



The dimensionality of emotional intelligence: Evidence for a four-factor model for post-Soviet and Central Asian adolescents

Kuandyk M. Taibolatov¹, Matthew Gordon Ray Courtney^{2,*}, Aikorkem Zhapparova³, and Daniel Hernández-Torrano⁴

¹ Department of Personal Development and Education, Toraighyrov University, Pavlodar, Kazakhstan.

² Institutional Research & Analytics, Office of the Provost, Nazarbayev University, Kazakhstan.

³ Research and Data Analysis Department, Center for Pedagogical Measurements under AEO “Nazarbayev Intellectual Schools”, Kazakhstan.

⁴ Graduate School of Education, Nazarbayev University, Kazakhstan.

Título: La dimensionalidad de la inteligencia emocional: Evidencia de un modelo de cuatro factores para adolescentes post-soviéticos y de Asia Central.

Resumen: *Introducción:* El estudio de la inteligencia emocional (IE) ha suscitado una atención significativa debido a su relevancia para diversos grupos de edades y poblaciones, así como para personas de diferentes contextos sociales y académicos. La capacidad de un individuo para comprender y gestionar eficazmente sus propias emociones, así como comprender y manejar las emociones de los demás, se ha identificado como una habilidad vital y un antecedente del éxito personal, social y profesional. Aunque la dimensionalidad de la IE se ha explorado ampliamente en contextos occidentales, existe una relativa falta de investigación en contextos post-soviéticos y en Asia Central. *Metodología:* Basándonos en una herramienta construida en Rusia por Lyusin y en una muestra amplia de adolescentes ($N = 658$) de 12 escuelas, encontramos muy pocas diferencias en la media de la IE las escuelas muestreadas. Utilizando un análisis factorial confirmatorio de primer orden, este estudio encontró evidencia de un modelo de IE de cuatro factores que incluye la comprensión y gestión de las propias emociones, así como la comprensión y gestión de las emociones de los demás. *Results:* El modelo presenta un ajuste de modelo adecuado, validez discriminante, correlaciones entre factores similares a las de otros estudios, así como una sólida invarianza según el género (aunque parcialmente invariance para el idioma). También encontramos evidencia de que las adolescentes muestran niveles ligeramente más altos de comprensión de las emociones de los demás y niveles más bajos de gestión de sus propias emociones. *Conclusion:* El modelo de cuatro factores puede ser una herramienta útil para medir la IE de los adolescentes, aunque se requieren más investigaciones sobre su utilidad en otros contextos postsoviéticos, de Asia Central y más allá.

Palabras clave: Inteligencia emocional. Rasgos de personalidad. Percepción emocional. Asia Central. Kazajstán.

Abstract: *Introduction:* The study of emotional intelligence (EI) has garnered significant attention due to its relevance to diverse age- and population-groups, and persons of various social and academic backgrounds. The capacity for an individual to effectively understand and manage one's own emotions and understand and manage the emotions of others has been identified as important life skill and antecedent to personal, social, and professional success. While the dimensionality of EI has been explored extensively in Western contexts, there is a relative dearth of research in post-Soviet and Central Asian contexts. *Methodology:* Building upon the EI instrumentation developed in Russia by Lyusin and a large sample of adolescents ($N = 658$) from 12 schools, we find very little differences in average levels of EI in the schools sampled. Thereafter, using first-order confirmatory factor analysis, this study finds evidence for a Four-Factor Model of EI inclusive of Understanding and Managing One's Own Emotions, and Understanding and Managing Others' Emotions. *Results:* The model exhibits adequate model fit, discriminant validity, inter-factor correlations similar to those in other studies, and is strongly invariant for gender (though partially invariant for language). We also find evidence for female adolescents exhibiting slightly higher levels of Understanding Other's Emotions, and lower levels of Managing Own Emotions. *Conclusions:* The four-factor model may be a useful tool for gauging the EI of adolescents, though further research as to its utility in other post-Soviet, Central Asian, and other contexts is required.

Keywords: Emotional intelligence. Personality traits. Emotional perception. Central Asia. Kazakhstan.

Introduction

Adolescence is a period of human development between childhood and adulthood characterized by pronounced physical, cognitive, social, and emotional changes (Sawyer et al., 2018). There is widespread agreement that adolescence is a highly sensitive period where genetic and environmental influences can have a long-term effect on important academic, social, occupational, and health outcomes (e.g., Llamas-Díaz et al., 2022; Puertas-Molero et al., 2020; Soriano-Sánchez & Jiménez-Vázquez, 2023). This makes concepts such as emotional intelligence (EI) particularly interesting for studying how young people adapt and cope with the complex person-

al and social demands that characterize this period (Megías-Robles et al., 2024).

EI was originally defined as “the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to differentiate between them, and to utilize this information to steer one's thoughts and actions” (Salovey & Mayer, 1989, p. 189). In recent years, the study of EI has garnered considerable attention due to its demonstrated impact across various age groups and diverse social and professional backgrounds (Fernández-Berrocal & Extremera, 2006). However, much of the research on EI in adolescents has been concentrated in WEIRD-Western, Educated, Industrialized, Rich, and Democratic-countries (Jose & Thomas, 2024), contributing to a limited understanding of the potential of EI in other contexts. Despite the availability of numerous EI instruments translated and validated across different contexts, the scarcity of models and measurement tools specifically designed to account for EI in non-WEIRD has contributed to this situation. Therefore, research on EI

* Correspondence address [Dirección para correspondencia]:

Dr Matthew G. R. Courtney, Head of Institutional Research & Analytics unit, Office of the Provost-Institutional Effectiveness, Nazarbayev University, Astana 010000, Kazakhstan. E-mail: matthew.courtney@nu.edu.kz
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requires measurement instruments that provide reliable and valid scores in different contexts, cultures, and languages.

This study aims to address this gap by examining the dimensionality of EI among adolescents in a post-Soviet context, specifically in Kazakhstan. Additionally, the research investigates gender and language differences and measurement invariance in EI. Studying the dimensionality of EI in countries like Kazakhstan is important because cultural and contextual factors play a significant role in understanding and measuring EI (Huynh et al., 2018). For instance, Costa & Faria (2024) have recently demonstrated that cultural orientations, such as collectivist vs. individualist orientations, determine self-reported EI levels in adolescents, often favoring those with more individualistic tendencies. Contrary to Western contexts, where individualist orientations are predominant, post-Soviet societies such as Kazakhstan typically emphasize collectivist values (Winter et al., 2022).

Hence, the following three research questions were specified:

RQ1: What measurement model best represents the EI of Kazakhstani adolescents?

RQ2: Is the measurement model invariant for gender and language?

RQ3: To what degree do adolescents differ in terms of EI by gender and language?

Conceptualizing and measuring EI

The conceptualization and measurement of EI have evolved since its origins as a research field in 1990. Nowadays, two common approaches to conceptualizing EI are ability EI and trait EI. Ability EI refers to EI as a form of intelligence that processes emotional information and focuses on an individual's capacity to perceive, facilitate, understand, and manage emotions (Mayer & Salovey, 1997). Ability EI is often measured through performance-based tests that simulate emotional scenarios, measuring an individual's competencies in real-time emotional navigation. An example of such an instrument is the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer et al., n.d.). In contrast, trait EI centers around inherent emotional traits and dispositions as stable dispositions and personality facets (Petrides, 2011). More specifically, trait EI has been defined as a constellation of emotional self-perceptions at the lower levels of personality hierarchies (Petrides et al., 2007). Trait EI is typically assessed through self-report questionnaires that offer a subjective assessment of one's emotional tendencies, such as the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides, 2009).

Joseph and Newman (2010) have expanded on this distinction, differentiating between three EI models: performance-based ability, self-report ability, and mixed EI models. Performance-based ability EI models define EI as a set of emotion-related abilities that should be assessed via performance-based tests (e.g., MSCEIT). Self-report ability models also view EI as an ability but suggest measuring it

through self-reported instruments that reflect participants' subjective perceptions about their emotional aptitudes. The most frequently used measurement tools within this alternative conceptualization are the Trait Meta-Mood Scale (TMMS; Salovey et al., 1995), the Schutte Self-Report Emotional Intelligence Test (SSEIT; Schutte et al., 1998), and the Wong and Law Emotional Intelligence Scale (WLEIS; Wong & Law, 2002). Mixed EI models understand EI as a broad construct combining emotion-related competencies, social skills, and personality features measured through self-report questionnaires. The Bar-On Emotional Quotient-Inventory (EQ-i; Bar-On, 2006) and the Emotional and Social Competence Inventory (ESCI; Boyatzis & Goleman, 2007) are commonly used by researchers to measure EI within this approach.

