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Measuring Emotional Knowledge: Assessment of Children's Emotional Skills (ACES) with Spanish School-age Children

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Emotion knowledge has attracted scientific interest in recent years due to its relevance to children's adjustment. Although there is some controversy as to its definition and components, the term is often used to describe the set of abilities to process emotional information. We need rigorous tools to assess it in multiple languages and contexts. The Assessment of Children's Emotional Skills-ACES was administered to 255 Spanish 8-to-11-year-old children along with, measures of adjustment and language. The Spanish ACES confirmed its three-factor structure; emotion recognition in faces, behaviours and situational emotional knowledge, and a second-order factor (i.e., overall emotional knowledge). The validity of this Spanish version of ACES was demonstrated in emotion knowledge relating to receptive vocabulary, age, sex and adjustment, with age, language and sex moderating relations between emotion knowledge and adjustment. The Spanish ACES can contribute to a greater understanding of the development of emotion knowledge in Spanish-speaking children; and help evaluate social and emotional intervention programmes.

Keywords: emotion knowledge, school-aged children, Spanish, ACES, assessment

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Introduction

Emotion Knowledge (EK) refers to the set of skills aimed at processing emotional information, enabling individuals to make adaptive use of said information. This knowledge helps children understand their own and others' emotional responses, something essential for emotional competence (Denham, 2019). It has attracted a

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great deal of scientific interest in recent years given its relevance to children's social and cognitive development (Trentacosta & Fine, 2010). Although there is some controversy as to its definition and components (Castro et al., 2016; O´Toole et al., 2013; Voltmer & von Salisch, 2017), the term is often used to describe the ability to identify emotions in facial expressions, behavioural cues and social contexts; to label emotions, to understand their meaning; to identify the causes and anticipate consequences; and to understand other aspects of emotional experience such as diversity, norms or ambivalence (Izard, 2001). The perception and labeling of emotions are the most basic facets of EK, and they underlie the development of more complex aspects of EK such as the identification of internal and external causes of emotions in oneself and others, the consequences and function of emotions, the knowledge of ambivalent emotions, and emotion regulation (Denham, 2019; Elsayed et al., 2020; Izard et al., 2011). The present study focuses on knowledge of others' discrete emotions, understood as the ability to perceive and understand the relatively unambiguous signals of discrete emotions in facial expressions, vocalizations, gestures and social contexts (Izard, 2001).

EK predicts social competence as it helps children engage appropriately and positively with other people. The more children develop emotional skills, the more they are receptive to peers' reality in emotionally-charged situations which, in turn, fosters social interactions (Denham, 2019). Many studies have found EK to predict prosocial behaviour and social adjustment (Domitrovich et al., 2017; Qualter et al., 2019; Rivers et al., 2012; Schultz et al., 2001; Trentacosta & Fine, 2010, Voltmer & von Salisch, 2017).

On the other hand, low EK places children at risk of experiencing difficulties in social interactions. If children incorrectly interpret emotional information they may respond inappropriately to peers, which may lead to social difficulties like rejection or avoidance of interactions (Denham, 2019; Domitrovich et al., 2017). The link between EK and both internalising and externalising problems during the school year has been widely evidenced (Castro et al., 2018; Cooper et al., 2020; Qualter et al., 2019; Rivers et al., 2012). A child who has trouble interpreting emotional cues may also experience learning and academic difficulties. Children with conflicted relationships or insecurity about social engagement due to low EK may detach from the school context and/or have difficulty with attention, memory, and problem-solving (Domitrovich et al., 2017; Voltmer & von Salisch, 2017).

Existing evidence to date suggests that various child characteristics—such as age, sex, or language—not only predict EK but can moderate how EK relates to social and behavioural adjustment. Both age (Barisnikov et al., 2020; Denham, 2019; Pons & Harris, 2019; Rivers et al., 2012; Trentacosta & Fine, 2010) and language development (Brechet et al., 2009; Shablack & Lindquist, 2019; Trentacosta & Fine, 2010) consistently relate to EK, Girls seem to perform better in emotion recognition (McClure, 2000; Montirosso et al., 2010; Myles-Palister et al., 2014), although, some studies do not find sex differences (García & Tully, 2020), and others suggest that girls' better performance depends on the specific task (Fidalgo et al., 2018), or increases with age (Rivers et al., 2012).

Trentacosta & Fine's (2010) meta-analysis showed that age moderated the relationship between externalising behaviour and EK, with stronger relationships seen at older ages. Age did not moderate

relationships between EK and internalising or social competence, however. Additionally, Qualter and colleagues (2019) found that emotional skills in children aged 9 to 11 years were linked to aggressive behaviour for girls but not boys.

In Spain, interest in children's emotional skills is growing, leading to a need for valid culturally adapted tools (Arrivillaga & Extremera, 2020) that will both help determine the relationship between EK and social functioning and enable rigorous evaluations of social and emotional intervention programs (Domitrovich et al., 2017; Humphrey et al., 2011).

