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Translation, cultural, adaptation and validity evidence of the negative mood regulation scale for the Brazilian context

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Abstract

The aim of the present study was to translate and adapt the Negative Mood Regulation Scale (NMR-S) into Brazilian Portuguese (NMR-B) and to seek evidence of dimensionality, reliability, convergent and discriminant validity. The translation and cultural adaptation of the NMR-B went through of six steps: 1) translation of the instrument from the source language into the target language; 2) synthesis of the translations; 3) review of the synthesis by expert judges; 4) assessment of the instrument by the target audience; 5) back-translation; 6) pretesting. In the process of cultural adaptation of the scale, seven items were created, specifically for the Brazilian version. Four hundred and forty-six participants were evaluated, between 18 and 59 years old, through online data collection (67.5% women). The psychometric results show a unidimensional model, and the analysis of the modification indices indicated 35-item for of NMR-B. This model showed satisfactory internal consistency ($a = 90$). In addition, the results of convergent validity indicated significant associations between higher levels of NMR-B with lower levels of difficulty in emotion regulation, and with levels of depression, anxiety and stress, and higher levels of NRM-B were negatively related to internality. The results of the present research have demonstrated that NMR-B is an adequate and reliable instrument to in Brazilian population.

Keywords Negative mood regulation scale · Regulation emotion · Cultural adaptation; measurement

The way individuals cope with their emotions is associated with the development and maintenance of different forms of psychopathology (Lukas et al., 2018). Intense and intrusive emotions can lead to maladaptive coping strategies, such as substance use, self-harm and binge eating, which may cause significant losses at intrapersonal and interpersonal levels (Linehan, 2018). Having functional abilities to regulate emotions is considered to be crucial for good mental health (Berking et al., 2012; Linehan, 2018).

Among several conceptualizations in the literature, emotional regulation abilities can be characterized as cognitive and behavioral strategies to recognize, evaluate and redirect emotional states aiming at actions that meet the individual's needs and goals (Gross, 2013). Moreover, it is emphasized that these are considered functional management abilities to deal with intrusive and intense emotions, that may cause suffering (Linehan, 2018).

It is suggested that the cognitive and behavioral strategies used to regulate emotions are influenced by the subject's self-perceived ability to achieve satisfactory results, that is, the belief that one can do something to effectively tolerate and/or reduce one's negative emotions (Chang et al., 2017; Ford & Gross, 2019). Those who believe that they are able to do something to feel better are also the ones most likely to resolve situations that involve suffering, with lower levels of avoidance and less distance from the problem (Catanzaro & Mearns, 2016; Shepherd-McMullen et al., 2015). It can be also argued that by believing that some action or thought will alleviate suffering, people tend to be more committed to employing functional emotion regulation strategies (Catanzaro & Mearns, 2016; Ford & Gross, 2019).

The role of self-perceived ability for emotion regulation can be understood from Rotter's (1954) social learning theory. According to the theory, by learning from situations experienced throughout life, subjects establish expectancies about whether or not to have successful outcomes from their own actions and generalize them to other contexts of life, which

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impacts their behavior. Based on Rotter's theory (Rotter, 1954), Catanzaro and Mearns (1990) proposed Negative Mood Regulation Expectancies (NMRE) and described them as subjects' beliefs about whether or not they can alleviate their unpleasant emotions by means of their behavior or cognition. Thus, the authors proposed that the likelihood of employing adaptive emotion regulation management is related to a subject's expectancy of achieving a successful outcome, that is, of relieving emotional suffering (Catanzaro & Mearns, 1990, 2016).

The literature suggests NMRE as a protective factor against psychopathological symptoms (Catanzaro & Mearns, 2016; Kanavou, 2019). As too, previous studies indicated that higher levels of NMRE correlate negatively with coping strategies of emotional avoidance (Shepherd-McMullen et al., 2015), with difficulty in interpersonal relationships (Thorberg & Lyvers, 2010), with suicidal ideation (Mearns et al., 2013) and also with different psychopathologies, such as post-traumatic stress disorder (PTSD) (Cloitre et al., 2008), depression (Catanzaro et al., 2014; Pfeiffer et al., 2012), anxiety (Catanzaro et al., 2014) and substance use disorder (Catanzaro & Laurent, 2004; Thorberg & Lyvers, 2010). Evidence further demonstrates that NMRE have a relevant role in treatment for clinical populations. They facilitate the increase of emotion regulation skills and, consequently, reduce psychopathological symptoms (Brister et al., 2011; Catanzaro & Mearns, 2016; Shepherd-McMullen et al., 2015; Cloitre et al., 2008; Stasiewicz et al., 2013).

Levels of NMRE are identified by the *Negative Mood Regulation Scale* (NMR-S) (Catanzaro & Mearns, 1990). The original scale was developed by Catanzaro and Mearns (1990). It consists of 30 items with phrases describing general cognitive and behavioral strategies that can be used to regulate negative emotions. The NMR-S scale has been used in different international studies, and has been reported as a relevant, empirically-based measure for evaluation of emotion regulation characteristics (Catanzaro & Mearns, 2016; Gratz & Roemer, 2004; Weiss et al., 2015). The scale has already been translated into different languages, including German (Backenstrass et al., 2010), Spanish (Pfeiffer et al., 2012), Hebrew (Orbach et al., 2007), Korean (Mearns et al., 2013), Japanese (Mearns et al., 2016), Greek (Kanavou, 2019), Hindi (Dubey et al., 2013) and Chinese (Wang et al., 2017).

