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Original Article

Psychometric Properties of the Trait Meta-Mood Scale (TMMS-23) in the Cuban Context

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Abstract: Emotional intelligence (EI) is important for mental health and successful human interaction. We aimed to test the psychometric properties of the Trait Meta-Mood Scale in the Cuban population. In Study 1 (N = 625), the scale had high internal consistency and the expected three-factor structure. We had to remove one item, as it was negatively correlated with the rest of the items on the scale—resulting in the Cuban TMMS-23. In Study 2 (total N = 240), we tested the scale's nomological validity: We found that EI had medium-sized positive correlations with extraversion and emotional stability. Negative associations were found between EI and negative affective states. Furthermore, EI was positively correlated with resilience, well-being, optimism, and protective factors for mental health. Thus, the TMMS-23 can be recommended for use in the Cuban context.

Keywords: emotional intelligence, mental health, Trait Meta-Mood Scale, resilience, optimism

EI is often considered the ability to perceive and handle one's own emotions and those of others. It has been defined as "the ability to monitor one's feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (Salovey & Mayer, 1990, p. 189). Research on emotional intelligence (EI) has increased in recent decades. This increase is not surprising, as EI has been found to be relevant to various positive characteristics, such as self-esteem, resilience, academic performance, and psychological and social well-being (Schütz & Koydemir, 2018). Several different measures have been employed to study the correlates and consequences of EI. However, a validated EI measure for the Cuban population has yet to be developed.

The Trait Meta-Mood Scale (TMMS) is an internationally widely used self-report instrument. It has been translated into several languages with good reliability and evidence of its validity. It can be efficiently administered to capture perceived EI. In the present study, we aimed to validate the TMMS in the Cuban context to provide a measure that can be used in psychological assessment as well as in social psychological, health, and personality research on EI in Cuba as well as in cross-cultural studies that are aimed at studying EI across nations.

Several studies have explored relationships between EI and variables in organizational, clinical, and developmental psychology as well as in social relationships. Positive correlations have been reported between EI and school performance (Rivers et al., 2012), academic success (Márquez et al., 2006), and sometimes with job performance (Law et al., 2004). EI has been reported to be positively related to well-being (Sánchez-Álvarez et al., 2015) and positive affect (Kafetsios & Zampetakis, 2008). Positive correlations of EI with self-reported and objective indicators of physical health were also found (Bar-On, 2012). Furthermore, EI has been found to be negatively related to mental distress (Shi & Wang, 2007) and psychological and biological reactivity to stress (Petrides et al., 2007). In close relationships, EI has demonstrated positive relationships with relationship quality, effective conflict management, closeness, and commitment (Malouff et al., 2014; Schröder-Abé & Schütz, 2011). Negative associations have been found between EI and alcohol or tobacco use and deviant behavior (e.g., Brackett & Mayer, 2003). EI is also negatively related to psychopathology, such as depression, anxiety, borderline

personality disorder, and psychopathy (see Schütz & Koydemir, 2018). Moreover, a negative correlation between suicidal risk and emotional clarity and regulation was demonstrated (Domínguez-García & Fernández-Berrocal, 2018). Overall, EI is suggested to promote emotional and intellectual growth (Mayer & Salovey, 1997).

Assessment tools in the domain of EI are based on ability models, trait models, or mixed models (Câmara et al., 2023; Extremera & Fernández-Berrocal, 2005). In the most prominent ability model (Mayer & Salovey, 1997), EI is conceived of as a set of interrelated abilities, and four factors are distinguished: perceiving emotions, using emotions to facilitate thought, understanding of emotional information, and emotion management. Trait models and mixed models represent a broader understanding of EI and include traits, such as extraversion or optimism (Bar-On, 2012). Whereas trait and mixed models are the basis of self-report instruments only, the ability model is the basis of both ability tests (e.g., the Mayer-Salovey-Caruso Emotional Intelligence Test; Mayer et al., 2007) and self-report instruments (e.g., the Self-Rated Emotional Intelligence Scale; Brackett et al., 2006) that assess self-perceived emotional competencies (see Gutiérrez-Cobo et al., 2017). Mayer and Salovey (1997) distinguished between four factors; however, based on meta-analytic data, a reduced model comprising the three factors, emotion perception, emotion understanding, and emotion regulation, was supported (Joseph & Newman, 2010). A prominent and often used self-report scale that is based on a three-factor model is the TMMS (Salovey et al., 1995) in which individuals estimate their EI subjectively. The TMMS has actually been reported to be the most used self-report measure of EI (Gutiérrez-Moret et al., 2017), and evidence of its reliability and validity has been reported (e.g., Salovey et al., 1995).

