

Trends

in Psychiatry and Psychotherapy

JOURNAL ARTICLE PRE-PROOF **(as accepted)**

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<http://dx.doi.org/10.47626/2237-6089-2021-0214>

Original submitted Date: 29-Jan-2021

Accepted Date: 13-Aug-2021

This is a preliminary, unedited version of a manuscript that has been accepted for publication in Trends in Psychiatry and Psychotherapy. As a service to our readers, we are providing this early version of the manuscript. The manuscript will still undergo copyediting, typesetting, and review of the resulting proof before it is published in final form on the SciELO database (www.scielo.br/trends). The final version may present slight differences in relation to the present version.

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Conflicts of interest? No

ABSTRACT

CONTEXT: The Cognitive Distortions Questionnaire (CD-Quest) is an instrument that identifies logical errors or cognitive distortions, [only available for adults](#), and used in trial-based cognitive therapy (TBCT). **PURPOSE:** To develop [and validate](#) a version of the CD-Quest for teens (CD-Quest-T) aged 11 to 17 years, and test its psychometric properties. **METHOD:** A total of 299 students participated in the investigation. After having its content validity assessed, the language was adapted to the age group, and the instrument was reduced to 8 items (from the initial 15). Five cognitive therapists analyzed the content and structure of the items. Lastly, to investigate the construct validity of the CD-Quest-T, the instrument was divided into [a full scale](#)

and two subscales, which measure the frequency of the distortions and the magnitude attributed to them. **RESULTS:** The overall internal consistency of the scale was $\alpha = 0.77$, whereas for the frequency scale, it was $\alpha = 0.75$, and for the intensity scale, $\alpha = 0.73$. Results from exploratory factor analysis and concurrent validity indicated that the CD-Quest-T items have good psychometric properties and generate scores reliably. **CONCLUSION:** The psychometric properties of the CD-Quest-T demonstrate its adequacy to measure cognitive distortions in adolescents.

Keywords: psychometrics, cognitive distortions, adolescents, questionnaires

INTRODUCTION

One of the intervention methods in cognitive-behavioral therapy (CBT) consists in addressing automatic thoughts (ATs), which are non-deliberate, spontaneous, quick, and pre-conscious cognitions. ATs are closely related to health because they directly affect emotions and behaviors. The psychological disorders follow specific cognitive patterns, maintained by dysfunctional core beliefs (CBs). These, when activated, can generate dysfunctional emotions and behaviors, potentially impairing the person's mental health and, consequently, their quality of life.^{1,2}

According to Beck,³ once the events can be perceived distortedly, such perceptions are called cognitive distortions, which, in excess, can lead to emotional difficulties or exacerbate mental disorders, such as depression and anxiety.

The adolescents' ways of interpreting their life experiences shape their emotional reactions and behaviors. When the person's dysfunctional CBs influence these ideas, logical errors or

cognitive distortions can intensely and frequently occur. Hence, the need for instruments to identify and quantify the possible cognitive distortions in this age group. The aim is to find ways to prevent such dysfunctional CBs' activation, as they may cause more problematic information processing and, consequently, impair the adolescents' healthy functioning.^{4,5}

The current scientific literature has some specific instruments that measure ATs. One of them is the Cognitive Distortions Questionnaire (CD-Quest), aimed at the general population and is used mainly in trial-based cognitive therapy (TBCT).⁶ It also aims to identify the cognitive errors to help the patient in their daily task of identifying cognitive distortions and relating them to emotions and behaviors. It provides the therapist with a quantitative measure for clinical follow-up.⁶ The CD-Quest's psychometric properties have been evaluated in Brazil,^{7,8} the United States,^{9,10} Australia,¹¹ Turkey,¹² and China.¹³

Two studies were conducted to assess the psychometric properties of the CD-Quest, adult version, in Brazil.^{7,8} The first one,⁷ included 184 university students, showing excellent supporting evidence in all the validation stages of the instrument. The factor analysis confirmed a unidimensional model, with an internal consistency measured with Cronbach's $\alpha = 0.85$. Moreover, the concurrent validity shows that the correlations between CD-Quest with the BDI and BAI are moderate ($r = 0.65$; $r = 0.52$), with high test-retest reliability (ICC= 0.87). The second Brazilian study⁸ included 197 university students and showed a good internal consistency, with Cronbach's $\alpha = 0.90$. A unidimensional solution was also observed, which corroborates the initial findings and shows that the CD-Quest is suitable to measure cognitive distortions in the Brazilian population.