NMR-S has a unidimensional structure (Catanzaro & Mearns, 1990, 2016). The study for validity evidence of the original scale indicated adequate internal consistency, with a reliability coefficient ranging from .87 to .93 (Catanzaro & Mearns, 1990). Other translated and culturally adapted versions also presented evidence of adequate psychometric validity, with reliability coefficients between .88 and .93 (Backenstrass et al., 2010; Mearns et al., 2013; Mearns et al., 2016; Pfeiffer et al., 2012; Wang et al., 2017). In addition, scale validity evidence studies conducted in different languages have reported construct validity evidence, based on associations with external variables. The results of such studies have indicated negative relationships between NMRE and measures of depression (Backenstrass et al., 2010; Catanzaro & Mearns, 1990; Mearns et al., 2013; Mearns et al., 2016; Pfeiffer et al., 2012; Wang et al., 2017) and general psychopathological symptoms (Dubey et al., 2013; Mearns et al., 2013; Mearns et al., 2016), and positive relationships with internal locus of control (Catanzaro & Mearns, 1990; Mearns et al., 2013), with measures of emotion regulation (Backenstrass et al., 2010; Dubey et al., 2013; Mearns et al., 2013; Pfeiffer et al., 2012) and with adaptive coping strategies (Backenstrass et al., 2010; Pfeiffer et al., 2012; Mearns et al., 2016).

The contribution to the content validity evidence of the scales may be strengthen through the inclusion of items. The inclusion of items related to cultural aspects of the adaptation version of NMR-S aims to increase and favor the assessment of the construct, considering the specificity of the target population and their cultural context (American Educational Research Association, 2014). The analyze of NMR-S cultural adaptation process shows that the NMR-S in German (Backenstrass et al., 2010) and Spanish (Pfeiffer et al., 2012) did not indicate the need for new items to be added to the original scale. Conversely, new items were added in the Asian adaptations (Korean, Hindi, Japanese and Chinese) and the Greek adaptation so that the instrument would contain mood regulation strategies commonly observed in these specific cultural contexts (Dubey et al., 2013; Mearns et al., 2013; Mearns et al., 2016; Wang et al., 2017). This trend can be justified based on the understanding that although emotions are universal, they are not only biological, given that sociocultural differences are relevant to emotion management and construction of emotion beliefs (Ford & Gross, 2019; Lim, 2016). In this perspective, emotion regulation strategies may vary according to the cultural context, as cultural values are essential for determining the meaning of pleasant and unpleasant emotional states and the forms of management that are adaptive (Ford & Gross, 2019; Lim, 2016; Tamir, 2016).

The validation of content of a psychological assessment instrument should consider semantic, idiomatic, and contextual equivalence, adapting such instrument to the lifestyle of respondents (AERA, 2014). Consequently, there are different formats of the adapted versions of NMR-S. For example, the Korean version consists of 19 original items and another 11 items that were created for its particular cultural context (Mearns et al., 2013). The Chinese version included 17 items from the original scale and 15 new ones (Wang et al., 2017) while the Japanese version has 25 original items and 15 new ones (Mearns et al., 2016). The Hindi and Greek versions were made up of all 30 original items, and three and six new items were added, respectively (Dubey et al., 2013; Kanavou, 2019). It is observed that several adaptations of the scale

included new items to adequately assess the NMRE to its cultural context, indicating that the simple NMR-S translation would not be enough to adequately measure the construct (AERA, 2014).

Evidence shows that the cultural adaptations of NMRS were carried out valuing an emic perspective (Benet-Martínez, 2007), which considers that conceptual constructions can have the same functional relationships between different cultures, but differ in terms of item content, scale format, and others scale features. Although a construct is indicated as universal, its understanding must be in accordance with the culture in which it is inserted. An example can be seen in the study of Lu and Gilmour (2004), who identified different aspects about the understanding of the happiness construct between western individuals (describing it with words like achievement, optimism and motivation) and oriental (describing it as harmony and spiritual element). Thus, a possible measurement of happiness for both populations would include such differences for their assessment, and thus assessing the happiness construct in both western and eastern populations. Moreover, evidence has already been found that cultural characteristics of sympathy are found in Latin, including Brazil, and Hispanic populations (Levine et al., 2001). The so-called culture of sympathy prioritizes friendly, pleasant, good-humored social behaviors due to productivity (Levine et al., 2001). Based on this evidence, it is observed that the cultural characteristics of the Brazilian population may have a high impact over Brazilian's evaluations of strategies and abilities that will contribute to them mitigate their emotional distress.

In this perspective, the emic approach shows the importance of including items that value the particularities of the population for which the NMR-S is culturally adapted. The inclusion of the cultural items of each NMR-S enable to assess the NMRE construct consistent with the target population, as observed in the validity evidence of different studies of NMR-S adaptation to other cultures (Kanavou, 2019; Mearns et al., 2016; Wang et al., 2017). The Brazilian population has particularities that can influence the way of handling negative emotions and, consequently, NMRE. An example of cultural specificities is demonstrated in a study that addresses the so-called Brazilian "jeitinho" (Brazilian way) for problem solving, which involves behaviors of creativity, sympathy, affection, prosocial orientation, willingness to meet the demands of family members, among others (Miura et al., 2019). Due to the particularities of Brazil, it is observed that the adaptation of the items and the inclusion of specific items to the Brazilian context is strongly indicated as a strategy to adequately measure the NMRE construct in this population.

Given the above, it appears that the NRME predict the engagement in functional strategies of emotional regulation, being characterized as an important therapeutic component in psychological treatments in different clinical populations. It is noteworthy that the use of NMR-B can be useful in the practice of evidence-based psychology, since it can assist in the clinical assessment of cases and base decision making in treatment planning, allowing control of the effect of treatment in practice the professional. The practice of evidence-based psychology is still scarce in Brazil, adapting instruments to evaluate clinical outcomes, like NMRE, is a strategy to contribute to professionals evaluate their interventions and develop evidence-based treatments.

