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Cross-sectional study of Emotion Understanding in Portuguese children

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Abstract

Emotion understanding in children is a complex process involving the conjugation of different other processes of emotional information. It has been considered a key component of emotional skills in young children and an important predictor social skills development.

This study aims to describe the emergence of emotion understanding different components according to age and degree of complexity.

The sample comprises 401 portuguese children, ages 43 to 77 months (M=64.17, DP=7.05), attending preschool, and the instruments used were the Test of Emotion Comprehension (TEC) and Raven's Colored Progressive Matrices (CPM).

Results have shown that different components of emotion understanding do not appear all at the same time, but evolve over the years along with cognitive development. Children at earlier ages are more able to recognize the expression of basic emotions, but the ability to reflect upon emotions consolidates later. Results haven't shown significant differences considering gender and socioeconomic status.

Introduction

In due time, it is expected that children develop emotional competence (Denham et al., 2011; Santos, & Faria, 2005). Emotional understanding is a key component of emotional competence of young children (Belacchi, & Farina, 2010). This is a construct that encompasses the developmental abilities of children to express, regular, and understand emotions. The failure to obtain that competence can sometimes lead to disastrous consequences (Schaffer, 2004).

Pons et al. (2004), have described that emotion understanding in children have at least nine different components: (1) emotions recognition, based on facial expressions; (2) understanding the external causes of emotions; (3) understanding of aroused desire; (4) understanding the beliefs based on emotions; (5) understanding the influence of recall in circumstances of evaluation of emotional states; (6) understanding the possibilities of controlling emotional experiences; (7) understanding the possibility of hiding an emotional state; (8) understanding of the existence of multiple or even contradictory (ambivalent) emotional responses; (9) understanding of moral expressions. These 9 components, depending on the level of development, can be grouped into three phases: an external phase (3-6 years); a mental phase (5-9 years); and a reflexive phase (8-12 years) that includes the possibility to identifying what a person can feel more than an emotion, includes moral emotions (such as guilt) and mental control of emotions.

Emotional understanding is a socio-cognitive ability and it has been shown to be an important predictor of the development of social skills (Belacchi, & Farina, 2010). Halberstadt et al. (2001) showed that children who have high abilities to understand emotional signals develop better social skills and positive interpersonal relationships. Thus, emotional understanding contributes to the crucial task of social competence between 2 and 5 years: the successful initiation of peer relationships (Denham et al., 2003). The growing complexity of social demands in our society, both personally and professionally, increases the interest in the study of this component of emotional competence.

Thus, the aim of the present study was to study emotional understanding in preschool children, and the questions that guided this investigation were:

- Does emotion understand increases with age?
- Emotional understanding relates to nonverbal intelligence?
- Do sex, socioeconomic level influence the emotion understanding?

For that, a quantitative, cross-sectional and correlational study was developed (Almeida, & Freire, 2008).

Method

Participants

The sample was collected in the 2nd and 3rd term in a pre-school in Madeira Island (Portugal). The study comprises 401 children aged 43-77 months (M=64.18), 205 girls (51.1%) and 196 boys (48.8%), 258 have low socioeconomic level (64.3%) and 123 and average level (30.7%) (Morais, Peneda, Neves, & Cardoso, 1993).

Instruments

To evaluate emotion understanding it was used the *Test of Emotion Comprehension* (TEC., developed by Pons, Harris, & de Rosnay, 2004 and translated by Roazzi et al., 2008 to portuguese population). This test analyze the following dimensions: I – Emotion Recognition; II – Understanding external causes; III – Understanding that a desire can cause an emotion; IV – Understanding belief-based emotions; V – Reminde on a present emotional state; VI – Emotion regulation; VII – Hiding an underlying true emotional state; VIII – Understanding mixed emotions; IX – Understanding the role of morality. The Portuguese version is computerized, for each component there is a situation / problem (female voice), there are five emotional responses optional that child can choose (e.g., happy, sad, angry, affraid, OK); only one is correct. Each child can obtain a minimum of zero and a maximum of nine points. Using the Kuder-Richardson coefficient as a measure of reliability, acceptable levels of internal consistency have been found (KR-20-= .72).

