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ORIGINAL PAPER

# Basque Adaptation of the Reduced Kentucky Inventory of Mindfulness Skills (KIMS-R)

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## Abstract

**Objectives** Mindfulness consists of paying attention to the present moment with curiosity, acceptance and non-judgment. Although several instruments exist for evaluating mindfulness in adults, few have been adapted for children, and even fewer have been adapted to the Basque language. The aim of the present study is to adapt the Reduced Kentucky Inventory of Mindfulness Skills (KIMS-R) questionnaire for use with Basque-speaking children.

**Method** A total of 479 children from the last 2 years of primary education (Years 5 and 6), aged between 9 and 12 years, participated in this study. The sample was divided into two subgroups: exploratory subsample ($n = 237$) and confirmatory subsample ($n = 242$). In addition to the KIMS-R, we also administered other questionnaires to measure mindfulness, perceived stress, emotional skills, neuroticism and depression.

**Results** The analysis showed that the adapted questionnaire was reliable, with scores measuring consistency and stability in acceptable ranges. The analysis revealed a 5-factor structure (Internal observation, External observation, Description, Acting with awareness and Acceptance without judgment). These dimensions showed acceptable internal consistency ($\alpha$ between 0.69 and 0.83; $\omega$ between 0.69 and 0.83) and temporal stability ($r = 0.54, 0.64, 0.79, 0.40, 0.59$). The instrument was also found to have adequate external validity, with associations being observed between mindfulness and emotional abilities, perceived stress, neuroticism and depression.

**Conclusions** The Basque version of the KIMS-R will enable scholars to assess the ability of children in the Basque Autonomous Community to be mindful. It will also be useful for evaluating the effectiveness of interventions designed to promote mindfulness skills. This adaptation of the KIMS-R instrument can be considered a step forward in the field of mindfulness research.

**Preregistration** This study is not preregistered.

**Keywords** Mindfulness · Childhood · Basque · Adaptation · Validation

In today's society, young children are often exposed to highly stressful situations (for example, difficulty with school work, increased pressure/responsibility at home and separation from parents) (Herzog & Schmahl, 2018). It is, therefore, necessary to design and implement interventions to foster the development of cognitive, behavioural and emotional strategies during childhood (Constantino & Espada, 2021; Davis & Hayes, 2011). Research has shown

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that mindfulness is an effective technique for this purpose and projects based on mindfulness have been implemented in several countries both inside and outside the classroom (Portele & Jansen, 2023). For example, Rice et al. (2023) incorporated a mindfulness intervention into the school-day curriculum, and it revealed improvements associated with behavioural control, motor control and cognitive control.

Although the body of mindfulness-based literature is growing rapidly, the evaluation of mindfulness skills has received less attention. In order to understand the nature of full attention in childhood and adolescence and to be able to design, implement and evaluate interventions based on mindfulness, it is essential to build and/or adapt instruments to these age groups. It should also be noted that no instruments are yet available in the Basque language to evaluate this construct reliably and usefully at any developmental stage.

Mindfulness is understood to mean "full attention". The technique is classified as a type of third-generation therapy and has its roots in various meditation techniques based on Buddhist spiritual practices (Aguila, 2020; Laurent et al., 2021). During the third decade of the twentieth century, attempts were made to introduce meditation into psychotherapy, but it was not until 1975 that any studies on mindfulness were published. From 2002 onwards, it began to gain in popularity, attracting the interest of many researchers and clinicians (Khoury et al., 2019).

The most popular definition of the term mindfulness is that proposed by Jon Kabat-Zinn, the pioneer who established the concept of full attention in the field of science. He defined it as follows: "with an attitude of acceptance and openness, voluntary and non-judgmental attention to the thoughts, sensations and actions of the moment" (Kabat-Zinn, 1990, 2003). He also defined the characteristics of mindfulness practice: (a) tolerance or patience (waiting for things to develop in their own time); (b) "the curiosity of the novice" (examining and experiencing everything that happens as if it were the first time); (c) self-confidence (listening to oneself); (d) lack of effort (not seeing the practice of mindfulness as necessary); (e) acceptance (accepting things as they are and not trying to change them); and (f) not adhering to experiences (not clinging to ideas, sensations and results). Moreover, he developed and implemented the Mindfulness-Based Stress Reduction therapy (MBSR; Kabat-Zinn, 1982, 1990). This definition and intervention have been taken as a key reference for researchers studying mindfulness (Baer, 2003; Bishop et al., 2004; Germer, 2005; Pratscher et al., 2019; Simón, 2010).

In short, mindfulness encourages practitioners to reflect on their emotions, thoughts and bodily sensations (Cook, 2016). This involves an awareness of one's breathing and senses (Galla et al., 2016) and a feeling of freedom from other thoughts, thereby helping to reduce stress, anxiety, pain, unhappiness and fear (Cordeiro et al., 2021). In an educational setting, introducing mindfulness practices to students holds the promise of improving children's self-awareness, concentration, self-control and ability to navigate social relationships (Andreu et al., 2021).

Empirical evidence has confirmed that mindfulness is a suitable and useful technique for helping children to acquire cognitive and social-emotional skills from an early age and to approach life more consciously and effectively (Mañas et al., 2014; Nhat, 2015). Indeed, emotional education has been found to promote psychological well-being and all-around development (Djambazova-Popordanoska, 2016; Schoeps et al., 2018).

Mindfulness can also result in neurological changes, triggering modifications in the attention network and frontostriatal circuit, as well as in cortical thickness and at the level of neurotransmitters (Forcadell et al., 2016). It also activates the frontal and subcortical areas of the brain, improving sustained attention and emotion regulation (Rubia, 2009). Moreover, the practice of meditation stimulates the limbic system, increasing the production of endorphins and generating a sensation of euphoria and happiness (Aftanas & Golocheikine, 2002; Lou et al., 1999). Moscoso and Lengacher (2015) found that mindfulness resulted in several changes, including control of attention (activation of the anterior cingulate cortex), development of relaxation (increased vagal tone), improvement of emotion regulation (prefrontal cortex) and cognitive reassessment (dorsolateral cortex).