The TMMS has been adapted into and validated in several languages, such as Chinese (Li et al., 2002), German (Otto et al., 2001), and Portuguese (Queirós et al., 2005). With respect to Spanish, the TMMS has been validated with participants from Spain and with participants from several Spanish-speaking countries, such as Brazil, Colombia, Chile, Argentina, Mexico, and Peru (Câmara et al., 2023; Cerón-Perdomo et al., 2011; Espinoza-Venegas et al., 2015; González et al., 2020; Ocaña-Zuñiga et al., 2019; Pérez-Zarate et al., 2020). The first Spanish adaptation of the TMMS was carried out by Fernández-Berrocal et al. (2004) and resulted in a 24-item version (TMMS-24). Cuba is considered a society with a collectivistic culture (Nartova-Bochaver et al., 2022), and it differs from other Latin American countries with respect to its socialist history. Particularly in Cuba, the social and natural environment often generates critical situations. However, the profile of the daily emotional lives of Cubans is characterized by a balanced proportion of positive and negative emotions that are strong and lasting and are centered on social and communicative relationships (Galati et al., 2004). For this reason, we aimed to explore the psychometric features of the TMMS in Cuba.

In Cuba so far, there have not been validation studies on the TMMS, but the validation of instruments in Cuba is important for studies that are aimed at making cross-national comparisons. At present, the availability of a validated EI tool in Cuba seems to be of major importance because COVID-19 has recently caused significant discomfort in the Cuban population, and pandemic anxiety was found to be related to EI (Jiménez-Puig et al., 2022). The objective of this research is thus to explore the psychometric properties of the TMMS in the Cuban population.

Overview of Studies

We conducted two studies to assess the psychometric properties of the TMMS. In Study 1, we explored the factor structure of the instrument. Study 2 was designed to test its nomological validity. The data from both studies are available at https://osf.io/e9r4b/ (Fernández-Castillo et al., 2023).

Study 1 – Factor Structure

We expected that the original factor structure would be confirmed in the Cuban context and that high reliability estimates would be found for the global scale and the three subscales. Furthermore, we tested for the measurement invariance of the (23-item version of the) scale between Cuban and Ecuadorian participants.

Method

Participants and Procedure

A survey was disseminated through WhatsApp groups, Facebook, e-mail lists, and the website of the Well-Being Center of the Universidad Central "Marta Abreu" de Las Villas. No incentives were offered for participation. All Cuban citizens over the age of 18 years were eligible to participate. Overall, 625 individuals took part (65.9% women, 34.1% men; M_{age} = 25.71, SD_{age} = 11.96, range: 15–80). Participants completed a survey via Google Forms® between February and July 2022.

Measures

The TMMS (Salovey et al., 1995) assesses perceived EI. The original scale included 48 items, but a reduced 30-item

Table 1. Descriptive statistics, corrected item-total correlations (r_{it}), and loadings of the TMMS-23 items

Item	*M*	*SD*	r_{it}	Loading
Emotional attention				
TMMS 1 Presto mucha atención a los sentimientos	3.83	1.18	.56	.80
TMMS 2 Normalmente me preocupo mucho por lo que siento	3.70	1.24	.54	.83
TMMS 3 Normalmente dedico mucho tiempo a pensar en mis emociones	3.40	1.24	.54	.82
TMMS 4 Pienso que merece la pena prestar atención a mis emociones y estado de ánimo	3.78	1.20	.54	.79
TMMS 6 Pienso en mi estado de ánimo constantemente	2.62	1.33	.36	.64
TMMS 7 A menudo pienso en mis sentimientos	3.18	1.25	.47	.80
TMMS 8 Presto mucha atención a cómo me siento	3.33	1.30	.54	.84
Emotional clarity				
TMMS 9 Tengo claros mis sentimientos	3.43	1.35	.59	.80
TMMS 10 Frecuentemente puedo definir mis sentimientos	3.23	1.29	.59	.80
TMMS 11 Casi siempre se cómo me siento	3.38	1.25	.62	.83
TMMS 12 Normalmente conozco mis sentimientos sobre las personas	3.55	1.21	.60	.79
TMMS 13 menudo me doy cuenta de mis sentimientos en diferentes situaciones	3.55	1.14	.66	.80
TMMS 14 Siempre puedo decir cómo me siento	2.96	1.35	.56	.79
TMMS 15 A veces puedo decir cuáles son mis emociones	3.14	1.27	.64	.82
TMMS 16 Puedo llegar a comprender mis sentimientos	3.36	1.27	.67	.85
Emotional repair				
TMMS 17 Aunque a veces me siento triste, suelo tener una visión optimista	3.42	1.35	.62	.85
TMMS 18 Aunque me sienta mal, procuro pensar en cosas agradables	3.35	1.36	.62	.90
TMMS 19 Cuando estoy triste, pienso en todos los placeres de la vida	2.94	1.44	.58	.82
TMMS 20 Intento tener pensamientos positivos aunque me sienta mal	3.30	1.36	.64	.90
TMMS 21 Si doy demasiadas vueltas a las cosas, complicándolas, trato de calmarme	3.24	1.32	.57	.73
TMMS 22 Me preocupo por tener un buen estado de ánimo	3.50	1.29	.64	.77
TMMS 23 Tengo mucha energía cuando me siento feliz	4.34	1.00	.47	.62
TMMS 24 Cuando estoy enfadado intento cambiar mi estado de ánimo	3.22	1.34	.57	.71