This study examines the dimensionality of EI in adolescents from Kazakhstan based on a self-reported ability model for three main reasons. First, although the trait EI model has gained popularity in recent years (Siegling et al. 2015), the self-reported ability model is the most widely used procedure to measure EI in adolescents (Soriano-Sánchez & Jiménez-Vázquez, 2023). Second, this seems to be the case in Kazakhstan, with limited research in this field, but some recent studies adopting self-reported ability EI conceptualizations in their designs (e.g., Adilzhanova et al., 2024; Taibolotov et al., 2024). Third, unlike trait EI models that conceptualize emotional intelligence as a set of stable personality traits, the self-reported ability model views EI as a set of competencies that can be developed and enhanced over time (Castillo-Gualda et al., 2018; Puertas-Molero et al., 2020).

Various studies have examined the validity and reliability of self-reported EI scales across different populations and cultural contexts. To note, Karabuschenko et al. (2016) explored the capacity of individuals to recognize emotions in others of different cultures and identified key differences in some population groups, emphasizing the need to consider the development of EI across various social and ethnic contexts. Therefore, validating the various instruments in different contexts is an ongoing research process. For instance, the TMMS-24 has been validated in adolescent samples in Spain (Pedrosa et al., 2014), Chile (Gong et al., 2020), Brazil (Câmara et al., 2023), and France (Maria et al., 2016), among many other countries. The factorial validity of the WLEIS has also been extensively explored in Spanish (Pacheco et al., 2019), Italian (Iliceto & Fino, 2017), American (LaPalme et al., 2016), and Chinese (Li et al., 2012) children and adolescents. Similarly, the psychometric properties of the SSEIT have been tested in adolescents and young adults across diverse contexts and cultures (e.g., Gong & Paulson, 2018; Nassar et al., 2023).

These studies contribute valuable insights into measuring and evaluating EI for diverse populations, emphasizing the significance of considering cultural and contextual factors when interpreting EI measures. By applying rigorous psychometric approaches to new sample groups, researchers can ensure the validity and reliability of the measurement of EI

and enable an expanded understanding of this important topic.

The protective role of self-reported ability EI in adolescence

During the critical stages of adolescence, teenagers experience major emotional and social changes for which the development of EI is imperative (Megías-Robles et al., 2024). Research has consistently pointed to the positive contributions of EI in adolescence, as measured through the self-reported ability model. For example, studies have shown that EI can positively influence adolescents' mental health and well-being states, including happiness (Abdollahi et al., 2019; Tejada-Gallardo et al., 2022), quality of life (Soriano-Sánchez & Jiménez-Vázquez, 2023), subjective well-being (Llamas-Díaz et al., 2022), and eudaimonic well-being (Salavera & Usán, 2022). Furthermore, there is evidence that high EI levels may predict teenagers' social adaptation (Mestre et al., 2006) and contribute to reducing suicidal thoughts (Extremera et al., 2023). Research has also identified the important role that EI has played in young people's educational outcomes. For example, Somaa et al. (2021) found consistent meta-analytic evidence that self-reported ability EI is a statistically significant predictor of academic achievement in young populations. Another recent meta-analysis supported this relationship after controlling for intelligence and Big Five personality factors (MacCann et al., 2020). In addition, self-reported ability EI has been demonstrated to predict important outcomes later in life, such as job performance (Joseph et al., 2015), health (Martins et al., 2010), and civic engagement (Miao et al., 2017).

These findings, collectively, emphasize the importance of understanding and evaluating EI to effectively support teenagers' development across multiple crucial aspects of their development. With much evidence to suggest that EI is associated with improved psychological, social, academic, and future outcomes, it is important to ensure that the measurement of EI is reliable and valid in different contexts, as well as differences and measurement invariant across important personal and socio-cultural characteristics, such as gender and language.

Gender, language, and self-reported ability EI

Gender differences in self-reported ability EI among adolescents have been a subject of interest in various studies. There is considerable consensus that females tend to report higher levels of performance-based ability EI (e.g., D'Amico & Geraci, 2022; Gutiérrez-Cobo et al., 2016). However, the evidence for gender differences in self-reported ability EI is less definitive, with findings showing that females sometimes score higher than males on only certain subscales. For example, Ciarrochi et al. (2001) found that females scored higher in total EI and perceived themselves as better at perceiving emotions, regulating others' emotions, and utilizing

emotions, but not in regulating their emotions. Similarly, Law et al. (2004) reported that women tend to score higher than men in others' emotion appraisal and use of emotion, with no significant differences observed in self-emotion appraisal and emotion regulation. More recently, Salavera and Usán (2022) found that girls report higher levels of attention to their own and others' emotions, emotion regulation, and using emotions in problem-solving, but not in others. Furthermore, other studies have found no sex-related differences in self-reported ability EI across dimensions (e.g., Joseph & Newman, 2010). Nevertheless, there seems to be more agreement on the gender measurement invariance of self-reported ability EI measures, which has been consistently observed in different contexts and through several scales (e.g., Kong, 2017; Pedrosa et al., 2014).

Researchers have also recognized the significance of linguistic characteristics when measuring EI. For example, Atamanova and Bogomaz (2018) investigated differences in self-perceived EI competencies among Russian university students majoring in foreign languages studying Chinese, English, and Romance languages. The findings revealed significant variations in EI scores across linguistic groups. Students studying Chinese scored higher in recognizing, understanding, and managing others' emotions compared to students studying English and Romance languages. Additionally, students in the Romance language group outperformed their English-speaking peers in emotional expression, intrapersonal EI, and emotion management. The authors suggest that these between-group differences may be linked to the distinctive characteristics of the languages studied, as stated by Smirnova (2017). For instance, the tonal nature of the Chinese language necessitates a strong ability to discern the emotional nuances in speech, while Romance languages are inherently more emotionally expressive. Similarly, El Ghoudani et al. (2018) adapted the existing WLEIS scale for the Moroccan-Arabic-speaking population group and emphasized the importance of considering the cultural and linguistic backgrounds of research participants to ensure the validity and reliability of EI assessments.

Collectively, these results suggest that examining the dimensionality of self-perceived emotional aptitudes and understanding gender- and language-specific differences is important and can help develop targeted interventions to foster EI development and promote important health, social, and academic outcomes among adolescents with diverse demographic and cultural backgrounds.

The Present Study

In recent years, the concept of EI in adolescence has also attracted some attention among scholars in post-Soviet contexts (e.g., Butvilas & Kovaitė, 2022; Ihnatovych & Liashch, 2020). The recognition of and interest in EI has grown steadily as individuals, organizations, and educational institutions have begun to realize its potential relevance to social and educational outcomes. However, research on this topic

in Central Asian countries, including Kazakhstan, is scarce. An exception is the study by Adilzhanova et al. (2024), which explored the link between self-perceived ability EI and subjective well-being among adolescents, revealing a positive correlation between the two. Another recent study examined the influence of EI on academic motivation, finding a significant positive association and gender differences in EI, with males scoring higher in intrapersonal EI, emotion management, and overall EI, and females excelling in interpersonal EI (Taibolatov et al., 2024).

Interestingly, both studies used Lyusin's Emotional Intelligence scale (EmIn), developed by Russian psychologist D. Lyusin in 2006, to measure self-perceived ability EI. The EmIn consists of 46 Likert-style statements designed to elicit participants' level of agreement with the EI-focused statements (Lyusin, 2006). The questionnaire includes positively and negatively worded items, categorized into subscales to measure five self-reported EI skills and competencies: Understanding Own Emotions, Managing Own Emotions, Controlling Own Expressions, Understanding Others's Emotions, and Managing Others's Emotions.

The recent publication of Adilzhanova et al.'s (2024) and Taibolatov et al.'s (2024) studies suggests that the EmIn is being progressively adopted in Kazakhstani research and will be used in future studies in this context. Therefore, an analysis of the psychometric characteristics of the Kazakhstani version of the instrument is warranted. However, there has been a lack of sound measurement practice among academics and scholars regarding the use of this instrument. For example, Lyusin's (2006) original study lacks sufficient evidence for construct validity—the factor pattern matrix, based on a moderate sample size of $N = 218$, conflates the management of one's own emotions with the management of other's emotions in a single factor (the third factor, p. 12-13) calling to question the dimensionality of the proposed scale. Additionally, the reliance on alpha reliability, the lack of discriminant validity assessment, and the poor model performance in Taibolatov et al.'s study demonstrate challenges in measuring EI. This limitation has hindered the reliable assessment of emotional self-perceived EI competencies among local students and has problematized the development of specialized programs and interventions that aim to cultivate EI that are in alignment with the cultural and linguistic context of the country.