The Assessment of Children's Emotional Skills (ACES)

The ACES (Schultz et al., 2004) is a direct child assessment of EK that involves 3 subtests: emotion recognition in faces, behavioural emotion recognition and situational EK. For each item, interviewers present either a photographed facial expression, a verbally-presented description of behaviour or a verbally-presented situational context, and children have to label the protagonist's emotion (a more detailed description is provided in the tools section).

Studies that have used the ACES as a measure for EK have found mixed results about psychometric properties. The authors of the original tool reported alphas of 0.68 (Schultz et al., 2004), .71 (Trentacosta et al., 2006), and .75 (Trentacosta & Izard, 2007). Mavroveli et al. (2009) reported a slightly higher internal consistency ($\alpha = .83$), and within the context of an intervention with Canadian children, Santos & Langill (2019) found acceptable Cronbach's alpha of .71 on the pre-test and .67 on the posttest, Myles-Pallister et al. (2014) applied the tool before and after intervention, however, and found a moderate internal consistency index for the total scale ($\alpha = .61$) and a moderate test-retest reliability ($r = 0.56$).

Studies that have used ACES adaptations to other cultures have mostly shown good reliability indices. A validation study of the ACES in the Turkish context showed a Cronbach alpha of .81 for the overall test and a good reliability index applying the halving method ($r = .79$) (Ünal Bozkan & Kömleksiz, 2014). Cronbach´s alpha for the Portuguese version was similarly acceptable at .70 (Alves & Cruz, 2016), but a study of a French version offered a lower value (.55) (Encinar et al., 2017).

Many studies have used the ACES to assess how EK relates to adjustment dimensions, the findings correlate with trait emotional intelligence and with social and peer nominations. Specifically, higher ACES scores were linked to more nominations of being a kind person, fewer nominations of being a bully, and higher peer rating of social competence (Mavroveli et al., 2009). It has also correlated with academic competence (Trentacosta & Izard, 2006), adaptive behaviour and behavioural regulation (Cramer et al., 2019; Schultz et al., 2004), and empathy and cooperative behaviours (Raimundo et al., 2013).

The ACES has additionally shown the capacity to detect effects of social and emotional interventions. For example, following intervention, ACES scores were significantly higher in an experimental group than in the control group (Santos & Langill, 2019). A Portuguese version of the ACES has been applied to evaluate interventions aimed at schoolchildren, proving its sensitivity multiple times to detect changes after the

intervention (Alves & Cruz, 2016; Raimundo et al., 2013). In contrast, Myles-Pallister et al. (2004) developed an intervention in Australia and did not detect changes in EK measured with the ACES, likely due to the aforementioned low ACES reliability in their study.

In an attempt to fill the relative lack of reliable and valid tools to evaluate EK within the Spanish context, the present study aims to validate the ACES for Spanish-children 8 to 11 years and to examine if age, verbal ability and sex may moderate the relationships between EK and adjustment.

Method

Participants

Participants were 255 children (48.7% girls) aged 8 to 11 years (M = 9.7 and SD = 0.90) in 3rd, 4th and 5th grade of elementary school. A non-probabilistic voluntary response sample was used, involving children from two schools in Madrid. One of them was a public school, and the other was a charter school. Both schools were located in neighbourhoods with a medium-low socioeconomic level, although no data were collected for the sample related to income level or SES.

Procedure

The present study's data were gathered within the framework of a study on the development of emotional skills in childhood. A cross-sectional selective design was used. First, the *Assessment of Children's Emotion Skills* (ACES) was adapted into Spanish through a process of English-Spanish double back-translation involving three Spanish and English speakers. We then contacted the school staff and held informational meetings with teachers, obtained informed consent from parents and drew up an assessment schedule. After this, each teacher was given BASC T2 forms to complete. Before starting data collection with the children, the researcher, trained in the tools, introduced herself in each classroom to promote familiarity and safety. The PPVT and ACES were administered in a single individual session of approximately 15-25 minutes. The BASC S2 self-report forms (paper version) were administered in one-hour group sessions in each classroom. The instruments were administered by trained psychologists, and sessions took place in the schools themselves, in a space equipped with tables adapted to the age of the children. The evaluation lasted for one month.

Instruments

Assessment of Children's Emotional Skills (ACES; Schultz er al., 2004). Measures EK among elementary school children. It has a total EK score and three subscales. First, the emotion recognition in faces comprises 16 photographs showing prototypic expressions (happiness, sadness, anger, fear). The child is asked how the child in the picture feels. Second, emotion recognition of behaviours is assessed through 12 statements about everyday child behaviours. After being read each description, the child reports the emotion that the protagonist feels (e.g., Julia speaks quietly, and there are tears in her eyes. How does Julia feel?). Third, situational EK describes 12 situations that typically elicit particular emotions, and the child reports the emotion

that the protagonist feels (e.g., Sandra is building a big tower of blocks. Another kid comes over and knocks it over and laughs. How does Sandra feel?). After each stimulus, the interviewer offers five response options (i.e., happy, sad, mad, scared or no feeling). The ACES takes 10-12 minutes to complete, and the original ACES demonstrated a Cronbach's alpha of 0.68. The process for adapting ACES to Spanish is described below.

