

**Emotional Dysregulation Scale Child and Adolescent (EDEIJ):
validity evidence****Escala de Desregulação Emocional Infantojuvenil (EDEIJ):
evidências de validade****Escala de Desregulación Emocional Infantil y Juvenil (EDEIJ):
evidencias de validez**

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Abstract

Emotional self-regulation when confronted with sad events is essential in different stages of human development, especially when it comes to children and adolescents, as different self-regulation strategies can serve as protective factors against mental disorders such as depression. This article aims to present the revised version of the Emotional Self-Regulation Scale Child and Adolescent (EARE-IJ, Escala de Autorregulação Emocional-Infantojuvenil), an instrument for measuring emotional self-regulation strategies toward sad events, with the purpose of improving it, searching for validity evidence based on the internal structure and reliability indices. The instrument was answered by 299 children and adolescents, aged 10 to 16 years ($M = 12.20$; $SD = 1.36$), and different models of confirmatory factor analysis, reliability coefficients, and an invariance model for the sex variable were tested. The results provide accumulating evidence in favor of the instrument in its new version, now known as the Emotional Dysregulation Scale Child and Adolescent (EDEIJ, Escala de Desregulação Emocional Infantojuvenil). The results also indicate that the instrument can evaluate children and adolescents with different levels of emotional dysregulation, while demonstrating configural and metric invariance. In conclusion, it is found that the tool is efficient in screening emotional self-regulation strategies in children and adolescents.

Keywords: emotions; validity; emotional regulation; psychological tests; sadness

Resumo

A autorregulação emocional frente a eventos tristes é essencial nas diferentes fases do desenvolvimento humano, principalmente ao tratar-se de crianças e adolescentes, uma vez que diferentes estratégias de autorregulação podem ser fatores protetivos a transtornos mentais como a depressão. Dado a existência da Escala de Autorregulação Emocional-Infantojuvenil (EARE-IJ) para mensurar tais eventos, este artigo tem como objetivo apresentar a versão revisada do instrumento, com o intuito de aprimorá-la, buscar evidências de validade baseadas na estrutura interna e índices de fidedignidade. Responderam ao instrumento 299 crianças e adolescentes, com idades de 10 até 16 anos ($M = 12,20$; $DP = 1,36$), de modo que foram testados diferentes modelos de análise fatorial confirmatória, coeficientes de confiabilidade e um modelo de invariância para a variável sexo. Os resultados acumulam evidências favoráveis para o instrumento em sua nova versão, passando a ser conhecida como Escala de Desregulação Emocional



Infantojuvenil (EDEIJ). Além de indicarem que o instrumento é capaz de avaliar crianças e adolescentes com diferentes níveis de desregulação emocional, bem como possui invariância configural e métrica. Conclui-se que a ferramenta é eficiente para realizar o rastreamento de estratégias de autorregulação emocional em crianças e adolescentes.

Palavras-chave: emoções; validade; regulação emocional; testes psicológicos; tristeza

Resumen

La autorregulación emocional ante eventos tristes es fundamental en diferentes etapas del desarrollo humano, especialmente cuando se trata de niños y adolescentes, ya que diferentes estrategias de autorregulación pueden ser factores protectores de trastornos mentales como la depresión. Dada la existencia de la Escala de Autorregulación Emocional-Niños y Jóvenes (EARE-IJ) para medir tales eventos, este artículo tiene como objetivo presentar la versión revisada del instrumento para mejorarlo, buscando evidencia de validez basada en la estructura e índices de confiabilidad. El instrumento fue respondido por 299 niños y adolescentes, de 10 a 16 años ($M = 12.20$; $DE = 1.36$). Se utilizaron diferentes modelos de análisis factorial confirmatorio, coeficientes de confiabilidad y un modelo de invariancia para la variable sexo. Los resultados acumulan evidencias favorables para el instrumento en su nueva versión, que se conoce como Escala de Desregulación Emocional Infantil y Juvenil (EDEIJ). Además de indicar que el instrumento es capaz de evaluar a niños y adolescentes con diferentes niveles de desregulación emocional, tiene invariancia configural y métrica. Se concluye que la herramienta es eficaz para realizar el cribado de estrategias de autorregulación emocional en niños y adolescentes.

