fit indices indicated that the model demonstrated an overall adequate fit to the empirical data. The chi-square test was statistically significant, $\chi^2(20) = 31.692$, $p = .047$. However, this result should be interpreted with caution, as the chi-square statistic is sensitive to sample size and may indicate statistical significance even when the model fits adequately.

Model evaluation, therefore, also relied on incremental, absolute, and residual-based fit indices. The Comparative Fit Index (CFI = 0.931) and Tucker–Lewis Index (TLI = 0.904) indicated acceptable fit, although they remained below the more stringent 0.95 criterion. Similarly, the Incremental Fit Index (IFI = 0.934) and Relative Noncentrality Index (RNI = 0.931) further supported the adequacy of the proposed model. In contrast, the Normed Fit Index (NFI = 0.840) and Relative Fit Index (RFI = 0.776) fell below recommended thresholds, indicating that some aspects of incremental fit were suboptimal.

Residual-based and approximation error indices supported the model's adequacy. The Root Mean Square Error of Approximation (RMSEA = 0.037; 90% CI [0.005, 0.060], $p = .799$) was below the 0.05 threshold, indicating low approximation error. The Standardized Root Mean Square Residual (SRMR = 0.024) was also below the 0.05 criterion, further supporting good residual fit. Absolute fit indices were high, namely the Goodness of Fit Index (GFI = 0.998) and the McDonald Fit Index (MFI = 0.986). The parsimony index (PNFI = 0.600) reflected an appropriate balance between model simplicity and explanatory power.

All standardized factor loadings were statistically significant ($p < .001$), indicating that all items contributed to the latent factor. Factor

loadings ranged from 0.420 to 0.752, indicating low-to-moderate to high associations with the latent construct (see Table 4). *Overgeneralization* (0.752) and *Jumping to conclusions* (0.744) showed the highest loadings, suggesting that these items were the strongest indicators of cognitive distortions in this sample.

The item *Blaming* showed the lowest factor loading (0.420), indicating a weaker association with the latent factor. This finding may reflect cultural or developmental specificities in how adolescents interpret and express this type of cognitive distortion. Nevertheless, the loading remained above the minimum acceptable threshold, supporting its retention in the model. Residual variances ranged from 0.434 to 0.823. *Blaming* showed the highest residual variance, suggesting that it was less well explained by the common factor than the remaining items.

Hoelter's critical N was 422.2 at $\alpha = 0.05$ and 504.8 at $\alpha = 0.01$. Given the CFA subsample size of $n = 426$, this result suggests adequate model stability according to the 0.05 criterion, although not according to the more stringent 0.01 criterion.

No post hoc model modifications were applied. Modification indices were not used to improve model fit, and no correlated residuals were specified between items.

Taken together, these results provide evidence that the European Portuguese version of the CD-Quest-T presents a stable and parsimonious unidimensional structure. Although some incremental fit indices were below the most stringent recommended thresholds, the overall pattern of results, including statistically significant factor loadings, low RMSEA and SRMR values, high absolute fit indices, and acceptable model stability, supports the structural validity of the instrument for use with adolescents.

Table 4

Standardized factor loadings for CD-Quest-T items.

Item	Factor loading	95% CI	p
All-or-nothing thinking	0.722	[0.655, 0.788]	<0.001
Fortune telling	0.709	[0.646, 0.772]	<0.001
Discounting the positive	0.644	[0.573, 0.716]	<0.001
Labeling	0.678	[0.603, 0.753]	<0.001
Mind reading	0.680	[0.620, 0.739]	<0.001
Overgeneralization	0.752	[0.693, 0.811]	<0.001
Jumping to conclusions	0.744	[0.688, 0.800]	<0.001
Blaming	0.420	[0.321, 0.520]	<0.001

Descriptive statistics and internal consistency

Descriptive analyses of the CD-Quest-T items ($N = 851$; scores ranging from 0 to 5) showed that *Fortune telling* ($M = 1.65$, $SD = 1.63$) and *Mind reading* ($M = 1.65$, $SD = 1.72$) were the most frequently endorsed distortions, whereas *Blaming* had the lowest mean score ($M = 0.59$, $SD = 1.15$). Standard deviations ranged from 1.15 to 1.72, with the greatest variability observed for *Mind reading*, suggesting substantial individual differences in this distortion (see Table 5).