Behaviour Assessment System for Children (BASC, González et al., 2004). This instrument assesses positive and negative behaviours and has different questionnaires for different age ranges and informants. We used the T2, filled in by the teacher, and the S2, the self-report version for ages 8-12. The T2 contains 149 items with a 4-point Likert-type response scale (i.e., never, sometimes, often, almost always), that is grouped into 4 global dimensions: adaptive skills (such as adaptability and social skills), internalising problems (such as anxiety, depression and somatization), externalising problems (including aggression, hyperactivity and behavioural problems) and school problems (as attention and learning problems). It takes approximately 10-20 minutes to complete per child. The S2 contains 146 dichotomous items grouped into 3 global dimensions: personal adjustment (including relationships with parents, interpersonal relationships, self-esteem and self-confidence), clinical maladjustment (such as anxiety, locus of control and somatization) and school maladjustment (which includes negative attitude towards school and towards teachers). The S2 requires about 30 minutes to complete. The validation study for the Spanish BASC showed good internal consistency, with Cronbach's alphas ranging 0.85-0.96 for the T2 dimensions and 0.84-0.90 for the S2.

Peabody Picture Vocabulary Test (PPVT-III, Spanish version: Dunn et al., 2006). This instrument assesses verbal ability and, more specifically, receptive vocabulary. It is one of the most widely used tests for evaluating verbal ability. The examiner shows pictures with 4 images and, for each image, says a word; the child has to indicate the option that best captures the meaning. Although the time of application is variable, it is usually between 10 and 20 minutes; in this study the interval was between 10 and 15 minutes. The Spanish adaptation of the tool has been found to have good internal consistency ($\alpha = 0.91$) and correlates closely with other measures of verbal skills and general intelligence.

ACES Adaptation Process

To adapt the ACES to Spanish, a double back-translation process was carried out (Hambleton & Patsula, 1999). Two teams of translators with expertise in the area translated the items into Spanish independently from each other. The two translations were then compared and discussed until a consensus version was obtained. Another two translators independently translated the items back into English. Those that did not have an equivalent meaning were analyzed and modifications were made to ensure equivalence. We also translated the instructions and response-coding sheets. We tested the resulting version in a pilot study ($N = 20$) to detect any difficulties in either the comprehension or the administration of the instrument. Following the pilot study, a further modification was made: we adapted the response format. In the original version, after presenting the stimulus, respondents are presented with response options of happy, sad, mad, scared or no feeling and asked how the person in the photograph is feeling. In the pilot study, however, a ceiling effect occurred for children's

accuracy scores. To increase the difficulty we therefore changed the format to an open-ended question about how the person was feeling with no response options offered. Two experts independently coded each response by each child. These coders were sufficiently reliable, with Cohen's kappa coefficients for individual items between 0.73 and 1.0. Discrepancies in coding were discussed by independent experts, and they generated a list of acceptable responses for each discrete emotion.

Data analysis plan

We initially conducted descriptive analyses of the main variables. Then, we conducted a confirmatory factor analysis, with the Mplus software package and the Weighted Least Squares Mean and Variance Adjusted (WLSMV) method, to test if a three-factor structure fit the data. To estimate the internal consistency we calculated Omega indices based on polychoric correlations. To investigate construct validity, we conducted multiple regression analyses, with the ACES global scale and three subscales as criterion variables and sex, age and receptive vocabulary as predictors. To explore for predictive validity, we conducted multiple regression analyses with BASC scales as criterion variables, the ACES as the predictor variable, and sex, age and receptive vocabulary as covariates. When the assumption of homogeneity of the regression slopes was not met, we additionally included the interaction between the ACES score and the specific covariate in the model.

Results

We first examined the distribution of all scores (see Table I). The ACES scores showed the best performance for the expression subscale (emotion recognition in faces), followed by situations and, finally emotion recognition in behaviour descriptions.

Table I. Descriptive Statistics for Study Variables

Variable	Min-Max	*M*	*SD*
Receptive Vocabulary	32-145	101.23	16.59
ACES Total	0-38	27.11	6.93
ACES Expression	0-16	12.15	3.15
ACES Behaviours	0-12	6.29	2.35
ACES Situations	0-12	8.12	2.46
Adaptive Skills	85-222	155.20	29.25
Internalising Problems	117-252	140.23	22.60
School Problems	74-153	100.94	20.93
Externalizing Problems	120-256	148.83	22.60
Personal adjustment	25-227	199.40	29.99
Clinical maladjustment	108-241	154.47	31.42
School maladjustment	86-171	101.49	16.78

We next assessed ACES dimensionality and structure. To do this, we used confirmatory factor analysis with the Weighted Least Squares Mean and Variance Adjusted (WLSMV) estimator because of the categorical and non-normal nature of the data. The three-factor model with one second-order factor was found to have adequate fit ($X^2(737) = 988.133$, $p < .001$; *CFI* = .91; TLI = .92; *RMSEA* = 0.037 (0.031-0.043)). Although this X^2 value is statistically significant, this test is quite sensitive to sample size. The results confirm the three dimensions and one second-order factor structure. Standardised weights estimators for the subscales were statistically significant at 0.89 (.043), 0.96 (.027), and 1.00 (.017), respectively. The internal consistency was adequate, with Omega indices of .84 for the expressions subscale, .71 for behaviours, .78 for situations, and .91 for the total ACES.