Palabras clave: emociones; validez; regulación emocional; pruebas psicológicas; tristeza

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The ability to regulate emotions is fundamental for human development, especially when considering children and adolescents, as different influences can affect their behaviors during these stages. Emotional self-regulation is directly related to the adaptive process of the human being, occurring through contextual influences and relying on different strategies. To measure such capacities, especially in the child and adolescent population, would allow psychological science, as well as psychologists, to propose more cohesive and effective interventions. Similar to what was performed with an adult population by Cremasco et al. (2020), the aim of this study is to review the child and adolescent version of the Emotional Self-Regulation Scale (Noronha et al., 2019), analyze the psychometric properties of a reduced version, and present a final version of the instrument, also improved in the equity of number of items per factor.

Emotional regulation strategies, or the ability to self-regulate, can be understood as the process in which individuals experience, regulate, and express their emotions (Gross, 1998). These regulation strategies can occur automatically or be controlled by the individuals, resulting in an adequate expression process (Barros et al., 2015; Gratz & Roemer, 2004). Furthermore, self-regulation skills are described based on multidimensional models, involving the evaluation, understanding, and acceptance of emotions (Weiss et al., 2015).

Therefore, evidence suggests that the ability to self-regulate can attenuate negative emotions, serving as a protective factor against depression and other psychopathologies (Berking et al., 2014; Drake et al., 2017; Weiss et al., 2015). Deficits in emotional regulation (or emotional self-regulation, used interchangeably here) are predictors of adverse outcomes, resulting in the inability to accept negative emotions and experiencing stressful events with greater intensity (Drake et al., 2017; Weiss et al., 2015). In children and adolescents, the characteristics of self-regulation can occur in an even more complex manner.

In childhood and adolescence, emotional self-regulation of sad events, the focus of the instrument discussed in this article, primarily operates in the process of cognitive restructuring when employed effectively. However, when used ineffectively, such restructuring strategies may indicate limited control and understanding of emotions and the environment (Burwell & Shrik, 2007). Empirical studies have confirmed this hypothesis and have shown that the more depressive symptoms in children and/or adolescents, or the higher the substance use, the less effective the emotional regulation strategies are (Borges & Pacheco, 2018; García del Castillo et al., 2012). Additionally, a meta-analysis found that emotional self-regulation was associated with school engagement and academic success in children and adolescents (Robson et al., 2020). Accordingly, it is indicated that individuals in the child and adolescent period who more frequently experience feelings of anger and sadness have greater difficulty in understanding their emotions (Borges & Pacheco, 2018; Cruvinel & Boruchovitch, 2011), which configures the complexity of the self-regulatory process in this developmental stage.

It is recognized that there is a scarcity of instruments specifically developed for assessing emotional self-regulation in children and adolescents (Philpott-Robinson et al., 2023); this scarcity is also acknowledged among Brazilian emotional self-regulation instruments (Batista & Noronha, 2018). With a specific focus on the emotion of sadness, only one scale was found in Brazilian literature. Therefore, the *Escala de Autorregulação Emocional – Infantojuvenil* (EARE-IJ, Emotional Self-Regulation Scale - Child and Adolescent; Noronha et al., 2019) deserves recognition. During its development, the instrument was proposed with four factors, namely, paralysis (i.e., indicating the process of attitudes taken or not taken when facing sad events); pessimism (i.e., the ability to solve or not solve problems and perceived self-worth); adequate coping strategies (i.e., problem-solving and dealing effectively with sad events); and evaluating experience (i.e., extracting positive or negative aspects from an experienced event). The instrument was theoretically based on Gratz and Roemer's (2004) proposal, considering emotional modulation, attention, understanding, and acceptance of emotions. In this context, the conceptualization of the self-regulation process involves understanding, acceptance, control, and the ability to express emotions in each lived event.

In its construction process and search for validity evidence, the instrument showed acceptable fit indices for a four-factor solution in a sample of 600 children and adolescents ($CFI = .99$ and $RMSEA = .03$; Noronha et al., 2019). However, the scale exhibits an unbalanced number of items among the factors and an excessive number of items (considering that children are the target population). Furthermore, the "evaluating experiences" dimension presents weaknesses in terms of the theoretical representation of the construct, as some positive and negative experience items overlap, especially with those of the pessimism dimension.