Notably, the construct evaluated with the NMR-S has been researched for 30 years in different cultures around the world, which is indicative of the reliability of the scale. Nevertheless, the scale was not validated on the Brazilian Portuguese language, which is widely spoken, and it could be a significant tool for the psychological treatment of such a population. Therefore, designing a version of the original scale to suit the Brazilian context (i.e., NRM-B) is extremely relevant. Thus, in view of the above-mentioned context, the aim of the present study was to translate and to seek evidence of dimensionality, reliability, convergent and discriminant validity for the NMR-B.

Based on the previous studies, it is expected that NMR-B shows a unifactorial structure, mantaning the same unifactorial structure of NMR-S (Catanzaro & Mearns, 2016). Moreover, participants scores on NMR-B should present negative relations with difficulty in emotion regulation's dimensions, levels of depression, anxiety, stress, externality-chance and externality-others, and a positive association with internality.

Method

Procedure for Translation and Cultural Adaptation of the Scale

The translation and cultural adaptation of the NMR-B was based on the proposal by Borsa et al. (2012), which consists of six steps: 1) translation of the instrument from the source language into the target language; 2) synthesis of the translations; 3) review of the synthesis by expert judges; 4) assessment of the instrument by the target audience; 5) back-translation; 6) pretesting. First, the NMR-S was translated from its original English version into Brazilian Portuguese by two bilingual translators: one who was more familiar with the construct of the instrument and one who was a seasoned translator working in the English-Portuguese pair (Step 1). The translations showed eight discrepancies between words and expressions. Such differences were found in the following items and with such words and expressions: 1) *geralmente* ("usually") or *normalmente* ("normally"); 4) *momentos agradáveis* ("pleasant times") or *momentos prazerosos* ("enjoyable times"); 5) *peso* ("burden") or *obstáculo/chatice* ("obstacle/drag"); 6) *dando a mim mesmo(a) algo que gusto*

("treating myself to something I like") or *me mimando com coisas que eu gosto* ("pampering myself with things I like"); 13) *me animar* ("cheer me up") or *me alegrar* ("make me happy"); 14) *provavelmente* ("most likely") or *possivelmente* ("possibly"); 21) *trabalhar* ("to work") or *solucionar* ("to work out"); and 29) *achar engraçado* ("find [the situation] funny") or *achar graça* ("find humor"). Then, the two translations were synthesized into one version by two judges who compared the translations and evaluated aspects relative to semantic, idiomatic, experiential and conceptual equivalence (Step 2). After the expert judges analyzed the synthesis of the translations, the new version was reviewed by two psychologists that are experts in the field of psychological assessment and/or have clinical experience in using the construct of the scale. In this step, the experts analyzed aspects relative to structure, layout and instructions of the instrument, bearing in mind its adaptation to the Brazilian context (Step 3). Four changes were suggested by the experts: changing *about your emotions* to *with respect to your emotions* in the description of the instructions of the scale; in item 9, replacing the expression *buscar encontrar algo melhor* ("try to find something better") with *tentar encontrar algo positivo* ("find some good in the situation"); in item 15, replacing *lidar com as coisas* ("deal with things") with *lidar com as situações* ("deal with situations"); and in item 23, using the phrase *sair para jantar com amigos* ("going out to dinner with friends") instead of only *sair com amigos* ("going out with friends"). In the next step, the instrument was assessed by the target public, composed of a group of university students, who checked whether or not the items could be understood correctly. After the above-mentioned adaptations had been implemented, the instrument was back-translated from Portuguese into English by two bilingual translators other than the ones from the first step (Step 5). The English version was revised by the original authors of the scale in order to assess the content validity of the items. The authors suggested four changes: in item 13, including the word *boa* ("good") after the phrase *Fazer alguma coisa* ("Do something"), emphasizing that it is about doing something positive; in item 16, changing the phrase *muito facilmente* ("very easily") into *facilmente* ("easily") only; in item 17, changing the phrase *me dedicar ao trabalho* ("Dedicating myself to work") into *Colocar o meu trabalho em dia* ("Catching up on my work"); and in item 23, specifying the purpose of meeting with friends, i.e., *Sair para almoçar* ou *tomar um café com amigos* ("Going out for lunch or coffee with my friends"), and including a new item indicating only *Sair com amigos* ("Going out with friends").

To conclude the process of cultural adaptation of the scale, based on other adaptations of the NMR-S, seven items were created for the Brazilian version, in order to include specificities on regulation of negative emotions of the target population. The inclusion of the items has been carried out in scale adaptations to other contexts and is strongly indicated by the original authors of NMR-S. In this study a focus group was held with three Brazilian undegraduate students. The group's objective was to explore the participants' perceptions about the way of handling negative emotions by the Brazilian population in general. The focus group listed that for Brazilian population the presence of friends and family, saying a prayer, and doing physical exercises were important strategies to deal with NMRE. The content expressed in the focus group was revised by researchers bilingual native Brazilians and a Brazilian clinical psychologist who is doing her master's with one of the authors of NMR-S in USA. The analysis of reviewers provided important insights to identify which of the behaviors that are commonly observed in Brazilian culture to deal with negative emotion would enable the measurement of NMRE levels. Based on this results, seven new items were created to compose the Brazilian version of NMR-S. The original authors also evaluated the new items that were created. Table 1 shows the items designed for the Brazilian version. After the process of translation and cultural adaptation, the NMR-B contained 37 items. This final version was answered by eight people from the general population, aged between 18 and 59 years and with varying levels of education (from elementary school to graduate school). The aim of this procedure was to check whether or not the instrument translated into Brazilian Portuguese was adequate and if its instructions and items could be clearly understood (Step 6). Only changes to the layout of the scale were suggested.