The practice of mindfulness facilitates the focalization of attention, improving concentration (Semple et al., 2017; Wimmer et al., 2016). It also enhances students' memory and academic performance (Lin & Mai, 2018; McCloskey, 2015). In general, mindfulness has been associated with improvements in executive function (Maynard et al., 2017).

In the emotional-affective field, mindfulness has been found to improve emotional well-being (Wu et al., 2019). Moreover, in addition to promoting emotional balance (Goyal et al., 2014), it enhances the individual's ability to fight against stress, depression and anxiety (Hoge et al., 2014) and fosters emotion regulation (Sibinga et al., 2014) and inhibition (Oberle et al., 2012), optimism, social skills, self-esteem, self-awareness and emotional resilience (Semple et al., 2010).

Consequently, if we develop mindfulness skills from childhood, we will have a greater chance of becoming freer, more responsible and happier people. This in turn would allow us to build a more positive life, developing the ability to transform negative emotions and achieve a higher level of well-being (Arguís et al., 2011).

Mindfulness has been taught and practiced mainly in adulthood and several instruments have been developed to assess it during this life stage. Some evaluate mindfulness

through a single dimension: (1) the *Freiburg Mindfulness Inventory* (FMI; Buchheld et al., 2001) and (2) the *Mindful Attention Awareness Scale* (MAAS; Brown & Ryan, 2003). Others, in contrast, adopt a two-dimensional perspective: (1) the *Toronto Mindfulness Scale* (TMS; Lau et al., 2006), (2) the *Philadelphia Mindfulness Scale* (PHLMS; Cardaciotto et al., 2008), (3) the *State Mindfulness Scale* (SMS; Tanay & Bernstein, 2013) and (4) the *Menstrual Practices Questionnaire* (MP-Q; Hennegan et al., 2020). Finally, another set of instruments evaluates mindfulness using multiple dimensions. Some of these focus on momentary actions (relaxation, sensory awareness, contemplation and introspection) and personality traits (openness to experiences, mystical experiences, search for novelty, flexibility and commitment): (1) the *Cognitive and Affective Mindfulness Scale* (CAMS; Feldman et al., 2007), (2) the *Southampton Mindfulness Questionnaire* (SMQ; Chadwick et al., 2010), (3) the *Langer Mindfulness Scale* (LMS; Langer, 2004), (4) the *Effects of Meditation* scale (EOM; Reavley & Pallant, 2009) and (5) the *Comprehensive Inventory Mindfulness Experiences* (CHIME; Bergomi et al., 2013). There are also two other multidimensional assessment instruments based on the multifactorial model developed by Bishop et al. (2004): (1) the *Kentucky Inventory of Mindfulness Skills* (KIMS; Baer et al., 2004) and (2) the *Five Facet Mindfulness Questionnaire* (FFMQ; Baer et al., 2006).

Despite the many instruments available for adults, to date, few have been developed to assess mindfulness in children and adolescents. Over recent years, efforts have been made to rectify this situation, although the instruments developed are often adaptations of scales originally designed for adults. For example, the *Mindful Attention Awareness Scale for Adolescents* (MAAS-A; Brown et al., 2011) and the *Mindful Attention Awareness Scale for Children* (MAAS-C; Lawlor et al., 2013) are both derived from the MAAS scale. However, some instruments have not been adapted from an adult scale, but rather specifically designed for children: (1) the *Child and Adolescent Mindfulness Measure* (CAMM; Greco et al., 2011), (2) the *Full Attention Scale in the School Environment* (EAP; León del Barco, 2008) and (3) the *Relaxation-Mindfulness Scale for Adolescents* (EREMIND-A; López-González et al., 2016).

In sum, although several instruments exist for evaluating mindfulness in adults, few have been adapted for children and, to date, none has been adapted to the Basque language. Therefore, it is necessary to adapt evaluation instruments for use with Basque-speaking children for two reasons. First, executive functions are in full structural and functional development between the ages of 7 and 12 (Best & Miller, 2010). Consequently, as psychic activity develops during childhood, the cognitive processes necessary for regulating behaviour, thought and emotions are upgraded, and the cognitive processes necessary for working memory and inhibitory control are promoted, improving the individual's ability to pay attention (Zelazo & Carlson, 2012). For this reason, interventions based on the acquisition of emotion regulation skills (such as mindfulness) are gaining strength in the field of education. Likewise, full attention is effective in fostering cognitive-social-emotional development. It is therefore necessary to have reliable evaluation instruments that can be used with children. Second, a large percentage of children in the Basque Country study in a teaching model taught entirely in Basque (model D), with Spanish and English as additional subjects. It is therefore necessary to create or adapt evaluation instruments in/to that language. Consequently, the aim of the present study is to adapt the Reduced Kentucky Inventory of Mindfulness Skills (KIMS-R) for use with children in the Basque language.

## Method

### Participants

A total of 479 children from the last 2 years of primary education (Years 5 and 6), aged between 9 and 12 years, participated in this study to develop the Basque version of the KIMS-R and analyse its factor structure and reliability. The sample distribution was as follows: $M_{age}$ = 10.64 years; $SD$ = 0.69; a good balance was obtained in terms of both genders (53.7% girls; 46.3% boys); and academic level (47.2% students from year 5; 52.8% students from year 6).

The cross-validation research sample was divided into two subgroups: (1) exploratory subsample ($n$= 237; $M_{age}$= 10.67 years; $SD$= 0.70; 50.4% girls and 49.6% boys) and (2) confirmatory subsample ($n$ = 242; $M_{age}$ = 10.61 years; $SD$ = 0.68; 57% girls and 43% boys). In contrast, the entire sample group participated in testing the external validity of the instrument.

### Procedure

Based on the theoretical model proposed by Kabat-Zinn (1990) for defining full attention, other researchers began to create evaluation tools to measure mindfulness. Mindfulness is understood as attention to the thoughts, sensations and actions of the moment, adopting an attitude of acceptance and openness (Kabat-Zinn, 2015; Pratscher et al., 2019).

