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Psychometric Evaluation of the Process Model of Emotion Regulation Questionnaire in the Portuguese Context

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Abstract

Validated instruments capturing the full complexity of emotion regulation remain scarce. Grounded in Gross's process model, this study examined the psychometric properties of the Portuguese version of the Process Model of Emotion Regulation Questionnaire (PMERQ). In a cross-sectional design, the translated 83-item PMERQ was administered online to two independent quota-based samples of Portuguese adults (Study 1: N = 254; Study 2: N = 270; mean age about 46 years; about 50% male; about 48% with higher education). In Study 1, exploratory factor analyses indicated a six-factor solution reflecting broad regulatory domains, while a 12-factor solution reproduced the theoretical dimensions with partial overlap among adjacent strategies; internal consistency was acceptable to good. In Study 2, the theoretical 12-factor structure was tested through confirmatory factor analysis. After data-driven refinement, a 45-item version showed adequate fit and acceptable to good reliability, with measurement invariance across gender (configural, metric, scalar). Associations with emotion regulation, emotional intelligence, well-being, distress, and aggression supported convergent and concurrent criterion validity, and associations with personality partially supported nomological validity. These findings provide preliminary support for the PMERQ in the Portuguese context.

Keywords: emotion regulation; PMERQ; psychometric validation; Portuguese population

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1. Introduction

Emotions play a central role in human adaptation, functioning as signals that guide attention, shape behavior, and support the pursuit of personally meaningful goals (Keltner et al., 2019). By organizing perception, motivating action, and coordinating physiological and behavioral responses, emotions contribute to effective functioning across everyday and challenging situations (Gross, 2015). However, emotional responses are not invariably adaptive. In some circumstances, emotions may arise with an intensity, duration, or form that interferes with goal attainment or psychological adjustment. In such cases, individuals engage in emotion regulation, defined as processes that influence how emotions unfold over time (Preece et al., 2025).

Importantly, emotion regulation is not limited to momentary adjustments in emotional responding. A growing body of research demonstrates that habitual patterns of emotion

regulation are systematically associated with long-term psychological functioning. Meta-analytic evidence indicates that the recurrent use of specific regulation strategies is linked to mental health, well-being, and interpersonal functioning across clinical and non-clinical populations (John & Gross, 2004; Naragon-Gainey et al., 2017; Schäfer et al., 2017; Webb et al., 2012). These findings underscore the central role of individual differences in emotion regulation in shaping both psychological resilience and vulnerability to maladjustment.

1.1. The Process Model of Emotion Regulation

The dominant theoretical framework guiding research on emotion regulation is the Process Model of Emotion Regulation (Gross, 2015). This model is grounded in the processual modal model of emotion, which describes how emotions unfold across a sequence of stages: a situation is encountered, attention is directed toward aspects of it, its significance in relation to personal goals is appraised, and experiential, behavioral, and physiological response tendencies are generated. Emotion regulation is conceptualized as a higher-order process that targets one or more of these stages. Building on this framework, the emotional response itself can be understood as the object of further evaluation and potential modification—what Preece et al. (2025) conceptualize as a second-level valuation system.

Based on the point of intervention in the emotion-generative sequence, Gross (2015) identified five broad families of regulation strategies: situation selection, situation modification, attentional deployment, cognitive change, and response modulation. This taxonomy has provided a unifying structure for organizing diverse regulatory processes and has guided extensive empirical research in affective science and clinical psychology.

Beyond the timing of regulatory intervention, accumulating evidence indicates that the orientation of emotion regulation strategies—specifically, whether individuals approach or disengage from emotional experiences—is also critical for understanding psychological outcomes (Olderbak et al., 2022). This distinction originates in the coping conceptualization literature, which differentiates between engagement-oriented strategies, involving cognitive or behavioral approaches to emotional experiences, and disengagement-oriented strategies, involving avoidance or withdrawal (Carver, 2011). Olderbak et al. (2022) extended this orientation framework to the process model of emotion regulation, proposing that each regulatory family can be enacted in either an engagement- or disengagement-oriented manner. Meta-analytic evidence from the psychological literature supports this distinction, showing that engagement-oriented strategies are generally associated with better psychological adjustment, whereas disengagement-oriented strategies—such as avoidance and expressive suppression—are robustly linked to psychological distress and interpersonal difficulties (Naragon-Gainey et al., 2017; Schäfer et al., 2017). Consistent with this pattern, cognitive reappraisal has been repeatedly associated with more adaptive emotional and social outcomes, whereas expressive suppression and avoidance have been reliably associated with poorer mental health indicators (Cabello et al., 2013; John & Gross, 2004; Megías-Robles et al., 2019; Webb et al., 2012).

1.2. The Process Model of Emotion Regulation Questionnaire (PMERQ)

Despite the conceptual richness of the process model, empirical progress has been limited by the scarcity of instruments capable of assessing emotion regulation across the full range of regulatory stages and strategy orientations. Recognizing this gap, Olderbak et al. (2022) developed the Process Model of Emotion Regulation Questionnaire (PMERQ), a measure specifically designed to capture the multidimensional nature of emotion regulation as conceptualized within the process model.

During its initial development, the PMERQ (Olderbak et al., 2022) was conceived as an 83-item instrument comprising twelve theoretically derived scales, designed to assess

engagement- and disengagement-oriented strategies across the five regulatory families, including paired strategies within situation selection, situation modification, attentional deployment, and response modulation, as well as a differentiated assessment of cognitive change through distinct scales of cognitive reappraisal, involving reinterpretation of emotional meaning, and cognitive repurposing, which reflects the assignment of new functional value or purpose to emotional experiences. Specifically, the twelve scales, oriented toward engagement and disengagement respectively, are: confront unpleasant situations and avoid unpleasant situations (situation selection); resolve conflicts and avoid conflicts (situation modification); focus elsewhere and cognitively distract (attentional deployment); realize coping potential and question interpretation (cognitive change through reconstrual); consider benefits and reduce importance (cognitive change through repurposing); and support by emotion sharing and expressive suppression (response modulation). This structure allowed for a fine-grained assessment of how individuals regulate emotions at different stages of the emotion-generative process and how they orient themselves toward emotional experiences (Olderbak et al., 2022).

1.3. Emotion Regulation and Its Correlates

Previous research provides a basis for expecting specific patterns of association between regulation strategies and other constructs. First, engagement-oriented strategies, particularly reappraisal, have been associated with higher well-being, whereas disengagement-oriented strategies such as suppression and avoidance have been linked to greater psychological distress (Gross & John, 2003; John & Gross, 2004; Naragon-Gainey et al., 2017; Schäfer et al., 2017; Webb et al., 2012). Second, regulation strategies are expected to relate to other measures of emotion regulation and to perceived emotional intelligence (Peña-Sarrionandia et al., 2015/2019), as well as to aggressive tendencies (Gutiérrez-Cobo et al., 2023; Vega et al., 2022). Third, meta-analytic evidence links personality to regulation and coping: lower neuroticism and higher extraversion, openness, and conscientiousness are associated with more adaptive regulation (Barańczuk, 2019), and extraversion and conscientiousness predict more problem solving and cognitive restructuring, whereas neuroticism predicts less (Connor-Smith & Flachsbart, 2007). This evidence guided the selection of the external measures and the hypotheses of Study 2, while the process model and the engagement/disengagement distinction, operationalized in the PMERQ, guided the factorial structure tested.

1.4. The Present Study

Because emotion regulation processes are shaped by cultural and linguistic contexts, the applicability of regulation measures cannot be assumed across populations (Matsumoto et al., 2008; Mesquita & Frijda, 1992). The importance of the present study is threefold. First, the PMERQ assesses emotion regulation across the stages of the process model while distinguishing engagement- from disengagement-oriented strategies, which allows a more fine-grained assessment than measures that focus on a small number of strategies (e.g., reappraisal and suppression). Second, a validated Portuguese version makes it possible for researchers and clinicians to examine how specific regulation strategies relate to well-being, psychological distress, and personality in the Portuguese population, and to compare findings with those obtained in other countries. Third, evidence of validity in Portugal cannot be assumed from the original validation (Olderbak et al., 2022), and the use of two independent quota-based samples provides evidence on the structure and validity of the instrument in the general adult population, rather than only in student or clinical samples.

Accordingly, the present study aims to examine the psychometric properties of the Portuguese version of the PMERQ, contributing to the cross-cultural validation of a process- and orientation-based assessment framework and extending the empirical study of emotion

regulation within this cultural context. The present study addressed the following research questions: (RQ1) What factor structure emerges when the items of the Portuguese version of the PMERQ are submitted to an exploratory factor analysis, and to what extent does it reproduce the 12 theoretically proposed dimensions? (RQ2) Do the PMERQ dimensions show adequate internal consistency? (RQ3) Is the theoretical 12-factor structure supported by confirmatory factor analysis in an independent sample, and is it invariant across gender? (RQ4) How are the PMERQ dimensions related to other measures of emotion regulation and emotional intelligence, well-being, ill-being, and personality traits?