Therefore, further studies are necessary regarding the EARE-IJ, particularly the possible reduction and improvement of the scale in terms of item balancing across the different factors. Considering the need to propose brief instruments to be answered by

children and adolescents, given that screening assessments can occur on a large scale; as well as the presentation of the EDEA by Cremasco et al. (2020), this study aims to update the EARE-IJ to a brief version, as well as test the validity evidence based on internal structure and reliability indices, which will now be known as the *Escala de Desregulação Emocional – Infantojuvenil* (EDEIJ, Emotional Dysregulation Scale - Child and Adolescent). The modification of the instrument's name is due to the focus on assessing characteristics of emotional dysregulation and inadequacy in response to events, as well as presenting a greater number of factors that assess negative aspects, thus facilitating its interpretation by the users. It is hypothesized that the new version will maintain the psychometric qualities of its predecessor and be a useful tool in evaluating emotional self-regulation in response to sad events in children and adolescents.

Method

Participants

The sample consisted of 299 children and adolescents aged 10 to 16 years ($M = 12.20$; $SD = 1.36$), with 55.5% being female. The participants were distributed across the 6th to 9th grades of middle/high school, with 44.5% in the sixth grade, 19.7% in the seventh grade, 18.4% in the eighth grade, and 17.4% in the ninth grade. It consists of a database from the first two authors.

Instruments

Sociodemographic questionnaire. Developed for this research, aimed at characterizing the sample in terms of sex, age, and grade level.

Escala de Autorregulação Emocional-Infantojuvenil (EARE-IJ, Emotional Self-Regulation Scale-Child and Adolescent; Noronha et al., 2019). The EARE-IJ was developed to measure emotional self-regulation in response to life events that generate sadness. It consists of 28 items rated on a Likert scale (1: *None of the time/nothing* to 5: *Always*), and has four factors: Paralysis (8 items), Pessimism (8 items), Adequate Coping Strategies (8 items), and Evaluating Experiences (4 items). Some examples of items are “When I am sad, I”: 1: *Cry*; 10: *Think that no one will be able to help me*, and 28: *Believe I am capable of solving the problem*.

Procedures

After approval by the Research Ethics Committee (CAAE: 53659716.8.0000.5514), the studies related to the self-regulation scales began. To be included in the sample, it was a requirement that children and adolescents had the signature of one of their legal guardians on the Informed Consent Form, which was delivered prior to data collection. Participants who agreed to participate were required to express their agreement to the research through the Assent Form. The instruments were collected in person at the respective schools, with a trained researcher available to provide additional information if requested by the children or adolescents.

Data Analysis

Initially, a Confirmatory Factor Analysis (CFA-Model I) was conducted for the four-factor model developed by Noronha et al. (2019). Subsequently, new confirmatory models that sought to find improved versions of the instrument (Model II and Model III) were tested. In all models, the Weighted Least Square Mean and Variance Adjusted (WLSMV) estimator was used, considering the fit indices: chi-square (χ^2) divided by

degrees of freedom (*df*), Comparative Fit Index ($CFI \geq .95$), Tucker-Lewis Index ($TLI \geq .95$), and Root Mean Square Error of Approximation ($RMSEA \leq .08$; Hu & Bentler, 1999).

Next, the information curves were tested to estimate the informative capacity of each factor, thus making it possible to analyze the region of the latent trait in which the instrument presents the highest level of accuracy; and in a complementary manner, Cronbach's alpha and McDonald's omega reliability indexes were tested (Dann et al., 2014). Finally, a model of invariance was analyzed for the participants' sex. The purpose was to test the equality of the items for both sexes at the configural, metric, and scalar levels (Horn & McArdle, 1992). The configural level tests the plausibility of using the instrument for different groups, that is, it analyzes whether the items function as similar indicators for different groups; the metric level tests the weight that the factor loadings have for both groups; finally, the scalar level tests the equivalence of intercepts for both groups (Damásio, 2013). Invariance was considered based on a decrease in the CFI, where ΔCFI changes smaller than 0.010 indicated invariant models (Chen, 2007). All analyses were performed using the MPlus 8 (Muthén & Muthén, 1998-2012) and RStudio software with the psych package (Revelle, 2014).

Results

Confirmatory Factor Analysis was tested for the instrument composed of 28 items and four factors (Model I). The fit indices yielded unsatisfactory results: $\chi^2/df = 4.20$; $CFI = .886$, $TLI = .875$, $RMSEA = .104$. Table 1 presents the factor loadings.