version was recommended by the authors due to its higher reliability. An adapted Spanish version of the scale was validated by Fernández-Berrocal et al. (2004), and in this process, a 24-item version was obtained. The subscales are *Emotional Attention* (perception of one's own emotions), *Emotional Clarity* (perceived understanding of one's own emotional states), and *Emotional Repair* (perceived capacity to regulate one's own emotional states correctly). Responses are given on a 5-point Likert scale (1 = *not at all* to 5 = *agree strongly*). We examined the Spanish version that would be used in Cuba. As we considered the Spanish TMMS translation to be convincing for Cuban participants, we made no changes to the item wordings. However, we deemed it important to test the TMMS in Cuba because each culture has its own rules for expressing emotions, and such rules are acquired through learning and modulate the meaning of emotions (González et al., 2020).

Data Analysis Strategy

The basic data analyses were computed with SPSS version 21. Confirmatory factor analyses (CFAs) were computed with Mplus version 8.8. The three EI factors were originally conceived to be correlated, whereas the residuals of the indicator variables should be uncorrelated. Comparative fit index (CFI) and Tucker–Lewis index (TLI) values that fall between .90 and .95 indicate an acceptable fit (see, e.g., Körner et al., 2023), and values above .95 indicate a perfect fit (Hu & Bentler, 1999). The root-mean-square error of approximation (RMSEA) values below .10 indicate an acceptable fit (Escobedo et al., 2016). Cronbach's α was used to

Table 2. Tests of measurement invariance across nations (Cuba vs. Ecuador)

	Fit indices				Model comparisons		
Fit indices	Configural (I)	Metric (II)	Scalar (III)	Strict (IV)	Δ I versus II	Δ II versus III	Δ III versus IV
χ^2	697.71	662.31	672.76	704.85	35.41	−10.45	−32.09
RMSEA	.033	.028	.027	.027	−.005	−.001	.000
90% CI	[.028, .038]	[.023, .033]	[.022, .032]	[.022, .032]	—	—	—
CFI	.956	.966	.968	.966	.010	.002	−.002
TLI	.951	.963	.967	.967	.013	.003	.000

Note. RMSEA = root-mean-square error of approximation. CFI = comparative fit index. TLI = Tucker–Lewis index.

assess reliability. Cronbach's α > .70 indicates good internal consistency (Shrestha, 2021). Additionally, we report McDonald's omega total (Dunn et al., 2013; Kelley, 2018).

Finally, we tested for measurement invariance using multigroup CFA (weighted least squares estimator [WLSMV]) via a set of analytical steps. The configural model is the initial model (the same number of factors and the same pattern of loadings across groups). Then, more restrictive models were computed and compared against each other (Meredith, 1993). For metric invariance, the factor loadings across the samples were constrained. Scalar invariance was examined by constraining the item intercepts to equality. Finally, for strict invariance, we constrained the residual variances to equality. We decided to reject invariance if ΔCFI ≥ −0.01 and ΔRMSEA ≥ −0.015 (Chen, 2007). Comparison data were obtained from Ecuadorian adults (for details, see Górriz et al., 2021).

Results

Construct Validity

Table 1 presents the means, *SD*s, corrected item-total correlations, and loadings for the items. The items showed above-average endorsement rates and considerable variance. As assessed with the Kolmogorov–Smirnov test ($p < .001$), the TMMS-24 items were not normally distributed. Thus, we used the WLSMV estimator for the CFA (DiStefano & Hess, 2005). The expected three-factor solution showed fit indices that were not satisfactory, $\chi^2(249) = 1{,}914.87$, $p < .001$; RMSEA = .103, 90% CI [.099, .108], $p < .001$; CFI = .917; TLI = .908. We then examined the modification indices and identified an item that was responsible for the poor fit. (Item 5 "I let my feelings affect my thoughts" was excluded.) The problematic item also had the lowest corrected item-total correlation (r_{it} = .12) and loading (.30), and modification indices suggested that the item had cross-loadings on the other two EI facets. The resulting 23-item factor solution showed acceptable fit, $\chi^2(227) = 1{,}407.68$, $p < .001$; RMSEA = .091, 90% CI [.087, .096], $p < .001$; CFI = .940; TLI = .933. All corrected item-total correlations were acceptable. All loadings were significant ($p < .001$). Emotional attention was positively correlated with emotional control, $r = .42$, $p < .001$, and emotional repair, $r = .42$, $p < .001$. Emotional control was strongly positively correlated with emotional repair, $r = .65$, $p < .001$. In the following, we used the 23-item version (TMMS-23).