Participants

The sample consisted of 446 participants (67.5% women), aged between 18 and 59 years. The majority of participant (42%) were between 22 to 29 years, 22% had 30 to 29 years, 19% 18 to 21 years, and 16% had 40 to 59 years. Most of the respondents were from the South of Brazil (89.2%), single

Table 1 Description of the items included in the Brazilian version

Items in Portuguese (items in English)
"Sair com amigos vai me ajudar." (Going out with friends will help me.)
"Passar um tempo com a minha família ou amigos me fará sentir melhor" (Spending time with my family or friends will make me feel better.)
"Ir em algum lugar que eu gosto (praia, campo, shopping, etc) não irá me ajudar a me sentir melhor" (Going somewhere I like (beach, countryside, shopping mall, etc.) will not help me feel better.)
"Praticar alguma atividade física irá me ajudar a me sentir melhor" (Doing some physical activity will help me feel better.)
"Fazer uma oração irá me ajudar a me sentir melhor." (Saying a prayer will help me feel better.)
"Eu me sentirei melhor se eu cantar, ouvir música ou dançar" (I will feel better if I sing, listen to music or dance.)
"Compartilhar o meu sofrimento com os meus amigos ou com a minha família não irá me ajudar" (Sharing my suffering with my friends or family will not help me.)

(61.7%), with incomplete higher education (41%), and currently employed (70%). Most of them self-reported as white (89.7%). Table 2 shows the characteristics of the sample.

Instruments

(1) *Questionnaire on Sociodemographic Data*: structured interview developed for this study with the objective of characterizing the sociodemographic profile of the participants (with information on age, education, marital status, profession, religion, etc.).

(2) *Negative Mood Regulation Scale* (Catanzaro & Mearns, 1990): self-report scale, answered on a *Likert* scale, which assesses beliefs, or expectancies about the ability to regulate negative emotions. The original version of NMRS consists of 30 items divided into Cognitive (10 items), Behavioral (10 items) and General (10 items). In previous studies, Cronbach's alpha ranged from .80 to .94. The Brazilian NMRS version was constituted of the 30 items of the original NMRS with the addition of seven items created to explore specificities of Brazilian population on regulation of negative emotions. The items are answered in a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). High scores indicate greater expectancies of regulating one's negative emotions.

(3) *Difficulties in Emotion Regulation Scale* (DERS) (Cancian et al., 2018; Gratz & Roemer, 2004): assesses difficulties in emotion regulation skills. It is a self-report instrument containing 36 items to be rated on a Likert scale, divided into six difficulty domains: 1) non-acceptance; 2) objectives; 3) impulse; 4) awareness; 5) strategies and 6) clarity. Participants respond to items on a Likert scale from 1 (Almost Never) to 5 (Almost Always). Higher scores on the dimensions of DERS reflect greater emotion regulation difficulties. Cronbach's alpha was .94 in the study on adaptation for Brazil and .85 in the present sample.

(4) *Depression, Anxiety and Stress Scale* (DASS-21) (Apóstolo et al., 2006): a short version of the original DASS, with 21 items divided into three subscales. Each subscale consists of seven items, which simultaneously assess the emotional states of depression, anxiety and stress (Apóstolo et al., 2006). The scale was validated for the Brazilian population by Apóstolo et al. (2006), with the following Cronbach's alpha for the subscales: depression, $\alpha = .90$; anxiety, $\alpha = .86$; and stress, $\alpha = .88$, respectively. The internal consistency indexes in the present study were also satisfactory (depression, $\alpha = .85$; anxiety, $\alpha = .82$; and stress, $\alpha = .80$). The items are answered in a Likert scale ranging from 0 (Did not apply to me at all) to 3 (Applied to me very much, or most of the time). Higher scores in the dimensions of

Table 2 Description of sociodemographic data of the sample

Variable	N (446)	%
Sex		
Males	145	32.5
Females	301	67.5
Sexual orientation		
Heterosexual	371	83.2
Homosexual	31	7
Bisexual	39	8.8
Other	4	1
Age		
18–21 y/o	83	18.6
22–29 y/o	192	43
30–39 y/o	97	21
40–41 y/o	37	8.3
50–59 y/o	37	83
Marital Status		
Single	275	61.7
Married/Domestic Partnership	155	34.8
Separated/Divorced	16	3.6
Level of education		
Elementary School	2	4
High School	23	5.2
Associate or Bachelor's Degree	183	41
Associate or Bachelor's Degree (unfinished)	75	16.8
Graduate Degree (unfinished)	38	8.5
Graduate Degree	125	28
Race		
White	400	89.7
Black	7	1.6
Brown	34	7.6
Yellow	3	0.7
Other	2	0.4
Currently employed		
Yes	312	70
No	134	30
Regions of Brazil		
South	398	89.2
Southeast	30	6.7
Midwest	7	1.6
North	3	0.7
Northeast	8	1.8
Religious		
Yes	167	37.4
No	279	62.6
Psychological treatment (current or past)		
Yes	316	70.6
No	130	29.4

depression, anxiety and stress reflect higher levels in the evaluated constructs.

(5) Levenson's Multidimensional Locus of Control Scale (Dela Coleta, 1987): It is a self-report scale, composed of 24 items to be answered on a Likert scale raging from 1 (Totally Disagree) to 5 (Totally Agree). Developed by Leveson (1973), it was translated and adapted for the Brazilian population by Dela Coleta (1987). The scale assesses one's perception of the source of control of events in one's life. It is divided into three subscales, with eight items each: I) Internality: a belief that one can control one's own life; PO) Control by powerful others: a belief that the events in one's life are controlled by other people; and C) Control by chance forces: a belief that chance or fate can control one's life (Tamayo, 2012). High scores on the subscales indicate one's expectancy about the source of control of events in one's life. In previous studies, *Cronbach*'s alpha ranged from .57 to .70, compared to .72 in the present sample.