To measure nor-verbal intelligence was used the Raven's Coloured Progressive Matrices (CPM, Raven, 1938 adapted to Portuguese population by Simões, 1995). It is composed by 36 items divided in three sets of items: A, AB, and B, each one with twelve items in an increasing order of difficulty. Each item is a figure where misses a piece, six solutions are given to the child to complete the figure; one is the correct. The total score is the total number of correct answers.

Procedure

Data collection took place in the school, after school board and parents authorization. The instruments were applied individually, in an appropriate place, during about 30 minutes. The child could stop or give up the participation as soon as they expressed that desire. It was guaranteed. the ethical and deontological principles of the Portuguese Psychologists Board (2011). After collecting data, they were introduced in the SPSS software, version 23.0 for Windows. Statistical and non-parametric statistical tests were used according to whether or not the assumptions for its use were met (normality of the distribution of the interval variable and homogeneity of the variances according to Morgan, Leech, Gloeckner and Barrett (2011) of 95%). The magnitude of the effect (ES) was also determined for all the tests used, following the formulas developed by Cohen (cited by Coelho, Cunha, & Martins, 2008).

Results

In the first analysis, each of the nine components was analyzed according to the percentage of correct answers. The components were ordered according to the percentage of children who scored on each of them. As expected, the best performances were in components I, II and V, which together form the external phase, which appears between 4 and 5 years (Pons et al., 2004). It is verified that in almost all the components as the age advances, the number of hits tends to increase with small variabilities, always having a significant association (χ^2), with the exception of component 9. It is also observed in a horizontal reading of the picture, that the number of hits tends to decrease with the complexity of the task and the level of processing emotional information.

Table 1 *Percentage of correct answers, and the results of the chi-square (χ^2) that was conducted to evaluate effect of age for each component.*

Age	N	I	II	III	IV	V	VI	VII	VIII	IX
4	28	75	82.1	7.1	25	39.3	17.9	10.7	7.1	10.7
5	97	91.3	80.4	27.2	27.2	48.9	28.3	22.8	17.4	22.8
6	52	92.3	92.3	36.5	42.3	50	42.3	28.8	44.2	21.2
7	90	85.6	96.7	46.7	42.2	58.9	47.8	34.4	45.6	26.7
8	55	98.2	98.2	49.1	40	61.8	56.4	40	50.9	34.5
9	47	95.7	100	55.3	48.9	83	72.3	61.7	68.1	31.9
10>	37	97.3	100	54.1	51.4	78.4	70.3	78.4	59.5	32.4
Méan		91.0	92.3	40.1	38.9	59.1	46.6	37.4	40.9	26.2
χ^2	401	18.7**	34.3***	30.3***	12.7*	27.2***	54.1***	57.4***	57.2***	8.2

Note: ***p> 0,01, **, p> 0,05

The overall results of emotion understanding also increase with age (cf. Figure 1). However, as noted by Albanese et al. (2007) Ponst et al. (2004), individual differences are present at any age.