In addition, we compared the three-factor model with (a) a unidimensional model in which all items loaded on a single latent EI factor and (b) a hierarchical model in which the items loaded on their corresponding subscales and the three subscales loaded on a higher-order global EI factor. The unidimensional model did not show good fit, $\chi^2(230) = 5{,}822.94$, $p < .001$; RMSEA = .197, 90% CI [.193, .202], $p < .001$; CFI = .715; TLI = .686. By contrast, the hierarchical model showed good fit, $\chi^2(227) = 1{,}407.69$, $p < .001$; RMSEA = .091, 90% CI [.087, .096], $p < .001$; CFI = .940; TLI = .933. These results support the notion of EI as a self-perceived ability comprising emotional attention, clarity, and repair.

Reliability

Reliability estimates were high for the total score (α = .92, ω = .92) and for Emotional Attention (α = .89, ω = .89), Emotional Clarity (α = .91, ω = .91), and Emotional Repair (α = .89, ω = .90).

Measurement Invariance

We tested for whether the TMMS-23 showed measurement invariance between Cuban and Ecuadorian participants. As presented in Table 2, we found strict measurement invariance.

Discussion

The aim of this study was to explore the factor structure and reliability of the TMMS. Using CFA, a three-factor structure was confirmed and found to be superior to a unidimensional solution. This factor structure is in line with the theoretical model of EI reported in the original version of the scale by Salovey et al. (1995), the results of the Spanish adaptation by Fernández-Berrocal et al.

(2004), and the meta-analytic results about ability EI measures by Joseph and Newman (2010). Furthermore, the three-factor structure corresponds to the structure reported in studies with Spanish-speaking samples in other Latin American countries (e.g., Espinoza-Venegas et al., 2015; Gómez-Nuñez et al., 2018). However, Item 5 was excluded because it loaded on all three EI subscales and had the lowest corrected item-total correlation.

The reliability analyses indicated high internal consistency. These results are similar to those computed by other authors in Spain and in Latin American contexts, such as González et al. (2020, Argentina), who obtained estimated reliabilities of .82, .84, and .85; Ocaña-Zuñiga et al. (2019, Mexico), who obtained estimated reliabilities of .85, .89, and .84; and Fernández-Berrocal et al. (2004, Spain), who obtained estimated reliabilities of .90, .90, and .86 for Emotional Attention, Emotional Clarity, and Emotional Repair, respectively (all Cronbach's α values). After the one problematic item was removed, internal consistency in this research reflected even higher values than the ones from previous studies. It is possible that the 23-item version will be useful for other Spanish-speaking countries, too. We found strict measurement invariance for the TMMS-23 between Cuba and Ecuador (i.e., equal dimensionality, loadings, intercepts, and residual variances).

Study 2 – Nomological Validity

This study was designed to test the nomological validity of the TMMS scale scores. To do so, we tested EI's associations with (a) broad personality traits, (b) negative affective states, and (c) variables related to psychological adjustment.

Szcześniak et al. (2020) explored EI's relationships with the Big Five and found that EI was positively correlated with extraversion, openness to experience, agreeableness, and conscientiousness—and negatively correlated with neuroticism. Antoñanzas (2021) also found a positive correlation between EI and openness to experience. Other studies focused on the subscale level and found that extraversion was positively related to Emotional Repair (Van der Zee et al., 2002) and Emotional Attention (Coffey et al., 2003). These findings make sense because people high in extraversion are open to others and are socially active. They may thus perceive emotions more thoroughly and may be convinced that they can regulate their emotions in an effective manner. Individuals high in agreeableness were reported to regulate negative stimuli in an automatic fashion (Haas et al., 2007), which is why agreeableness may be positively linked to Emotional Repair. Diligence, attention to details, and careful working characterize conscientiousness (McCrae & Costa, 2008). It seems plausible that Emotional Clarity requires knowledge about emotional states, and this knowledge in turn may help individuals regulate their emotions. Thus, conscientiousness might be positively linked to all facets of EI. By contrast, neuroticism should be negatively related to Emotional Clarity and Emotional Repair. People high in neuroticism might perceive their emotions but might not understand them and may be unable to regulate them in a healthy fashion. These people are often worried and feel vulnerable (McCrae & Costa, 2008). In fact, neuroticism has been shown to be strongly linked to insufficient emotion regulation abilities (van der Zee et al., 2002). Finally, highly open-minded individuals might be sensitive to their emotional states but might not necessarily need to understand them or know how to regulate them.

EI is also considered a significant negative predictor of suicidal thoughts and behaviors. This relationship was reported to be fully mediated by depressive symptoms (Quintana-Orts et al., 2023). Cejudo et al. (2018) reported that EI is negatively associated with stress and anxiety. Additionally, EI was found to be negatively associated with aggression, hostility, and anger, suggesting that EI could be a protective factor against specific aspects of aggression (Bibi et al., 2020). Thus, we expected to find negative links between EI and negative affective states (depression, anxiety, anger). We also expected this negative link primarily for the facets Emotional Clarity and Emotional Repair because highly depressive and anxious individuals have been found to pay attention to their emotions and should thus score high on the Emotional Attention facet (e.g., Maydych, 2019).