The scale demonstrated good internal consistency, with Cronbach's $\alpha = 0.87$. Corrected item–total correlations ranged from 0.43 for *Blaming* to 0.69 for *Overgeneralization* and *Fortune telling*, all above the recommended cutoff of 0.30. Cronbach's alpha values remained stable (0.85–0.88) when individual items were deleted, with a slight increase observed when *Blaming* was removed ($\alpha = 0.88$), indicating that this item contributed less consistently to the overall reliability.

Inter-item correlations

All inter-item correlations were positive and statistically significant ($p < .001$), ranging from $r = 0.30$ between *Blaming* and *Fortune telling* to $r = 0.63$ between *All-or-nothing thinking* and *Fortune telling*, indicating consistent but differentiated relationships among items. Item–total correlations ranged from $r = 0.53$ for *Blaming* to $r = 0.78$ for *Fortune telling*, *Mind reading*, and *Overgeneralization*, providing further evidence of the CD-Quest-T's internal consistency and structural coherence (see Table 6).

Convergent validity

The CD-Quest-T total score correlated positively with both the GAD-7 ($r = 0.58$, $p < .001$) and the PHQ-9 ($r = 0.54$, $p < .001$), supporting its convergent validity.

At the item level, correlations with the GAD-7 ranged from $r = 0.26$ for *Blaming* to $r = 0.48$ for *Overgeneralization*, whereas correlations with the PHQ-9 ranged from $r = 0.24$ for *Blaming* to $r = 0.45$ for *Overgeneralization*. Cognitive distortions reflecting rigid or absolutist thinking, such as *Overgeneralization*, *Fortune telling*, *All-or-nothing thinking*, and *Jumping to conclusions*, showed the strongest associations with anxiety and depressive symptoms.

Regarding individual PHQ-9 items, the strongest correlations with CD-Quest-T total scores were observed for “Have I ever felt bad about myself, like I am a failure, or that I have disappointed myself or my family?” and “Did I feel down, depressed, angry, or hopeless?” (both $r = 0.51$), followed by “Did I feel tired or have low energy?” ($r = 0.43$). Lower correlations were found with somatic or severe depressive symptoms, including psychomotor agitation ($r = 0.37$) and suicidal ideation ($r = 0.32$). Overall, these findings support the theoretical consistency of the instrument: adolescents reporting higher levels of cognitive distortions also showed greater severity of anxiety and depressive symptoms, with *Overgeneralization* and *All-or-nothing thinking* emerging as particularly salient cognitive patterns.

Table 5
Descriptive statistics of the CD-Quest-T Items ($N = 851$).

Item	Min	Max	<i>M</i>	<i>SD</i>
All-or-nothing thinking	0.00	5.00	1.18	1.43
Fortune telling	0.00	5.00	1.65	1.63
Discounting the positive	0.00	5.00	1.28	1.58
Labeling	0.00	5.00	1.39	1.58
Mind reading	0.00	5.00	1.65	1.72
Overgeneralization	0.00	5.00	1.25	1.59
Jumping to conclusions	0.00	5.00	1.19	1.57
Blaming	0.00	5.00	0.59	1.15

Note. Min = minimum; Max = maximum; M = mean; SD = standard deviation.

Discussion

This study aimed to translate, culturally adapt, and validate the Cognitive Distortions Questionnaire for Adolescents (CD-Quest-T) for use among European Portuguese-speaking adolescents. Overall, the findings provide evidence supporting the psychometric adequacy of the European Portuguese version, including its unifactorial structure, internal consistency, and convergent validity with measures of anxiety and depressive symptoms.

The exploratory and confirmatory factor analyses supported the theoretical model of cognitive distortions as a single latent construct. Factor loadings ranged from 0.55 to 0.81, indicating that all items contributed meaningfully to the latent factor. These results are consistent with the original Brazilian validation study, which also supported a unidimensional structure for the CD-Quest-T, although factor loadings in the present study were generally higher (de Souza et al., 2023). Similar unidimensional solutions have also been reported in studies using the adult version of the CD-Quest across different cultural contexts (Batmaz et al., 2015; de Oliveira et al., 2015; Kostoglou & Pidgeon, 2016; Qian et al., 2020).