The validation process was conducted across two studies using independent samples, with the following objectives: (a) Study 1: to examine the factorial structure of the PMERQ through exploratory factor analysis (EFA), including the extent to which it reproduces the 12 theoretically proposed dimensions, and to assess the internal consistency of its dimensions; (b) Study 2: to test the theoretical 12-factor structure of the PMERQ through confirmatory factor analysis (CFA), to examine its measurement invariance across gender, and to examine its relations with other constructs, namely convergent validity (other emotion regulation and emotional intelligence measures), concurrent criterion validity (indicators of well-being and ill-being), and nomological validity (personality traits). Study 1 was exploratory and no hypotheses were formulated. For Study 2, based on the original validation of the PMERQ (Olderbak et al., 2022) and on the literature reviewed above, we hypothesized that: (H1) the theoretical 12-factor correlated model would show acceptable fit in an independent sample; (H2) the factor structure would be invariant across gender; (H3) engagement-oriented strategies, particularly reappraisal through coping potential and consider benefits, would be positively associated with adaptive regulation strategies, emotional intelligence, and well-being, and negatively with ill-being, whereas disengagement-oriented strategies (e.g., expressive suppression, avoidance) would show the opposite pattern (convergent and concurrent criterion validity); and (H4) cognitive change strategies would be positively associated with extraversion, conscientiousness, and intellect/imagination, and negatively with neuroticism (nomological validity). Together, these studies provide a comprehensive evaluation of the PMERQ's psychometric adequacy in the Portuguese population.

2. Materials and Methods

2.1. Participants

The study comprised two independent adult samples from the Portuguese population, corresponding to Study 1 (N = 254) and Study 2 (N = 270), in a cross-sectional design. Participants were recruited through quota sampling, with quotas defined to match the distribution of the Portuguese adult population in age, gender, geographic region, and educational level. Two independent samples were collected so that exploratory and confirmatory analyses could be conducted on different participants (Worthington & Whittaker, 2006). Both samples exceed the 200 participants commonly considered fair for factor-analytic procedures (Comrey & Lee, 1992; Tabachnick & Fidell, 2019). These samples correspond to approximately 3 participants per item for the full 83-item version, below the ratio of seven participants per item suggested by COSMIN (Mokkink et al., 2018). Each sample corresponds to approximately 0.003% of the Portuguese adult population; as the aim was psychometric validation rather than population estimation, sample sizes were not defined as a fraction of the population.

Study 1 included 254 adult participants. Participants ranged in age from 18 to 80 years (M = 46.5, SD = 14.9), and the sample was balanced by gender (50.8% male). Age groups were distributed as follows: 25.6% aged 18–34 years, 32.3% aged 35–54 years, and 42.1% aged 55 years or older. Most participants reported Portuguese nationality (96.0%). Regarding

education, 42.5% reported secondary education, 32.7% held a university degree, and 15.0% reported postgraduate education. The majority were professionally active (approximately 72%), while 13.4% were retired. Participants were recruited from all Portuguese districts, including the autonomous regions.

Study 2 included 270 adult participants. Participants ranged in age from 18 to 80 years (M = 45.7, SD = 14.9) and were equally distributed by gender (50.0% male). The age distribution comprised 27.0% aged 18–34 years, 34.4% aged 35–54 years, and 38.5% aged 55 years or older. Most participants reported Portuguese nationality (95.9%). Regarding education, 44.2% reported secondary education, 35.3% held a university degree, and 13.0% reported postgraduate education. The majority were professionally active (approximately 75%), and 12.6% were retired. Participants were recruited from all Portuguese districts, including the autonomous regions.

2.2. Measures

i. Emotion Regulation and EI Measures

Process Model of Emotion Regulation Questionnaire (PMERQ). This instrument (Olderbak et al., 2022) was adapted for use in the Portuguese cultural context. The translation focused on the original 83-item version of the instrument, preserving its structure, content, and response format. The PMERQ was translated into Portuguese using rigorous translation and back-translation procedures. Two bilingual researchers independently translated the original items, aiming to preserve their meaning and conceptual equivalence. An independent bilingual translator then back-translated the Portuguese version into English, and discrepancies were resolved by consensus among the translation team to ensure conceptual equivalence and linguistic clarity (F. van de Vijver & Hambleton, 1996).

Following the forward and back-translation procedures, and in line with Beaton et al. (2000), a pretest of the Portuguese version was conducted with 23 adults from the target population. Although this was a small-scale pretest, participants with diverse sociodemographic characteristics were sought (70% male; age M = 39.9, SD = 13.0, range = 18–71; participants from almost all regions of mainland Portugal). The pretest aimed to assess the administration time of the instrument and to identify possible difficulties in understanding the items and response options. Participants reported no difficulties in comprehension, and no changes to the items or response options were required. The average completion time was approximately 20 min.

The questionnaire was administered in this original 83-item format, with items rated on a 6-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree). Items were distributed across 12 dimensions, capturing engagement- and disengagement-oriented strategies across the main stages of the emotion-generative process: situation selection, situation modification, attentional deployment, cognitive reappraisal (reconstrual and repurposing), and response modulation. Higher scores indicate greater agreement with the use of the corresponding emotion regulation strategy.

With respect to the psychometric properties of the original instrument, Olderbak et al. (2022) reported strong internal consistency, with reliability estimates for individual scales reaching values as high as 0.92. A confirmatory factor analysis specifying the 12 scales as correlated latent variables showed a good fit to the data ($\chi^2 = 3523.49$, $p < .001$, CFI = 0.913, RMSEA = 0.045, SRMR = 0.061). In addition, the authors reported adequate discriminant validity and established measurement invariance across gender and age groups. Olderbak et al. (2022) further tested a more complex second-order model in which the 12 scales were grouped into higher-order engagement and disengagement factors; however, this model showed an unsatisfactory fit (CFI = 0.873, SRMR = 0.135). Based on these findings, the authors developed a more parsimonious 45-item version comprising 10 scales. This refined

version demonstrated good model fit, robust measurement invariance across gender and age groups, strong test–retest reliability over a one-month interval, and clear evidence of convergent, discriminant, and predictive validity (Olderbak et al., 2022).

Emotion Regulation Questionnaire (ERQ). Emotion regulation strategies were assessed using the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), translated and adapted to Portuguese by Dinis and Pinto-Gouveia (2007). The ERQ assesses two emotion regulation strategies that differ in the point at which they exert their first impact on the emotion-generative process: cognitive reappraisal and expressive suppression (Gross, 1998; John & Gross, 2004). The ERQ consists of 10 items organized into two dimensions (reappraisal and suppression), rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). In the original validation study, internal consistency coefficients were $\alpha = 0.79$ for cognitive reappraisal and $\alpha = 0.73$ for expressive suppression (Gross & John, 2003). The Portuguese adaptation reported psychometric properties comparable to the original version—$\alpha = 0.80$ for both subscales (Dinis & Pinto-Gouveia, 2007).

Cognitive Emotion Regulation Questionnaire (CERQ). Cognitive emotion regulation strategies were assessed using the Cognitive Emotion Regulation Questionnaire (CERQ) developed by Garnefski et al. (2001). The Portuguese version of the CERQ was translated, adapted, and psychometrically examined by Matos et al. (2019). The CERQ comprises 36 items, originally organized into nine cognitive emotion regulation strategies, rated on a 5-point Likert-type scale ranging from 1 (almost never) to 5 (almost always). The Portuguese study supported a multidimensional structure distinguishing between theoretically more and less adaptive strategies, and reported good internal consistency, with Cronbach's alpha values ranging from $\alpha = 0.75$ to $\alpha = 0.91$ across the main components (Matos et al., 2019).

Trait Meta-Mood Scale—24 (TMMS-24). Perceived emotional intelligence was assessed using the Trait Meta-Mood Scale—24 (TMMS-24) (Fernández-Berrocal et al., 2004). The TMMS-24 consists of 24 items organized into three dimensions: emotional attention, emotional clarity, and emotional repair. Items are rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Portuguese version of the TMMS-24, adapted by Queirós et al. (2005), supported the original three-factor structure and demonstrated good internal consistency, with Cronbach's alpha coefficients above 0.80 for all subscales.

ii. Well-Being Measures

Scale of Positive and Negative Experience (SPANE). Affective well-being was assessed using the Scale of Positive and Negative Experience (SPANE) developed by Diener et al. (2010). The SPANE consists of 12 items, organized into two dimensions (positive affect and negative affect), as well as an affective balance score. Items are rated on a 5-point Likert-type scale ranging from 1 (very rarely or never) to 5 (very often or always). The Portuguese version of the SPANE, adapted and validated by Silva and Caetano (2013), reported good internal consistency, with Cronbach's alpha coefficients of $\alpha = 0.89$ for Positive Affect and $\alpha = 0.84$ for Negative Affect.

Satisfaction with Life Scale (SWLS). Cognitive well-being was assessed using the Satisfaction with Life Scale (SWLS) developed by Diener et al. (1985). The SWLS comprises 5 items assessing global life satisfaction, rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The Portuguese adaptation of the SWLS, conducted by Simões (1992) and further supported by Neto (1993), demonstrated good to excellent internal consistency, with reported Cronbach's alpha values ranging from approximately $\alpha = 0.78$ to $\alpha = 0.87$.

iii. Ill-being Measures

Depression Anxiety Stress Scales (DASS-21). Psychological distress was assessed using the Depression Anxiety Stress Scales (DASS-21) developed by Lovibond and Lovibond (1995). The DASS-21 consists of 21 items organized into three dimensions: depression, anxiety, and stress, rated on a 4-point Likert-type scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). The Portuguese validation by Pais-Ribeiro et al. (2004) reported high internal consistency, with Cronbach's alpha values above 0.85 for all three subscales.