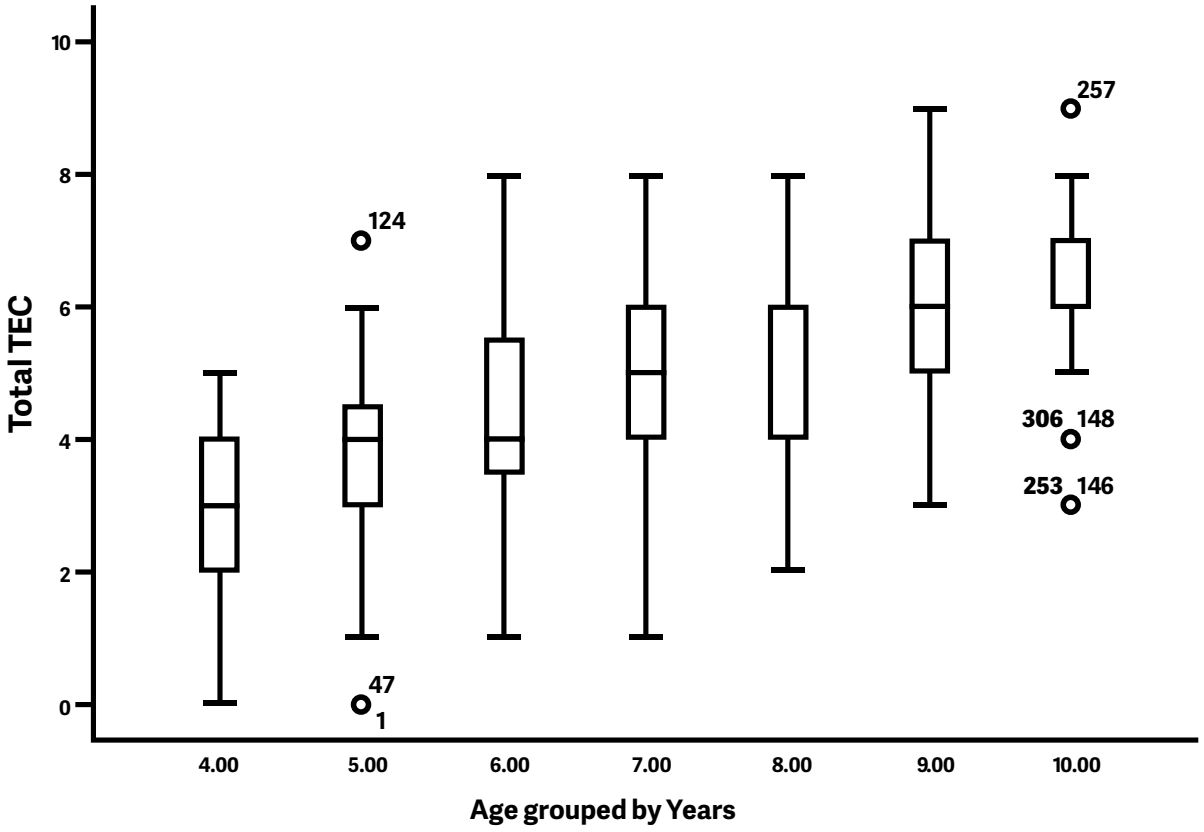

Figure 1 TEC total results and age

Analyzing the difficulty of the components (Table 2), the results indicate that the proportion of hits (the degree of difficulty) is different between component (Q (8)=770.25, p< .001). The results of the contrast analysis (Friedman test comparing the number of hits in each pair of components) shows that the nine components may be divided into four groups with a different difficulty level. In the first group, the components I and II (both components of the external phase) have the highest number of hits and the lowest levels of difficulty. With a higher level of difficulty are the components V and VI (the first phase but external phase belonging to the second reflective described by Pons et al. 2004). Then, again the component VI with components VIII, III, IV and VII (two-phase and two-phase external reflective) and finally the components more difficult for students were IV, VII and IX (two-phase mental and the reflective).

Table 2 *Analysis of the difficulty of the components*

	I	V	VI	VIII	III	IV	VII	IX
II	-0.06^{ns}	1.59***	2.05***	2.31***	2.34***	2.40***	2.47***	2.97***
I		1.49***	2.00***	2.26***	2.29***	2.24***	2.41***	2.92***
V			0.56^{ns}	0.82**	-0.85***	-0.91***	0.98***	1.48***
VI				0.26^{ns}	-0.29^{ns}	-0.35^{ns}	0.41^{ns}	0.92***
VIII					-0.03^{ns}	-0.09^{ns}	-0.16^{ns}	0.66*
III						0.06^{ns}	0.12^{ns}	0.63*
IV							0.07^{ns}	0.57^{ns}
VII								0.50^{ns}

Note: ***p> 0,01, **, p> 0,05, ns Not significant

Table 3 *Pearson correlations, bivariate and partial controlling for age, between the TEC (total score) and the CPM*

Control variable	MPCR		IC 95%	
			LL	UL
Noned*	TEC	.19***		
Age in month	TEC	.21***		

Note: n=397; a=Cells contain zero-order correlations (Spearman); CI=confidence interval; LL=lower limit; UL=upper limit p< .05.