The confirmatory factor analysis further supported the adequacy of the unifactorial model. Although CFI = 0.931 and TLI = 0.904 did not reach the more stringent threshold of 0.95, these values were within the acceptable range and approached recommended criteria. In addition, the RMSEA value (0.037) indicated good approximate fit. Importantly, model fit was achieved without the application of post hoc modifications: no modification indices were used to improve model fit, and no correlated error terms were specified between items. This suggests that the observed fit indices reflect the adequacy of the hypothesized unidimensional structure rather than model overfitting. The adequacy of the one-factor model may be explained by the conceptual homogeneity of the construct and the strong interrelatedness of cognitive distortions, which are theoretically expected to co-occur as manifestations of a common latent process.

Regarding reliability, the European Portuguese version of the CD-Quest-T demonstrated good internal consistency, with Cronbach's $\alpha = 0.87$. This value was higher than that reported in the original Brazilian validation study ($\alpha = 0.77$) and falls within the range reported in studies using the adult CD-Quest in different languages and populations ($\alpha = 0.80$ –0.94) (de Oliveira et al., 2015; Kaplan et al., 2017; Kostoglou & Pidgeon, 2016; Morrison et al., 2015; Qian et al., 2020). Corrected item–total correlations also exceeded recommended thresholds, indicating adequate item homogeneity.

A noteworthy finding concerns the performance of the *Blaming* item, which showed the lowest factor loading, communality, and corrected item–total correlation in the present sample. Although its removal would result in a slight increase in Cronbach's alpha, the item was retained based on theoretical and content validity considerations.

Blaming represents a relevant cognitive distortion within the cognitive models of emotional disorders, reflecting maladaptive attributional processes that may contribute to psychological distress. Moreover, this item is included in the original Brazilian CD-Quest-T, and its retention preserves conceptual fidelity and comparability with previous studies.

From a psychometric standpoint, the loading for *Blaming* remained above the minimum acceptable threshold, supporting its contribution to the latent construct. Internal consistency indices such as Cronbach's alpha should not be used as the sole criterion for item retention, particularly in brief instruments, where removing an item may artificially increase reliability while reducing content coverage. The comparatively weaker performance of the *Blaming* item may reflect developmental or cultural specificities in attributional styles among Portuguese adolescents. For example, adolescents may be more prone to internalizing cognitive patterns, such as self-criticism, than to externalizing blame, which could reduce the salience of this distortion in this population. Future studies should further examine the functioning of this item across sex, age groups, and clinical versus non-clinical samples.

Table 6

Inter-item and item-total correlations of the CD-Quest-T (N = 851).

Item	1	2	3	4	5	6	7	8	Total
1 - All-or-nothing thinking	–	0.626	0.481	0.489	0.512	0.504	0.506	0.315	0.759
2 - Fortune telling		–	0.495	0.500	0.567	0.502	0.501	0.296	0.779
3 - Discounting the positive			–	0.446	0.461	0.467	0.433	0.323	0.709
4 - Labeling				–	0.502	0.529	0.466	0.297	0.732
5 - Mind reading					–	0.587	0.489	0.343	0.779
6 - Overgeneralization						–	0.565	0.345	0.779
7 - Jumping to conclusions							–	0.348	0.742
8 - Blaming								–	0.529

Note. Values are Pearson correlation coefficients. Total = item–total correlation. All coefficients were statistically significant at $p < .001$.

Convergent validity was supported by moderate, positive, and statistically significant correlations between CD-Quest-T scores and symptoms of anxiety and depression. The CD-Quest-T total scores correlated with the GAD-7 ($r = 0.58$) and the PHQ-9 ($r = 0.54$), supporting the expected association between cognitive distortions and emotional symptoms. These findings are consistent with cognitive models suggesting that distorted thinking patterns contribute to emotional dysregulation, negative affectivity, and vulnerability to internalizing symptoms during adolescence (Beck & Haigh, 2014; Cannon & Weems, 2010; Maric et al., 2011; Orchard & Reynolds, 2018; Tairi et al., 2016).

At the item level, *Overgeneralization*, *All-or-nothing Thinking*, and *Fortune Telling* showed particularly strong associations with anxiety and depressive symptoms. This is theoretically coherent, as rigid, absolutist, and future-oriented negative thinking patterns are central to cognitive accounts of internalizing psychopathology. These results further support the theoretical relevance of the CD-Quest-T for assessing cognitive vulnerability in adolescents.