By and large, across factors loadings were statistically significant and above .35 (see Table II). One behavioural item did not have a significant loading (*When the teacher asks Laura a question, she looks down. How does Laura feel?*), and three items had significant but low loadings: one facial expression of fear, another behavioural item (*The school principal calls a group of children into her office. Pablo is at the back of the group, walking slowly. How does Pablo feel?*), and a situational item (*Lucas is walking down the hallway. An older boy walks right by him and tells him to get out of the way. How does Lucas feel?*

We next conducted multiple regression analyses to explore the relation between previously established predictors—age, receptive vocabulary and sex—and the Spanish ACES´ scores (see Table III). The model predicted the total ACES score [$R^2_{adj} = 0.054$; $F(3,245) = 5.76$, $p < .001$], with receptive vocabulary as a unique statistically significant predictor. Higher receptive vocabulary related to greater EK. The model did not predict facial expression recognition scale significantly [$R^2_{adj} = .013$, $F(3,245) = 2.11$, $p = .10$]. The model for ACES´ behavioural items was significant [$R^2 = .053$, $F(3,245) = 5.60$, $p < .001$], with age and receptive vocabulary being statistically significant predictors. Children with greater receptive vocabulary and older children demonstrated greater emotion recognition in behaviours. Finally, the model predicted emotional situation scores significantly [$R^2_{adj} = .096$, $F(3,245) = 8.68$, $p < .001$]. Girls and children with greater receptive vocabulary demonstrated higher situational EK.

To explore predictive validity, we conducted multiple regression analyses with the overall ACES score as a predictor, sex, age and receptive vocabulary as control variables, and adaptive skills, internalising problems, externalising problems, school problems, personal adjustment, clinical maladjustment and school maladjustment as separate dependent variables. To test the homogeneity assumption of the regression slopes, we analyzed the interactions between the predictor (EK) and the covariates (sex, age and receptive vocabulary). When these interactions were statistically significant, they were interpreted, and, if they were not, they were eliminated from the analysis. Overall, we found main effects for EK for adaptive skills and school problems but not internalising problems ($p = .059$) (see Table IV). Higher EK related to more adaptive skills and less school problems.

Table II. Standardized factor loadings from the CFA of the three-factor model

Items	*F1*	F2	F3
1.1	0.656		
1.2	0.575		
1.3	0.675		
1.4	0.517		
1.5	1.083		
1.6	0.795		
1.7	0.257		
1.8	0.847		
1.9	0.644		
1.10	0.416		
1.11	0.753		
1.12	0.561		
1.13	0.861		
1.14	0.810		
1.15	0.522		
1.16	0.990		
2.1		0.377	
2.2		0.453	
2.3		0.418	
2.4		0.507	
2.5		0.133	
2.6		0.826	
2.7		0.435	
2.8		0.727	
2.9		0.223	
2.10		0.737	
2.11		0.964	
2.12		0.829	
3.1			0.925
3.2			0.917
3.3			0.229
3.4			0.321
3.5			0.557
3.6			0.451
3.7			0.947
3.8			0.860
3.9			0.621
3.10			0.503
3.11			0.564
3.12			0.709

Table III. Multiple regression predicting the ACES

	B	*SE*	β	95% CI	R^2	*p*	*N*
ACES Total					.054	<.001**	255
Sex	-.93	.69	-.083	-2.3-.48		.20	
Age	.05	.03	.095	-.01-.10		.08	
Receptive vocabulary	.08	.03	.247**	.03-.14		.003	
ACES Expressions					.013	.10	255
Sex	-.35	.33	-.070	-1-.31		.29	
Age	.01	.01	.066	-.01-.05		.28	
Receptive vocabulary	.02	.01	.145*	.01-.05		.05	
ACES Behaviours					.053	<.001**	255
Sex	.17	.26	.039	-.35-.72		.52	
Age	.03	.01	.151*	.01-.05		.007	
Receptive vocabulary	.03	.01	.207**	.01-.05		.008	
ACES Situations					.074	<.001**	255
Sex	-.74	.26	-.174**	-1.25--.23		.003	
Age	.004	.01	.02	-.01-.02		.72	
Receptive vocabulary	.03	.01	.265**	.02-.05		.001	

Note: *$p < .05$, **$p < .01$

Table IV. Multiple Regression for adaptive skills, internalising problems and school problems

	B	*SE*	β	95% CI	R^2	*p*	*N*
Adaptive Skills					.197	.000	255
Sex	-.14.2	3.3	-.247**	-20.7—7.7		.000	
Age	-.26	.14	-.227**	-.54-.04		.05	
Receptive vocabulary	.59	.10	.358**	.40-.81		.000	
EK	.74	.28	.134*	.21-1.31		.008	
Internalizing Problems					.074	.000	255
Sex	-.93	2.8	-.015	-6.6-4.6		.74	
Age	.31	.11	.218**	.07-.51		.005	
Receptive vocabulary	-.23	.08	-.205**	-.41- -.08		.005	
EK	-.52	.27	-.121	-1.03-.06		.053	
School Problems					.205	.000	255
Sex	5.01	2.4	.123*	.17-9.9		.041	
Age	.31	.12	.272**	.07-.53		.010	
Receptive vocabulary	-.37	.07	-.312**	-.51- -.24		.000	
EK	-.92	.26	-.241**	-1.4- -.38		.001	