In the USA, Morrison et al.⁹ analyzed the psychometric properties of the CD-Quest administered to 906 students of a public university. They found excellent internal consistency with

Cronbach's $\alpha = 0.88$. The study identified a single factor and good psychometric properties, showing strong evidence of convergent validity with AT measures [e.g., Automatic Thoughts Questionnaire-Revised (ATQ-R)],¹⁴ psychopathology measures [e.g., Anxiety Sensitivity Index-3 (ASI-3)]¹⁵ and general functioning measures (e.g., Quality of Life Inventory (QOLI)).¹⁶ Discriminant validity was proved against the Levenson Self-Report Psychopathology Scale (LSRP).¹⁷ Also, in the USA, Kaplan et al.¹⁰ conducted a study to assess the psychometric properties of CD-Quest in 216 patients diagnosed with social anxiety disorder (SAD). Again, they noticed an excellent internal consistency with Cronbach's $\alpha = 0.91$, and reported a unidimensional structure using exploratory factor analysis and confirmatory factor analysis.

In Australia, the CD-Quest was validated by Kostoglou et al.,¹¹ with a sample of 127 university students. Their study showed an adequate internal consistency with Cronbach's $\alpha = 0.80$, and significant positive correlations between the CD-Quest and both the ATQ¹⁴ and the Depression Anxiety Stress Scales (DASS).¹⁸ They also confirmed the convergent and discriminant validity of the questionnaire in the studied population.

The CD-Quest was also studied by Batmaz et al.¹² in a clinical setting in two cities of Turkey. The research was conducted with a sample of 269 patients and yielded excellent internal consistency results with Cronbach's $\alpha = 0.93$, good test-retest reliability ($r = 0.90$), a unidimensional factor structure, and evidence of convergent and discriminant validity.

The reliability and validity of the Chinese version of the CD-Quest were recently confirmed among 239 Chinese college students. The results also suggested a unidimensional factor structure. An excellent internal consistency was demonstrated with Cronbach's $\alpha = 0.94$ and the test-retest reliability was 0.93.¹³

In the review conducted for the present study, no questionnaires were found with the characteristics of the CD-Quest-T. The one that came closest was the CNCEQ (Children Negative Cognitive Error Questionnaire), developed by Leitenberg et al.¹⁹ and revised by Messer et al.²⁰

The CD-Quest-T is an adaptation of the original CD-Quest adult version,⁶ which identifies both the frequency and intensity with which the cognitive distortions occur during the week. Hence, it is an initial self-monitoring instrument that helps in the patient's psychoeducation and in understanding the distortions and errors the person can make in the situations they experience. Therefore, the objective of this study was to develop the adolescent version of the CD-Quest, adapting it to this age group's language.

1. Portuguese Version (CD-Quest-T)

Questionário de Distorções Cognitivas CD-Quest Versão para Adolescentes

Irismar Reis de Oliveira

Nome: Data:..... Serie:.....

Leia com atenção e faça um círculo em torno do número que melhor descreve quantas vezes e em que intensidade os erros ou distorções cognitivas ocorreram durante esta semana. Ao avaliar cada distorção cognitiva, por favor, indique quanto você acreditou nela no momento em que ela aconteceu (e não quanto você acredita agora) e com que frequência ela aconteceu durante esta semana.

DURANTE ESTA SEMANA, PERCEBI QUE ESTAVA PENSANDO DA SEGUINTE FORMA:

1. **Pensamento tudo-ou-nada:** Vejo os acontecimentos e as pessoas como “tudo ou nada” ou “oito ou oitenta”. Não considero o que está no meio.

EXEMPLOS: “Se não tiro 10, isso significa que fracasei na prova”. “Ou consigo estudar todo o assunto, ou é melhor nem tentar.” “Minha mãe não me deu o presente que eu queria. Ela não gosta de mim.”

Intensidade:	Frequência:	Não aconteceu	Aconteceu 1 a 2 dias na semana	Aconteceu 3 a 5 dias na semana	Aconteceu o tempo todo, 6 a 7 dias na semana
Acreditei...		0			
Um pouco			1	2	3
Médio			2	3	4
Muito			3	4	5

2. **Previsão do futuro:** Adivinhei o futuro, como se tivesse uma bola de cristal, geralmente prevendo o pior.

EXEMPLOS: “Vou ficar nervoso e me dar mal na prova”. “A diretora me chamou para ir à secretaria. Ela vai brigar comigo”. “A festa vai ser muito ruim”.

Intensidade:	Frequência:	Não aconteceu	Aconteceu 1 a 2 dias na semana	Aconteceu 3 a 5 dias na semana	Aconteceu o tempo todo, 6 a 7 dias na semana
Acreditei...		0			
Um pouco			1	2	3
Médio			2	3	4
Muito			3	4	5

3. **Desqualificação do positivo:** Desmereço ou diminuo o valor das coisas boas e positivas que acontecem comigo.