#### Item Adaptation

The adaptation process of the KIMS-R for Basque speakers meticulously adhered to established standards recognized by the scientific community (Balluerka et al., 2007; Hambleton & Patsula, 1999). Following these guidelines, the translation of the questionnaire into Basque employed a rigorous

forward and backward translation method. All items from the English version were translated into Basque by two proficient bilingual professionals, well-versed in both English and Basque and trained in the fundamental psychometric aspects of instrument construction. The two independent translations were systematically compared, and a consensus was reached to create a single version for each item. Subsequently, two additional linguists, also proficient in both languages, performed a back translation of the items from Basque to English. A meticulous analysis of meaning equivalence ensued, wherein the four members of the translation team compared each adapted item with the original version. Any discrepancies were scrutinized, and, if necessary, adjustments were made to ensure semantic and conceptual alignment.

Additionally, the age adaptation of the questionnaire was meticulously conducted, taking into account the developmental nuances of executive functions among children aged between 9 and 12. This rigorous process underscores the commitment to achieving linguistic and cultural equivalence in the Basque adaptation of the KIMS-R, thereby enhancing the validity and reliability of the instrument.

### Content Validity

Once the 20 items had been translated into Basque and adapted to the target age group, a group of professionals who were experts in mindfulness and children's social-emotional skills evaluated their content validity. Of these professionals, 50% were experts in mindfulness techniques and the rest (50%) were experts in children's social-emotional skills. The experts were charged with two main tasks; first, to determine the appropriateness of the items, analysing their ability to measure the construct (1 = *Not suitable at all*, 2 = *Slightly suitable*, 3 = *Somewhat suitable*, 4 = *Very suitable*). Their second task was to assign the items to the appropriate theoretical dimension (Observation, Description, Acting with awareness or Acceptance without judgment). Inter-rater agreement was calculated using Cohen's kappa coefficient, with the result being adequate ($\kappa = 0.84$).

All 20 items of the questionnaire were selected (Table 1), since they were all classified as "somewhat suitable" or "very suitable" (i.e., a score of 3 points or more out of 4) and all were assigned to their corresponding dimension. The original 5-point Likert-type scale (1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*, 5 = *Always*) was transformed into a 4-point scale (1 = *Never*, 2 = *Rarely*, 3 = *Often*, 4 = *Always*) to avoid an excessive tendency towards neutral responses (Martínez-Arias et al., 2006).

### Pilot Study

A pilot study was carried out with 88 students from the Basque Country (44.3% girls and 55.7% boys) aged between 9 and 12 years ($M_{age} = 10.58$; $SD = 0.65$). We calculated the means and standard deviations: (a) Observation ($M = 13.69$, $SD = 2.86$); (b) Description ($M = 13.23$, $SD = 2.31$); (c) Acting with awareness ($M = 10.69$, $SD = 1.99$) and Acceptance without judgment ($M = 14.68$, $SD = 3.52$), along with the range of discrimination indices: from 0.26 to 0.76 for the Observation dimension; from 0.37 to 0.82 for Description; from 0.66 to 0.95 for Acting with awareness; and from 0.82 to 0.94 for Acceptance without judgment.

Since the first two items had a mean discrimination index rate, we decided to reformulate them. The first item "When I'm walking, I deliberately notice the sensations of my body moving" was replaced with "When I'm walking, I pay attention to how my body moves". The second item "When I take a shower or a bath, I stay alert to the sensations of water on my body" was changed to "When I take a shower, I pay attention to how the water flows down my body". The other items remained unchanged. Once the changes required by the pilot study had been made, the next step was to validate the KIMS-R instrument. To this end, in addition to the KIMS-R, we also administered a battery of other questionnaires (EAP, IECI, TMMS-23, NEO PI-R and CDS).

## Measures

### Reduced Kentucky Inventory of Mindfulness Skills (KIMS-R)

Kentucky Inventory of Mindfulness Skills (KIMS-R; Baer et al., 2004) was a multidimensional measure of everyday skills related to full attention. The questionnaire contains a total of 39 items, divided into 4 subscales: (a) Observation: measures the level of attention paid to external events and internal emotions, sensations and cognitions ("When I take a shower or a bath, I stay alert to the sensations of water on my body"), (b) Description: evaluates the individual's ability to describe external and internal experiences ("I'm good at finding the words to describe my feelings"), (c) Acting with awareness: observes the individual's ability to be completely attentive to the moment ("I tend to do several things at once rather than focusing on one thing at a time"), and (d) Acceptance without judgment: measures the individual's self-judgmental behaviour ("I make judgments about whether my thoughts are good or bad"). Items are rated on a 5-point Likert-type scale, with responses ranging from 1 = *Never or very rarely* to 5 = *Very often or always* (Medvedev et al., 2016).

The four factors evaluated in this questionnaire (Observation, Description, Acting with awareness and Acceptance without judgment) were defined by researchers who were experts in stress reduction and mindfulness (Goldstein, 2002; Kabat-Zinn, 1982; Linehan, 1993; Segal et al., 2002). Indeed, these components are one of the main strengths of mindfulness.