The current study uses the EmIn to explore the dimensionality of Kazakhstani adolescents' EI to bridge the existing gap in empirical research on assessing EI. More specifi-

cally, this study aims to examine the validity of Lyusin's model of EI among a large sample of Kazakhstani adolescents and to examine the potential role of gender and language in the factors in the model. By examining the alignment between Lyusin's model and self-perceived EI competencies of Kazakhstani adolescents, the research intends to provide insights into the applicability and relevance of the model in the specific cultural context of Kazakhstan.

Method

Participants

The sample comprised 658 adolescents with a mean age of 13.09 ($SD = 0.97$, skew = -0.15), with 242 males (37.4%) and 416 (63.2%) females. In terms of grade, 270 (41.0%) were in Grade 8, 226 (34.3%) in Grade 7, and 162 (24.6%) in Grade 6. The sampled students were based on a convenience sample. Most students ($n = 624$) were from urban locations, while 34 were from rural locations. Overall, participants in the study were sampled from 11 different districts in Kazakhstan including Aksu ($n = 44$), Aktobe ($n = 67$), Baykonys ($n = 11$), Druzhba ($n = 1$), Kostanay ($n = 93$), Kyzylzhar ($n = 10$), Leninskiyi ($n = 3$), Pavlodar ($n = 387$), Semey ($n = 33$), Terenol ($n = 3$), and Zhelezenskiyi ($n = 6$). In terms of schools, student participants were drawn from 12 unique public schools with the following representation from anonymized school IDs 1 to 12, respectively: $n = 67$, 129, 33, 11, 44, 14, 94, 10, 3, 108, 139, and 6.

Instruments

All EI items were Likert-style with the following response options: 0 = Strongly disagree, 1 = Slightly disagree, 2 = Slightly agree, 3 = Strongly agree. After the deletion of several items due to poor functioning, the final instrument was comprised the following four factors and 19 items: Understanding Own Emotions (3 items, combined score averages for students were: $M = 1.99$, $SD = 0.61$), Managing Own Emotions (4 items, $M = 1.77$, $SD = 0.66$), Understanding Other's Emotions (8 items, $M = 1.86$, $SD = 0.55$), Managing Other's Emotions (4 items, $M = 1.91$, $SD = 0.65$) (inclusion of items for Controlling Own Expressions, did not result in sufficient model fit). Table 1 provides details as to all descriptive statistics.

Table 1
Descriptive Statistics for All EmIn Items

Code: Original Scale/Items	0	1	2	3	Med	M	SD	Skew	ICC
Understanding Own Emotions (M = 1.99, SD = 0.61, alpha = .51, omega_t = .52, omega_{tp} = .60)									
I always know why I like or dislike a certain person	51	133	288	186	2	1.93	0.89	-0.52	.00
When I get angry, I may not notice it myself (R)	75	190	235	158	2	1.72	0.95	-0.21	.00
When I get angry, I always know why	40	117	318	183	2	1.98	0.84	-0.58	.00
I find it difficult to express how I feel about someone (R)	128	271	173	86	1	1.33	0.93	0.26	.000
Sometimes I don't know why I'm happy or sad (R)	147	242	174	95	1	1.33	0.98	0.23	.000
I always know if I'm happy or sad	38	103	302	215	2	2.05	0.84	-0.68	.000
To me, feeling guilty or ashamed is the same thing (R)	111	219	225	103	1	1.49	0.95	0.00	.000
I don't know how to tell my friends about my feelings (R)	109	186	245	118	2	1.57	0.97	-0.14	.00
I get happy or sad for no reason (R)	171	223	167	97	1	1.29	1.01	0.26	.000
I have feelings I don't know the names of (R)	167	227	177	87	1	1.28	0.99	0.24	.02
Managing Own Emotions (M = 1.77, SD = 0.66, alpha = .67, omega_t = .72, omega_{tp} = .78)									
If I'm sad, I know what to do to make me happy	72	141	256	189	2	1.85	0.96	-0.45	.00
If I have to hurry or if I am scolded, I cannot pull myself together and do what needs to be done (R)	114	211	227	106	2	1.49	0.96	-0.02	.01
I can make sure that my mood is good for a very long time	74	170	263	151	2	1.75	0.94	-0.30	.01
If I am angry, I know how to calm down	65	174	275	144	2	1.76	0.91	-0.30	.00
When I'm in a bad mood, there's nothing I can do about it (R)	105	194	257	102	2	1.54	0.94	-0.14	.00
I can control my mood	76	181	263	138	2	1.70	0.93	-0.25	.00
Understanding Other's Emotions (M = 1.86, SD = 0.55, alpha = .81, omega_t = .86, omega_{tp} = .89)									
I always see when my loved ones are upset, even if they hide it	71	133	310	144	2	1.80	0.90	-0.48	.01
I can tell by a person's face what mood they are in	40	122	341	155	2	1.93	0.81	-0.55	.00
I understand without any words the mood of my best friend	31	93	319	215	2	2.09	0.81	-0.71	.01
I understand other people's facial expressions and gestures well	52	155	320	131	2	1.81	0.84	-0.41	.04
Looking at a person, I can easily understand what mood that they are in	37	147	340	134	2	1.87	0.80	-0.43	.00
If someone hides their feelings, I notice it	69	183	272	134	2	1.72	0.91	-0.26	.00
You can tell by the voice what mood a person is in	45	100	320	193	2	2.00	0.85	-0.68	.00
I can guess exactly how my friends feel	63	247	262	86	2	1.56	0.84	-0.02	.00
If you carefully follow the expression on a person's face, you can understand how he feels	44	114	341	159	2	1.93	0.82	-0.60	.01
If my friend or an adult gets angry with me, sometimes I don't notice it right away (R)	56	205	239	158	2	1.76	0.91	-0.18	.00
I can't guess how the mood of adults or my friends will change (R)	99	239	236	84	1	1.46	0.90	0.01	.00
I don't understand why some people resent me (R)	160	233	158	107	1	1.32	1.02	0.26	.00
Managing Other's Emotions (M = 1.91, SD = 0.65, alpha = .74, omega_t = .75, omega_{tp} = .80)									
If someone is offended by me, I do not know how to make peace with them (R)	56	190	268	144	2	1.76	0.89	-0.24	.00
I am unable to cheer up or anger my friend (R)	50	131	270	207	2	1.96	0.90	-0.55	.00
I can cheer up my friends	36	84	306	232	2	2.12	0.83	-0.79	.02
I can comfort a person who is sad	64	162	293	139	2	1.77	0.89	-0.36	.00
I can comfort my parents and friends when they are sad or worried	64	136	311	147	2	1.82	0.89	-0.48	.15
If I want, I can make someone angry	75	165	241	177	2	1.79	0.97	-0.33	.02
I can't change other people's moods (R)	61	182	283	132	2	1.74	0.88	-0.27	.00
When my friend tells me about their grief, I can comfort them	51	120	305	182	2	1.94	0.88	-0.58	.02
If my friend is crying, I don't know what to do (R)	76	164	256	162	2	1.77	0.95	-0.33	.01
When I want to help a friend, I try to comfort them but they do not understand this (R)	137	248	196	77	1	1.32	0.93	0.18	.01
Controlling Own Expressions									
When I get angry, I can't help but say whatever I think (R)	93	179	223	163	2	1.69	1.00	-0.22	.00
When I tell something to my mother or a friend, I often speak very loudly and wave my arms (R)	78	143	240	197	2	1.84	0.98	-0.43	.02
Adults think that I laugh and cry too often (R)	95	157	258	148	2	1.70	0.98	-0.30	.00
If I feel embarrassed when talking to strangers, I can hide it (R)	85	179	281	113	2	1.64	0.91	-0.25	.00
I always know what my facial expression is, and I can control it	58	200	259	141	2	1.73	0.90	-0.19	.00
If I really need to, I can control the expression on my face	40	106	315	197	2	2.02	0.84	-0.65	.00
Relatives can always guess by my voice what my mood is (R)	146	250	179	83	1	1.30	0.95	0.24	.00

Notes. R = reversed-scored item (as presented as semantically-reversed); Med. = median; Skew = skewness; ICC = intraclass correlation coefficient by 12 school clusters, as calculated with the R misty package's (Yanagida, 2023) multilevel.icc function; 0 = Strongly disagree, 1 = Rather disagree, 2 = Rather agree, 3 = Strongly agree; items retained in the final four-factor model in bold; alpha, omega_{t[total]}, and omega_{tp[total, polychoric]} reliability estimates are based on the bold items retained in the final model.