EXEMPLOS: “Só tirei nota boa na prova porque estava fácil.” “Minha mãe ficou contente porque eu a ajudei, mas isso não foi mais do que minha obrigação.” “Passar de ano não foi grande coisa. Qualquer um consegue.”

Intensidade:	Frequência:	Não aconteceu	Aconteceu 1 a 2 dias na semana	Aconteceu 3 a 5 dias na semana	Aconteceu o tempo todo, 6 a 7 dias na semana
Acreditei...		0			
Um pouco			1	2	3
Médio			2	3	4
Muito			3	4	5

4. **Rotulação:** Coloco um carimbo, um rótulo ou uma etiqueta geralmente negativo em mim ou nos outros.

EXEMPLOS: “Maria é metida.” “Paulo é antipático.” “Sou burro.” “Sou um fracasso.”

Intensidade:	Frequência:	Não aconteceu	Aconteceu 1 a 2 dias na semana	Aconteceu 3 a 5 dias na semana	Aconteceu o tempo todo, 6 a 7 dias na semana
Acreditei...		0			
Um pouco			1	2	3
Médio			2	3	4
Muito			3	4	5

5. **Leitura mental:** Acredito que posso adivinhar o que as pessoas estão pensando ou que elas podem adivinhar meus pensamentos.

EXEMPLOS: “Alice não me ligou porque não quer sair comigo.” “Pela cara do professor, tirei nota baixa.”

“Jane passou e nem me olhou. Deve estar zangada comigo.”

Intensidade:	Frequência:	Não aconteceu	Aconteceu 1 a 2 dias na semana	Aconteceu 3 a 5 dias na semana	Aconteceu o tempo todo, 6 a 7 dias na semana
Acreditei...		0			
Um pouco			1	2	3
Médio			2	3	4
Muito			3	4	5

6. **Generalização:** Generalizo e exagero as coisas usando palavras como “sempre”, “nunca”, “tudo”, “nada”, “só”, etc.

EXEMPLOS: “Ninguém gosta de mim.” “Nada comigo dá certo”. “Meus pais nunca me entendem”.

Intensidade:	Frequência:	Não aconteceu	Aconteceu 1 a 2 dias na semana	Aconteceu 3 a 5 dias na semana	Aconteceu o tempo todo, 6 a 7 dias na semana
Acreditei...		0			
Um pouco			1	2	3
Médio			2	3	4
Muito			3	4	5

7. **Conclusões precipitadas:** Tiro conclusão precipitada e faço as coisas de forma apressada, sem observar melhor o que está se passando.

EXEMPLOS: “Fui mal na primeira unidade. Não adianta continuar, vou abandonar o colégio.” “Se não respondeu a minha mensagem é porque não se importa comigo.” “Se olhou para minha namorada, é porque está paquerando ela.”

Intensidade:	Frequência:	Não aconteceu	Aconteceu 1 a 2 dias na semana	Aconteceu 3 a 5 dias na semana	Aconteceu o tempo todo, 6 a 7 dias na semana
Acreditei...		0			
Um pouco			1	2	3
Médio			2	3	4
Muito			3	4	5

8. **Culpar:** Culpo as pessoas pelo que me acontece, não considerando minha responsabilidade no acontecimento.

EXEMPLOS: “Meus pais são os únicos culpados por minha infelicidade.” “Tirei nota baixa por culpa da professora.” “Cheguei atrasado porque minha mãe não me acordou.”

Intensidade:	Frequência:	Não aconteceu	Aconteceu 1 a 2 dias na semana	Aconteceu 3 a 5 dias na semana	Aconteceu o tempo todo, 6 a 7 dias na semana
Acreditei...		0			
Um pouco			1	2	3
Médio			2	3	4
Muito			3	4	5

2. English Version (CD-Quest-T)

Cognitive Distortions Questionnaire

Version for Teenagers (CD-Quest-T)

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Irismar Reis de Oliveira

Many thoughts go through our minds. Many of these thoughts are correct, however, many others are inaccurate.

For this reason they are called thinking errors or cognitive distortions.

Take this example: Paul is a good student who handed in his essay, which the teacher corrected. She made few corrections.

Paul became nervous and thought: “The teacher didn’t like it. If the essay were good, she wouldn’t have made any corrections.”

To Paul, there are only two conditions: either the essay is good, or it is bad. This type of thinking error is known as “all or nothing.”

Since Paul had this thought on Friday and Saturday (two days), and Paul believed it a lot, he circled number 3 in the second column of the chart below.

1. **All-or-nothing thinking:** I see events and people as “all or nothing” or “black or white,” and don’t consider the gray areas.

EXAMPLES: “If I don’t get an A, this means I failed my test.” “Either I’m able to study all the subject matter, or I might as well not even try.”