**Table 1** Items of the Basque version of the KIMS-R

| |
|---|
| 1. **Ibiltzen ari naizenean, nire gorputza nola mugitzen den fijatzen naiz**<br>*(When I'm walking, I pay attention to how my body moves)* |
| 2. **Dutxatzerakoan, ura gorputzean behera nola doan fijatzen naiz**<br>*(When I take a shower, I pay attention to how the water flows down my body)* |
| 3. **Sentsazio ezberdinetan fijatzen naiz; esate baterako haizea nire ilean edo eguzkia aurpegian**<br>*(I pay attention to sensations, such as the wind in my hair or the sun on my face)* |
| 4. **Soinuei arreta jartzen diet; adibidez, erlojuen tik-tok-ei, txorien kantuei edo pasatzen diren kotxeei**<br>*(I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing)* |
| 5. **Usaia ezberdinak nabaritzen ditut; adibidez, janariak edo koloniak**<br>*(I notice the smells and aromas of things)* |
| 6. **Koloretan, formetan, argietan eta itzaletan fijatzen naiz**<br>*(I notice visual elements in art or nature, such as colours, shapes, textures, or patterns of light and shadow)* |
| 7. **Nire sentimenduak deskribatzeko hitz egokiak aurkitzeko gai naiz**<br>*(I'm good at finding the words to describe my feelings)* |
| 8. **Zaila egiten zait pentsatzen ari naizena deskribatzeko hitz egokiak aurkitzea**<br>*(It's hard for me to find the words to describe what I'm thinking)* |
| 9. **Sentitzen dudana adierazteko hitz egokiak topatzen ditut**<br>*(I have trouble thinking of the right words to express how I feel about things)* |
| 10. **Gorputzean sentsazio bat dudanean, erraz egiten zait hori deskribatzea**<br>*(When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words)* |
| 11. **Haserre nagoenean gai naiz haserre hori hitzez adierazteko**<br>*(Even when I'm feeling terribly upset, I can find a way to put it into words)* |
| 12. **Zerbait egiten dudanean, egiten ari naizen horretan bakarrik kontzentratzen naiz, besterik ez**<br>*(When I'm doing something, I'm only focused on what I'm doing, nothing else)* |
| 13. **Gauzak egiten ditudanean, erabat kontzentratuta geratzen naiz horretan eta ez dut beste ezertan pentsatzen**<br>*(When I do things, I get totally wrapped up in them and don't think about anything else)* |
| 14. **Aldi berean hainbat gauza egin ohi ditut, gauza bakarrean kontzentratu beharrean**<br>*(I tend to do several things at once rather than focusing on one thing at a time)* |
| 15. **Erabat murgiltzen naiz momentuan egiten ari naizen horretan eta nire arreta guztia ekintza horretan jartzen dut**<br>*(I get completely absorbed in what I'm doing, so that all my attention is focused on it)* |
| 16. **Nire buruarekin gaizki sentitzen naiz emozio desegokiak edukitzeagatik**<br>*(I criticise myself for having irrational or inappropriate emotions)* |
| 17. **Uste dute nire pentsamendu batzuk desegokiak direla eta ez nukeela horrela pentsatu behar**<br>*(I believe some of my thoughts are abnormal or bad and I shouldn't think that way)* |
| 18. **Nire pentsamenduak onak edo txarrak diren epaitzen dut**<br>*(I make judgments about whether my thoughts are good or bad)* |
| 19. **Neure buruari esaten diot ez nukeela pentsatu behar pentsatzen dudana**<br>*(I tell myself that I shouldn't be thinking the way I'm thinking)* |
| 20. **Uste dut nire emozio batzuk desegokiak direla eta ez nituzkeela sentitu behar**<br>*(I think some of my emotions are bad or inappropriate and I shouldn't feel them)* |

Notes: Items in parentheses are items taken from the English version. In this study, as they have been adapted to Basque and for use with children, they are not exact reproductions of the original items

The original KIMS served as the basis for the development of a short 20-item version of the instrument (KIMS-R; Höfling et al., 2011). This questionnaire measures the same four dimensions as the original version (Observation, Description, Acting with awareness and Acceptance without judgment) with fewer items. However, during the adaptation process, the dimension "Observation" was divided into two sub-factors: (1) observation of internal stimuli and (2) observation of external stimuli. Höfling et al. (2011) claim that the KIMS-R is a reliable and useful questionnaire for measuring skills linked to conscious attention and the original questionnaire (KIMS) has been adapted to other languages (Korean and German) (Kim, 2006; Ströhle et al., 2010).

The KIMS-R (20 items) is considered suitable for use in the school environment since it is a multidimensional self-perception inventory that evaluates the four mindfulness skills proposed by Bishop et al. (2004) that are present in everyday life. Although the KIMS-R was designed for adults, the original items focus on daily activities and we have adapted them both to the Basque language and for use with children, taking into account the level of understanding acquired by students aged between 9 and 12 years.

#### Full Attention Scale in the School Environment (EAP)

The EAP is a questionnaire written in Spanish and aimed at adolescents aged between 12 and 16 (León del Barco, 2008; León del Barco et al., 2008). It comprises a total of 12 items rated on a Likert-type response scale ranging from 1 = *Never* to 5 = *Always*.

The scale contemplates three factors: (a) External attention: the ability to direct attention towards external activities and actions (for example: "When I go from home to school, I focus on the path I take"), (b) Internal attention (introspection): the ability to direct attention towards one's ideas, thoughts, feelings and activities (for example: "When I notice beautiful things in life, I feel well and full of energy"), and (c) Kinaesthetic attention: the ability to pay attention to one's movements and motor actions (for example: "When I get dressed, I notice the movements I make with my whole body: hands, legs and head"). The EAP questionnaire has been found to have adequate psychometric properties: (1) External attention ($\alpha$= 0.60), (2) Internal attention ($\alpha$ = 0.66) and (3) Kinaesthetic attention ($\alpha$ = 0.74). In the present work, each dimension showed adequate values of internal consistency in terms of Cronbach's alpha and McDonald's omega ($\alpha$ = 0.79; $\omega$ = 0.79 for External attention; $\alpha$ = 0.70; $\omega$ = 0.72 for Internal attention and $\alpha$ = 0.73; $\omega$ = 0.73 for Kinaesthetic attention).

The items were translated from Spanish to Basque. Moreover, since the items are aimed at teenagers, they were adapted for children aged between 9 and 12 years. Specifically, one item ("When I feel, think or act, I remember who I am") was rewritten because it was thought that younger children may have difficulty understanding it. The self-reference ("I remember who I am") was removed and a direct action referring to emotions or thoughts was inserted instead ("I am happy with what I feel, think and do").

#### Children's Daily Stress Inventory (IECI)

This is a 22-item questionnaire with dichotomous answers (Yes/No). It describes events, problems, demands and concerns that may have a negative impact on the cognitive and social-emotional development of children and that arise in interaction with the environment (Trianes et al., 2009). This instrument is aimed at children aged between 6 and 12 and describes three contexts that can cause stress during childhood: psychosomatic stress (for example: "I have been sick several times this year"), the stress in the school context (for example: "I find school tasks difficult"), and contextual family stress (for example: "I spend little time with my parents").

The main purpose of this instrument is to explore children's responses to daily stressors. The IECI has presented adequate values of internal consistency in the original Spanish version ($\alpha$ = 0.70). In this study, the items were translated from Spanish to Basque using the forward-backward technique.

#### Short Trait Meta-Mood Scale (TMMS-23)

The Trait Meta-Mood Scale (TMMS; Salovey et al., 1995) was designed to assess, through 48 items, individual differences in the emotion regulation process, also known as emotional meta-cognition, which combines continuity, evaluation and regulation of one's feelings and emotions. The scale assesses respondents' ability to pay attention to emotions and feelings, understand their own emotions, regulate negative emotional states and prolong positive ones. Items are rated on a 5-point Likert-type scale ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*.