From a nursing perspective, these findings highlight the potential usefulness of the CD-Quest-T as a brief and developmentally appropriate screening instrument for school health, primary care, and community settings. School and primary care nurses may use the instrument to identify maladaptive cognitive patterns that may precede or accompany anxiety and depressive symptoms. The CD-Quest-T may therefore support early psychosocial assessment, psychoeducational interventions, brief cognitive-behavioral strategies, emotional regulation work, and timely referral to specialized mental health services when indicated. Its use is consistent with the preventive and health-promoting role of nursing in adolescent mental health care.

Overall, the results suggest that the European Portuguese version of the CD-Quest-T is a reliable and valid instrument for assessing cognitive distortions among adolescents. Nevertheless, further research is needed to examine its performance in clinical samples, evaluate measurement invariance across relevant sociodemographic groups, and determine its sensitivity to change following nursing-led or cognitive-behavioral interventions.

Limitations

This study has several limitations. First, the use of a convenience sample from the Central Region of Portugal limits the generalizability of the findings to adolescents from other regions or educational contexts. Second, data were collected through self-report measures, which may be influenced by social desirability, self-perception biases, or difficulties in accurately reporting internal experiences. In addition, questionnaires were completed in classroom settings using students' personal smartphones. Although responses were anonymous and completed under teacher supervision, the presence of classmates and the group setting may have influenced participants' perceived privacy and willingness to respond openly, particularly for items related to emotional symptoms and cognitive distortions. The use of personal devices may also have introduced variability in response conditions, such as screen size, privacy, internet connectivity, or distractions. Third, the cross-sectional

design prevents causal inferences regarding the relationships between cognitive distortions and emotional symptoms. Fourth, the sample was predominantly female, which may have influenced cognitive and emotional patterns, as gender differences have been shown to affect attributional styles and vulnerability to internalizing symptoms. Finally, although the psychometric findings were satisfactory, further studies should examine the external validity of the CD-Quest-T in adolescents across different regions, educational contexts, and clinical populations, and use longitudinal designs to evaluate its sensitivity to change.

Despite these limitations, the findings provide a solid foundation for the continued development and application of the CD-Quest-T in nursing research and practice.

Implications for nursing practice and research

The European Portuguese version of the CD-Quest-T offers a practical, reliable, and developmentally appropriate tool that may be integrated into nursing practice, particularly in school health, primary care, and community settings. Its brevity and ease of administration make it useful as a complementary screening instrument to identify adolescents who present cognitive vulnerability patterns associated with anxiety and depressive symptoms. However, the CD-Quest-T should not be interpreted as a diagnostic tool, but rather as a resource to support early identification, clinical judgment, and decision-making regarding preventive or referral pathways.

In school health settings, nurses may use the CD-Quest-T to identify specific maladaptive cognitive patterns, such as overgeneralization, mind reading, all-or-nothing thinking, fortune-telling, jumping to conclusions, or blaming. Based on adolescents' responses, nurses can implement brief psychoeducational interventions focused on mental health literacy, recognition of cognitive distortions, the relationship between thoughts, emotions, and behaviors, and strategies for adaptive coping. For example, nurses may organize individual or group sessions to help adolescents identify automatic negative thoughts, examine the evidence supporting those thoughts, generate more balanced alternatives, and reflect on how cognitive patterns influence emotional responses and interpersonal relationships.

The instrument may also support nursing-led preventive interventions grounded in cognitive-behavioral principles. These may include structured activities such as thought-monitoring exercises, cognitive reframing, problem-solving training, emotional regulation strategies, relaxation or breathing techniques, and guidance on help-seeking behaviors. In classroom or school-based mental health promotion programs, the CD-Quest-T may be used as part of broader assessment protocols to help identify cognitive targets for intervention and to monitor changes in cognitive distortions over time, although future studies should further examine its sensitivity to change.

In addition, CD-Quest-T results may help nurses determine when further assessment or referral is needed. Referral to specialized mental health services should be considered when high levels of cognitive distortions are accompanied by clinically relevant depressive or anxiety symptoms, persistent emotional distress, functional impairment, school absenteeism, social withdrawal, self-harm ideation or behavior, suicidal

ideation, or when the adolescent reports difficulties that exceed the scope of brief school- or primary-care-based nursing interventions. In such cases, the CD-Quest-T may facilitate interdisciplinary communication among nurses, psychologists, psychiatrists, teachers, families, and other educational or healthcare professionals.

In primary care and community settings, the CD-Quest-T can help identify adolescents who may not yet exhibit clinically significant symptoms but show cognitive vulnerability patterns that could increase their future risk. This may facilitate preventive, person-centered care, including brief counseling, psychoeducation for adolescents and families, promotion of emotional regulation skills, and timely referral when necessary.