“My Mom didn’t give me the present I wanted. She doesn’t like me.”

Paul’s example: *My essay is really bad. If it were a good one, my teacher wouldn’t have made any corrections.*

Frequency:	Didn’t Happen	If happened 1 to 2 days this week	If happened 3 to 5 days this week	If happened all the time, 6 to 7 days this week
Intensity:				
I believed it...	0			
A little		1	2	3
Somewhat		2	3	4
A lot		3	4	5

Please turn the page and evaluate how you think.

Cognitive Distortions Questionnaire

Version for Teenagers (CD-Quest-T)

Irismar Reis de Oliveira

Name: Date:..... Grade:.....

Read carefully and circle the number that best describes how many times the cognitive distortions happened and how intense they were during this week. When evaluating each cognitive distortion, please indicate how much you believed it at the time it happened (and not how much you believe it now) and how often it happened during this week.

DURING THIS WEEK, I NOTICED THAT I WAS THINKING IN THE FOLLOWING MANNER:

1. **All-or-nothing thinking:** I see events and people as “all or nothing” or “black or white,” and don’t consider the gray areas.

EXAMPLES: “If I don’t get an A, this means I failed my test.” “Either I’m able to study all the subject matter, or I might as well not even try.”

“My Mom didn’t give me the present I wanted. She doesn’t like me.”

Intensity:	Frequency:	Didn’t Happen	It happened 1 to 2 days this week	It happened 3 to 5 days this week	It happened all the time, 6 to 7 days this week
I believed it...		0			
A little			1	2	3
Somewhat			2	3	4
A lot			3	4	5

2. **Fortune-telling:** I guess the future, as if I had a crystal ball, usually predicting the worst.

EXAMPLES: “I’ll be nervous and do poorly on the test.” “The principle called me to the office. I’m in trouble.” “The party will be awful.”

Intensity:	Frequency:	Didn’t Happen	It happened 1 to 2 days this week	It happened 3 to 5 days this week	It happened all the time, 6 to 7 days this week
I believed it...		0			
A little			1	2	3
Somewhat			2	3	4
A lot			3	4	5

3. **Discounting positives:** I discredit or decrease the merit of the good and positive things that happen to me.

3. Discounting positives: I discredit or decrease the merit of the good and positive things that happen to me.

EXAMPLES: “I only got a good grade on the test because it was easy.” “My Mom was happy because I helped her, but it was nothing more than my duty.”

“Passing my final exams wasn’t a big deal; anyone can do that.”

Frequency:	Didn’t Happen	It happened 1 to 2 days this week	It happened 3 to 5 days this week	It happened all the time, 6 to 7 days this week
Intensity:				
I believed it...	0			
A little		1	2	3
Somewhat		2	3	4
A lot		3	4	5

4. Labeling: I put a stamp, a label or a tag, usually negative, on myself or others.

EXAMPLES: “Maria is a snob.” “Paulo is rude.” “I’m stupid.” “I’m a failure.”

Frequency:	Didn’t Happen	It happened 1 to 2 days this week	It happened 3 to 5 days this week	It happened all the time, 6 to 7 days this week
Intensity:				
I believed it...	0			
A little		1	2	3
Somewhat		2	3	4
A lot		3	4	5

5. Mind reading: I believe I can guess what people are thinking or that they can guess my thoughts.

EXAMPLES: “Alice didn’t call me because she doesn’t want to go out with me.” “From the looks on my teacher’s face, I got a bad grade.”

“Jane walked by and didn’t even look my way. She must be mad at me.”

Frequency:	Didn’t Happen	It happened 1 to 2 days this week	It happened 3 to 5 days this week	It happened all the time, 6 to 7 days this week
Intensity:				
I believed it...	0			
A little		1	2	3
Somewhat		2	3	4
A lot		3	4	5

6. Overgeneralizing: I generalize and exaggerate things by using words like “always,” “never,” “all,” “nothing,” “only,” etc.

EXAMPLES: “Nobody likes me.” “I can’t do anything right.” “My parents never understand me.”

Frequency: Intensity:	Didn't Happen	It happened 1 to 2 days this week	It happened 3 to 5 days this week	It happened all the time, 6 to 7 days this week
I believed it...	0			
A little		1	2	3
Somewhat		2	3	4
A lot		3	4	5

7. Jumping to conclusions: I jump to conclusions and do things hastily, without taking a better look at what’s going on.

EXAMPLES: “I did badly in the first quarter. No use continuing, I’m going to quit school.” “If he didn’t reply to my message, it’s because he doesn’t care about me.” “If he looked at my girlfriend, it’s because he is flirting with her.”