Buss-Perry Aggression Questionnaire (AQ-SF). Aggressive tendencies were assessed using the short form of the de Buss-Perry Aggression Questionnaire (AQ-SF), derived from the original instrument by Buss and Perry (1992). The Portuguese short version of the AQ, examined by Cunha and Gonçalves (2012), provides a more concise assessment of aggressive tendencies while preserving the core dimensions of the original measure. The AQ-SF comprises 12 items organized into four dimensions: physical aggression, verbal aggression, anger, and hostility, rated on a 5-point Likert-type scale ranging from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). The Portuguese study reported very good internal consistency for the total scale ($\alpha = 0.88$), with reliability estimates comparable to those observed for the full version, while subscale reliabilities were mostly acceptable ($\alpha = 0.76$–0.79), except for the verbal aggression subscale, which showed inadequate internal consistency ($\alpha = 0.56$).

iv. Personality Traits Measure

Personality traits were assessed using the Mini International Personality Item Pool (Mini-IPIP), a brief measure of the Big Five personality dimensions originally developed by Donnellan et al. (2006). The Mini-IPIP consists of 20 items, rated on a 5-point Likert-type scale ranging from 1 (very inaccurate) to 5 (very accurate), organized into five dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and intellect/imagination. The Portuguese version of the Mini-IPIP, psychometrically evaluated by Oliveira (2019), supported the five-factor structure and reported acceptable internal consistency, with Cronbach's alpha coefficients ranging from $\alpha = 0.60$ to $\alpha = 0.77$.

2.3. Procedure

Participants were recruited through quota sampling, with quotas defined to match the distribution of the Portuguese adult population in age, gender, geographic region, and educational level. Recruitment and data collection were conducted by a specialized data collection company that aggregates several different online panels, and the research team did not take part in data collection. Participation was voluntary. All respondents were informed about the aims of the study, and confidentiality and anonymity were guaranteed. Informed consent was obtained prior to participation. Participants were members of the company's panel and received a small monetary compensation (about €3.50), delivered by the company through several mechanisms and recorded in its payment system. Data were collected between April and May 2025 by the same data collection company, using self-report questionnaires administered online.

The online version was administered on SurveyMonkey, and participants could leave items unanswered. The proportion of missing data was low (≤6% per item). Two independent samples of different participants were recruited, each following the same quota criteria (age, gender, geographic region, and educational level), corresponding to Study 1 and Study 2. Study 1 was used for the exploratory analyses and reliability, and Study 2 for the confirmatory, measurement invariance, and external validity analyses. The studies also differed in the instruments administered. In Study 1, participants completed the 83-item

PMERQ and sociodemographic questions. In Study 2, participants completed the PMERQ together with the external validation measures (ERQ, CERQ, TMMS-24, SPANE, SWLS, DASS-21, AQ-SF, and Mini-IPIP) and sociodemographic questions. Completing the questionnaire took approximately 20 min in Study 1 and approximately 44 min in Study 2. The study was conducted in accordance with ethical standards for research involving human participants and received approval from the Ethics Committee of the Faculty of Psychology and Education Sciences of University of Porto(approval no. 2021/11-04, 9 December 2021) prior to data collection.

2.4. Data Analyses

Data analyses were conducted separately for Study 1 and Study 2, following recommended procedures for scale development and validation (Boateng et al., 2018; Mokkink et al., 2018; Worthington & Whittaker, 2006). All analyses were performed using jamovi (version 2.6.45.0), employing the jYS and SEM modules. Prior to the main analyses, missing data patterns were examined using the procedures implemented in jamovi. Little's test indicated that data were not missing completely at random. However, the proportion of missing values was very small (no more than approximately 6% per item). Given the low level of missingness, missing responses were handled using random forest imputation (missForest algorithm) as implemented in jamovi, allowing the retention of participants with partial data in subsequent analyses.

In Study 1, analyses focused on the preliminary psychometric evaluation of the PMERQ. Item-level descriptive statistics were examined to assess response distributions and item sensitivity, including means, standard deviations, skewness, and kurtosis. The factor structure of the PMERQ was examined using an exploratory factor analysis (EFA) with maximum likelihood extraction and oblimin rotation, given the expected correlations among the latent factors. The adequacy of the data for factor analysis was evaluated using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Finally, internal consistency reliability was examined using Cronbach's alpha (α) and McDonald's omega (ω) coefficients (McNeish, 2018).

In Study 2, analyses aimed to confirm the factorial validity of the PMERQ and to examine its measurement invariance and external validity. The theoretical 12-factor structure (H1) was tested using confirmatory factor analysis (CFA) within a structural equation modeling framework. Model fit was evaluated using the χ^2 statistic, CFI, TLI, RMSEA (with 90% confidence intervals), and SRMR (Hu & Bentler, 1999). Measurement invariance across gender (H2) was examined through multigroup CFA, testing configural, metric, and scalar invariance, using ΔCFI $\leq$ 0.01 and ΔRMSEA $\leq$ 0.015 as criteria (F. F. Chen, 2007; G. W. Cheung & Rensvold, 2002). Validity evidence based on relations with other variables (H3 and H4) was examined through Pearson correlations between PMERQ dimensions and external measures. Convergent validity was examined with the ERQ, CERQ, and TMMS-24, and concurrent criterion validity with measures of well-being (SPANE, SWLS) and ill-being (DASS-21, AQ-SF), and nomological validity with the Big Five traits (Mini-IPIP). Correlations were interpreted as small ($|r| \approx 0.10$), medium ($\approx$0.30), and large ($\approx$0.50) (Cohen, 1988). Based on the theoretical framework and previous evidence (Carver, 2011; Naragon-Gainey et al., 2017; Olderbak et al., 2022; Schäfer et al., 2017), we expected engagement-oriented strategies, particularly reappraisal through coping potential and consider benefits, to be positively associated with adaptive regulation and well-being and negatively associated with ill-being, whereas disengagement-oriented strategies (e.g., expressive suppression, avoidance) were expected to show the opposite pattern (Gross & John, 2003; John & Gross, 2004; Webb et al., 2012). Nomological validity was examined through the associations with Big Five traits (Mini-IPIP). Based on meta-analytic evidence

linking personality traits to emotion regulation and coping (Barańczuk, 2019; Connor-Smith & Flachsbart, 2007), we expected cognitive change strategies (reappraisal) to be positively associated with extraversion, conscientiousness, and intellect/imagination, and negatively associated with neuroticism. Correlations were interpreted as small ($|r| \approx 0.10$), medium (≈ 0.30), and large (≈ 0.50; Cohen, 1988).

This study was not preregistered. The analyses of Study 1 (EFA) were exploratory. In Study 2, the theoretical 12-factor structure was tested in an independent sample, but model refinement (removal of items and inclusion of correlated residuals, guided by modification indices) was data-driven; the Study 2 analyses are therefore partly exploratory, and the final 45-item model requires cross-validation in an independent sample. Hypotheses regarding the associations with external measures were derived from previous literature but were not registered in advance.

2.5. Use of Generative AI

During the preparation of this manuscript, the authors used Microsoft 365 Copilot (GPT-5 chat model) to improve textual fluency, ensure coherent structuring across sections, and format the output of the statistical analyses into tables. The tool was not used for study design, data collection, statistical analysis, or interpretation of results. All analyses were conducted by the authors in jamovi, and all tables were checked against the original outputs to ensure accuracy. The authors reviewed all AI-assisted content and take full responsibility for the final manuscript.

3. Results

3.1. Study 1

3.1.1. Item Descriptive Statistics

Descriptive statistics were examined for all 83 items to characterize response distributions (see Supplementary Table S1). Item means ranged from 3.63 to 4.70 on a six-point scale, with standard deviations generally around or above 1.00, indicating adequate variability. Skewness values were consistently negative and within acceptable limits ($|\text{skewness}| < 2$), while kurtosis values were also within recommended thresholds ($|\text{kurtosis}| < 7$), indicating no severe departures from normality. Medians and modes were predominantly 4, reflecting moderate to high endorsement levels. Overall, item distributions showed adequate variability and acceptable distributional properties.

3.1.2. Exploratory Factor Analysis

An exploratory factor analysis (EFA) was conducted on the initial pool of 83 items, theoretically developed to assess 12 emotion regulation strategies, distributed across engagement-oriented and disengagement-oriented processes. Sampling adequacy was confirmed by a significant Bartlett's test of sphericity, $\chi^2(3403) = 13{,}099$, $p < .001$, and an excellent Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy (KMO = 0.899). Item-level KMO values ranged from 0.756 to 0.954, indicating that all items were appropriate for factor analytic procedures. In the 12-factor solution, communalities were moderate to high (M = 0.60, range = 0.40–0.78; Supplementary Table S2).

3.1.3. Unconstrained Exploratory Solution

Factor retention was guided primarily by parallel analysis, complemented by inspection of eigenvalues and the scree plot. Results supported the extraction of six factors. The six-factor solution yielded eigenvalues ranging from 9.80 to 4.50 and accounted for 51.4% of the total variance, with individual factors explaining between 5.42% and 11.80% of the variance.

Inter-factor correlations ranged from 0.08 to 0.50, indicating low to moderate associations between factors and supporting the use of an oblique rotation. Inspection of factor loadings showed that the extracted factors predominantly reflected broad regulatory domains, rather than discrete representations of the 12 theoretically proposed strategies. Items assessing situational processes, attentional deployment, and cognitive change frequently loaded within the same factors, whereas avoidance-oriented strategies also tended to cluster. Response modulation strategies generally showed more distinct loading patterns relative to other strategy domains.