Descriptive statistics also revealed that there was very little variance in EI variables due to between-school effects. Specifically, ICCs for each item ranged between 0.00 and 0.04, with only one instance of 0.15 for the managing other's emotions item, "I can comfort my parents and friends when they are sad or worried" (Table 1). Overall, this meant that very little of the variance in EI attributes, as measured by the 46 different items, could be attributable to between-school effects. It should be noted that the questionnaire was available to students in either Russian or Kazakh languages. As no examples of the survey could be found in Kazakh, the survey was translated by the first author (a bi-lingual Russian and Kazakh speaker) from Russian (source) to Kazakh (target). Thereafter, the Kazakh translation was checked for translation flaws, awkward sentence structure, and usage by a native Kazakh-speaking colleague. All data preparatory steps and cleaning are detailed in the Supplementary Materials, R Code.

Data Analysis

General Modelling Approach

RQ1 asks, What measurement model best represents the EI of Kazakhstani adolescents? To answer this question, a general modelling approach needs to be first selected. Given that the descriptive statistics revealed very little between-school variance, single-level confirmatory factor analysis was chosen as the method of analysis for this study. Analysis was carried out with the assistance of the open-source R programming language (R Core Team, 2023). The R lavaan package (Rosseel, 2012) was used. Bi-factor and higher-order models were not explored as prior research on EI has suggested that higher order factors are not able to account for the relationship between first-order factors and that aggregating results across lower order factors was poor practice (Barchard & Christensen, 2007).

After an initial five-factor model was specified in accordance with the five groups of items defined in Table 1, multiple alternate models were explored in order to arrive at a final factor solution that met the requirements for model fit, internal consistency, and convergent and discriminant validity (See Supplementary Materials, R Code, for details). In addition, as a form of sensitivity analysis, we model the ordinal variables in our final model with Pearson and polychoric correlations to provide complementary information (see Robitzsch, 2020, for use of maximum likelihood and weighted least square estimation methods). While the WLSMV estimation is complementary, given comparable results, we interpret the ML estimated results in the discussion section.

Assessment of Model Fit, Internal Consistency, and Convergent and Discriminant Validity

For selecting the most appropriate model, (1) general model fit, and (2) criteria for discriminant validity were assessed.

Various models were examined in terms of general model fit (see Fan & Sivo, 2005; Hu & Bentler, 1999, for simulation studies suggestive of the utility of model fit cutoffs below). First, the badness-of-fit measures included the Chi-square (χ^2) and degrees of freedom (df) (though considered sensitive to sample size, so non-significance is not necessary; Fan et al., 1999), Standardized Root Mean Square Residual (SRMR) (less than 0.08; Hu & Bentler, 1999), and Root Mean Square Error of Approximation (RMSEA) (less than 0.08; Byrne, 2001). Second, the goodness of fit measures included the Comparative Fit Index (CFI) (above 0.90; Cheung & Rensvold, 2002), the Tucker-Lewis Index (TLI) (above 0.90; Cheung & Rensvold, 2002), and Gamma Hat (above 0.90, Fan & Sivo, 2007; for implementation, see semTools package's moreFitIndices function; Jorgensen et al., 2022).

We assess convergent validity by way of the existence of minimum item-factor loadings (with > 0.40 , acceptable). We also assess the internal consistency of the scales by way of Cronbach's alpha reliability coefficient (Cronbach, 1951) for each factor (with > 0.70 , ideal). We also make use of the ω_t (omega total) and the ω_{ap} (omega total with polychoric correlations) to assess internal consistency for each factor using the same interpretation (with > 0.70 , ideal). We also examine discriminant validity via the heterotrait-monotrait criteria (HTMT_{.85}; see htmt function, Jorgensen et al., 2022; see Henseler et al., 2015, for introduction to criterion). For the heterotrait-monotrait ratio that uses the geometric mean, a ratio of .85 was considered a maximum (for implementation, see semTools package's htmt function; Jorgensen et al., 2022; see Hair et al., 2010, p. 710, for the utility of tests for discriminant validity for CFA). We also test for discriminant validity by testing whether each inter-factor correlation coefficient is statistically different from 1.00. To do this, we generate bootstrapped 95% confidence intervals for each estimate. Instances for when the upper 95% confidence intervals are lower than 1.00 provide evidence for sufficient discriminant validity (see Appendix A for R code for test).

Examination of Measurement Invariance and Group Differences

For RQ2, tests for configural, metric, and scalar invariance for the respective gender (male and female) and language (Kazakh and Russian) groups were undertaken with the assistance of the R lavaan package's group and group.equal arguments (Appendix A). To reach configural invariance (equivalent factorial structure), the resultant RMSEA of .05 or less would need to be met (Cheung & Rensvold, 2002). Assuming the requirement for configural invariance is met, to reach metric invariance (equivalence of

item-factor loadings), a change in CFI of .01 or less and a change in gamma of .001 or less would also both need to be met. With the requirements of configural and metric invariance met, to reach scalar invariance (equivalent vector of intercepts), a change in CFI of .01 or less and a change in gamma of .001 or less would also both need to be met. In this instance, evidence of scalar invariance suggests that comparisons of gender and language differences in latent factor means is defensible (Cheung & Rensvold, 2002). Given that these assumptions held, for RQ3, comparisons of latent factor mean differences were carried out with the effect of being female (as opposed to being male) and completing the survey in Kazakh (as opposed to Russian) examined (Appendix A). For group differences, standardized differences in latent factor means (Cohen's *d*) were interpreted as

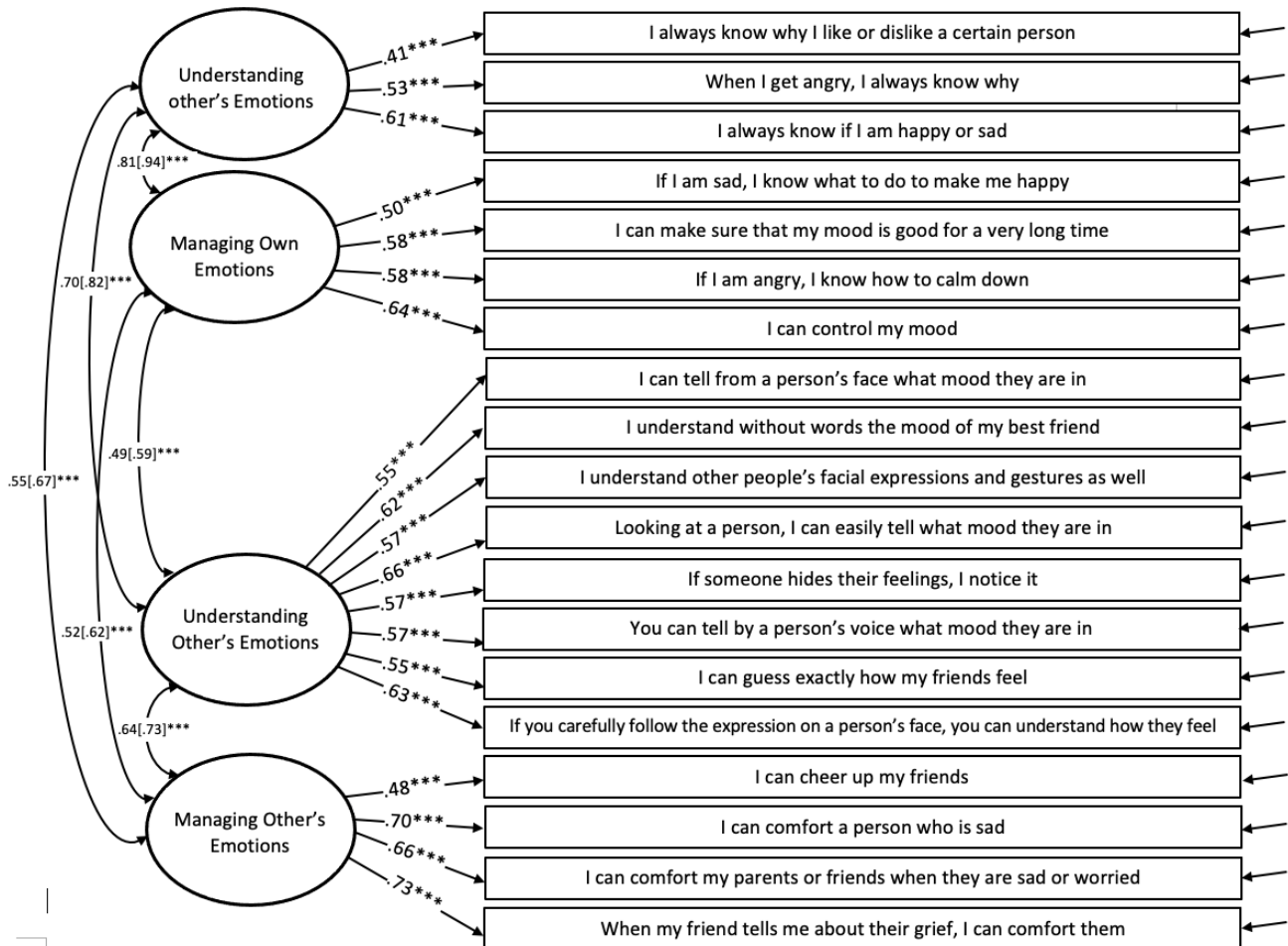
follows: small, $0.20 \leq d < 0.40$; medium, $0.40 \leq d < 0.60$, and large $0.60 \leq d$ (Hattie, 2009). For all analyses, the threshold for statistical significance was set at $p < .05$.