Frequency: Intensity:	Didn't Happen	It happened 1 to 2 days this week	It happened 3 to 5 days this week	It happened all the time, 6 to 7 days this week
I believed it...	0			
A little		1	2	3
Somewhat		2	3	4
A lot		3	4	5

8. Blaming: I blame others for what happens to me, without considering my responsibility in the situation.

EXAMPLES: “My parents are the only ones to blame for my unhappiness.” “It’s the teacher’s fault that I got a poor grade.” “I arrived late because my mom didn’t wake me up.”

Frequency: Intensity:	Didn't Happen	It happened 1 to 2 days this week	It happened 3 to 5 days this week	It happened all the time, 6 to 7 days this week
I believed it...	0			
A little		1	2	3
Somewhat		2	3	4
A lot		3	4	5

Table 1. Original CD-Quest items, indicating the ones modified in or excluded from the CD-Quest-T

Original CD-Quest items	Items modified in CD-Quest-T	Items excluded from CD-Quest-T
1. Dichotomous thinking	1. All-or-nothing thinking	4. Emotional reasoning
2. Fortune telling	2. Fortune telling	6. Magnification/Minimization
3. Disqualifying negative aspects	3. Discounting positives	7. Selective abstraction
4. Emotional reasoning	4. Labeling	10. Personalization
5. Labeling	5. Mind reading	11. "Should" statements
6. Magnification/Minimization	6. Overgeneralizing	14. What if...?
7. Selective abstraction	7. Jumping to conclusions	15. Unfair comparisons
8. Mind reading	8. Blaming	
9. Overgeneralization		
10. Personalization		
11. "Should" statements		
12. Jumping to conclusions		
13. Blaming		
14. What if...?		
15. Unfair comparisons		

METHOD

This study was conducted in two phases, as described below. In the first phase, the objective was to adapt the CD-Quest to adolescents, and in the second phase, to analyze the psychometric properties of the CD-Quest-T.

Table 2. MSA and KMO values of the factorial analysis used for items of the CD-Quest-T.

ITEM	MSA
1. All-or-nothing	0.87
2. Fortune telling	0.86
3. Discounting positives	0.80
4. Labeling	0.83
5. Mind reading	0.82
6. Overgeneralizing	0.83
7. Jumping to conclusions	0.87
8. Blaming	0.82
KMO	0.83

Phase 1- Adaptation of the CD-Quest-T

The data for the development of the CD-Quest-T was collected through Survey Monkey (www.surveymonkey.com). Questions on cognitive distortions were previously sent via e-mail to cognitive therapists in Brazil through the list of the Brazilian Federation of Cognitive Therapies (FBTC; <https://www.fbtc.org.br>), and around the world through the Academy of Cognitive and Behavioral Therapies listserv (ACBT; www.academyofct.org).

Table 3. Factor analysis of the individual items of the CD-Quest-T

ITEM	Factor 1	h2*	Correlation item X result
1. All-or-nothing	0.38	0.14	0.86
2. Fortune telling	0.53	0.28	0.72
3. Discounting positives	0.35	0.12	0.88
4. Labeling	0.64	0.41	0.59
5. Mind reading	0.69	0.48	0.52
6. Overgeneralizing	0.65	0.42	0.58
7. Jumping to conclusions	0.62	0.41	0.59
8. Blaming	0.47	0.22	0.78

Source: Data collected by the author

*h2 = communality (common variance)

Factor 1 = factor loadings

The therapists who participated (FBTC = 69; ACBT = 16) chose, from the 15-distortion list in the adult version of the CD-Quest, the 5 most common ones among the adolescents they attended. They also suggested likely examples of cognitive distortions they dealt with in these patients' therapeutic process. Based on the therapists' answers, the 8 cognitive distortions found most often in adolescents were selected, along with their respective examples. The idea was to reduce the items of the original instrument from 15 to 8, making this a short version with a more suitable language to identify such distortions in this age group.

After the CD-Quest-T was designed, it was sent to 5 people who were not involved in the previous survey, and who accepted to take on the role of experts to assess the items' development quality. Four questions regarding the items of the instrument were asked: 1) Does each item adequately assess the cognitive distortions? 2) Can they clearly evaluate the frequency and intensity of the distortions? 3) Is the language adequate for adolescents? 4) Would you suggest any changes (e.g., inclusion or exclusion of items)?

In this phase, the experts evaluated the questionnaire based on the definitions and items specified in an answer sheet developed for this purpose. The expected level of agreement in the content was between 70% and 100%.²¹

Phase 2 – Assessment of the psychometric properties of the CD-Quest-T

Sample

The sample involved 299 students, comprising 277 (92.6%) students from two public schools and 22 (7.3%) from a private one, in Salvador, Bahia, Brazil. The age ranged from 11 to 17 years – encompassing the age group proposed in the study to adapt the CD-Quest-T. They

were from the sixth to ninth grades; 156 (52.1%) students were females and 143 (47.8%) were males. The sample was chosen according to the students' schedules.