People with high scores on the Emotional Repair dimension have also been reported to use more problem-focused coping, show more social support seeking, and experience less rejection (Puigbó et al., 2019). Higher scores on the Emotional Attention factor were also related to better acceptance of emotions and greater search for social support (Puigbó et al., 2019). For this reason, we expected that EI would promote emotional well-being by supporting adaptive coping in the face of daily stress. Furthermore, numerous studies have found relationships between EI and factors that protect against mental health problems. For example, Moeller et al. (2020) assumed that EI would act as a protective factor against depression, anxiety, and stress and were able to show that people with higher EI had lower levels of mental health problems.

Similarly, people with higher levels of EI were found to experience greater subjective well-being and life satisfaction and also show more optimism and hope (Di Fabio et al., 2018). EI was also found to function as a negative predictor of perceived stress through resilience as a mediating variable (Sarrionandia et al., 2018). We thus

expected to find positive relationships between the different factors of the TMMS-23 and factors that protect mental health, subjective well-being, optimism, and resilience. More specifically, we assumed that more developed perceived EI abilities would have higher positive associations with these constructs. For example, Emotional Attention might be weakly positively related to optimism, Emotional Clarity might show a medium-sized positive correlation, and Emotional Repair might show a strong positive link to optimism. A positive relationship was reported between optimism and Emotional Repair (Gavín-Chocano & López-Baraja, 2020). Thus, regulating emotions can be assumed to be more important for optimism than attention to emotions or clarity. In other words, being able to regulate one's emotions will likely promote optimism more than simply being able to perceive one's emotions. A similar logic applies to well-being, resilience, and protective factors for mental health.

Method

Participants and Procedure

We used data from two independent samples. As we had one sample in Study 1, we refer to the two samples in Study 2 as Samples 2 and 3. Sample 2 came from the general population, and Sample 3 came from the university context. Sample 2 comprised 107 individuals (72.9% women, 27.1% men; M_{age} = 20.2, SD_{age} = 3.51, range: 15–48) who provided responses on EI, personality traits, negative affective states, well-being, optimism, and resilience. Respondents participated through a Google Forms survey that was distributed through social media (WhatsApp groups, Facebook, Twitter) and e-mail lists. Participation was voluntary, and no incentives were offered for participation.

Sample 3 comprised 133 university students (75.1% women, 24.1% men; M_{age} = 21.21, SD_{age} = 2.44, range: 18–29) from the Central University of Las Villas, Villa Clara, who provided responses on EI as well as protective and risk factors for mental health. Participation was voluntary. No incentives were offered for participation.

Measures

Ten-Item Personality Inventory

The 10-Item Personality Inventory (Gosling et al., 2003; Renau et al., 2013) assesses neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness with two items each. Answers are given on a 7-point Likert scale ranging from 1 (*disagree strongly*) to 7 (*agree strongly*; e.g., "I see myself as… extraverted, enthusiastic"). In this study, the estimated reliabilities of the instrument were α = .74, ω = .74 for extraversion; α = .21, ω = .24 for agreeableness; α = .42, ω = .46 for conscientiousness; α = .62, ω = .63 for neuroticism; and α = .38, ω = .38 for openness to experience. Internal consistencies for some subscales were rather low but comparable to the values reported in previous studies (e.g., Renau et al., 2013). Furthermore, low estimates of reliability are to be expected when assessing broad constructs with only two items. However, because we computed group statistics, the low α coefficients were not a major concern (Gosling et al., 2003; Ziegler et al., 2014).

Experiential Self-Report

The Experiential Self-Report (VS; Fernández-Castillo et al., 2013) consists of 14 items that reflect three types of negative affective states: negative depressive experiences (sadness, apathy, suffering, despondency, and anguish), negative experiences of anger–disgust–rejection (irritability, anger, rejection, and contempt), and negative experiences of anxiety–fear (restlessness, distrust, fear, insecurity, and anxiety). Participants are asked how intensively they have felt each of the negative affective states in the past few years. Responses are given on a scale ranging from 1 (*poorly*) to 3 (*intensely*). In the present study, the following reliability estimates were found: negative depressive experiences: α = .85, ω = .85; negative anger–disgust–rejection experiences: α = .65, ω = .68; negative anxiety–fear experiences: α = .71, ω = .72.