3.1.4. Exploratory Solution with 12 Factors

To further evaluate the theoretically proposed structure, an exploratory solution specifying 12 factors was estimated using maximum likelihood extraction with oblimin rotation. The full rotated factor loading matrix, communalities, eigenvalues, and explained variance are provided in Supplementary Table S2. This forced solution accounted for 59.57% of the total variance, with eigenvalues ranging from 5.70 for the first factor to 1.82 for the twelfth factor. Individual factors accounted for between 6.87% and 2.20% of the total variance, indicating that all factors contributed meaningfully to the overall explanation of item variance. Examination of the factor loading matrix indicated that all 12 theoretically defined dimensions were empirically represented. Factors 1–9 were each defined by at least three items with primary loadings ≥ 0.40 (several ≥ 0.60). Factors 10 and 11 were less well defined (two and three items with primary loadings ≥ 0.40, respectively), and Factor 12 was weakly defined, with a single item with its primary loading on this factor (0.365) and no primary loading ≥ 0.40. Four items (items 1, 32, 41, and 73) did not show a loading ≥ 0.30 on any factor (Supplementary Table S2). Cross-loadings were observed for a subset of items, typically at moderate levels (approximately 0.30–0.35), with a few items showing comparable loadings on two factors (e.g., items 10, 12, 29). These cross-loadings occurred primarily between conceptually adjacent strategies. Overlap was most evident between situation selection and situation modification, between attentional focus and cognitive distraction, and among avoidance-oriented strategies. In contrast, response modulation strategies showed relatively more distinct loading patterns, with fewer cross-loadings observed. Inter-factor correlations in the 12-factor solution ranged from −0.03 to 0.44, with higher correlations observed mainly between theoretically related dimensions and lower correlations between more distal strategies. Overall, the forced 12-factor solution demonstrated that the complete set of theoretically proposed strategies was empirically identifiable, with each factor represented by a coherent subset of items and distinct contributions to the factor structure.

3.1.5. Reliability

Internal consistency was assessed using Cronbach's alpha (α) and McDonald's omega (ω) for the total scale and for each of the 12 dimensions. The full 83-item scale demonstrated excellent internal consistency ($\alpha = 0.97$, $\omega = 0.96$; see Table 1). At the dimensional level, all subscales showed adequate to good reliability, with α coefficients ranging from 0.80 to 0.88 and ω coefficients ranging from 0.81 to 0.88. Omega values were comparable to, and in most cases slightly higher than, the corresponding alpha coefficients. Item-level analyses indicated that removal of individual items did not result in meaningful increases in reliability coefficients for any dimension, supporting the internal coherence of the item sets.

Table 1. Internal Consistency Reliability of the PMERQ Dimensions.

PMERQ Dimension	Items (k)	α	ω
Situation Modification—Confront Unpleasant Situations	6	0.860	0.865
Situation Modification—Avoid Unpleasant Situations	7	0.802	0.805
Situation Modification—Resolve Conflicts	7	0.861	0.861
Situation Modification—Avoid Conflicts	6	0.878	0.883
Attentional Deployment—Focus Elsewhere	7	0.829	0.832
Attentional Deployment—Cognitive Distraction	7	0.826	0.843
Cognitive Reappraisal—Reconstrual (Questioning Interpretation)	7	0.840	0.848
Cognitive Reappraisal—Reconstrual (Coping Potential)	7	0.884	0.884
Cognitive Reappraisal—Repurpose (Consider Benefits)	7	0.864	0.870
Cognitive Reappraisal—Repurpose (Reduce Importance)	8	0.834	0.841
Response Modulation—Emotion Sharing	6	0.843	0.849
Response Modulation—Expressive Suppression	8	0.810	0.814
Total Scale	83	0.973	0.975

Note. α = Cronbach's alpha; ω = McDonald's omega.

3.2. Study 2

3.2.1. Confirmatory Factor Analysis

The present study aimed to validate an adapted version of the PMERQ, comprising 83 items distributed across 12 latent dimensions. To evaluate the factorial validity of the adapted instrument (H1), a confirmatory factor analysis (CFA) was conducted using jamovi with robust (scaled) maximum likelihood estimation. The initial measurement model specified the full set of 83 items loading on their respective latent factors, with all latent variables freely correlated. This model demonstrated poor fit, χ^2 (3254) = 8692, $p < .001$, CFI = 0.653, TLI = 0.637, RMSEA = 0.079, 90% CI [0.077, 0.081], SRMR = 0.090, indicating the need for substantial model refinement (see Table 2). Model refinement was guided by both statistical criteria and theoretical considerations. Given that standardized factor loadings were generally acceptable, model refinement initially focused on inspection of modification indices, alongside evaluation of low item communalities and standardized loadings ($\lambda < 0.30$; communalities < 0.30). This process led to the identification of localized sources of misfit.

Table 2. Goodness-of-Fit Indices for the Confirmatory Factor Analyses and Measurement Invariance Across Gender.

Model	χ^2	*df*	CFI	TLI	RMSEA	90% CI RMSEA	SRMR	ΔCFI
Confirmatory Factor Analysis								
Initial CFA (83 items)	8692	3254	0.653	0.637	0.079	[0.077, 0.081]	0.090	—
Final CFA (45 items)	1335	807	0.928	0.911	0.049	[0.045, 0.054]	0.059	—
Measurement Invariance Across Gender								
Configural invariance	2723	1672	0.913	0.902	0.072	[0.067, 0.077]	0.071	—
Metric invariance (loadings)	2700	1704	0.918	0.909	0.070	[0.065, 0.075]	0.076	0.005
Scalar invariance (intercepts)	2684	1692	0.918	0.908	0.070	[0.065, 0.075]	0.076	0.000

Note: χ^2 = chi-square; *df* = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = confidence interval; SRMR = Standardized Root Mean Square Residual; ΔCFI = change in CFI relative to the previous, less constrained model. For measurement invariance models, scaled (robust) fit indices are reported.

Correlated residuals were introduced selectively between item pairs based on modification indices and theoretical similarity, both within factors and across conceptually adjacent engagement and disengagement domains. These residual correlations reflected shared variance attributable to item wording similarity, content overlap, or method effects. As model refinement progressed, several problematic items were gradually removed due to

low loadings, weak communalities, or cross-domain redundancy. Importantly, item reduction was conducted while preserving balanced representation across all factors, ensuring a minimum of three indicators per latent dimension. Because item removal and the inclusion of residual correlations were guided by modification indices and by the same data used to evaluate the model, the fit of the final model should be considered provisional until replicated in an independent sample.

The final measurement model retained 45 items across the original 12 dimensions (see Supplementary Table S3), with all latent factors freely correlated. All items loaded significantly on their intended latent factors, with standardized factor loadings generally ranging from moderate to high, indicating adequate convergent validity. The final model demonstrated good fit to the data, χ^2 (807) = 1335, $p < .001$, CFI = 0.928, TLI = 0.911, RMSEA = 0.049, 90% CI [0.045, 0.054], SRMR = 0.059 (see Table 2).

Correlations between the PMERQ dimension scores are presented in Supplementary Table S4. Correlations among engagement-oriented dimensions ranged from 0.39 to 0.77 (M ≈ 0.55), and among disengagement-oriented dimensions from 0.36 to 0.75 (M ≈ 0.55). Correlations between engagement- and disengagement-oriented dimensions were on average somewhat lower (M ≈ 0.45) but varied widely (0.13 to 0.76); for example, question interpretation (disengagement) was strongly related to realize coping potential (engagement; r = 0.76). This suggests that the dimensions are organized by regulatory family as well as by orientation, and that engagement and disengagement are related rather than independent domains.

3.2.2. Reliability

Following confirmation of the final factor structure, internal consistency was examined using Cronbach's alpha (α) and McDonald's omega (ω) for each confirmed scale and for the total score. Reliability analyses were conducted using the final set of retained items. At the dimensional level, internal consistency estimates ranged from acceptable to good, with α coefficients ranging from 0.74 to 0.86 and ω coefficients from 0.76 to 0.86 (see Table 3 for means and standard deviations). Omega coefficients were consistently comparable to or slightly higher than the corresponding alpha coefficients, indicating stable reliability across scales. Item-level analyses showed that removing individual items did not result in meaningful increases in reliability coefficients for any scale. The total score, computed from the final 45-item version of the instrument, demonstrated excellent internal consistency (α = 0.96, ω = 0.96), supporting the measure's overall reliability.

Table 3. Descriptive statistics and reliability of PMERQ dimensions (Study 2).