Results

RQ1: Measurement Model for EI of Kazakhstani Adolescents

Adequate model fit, discriminant validity, and minimum item-factor loadings were ultimately reached with a four-factor solution that maintained most of the pre-conceived items. Figure 1 provides a visual illustration of the Four-Factor model of EI.

Figure 1
Four-Factor Self-Other Understand-Manage Model of Emotional Intelligence



Note. 95% upper confidence interval for inter-factor correlation coefficients in brackets.

The measurement model exhibited adequate model fit across all indices using both maximum likelihood (ML) and mean and variance adjusted weighted least squares (WLMSV) estimation methods (Table 2). All inter-factor

correlations and item-factor loadings for the full WLSMV-estimated measurement model are presented in Figure B1 (Appendix B).

Table 2

Model Fit Indices for the Four-Factor Self-Other Understand-Manage Model of EI

Estimation	Chi-Sq.	df	Ratio (<i>p</i>)	CFI	RMSEA	SRMR	Gamma
ML	384.47	146	2.39 (.12)	.932	.046	.043	.969
WLSMV ^a	446.10	146	3.06 (.08)	.954	.056	.048	.985

Note. Chi-Sq. = the chi-square statistic; *df* = degrees of freedom for the model; Ratio = the chi-square to degrees-of-freedom ratio for the model; the *p* value associated with the ratio; ^aall fit statistics are “scaled” versions.

Table 3 presents the results of the HT-MT_{.85} test for discriminant validity. As all estimates were under the standard limit of .85, all four factors in the model were deemed to be sufficiently discriminant from each other. In addition, all up-

Table 3

Results for the HT-MT_{.85} Tests for Discriminant Validity

Factors	Underst. Other's Emotions	Managing Other's Emotions	Underst. Own Emotions	Managing Own Emotions
Understanding Other's Emotions	1.00		–	
Managing Other's Emotions	.64	1.00		
Understanding Own Emotions	.74	.58	1.00	
Managing Own Emotions	.41	.52	.76	1.00

Note. Underst. = Understanding.

Given that the Self-Other Understand-Manage model exhibited adequate fit, sufficient discriminant validity, and theoretical relevance, it was selected as the final measurement model for the current study.

RQ2: Measurement Invariance for Gender and Language

The tests for configural invariance for gender and language revealed RMSEA values of .05 and .05, respectively. Therefore, this suggested that the general factor structure was equivalent for both male and female gender groups, and Kazakh and Russian language groups (note that gamma also acceptable at = .958 and .961). The subsequent tests for metric invariance were also met with the change in CFI (from the model with loadings not held equivalent and loadings held equivalent) estimated at .0001, and .0005, respectively (note delta gamma = .000, and .000, respectively; results available to three decimal places). Therefore, the tests for scalar equivalence were also met with the change in CFI (from the model with loadings held equivalent; and loadings and intercepts held equivalent) estimated at .0050, and .0013, respectively (note delta gamma = .002, and .001, respectively). As the delta gamma statistic was above .001, the criteria for scalar invariance across the Kazakh and Russian survey languages was not met. Therefore, only subsequent analysis of differences in latent factor means for gender was undertaken.

RQ3: Differences in latent factor means by gender

Table 4 presents the results of the latent factor means difference tests.

per 95% confidence intervals for the inter-factor correlation coefficients were statistically significantly different from 1.00 (Figure 1, coefficients in brackets).

It should be noted that a large number of items were dropped from the originally conceived 46 items (from 46 to 19) due to reversed item-factor loadings in the CFA models. Additionally, fit was not achievable with the inclusion of Notably, none of the reverse-coded items (those presented semantically negative) were retained. Additionally, due poor model fit, the inclusion of the proposed Controlling Own Expressions, was also dropped from the final model.

Table 4

Differences in Latent Factor Means by Gender

Factors	Estimate (<i>d</i>)	<i>se</i>	ζ	<i>p</i>
Understanding Other's Emotions	.20	.07	3.01	.003
Managing Other's Emotions	-.01	.07	-.10	.92
Understanding Own Emotions	.09	.07	1.16	.25
Managing Own Emotions	-.21	.08	-2.77	.006

Notes. Standardized estimates reflect effect of being female on the latent factor mean; *d* = Cohen's *d*; statistically significant estimates (*p* < .05) in bold and underlined; *se* = standard error, ζ = z-score, and *p* = probability.

Analysis revealed that females exhibited slightly higher levels of Understanding Other's Emotions than males (*d* = .20, small, *p* = .003), while males exhibited slightly higher levels of Managing Own Emotions (*d* = -.21, small, *p* = .006). No statistically significant differences between males and females were found for the Understanding Own Emotions and Managing Other's Emotions latent variables.

Discussion

The proposed model

This study found low levels of between-school variation in EI among Kazakhstani adolescents. The finding suggests that different school environments have a limited influence on the overall development of EI in the Kazakhstani adolescent school population. The low between-school variation in EI suggests that individual differences play a more significant role than school-level factors in shaping adolescents' EI. Therefore, factors beyond the school environment, such as family dynamics, cultural influences, and personal experiences may have a stronger impact on the development of EI for adolescents in the country (Azpiazu et al., 2023).

The initial purpose for including items with both positive and negative wording in the current study was to avoid acquiescence, affirmation, or agreement bias. However, DeVelis (2012) argues that the disadvantages of including negatively worded items outweigh any benefits (also see, Johanson & Osborn, 2000; Motl et al., 2000). Based on the findings of the current study, it appears that Kazakhstani adolescents may have experienced confusion or difficulty in responding to negatively-worded items related to EI. Therefore, in the future, researchers should consider excluding such items, especially when attempting to gauge EI among adolescents.

Results demonstrate especially strong positive relationships between Understanding Own Emotions and three other factors. Firstly, the coefficient of $r = .81$ (ML estimated coefficient) indicates a very strong positive correlation between Understanding Own Emotions and Managing Own Emotions, which suggests that individuals who possess a deep understanding of their own emotions are more likely to be effective in regulating their emotional responses, supportive of previous findings in the literature (e.g., Harris et al., 2000). In addition, the strong positive correlation ($r = .70$) between Understanding Own Emotions and Understanding Other's Emotions implies that individuals with a high level of emotional self-awareness also demonstrate a greater understanding of the emotions experienced by others. Individuals who possess a strong understanding of their own emotions also appear more capable of managing the emotions of others, as demonstrated by the strong correlation between Understanding Own Emotions and Managing Other's Emotions ($r = .55$).

The Understanding Own Emotions factor encompassed students' capacity to understand their sentiments toward others, the reasons behind their anger, and insight into their own emotional state. These results suggest that there may exist a cluster of emotional understanding pertaining to recognizing one's anger, sentiment toward others, and reasons for attraction/repulsion to others. It may be that these particular personal emotional capacities play an important part in determining how adolescents manage their own emotions, understand others' emotions, and ultimately manage other's emotions. The general pattern of inter-factor correlations in the current study are reflected in a similar first-order measurement model study by Barchard and Christensen (2007). In that study, among the equivalent four (self-other understand-manage) trait EI factors, the strongest correlation was between Recognition of Emotion in the Self and Regulation of Emotion in the Self ($r = .48, p < .01$). The second strongest correlation was between Recognition of Emotion in the Self and Recognition of Emotion in Others ($r = .41, p < .01$), while the correlation between Recognition of Emotion in the Self and Regulation of Emotion in Others was slightly smaller at $r = .35$ ($p < .01$). While these patterns were not discussed explicitly in that paper, they point to the centrality of the Understanding Own Emotions subscale of EI and provide some evidence of construct validity. The pattern of the three correlations in Barchard and Christensen (2007)

and the current study are somewhat expected—one would assume more convergence between the understanding and regulation of self and more divergence between the understanding of self and regulation of others.