Data Collection Procedures

This research was submitted to the Research Ethics Committee of XXXXXX, and approved under protocol no. 3.066.397. Data were collected using a self-administered form designed on the Qualtrics platform, which offers cloud-based organization and collection of research data. Information about the research - including a description of the target population (adults aged 18 to 59 years) and a hyperlink for access to the questionnaire - was shared through various sources, such as social and professional media networks (e.g., Facebook, LinkedIn, Whatsapp, Telegram). Upon clicking on the said link, an Informed Consent Form (ICF) was presented to the participants before they started the survey. After confirming their agreement to participate in the study, they were directed to the web page containing the instruments to be answered. Data collection was held for four months (from January 21 to May 20, 2019), and average time spent on filling in the form was one and a half hours.

Data Analysis Procedures

The descriptive statistics (mean and standard deviation), the asymmetry and kurtosis of items, and the item-total correlation were evaluated. Furthermore, the items relations were assessed through polychoric correlations, because the items were ordinal variables.

To define the dimensionality of NMR-B, two criteria were used: theoretical assumptions (the NMR-S has a unifactorial structure, Catanzaro & Mearns, 2016) and Parallel Analysis (Hayton et al., 2004). A Confirmatory Factor Analysis was conducted to evaluate the fit of NMR-B. Estimation was performed with the *Weighted Least Squares Mean and Variance-Adjusted* (WLSMV) method, as this is a robust method for extraction of ordinal data (Muthén & Muthén, 2010). The fit indices were as follows: CFI (> .90), TLI (> .90), and RMSEA (< .08, with a 90% confidence interval not exceeding .10). Modification indices (MI) with values above 100.00 were assessed to identify sources of problems with model specification (Brown, 2015).

The first model of the NMR-B investigated the single factor solution of the scale, which was composed of the 37 items of the instrument. After the final solution of the scale was defined, internal consistency was calculated using Ordinal Cronbach's alpha (a) and Omega (ω).

Evidence of convergent validity of the NMR-B was assessed through the relationship of NMRE with the dimensions of difficulty in emotion regulation (non-acceptance, objectives, impulse, awareness, strategies and clarity), with the dimensions of locus of control (externality-chance, externality-others and internality) and with the levels of stress, anxiety and depression. The relationships between NMRE and the above-mentioned dimensions were investigated by modeling the structural equations and investigating the zero-order correlations between variables. WLSMV was the estimation method used for modeling the structural equations. The level of statistical significance was set at 95%. In order to evaluate the discriminant validity of NMR-B, the values of average variance extracted (AVE) of each construct and the square correlations of the constructs with each other were calculated.

Results

The NMR-B items means ranged from 1.78 to 4.21, indicating that the participants' scores covered different levels of the construct. Univariate skewness of items ranged from −1.39 to 1.23 and univariate kurtosis of items ranged from −1.46 to 1.53, suggesting that the responses were relatively normally distributed (Table 3).

The dimensionality of NMR-B was based on two criteria. The first criterion was the theoretical assumptions, which indicated that the scale has a unidimensional structure (Catanzaro & Mearns, 1990, 2016; Pfeiffer et al., 2012). The second criterion was parallel analysis.

The Kaiser-Meyer-Olkin (KMO) test for sampling adequacy was .91 and Bartlett's Sphericity Test also displayed positive results ($\chi^2(666) = 5134.7$, $p = .001$), suggesting that the correlation matrix was not identical and that, based on their shared variance, items could be regroup into a factor. The results of the parallell analysis demonstrated that the single-factor solution would be the most suitable for NMR-B. The first eigenvalue was 10.38 and the single-factor assumed the explanation of 39% of variance. The items loading ranged

Table 3 Descriptive Statistics of Items, Asymmetry and Kurtosis

I	M	SD	S	K	ITC
1	3.67	1.00	−.85	.16	.59
2	3.92	93	−1.06	1.07	.58
3	2.93	1.27	.16	−1.18	.48
4	3.66	1.21	−.62	−.71	.39
5	2.36	1.22	.56	−.83	.41
6	3.90	1.09	−.99	.32	.23
7	4.21	1.00	−1.39	1.60	.36
8	1.78	99	1.23	.77	.52
9	2.04	1.19	1.00	−.04	.43
10	3.34	1.18	−.39	−.80	.50
11	2.54	1.32	.37	−1.17	.46
12	3.42	1.23	−.58	−.71	.43
13	3.87	1.05	−.91	.31	.45
14	2.56	1.26	.31	−1.04	.59
15	4.09	99	−1.30	1.53	.43
16	2.15	1.15	.76	−.43	.37
17	3.56	1.22	−72	−.50	.35
18	2.69	1.20	.34	−.86	.24
19	3.30	1.17	−.37	−.90	.41
20	3.55	1.14	−.81	−.19	.60
21	2.35	1.27	.68	−.68	.46
22	2.47	1.23	.60	−.68	.30
23	4.14	1.02	−1.36	1.41	.48
24	2.76	1.22	.14	−1.04	.54
25	2.84	1.33	.12	−1.25	.53
26	3.69	1.12	−.78	−.02	.45
27	2.75	1.28	.14	−1.15	.58
28	2.43	1.26	.59	−.80	.44
29	3.23	1.33	−.42	−1.09	.44
30	2.78	1.31	.18	−1.19	.52
31	4.09	95	−1.22	1.38	.55
32	4.10	1.02	−1.29	1.26	.54
33	2.16	1.27	1.05	−.02	.32
34	4.03	1.13	−1.30	1.00	.37
35	3.12	1.55	−.25	−1.46	.27
36	4.06	1.03	−1.27	1.28	.40
37	2.33	1.26	.75	−.55	.37

*Note. I = Items, M = Mean, SD = Standard-deviation, S = Skewness, K = Kurtosis, * = p < .01*

were higher than .35, with exception of item 6 and 18 (Table 4).

Based on the theoretical assumptions and the results of parallel analysis, Confirmatory Factor Analysis (AFC) was used for investigating whether the NMR-B had a single-factor structure. The results of the analysis of the 37-item NMR-B indicated that the scale had a unidimensional structure. However, the factor loadings of two items were lower than .30, and the low values of the CFI and TLI indices indicated that this model was not the best representation of the construct (Table 4).