PMERQ Dimension	Items (k)	α	ω	*M*	*SD*
Situation Modification—Confront Unpleasant Situations	4	0.799	0.804	4.17	0.920
Situation Modification—Avoid Unpleasant Situations	4	0.794	0.799	4.19	0.896
Situation Modification—Resolve Conflicts	4	0.786	0.789	4.32	0.823
Situation Modification—Avoid Conflicts	4	0.857	0.861	4.02	0.926
Attentional Deployment—Focus Elsewhere	4	0.776	0.782	4.03	0.876
Attentional Deployment—Cognitive Distraction	4	0.741	0.757	4.08	0.846
Cognitive Reappraisal—Reconstrual (Questioning Interpretation)	4	0.817	0.820	4.14	0.871
Cognitive Reappraisal—Reconstrual (Coping Potential)	4	0.829	0.830	4.25	0.888
Cognitive Reappraisal—Repurpose (Consider Benefits)	3	0.757	0.779	4.22	0.905
Cognitive Reappraisal—Repurpose (Reduce Importance)	3	0.810	0.814	4.12	0.928
Response Modulation—Emotion Sharing	4	0.774	0.779	4.01	0.977
Response Modulation—Expressive Suppression	3	0.841	0.844	4.04	0.977
Total Scale	45	0.957	0.958	4.13	0.658

Note. α = Cronbach's alpha; ω = McDonald's omega. *M* and *SD* refer to the mean of the items of each dimension (response scale 1–6).

3.2.3. Measurement Invariance Across Gender

To test H2, measurement invariance across gender was assessed using multi-group confirmatory factor analysis within jamovi with robust (scaled) maximum likelihood estimation. A hierarchical sequence of increasingly restrictive models was tested, including configural, metric, and scalar invariance. The configural model demonstrated acceptable fit to the data, $\chi^2(1672) = 2723$, $p < .001$, CFI = 0.913, TLI = 0.902, RMSEA = 0.071 (see Table 2), supporting the adequacy of the hypothesized 12-factor structure across gender groups. The metric invariance model, in which factor loadings were constrained to equality across groups, showed no meaningful deterioration in model fit relative to the configural model, $\chi^2(1704) = 2700$, $p < .001$, CFI = 0.918, TLI = 0.909, RMSEA = 0.070. The change in fit indices was minimal (ΔCFI = 0.005; ΔRMSEA = 0.001), supporting metric invariance. The scalar invariance model, which additionally constrained item intercepts to equality across groups, also demonstrated stable model fit, $\chi^2(1692) = 2684$, $p < .001$, CFI = 0.918, TLI = 0.908, RMSEA = 0.070. The CFI remained stable across the metric and scalar models, indicating that imposing additional equality constraints did not meaningfully degrade model fit (ΔCFI = 0.000; ΔRMSEA = 0.000; see Table 2).

Overall, the results support full measurement invariance (configural, metric, and scalar) across gender. This indicates that the factor structure, factor loadings, and item intercepts are equivalent across groups, allowing for meaningful comparisons of latent constructs between males and females. Importantly, the invariance testing was conducted using a parsimonious measurement model without correlated error terms, ensuring that cross-group equivalence was evaluated based on a theoretically constrained and non–sample-specific specification. Because this model did not include the residual correlations of the final model, its fit (e.g., configural RMSEA = 0.071) is lower than that of the final model reported above (RMSEA = 0.049).

3.2.4. Convergent Validity

Regarding H3, evidence for convergent validity was examined through associations with ERQ, CERQ, and TMMS-24 dimensions. Overall, the pattern of results was consistent with theoretical expectations and provided robust support for the construct validity of the PMERQ. More specifically, PMERQ cognitive reappraisal dimensions showed consistent positive associations with ERQ reappraisal, indicating conceptual overlap in the use of adaptive cognitive change strategies (see Table 4). These dimensions were also positively related to adaptive CERQ strategies, particularly positive reappraisal, refocusing planning, putting into perspective, and, to a lesser extent, acceptance. In contrast, they tended to show weak or negative associations with maladaptive CERQ strategies such as catastrophizing, self-blame, and blaming others, supporting their adaptive regulatory nature.

Disengagement-oriented strategies displayed a distinct pattern. Response modulation—expressive suppression was positively associated with ERQ suppression and showed positive associations with maladaptive CERQ strategies, including catastrophizing and blaming others, while presenting weaker or non-significant associations with adaptive strategies. Similarly, avoidance-based dimensions (e.g., situation selection—avoid unpleasant situations and situation modification—avoid conflict) tended to show small-to-moderate positive associations with both adaptive and maladaptive CERQ strategies, suggesting a more ambivalent or context-dependent regulatory profile.

Table 4. Convergent Validity—Correlations Between PMERQ Dimensions and Emotion Regulation and Emotional Intelligence Measures.

PMERQ	ERQ-Sup	ERQ-Reap	CERQ-SB	CERQ-Acc	CERQ-Foc	CERQ-PR	CERQ-PReap	CERQ-Plan	CERQ-Persp	CERQ-Cat	CERQ-BO	TMMS-Att	TMMS-Clar	TMMS-Rep	TMMS-Tot
SS-Con	0.04	0.35 ***	−0.05	0.07	0.15 *	0.28 ***	0.48 ***	0.40 ***	0.25 ***	−0.02	0.05	0.18 **	0.07	0.20 **	0.17 **
SS-Avoid-U	0.20 **	0.22 ***	0.06	0.16 *	0.19 **	0.13 *	0.05	0.05	0.09	0.15 *	0.14 *	0.28 ***	0.16 *	0.25 ***	0.26 ***
SM-Resolve	0.10	0.36 ***	0.05	0.14 *	0.22 ***	0.23 ***	0.42 ***	0.40 ***	0.24 ***	−0.05	0.03	0.32 ***	0.33 ***	0.42 ***	0.40 ***
SM-Avoid-C	0.32 ***	0.28 ***	0.08	0.13 *	0.15 *	0.24 ***	0.11	0.07	0.15 *	0.17 **	0.23 ***	0.29 ***	0.07	0.22 ***	0.22 ***
AD-Focus	0.21 ***	0.39 ***	0.09	0.12	0.18 **	0.36 ***	0.32 ***	0.22 ***	0.30 ***	0.12	0.17 **	0.29 ***	0.16 *	0.31 ***	0.29 ***
AD-Distract	0.30 ***	0.22 ***	0.15 *	0.17 **	0.18 **	0.19 **	0.08	0.06	0.13 *	0.21 ***	0.16 **	0.23 ***	0.10	0.22 ***	0.21 ***
CR-Recon-CP	0.02	0.46 ***	−0.08	0.07	0.18 **	0.39 ***	0.53 ***	0.41 ***	0.31 ***	−0.07	0.06	0.36 ***	0.42 ***	0.52 ***	0.49 ***
CR-Recon-QI	0.14 *	0.51 ***	0.07	0.14 *	0.28 ***	0.41 ***	0.49 ***	0.41 ***	0.38 ***	−0.01	0.11	0.41 ***	0.31 ***	0.44 ***	0.44 ***
CR-Rep-CB	0.04	0.51 ***	−0.05	0.07	0.21 ***	0.37 ***	0.59 ***	0.42 ***	0.37 ***	−0.06	0.03	0.41 ***	0.43 ***	0.56 ***	0.53 ***
CR-Rep-RI	0.13 *	0.43 ***	0.05	0.14 *	0.24 ***	0.33 ***	0.43 ***	0.28 ***	0.30 ***	0.09	0.15 *	0.40 ***	0.27 ***	0.39 ***	0.40 ***
RM-Share	0.03	0.30 ***	0.06	0.13 *	0.17 **	0.24 ***	0.30 ***	0.19 **	0.23 ***	0.18 **	0.20 **	0.31 ***	0.41 ***	0.46 ***	0.45 ***
RM-Suppr	0.43 ***	0.29 ***	0.16 **	0.19 **	0.12	0.22 ***	0.15 *	0.09	0.12	0.13 *	0.17 **	0.18 **	0.07	0.20 **	0.17 **

Note. PMERQ = Process Model of Emotion Regulation Questionnaire; SS = Situation Selection; Con = Confront unpleasant situations; Avoid U = Avoid unpleasant situations; SM = Situation Modification; Resolve = Resolve conflict; Avoid C = Avoid conflicts; AD = Attentional Deployment; Focus = Focus elsewhere; Distract = Cognitive Distraction; CR = Cognitive Reappraisal; Recon = Reconstrual; QI = Questioning interpretation; CP = Coping Potential; Rep = Repurpose; CB = Consider Benefits; RI = Reduce Importance; RM = Response Modulation; Share = Emotion sharing; Suppr = Expressive suppression. ERQ = Emotion Regulation Questionnaire; ERQ Sup = Suppression; ERQ Reap = Reappraisal. CERQ = Cognitive Emotion Regulation Questionnaire; SB = Self-blame; Acc = Acceptance; Foc = Focus on thought/rumination; PR = Positive refocusing; PReap = Positive reappraisal; Plan = Refocus on planning; Persp = Putting into perspective; Cat = Catastrophizing; BO = Blaming others. TMMS = Trait Meta-Mood Scale; Att = Emotional Attention; Clar = Emotional Clarity; Rep = Emotional Repair; Tot = TMMS Total. $p < .05$ *, $p < .01$ **, $p < .001$ ***.

Extending these findings, PMERQ dimensions also showed positive and statistically significant associations with emotional intelligence. Associations with TMMS-24 dimensions—emotional attention, emotional clarity, and emotional repair—were generally moderate, with stronger and more consistent links observed for emotional clarity and emotional repair (see Table 4). These associations were particularly pronounced for cognitive reappraisal dimensions, especially reconstrual and repurposing, which showed the strongest relationships with emotional clarity and repair. In contrast, disengagement-oriented strategies, such as response modulation and expressive suppression, showed weaker associations, especially with clarity. The strongest overall associations emerged with the TMMS total score across most engagement-related dimensions, supporting the expected convergence between adaptive emotion regulation processes and emotional intelligence.