Table 1*Confirmatory factor analysis of the Emotional Self-regulation Scale-Child and Adolescent (EARE-IJ, 28 items)*

Factors	Items	Factor loading
Factor 1: Paralysis	EARE-IJ1	.60
	EARE-IJ2	.74
	EARE-IJ3	.80
	EARE-IJ4	.66
	EARE-IJ5	.60
	EARE-IJ7	.59
	EARE-IJ8	.73
	EARE-IJ9	.83
	Factor 2: Pessimism	EARE-IJ6
EARE-IJ10		.82
EARE-IJ11		.74
EARE-IJ20		.86
EARE-IJ21		.83
EARE-IJ22		.95
EARE-IJ23		.90
Factor 3: Adequate coping strategies	EARE-IJ12	.48
	EARE-IJ13	.50
	EARE-IJ14	.80
	EARE-IJ15	.60
	EARE-IJ16	.73
	EARE-IJ17	.88
	EARE-IJ18	.63
Factor 4: Evaluating experiences	EARE-IJ27	.64
	EARE-IJ19*	.04
	EARE-IJ25	.78
	EARE-IJ26	.67
	EARE-IJ28	-.52

* Item EARE-IJ19 had a p -value of .432, while all other items had p -values < .001.

Although most factor loadings were acceptable (i.e., > 0.30), it was considered that the fourth factor contributed little to the theoretical measurement of the construct because its content required complex abstractions for children and adolescents (e.g., “I believe what I feel is important for my growth”); it overlapped with the Pessimism dimension in terms of the semantic construction of items. In this regard, a new model of Confirmatory Factor Analysis was tested, disregarding the Evaluating Experiences dimension and items from other dimensions (Model II) that are redundant or have lower loading. The results are presented in Table 2.

Table 2

Confirmatory Factor Analysis of the Emotional Self-regulation Scale-Child and Adolescent (EARE-IJ, 21 items)

Factors	Items	Factor loading
Factor 1: Paralysis	EARE-IJ1	.60
	EARE-IJ2	.76
	EARE-IJ4	.64
	EARE-IJ5	.63
	EARE-IJ8	.76
	EARE-IJ9	.88
Factor 2: Pessimism	EARE-IJ6	.82
	EARE-IJ10	.82
	EARE-IJ11	.72
	EARE-IJ20	.85
	EARE-IJ21	.83
	EARE-IJ22	.95
	EARE-IJ23	.90
	EARE-IJ24	.89
Factor 3: Adequate coping strategies	EARE-IJ12	.41
	EARE-IJ14	.81
	EARE-IJ15	.59
	EARE-IJ16	.73
	EARE-IJ17	.88
	EARE-IJ18	.62
	EARE-IJ27	.62
EARE-IJ1	.60	