Questionnaire of Protective Factors for Mental Health

The Questionnaire of Protective Factors for Mental Health (Fernández-Castillo et al., 2017) assesses protective factors for mental health, that is, self-esteem (4 items), self-efficacy (2 items), social skills (5 items), decision-making (4 items), optimism (5 items), resilience (10 items), and personal satisfaction with the university context (7 items), and risk factors for mental health (10 items). Responses are given on a 5-point Likert scale (1 = *not at all* to 5 = *agree strongly*). In this study, the estimated reliabilities were α = .84, ω = .86 for the protective factors and α = .61, ω = .63 for the risk factors.

Reduced Subjective Well-Being Scale

The Reduced Subjective Well-Being Scale (RWBS; Rodríguez-Martín & Moleiro-Pérez, 2012) provides scale scores for four subjective well-being factors: hedonic aspects (3 items), satisfaction with oneself (3 items), satisfaction with the activity performed (2 items; obtained from performing rewarding activities), and a healthy self-image (2 items). Furthermore, an overall score can be computed. The response format ranges from 1 (*never or almost never*) to 5 (*always*; e.g., "I look for moments of distraction and rest"). In this study, the reliability estimates were α = .81, ω = .82

for subjective well-being; α = .50, ω = .62 for hedonic aspects; α = .71, ω = .73 for self-satisfaction; α = .73, ω = .73 for satisfaction with the activity performed, and α = .50, ω = .50 for a healthy self-image.

Test of Reduced Optimism

The Test of Reduced Optimism (TRO; Rodríguez-Martín & Moleiro-Pérez, 2012) measures dispositional optimism with six items. Responses are given on a scale ranging from 1 (*completely disagree*) to 5 (*completely agree*; e.g., "I am always optimistic about the future"). In this study, the estimated reliabilities were α = .75, ω = .75.

Reduced Resilience Scale

The Reduced Resilience Scale (RRS; Rodríguez-Martín & Moleiro-Pérez, 2012) captures resilience with 10 items that are answered on a scale ranging from 1 (*not at all*) to 5 (*always*; e.g., "can take on anything"). In this study, the estimated reliabilities were α = .80, ω = .80.

Results

First, we aimed to replicate the factor structure of the TMMS-23 found in Study 1. We merged Samples 2 and 3 to have enough participants for CFAs. With 23 items, the expected three-factor solution showed fit indices that were satisfactory, $\chi^2(227) = 628.92$, $p < .001$; RMSEA = .086, 90% CI [.078, .094], $p < .001$; CFI = .935; TLI = .928. By contrast, the 24-item version did not show good model fit, $\chi^2(249) = 838.02$, $p < .001$; RMSEA = .099, 90% CI [.092, .107], $p < .001$; CFI = .907; TLI = .896. Again, the problematic Item 5 had the lowest loading on the corresponding factor and showed cross-loadings on the other factors. Thus, further evidence for using the TMMS-23 in Cuba was found.

We interpreted correlations of .10 as small, .20 as medium, and .30 as large (Funder & Ozer, 2019). Table 3 contains the correlations between EI and personality traits, negative affective states, well-being, optimism, resilience, and protective and risk factors for mental health.

Medium-to-large correlations were found between the global EI score and conscientiousness ($r = .34$, $p < .001$), extraversion ($r = .25$, $p = .007$), and neuroticism ($r = -.31$, $p < .001$). Emotional Attention was positively correlated with extraversion ($r = .20$, $p = .030$); Emotional Clarity was negatively correlated with neuroticism ($r = -.24$, $p = .012$) and positively correlated with conscientiousness ($r = -.32$, $p < .001$); and Emotional Repair was correlated as expected with all the Big Five traits. Negative correlations reflecting medium-sized effects were observed between global EI and all the negative affective states (*r*s = −.23/−.24). Emotional Clarity and Emotional Repair were also negatively correlated with all the negative affective states with medium-to-large effect sizes. Emotional Attention was barely correlated with the negative affective states and had a small positive correlation with anxiety–fear experiences ($r = .13$).

Global EI was positively associated with general well-being, optimism, and resilience. Emotional Attention showed the strongest associations with well-being, but only small or very small associations with optimism and resilience. By contrast, Emotional Clarity and Emotional Repair were positively correlated with all the constructs that were assessed, showing large effect sizes for general subjective well-being, resilience, and optimism.

Positive correlations were obtained between global EI and protective factors for mental health (self-esteem: $r = .34$, $p < .001$; self-efficacy: $r = .43$, $p < .001$; social skills: $r = .22$, $p = .009$; decision-making: $r = .31$, $p < .001$; optimism: $r = .26$, $p = .002$; resilience: $r = .52$, $p < .001$); the largest effect size was found with resilience. Global EI and the TMMS subscales showed only small associations with the risk factors. Emotional Attention was most strongly correlated with self-efficacy ($r = .18$, $p = .030$) and decision-making ($r = .25$, $p = .003$), with medium effect sizes. Emotional Clarity was correlated with all the protective factors (all *r*s > .20), and Emotional Repair was correlated with the protective factors, such as self-esteem ($r = .32$, $p < .001$), self-efficacy ($r = .27$, $p < .001$), decision-making ($r = .27$, $p = .002$), optimism ($r = .38$, $p < .001$), and resilience ($r = .38$, $p = .46$).