The factor Managing Own Emotions has moderate correlations with factors related to understanding and managing others' emotions ($r = .49$ and $.52$, respectively). This suggests that individuals who are adept at *managing* their emotions also tend to have a deeper understanding of others' emotions and the capacity to manage the emotions of others. In general, this suggests that individuals who are proficient in understanding the emotions of others also demonstrate a deep understanding of their own emotional experiences, and generally excel in assisting and supporting others in managing their emotions. It may also be that the ability to comprehend and relate to others' emotions may enhance self-awareness, provide insights into one's own emotional state, enabling more empathy and more appropriate emotional responses to the emotional needs of others (see Juckel et al., 2018).

Effects of gender on EI

The results indicated that the proposed model's general factor structure was comparable for both male and female groups. Therefore, furthermore, subsequent analyses were conducted to examine differences in latent factors between male and female participants. The results, presented in Table 4, indicate that there were slight variations in two out of the four factors based on gender. The female cohort demonstrated a slightly higher level of Understanding Other's Emotions, while male participants exhibited slightly higher levels on Managing Own Emotions factor. No significant differences were found in Managing Other's Emotions or in Understanding Own Emotions. These findings suggest that there are subtle gender differences in certain aspects of one's understanding and managing emotions. Females may have a slight advantage in understanding the emotions of others. This finding is supported by research that suggested that girls exhibit slightly more emotional empathy than boys (Watanabe et al., 2020), while males may exhibit slightly higher levels of self-emotion management (see Cabello et al., 2016, Ngondi et al., 2020, for similar findings). However, it is important to note that the effect sizes for these differences were small, indicating that the practical significance of these findings may be limited.

Future research directions

Currently there are over 30 distinct and widely used measurement approaches for trait EI (O'Connor et al., 2019). However, one fundamental similarity among the EI models is the recognition of emotional awareness and regulation as essential components of EI ability. They all emphasize the capacity to perceive, understand, and manage one's own emotions as well as recognize and empathize with the emotions of others. This focus on emotional awareness and

regulation reflects the core notion that EI involves effectively navigating and utilizing emotions in social interactions and personal well-being. Therefore, our model might represent a first step for validly and reliably measuring EI among adolescents in Central Asia. However, some models rely on self-report questionnaires where individuals rate their emotional experiences and responses. Such models significantly diverge from Self-Other Understand-Manage related models. For example, Schutte Self-Report Emotional Intelligence Test (SREIT; Schutte et al., 1998) assesses EI by including factors related to optimism, emotion assessment, and social skills, whereas the Emotional and Social Competence Inventory (ESCI) model includes dimensions related to self and social awareness. Therefore, new lines of research into EI in Central could also include optimism, emotional assessment, and social skills. Researchers have sought to develop culturally sensitive EI measures to ensure the universality of the construct across diverse populations (Crnički, 2023; Mesquita & Frijda, 1992), and we encourage more research in this area. Furthermore, cross-cultural research that incorporates an examination of multiple post-Soviet and Central Asian countries, such as Ukraine and Kyrgyzstan, would augur well.

Conclusions

The main objective of this study was to explore and identify a suitable model of EI for Kazakhstani adolescents, using

the Lyusin instrumentation as an initial reference. Findings of the study also revealed small but statistically significant gender effects with female students exhibiting slightly higher levels of Understanding Other's Emotions and males exhibiting slightly lower levels of Managing Own Emotions. While the study does have some inherent limitations, i.e., only students from 12 public schools were sampled, not all districts in Kazakhstan were represented, and the study was based on self-reported data, the investigation affords a useful contribution to the literature based on children under-represented in the literature. Understanding gender differences in emotional intelligence among more broad population groups could provide valuable insights into how emotional abilities are influenced by gender-related factors and inform interventions or support strategies tailored to each gender. Moreover, ultimately, well-developed EI instruments could serve as a valuable tool for educators, counselors, and policymakers in designing targeted interventions to improve EI and the well-being of adolescents in the region.

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References

- Abdollahi, A., Hosseinian, S., Panahipour, H., Najafi, M., & Soheili, F. (2019). Emotional intelligence as a moderator between perfectionism and happiness. *School Psychology International*, 40(1), 88-103. <https://doi.org/10.1177/0143034318807959>
- Adilzhanova, K., Yermenayeva, A., Yermenova, B., Zharmukhametova, R., & Kulmysheva, N. (2024). The features of development of subjective well-being in adolescence. *Scientific Herald of Uzhborod University*, 55, 336-344. <https://doi.org/10.54919/physics/55.2024.33ke6>
- Atamanova, I. V., & Bogomaz, S. A. (2018, October). *Emotional intelligence in linguistic students majoring in languages belonging to different language groups* [paper presentation]. 8th International Conference on Cognitive Science, Svetlogorsk, Russia. <https://vital.lib.tsu.ru/vital/access/services/Download/vtls:000660833/SOURCE1>
- Azpiazu, L., Antonio-Agíre, I., Fernández-Zabala, A., & Escalante, N. (2023). How does social support and emotional intelligence enhance life satisfaction among adolescents? A mediational analysis study. *Psychology Research and Behavior Management*, 16, 2341-2351. <https://doi.org/10.2147/PRBM.S413068>
- Barchard, K. A., & Christensen, M. M. (2007). Dimensionality and higher-order factor structure of self-reported emotional intelligence. *Personality and Individual Differences*, 42(6), 971-985. <https://doi.org/10.1016/j.paid.2006.09.007>
- Bar-On, R. (2006). The Bar-On model of emotional-social intelligence (ESI) 1. *Psicothema*, 18, 13-25.
- Butvilas, T., & Kovaitė, K. (2022). The expression of socio-emotional competence among younger Lithuanian adolescents as the precondition for their creativity. *Creativity Studies*, 15(2), 497-510. <https://doi.org/10.3846/cs.2022.16630>
- Boyatzis, R. E., & Goleman, D. (2007). *Emotional and Social Competency Inventory*. The Hay Group.
- Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Lawrence Erlbaum Associates.
- Cabello, R., Sorrel, M. A., Fernández-Pinto, I., Extremera, N., & Fernández-Berrocal, P. (2016). Age and gender differences in ability emotional intelligence in adults: A cross-sectional study. *Developmental Psychology*, 52(9), 1486-1492. <https://doi.org/10.1037/dev0000191>
- Câmara, S. G., Carlotto, M. S., Cabello, R., & Fernández-Berrocal, P. (2023). Adaptation and validity of the Trait Meta-Mood scale for Brazilian adolescents. *Frontiers in Psychology*, 14, 1058426. <https://doi.org/10.3389/fpsyg.2023.1058426>
- Castillo-Gualda, R., Cabello, R., Herrero, M., Rodríguez-Carvajal, R., & Fernández-Berrocal, P. (2018). A three-year emotional intelligence intervention to reduce adolescent aggression: The mediating role of unpleasant affectivity. *Journal of Research on Adolescence*, 28(1), 186-198. <https://doi.org/10.1111/jora.12325>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233-255. https://doi.org/10.1207/S15328007SEM0902_5
- Ciarrochi, J., Chan, A. Y., & Bajgar, J. (2001). Measuring emotional intelligence in adolescents. *Personality and Individual Differences*, 31(7), 1105-1119. [https://doi.org/10.1016/S0191-8869\(00\)00207-5](https://doi.org/10.1016/S0191-8869(00)00207-5)
- Costa, A., & Faria, L. (2024). Individualist-collectivist profiles in secondary school: An exploratory study of trait emotional intelligence and academic achievement. *European Journal of Psychology in Education*, 39, 2783-2803. <https://doi.org/10.1007/s10212-024-00879-6>
- Crnički, P. (2023). *Empowering cross-cultural kids-bridging the international emotional gap* [Doctoral dissertation, University of Zagreb, Faculty of Teacher Education].
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334. <https://doi.org/10.1007/BF02310555>