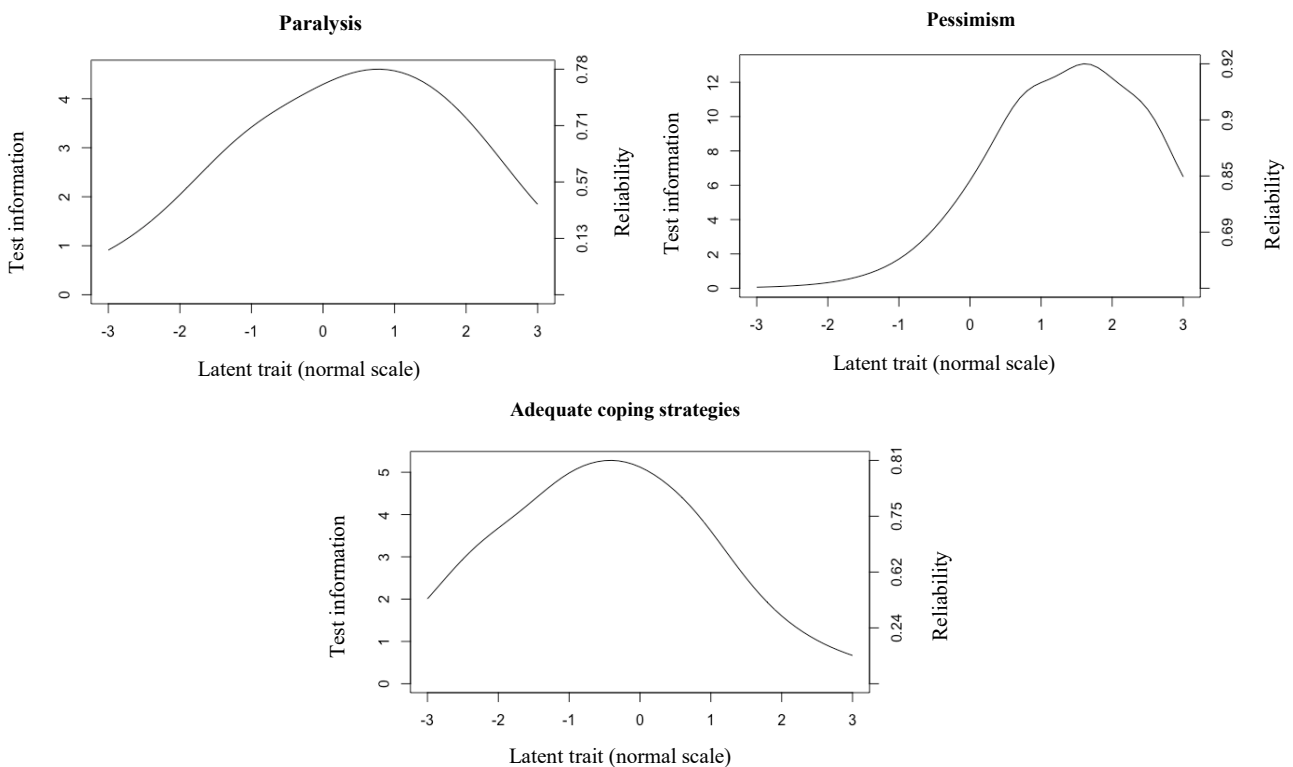
The fit indices results were satisfactory $\chi^2/df = 2.91$; CFI = .957; TLI = .952; RMSEA = .080, and the factor loadings had values starting from 0.40. However, due to the large number of items, their imbalance, and the use of items with similar phrasal content, a new model was chosen to result in a more balanced instrument, easy to administer, reducing response time, and with items containing unique semantic content. Item selection was based on a theoretical criterion (i.e., items that best described emotional regulation contents, evaluated by two expert judges in the area of Psychological Evaluation and emotional self-regulation) and a statistical criterion (i.e., selection of items with higher factor loadings, as presented in Table 2). Thus, the final Confirmatory Factor Analysis was conducted (Model III), as shown in Table 3.

Table 3
Emotional Dysregulation Scale Child and Adolescent (EDEIJ, 15 Items)

Factors	Items	Factor loading
Factor 1: Paralysis	EDEIJ1	.77
	EDEIJ2	.62
	EDEIJ3	.62
	EDEIJ4	.78
	EDEIJ5	.90
Factor 2: Pessimism	EDEIJ6	.85
	EDEIJ7	.84
	EDEIJ8	.97
	EDEIJ9	.91
	EDEIJ10	.89
Factor 3: Adequate coping Strategies	EDEIJ11	.79
	EDEIJ12	.71
	EDEIJ13	.93
	EDEIJ14	.53
	EDEIJ15	.61

For this final model, the fit indices were excellent $\chi^2/df = 2.55$; CFI = .980; TLI = .976; RMSEA = .072, maintaining the theoretically relevant dimensions and brief application in children and adolescents. Next, the information curve for each of the factors of the EDEIJ was tested, and Figure 1 presents the results obtained.

Figure 1
Information curve of the EDEIJ factors



Based on the results found in the information curves, it was possible to visually identify that the factors Paralysis and Pessimism better assess individuals who have levels between -1 and 2 on the theta scale, while the factor Adequate Coping Strategies better assesses individuals between -2 and 0 on the theta scale. Regarding reliability indices, the following values were obtained: Paralysis $\alpha = .84$ and $\omega = .87$; Pessimism $\alpha = .92$ and $\omega = .94$; and Adequate Coping Strategies $\alpha = .80$ and $\omega = .85$. Once the instrument was finalized, its invariance with respect to participants' sex was tested, and the results are presented in Table 4.