Table 4 *Biserial correlations, bivariate between componentes and CPM*

Control variable		I	II	III	IV	V	VI	VII	VIII	IX
None	MPCR	.18*	.24**	.20**	.11	.01	.24***	.01	.13*	.01

Note: *n*=395; a. Cells contain zero-order correlations

We verify (Table 3) that the emotion understanding is correlated with fluid intelligence, rs (395)= .19, p< .001. After the controlled variable age, the correlations between the emotion understanding and cognitive development remain significant (r (392)= .21, p< .001). Significant relationships were also found between the scores of CPM (Table 4) and component I, recognition (rb (393)= .18, p= .045), and component II, external causes (rb (393)= .24, p= .009) the component III, desire (rb (393)= .20, p= .003), the component VI, regulation of emotions (rb (393)= .24, p< .001), and component 8, mixed emotions (rb (393)= .13, p= .049). The associations continue to be statistically significant, even after controlling for age. It can be inferred that the higher fluid intelligence, best children are to recognize emotions and understand the external causes of emotions, aroused desire, regulate emotions and understand ambivalent emotions. Using the guidelines of Cohen (quoted by Morgan et al., 2011) we can state that the size of effect of fluid intelligence is between small and moderate.

Regarding, de variable sex, no differences were found in total scores when analyzed using a t-test for independent samples (t (399)= 0.155, p= .877), nor in the different components using the #2 test. The same append with the socioeconomic level, were no significant differences were found for total score (t (379)= .09, p= .932) or for the different components.

Discussion

As we stated at the beginning, the aims of this research were, in the first place, to verify if emotion understanding increases with age, as well as the mastery of more complex processes of emotional information, secondly, if it would depend on nonverbal intelligence and, thirdly, if it was influenced by individual (sex) and contextual variables (socioeconomic level).

Regarding first aim, the children in our study were able to identify and recognize expressions for basic emotions and to identify their triggers (Schultz et al., 2005). They also revealed being aware of beliefs, desires and emotional memories influences on their responses, and furthermore, they revealed emotional regulation strategies (Rosnay et al., 2004; de Rosnay et al., 2014).

As expected, accordingly to literature, in each component of emotion understanding children performance increased with age, in almost all components (Pons et al., 2002; Pons et al., 2004; Albanese et al., 2006). Likewise, children resolved more successfully complex tasks as age increase. Therefore,

as age increases, children were abler to recognize the emotions expressed by others, to relate different circumstances involved in one situation, to differentiate true emotion expressions from false ones, to understand different mechanisms involved in emotional regulation processes, and to perceive these regulations as important to moral judgments and consequently to social relationships.

Further, results were consistent with Tenenbaum et al. model (2004). Emotion understanding at mental and reflexive phases showed up to work at a more complex level of representation than at external phase. As explained by Albanese et al. (2010), emotions can be considered as abstract objects at mental and reflexive phases. For example, children are only able to understand mixed emotions if they have the ability to think both positive and negative emotions simultaneously. Therefore, the more children are able to represent emotions in an abstract form, the better they will understand it.

Regarding the relation between emotion understanding and non-verbal intelligence, correlations found were not as strong as correlations found in other studies (Albanese et al., 2010). But although correlations were weak and moderate, they remained independent of children's age, thus revealing a constancy throughout development.

The results suggested that children are abler to solve problems measured by CPM as they integrate multiple sources of information, since it allows them to into account different variables when they have to solve a more complex emotional situation. The ability to analyze problems from multiple perspectives and integrate them is critical to achieve the reflexive phase of emotion understanding (Albanese et al., 2010).

Regarding our third objective, and similarly to other studies, neither sex nor socioeconomic level had been shown to influence development of emotion understanding (Albanese et al., 2007; Belachi, & Farina, 2010; Farina et al., 2007; Gustafson, 2009).

Thus, this study has contributed to further corroborate the data that had already proven the development of emotion understanding with the age.

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