Instruments

Besides the CD-Quest-T, two other scales were used in this study to provide information on criteria validity: the Children's Depression Inventory (CDI)²² and Screen for Child Anxiety Related Emotional Disorders – Revised (SCARED-R).²³

The CDI was developed to assess the depressive symptoms in childhood, adapted from the Beck Depression Inventory (BDI)²⁴ and devised by Kovacs.²⁵ It is used with children aged 7 to 15 years old. It is a self-administered instrument with 27 items in its original version. In this study, 20 items were used, distributed in blocks with three affirmative sentences, to identify with which intensity and frequency each situation took place. The Brazilian version of the CDI was translated, adapted, and standardized by Gouveia et al.,²⁶ in a sample with 305 students, 8 to 15 years old, from public and private schools of João Pessoa, Paraíba, Brazil. It presented an internal consistency coefficient of 0.81. Another study conducted in public and private schools of São Luís, Maranhão, Brazil, with a sample of 280 students, aged 9 to 17 years old, assessing the CDI psychometric properties, showed a high internal consistency index, with Cronbach's $\alpha = 0.91$.²²

The SCARED-R is a questionnaire developed by Birmaher et al.²⁷ to assess anxiety-related emotional problems or disorders in children and adolescents. The version used in this study has 41 items, which aimed to assess different dimensions of anxiety in the age group from 8 to 18 years old. The scale is divided into ten categories corresponding to the subdivisions of the anxiety disorders in the DSM-IV. On a scale of three points (0 = never or seldom, 1 =

sometimes, 2 = frequently), it indicates the child's experiences with the symptoms observed in the previous three months.^{23,27,28} The study on the psychometric properties of the Brazilian version of the SCARED-R was performed by Isolan et al.²⁹, in a sample of 2,410 students aged 9 to 18 years old, with a Cronbach's $\alpha = 0.90$ for the total scale, and test-retest reliability of the total score of $r = 0.68$ and $ICC = 0.81$.

For the adaptation of the CD-Quest-T from the original adult version to adolescents, it was not necessary to change the original structure, but only the language used. Also, the number of items with cognitive distortions was reduced from 15 to 8. The intention was to give it an adequate size and format, making it more suitable for the age group. Also, a questionnaire was used to obtain sociodemographic data such as age, school grade, and gender.

Procedure

Data for the adaptation of the CD-Quest-T were collected in two schools from July 2015 to July 2016, in 50-minute classes during school hours. As this study is part of a larger one that addresses the preventive use of the trial-based cognitive training (TBCTr) in schools, the questions in the CD-Quest-T were explained to the students at the end of one of the meetings related to the cognitive distortions foreseen in the manual comprising 18 meetings developed for this age group, involving TBCTr and used in group sessions.³⁰

Three mental health professionals were available in the classroom for clarification if they had doubts when filling out the CD-Quest-T. The students had to identify the cognitive distortions, circling the number that corresponded to the frequency they occurred in the previous week and the intensity with which they believed them at the moment the distortions occurred.

Data analysis

The CD-Quest-T's psychometric properties were analyzed in R software. The content validity index (CVI) for the total score items was estimated in the first phase. The minimum CVI required for the items was according to the recommendations of Almanasreh, Moles, and Chen³¹ – i.e., preferably of 100%, while a value below .80 would indicate that the item needed to be either changed or removed. In the construct validity, an exploratory factor analysis (EFA) was employed. First, the factorability of the data was analyzed by estimating the Kaiser-Meyer-Olkin (KMO) index, for which the results are considered minimally adequate, beginning at 0.60. The individual measures of sampling adequacy (MSA) indexes of the items were also reported. Bartlett's sphericity test was used in this phase to confirm the adequacy of the correlation matrix, in which the items must present minimum collinearity. The factor loadings presented were reported considering $r > 0.30$ as the minimum necessary value for each item to be retained.²¹

The correlation between scales was used to test the concurrent validity between the CD-Quest-T and the SCARED-R and CDI. In the internal consistency and reliability analysis of the scales, the Cronbach's alpha (α) was estimated, with a reference value of $\alpha > 0.70$, separately calculated for CD-Quest-T's total score, frequency and intensity subscales.³²

Ethical Considerations

The project was submitted to the research ethics committee of Climério de Oliveira Maternity Hospital, and approved under number 966.202. All the procedures adopted in this research comply with the ethics guidelines stipulated in Resolution 466/2012 of the Brazilian

National Health Council.³³ All students signed an assent form prior to participation, and their parents or legal guardians signed a consent form.