Table 4
Invariance Model for the EDEIJ

Sex Invariance Model	χ^2	df	CFI	AIC	BIC	Comparison Model	$\Delta\chi^2$	Δdf	p	ΔCFI
Configural	211.497	126	.951	13736.407	14269.271					
Metric	252.995	162	.948	13711.588	14111.236	2 vs. 1	41.430	36	0.245	0.003
Scalar	290.238	174	.934	13726.522	14081.765	3 vs. 2	40.493	12	0.001	0.014

Note. AIC: Akaike Information Criterion; BIC: Bayesian Information Criterion.

Based on the results obtained, it can be assumed that no configural and metric variance was found, while scalar variance was marginally significant ($\Delta CFI = 0.014$). This result indicates that when considering the sex of children and adolescents, differences may exist in intercepts between groups.

Discussion

This study aimed to present the updated version of the *Escala de Desregulação Emocional – Infantojuvenil* (EDEIJ, Emotional Dysregulation Scale - Child and Adolescent), test its validity evidence based on internal structure and reliability indices after item and factor reduction, as well as analyze the invariance of the selected items according to the variable sex of children and adolescents. The results confirmed the established hypotheses and predictions, indicating that the EDEIJ is an effective instrument for measuring emotional self-regulation for dealing with sad events and has good psychometric properties.

From the factorial analysis models tested, it was noted that the full version of the *Escala de Autorregulação Emocional-Infantojuvenil* (EARE-IJ, Emotional Self-regulation Scale; Noronha et al., 2019) presented unsatisfactory fit indices, as well as one item that was not statistically significant. This attests to the study's objective, given that when tested on a new sample, the instrument did not maintain the satisfactory indices found in its developmental version. In this sense, aiming to maintain the proposal of Gratz and Roemer (2004), the Evaluating Experiences dimension was excluded, as these items presented redundant content with other dimensions and could be considered difficult for the child and adolescent audience to comprehend. After excluding this dimension, the obtained results were satisfactory, and the instrument maintained the necessary theoretical characteristics (Gratz & Roemer, 2004; Weiss et al., 2015). However, the number of items was unbalanced and excessive for use in the child population, and items with similar semantic content were retained, potentially making the instrument redundant, as indicated by expert judges in our evaluation process.

In order to obtain a concise, clear instrument that would be an efficient screening tool, especially in the evaluation of children and adolescents, the decision was made to select the items with the highest factorial loadings that best described the content related

to emotional self-regulation in sad events (American Educational Research Association et al., 2014; Philpott-Robinson et al., 2023; Streiner, 2003). The results showed excellent fit indices (Hu & Bentler, 1999), comparable to the adult version of the instrument, namely the Escala de Desregulação Emocional Adultos (EDEA, Emotional Dysregulation Scale Adults; Cremasco et al., 2020). Regarding the instrument's evaluation capacity, assessed by information curves, it demonstrates better functionality in assessing children and adolescents with dysfunctional self-regulation strategies, namely, paralysis and pessimism. Like the adult version of the instrument, the reliability indices yielded excellent results (Cremasco et al., 2020; George & Mallery, 2002).

Lastly, to analyze whether the proposed measure can be considered equivalent between the sexes of children and adolescents, models of configural, metric, and scalar invariance were analyzed, with only the latter showing variant results. These findings indicate that when comparing the intercepts of these groups, the results cannot be considered equivalent (Chen, 2007; Damásio, 2013). In other words, if future studies find differences for the sex variable in the EDEIJ items, this result cannot be attributed to differences in the trait level of children and adolescents, thus indicating a non-equivalence in the scale parameters (Chen, 2007). Therefore, one possibility, if this trend persists in other studies, could be the specification of norm tables for both sexes.

This study is not without limitations, and these results should be tested with different samples of children and adolescents, as well as in different geopolitical regions of Brazil. Screening instruments, such as herein proposed EDEIJ, have shown to be efficient for large-scale assessments, although they may be less sensitive (Streiner, 2003). Furthermore, when considering the assessment process for children and adolescents, greater caution should be exercised as developmental or contextual factors may affect the results, just as parental self-regulation can have implications in cases, functioning as a temporary model (Barros et al., 2015). It is suggested that future studies test the EDEIJ with variables related to coping strategies in response to positive events, as the regulation of positive emotions is also necessary (Noronha et al., 2019); similarly, when considering sex variance, future studies should develop different interpretation tables for this variable.

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