As a result, a second unidimensional model was tested after removal of items 6 "I can feel better by treating myself to something I like." and 18 "The advice friends give won't help me feel better.", whose factor loadings were less than .30. The results of the second model showed an increase in the values of the fit indices of the scale (Table 4). Thus, all items had factor loadings greater than .30 (Table 4).

After the single-factor structure of the scale was defined, an analysis was made of the modification indices of the 35-item Brazilian version of NMR-B. Based on the results, the errors of the pairs of items 1 and 2 (MI = .334), 23 and 31 (MI = .363), 24 and 25 (MI = .316), and 31 and 32 (MI = .433) were correlated. The 35 items that make up the NMR-B remained with significant factor loadings that were above .30 (Table 4). The fit index of the unidimensional solution with the correlated error pairs demonstrated that this model was fit for the NMR-B (Table 4). In addition, the second model showed satisfactory internal consistency (Ordinal Cronbach's alpha (*a* (95% C.I.) = .90 (.89–.92)) and Omega (*w* (95% C.I.) = .91 (.89–.92)).

Evidence of validity with external variables on the NMR-B scale was measured using associations of scores on NMRE with the dimensions of difficulty of emotion regulation (non-acceptance, goals, impulse, awareness, strategies and clarity), with the dimensions of locus of control (externality-chance, externality-others and internality), and with the levels of stress, anxiety and depression. Participants showed means scores of 3.58 (*SD* = .60) on negative mood regulation. The dimensions of DERS showed the following means: non-acceptance was 2.34 (*SD* = 1.10), objectives was 2.98 (*SD* = .73), impulse was 2.12 (*SD* = .69), awareness was 3.60 (*SD* = .79), strategies was 2.38 (*SD* = .73) and clarity was 2.59 (*SD* = .40). The scores on the dimensions of locus of control were 3.66 (*SD* = .67) for externality-chanc, 3.56 (*SD* = .78) for externality-others and 2.40 (*SD* = .58) for internality. The mean on the dimensions of depression (1.65, *SD* = .69), anxiety (1.60 (*SD* = .62) and stress (2.00, *SD* = .69) were low. Most participants showed minimum scores for depression (64%), anxiety (57%) and stress (58%). Furthermore, few participants showed mild (10% for depression, 17% for anxiety and 10% for stress). moderate (13% for depression, 8% for anxiety and 15% for stress), severe (5% for depression, 6% for anxiety and 16% for stress) and extremely severe (7% for depression, 12% for anxiety and 5% for stress) scores.

The NMR-B scores were negatively associated with difficulties in emotion regulation in the dimensions of non-acceptance, objectives, impulse, strategies of emotion regulation, emotional clarity, with levels of depression, anxiety and stress, as well as with the dimension internal locus of control. NMR-

Table 4 Exploratory Factor Analysis, Confirmatory Factor Analysis and Fit Indices of NMR-B 37 and NMR-B 35

Items	Exploratory Factor Analysis	Model 1 - NMR-B 37	Model 2 - NMR- 35	Model 2 - NMB-S 35 (Correlated errors)	
1)	.689*	.679*	.679*	.649*	
2)	.681*	.679*	.678*	.646*	
3)	−.547*	- .559*	- .561*	- .576*	
4)	.451*	.434*	.434*	.444*	
5)	−.471*	- .475*	- .475*	- .482*	
6)	.166	.155			
7)	.442*	.431*	.431*	.443*	
8)	−.619*	- .602*	- .600*	- .615*	
9)	−.531*	- .512*	- .511*	- .524*	
10)	.571*	.564*	.565*	.578*	
11)	−.520*	- .510*	- .506*	- .518*	
12)	.473*	.452*	.452*	.463*	
13)	.522*	.504*	.505*	.517*	
14)	−.656*	- .664*	- .666*	- .682*	
15)	.505*	.484*	.485*	.498*	
16)	.460*	.463*	.469*	.479*	
17)	.407*	.392*	.392*	.401*	
18)	−.289*	- .281*			
19)	−.491*	- .488*	- .486*	- .495*	
20)	.690*	.670*	.671*	.690*	
21)	−.517*	- .497*	- .495*	- .509*	
22)	−.352*	- .339*	- .337*	- .342*	
23)	.594*	.655*	.652*	.582*	
24)	−.606*	- .677*	- .681*	- .611*	
25)	−.619*	- .695*	- .697*	- .627*	
26)	.517*	.494*	.493*	.506*	
27)	−.660*	- .673*	- .673*	- .689*	
28)	−.511*	- .501*	- .500*	- .513*	
29)	.499*	.486*	.488*	.499*	
30)	−.591*	- .583*	- .583*	- .598*	
31)	.651*	.758*	.758*	.580*	
32)	.641*	.721*	.721*	.613*	
33)	−.439*	- .423*	- .418*	- .427*	
34)	.461*	.450*	.448*	.456*	
35)	.352*	.334*	.334*	.342*	
36)	.511*	.492*	.491*	.500*	
37)	−.447*	- .426*	- .418*	- .425*	
Fit Indices of CFA Models		χ^2 (*gl*)	CFI	TLI	RMSEA (90% CI)
Model 1 - NMR-B 37		2036.33 (629)	.856	.848	.071 (.067–.074)
Model 2 - NMR-B 35		1952.25 (560)	.857	.848	.075 (.071–.078)
Model 2 - NMR-B 35 (Correlated errors)		1490.192 (566)	.904	.897	.061 (.058–.065)

Note: * = $p < .001$

B showed positive relationships with awareness, externality-chance and externality-other of locus of control (Table 5). It was observed that the AVE's values of all variables were greater than their squared correlations, demonstrating that there was discriminant validity between negative mood regulation evaluated by NRM-B and the other variables measured. Based on that, the results showed evidence of discriminant validity for the NMR-B. It was observed that negative mood

regulation assessed by NRM-B differ from difficulty of emotion regulation (non-acceptance, objectives, impulse, awareness, strategies and clarity), dimensions of locus of control (externality-chance, externality-others and internality), and levels of stress, anxiety and depression (Table 5).