From a research perspective, the availability of a culturally adapted and psychometrically adequate instrument opens new avenues for advancing knowledge on cognitive vulnerability in Portuguese adolescents. Future studies should examine the predictive validity of the CD-Quest-T, its sensitivity to change following cognitive-behavioral or nursing-led interventions, and its applicability in clinical populations. Longitudinal research is particularly needed to clarify the role of cognitive distortions as risk factors for the development of anxiety and depression over time. Additionally, the use of the CD-Quest-T in intervention studies may support the evaluation of school-based and community-based mental health programs, contributing to the development of evidence-based nursing practices.

Overall, integrating the CD-Quest-T into nursing research and practice may strengthen nurses' roles in early identification, prevention, psychoeducation, referral, and the promotion of adolescent mental health.

Conclusion

The European Portuguese version of the Cognitive Distortions Questionnaire for Adolescents (CD-Quest-T) demonstrated adequate psychometric properties, supporting its unifactorial structure, internal consistency, and convergent validity with measures of anxiety and depression. These findings provide evidence of the instrument's reliability and validity as a measure of cognitive distortions among European Portuguese-speaking adolescents.

Given its brevity, developmental appropriateness, and ease of administration, the CD-Quest-T may be a useful complementary tool for nurses working in school health, primary care, and community settings. Its use can support the early identification of maladaptive cognitive patterns associated with emotional vulnerability, helping nurses guide psychoeducational activities, brief cognitive-behavioral strategies, emotional regulation interventions, and timely referral to specialized mental health services when clinically indicated.

However, the CD-Quest-T should not be interpreted as a diagnostic instrument, but rather as a screening and clinical decision-support tool within broader adolescent mental health assessment. Further studies are warranted to evaluate the CD-Quest-T in clinical populations, examine its sensitivity to change following nursing-led or cognitive-behavioral interventions, and explore its longitudinal and predictive utility in nursing practice.

CRedit authorship contribution statement

Ana Cristina Maia Rocha: Writing – review & editing, Writing – original draft, Validation, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Leonel Lusquinhos:** Writing – review & editing, Validation, Supervision, Methodology, Formal analysis. **Ana Lúcia da Silva João:** Writing – review & editing, Validation, Formal analysis. **Irismar Reis de Oliveira:** Writing – review & editing. **Lara Manuela Guedes de Pinho:** Writing – review & editing, Validation, Supervision, Methodology, Formal analysis.

Informed consent

Informed assent and/or consent were obtained from all participants and, when required, from their legal guardians, in accordance with institutional and national ethical guidelines.

Ethical approval

The study was approved by an institutional ethics committee and the national educational authority and conducted in accordance with the Declaration of Helsinki.

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Declaration of competing interest

A potential non-financial conflict of interest exists, as one of the authors contributed to the development of the adult version of the Cognitive Distortions Questionnaire (CD-Quest). This author had no involvement in the data analysis, interpretation of results, or conclusions of this study. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

The datasets generated and analyzed in the current study are not publicly available due to ethical and privacy restrictions; however, they are available from the corresponding author upon reasonable request.