Note: *$p < .05$, **$p < .01$

We additionally found several interactions between EK and the covariates in predicting adjustment scores. In the prediction of externalising behaviours, EK and sex [$t(238) = 2.03$; $p = .043$] and EK and receptive vocabulary [$t(238) = 2.26$; $p = .024$] interacted. The model including both interactions explained 16.5% of the variance in externalising behaviours [$F(6,238) = 9.03$; $p < .001$]. EK predicted externalising behaviour more strongly for girls than boys. Greater EK related to lower externalising behaviour for girls [$t(238) = -3.59$); $p < .001$] but not for boys [$t(238) = -1.23$; $p = .217$] (see Figure 1). On the other hand, there was a moderating effect of receptive vocabulary at the 10th, 25th, 50th, 75th and 90th percentiles (see Figure 2): below a score of 120.56 in receptive vocabulary, children with higher EK had lower externalising problems but, above this level, EK did not relate with externalising problems significantly.

In the predictions of self-reported personal adjustment, clinical maladjustment, and school maladjustment, EK interacted with age. For personal adjustment, the model with this interaction explained 7% of the variance, [F(5,228) = 3.41; p = .005], and the interaction between EK and age predicted personal adjustment significantly [t(228) = 2.65, p = .008]. The Johnson-Neyman technique was applied to determine that at 115 months (9.6 years) or older, children with higher EK had a higher personal adjustment. Before this age, EK did not relate to personal adjustment significantly (see Figure 3).

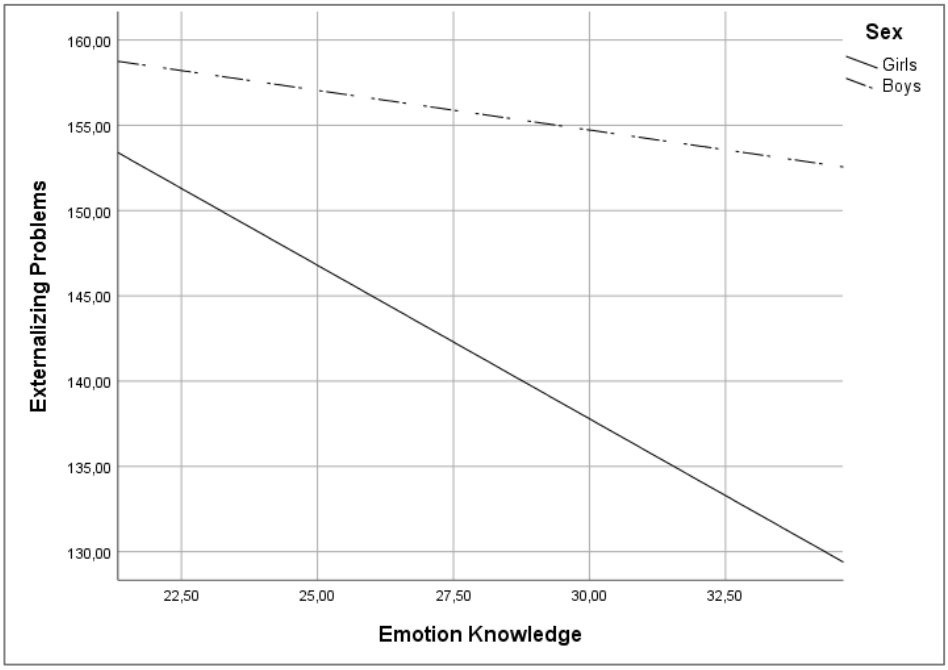

Figure 1: Association between emotional knowledge and externalising problems by sex