Discussion

The aim of this study was to translate and adapt the NMR-S into Brazilian Portuguese and investigate the evidence of its validity as a tool. The results of the present research have demonstrated that NMR-B is an adequate and reliable instrument to evaluate NMRE in Brazilian population. Initially, to the cross-cultural adaptation of the scale, seven new items were designed to be added to the Brazilian version. Remarkably, all new items presented high factor loadings, and satisfactory internal consistency values for the NMR-B.

NMR-B, with the new items included, maintained the unidimensional structure equivalent to that of the original scale (Catanzaro & Mearns, 1990). This result is relevant, since it indicates that these items are in accordance with the proposed construct and suggests that the strategies described are consistent with those that Brazilians believe they can use to manage their negative emotions. However, for the better representativeness of the evaluated construct, two items from the original scale were excluded because they had low factor loadings: item 6 *Eu posso me sentir melhor dando a mim mesmo(a) algo que gosto.* ("I can feel better by treating myself to something I like.") and item 18 *Os conselhos que meus amigos dão não irão me ajudar a me sentir melhor.* ("The advice friends give me won't help me feel better."). The lack of fit of item 6 may be due to the difficulty in culturally adapting the expression "treating myself to something I like", which resulted in discrepancies between the translators in the first step of the scale translation process. In item 18, the strategy of receiving advice from friends requires the expression of an unpleasant emotion, which is not a necessary skill in the other items of the scale.

Regarding the errors of the pairs of items included in the second model tested, it can be inferred that the relationship between these pairs is due to the fact that the content of the items refers to similar strategies that can be used to manage negative effects (Catanzaro & Mearns, 1990). This can be seen in the wording of the item pairs: Item 1 *Quando eu estou chateado(a), eu acredito que, geralmente, eu consigo encontrar uma forma de me animar*. ("When I'm upset, I believe that I can usually find a way to cheer myself up.") and Item 2 *Quando eu estou chateado(a), eu acredito que eu consigo fazer algo para me sentir melhor.* ("When I'm upset, I believe that I can do something to feel better."); Item 23 *Quando eu estou chateado(a), eu acredito que sair para almoçar ou tomar um café com amigos vai me ajudar.* ("When I'm upset, I believe that going out to lunch or having coffee with friends will help.") and Item 31 *Quando eu estou chateado(a), eu acredito que sair com amigos vai me ajudar.* ("When I'm upset, I believe that going out with friends will help."); Item 24 *Quando eu estou chateado(a), eu acredito que eu vou me sentir chateado(a) por muito tempo*. ("When I'm upset, I believe that I'll be upset for a long time.") and Item 25 *Quando eu estou chateado(a), eu acredito que eu não vou conseguir tirar isso da minha cabeça.* ("When I'm upset, I believe that I won't be able to put it out of my mind."); and Item 31 *Quando eu estou chateado(a), eu acredito que sair com amigos vai me ajudar.* ("When I'm upset, I believe that hanging out with friends will help.") and Item 32 *Quando eu estou chateado(a), eu acredito que passar um tempo com a minha família ou amigos me fará sentir melhor.* ("When I'm upset, I believe that spending time with my family or friends will make me feel better."). Despite the similarity between the items, the inclusion of this pair is relevant because it covers different facets of the strategies used for emotion regulation of negative affects.

It was found that NRM-B presents evidence of convergent and discriminant validity that corroborate the fact that this scale is properly investigating NMRE. The results of convergent validity indicated significant associations between higher levels of NMRE with lower levels of difficulty in emotion regulation, especially in the dimensions "Non-Acceptance", "Impulse", "Objectives", "Strategies", "Clarity", and also with levels of depression, anxiety and stress assessed by DASS-21. In addition, higher levels of NRME were positively related to "Awareness" and the strategies of externality-chance and externality-others, and negatively with the strategies of internality. The relationships between such variables are in agreement with results of previous studies (Kanavou, 2019; Mearns et al., 2013; Mearns et al., 2016; Pfeiffer et al., 2012).

The existing relationships among difficulties in emotion regulation subscales are in line with theoretical propositions (Catanzaro & Mearns, 2016; Gratz & Roemer, 2004). As previously highlighted, NRM-B assesses what people believe they can do to feel better when they are "upset", in a general perspective on the expectancy of a change in their negative emotional state (Catanzaro & Mearns, 2016). According to Gratz and Roemer (2004), the development of the DERS scale was based on NMR-S, especially for the composition of the "Strategies" subscale. This dimension assesses how much respondents believe that they are able to cope with a strong emotion (Coutinho et al., 2010). It is closely related to the concept of NMRE, and it accounts for the strongest correlation among all the other variables evaluated in this study. The "Goals" and "Impulse" subscales indicate, respectively, difficulty in engaging in goal-directed behavior in situations that involve unpleasant emotions and difficulty in controlling impulsive behaviors (Gratz & Roemer, 2004). It is assumed that