The instrument also evaluates emotional abilities through 3 dimensions: (a) Attention: the ability to pay attention to feelings (for example: "I think my emotions and state of mind deserve to be paid attention to"), (b) Clarity: the ability to feel feelings clearly, without confusion (for example: "I usually know how I feel about people"), and (c) Reparation: the ability to use positive thoughts to repair negative emotional states (for example: "I try to have positive thoughts even when I feel bad").

The original version of the TMMS has been found to have adequate internal consistency (Salovey et al., 1995): (1) Attention ($\alpha$ = 0.86), (2) Clarity ($\alpha$ = 0.87) and (3) Reparation ($\alpha$ = 0.82). It has also been adapted to other languages, including Portuguese (De Figueiredo et al., 2005), French (Maria et al., 2016) and Spanish (Fernández-Berrocal et al., 2004). The Basque adaptation (Gorostiaga, Balluerka, Alonso-Arbiol, & Haranburu, 2011a) of the abbreviated version of the TMMS that was used in the present study has adequate internal consistency: Attention ($\alpha$ = 0.84), Clarity ($\alpha$ = 0.80) and Repair ($\alpha$ = 0.82). Except for emotional clarity, it also showed appropriate values of internal consistency in the present work ($\alpha$ = 0.73; $\omega$ = 0.73 for Attention; $\alpha$= 0.58; $\omega$ = 0.58 for Clarity and $\alpha$ = 0.72; $\omega$ = 0.72 for Repair).

#### Revised NEO Personality Inventory (NEO-PI-R)

The NEO-PI-R (Revised NEO Personality Inventory) is a shortened version of the original questionnaire that uses 60 items to measure the five domains of personality (Costa & McCrae, 1999): (a) Neuroticism (indicates a tendency to experience feelings such as instability, fear, anger, guilt or shame), (b) Extraversion (examines the tendency to go out in public, in groups and meetings, to seek strong emotions, and experience positive emotions, assertiveness and a high level of energy in activities), (c) Responsibility (feelings about one's abilities: how much obligation one feels to fulfil one's

duties, what level of aspirations one has, how hardworking one is), (d) Kindness (being a kind, altruistic and empathic person, trusting and sympathizing with others and being ready to help them), and (e) Openness to experience (a person's interest in the external and internal world; it indicates openness to new ideas and unconventional values).

In this study, only nine items from the neuroticism dimension were used. Items were rated on a 5-point Likert-type response scale ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. The Basque version of the NEO-PI-R has adequate psychometric properties (Gorostiaga, Balluerka, Aritzeta, et al., 2011b): $\alpha$ between 0.83 and 0.92 in all dimensions. In the present study, internal consistency values for neuroticism dimension were also acceptable ($\alpha$ = 0.79; $\omega$ = 0.80).

### Children's Depression Scale (CDS)

This scale evaluates depression through 66 items and is designed for use with children and adolescents between the ages of 8 and 16. Responses are given on a 5-point Likert-type scale ranging from 1 = *Strongly disagree* to 5 = *Strongly agree* (Lang & Tisher, 1978, 2014).

The questionnaire measures two main dimensions, with 48 items assessing the depressive aspect and 18 items evaluating the positive aspect. It is divided into 8 subscales: (1) Affective response (indicates the mood state of feelings), (2) Social problems (refers to social interaction difficulties, isolation and loneliness), (3) Self-esteem (corresponds to self-esteem and self-worth), (4) Concern about death or health (evaluates dreams and fantasies related to death and illness), (5) Feelings of guilt (examines one's sense of guilt), (6) Multiple depressions (includes depression-type issues that could not be combined to form an entity), (7) Joy (refers to the ability to experience joy), and (8) Several positive aspects (includes positive-type issues that could not be combined to form an entity). The first 6 subscales constitute the first dimension (depressive aspect) and the last 2 subscales form the second dimension (positive aspect).

This questionnaire has been translated into different languages, including Arabic (Abdel-Khalek, 1991), German (Luteijn, 1981), Italian (Gori-Savellini & Morino-Abbelle, 1984), Japanese (Kodaki, 1985), Spanish (Seisdedos, 2003) and Basque (Balluerka et al., 2012). Since this last adaptation (into Basque), the scale has been found to have adequate internal consistency ($\alpha$ = 0.95 in the depressive aspect and $\alpha$ = 0.79 in the positive aspect), and three of its subscales were used here: affective response, social problems and joy. In the present work, these dimensions also showed adequate values of internal consistency ($\alpha$ = 0.88; $\omega$ = 0.88 for Affective response; $\alpha$ = 0.92; $\omega$ = 0.92 for Social problems and $\alpha$ = 0.87; $\omega$ = 0.87 for Joy).

## Data Analyses

Data analyses were carried out using SPSS v28.0 and Mplus v.8 software. First, the dimensionality of the KIMS-R was analysed using the cross-validation procedure, dividing the sample into two subsamples: (1) the exploratory sample ($n$ = 237), which was used to determine the factor structure; and (2) the confirmatory sample ($n$ = 242), which was used to confirm the structure obtained from the exploratory sample.

An exploratory factor analysis (EFA) was conducted with the first subsample, using the principal axis factorization procedure and oblique rotation through SPPS v28.0. Next, a confirmatory factor analysis (CFA) was carried out with the second subsample, using Mplus v.8. We employed maximum likelihood robust estimation (MLrobust) in our analysis. This statistical approach is utilized to account for potential violations of the assumption of multivariate normality, making our results more reliable and robust against outliers and non-normal data distributions. The absolute fit index was used to evaluate goodness of fit, expressed as the ratio of chi-square to degrees of freedom ($\chi^2/df$). This goodness of fit index is deemed adequate if it is below 5 (Wheaton et al., 1977). We also calculated comparative fit indexes (TLI, CFI) and residual fit indexes (RMR and RMSEA). Values of around 0.90 in the TLI, greater than or equal to 0.95 in the CFI, less than or equal to 0.08 in the RMR and less than 0.06 in the RMSEA indicate an adequate fit to the data (Schreiber et al., 2006; Whittaker, 2011). Internal consistency was calculated using Cronbach's alpha and McDonald's omega coefficient, and temporal stability was analysed using Pearson's correlation.