3.2.5. Concurrent Criterion Validity (Well-Being Outcomes)

Regarding H3, concurrent validity was examined through associations between PMERQ dimensions and both affective outcomes (SPANE) and subjective well-being (SWLS). Overall, results showed a consistent pattern in which engagement-oriented strategies were positively associated with more adaptive outcomes.

With respect to SPANE, cognitive reappraisal dimensions—particularly reconstrual and repurpose—were positively associated with positive affect (r = 0.13 to 0.30) and affect balance (r = 0.20 to 0.31, Table 5), while showing no significant associations with negative affect (see Table 5). Similarly, situation confrontation (r = 0.24 for positive affect; r = 0.24 for

affect balance) and conflict resolution (r = 0.27 and r = 0.17, respectively) were positively related to positive affect and affect balance, as was attentional focusing (r = 0.25 and r = 0.12, respectively). Avoidance-oriented strategies—situation avoidance and conflict avoidance—showed weaker and less consistent associations, with conflict avoidance showing a small positive association with negative affect (r = 0.20). Disengagement-oriented strategies, particularly expressive suppression (r = 0.23 for positive affect; r = 0.17 for negative affect) and cognitive distraction (r = 0.15 for positive affect; r = 0.17 for negative affect), showed weaker associations with positive affect and small positive associations with negative affect, with no meaningful relationship with affect balance. Emotion sharing showed positive associations with positive affect (r = 0.31) and affect balance (r = 0.17).

Table 5. Concurrent validity—positive outcomes—Correlations Between PMERQ Dimensions and Well-Being Measures (SPANE and SWLS).

PMERQ	SPANE-Pos	SPANE-Neg	SPANE-Bal	SWLS
SS-Con	0.24 ***	−0.07	0.24 ***	0.36 ***
SS-Avoid-U	0.10	0.10	0.01	0.10
SM-Resolve	0.27 ***	0.05	0.17 **	0.27 ***
SM-Avoid-C	0.16 **	0.20 **	−0.02	0.15 *
AD-Focus	0.25 ***	0.10	0.12 *	0.26 ***
AD-Distract	0.15 *	0.17 **	−0.02	0.05
CR-Recon-CP	0.27 ***	−0.04	0.24 ***	0.37 ***
CR-Recon-QI	0.30 ***	0.00	0.24 ***	0.36 ***
CR-Rep-CB	0.30 ***	−0.08	0.31 ***	0.38 ***
CR-Rep-RI	0.13 *	0.08	0.20 **	0.29 ***
RM-Share	0.31 ***	0.10	0.17 **	0.32 ***
RM-Suppr	0.23 ***	0.17 **	0.06	0.09

Note. PMERQ = Process Model of Emotion Regulation Questionnaire; SS = Situation Selection; Con = Confront unpleasant situations; Avoid-U = Avoid unpleasant situations; SM = Situation Modification; Resolve = Resolve conflict; Avoid-C = Avoid conflicts; AD = Attentional Deployment; Focus = Focus elsewhere; Distract = Cognitive Distraction; CR = Cognitive Reappraisal; Recon = Reconstrual; QI = Questioning interpretation; CP = Coping Potential; Rep = Repurpose; CB = Consider Benefits; RI = Reduce Importance; RM = Response Modulation; Share = Emotion sharing; Suppr = Expressive suppression. SPANE-Pos = Positive Affect; SPANE-Neg = Negative Affect; SPANE-Bal = Balance; SWLS = Satisfaction with Life Scale. $p < .05$ *, $p < .01$ **, $p < .001$ ***.

Regarding SWLS, a similar pattern emerged. Cognitive reappraisal dimensions again showed the strongest positive associations with life satisfaction, particularly repurpose—consider benefits (r = 0.38) and reconstrual—coping potential (r = 0.37), followed by reconstrual—questioning interpretation (r = 0.36) and repurpose—reduce importance (r = 0.29; see Table 5). Situational engagement strategies such as situation confrontation (r = 0.36), conflict resolution (r = 0.27), and attentional focusing (r = 0.26) also showed positive associations with life satisfaction, whereas situation avoidance showed no significant relationship and conflict avoidance showed only a weak association (r = 0.15). Emotion sharing showed a positive association with life satisfaction (r = 0.32), while expressive suppression showed no meaningful association.

3.2.6. Concurrent Criterion Validity—Ill-Being Outcomes

To test H3, PMERQ dimensions showed consistent associations with both psychological distress (DASS-21: stress, anxiety, depression) and aggression outcomes (AQSF: total aggression, verbal aggression, hostility, physical aggression, anger; see Table 6).

Table 6. Concurrent validity (negative outcomes)—Correlations Between PMERQ Dimensions, Psychological Distress (DASS) and Aggression (AQSF).

PMERQ	DASS-Str	DASS-Anx	DASS-Dep	AQSF-Tot	AQSF-Verb	AQSF-Host	AQSF-Phys	AQSF-Ang
SS-Con	−0.15 *	−0.10	−0.19 **	−0.03	−0.07	−0.02	−0.04	0.01
SS-Avoid-U	0.10	0.06	0.09	0.16 **	0.19 **	0.16 **	0.11	0.12
SM-Resolve	−0.06	−0.03	−0.13 *	−0.02	−0.04	0.02	−0.02	−0.01
SM-Avoid-C	0.14 *	0.16 *	0.15 *	0.18 **	0.18 **	0.18 **	0.13 *	0.14 *
AD-Focus	0.06	0.08	0.00	0.09	0.08	0.10	0.07	0.09
AD-Distract	0.11	0.06	0.09	0.14 *	0.17 **	0.15 *	0.09	0.09
CR-Recon-CP	−0.18 **	−0.10	−0.21 ***	−0.08	−0.12 *	−0.06	−0.07	−0.03
CR-Recon-QI	−0.07	0.00	−0.12 *	0.01	0.00	0.01	−0.04	0.07
CR-Rep-CB	−0.13 *	−0.09	−0.21 ***	−0.05	−0.10	−0.01	−0.08	0.03
CR-Rep-RI	0.03	0.08	−0.00	0.08	0.07	0.10	0.02	0.10
RM-Share	0.02	0.08	0.01	0.04	0.09	0.01	0.02	0.02
RM-Suppr	0.08	0.12	0.10	0.09	0.14 *	0.10	0.03	0.06

Note. PMERQ = Process Model of Emotion Regulation Questionnaire; SS = Situation Selection; Con = Confront unpleasant situations; Avoid-U = Avoid unpleasant situations; SM = Situation Modification; Resolve = Resolve conflict; Avoid-C = Avoid conflicts; AD = Attentional Deployment; Focus = Focus elsewhere; Distract = Cognitive Distraction; CR = Cognitive Reappraisal; Recon = Reconstrual; QI = Questioning interpretation; CP = Coping Potential; Rep = Repurpose; CB = Consider Benefits; RI = Reduce Importance; RM = Response Modulation; Share = Emotion sharing; Suppr = Expressive suppression. DASS = Depression, Anxiety, Stress Scales; Str = Stress; Anx = Anxiety; Dep = Depression. AQSF = Aggression Questionnaire—Short Form; Tot = Total aggression score; Verb = Verbal aggression; Host = Hostility; Phys = Physical aggression; Ang = Anger. MIPIP = Mini-IPIP Scale: Extra = Extraversion; Agree = Agreeableness; Consc = Conscientiousness; Neuro = Neuroticism; Intel = Intellect. $p < .05$ *, $p < .01$ **, $p < .001$ ***.

Regarding DASS-21 outcomes, cognitive reappraisal showed the most consistent negative associations with distress, particularly for coping potential and considering benefits reappraisal, which were negatively associated with both stress and depression (r = −0.13 to −0.21), and questioning interpretation, which was negatively associated with depression only (r = −0.12). Situation confrontation was negatively associated with stress and depression (r = −0.15 and −0.19), while conflict resolution showed a small negative association with depression only (r = −0.13). Conflict avoidance was positively associated with stress, anxiety, and depression (r = 0.14 to 0.16). No other strategies showed significant associations with DASS-21 outcomes.

Regarding AQSF outcomes, associations were generally small and selective. Situation avoidance and conflict avoidance showed small positive associations with total aggression, verbal aggression, physical aggression, and anger (r = 0.13 to 0.19). Cognitive distraction showed small positive associations with total and verbal aggression (r = 0.14 to 0.17). Coping potential reappraisal was the only engagement strategy negatively associated with total aggression (r = −0.12), and expressive suppression showed a small positive association with total aggression only (r = 0.14). No other strategies showed significant associations with AQSF outcomes.

3.2.7. Nomological Validity

Regarding H4, associations with personality traits are presented in Table 7. As expected, the reappraisal dimensions (including the disengagement-oriented scales question interpretation and reduce importance) were positively associated with extraversion (r = 0.17 to 0.24) and negatively associated with neuroticism (r = −0.14 to −0.38). Associations with conscientiousness were in the expected direction but statistically significant only for reconstrual—coping potential (r = 0.24) and reconstrual—questioning interpretation (r = 0.13). Contrary to expectations, intellect/imagination was not associated with reappraisal (r = −0.04 to 0.04), except for a small negative association with repurposing—reduce importance (r = −0.13). Situation confrontation and conflict resolution showed a

pattern similar to reappraisal (extraversion r = 0.29 and 0.11; conscientiousness r = 0.16 and 0.17; neuroticism r = −0.27 and −0.17), and attentional focusing was associated only with extraversion (r = 0.18). Emotion sharing was associated with higher extraversion (r = 0.32) and lower intellect/imagination (r = −0.14). Among disengagement-oriented strategies, cognitive distraction was associated with higher neuroticism (r = 0.14) and lower intellect/imagination (r = −0.13), conflict avoidance was negatively associated with intellect/imagination (r = −0.19), and neither expressive suppression nor situation avoidance was significantly associated with any trait. Agreeableness was significantly associated only with conflict resolution (r = 0.15).