RESULTS

Content Validity

The first part of this paper consisted of adapting the CD-Quest-T based on the results of the questions sent to the cognitive therapists. Out of the 15 cognitive distortions present in the CD-Quest, adult version, they indicated the five they considered the most common and frequent among adolescents. From the answers they sent, the eight cognitive distortions most cited by those professionals were selected.

In this version, the main characteristics of the CD-Quest-T were its reduced number of items (considering eight cognitive distortions), the language suitability (which became more straightforward for the age group), and the modifications in the examples for each cognitive distortion. The attempt was to make the questionnaire easier to answer and as self-explanatory as possible for the adolescents to relate to the examples cited. These characteristics of the new instrument, whose format is similar to the adult version, included the name of the distortions, the definitions, and the examples.

The eight cognitive distortions selected were: 1. All-or-nothing thinking; 2. Fortune-telling; 3. Discounting positives; 4. Labeling; 5. Mind reading; 6. Overgeneralizing; 7. Jumping to conclusions; and 8. Blaming. Regarding the changes in the text of the CD-Quest, an example is taken from the first distortion, dichotomous thinking (also known as all-or-nothing, black-and-white, or polarized), defined as follows: I see events only in terms of “either this or that”, placing

them in two extreme categories, instead of a continuum (examples: “I made a mistake, so my performance was a failure. I ate more than I had intended to, so I ruined my whole diet.”). In the CD-Quest-T version, in a simpler language, the first distortion, the all-or-nothing thinking, reads: “I see events and people as “all or nothing” or “black or white”, and don’t consider the gray areas.” The examples have more adolescent-related situations, such as: “If I don’t get an A, this means I failed my test.”, “Either I’m able to study all the subject matter, or I might as well not even try.” “My Mom didn’t give me the present I wanted. She doesn’t like me.”

Of the experts who analyzed it, one was a psychometrics specialist, and four were cognitive-behavioral therapists. All of them agreed that each item presented related to their corresponding dimension; they proposed no changes regarding the expected objective for the instrument. The language was considered adequate for the age group addressed in the study. The consensus between experts in the evaluation and descriptive analysis of the questionnaire was that each item would be represented by a CVI of over .80. The design and content of the items in the CD-Quest-T achieved a CVI of 1.00 between the experts, indicating optimal quality; hence, it was not necessary to remove any item or modify the original structure.

Exploratory Factor Analysis

Factor analysis was used to test the scale dimensionality. The results indicate that the data is adequately sampled with a KMO = 0.83, which suggests it was feasible to analyze the data with the EFA. The result of Bartlett’s sphericity test ($x^2 = 27.113$; $p < 0.001$) was significant, showing that the correlation matrix tends to be mostly different from the identity matrix.

The results support a unidimensional solution with factor loadings ranging from 0.35 to 0.69. The commonality (h^2) ranged from 0.12 to 0.48, and the correlation between each item and the total varied between 0.52 and 0.86 for all the questions in the CD-Quest-T, resulting in good correlations. The proportion of explained variance was 31% for a single factor. The adequacy of the number of factors was verified with the scree plot, confirming that one single factor was enough.³²

Concurrent validity

The concurrent validity of the CD-Quest-T was confirmed with the use of SCARED-R and CDI. Considering $r > 0.30$ as a reference, significant correlation coefficients were found. The correlation with the total score of the SCARED-R was ($r = 0.31, p < 0.01$) and with the total score of the the CDI was $r = 0.30$. In the frequency subscale, the correlation with the SCARED-R was $r = 0.41$, whereas, for the CDI, $r = 0.46$. For the intensity subscale, the SCARED-R showed $r = 0.43$ and, for the CDI, $r = 0.40$.

Internal Consistency Analysis

The internal consistency with Cronbach's α was calculated separately for the total scale and the frequency and intensity subscales. Concerning the internal consistency of the questionnaire, a global Cronbach's $\alpha = 0.77$ was obtained for the total scale, and Cronbach's 0.75 and 0.73, respectively, for the frequency and intensity scales, which indicate a good and adequate internal consistency in all measure levels.³¹ It should be noted that even excluding any of the items would not cause a variation in the total Cronbach's α value.

Table 4. Cronbach's alpha

ITEM	Total Cronbach's alpha if one item is excluded
1. all-or-nothing	0.76
2. Fortune telling	0.74
3. Discounting positives	0.77
4. Labeling	0.73
5. Mind reading	0.72
6. Overgeneralizing	0.73
7. Jumping to conclusions	0.73
8. Blaming	0.76

DISCUSSION

The present study aimed to adapt the CD-Quest for adolescents, and analyze its psychometric properties, gathering supporting evidence for its content and construct validity.