External validity was also analysed using Pearson's correlation. This statistic reflects correlations between mindfulness skills and perceived stress, emotional abilities, neuroticism and depression. Finally, differences in terms of gender and academic year were analysed using Student's $t$-test and effect size was calculated using Cohen's $d$.

# Results

## Factor Structure

As mentioned above, an EFA was performed with one of the subgroups ($n$ = 237) and sampling adequacy was examined using the Kaiser-Meyer-Olkin index (KMO = 0.79) and Bartlett's test of sphericity ($\chi^2(190) = 1522.48$; $p < 0.001$). This analysis revealed a 5-factor structure that, in general, explained 60.17% of the total variance: the first factor (Acceptance without judgment) explained 22.31% of the variance; the second factor (Description) explained 14.95%; the third factor (Acting with awareness) 10.31%, the fourth (Internal observation) 7.01% and the fifth (External observation) 5.5%. The positioning of the items in the

dimensions was analysed using a factor loading cutoff point of 0.32 (Tabachnik & Fidell, 2001) and most of the items loaded onto their corresponding factors.

Item 8 ("It's hard for me to find the words to describe what I'm thinking") and Item 14 ("I tend to do several things at once rather than focusing on one thing at a time") failed to pass the cutoff point, with their factor loadings being 0.23 and 0.29, respectively. Despite this, a deliberate decision was made to retain these items based on careful consideration of their content alignment with their assigned dimensions. Their content was deemed conceptually integral to the intended constructs. Removal of these items would risk sacrificing the nuanced aspects of the dimensions they were designed to measure.

To confirm the 5-factor structure found in the exploratory subgroup, a CFA was carried out ($n = 242$), returning the following between-factor correlations: 0.82 (Internal observation and External observation); 0.17 (Internal observation and Description); 0.26 (Internal observation and Acting with awareness); −0.13 (Internal observation and Acceptance without judgment); 0.24 (External observation and Description); 0.22 (External observation and Acting with awareness); −0.08 (External observation and Acceptance without judgment); 0.47 (Description and Acting with awareness); 0.27 (Description and Acceptance without judgment); and 0.13 (Acting with awareness and Acceptance without judgment). The fit indexes revealed adequate goodness of fit for the 5-factor model with 20 items (Fig. 1). The chi-square statistic divided by degrees of freedom ($\chi^2/df$) was 1.75 ($\chi^2(160) = 280.44$; $p < 0.001$); TLI 0.90; CFI 0.91; RMR 0.06; and RMSEA 0.05 (90% CI =0.04 to 0.06). Table 2 shows the goodness of fit indexes for the three different models: the 5-factor model (Internal observation, External observation, Description, Acting with awareness and Acceptance without judgment), the 4-factor model (Observation, Description, Acting with awareness and Acceptance

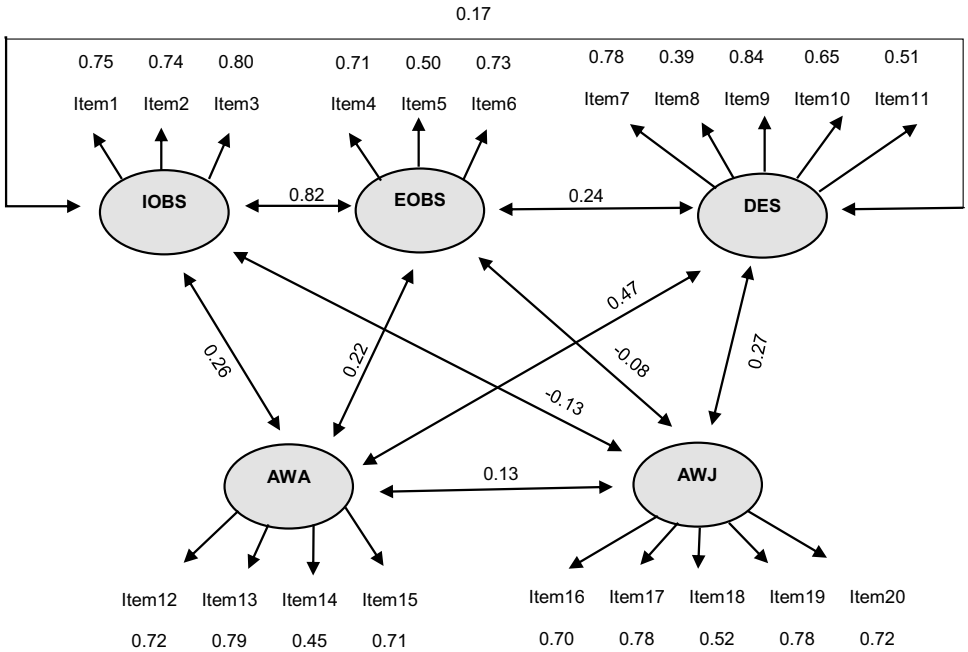


**Fig. 1** Confirmatory Factor Analysis model of the Basque KIMS-R. Note: IOBS, Internal observation; EOBS, External observation; DES, Description; AWA, Acting with awareness; AWJ, Acceptance without judgment

**Table 2** Goodness of fit indexes for the different models of the Basque KIMS-R

| Model | Factor model | $\chi^2$ | *df* | $\chi^2/df$ | TLI | CFI | RMR | RMSEA |
|---|---|---|---|---|---|---|---|---|
| A | 5-factor model | 280.44 | 160 | 1.75 | 0.90 | 0.91 | 0.06 | 0.05 |
| B | 4-factor model | 297.80 | 164 | 1.81 | 0.89 | 0.90 | 0.07 | 0.05 |
| C | Unidimensional model | 1286.57 | 170 | 7.56 | 0.13 | 0.22 | 0.17 | 0.16 |

Notes about the models: (A) Items 1–3 (Internal observation), Items 4–6 (External observation), Items 7–11 (Description), Items 12–15 (Acting with awareness), Items 16–20 (Acceptance without judgment); (B) Items 1–6 (Observation), Items 7–11 (Description), Items 12–15 (Acting with awareness), Items 16–20 (Acceptance without judgment); (C) Items 1–20 (Mindfulness skills)