Table 5 Convergent and Discriminant Evidence of NMR-B

	M(*SD*)	AVE	1	2	3	4	5	6	7	8	9	10	11	12	13
1.NR	3.58 (.60)	.54		.12	.18	.15	.08	.40	.03	.31	.22	.25	.12	.13	.08
2.NA	2.34 (1.10)	.85	−.35*		.20	.18	.04	.40	.08	.16	.18	.17	.06	.09	.02
3.Obj	2.98 (.73)	.77	−.43*	.45*		.15	.00	.38	.07	.18	.18	.22	.08	.10	.05
4.Imp	2.12 (.69)	.84	−.39*	.42*	.39*		.01	.35	.07	.12	.19	.23	.10	.10	.04
5.Awa	3.60 (.79)	.67	.28*	−.21*	−.06	−.09		.03	.00	.06	.02	.01	.03	.03	.06
6.Sta	2.38 (.73)	.77	−.63*	.63*	.62*	.59*	−.16*		.11	.35	.30	.35	.12	.12	.07
7.Cla	2.59 (.40)	.76	−.17*	.28*	.27*	.26*	.03	.33*		.07	.08	.07	.04	.03	.00
8.Dep	1.65 (.69)	.82	−.56*	.40*	.42*	.35*	−.24*	.59*	.27*		.53	.49	.11	.10	.03
9.Anx	1.60 (.62)	.77	−.47*	.43*	.43*	.44*	−.15*	.55*	.28*	.73*		.59	.12	.09	.03
10.Sts	2.00 (.69)	.75	−.50*	.41*	.47*	.48*	−.11*	.59*	.26*	.70*	.77*		.07	.08	.04
11.EA	3.66 (.67)	.55	.34*	−.25*	−.29*	−.32*	.17*	−.35*	−.19*	−.33*	−.34*	−.27*		.32	.03
12.EO	3.56 (.78)	.67	.36*	−.30*	−.31*	−.31*	.16*	−.34*	−.16*	−.32*	−.30*	−.29*	.57*		.08
13.Int	2.40 (.58)	.53	−.29*	.14*	.23*	.20*	−.24*	.26*	.04	.18*	.17*	.19*	−.16*	−.29*	

Note. *= $p < .05$, **= $p < .01$. *M* = Mean, *SD* = Standard Deviation. *NR* = Negative Mood Regulation, *NA* = Non-Acceptance, *Obj* = Objectives, *Imp* = Impulse, *Awa* = Awareness, *Sta* = Strategies, *Cla* = Clarity, *Dep* = Depression, *Anx* = Anxiety, *Sts* = Stress, *EC* = Externality-Chance, *EO* = Externality-Others, *Int* = Internality. *The lower diagonal shows the correlations between the latent variables, estimated using structural equations. In the upper diagonal, the effect size of the relations are presented (that is, the square of the correlation)*

when people expect to be successful while trying to tolerate and alleviate their unpleasant emotions, they are able to act according to their personal goals, thereby inhibiting undesirable behaviors. Likewise, not believing in the possibility of decreasing negative affect will influence the belief that emotion is uncontrollable, which can increase impulsive behaviors that generate momentary pleasure and emotional avoidance (Ford & Gross, 2019). However, more research is needed to provide further insights into the relationships between such subscales and NMRE.

In the case of symptoms of depression, anxiety and stress, there were negative relationships with NMRE. Previous studies have indicated the same behavior among such variables; for example, there was evidence that low expectancies about emotion regulation were negatively related to symptoms of depression, anxiety and stress among heavy smokers (Lyvers et al., 2008). The symptoms evaluated involve emotional states that are negative as well as related to a lack of perspective for change, e.g., hopelessness and fear of not being able to perform a certain task or deal with a specific demand (Backenstrass et al., 2010; Kanavou, 2019). Thus, such individuals are not expected to have significant beliefs about being able to reduce emotional suffering, which accounts for the low NMRE (Fergus & Bardeen, 2016).

Finally, higher levels of NRM-B were negatively related to the Locus of Internal Control, a result that differs from the theoretical assumptions and results of previous studies (Backenstrass et al., 2010; Catanzaro & Mearns, 1990; Mearns et al., 2013). The initial hypothesis for such a result refers to the expectations of dealing with negative emotions of the target population, which is the Brazilian population, to be based on interpersonal relationships and interactions with the outside world. Which justified the inclusion of seven new items with content including family, friends, pleasant places, among others. It is suggested that further studies aim to better understand the relationships between NMREs and the internal and external locus of control.

Conclusions

The aim of the present study was to translate and adapt the NMR-S to the Brazilian context, thereby producing the NMR-B, and to present initial evidence of validity of the latter scale. As part of the cultural adaptation process, seven new items were designed using the emic approach and including specificities of the Brazilian population as far as NMRE are concerned. All new items have high factor loadings, indicating their suitability for evaluating NMRE in the Brazilian context. The one-dimensional structure of the original scale was maintained for the Brazilian version. Thus, the NMR-B consists of 35 items (28 original ones translated into Portuguese and 7 newly designed ones), and it shows good internal consistency. The present study also demonstrated evidence of convergent and discriminant validity, based on relationships between higher levels in NMR-B scores and lower levels of deficit in emotion regulation skills and symptoms of depression and anxiety, and stronger internal locus of control.

The major contribution of this study was to provide an instrument for adequate measurement of NMRE. The assessment of NMRE makes it possible to understand characteristics that strongly assist in emotion regulation and enable the

definition of specific interventions to facilitate treatment, as needed.

Despite this contribution, the main limitation of the present study is that it uses a convenience sample, whose data was collected online. Convenience sampling may have led the sample to be composed predominantly of women, from the southern region of Brazil, with complete or incomplete higher education. This limitation restricts the generalization of the findings.

Future studies covering a wider range of the Brazilian population are needed to provide additional evidence of the validity of NMR-B. It is also recommended that further research should seek to identify the psychometric properties of the scale for the clinical population, thus contributing to the development of psychological assessments and the development of evidence for interventions in other contexts.

Availability of Data and Material Not applicable.

Code Availability Not applicable.

Declarations

Ethics Approval This research was submitted to the Research Ethics Pontifical Catholic University of Rio Grande do Sul Committee and approved under protocol no. 3.066.397.

Consent to Participate Informed consent was obtained from all individual participants included in the study.

Consent for Publication Authors declare that patients signed informed consent regarding publishing their data.

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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