References

- Andreas, J. B., & Brunborg, G. S. (2017). Depressive symptomatology among Norwegian adolescent boys and girls: The patient health questionnaire-9 (PHQ-9) psychometric properties and correlates. *Frontiers in Psychology*, 8(JUN). <https://doi.org/10.3389/fpsyg.2017.00887>
- Anum, A., Adjorlolo, S., & Kugbey, N. (2019). Depressive symptomatology in adolescents in Ghana: Examination of psychometric properties of the Patient Health Questionnaire-9. *Journal of Affective Disorders*, 256, 213–218. <https://doi.org/10.1016/j.jad.2019.06.007>
- Bartlett, M. S. (1954). A note on the multiplying factors for various χ^2 approximations. *Journal of the Royal Statistical Society: Series B (Methodological)*, 16, 296–298. <https://doi.org/10.1111/j.2517-6161.1954.tb00174.x>
- Batmaz, S., Kocbiyik, S., & Yuncu, O. A. (2015). Turkish version of the cognitive distortions questionnaire: Psychometric properties. *Depression Research and Treatment*, 2015. <https://doi.org/10.1155/2015/694853>
- Beck, A. T., & Haigh, E. A. P. (2014). Advances in cognitive theory and therapy: The generic cognitive model. *Annual Review of Clinical Psychology*, 10, 1–24. <https://doi.org/10.1146/annurev-clinpsy-032813-153734>
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press www.guilford.com/MSS.
- Cannon, M. F., & Weems, C. F. (2010). Cognitive biases in childhood anxiety disorders: Do interpretive and judgment biases distinguish anxious youth from their non-anxious peers? *Journal of Anxiety Disorders*, 24(7), 751–758. <https://doi.org/10.1016/j.janxdis.2010.05.008>
- de Oliveira, I. R., Seixas, C., Osório, F. L., Crippa, J. A. S., de Abreu, J. N., Menezes, I. G., ... Wenzel, A. (2015). Evaluation of the psychometric properties of the cognitive distortions questionnaire (CD-Quest) in a sample of undergraduate students. *Innovation in Clinical Neuroscience*, 12(7–8), 20–27. <https://pubmed.ncbi.nlm.nih.gov/26351620>.
- de Souza, C. L. S. G., Pires, P. P., Couto, I. S. L., de Vasconcelos, N. S. S. M., Menezes, I. G., & de Oliveira, I. R. (2023). Development and psychometric properties of the Cognitive Distortions Questionnaire for Adolescents (CD-Quest-T). *Trends in*