- D'Amico, A., & Geraci, A. (2022). Sex differences in emotional and meta-emotional intelligence in pre-adolescents and adolescents. *Acta Psychologica*, 227, 103594. <https://doi.org/10.1016/j.actpsy.2022.103594>
- DeVellis, R. F. (2012). *Scale development: Theory and applications* (3rd ed.). Thousand Oaks, CA: Sage.
- El Ghoudani, K., Pulido-Martos, M., & Lopez-Zafra, E. (2018). Measuring emotional intelligence in Moroccan Arabic: The Wong and Law emotional intelligence scale [Medidas de la inteligencia emocional en árabe marroquí: La escala de inteligencia emocional de Wong y Law]. *Revista de Psicología Social*, 33(1), 174-194. <https://doi.org/10.1080/02134748.2017.1385243>
- Pacheco, N. E., Rey, L., & Sánchez-álvarez, N. (2019). Validation of the Spanish version of the Wong Law Emotional Intelligence Scale (WLEIS-S). *Psicothema*, 31(1), 94-100. <https://doi.org/10.7334/psicothema2018.147>
- Extremera, N., Rey, L., Quintana-Orts, C., Mérida-López, S., & Neto, F. (2023). A 4-month prospective study of the relationship between emotional intelligence and suicide ideation in Spanish adolescents: The mediating role of positive and negative affect. *Death Studies*, 47(4), 509-513. <https://doi.org/10.1080/07481187.2022.2072019>
- Fan, X., & Sivo, S. A. (2005). Sensitivity of fit indices to misspecified structural or measurement model components: Rationale of two-index strategy revisited. *Structural Equation Modeling*, 12(3), 343-367. https://doi.org/10.1207/s15328007sem1203_1
- Fan, X., & Sivo, S. A. (2007). Sensitivity of fit indices to model misspecification and model types. *Multivariate Behavioral Research*, 42(3), 509-529. <https://doi.org/10.1080/00273170701382864>
- Fan, X., Thompson, B., & Wang, L. (1999). Effects of sample size, estimation methods, and model specification on structural equation modeling fit indexes. *Structural Equation Modeling*, 6(1), 56-63. <https://doi.org/10.1080/10705519909540119>
- Fernández-Berrocá, P., & Extremera, N. (2006). Emotional intelligence: A theoretical and empirical review of its first 15 years of history. *Psicothema*, 18(Suppl.), 7-12.
- Gómez-Núñez, M. I., Torregrosa, M. S., Inglés, C. J., San Martín, N. G. L., Sanmartín, R., Vicent, M., & García-Fernández, J. M. (2020). Factor invariance of the Trait Meta-Mood Scale-24 in a sample of Chilean adolescents. *Journal of Personality Assessment*, 102(2), 231-237. <https://doi.org/10.1080/00223891.2018.1505730>
- Gong, X., & Paulson, S. E. (2018). Validation of the Schutte self-report emotional intelligence scale with American college students. *Journal of Psychoeducational Assessment*, 36(2), 175-181. <https://doi.org/10.1177/0734282916669245>
- Gutiérrez-Cobo, M. J., Cabello, R., & Fernández-Berrocá, P. (2016). The relationship between emotional intelligence and cool and hot cognitive processes: a systematic review. *Frontiers in Behavioral Neuroscience*, 10, 101. <https://doi.org/10.3389/fnbeh.2016.00101>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson.
- Harris, P. L. (2000). Understanding emotion. In M. Lewis & J. Haviland-Jones (Eds.), *Handbook of emotions* (2nd ed., pp. 281-292). The Guilford Press.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Henseler, J., Ringle, C. M. & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115-135 (2015). <https://doi.org/10.1007/s11747-014-0403-8>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1-55. <https://doi.org/10.1080/10705519909540118>
- Huynh, A.C., Oakes, H., & Grossmann, I. (2018). The Role of Culture in Understanding and Evaluating Emotional Intelligence. In: Keefer, K., Parker, J., Saklofske, D. (eds) *Emotional Intelligence in Education*. The Springer Series on Human Exceptionality. Springer, Cham. https://doi.org/10.1007/978-3-319-90633-1_5
- Ihnatovych, E., & Liashch, O. (2020). The psychological patterns of emotional intelligence development in adolescence as a condition of personal mental health. *Psychiatry, Psychotherapy and Clinical Psychology*, 11(4), 802-811.
- Iliceto, P., & Fino, E. (2017). The Italian version of the Wong-Law Emotional Intelligence Scale (WLEIS-I): A second-order factor analysis. *Personality and Individual Differences*, 116, 274-280. <https://doi.org/10.1016/j.paid.2017.05.006>
- Johanson, G. A., & Osborn, C. J. (2000). Acquiescence as differential person functioning. *Assessment & Evaluation in Higher Education*, 29(5), 535-548. <https://doi.org/10.1080/02602930410001689126>
- Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., & Rosseel, Y. (2022). *semTools: Useful tools for structural equation modeling*. R package version 0.5-6. <https://CRAN.R-project.org/package=semTools>
- Jose, B., & Thomas, A. (2024) Navigating the Research Landscape of Emotional and Social Intelligence Among Young Adults: A Bibliometric Perspective. *Cureus* 16(4): e59130. <https://doi.org/10.7759/cureus.59130>
- Joseph, D. L., & Newman, D. A. (2010). Emotional intelligence: An integrative meta-analysis and cascading model. *Journal of Applied Psychology*, 95(1), 54-78. <https://doi.org/10.1037/a0017286>
- Joseph, D. L., Jin, J., Newman, D. A., & O'Boyle, E. H. (2015). Why does self-reported emotional intelligence predict job performance? A meta-analytic investigation of mixed EI. *Journal of Applied Psychology*, 100(2), 298-342. <https://doi.org/10.1037/a0037681>
- Juckel, G., Heinisch, C., Welpinghus, A., & Brüne, M. (2018). Understanding another person's emotions—an interdisciplinary research approach. *Frontiers in Psychiatry*, 9(414), 1-7. <https://doi.org/10.3389/fpsyt.2018.00414>
- Karabuschenko, N. B., Ivashchenko, A. V., Sungurova, N. L., & Hovorova, E. M. (2016). Emotion recognition in different cultures. *Indian Journal of Science and Technology*, 9(48), 1-17. <https://doi.org/10.17485/ijst/2016/v9i48/109085>
- Kong, F. (2017). The validity of the Wong and Law Emotional Intelligence Scale in a Chinese sample: Tests of measurement invariance and latent mean differences across gender and age. *Personality and Individual Differences*, 116, 29-31. <https://doi.org/10.1016/j.paid.2017.04.025>
- LaPalme, M. L., Wang, W., Joseph, D. L., Saklofske, D. H., & Yan, G. (2016). Measurement equivalence of the Wong and Law Emotional Intelligence Scale across cultures: An item response theory approach. *Personality and Individual Differences*, 90, 190-198. <https://doi.org/10.1016/j.paid.2015.10.045>
- Law, K. S., Wong, C. S., & Song, L. J. (2004). The construct and criterion validity of emotional intelligence and its potential utility for management studies. *Journal of Applied Psychology*, 89(3), 483-496. <https://doi.org/10.1037/0021-9010.89.3.483>
- Li, T., Saklofske, D. H., Bowden, S. C., Yan, G., & Fung, T. S. (2012). The measurement invariance of the Wong and Law Emotional Intelligence Scale (WLEIS) across three Chinese university student groups from Canada and China. *Journal of Psychoeducational Assessment*, 30(4), 439-452. <https://doi.org/10.1177/0734282912449449>
- Llamas-Díaz, D., Cabello, R., Megías-Robles, A., & Fernández-Berrocá, P. (2022). Systematic review and meta-analysis: The association between emotional intelligence and subjective well-being in adolescents. *Journal of Adolescence*, 94(7), 925-938. <https://doi.org/10.1002/jad.12075>
- Lyusin, D. V. (2006). A new method for measuring emotional intelligence: The EmIn questionnaire. *Psychological Diagnostics*, 4, 3-22. https://www.researchgate.net/publication/311706448_Novaa_metodi_ka_dla_izmerenia_emocionalnogo_intellekta_oprosnik_EmIn
- MacCann, C., Jiang, Y., Brown, L. E. R., Double, K. S., Bucich, M., & Minbashian, A. (2020). Emotional intelligence predicts academic performance: A meta-analysis. *Psychological Bulletin*, 146(2), 150-186. <https://doi.org/10.1037/bul0000219>
- Maria, A.-S., Bourdier, L., Ducloux, J., Ringuenet, D., & Berthoz, S. (2016). Psychometric properties of the French version of a scale measuring perceived emotional intelligence: The Trait Meta-Mood Scale (TMMS) [Propriétés psychométriques de la version française d'une échelle de mesure de l'intelligence émotionnelle perçue: la Trait Meta-Mood Scale (TMMS)]. *Canadian Journal of Psychiatry*, 61(10), 652-662. <https://doi.org/10.1177/0706743716639936>
- Martins, A., Ramalho, N., & Morin, E. (2010). A comprehensive meta-analysis of the relationship between emotional intelligence and health.