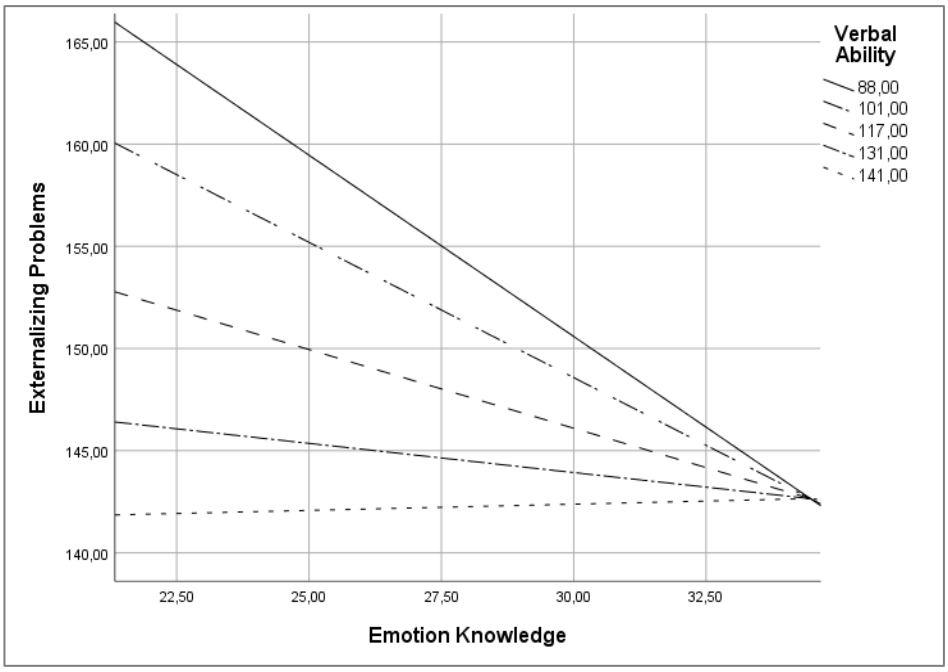

Figure 2: Association between emotion knowledge and externalising problems based on receptive vocabulary

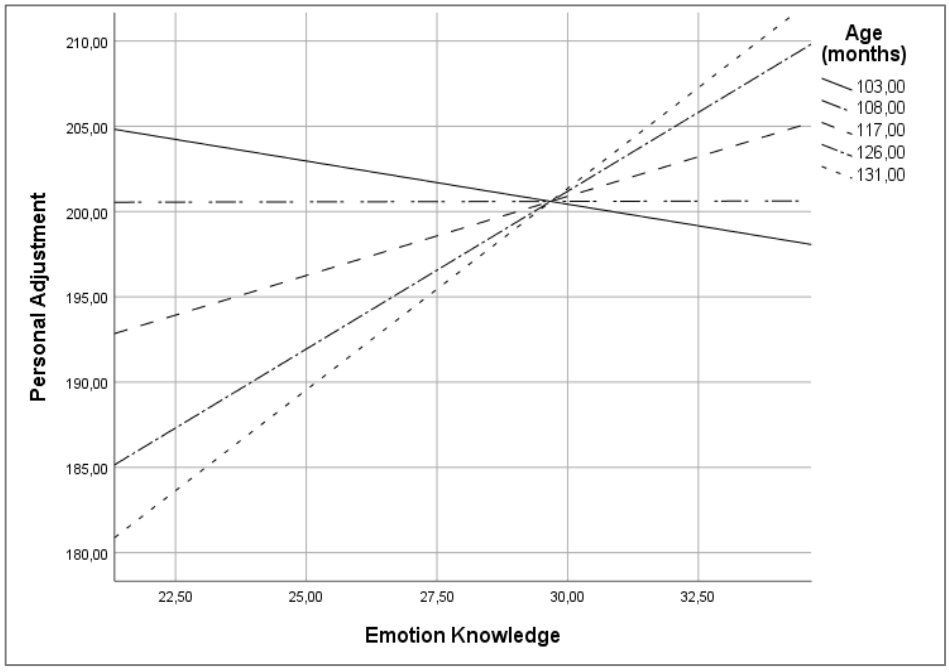

Figure 3: Association between emotion knowledge and personal adjustment by age

For clinical maladjustment, a model that included EK, sex, receptive vocabulary, age and the interaction between age and EK predicted 4.7% of the variance [$F(5,222) = 3.26$; $p = .007$]. The interaction

between EK and age was statistically significant [$t(222) = -2.44$ $p = .015$]. The Johnson-Neyman technique determined that, at age 119 months (10 years) or older, children with higher EK had lower levels of clinical maladjustment. Prior to this age, EK did not relate significantly to clinical maladjustment (see Figure 4).