Notes about the indices: $\chi^2/df$ (chi-square likelihood ratio statistic), TLI (Tucker-Lewis Index), CFI (comparative fit index), RMR (root mean square residual), and RMSEA (root mean square error of approximation)

without judgment), and the unidimensional model (Mindfulness skills). For the 4-factor model, the chi-square statistic divided by degrees of freedom ($\chi^2/df$) was 1.81 ($\chi^2(164) = 297.80$; $p < 0.001$); TLI 0.89; CFI 0.90; RMR 0.07; and RMSEA 0.05, and for the unidimensional model, the chi-square statistic divided by degrees of freedom ($\chi^2/df$) was 7.56 ($X^2(170) = 1286.57$; $p < 0.001$); TLI 0.13; CFI 0.22; RMR 0.17; and RMSEA 0.15. The 5-factor model was found to have the best-fit values. We therefore decided to maintain the model of the Basque KIMS-R (Höfling et al., 2011) in the Basque adaptation.

### Reliability

The internal consistency of each factor was evaluated using the Cronbach's alpha and McDonald's omega coefficient: $\alpha = 0.80$ and $\omega = 0.80$ for the Internal observation dimension; $\alpha = 0.69$ and $\omega = 0.69$ for External observation; $\alpha = 0.74$ and $\omega = 0.76$ for Description; $\alpha = 0.75$ and $\omega = 0.77$ for Acting with awareness; $\alpha = 0.83$ and $\omega = 0.83$ for Acceptance without judgment. Temporal stability was also analysed using a test-retest procedure. The KIMS-R was administered a second time to 44 participants (44.2% girls and 55.8% boys) 4 weeks after the first time. Pearson's correlation was calculated to estimate the correlations between the two administration periods for each dimension, with the values returned proving acceptable: 0.54 for Internal observation; 0.64 for External observation; 0.79 for Description; 0.40 for Acting with awareness; and 0.59 for Acceptance without judgment.

### Associations Between Mindfulness Skills (KIMS-R) and Stress (IECI), Emotional Skills (TMMS-23), Neuroticism (NEO PI-R) and Depression (CDS)

When the correlations between the KIMS-R dimensions and the factors of the EAP questionnaire (mindfulness skills evaluation) were analysed, strong positive correlations were found between the Observation sub-dimensions and Kinaesthetic attention ($r = 0.74$ and $r = 0.54$, respectively) and External attention ($r = 0.53$ and $r = 0.58$). Moreover, moderate positive correlations were observed between Internal-External observation and Description and Internal attention ($r = 0.31$, $r = 0.47$, and $r = 0.43$, respectively).

Statistically significant negative correlations were found between mindfulness skills (KIMS-R) and perceived stress (IECI): in particular, a moderate correlation was observed between Acceptance without judgment and Psychosomatic stress ($r = -0.31$). Similarly, weaker associations were found between Acceptance without judgment and Family and School stress ($r = -0.25$ and $r = -0.20$), as well as between the Description dimension and all three dimensions of the IECI ($r = -0.25$, $r = -0.22$, and $r = -0.28$).

Furthermore, mindfulness skills positively correlated with emotional skills (TMMS-23). Specifically, Description showed a strong correlation with the Clarity dimension ($r = 0.55$) and a moderate correlation with Reparation ($r = 0.37$). Similarly, External and Internal observation exhibited a moderate correlation with Attention ($r = 0.30$ and $r = 0.25$, respectively), with a notably stronger association observed in the case of Internal observation.

Regarding neuroticism (NEO PI-R), statistically significant negative correlations were observed with two dimensions of the KIMS-R: moderate correlation with Acceptance without judgment ($r = -0.31$) and weaker correlation with Description ($r = -0.27$).

Finally, mindfulness skills were negatively associated with depression (CDS), with moderate correlations being found between Acceptance without judgment and the three dimensions of the CDS ($r = -0.45$, $r = -0.44$, and $r = 0.31$, respectively). The Description dimension of the KIMS-R positively correlated with Joy ($r = 0.38$) and negatively with Affective response ($r = -0.29$) and Social problems ($r = -0.29$) with moderate correlation. Acting with awareness was positively associated with Joy ($r = 0.25$). Table 3 shows these correlations.

### Differences in Mindfulness Skills by Gender and Academic Year

No significant differences were found between boys and girls or between those in Year 5 and those in Year 6; mean scores were similar across all five dimensions (Table 4).

## Discussion

The purpose of the present study was to adapt the Reduced Kentucky Inventory of Mindfulness Skills (KIMS-R) questionnaire to Basque and for use with children. As our aim was to provide evidence of the validity of this evaluation instrument among children aged between 9 and 12 years, mindfulness skills were assessed alongside perceived stress, emotional abilities, neuroticism and depression.

In terms of dimensionality, the 5-factor structure of the reduced 20-item version (Höfling et al., 2011) was maintained in the Basque version: Internal observation (Items 1–3), External observation (Items 4–6), Description (Items 7–11), Acting with awareness (Items 12–15), and Acceptance without judgment (Items 16–20). This essentially means that our instrument effectively captures different aspects of mindfulness. The internal consistency and temporal stability indexes confirmed that the Basque version of the KIMS-R has adequate reliability.

In order to determine the validity of the KIMS-R dimensions, correlations between the KIMS-R and EAP

**Table 3** Correlations between the dimensions of the Basque KIMS-R and Mindfulness skills (EAP), Perceived stress (IECI), Emotional skills (TMMS-S), Neuroticism (NEO-PI-R) and Depression (CDS)

| | EAP | | | IECI | | | TMMS-23 | | | NEO PI-R | CDS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KA | EA | IA | P | F | S | A | C | R | | AR | SP | J |
| IOBS | 0.74** | 0.53** | 0.31** | 0.12** | 0.04 | −0.02 | 0.30** | 0.15** | 0.11* | −0.11* | 0.09* | 0.06 | −0.01 |
| EOBS | 0.54** | 0.58** | 0.47** | 0.03 | 0.03 | −0.02 | 0.25** | 0.23** | 0.24** | −0.12* | −0.01 | −0.02 | 0.10* |
| DES | 0.21** | 0.25** | 0.43** | −0.25** | −0.22** | −0.28** | 0.20** | 0.55** | 0.37** | −0.27** | −0.29** | −0.29** | 0.38** |
| AWA | 0.22** | 0.24** | 0.28** | −0.15** | −0.06 | −0.19** | 0.10* | 0.21** | 0.23** | −0.16** | −0.18** | −0.16** | 0.25** |
| AWJ | −0.10* | −0.03 | 0.16** | −0.31** | −0.25** | −0.20** | −0.15** | 0.15** | 0.02 | −0.31** | −0.45** | −0.44** | 0.31** |