The factor analysis indicated that the instrument represented a single dimension when analysing the psychometric properties, with satisfactory factor loadings. However, part of the commonalities was relatively problematic, which can be due to the heterogeneity of cognitive distortions. The CD-Quest-T presented concurrent validity evidence, indicating that the scores correlated with both the SCARED and the CDI. It is expected that cognitive distortions have significant positive correlations, indicating the presence of symptoms of anxiety and depression.

There is suggestive evidence that adolescents with anxious or depressive disorders have distorted cognitions, sustained by dysfunctional CBs about themselves, the world, and other people.^{3,5,33}

Unfortunately, as the sample underwent a therapeutic intervention, a test-retest study was not conducted in the reliability phase of the psychometric analysis of this sample, which can be considered a limitation of this study. Consequently, the results would not inform the temporal stability of the CD-Quest-T scores. Nonetheless, the internal consistency results were favorable.

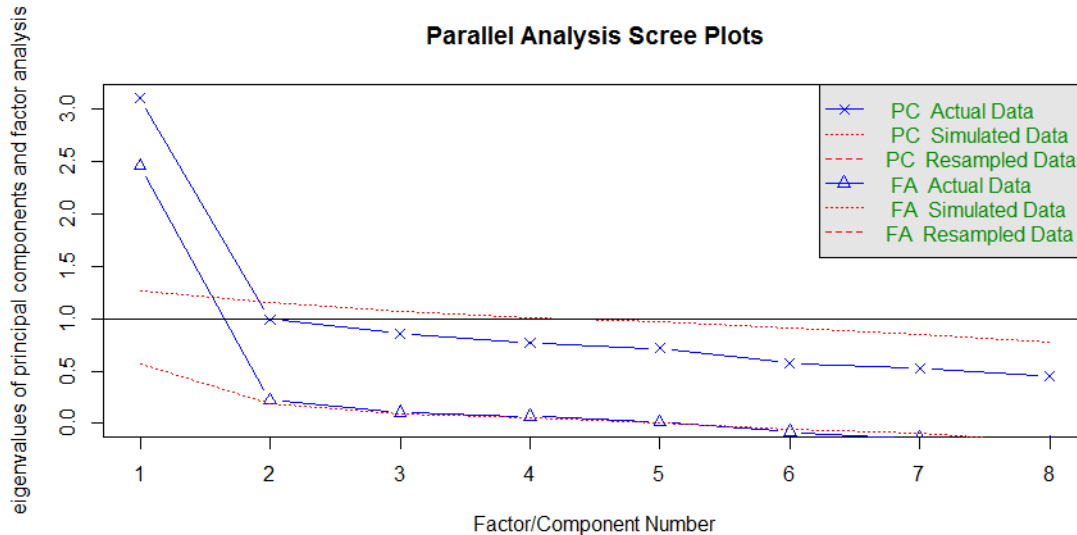
Given the formulated hypotheses, once the development of CD-Quest-T items and evaluation of its psychometric analysis were concluded, satisfactory evidence of the functioning of its items and scores was obtained. The results were similar to those found in the literature regarding the adult version of the CD-Quest as a unidimensional instrument^{7,10,12}. However, future studies are necessary to evaluate the stability of the scores, as well as the instrument's sensitivity to clinical conditions. More information on the nomological network would enrich the understanding of how informative the CD-Quest-T can be when interacting with other variables related to mental health.

In this study, an assessment of content validity was conducted as an essential step to ascertain that CD-Quest-T format and content were adequate for the targeted population. Regarding information on the psychometric properties, we also provided multiple evidence on both construct and criterion validity, understanding that validity is a perspective on multiple cumulative levels.

This study has a few limitations. First, it was conducted with students from only one Brazilian city. Secondly, it did not involve a clinical sample, which suggests future investigations need to be conducted to analyse the psychometric properties of the CD-Quest-T in different

contexts and populations. Thirdly, this study was limited by the lack of information on other types of reliability assessment, as internal consistency, denoting that more information is needed on the stability of the scores across time, especially if the scale is intended to monitor change during therapy. Future studies should enlarge the known nomological network to provide more information on the functioning of the CD-Quest-T scores and their relationships with other clinical variables. Finally, future efforts should aim to compose test norms for score interpretation while also testing the potential use of the CD-Quest-T to detect different psychological conditions, which could be provided by an ROC curve analysis in a clinical sample.

Figure 1. Curve inclined to almost 90 degrees, confirming that a single factor is enough.



In summary, the results of the present study provide the preliminary psychometric underpinnings for the use of the CD-Quest-T as a brief self-report measure of cognitive distortions, showing that it is a valid and reliable instrument to assess such cognitions in adolescents.

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