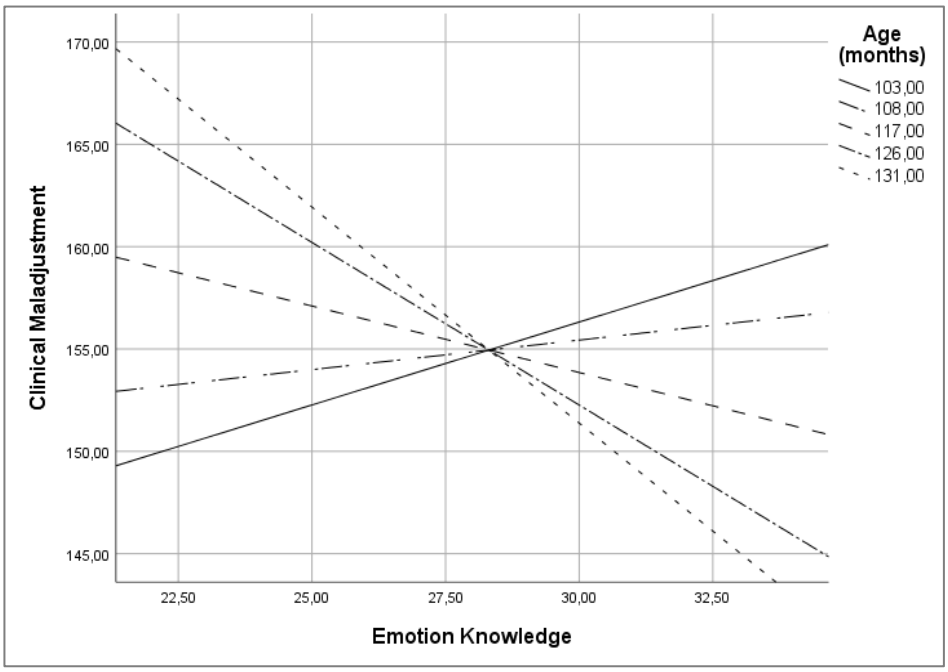

Figure 4: Association between emotion knowledge and clinical maladjustment by age

For school maladjustment, the model including EK, sex, receptive vocabulary, age and the interaction between age and EK predicted 8.5% of the variance [$F(5,227) = 4.22$; $p = .001$]. The interaction between EK and age was statistically significant [$t(227) = -2.51$ $p = .012$]. For children aged 119 months (10 years) and older, higher EK predicted lower school maladjustment. Before this age, however, EK did not relate significantly to school maladjustment (see Figure 5).

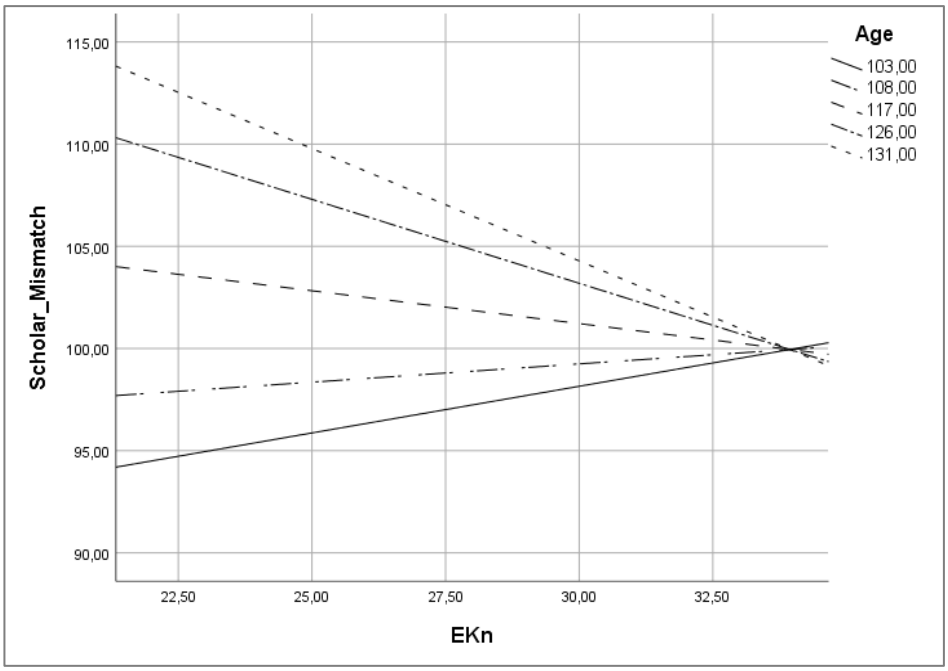

Figure 5: Association between emotion knowledge and school maladjustment by age

Discussion

This Spanish ACES demonstrated adequate psychometric properties. The existence of three factors (expressions, behaviours, and situations) that cohered into a single second-order factor (overall EK) was confirmed. The internal consistency for the three subscales in the current study was adequate and, in fact, stronger than those obtained in previous studies (Myles-Pallister et al., 2014; Santos & Langill, 2019; Schultz et al. 2004). The modified response format utilized in this study that is, not providing possible answers—may have provided greater precision.

One item loaded insignificantly, and another three loaded significantly but weakly. Interestingly all involved fear stimuli. This is consistent with Ekman's original cross-cultural studies that found fear recognition to demonstrate weaker consistency across cultures than other discrete emotions (Ekman, 1972). Some of the items with low loadings (e.g., "When the teacher asks Laura a question, she looks down. How does Laura feel?") might be expected to generate fear- and shame-related experiences in the Spanish child population, but others, such as "Lucas is walking down the hallway. An older child passes right by him and tells him to get out of the way. How does Lucas feel?" seem more clearly linked to fear in this population. To reach a culturally adapted ACES, we will adapt these problematic items further to make the associations with fear clearer within the Spanish context.