Significant at *$p < 0.05$; **$p < 0.01$

Note: *IOBS* Internal observation, *EOBS* External observation, *DES* Description, *AWA* Acting with awareness, *AWJ* Acceptance without judgment, *KA* Kinaesthetic attention, *EA* External attention, *IA* Internal attention; *P* Psychosomatic, *F* Family, *S* School, *A* Attention, *C* Clarity, *R* Reparation, *AR* Affective response, *SP* Social problems, *J* Joy

**Table 4** Differences based on gender and academic year for the Basque KIMS-R

| | Girls | | Boys | | *T(df)* | *p* | *d* | Year 5 | | Year 6 | | *t(df)* | *p* | *d* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | | | *M* | *SD* | *M* | *SD* | | | |
| IOBS | 7.28 | 2.02 | 6.93 | 2.25 | 1.74 (462) | 0.08 | 0.16 | 7.15 | 2.17 | 7.08 | 2.08 | 0.37 (470) | 0.71 | 0.03 |
| EOBS | 8.36 | 1.77 | 8.11 | 1.87 | 1.46 (463) | 0.15 | 0.14 | 8.18 | 1.90 | 8.28 | 1.74 | −0.58 (471) | 0.65 | −0.05 |
| DES | 13.53 | 2.63 | 13.47 | 2.66 | 0.26 (462) | 0.79 | 0.02 | 13.65 | 2.66 | 13.39 | 2.62 | 1.07 (470) | 0.28 | 0.10 |
| AWA | 10.60 | 2.19 | 10.46 | 2.00 | 0.74 (460) | 0.46 | 0.07 | 10.67 | 2.18 | 10.41 | 2.02 | 1.36 (468) | 0.17 | 0.13 |
| AWJ | 15.36 | 3.36 | 15.37 | 3.01 | −0.04 (460) | 0.97 | −0.00 | 15.35 | 3.17 | 15.37 | 3.21 | −0.05 (468) | 0.96 | −0.00 |

Significant at *$p< 0.05$; **$p< 0.01$

Note: *IOBS* Internal observation, *EOBS* External observation, *DES* Description, *AWA* Acting with awareness, *AWJ* Acceptance without judgment, *M* Mean Scores, *SD* Standard Deviations, *t* Student's *t*, *d* Cohen's *d*

dimensions were analysed, with the results revealing positive associations, particularly between the two sub-dimensions related to observation (KIMS-R) and the factors of the EAP. Similarly, in the current literature, mindfulness has been associated with the other variables analysed in the present study: positively with emotional intelligence (Rodríguez-Ledo et al., 2018) and optimism (Crego et al., 2021) and negatively with perceived stress (Mendelson et al., 2023), neuroticism (O'Loughlin et al., 2019) and depression (Pickerell et al., 2023).

Consistent with previous literature, the results of the present study confirmed the external validity of the instrument. The dimensions measuring emotional abilities (TMMS-23) correlated positively with all the dimensions of the KIMS-R questionnaire. The reparation dimension (TMMS-23) did not correlate with acceptance without judgment (KIMS-R), although joy (CDS) correlated positively with description, acting with awareness and acceptance without judgment. For its part, psychosomatic stress and perceived stress at school (IECI) correlated negatively with description, acting with awareness and acceptance without judgment. Moreover, perceived stress in the family (IECI) correlated negatively with description and acceptance without judgment (KIMS-R) and scores indicating good mindfulness skills correlated negatively with neuroticism (NEO PI-R). Finally, affective response and social problems (CDS) correlated negatively with three dimensions of the KIMS-R (description, acting with awareness and acceptance without judgment).

In terms of gender, the differences were not statistically significant. Similarly, no differences were observed in accordance with the academic year.

Based on the results of the present study, we can conclude that the Basque version of the KIMS-R is a reliable and acceptable instrument for evaluating mindfulness skills in children aged between 9 and 12 years. In particular, the study presents a 20-item evaluation instrument with adequate psychometric properties, divided into five dimensions (Internal observation, External observation, Description, Acting with awareness and Acceptance without judgment). The instrument was also found to have adequate external validity, with associations being observed between mindfulness and emotional abilities, perceived stress, neuroticism and depression.

## Limitations and Future Research

The Basque version of the KIMS-R was administered to children aged between 9 and 12 years, studying in the last 2 years of primary school. This limits the possibility of extrapolating the results to other age groups, due to the differences in cognitive-social-emotional abilities between different developmental stages, which may cause problems linked to the comprehension of the items. Furthermore, external validity was based on associations between different instruments, a circumstance that precludes any conclusions being drawn regarding the causal relationship between variables. Future studies may wish to consider conducting experimental research or adopting a longitudinal approach to data collection. Additionally, although the study explored gender and academic year differences, it is important to note that item bias testing based on these factors was not conducted. Future research should consider investigating potential biases in item responses by gender and academic year to ensure the instrument's fairness across diverse groups.

In conclusion, this Basque version of the KIMS-R will enable scholars to assess the ability of children in the Basque Autonomous Community to be mindful. It will also be useful for evaluating the effectiveness of interventions designed to promote mindfulness skills in this age group. In light of the above, in general, the adaptation of the KIMS-R instrument can be considered a step forward in the field of research focusing on full attention.

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**Data Availability** Data can be obtained from the first author upon an email request.

## Declarations

**Use of Artificial Intelligence** No Artificial Intelligence tools were used.

**Ethics Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Committee for Research Involving Humans of the University of the Basque Country (M10_2020_318).

**Informed Consent** Informed consent was obtained from all individual participants included in the study. Written informed consent has been obtained from the patient(s) to publish this paper.

**Conflict of Interest** The authors declare no competing interests.



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