Note that, in both samples, as in Study 1, we found high reliability estimates for the TMMS-23 and its subscales.

Discussion

The associations between EI and the validity measures were largely in line with expectations. Global EI was particularly strongly related to conscientiousness, extraversion, and neuroticism (negatively). There were no significant correlations between Emotional Attention and openness, agreeableness, or neuroticism, thus mirroring previous research findings (e.g., Antoñanzas, 2021). The correlation between neuroticism and Emotional Clarity and the correlations that extraversion, conscientiousness, neuroticism, and openness to experience had with Emotional Repair were consistent with the results obtained by Salguero et al. (2010). They found small correlations between Emotional Attention and extraversion ($r = .14$) and between Emotional Clarity and neuroticism ($r = -.09$). They also found that Emotional Repair had small correlations with extraversion ($r = .12$), agreeableness ($r = .20$), conscientiousness ($r = .12$), neuroticism ($r = -.20$), and openness ($r = .18$). Antoñanzas (2021) found that Emotional Clarity was linked with conscientiousness ($r = .21$)

Table 3. Nomological network of the TMMS-23

Scales	TMMS-23 global	Emotional attention	Emotional clarity	Emotional repair
Sample 2				
TMMS-23 global score	.92/.92			
Emotional attention	.58***	.89/.89		
Emotional clarity	.69***	.27**	.91/.91	
Emotional repair	.68***	.28**	.30**	.89/.90
Extraversion	.25**	.20*	.12	.23*
Agreeableness	.15	−.00	.03	.19*
Conscientiousness	.34***	.09	.32***	.26**
Neuroticism	−.31***	.11	−.24*	−.45***
Openness	.12	.06	.06	.22*
Depressive experiences	−.23*	.03	−.28**	−.28**
Anger–disgust–rejection experiences	−.23*	−.01	−.19*	−.30**
Anxiety–fear experiences	−.24*	.13	−.39***	−.27**
General subjective well-being	.56***	.26**	.40***	.55***
Hedonic aspects	.27**	.25**	.12	.29**
Self-satisfaction	.57***	.15	.43***	.52***
Satisfaction with the activity performed	.45***	.18	.28**	.43***
Healthy self-image	.49***	.21*	.32***	.52***
Optimism	.48***	.12	.25**	.52***
Resilience	.35***	.04	.31***	.48***
Sample 3				
TMMS-23 global	.92/.92			
Emotional attention	.56***	.89/.89		
Emotional clarity	.62***	.20*	.91/.91	
Emotional repair	.67***	.13	.27**	.89/.90
Protective factors	.48***	.13	.41***	.39***
Self-esteem	.34***	−.01	.41***	.32***
Self-efficacy	.43***	.18*	.34***	.27**
Social skills	.22**	−.06	.30***	.15
Decision-making	.31***	.25**	.26**	.27**
Optimism	.26**	−.13	.20*	.38***
Resilience	.52***	.07	.42***	.46***
Satisfaction with the university context	.26**	.05	.31***	.09
Risk factors	.11	−.13	.16	.15

Note. Sample 2: $N = 107$; Sample 3: $N = 133$. TMMS-23 = Trait Meta-Mood Scale. Reliability estimates (Cronbach's alpha, McDonald's omega) for the TMMS-23 are presented in the diagonal.
*$p < .05$ (two-tailed). **$p < .01$ (two-tailed). ***$p < .001$ (two-tailed).

and Emotional Repair with extraversion ($r = .35$), agreeableness ($r = .29$), and neuroticism ($r = -.18$). Overall, in line with the aforementioned studies, we found that Emotional Repair had the strongest links with personality, whereas Emotional Attention had the weakest links.

With respect to negative affective states, as expected, we found that global EI, Emotional Clarity, and Emotional Repair were negatively related to anxiety, depression, and anger experiences. Thus, the more accurate the understanding of the emotions that were felt and the greater the capacity to regulate them, the fewer the negative experiences. Yet, Emotional Attention was barely related to negative affective states. These findings dovetail with those of other authors who did not find significant relationships between Emotional Attention and negative experiences, such as anxiety (Guil et al., 2019), depression (Guil et al., 2022), and risky behaviors that endanger health and safety (Sánchez-López et al., 2022).