Table 7. Nomological validity—Correlations Between PMERQ Dimensions and Personality Traits (Mini-IPIP).

PMERQ	MIPIP-Extra	MIPIP-Agree	MIPIP-Consc	MIPIP-Neuro	MIPIP-Intel
SS-Con	0.29 ***	0.09	0.16 **	−0.27 ***	0.05
SS-Avoid-U	−0.03	0.06	0.03	0.12	−0.08
SM-Resolve	0.11	0.15 *	0.17 **	−0.17 **	0.05
SM-Avoid-C	0.09	0.02	−0.01	0.08	−0.19 **
AD-Focus	0.18 **	0.00	0.07	−0.11	−0.09
AD-Distract	0.01	0.01	−0.02	0.14 *	−0.13 *
CR-Recon-CP	0.19 **	0.05	0.24 ***	−0.29 ***	0.01
CR-Recon-QI	0.20 **	0.00	0.13 *	−0.27 ***	−0.04
CR-Rep-CB	0.24 ***	0.06	0.12	−0.38 ***	0.04
CR-Rep-RI	0.17 **	0.02	0.07	−0.14 *	−0.13 *
RM-Share	0.32 ***	0.02	0.00	−0.08	−0.14 *
RM-Suppr	0.01	−0.01	0.01	0.03	−0.10

Note. PMERQ = Process Model of Emotion Regulation Questionnaire; SS = Situation Selection; Con = Confront unpleasant situations; Avoid-U = Avoid unpleasant situations; SM = Situation Modification; Resolve = Resolve conflict; Avoid-C = Avoid conflicts; AD = Attentional Deployment; Focus = Focus elsewhere; Distract = Cognitive Distraction; CR = Cognitive Reappraisal; Recon = Reconstrual; QI = Questioning interpretation; CP = Coping Potential; Rep = Repurpose; CB = Consider Benefits; RI = Reduce Importance; RM = Response Modulation; Share = Emotion sharing; Suppr = Expressive suppression. MIPIP = Mini-IPIP Scale: Extra = Extraversion; Agree = Agreeableness; Consc = Conscientiousness; Neuro = Neuroticism; Intel = Intellect. $p < .05$ *, $p < .01$ **, $p < .001$ ***.

4. Discussion

The present study examined the psychometric properties of the Portuguese version of the PMERQ, evaluating its factorial structure, reliability, measurement invariance across gender, and validity evidence based on relations with other variables (convergent, concurrent criterion, and nomological) within the Portuguese cultural context Overall, the findings provide preliminary support for the PMERQ as a coherent and theoretically grounded instrument for assessing emotion regulation strategies within a process and orientation-based framework (Gross, 2015; Olderbak et al., 2022), while indicating that the 45-item version requires replication in independent samples.

The exploratory factor analysis provided an initial empirical overview of the factorial organization of the PMERQ. Results broadly supported a multidimensional structure consistent with the theoretical framework, while also revealing areas of overlap among specific dimensions. These analyses indicated overlap among conceptually adjacent strategies, both within families (e.g., among cognitive change dimensions) and between neighbouring families (e.g., situation selection and situation modification; focus elsewhere and cognitive distraction), where several items showed meaningful cross-loadings on theoretically adjacent factors. This pattern may reflect the natural proximity of related regulatory processes, but it also indicates that the empirical distinction between some strategies is less

clear than the theoretical one. Although the PMERQ was originally conceptualized as a 12-dimensional instrument, the unrestricted exploratory analyses suggested a more parsimonious six-factor solution, indicating that several theoretically distinct dimensions showed substantial empirical overlap within the Portuguese sample. To examine the extent to which the original theoretical structure could be recovered, an exploratory solution specifying the 12 expected dimensions was also estimated. Under this specification, Factors 1 to 9 were clearly defined, whereas Factors 10 and 11 showed weaker empirical support and Factor 12 was only marginally represented. These findings suggest that the distinction among some theoretically adjacent emotion regulation processes may be less pronounced empirically, particularly when the factor structure is allowed to emerge freely from the data. At the same time, the results broadly supported the multidimensional nature of the construct and provided a basis for the subsequent confirmatory analyses and item refinement procedures.

Internal consistency analyses complemented these findings, with reliability estimates generally within acceptable to good ranges across scales. Higher reliability coefficients were observed for dimensions tapping closely related regulatory processes—especially cognitively oriented engagement and some situation-focused strategies—mirroring the overlap identified at the exploratory level. This pattern suggests that redundancy was more pronounced in domains where strategies are conceptually adjacent and functionally overlapping, reflecting shared variance rather than poor item functioning or lack of conceptual distinction. At the same time, reliability values did not reach levels typically associated with excessive item duplication, supporting the retention of distinct dimensions while providing empirical context for the more focused evaluation and refinement undertaken at the confirmatory stage. Taken together, these findings suggest that the Portuguese version preserves the internal coherence of the regulatory dimensions assessed by the original instrument, despite the challenges typically associated with cross-cultural adaptation and item refinement.

Confirmatory factor analyses (H1) were conducted to further examine the factorial structure of the PMERQ. Results indicated that factor loadings were generally moderate to high, suggesting that items functioned as meaningful indicators of their respective latent constructs. In contrast, the initial 83-item model showed inadequate fit, as reflected in low incremental fit indices and RMSEA values above recommended thresholds, together with indications of item redundancy and localized misfit. These findings provided empirical support for subsequent model refinement, in accordance with established psychometric guidelines for model evaluation and re-specification (Hu & Bentler, 1999).

Importantly, the refinement observed in the present study mirrors the developmental trajectory of the original PMERQ. During its initial validation, the authors similarly moved from a comprehensive item pool to a shorter, more parsimonious version to enhance conceptual clarity and psychometric performance (Olderbak et al., 2022). Notably, the Portuguese adaptation also began with the original 83-item structure encompassing 12 theoretical dimensions. While the unrestricted exploratory analyses suggested a more parsimonious six-factor solution, the subsequent refinement process demonstrated that a substantial reduction in items was possible while preserving the theoretically proposed dimensional structure. The final model retained 45 items distributed across the 12 dimensions, with most factors represented by approximately four items and demonstrating satisfactory psychometric properties. This finding contrasts with the original PMERQ validation, which also reduced the instrument to 45 items but converged on a 10-scale solution (Olderbak et al., 2022). The present results therefore suggest that meaningful item reduction can be achieved without necessarily reducing the number of theoretically relevant dimensions. At the same time, because some of the later factors showed weaker empirical definition in the exploratory analyses, the retained 12-dimensional structure should be considered

promising but provisional until replicated in independent samples. More broadly, the difficulty of maintaining lengthy instruments in adapted versions is well documented in psychometric research. Long scales are particularly vulnerable to redundancy and altered item functioning when translated or adapted across cultural and linguistic settings (F. M. Cheung et al., 2011; Hambleton, 2005). Accordingly, item refinement can be viewed as a necessary process to preserve construct validity while improving interpretability and practical utility (F. J. R. van de Vijver & Leung, 2011). Within this framework, the final model should be interpreted as a data-driven reduction in the instrument for the current cultural context. H1 was therefore only partially supported: the theoretical 12-factor model showed acceptable fit only after data-driven refinement.

The pattern of correlations between the dimensions indicated related dimensions, generally stronger among theoretically proximal strategies and, on average, somewhat lower between engagement- and disengagement-oriented dimensions, although some cross-orientation correlations were also high. This pattern is consistent with the conceptualization of emotion regulation as a system of interrelated regulatory processes operating across different stages of the emotion-generative sequence (Gross, 2015; Olderbak et al., 2022). However, as discriminant validity was not formally tested, the empirical distinctiveness of some dimensions remains to be established.

Measurement invariance analyses (H2) supported configural, metric, and scalar invariance across gender. Negligible changes in model fit across increasingly constrained models support meaningful comparisons of latent means, indicating that observed group differences are unlikely to reflect measurement artefacts (F. F. Chen, 2007; G. W. Cheung & Rensvold, 2002). This finding supports the use of the PMERQ in gender-comparative research designs. Beyond supporting the psychometric implications of the Portuguese PMERQ, the demonstration of scalar invariance across gender has important substantive implications. Gender differences in emotion regulation have been frequently reported in the literature, yet their interpretation depends on demonstrating that the instrument measures the same constructs equivalently across groups. The present findings indicate that comparisons of PMERQ scores between men and women are unlikely to be confounded by measurement bias, thereby strengthening the utility of the instrument for research examining gender-related differences in emotion regulation processes. Furthermore, the invariance results are consistent with those reported in the original PMERQ validation study, providing additional support for the cross-group stability of the measurement framework (Olderbak et al., 2022).