- Psychiatry and Psychotherapy*, 45(e20210214), 1–8. <https://doi.org/10.47626/2237-6089-2021-0214>
- DeVellis, R. F., & Thorpe, C. T. (2022). *Scale development: Theory and applications* (5th ed.). SAGE Publications, Inc.
- Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion*, 7(2), 336–353. <https://doi.org/10.1037/1528-3542.7.2.336>
- Fonseca-Pedrero, E., Díez-Gómez, A., Pérez-Albéniz, A., Al-Halabi, S., Lucas-Molina, B., & Debbané, M. (2023). Youth screening depression: Validation of the Patient Health Questionnaire-9 (PHQ-9) in a representative sample of adolescents. *Psychiatry Research*, 328. <https://doi.org/10.1016/j.psychres.2023.115486>
- Freitas, A. I. F., Barros, L., & Mendonça, D. (2012). Cognitive errors and anxiety in school aged children. *Psicologia: Reflexão e Crítica*, 25(4), 817–823. <https://doi.org/10.1590/S0102-79722012000400022>
- Ganguly, S., Samanta, M., Roy, P., Chatterjee, S., Kaplan, D. W., & Basu, B. (2013). Patient health questionnaire-9 as an effective tool for screening of depression among Indian adolescents. *Journal of Adolescent Health*, 52(5), 546–551. <https://doi.org/10.1016/j.jadohealth.2012.09.012>
- Gonçalves, M., & Santiago, L. M. d. M. S. (2019). *Ansiedade em Crianças e Adolescentes - Validação da Escala GAD-7 [Anxiety in children and adolescents – Validation of the GAD-7 scale]* [Master's thesis, Faculdade de Medicina da Universidade de Coimbra]. <https://estudogeral.ucp.pt/bitstream/10316/89592/1/Tese%20final%20Ma%cc%81rcia%20Gonc%ca7alves.pdf>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate Data Analysis* (8th ed.). Cengage Learning www.cengage.com/highered
- IBM Corp. (2023). *IBM SPSS statistics for windows (version 29.0.2.0)*. IBM Corp.
- International Test Commission. (2017). The ITC guidelines for translating and adapting tests (2nd ed.). <https://www.intestcom.org>
- JASP Team. (2025). JASP (Version 0.95.4). <https://jasp-stats.org>
- Johnson, J. G., Harris, E. S., Spitzer, R. L., & Williams, J. B. W. (2002). The patient health questionnaire for adolescents. *Journal of Adolescent Health*, 30(3), 196–204. [https://doi.org/10.1016/S1054-139X\(01\)00333-0](https://doi.org/10.1016/S1054-139X(01)00333-0)
- Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and Psychological Measurement*, 34(1), 111–117. <https://doi.org/10.1177/001316447403400115>
- Kaplan, S. C., Morrison, A. S., Goldin, P. R., Olino, T. M., Heimberg, R. G., & Gross, J. J. (2017). The Cognitive Distortions Questionnaire (CD-Quest): Validation in a sample of adults with social anxiety disorder. *Cognitive Therapy and Research*, 41(4), 576–587. <https://doi.org/10.1007/s10608-017-9838-9>
- Kostoglou, S. L., & Pidgeon, A. M. (2016). The cognitive distortions questionnaire: Psychometric validation for an Australian population. *Australian Journal of Psychology*, 68(2), 123–129. <https://doi.org/10.1111/ajpy.12101>
- Leitenberg, H., Yost, L. W., & Carroll-Wilson, M. (1986). Negative cognitive errors in children: Questionnaire development, normative data, and comparisons between children with and without self-reported symptoms of depression, low self-esteem, and evaluation anxiety. *Journal of Consulting and Clinical Psychology*, 54(4), 528–536. <https://doi.org/10.1037//0022-006x.54.4.528>
- Maric, M., Heyne, D. A., Van Widenfelt, B. M., & Westenberg, P. M. (2011). Distorted cognitive processing in youth: The structure of negative cognitive errors and their associations with anxiety. *Cognitive Therapy and Research*, 35(1), 11–20. <https://doi.org/10.1007/s10608-009-9285-3>
- Morrison, A. L., Morrison, A. S., Potter, C. M., Carper, M. M., Kinner, D. G., Jensen, D., ... Heimberg, R. G. (2015). The Cognitive Distortions Questionnaire (CD-Quest): Psychometric properties and exploratory factor analysis. *International Journal of Cognitive Therapy*, 8(4), 287–305. <https://doi.org/10.1521/ijct.2015.8.4.287>
- Orchard, F., & Reynolds, S. (2018). The combined influence of cognitions in adolescent depression: Biases of interpretation, self-evaluation, and memory. *British Journal of Clinical Psychology*, 57(4), 420–435. <https://doi.org/10.1111/bjc.12184>
- Qian, L., Liu, L., Chen, M., Wang, S., Cao, Z., & Zhang, N. (2020). Reliability and validity of the Chinese version of the cognitive distortions questionnaire (cd-quest) in college students. *Medical Science Monitor*, 26, Article e926786. <https://doi.org/10.12659/MSM.926786>
- Slavny, R. J. M., Sebastian, C. L., & Pote, H. (2019). Age-related changes in cognitive biases during adolescence. *Journal of Adolescence*, 74, 63–70. <https://doi.org/10.1016/j.adolescence.2019.04.007>
- Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., ... Fusar-Poli, P. (2022). Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry*, 27(1), 281–295. <https://doi.org/10.1038/s41380-021-01161-7>
- Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, 166(10). <https://doi.org/10.1001/archinte.166.10.1092>
- Tairi, T. (2020). Associations between cognitive errors and mental health status in New Zealand adolescents. *Behavioural and Cognitive Psychotherapy*, 48(3), 280–290. <https://doi.org/10.1017/S1352465819000626>
- Tairi, T., Adams, B., & Zilikis, N. (2016). Cognitive errors in Greek adolescents: The linkages between negative cognitive errors and anxious and depressive symptoms. *International Journal of Cognitive Therapy*, 9(3), 261–279. <https://doi.org/10.1521/ijct.2016.09.11>
- Thingbak, A., Wells, A., & O'Toole, M. S. (2024). Group metacognitive therapy for children and adolescents with anxiety and depression: A preliminary trial and test of proposed mechanisms. *Journal of Anxiety Disorders*, 107, Article 102926. <https://doi.org/10.1016/j.janxdis.2024.102926>
- Tsai, F. J., Huang, Y. H., Liu, H. C., Huang, K. Y., Huang, Y. H., & Liu, S. I. (2014). Patient Health Questionnaire for school-based depression screening among Chinese adolescents. *Pediatrics*, 133(2). <https://doi.org/10.1542/peds.2013-0204>
- Weems, C. F., Berman, S. L., Silverman, W. K., & Saavedra, L. M. (2001). Cognitive errors in youth with anxiety disorders: The linkages between negative cognitive errors and anxious symptoms. *Cognitive Therapy and Research*, 25(5), 559–575. <https://doi.org/10.1023/A:1005505531527>
- World Health Organization. (2025). Mental health of adolescents. <https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health>
- Zbukvic, I., McKay, S., Cooke, S., Anderson, R., Pilkington, V., McGillivray, L., ... Tye, M. (2024). Evidence for targeted and universal secondary school-based programs for anxiety and depression: An overview of systematic reviews. *Adolescent Research Review*, 9(1), 53–73. <https://doi.org/10.1007/s40894-023-00211-1>