EI's associations with protective factors for mental health, well-being, optimism, and resilience were largely consistent with our predictions. Global EI was positively related to protective factors for mental health. It was thus associated with higher levels of confidence, self-efficacy, social skills, decision-making, optimism, and resilience. These findings dovetail with research by Pérez-Fuentes et al. (2019), who found that self-esteem and self-efficacy were positively associated with Emotional Clarity and Emotional Repair. Similarly, Trigueros et al. (2020) reported a positive link between EI and social skills. Thus, in line with other research, we found that emotionally intelligent people show high self-regard and social confidence, that is, EI may serve as a buffer against mental health threats. Moreover, the positive link between EI and protective factors for mental health is in line with research that has considered EI to be a protective factor for depression, anxiety, and stress. In fact, individuals with higher EI have lower mental health problems in general (Moeller et al., 2020). Moreover, our results may also support the finding that EI decreases maladaptive emotional reactions by enhancing positive moods and reducing negative ones, including anxiety (MacCann et al., 2011). Yet, the Emotional Attention subscale was less relevant for protective factors for mental health. Seemingly, emotional skills need to be developed at higher levels (Emotional Clarity, Emotional Repair) to benefit the individual.

Global EI and all the TMMS-23 subscales were positively related to subjective well-being, and robust positive associations were found with resilience and optimism (except for Emotional Attention). These results are in line with previous research linking EI with optimism and resilience (Di Fabio et al., 2018; Sarrionandia et al., 2018; Veliz-Burgos et al., 2018). Thus, like Tejada-Gallardo et al. (2022), we assume that EI plays a key role in subjective well-being as a predictor of happiness and optimism. More precisely, as emotional understanding and regulation abilities increase, so should subjective happiness (Guerra-Bustamante et al., 2019).

General Discussion

The aim of this research was to explore the psychometric properties of the TMMS-23 to provide evidence of the validity and reliability of the scale scores in the Cuban population. The three-factor structure of the scale demonstrated good fit. Yet, Item 5 ("I let my feelings affect my thoughts") was excluded because it was negatively correlated with the other items. Apparently, this item was related to all three TMMS-23 subscales. The factor structure mirrors the structure found with other Spanish-speaking samples (Angulo & Albarracín, 2018; Espinoza-Venegas et al., 2015; Fernández-Berrocal et al., 2004; Ocaña-Zuñiga et al., 2019; Pérez-Zarate et al., 2020) and corresponds with theoretical models on EI (Mayer & Salovey, 1997; Salovey & Mayer, 1990; Salovey et al., 1995). The internal consistencies of the full scale and the subscales were high. Convincing evidence was found for nomological validity (i.e., expected correlations with personality, negative affective states, and psychological adjustment). The data obtained in this research thus provide support for the good psychometric properties of the TMMS-23 in the Cuban context.

It is important to adapt scales to a specific culture and test whether the psychometric properties are good in a certain context to obtain an accurate and valid EI measure. The present study confirms that the TMMS-23 can be used in Cuba. It may be useful in social and personality psychology research on EI as well as in clinical intervention studies. Furthermore, we studied the psychometric properties of a self-report tool that was based on perceived emotional competencies. This basis has the advantage of taking into account individuals' subjective experience, which is central to psychology (Wegner & Gilbert, 2000). Moreover, it avoids construct overlap with personality traits and stable self-evaluations – a criticism of trait models of EI (see Schütz & Koydemir, 2018). Nevertheless, it would be interesting to compare how well self-perceived EI abilities match results from objective EI tests in Cuba.

Limitation

One limitation of the current studies is that women were overrepresented in the samples. Obtaining gender-balanced samples in future studies could increase confidence in the findings. Moreover, we used a variety of measures to investigate nomological associations; however, some of the measures had low internal consistencies, which is why the correlations may have been underestimated. Future research could also include mediation analyses to explore the role of EI as a protective factor against negative emotional states, such as anxiety, depression, or fear (to do so, intervention techniques, experimental designs, or instrumental variable approaches may be helpful). Moreover, as we did not test for the temporal stability of the scale score, future research should also assess test–retest correlations for the TMMS-23. Finally, data from informant reports could be used to examine the extent to which self-perceived EI assessed with the TMMS-23 matches peer-rated EI. Other limitations refer to the exclusive reliance on self-report data, the use of predominantly student samples, and the assumption of very similar participants because snowball sampling was used throughout to recruit participants.

Conclusion

In conclusion, the TMMS-23 differs slightly from the original scale and from adaptions for other Spanish-speaking countries. Yet, the TMMS-23 demonstrates at least comparable if not superior psychometric properties when compared with scales that have been used in other Spanish-speaking countries and may be used there successfully, too. In any case, we hope that researchers and practitioners who wish to assess EI in Cuban individuals make use of the instrument presented here, as the conclusions derived from the scale scores can be considered reliable and valid.

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Open Science
Open Data: The authors confirm that there is sufficient information for an independent researcher to reproduce all of the reported results (Fernández-Castillo et al., 2023).

Open Materials: The authors also confirm that there is sufficient information for an independent researcher to reproduce all of the reported methodology (Fernández-Castillo et al., 2023).

We report all data exclusions, all data inclusion/exclusion criteria, all measures in the study, and all analyses including all tested models.

For inferential tests, we report exact *p*-values and effect sizes.

All data are available at https://osf.io/e9r4b/

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