The results offered evidence of predictive validity in significant relationships both between EK and child characteristics (verbal ability, age and sex) and between EK and the child's social, behavioural and school functioning. Consistent with previous studies (Brechet et al., 2009; Trentacosta & Izard, 2007), verbal ability was strongly associated with EK, relating significantly to the overall ACES score and each subscale, even after

controlling for age and sex. As stated previously, children with greater verbal ability are more apt to have a well-developed emotion vocabulary and to connect these words to facial expressions, behaviours, and situations (Denham, 2019; Shablack & Lindquist, 2019; Trentacosta & Fine, 2010). Age only predicted better performance in emotion behaviour knowledge—that is, the ability to identify emotions in behavioural manifestations (Barisnikov et al., 2020; Pons & Harris, 2019; Rivers et al., 2012). Somewhat surprisingly, girls and boys differed significantly in situational EK but not in other facets of EK, such as facial recognition. McClure's (2000) meta-analysis demonstrated an advantage for girls in facial emotion recognition with greater differences as children age (McClure, 2000; Rivers et al., 2012). Not all studies find this difference (García & Tully, 2020), however, and girls' superior EK performance may depend on the specific task (Fidalgo et al., 2018).

Consistent with other studies, children with higher EK displayed more adaptive behaviours and fewer school problems (Cramer et al., 2019; Schultz et al., 2001; Trentacosta & Fine, 2010; Voltmer & von Salisch, 2017). This is something particularly important to document for a new EK tool, as this is an established behavioural correlate of EK (Denham, 2019; Trentacosta & Fine, 2010). ACES scores did not relate significantly to internalising behaviour. Trentacosta and Fine´s meta-analysis (2010) found no statistically significant relationship between EK and internalising behaviour for children aged 6-11 years but did at younger and older ages. The finding remains suggestive that EK might relate to internalising behaviours less strongly during the pre-adolescent elementary school years. It should be noted that few children in the sample exhibited elevated internalising problems: more than 90% of participants had adaptive scores. Only 5% had risk scores, and less than 3% had clinical scores. The relationship between EK and internalising behaviours may be better captured by studying it in samples with a wider range of internalising problems. Alternatively, the overwhelming majority of studies within Trentacosta and Fine's meta-analysis occurred within English-speaking contexts. Whether children's EK relates to internalising behaviours somewhat differently within the Spanish context remains to be determined.

We found many interesting interactions between EK and child characteristics in the prediction of social, behavioural, and school adjustment. Age moderated relationships between EK and self-reported personal adjustment, clinical maladjustment, and school maladjustment, with older but not younger children higher in EK showing greater personal adjustment and lower clinical and school maladjustment. The Trentacosta & Fine (2010) meta-analysis did not examine any of these specific indicators of social, behavioural or school adjustment. This interaction is similar to their results for externalising behaviours, however, in that they found stronger relationships between EK and externalising behaviours at older than younger ages.

Although some studies have found a main effect of EK on externalising behaviour (Cooper et al., 2020; Qualter et al., 2019; Rivers et al., 2012) or age to moderate this relationship, in the present study this relationship was moderated by sex and verbal ability. In particular, for girls but not boys, lower EK related to more externalising behaviours. This finding is consistent with Qualter et al., (2019), who detected a negative relation between EK and aggressive behaviours among 9-11-year-old girls but not boys. In some ways,

emotional processes play a more central role in girls' relationships and interactions. For example, as of toddlerhood, girls both express (Fabes, 1994) and discuss (Cervantes & Callanan, 1998) emotions more often than boys. Girls are also encouraged to take the perspective of others more often than boys (Van der Graff et al., 2018). Missed or mistaken emotion recognition may constitute a greater social transgression within girls' peer groups than boys' and therefore more likely lead to conflicts with peers and other disruptive behaviours.

Verbal ability also moderated the relationship between EK and externalising behaviours; for children with more limited receptive vocabulary, greater EK predicted less externalising behaviours. This suggests that EK and verbal ability may work together to protect against developing externalising behaviours.

Why age did not moderate relations between EK and externalising behaviours, as it did in Trentacosta & Fine's (2010) work, is unclear. When this age-related change occurs, we do not know why. Generally, we know little about the specific processes by which EK relates to social and behavioural adjustment at specific ages and how these processes might change across development. Studies of other skills such as self-regulation (Chang et al., 2015; Hosch et al., 2022) and emotional problems (Picoito et al., 2021) demonstrate that heterotypic continuity occurs. That is, the structure of the construct changes over time, and different aspects of the construct relate to behavioural functioning at different times. More research is needed to examine if and how heterotypic continuity may occur in EK development.

Limitations and Future Directions

This study has certain limitations. First, the ACES was created within an American context, and emotional behaviours and situations for children in Spain may differ slightly. While the Spanish ACES has adequate psychometric properties, the items might miss contexts within emotions are elicited for Spanish children. Secondly, the ACES response format was modified from close-ended to open-ended and therefore increased demands on children's expressive language skills. Future research should assess expressive vocabulary to analyse its role in Spanish ACES assessments. Additionally, the relatively homogeneous demographic composition of the sample may have limited the generalisability of the results. Future studies should include more diverse populations and clinical samples to address the relationship between EK and emotional and behavioural problems more thoroughly.

The present study documents both adequate psychometric properties of the Spanish ACES and how it relates to social, behavioural and school functioning in interactive and interesting ways. This tool may help researchers go deeper into the development of EK in Spanish children and if and how EK might relate to social and behavioural functioning somewhat differently in Spanish children.

Conflict of interest

We have not known conflict of interest to disclose. The ACES tool and the data that support the findings of this study are available upon reasoned request to the corresponding author.

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