Evidence for convergent validity (H3) emerged from theoretically coherent associations between the PMERQ and established emotion regulation measures, particularly the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) and the Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2001). Cognitive reappraisal-based dimensions converged strongly with ERQ reappraisal and with adaptive CERQ strategies, while showing weak or negative associations with maladaptive strategies. In contrast, disengagement-oriented strategies demonstrated stronger convergence with ERQ suppression and maladaptive CERQ dimensions, supporting the conceptual distinctions embedded in the instrument. Associations with perceived EI (TMMS-24) dimensions further reinforced the broader validity of the PMERQ. Engagement-oriented strategies—particularly reappraisal through coping potential and consider benefits—were positively related to emotional clarity and emotional repair, suggesting that individuals who report greater understanding and management of emotional experiences are more likely to engage in adaptive, cognitively oriented regulation strategies. These findings align with previous research demonstrating that higher levels of emotional clarity and emotional repair are associated with greater use of adaptive emotion regulation strategies, particularly cognitive

reappraisal, and lesser reliance on maladaptive strategies such as expressive suppression (Cabello et al., 2013; Megías-Robles et al., 2019), which is also consistent with the results reported in the original validation study of the PMERQ (Olderbak et al., 2022).

Evidence for concurrent criterion validity (H3) emerged from associations with indicators of emotional well-being and ill-being. Dimensions reflecting engagement through cognitive reappraisal and situation selection or modification were generally associated with higher positive affect and affective balance, as measured by the SPANE (Diener et al., 2010), and with greater life satisfaction assessed by the SWLS (Diener et al., 1985). These findings are consistent with the broader literature, which shows that engagement emotion regulation strategies—particularly cognitive reappraisal—are positively associated with life satisfaction (Sánchez-Sánchez et al., 2025; Wu et al., 2024) and with higher positive affect and lower negative affect, the core components captured by the SPANE (Tsujimoto et al., 2024). In contrast, dimensions reflecting avoidance-based attentional deployment and expressive suppression tended to show weaker or less favorable associations, including small positive relations with negative affect, and, for conflict avoidance, with psychological distress measured by the DASS-21 (Lovibond & Lovibond, 1995). This pattern is consistent with evidence from adult samples indicating that specific disengagement emotion regulation strategies, such as avoidance and suppression, are associated with higher levels of anxiety, depression, and stress, as well as broader internalizing symptoms (Aldao et al., 2010; Visted et al., 2018). Furthermore, expressive suppression has been consistently linked to increased negative affect and poorer psychological functioning in adults (Gross & John, 2003). Associations with aggressive tendencies, assessed using the Aggression Questionnaire (Buss & Perry, 1992), were generally modest but followed the same conceptual pattern, in line with meta-analytic findings showing that suppression and avoidance are positively associated with anger and aggression-related outcomes (Pop et al., 2025).

Finally, nomological validity was partially supported by the associations with personality traits assessed by the Mini-IPIP (Donnellan et al., 2006). This pattern is theoretically meaningful, as personality traits are thought to influence the habitual selection and implementation of emotion regulation strategies. Individuals high in neuroticism typically experience greater emotional reactivity and vulnerability to negative affect, which may hinder the use of adaptive regulatory processes, whereas extraversion has been associated with greater positive emotionality and more active forms of emotional engagement (Barańczuk, 2019; Connor-Smith & Flachsbart, 2007). As expected, reappraisal dimensions were associated with lower neuroticism and higher extraversion, in line with meta-analytic evidence linking neuroticism to less adaptive regulation and extraversion to more adaptive regulation (Barańczuk, 2019; Connor-Smith & Flachsbart, 2007). Associations with conscientiousness were in the expected direction but significant for only two reappraisal dimensions, and the expected association with intellect/imagination was not observed. Situation confrontation and conflict resolution showed a similar pattern. Associations for disengagement-oriented strategies were limited: cognitive distraction was related to higher neuroticism, as expected, whereas expressive suppression and avoidance were unrelated to neuroticism, contrary to meta-analytic evidence (Barańczuk, 2019). The disengagement-oriented reappraisal scales (question interpretation and reduce importance) were also associated with lower neuroticism ($r = -0.27$ and -0.14), contrary to what was expected for disengagement-oriented strategies. The relatively modest pattern of associations observed for several personality traits may suggest that emotion regulation strategies are not determined exclusively by broad dispositional characteristics. Contemporary perspectives increasingly emphasize the role of situational demands, contextual factors, and regulatory flexibility in shaping strategy selection, which may contribute to explaining why some theoretically expected as-

sociations were weak or absent. Given the small size of several associations and the number of correlations examined, these findings should be interpreted with caution and replicated.

Importantly, engagement- and disengagement-oriented strategies were positively correlated, suggesting that individuals tend to use both types of regulatory responses rather than relying exclusively on one. This finding is consistent with contemporary models of regulatory flexibility, which propose that adaptive emotion regulation depends less on the habitual use of specific strategies and more on the capacity to flexibly deploy different strategies according to contextual demands and personal goals (Bonanno & Burton, 2013; Gross, 2015). From this perspective, the co-occurrence of engagement and disengagement strategies should not necessarily be interpreted as contradictory. Rather, it may reflect a broader and more versatile regulatory repertoire, allowing individuals to adapt their responses to the requirements of different situations. This interpretation is also consistent with recent work emphasizing flexibility as a central component of effective emotion regulation and psychological adjustment (Aldao et al., 2010; S. Chen & Bonanno, 2021).

From an applied perspective, the availability of a preliminary psychometrically supported Portuguese version of the PMERQ may facilitate research examining how specific emotion regulation strategies relate to psychological adjustment, well-being, and mental health outcomes. Because the instrument assesses both engagement- and disengagement-oriented strategies across multiple stages of the emotion-generation process, it may also prove useful for identifying regulatory profiles associated with adaptive and maladaptive functioning, an issue increasingly emphasized in contemporary emotion regulation research (Olderbak et al., 2022; Sánchez-Sánchez et al., 2025).

Limitations and Future Directions

Several limitations should be considered when interpreting the present findings. First, the cross-sectional and self-report nature of the study limits causal interpretations and may be influenced by common method variance and response styles, and does not allow conclusions regarding whether emotion regulation strategies are deployed flexibly across different contexts. Second, sample sizes were below the ratio of seven participants per item recommended by COSMIN (Mokkink et al., 2018) for the 83-item version (approximately 3 participants per item in each study). Two independent samples were used for the exploratory and confirmatory analyses, rather than a single larger sample for all analyses, which limited the sample size available for each analysis. Although moderate-to-high communalities and adequate sampling indices support the stability of most factors (Guadagnoli & Velicer, 1988; MacCallum et al., 1999), the exploratory solution may be less stable for factors defined by few items. Third, the pretest of the Portuguese version involved 23 participants, fewer than the 30–40 suggested by Beaton et al. (2000), and its sample was not representative of the general population (e.g., 70% male); evidence on the comprehensibility and cultural equivalence of the items should therefore be interpreted with caution. Fourth, the refinement process led to a substantial reduction in the number of items, which—despite being theoretically and empirically justified—may have resulted in the exclusion of content relevant in other populations or applied contexts. Fifth, the study was not preregistered, which limits the distinction between confirmatory and exploratory analyses. In particular, the final 45-item model was derived through data-driven refinement in the same sample in which it was evaluated, so its fit may be optimistic and should be considered provisional until replicated in an independent sample. Sixth, discriminant validity was not formally tested, and the high correlations between some dimensions (up to $r \approx 0.77$) suggest overlap between them; the empirical distinction between these dimensions should be examined in future studies. Seventh, the samples were collected exclusively in Portugal, so the results cannot be generalized to other countries or languages, where cultural and linguistic differ-

ences may affect the meaning of the items. Finally, the use of a non-clinical sample restricts conclusions regarding the applicability of the PMERQ in clinical or high-risk groups.

Notwithstanding these limitations, several directions for future research emerge from the present findings. Replication in larger and independent samples would further examine the stability and generalizability of the measurement model. Longitudinal designs would also be valuable for assessing temporal stability and clarifying the concurrent role of specific emotion regulation strategies over time.

5. Conclusions

Overall, the present findings provide preliminary evidence of structural validity, reliability, measurement invariance across gender, and validity based on relations with other variables for the Portuguese version of the PMERQ, supporting a coherent measurement framework that balances parsimony with theoretical consistency. These results support the use of the instrument for assessing emotion regulation strategies within the Portuguese cultural context.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/jintelligence14110274/s1: Table S1—Item-Level Descriptive Statistics for the PMERQ Items; Table S2—Rotated Factor Loadings and Communalities (h^2) for the 12-Factor Exploratory Solution; Table S3—Overview of the final Portuguese version of the PMERQ; Table S4—Correlations Between the PMERQ Dimension Scores (Study 2).

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Abbreviations

The following abbreviations are used in this manuscript:

AQ-SF	Buss-Perry Aggression Questionnaire
CERQ	Cognitive Emotion Regulation Questionnaire
CFA	Confirmatory Factorial Analysis
CFI	Comparative Fit Index
COSMIN	Consensus-based Standards for the selection of health Measurement Instruments
DASS-21	Depression Anxiety Stress Scales

EFA	Exploratory Factorial Analysis
ERQ	Emotion Regulation Questionnaire
KMO	Kaiser–Meyer–Olkin Test
PMERQ	The Process Model of Emotion Regulation Questionnaire
RMSEA	Root Mean Square Error of Approximation
SPANE	Scale of Positive and Negative Experience
SWLS	Satisfaction with Life Scale
TLI	Tucker–Lewis Index
TMMS-24	Trait Meta-Mood Scale—24

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