- Personality and Individual Differences*, 49(6), 554-564. <https://doi.org/10.1016/j.paid.2010.05.029>
- Mayer, J. D. & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. Sluyter (Eds), *Emotional development and emotional intelligence: Implications for educators* (pp. 3-31). Basic Books.
- Mayer, J. D., Salovey, P., & Caruso, D. R. (n.d.). Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT™) [Database record]. *APA PsycTests*. <https://doi.org/10.1037/t05047-000>
- Megías-Robles, A., Gutiérrez-Cobo, M. J., Fernández-Berrocal, P., Gómez-Leal, R., & Cabello, R. (2024). The development of ability emotional intelligence during adolescence. *Personality and Individual Differences*, 224, 112642. <https://doi.org/10.1016/j.paid.2024.112642>
- Mesquita, B., & Frijda, N. H. (1992). Cultural variations in emotions: A review. *Psychological Bulletin*, 112(2), 179-204. <https://doi.org/10.1037/0033-2909.112.2.179>
- Mestre, J. M., Guil, R., Lopes, P. N., Salovey, P., & Gil-Olarte, P. (2006). Emotional intelligence and social and academic adaptation to school. *Psicothema*, 18(Suppl), 112-117.
- Miao, C., Humphrey, R. H., & Qian, S. (2017). Are the emotionally intelligent good citizens or counterproductive? A meta-analysis of emotional intelligence and its relationships with organizational citizenship behavior and counterproductive work behavior. *Personality and Individual Differences*, 116, 144-156. <https://doi.org/10.1016/j.paid.2017.04.015>
- Modt, R. W., Conroy, D. E., & Horgan, P. M. (2000). The social physique anxiety scale: An example of the potential consequence of negatively-worded items in factorial validity studies. *Journal of Applied Measurement*, 1(4), 327-345.
- Nassar, Y. H., Alharballeh, S., & Dodeen, H. M. (2023). A cross-national study of the emotional intelligence of young adults in the Middle East. *Journal of Applied Research in Higher Education*. <https://doi.org/10.1108/JARHE-02-2023-0059>
- Ngondi, R., Khasakhala, L., & Yugi, P. (2020). Emotional intelligence in relation to gender among secondary school students in Athi-River sub-county, Kenya. *African Research Journal of Education and Social Sciences*, 7(1), 35-44.
- O'Connor, P. J., Hill, A., Kaya, M., & Martin, B. (2019). The measurement of emotional intelligence: A critical review of the literature and recommendations for researchers and practitioners. *Frontiers in Psychology*, 10(1116). <https://doi.org/10.3389/fpsyg.2019.01116>
- Pacheco, N. E., Rey, L., & Sánchez-Álvarez, N. (2019). Validation of the Spanish version of the Wong Law Emotional Intelligence Scale (WLEIS-S) [Validación de la versión española de la escala de inteligencia emocional de Wong y Law (WLEIS-S)]. *Psicothema*, 31(1), 94-100. <https://doi.org/10.7334/psicothema2018.147>
- Pedrosa, I., Suárez-Álvarez, J., Lozano, L. M., Muñoz, J., & García-Cueto, E. (2014). Assessing perceived emotional intelligence in adolescents: New validity evidence of Trait Meta-Mood Scale-24. *Journal of Psychoeducational Assessment*, 32(8), 737-746. <https://doi.org/10.1177/0734282914539238>
- Petrides, K. V. (2009). *Technical manual for the Trait Emotional Intelligence Questionnaires (TEIQue)*. London: London Psychometric Laboratory.
- Petrides, K. V. (2011). Ability and trait emotional intelligence. In Chamorro-Premuzic, T., Furnham, A., & von Stumm, S. (Eds.), *The Blackwell-Wiley Handbook of Individual Differences*. Wiley.
- Petrides, K. V., Pita, R., & Kokkinaki, F. (2007). The location of trait emotional intelligence in personality factor space. *British Journal of Psychology*, 98(2), 273-289. <https://doi.org/10.1348/000712606X120618>
- Puertas-Molero, P., Zurita Ortega, F., Chacón Cuberos, R., Castro Sánchez, M., Ramírez Granizo, I. A., & Gonzalez Valero, G. (2020). *Emotional intelligence in the field of education: a meta-analysis*. <https://doi.org/10.6018/analesps.345901>
- R Core Team. (2023). R: *A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1-36. <https://doi.org/10.18637/jss.v048.i02>
- Robitzsch, A. (2020). Why ordinal variables can (almost) always be treated as continuous variables: Clarifying assumptions of robust continuous and ordinal factor analysis estimation methods. *Frontiers in Education*, 5, 1-7. <https://doi.org/10.3389/educ.2020.589965>
- Salavera, C., & Usán, P. (2022). The relationship between eudaimonic well-being, emotional intelligence and affect in early adolescents. *Current Psychology*, 41(10), 6945-6953. <https://doi.org/10.1007/s12144-020-01208-y>
- Salovey, P., & Mayer, J. D. (1989). Emotional intelligence. *Imagination, Cognition and Personality*, 9(3), 185-211. <https://doi.org/10.2190/DUGG-P24E-52WK-6CDG>
- Salovey, P., Mayer, J. D., Goldman, S. L., Turvey, C., & Palfai, T. P. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta-Mood Scale. In J. W. Pennebaker (Ed.), *Emotion, disclosure, & health* (pp. 125-154). American Psychological Association. <https://doi.org/10.1037/10182-006>
- Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child & Adolescent Health*, 2(3), 223-228. [https://doi.org/10.1016/S2352-4642\(18\)30022-1](https://doi.org/10.1016/S2352-4642(18)30022-1)
- Schutte, N. S., Malouff, J. M., Hall, L. E., Haggerty, D. J., Cooper, J. T., Golden, C. J., & Dornheim, L. (1998). Development and validation of a measure of emotional intelligence. *Personality and Individual Differences*, 25, 167-177. [https://doi.org/10.1016/S0191-8869\(98\)00001-4](https://doi.org/10.1016/S0191-8869(98)00001-4)
- Siegling, A. B., Saklofske, D. H., & Petrides, K. V. (2015). Measures of ability and trait emotional intelligence. In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *Measures of Personality and Social Psychological Constructs*. Academic Press. <https://doi.org/10.1016/B978-0-12-386915-9.00014-0>
- Smirnova, S. V. (2017). *Psychological characteristics of students of the linguistic profile studying English and Chinese languages* [paper presentation]. XXVII international Scientific Conference Language and Culture. Tomsk, Russia.
- Somaa, F., Asghar, A., & Hamid, P. F. (2021) Academic Performance and Emotional Intelligence with Age and Gender as Moderators: A Meta-analysis. *Developmental Neuropsychology*, 46(8), 537-554. <https://doi.org/10.1080/87565641.2021.1999455>
- Soriano-Sánchez, J. G. & Jiménez-Vázquez, D. (2023). Benefits of emotional intelligence in school adolescents: A systematic review. *Revista de Psicología y Educación*, 18(2), 83-95. <https://doi.org/10.23923/rpye2023.02.237>
- Taibolotov, K. M., Pfeyfer, N. E., Burdina, E. I., Kudysheva, A. A., & Bolatov, A. K. (2024). The role of emotional intelligence on academic motivation of schoolchildren. *Frontiers in Education*, 9, 1265946. <https://doi.org/10.3389/educ.2024.1265946>
- Tejada-Gallardo, C., Blasco-Belled, A., Torrelles-Nadal, C., & Alsinet, C. (2022). How does emotional intelligence predict happiness, optimism, and pessimism in adolescence? Investigating the relationship from the bifactor model. *Current Psychology*, 41(8), 5470-5480. <https://doi.org/10.1007/s12144-020-01061-z>
- Watanabe, Y., Motomura, Y., Saeki, R. (2020). Development of emotional literacy and empathy among elementary-aged Japanese children. *International Journal of School and Educational Psychology*, 10(3), 316-335. <https://doi.org/10.1080/21683603.2020.1837699>
- Winter, L., Hernández-Torrano, D., McLellan, R., Almukhambetova, A., & Brown-Hajdukova, E. (2022). A contextually adapted model of school engagement in Kazakhstan. *Current Psychology*, 41(4), 2479-2495. <https://doi.org/10.1007/s12144-020-00758-5>
- Wong, C. S., & Law, K. S. (2002). The effects of leader and follower emotional intelligence on performance and attitude: An exploratory study. *The Leadership Quarterly*, 13(3), 243-274. [https://doi.org/10.1016/S1048-9843\(02\)00099-1](https://doi.org/10.1016/S1048-9843(02)00099-1)
- Yanagida, T. (2023). *misty: Miscellaneous Functions T. Yanagida*. R package version 0.4.11. <https://CRAN.R-project.org/package=misty>

Appendix A. R code for test

In <https://revistas.um.es/analesps/libraryFiles/downloadPublic/17241>

Appendix B

