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Version of record first published: 06 Aug 2012

To cite this article: Veronica Ornaghi & Ilaria Grazzani (2012): The relationship between emotional-state language and emotion understanding: A study with school-age children, Cognition & Emotion, DOI:10.1080/02699931.2012.711745

To link to this article: http://dx.doi.org/10.1080/02699931.2012.711745
The relationship between emotional-state language and emotion understanding: A study with school-age children

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We carried out an investigation with primary-school children on the relationship between both use and comprehension of emotional-state language and emotion understanding. Participants were 100 students between 7 and 10 years old (mean age = 8 years and 10 months; SD = 15.3 months), equally divided by gender. They completed four tests evaluating their language ability, use of emotional-state language, comprehension of emotional-state language and emotion understanding (EU) respectively. Significant correlations were found between both use and comprehension of emotional-state talk and children’s EU. In addition, regression analyses showed that comprehension of emotional-state language, rather than its use, plays a significant role in explaining children’s emotion understanding.

Keywords: Emotional-state language; Use and comprehension of the psychological lexicon; Emotion understanding; Theory of mind.

This study examined, in primary-school children, the relationship between emotional-state language (ESL) as a particular type of mental-state talk and emotion understanding (EU) as a particular case of theory of mind (Harris, 2008). Understanding the emotions of self and others is an important component of children’s social cognition, to the extent that lack of such ability is implicated in atypical development and problem behaviours (Dunn, 2000).

Numerous studies on children’s theory of mind (ToM) suggest that language plays a key role in acquiring understanding of mental states such as desires, thoughts, intentions and emotions (Milligan, Astington, & Dack, 2007). In fact, through language children participate in social interactions...
fostering their ability to link actions and behaviours with mental states that are inaccessible to direct observation.

The relationship between language and ToM is well embedded in the specific type of lexicon known as mental-state talk (Astington & Olson, 1990) that allows people to describe their internal worlds. Ability to use mental-state terms has been shown to be a key indicator of early ToM competencies, and a precursor of later metarepresentational ability (Astington & Baird, 2005). Longitudinal studies with toddlers have shown that the more a mother uses mental-state terms when speaking to her child, the better the child’s performance on false-belief tasks (Symons, Fossum, & Collins, 2006) and tests of EU (Taumoepeau & Ruffman, 2008), and the more frequently the child itself makes use of psychological language (Howard, Mayeux, & Naigles, 2008). Research with preschoolers has indicated an association between the frequency with which children use mental-state terms during spontaneous conversation and their scores on false-belief ToM tasks (e.g., Ruffman, Slade, & Crowe, 2002). Moreover, training studies with 3- to 5-year-old children (Lohman & Tomasello, 2003; Ornaghi, Brockmeier, & Grazzani Gavazzi, 2011) have shown that language games featuring the mental-state lexicon and involving conversation about the mind play a significant role in fostering theory-of-mind development. These studies, which share the Vygotskian and social constructionist perspective adopted here (Nelson, 2007), have shown the key role played by children’s active participation in linguistic exchanges about mental states; as forms of social interaction, such exchanges allow children to internalise thoughts regarding the internal world of self and others (Symons, 2004).

And what about the school-age years? Meins, Fernyhough, Johnson, and Lidstone (2006) investigated the relationship between use of the psychological lexicon and theory-of-mind development in a sample of 7- to 9-year-olds. Participants were administered two tasks (book narration and describe-a-friend) to evaluate their use of mental-state talk, and the strange stories task to assess ToM. The authors found that ToM performance was not related to children’s use of psychological lexicon. Similar results were reported by Charman and Shmueli-Goetz (1998), regarding a study in which children’s use of mental-state terms while narrating a wordless book was unrelated to measures of ToM. However, two recent studies have reported different results. Lecce, Caputi, and Pagnin (2009) found that when the effects of individual differences in verbal ability were partialled out, school-age children’s inner-state talk was still significantly correlated with performance on theory-of-mind tasks. Similarly, Grazzani and Ornaghi (2012) found moderate correlations between use of mental-state talk, measured with a non-interactional task, and scores on ToM tests in a sample of 8- to 10-year-old students.

In contrast to research on the earlier stages of development, studies with school-age children have tended to also investigate the comprehension of mental-state language. This ability has generally been assessed through short stories with illustrations, each followed by a question. Specifically, the child is asked to choose which of two alternative mental terms (e.g., know vs. remember) better expresses the inner state of the story’s protagonist, as in Astington and Pelletier’s mental-state language task (1998). With a similar measure, Antonietti, Liverta, Marchetti, and Astington (2006) found that comprehension of mental-state language correlates with understanding of both epistemic and emotional inner states. Finally, Pelletier (2006) and Grazzani and Ornaghi (2012) found strong correlations between comprehension of mental-state terms and ToM in childhood.

Taken all together, the studies examined yield partly contradictory results, which do not allow us to draw firm conclusions on the relationships under study. Specifically, use of mental-state language was found to correlate with ToM ability in some studies only, whereas all the research examining comprehension of mental-state language reported a correlation with ToM. Moreover, with the exception of the study by Grazzani and Ornaghi (2012) just cited, all the other research reviewed here has focused either solely on the use, or solely on the
comprehension, of the psychological lexicon. In addition, it must be emphasised that only one of the studies examined (Antonietti et al., 2006) makes reference to emotional-state language, despite the fact that this is a key component of the psychological lexicon. Finally, as far as we know, no earlier studies with school-age children have focused specifically on the impact of emotional-state language on emotion understanding as a special case of ToM. We intended our study to contribute to bridging this gap, by focusing on the unexplored area regarding both use and comprehension of ESL in relation to children’s EU.

ESL is to be differentiated from other categories of mentalistic language such as terms relating to cognition and moral judgement (e.g., believe, hypothesise, be obliged to). In fact, the latter types of mental-state terms develop in line with cognitive and learning processes in school-age children (Pelletier, 2006) and have been the focus of most of the research mentioned above. In contrast, the language of emotional and affective states (e.g., be angry, be ashamed, be envious) refers mainly to interpersonal processes, the relationship between self and others, and understanding of the social world. Children regularly talk of and reflect on emotions in the course of their daily lives (Dunn & Hughes, 1998) developing an elaborate understanding of the nature and causes of emotions, including emotions based on false belief. Emotion understanding is a key component of ToM (Harris, 2008) and a key aspect of the broader socioemotional competence that children develop from infancy and primary-school age through adolescence and beyond (Denham, 2007).

A substantial body of research on ToM and emotion shows that performance on measures of EU registers gains between the ages of 6 and 8, and again between the ages of 8 and 10, as Pons, Harris, and de Rosnay (2004) have reported. The latter authors have proposed a developmental model of EU that is borne out by empirical data from a number of different countries (e.g., Albanese & Molina, 2008; Tenenbaum, Alfieri, Brooks, & Dunne, 2008) using the Test of Emotion Comprehension (TEC; Pons & Harris, 2000), the same instrument adopted in this study. According to this model, children with a typical developmental profile progress through a series of landmarks in developing EU, which comprises nine different components. At a first level (conventionally referred to as external by the authors) children from around 3 to 4 years of age demonstrate mastery of three initial components: recognition of facial expressions, understanding the impact of situational causes on emotions, and the role of desires in emotions. At a second level (termed mental), children from around 6 to 7 years of age display correct understanding of three further components: the role of beliefs in emotions, the impact of memory on emotions and the distinction between outwardly expressed and privately felt emotions. At a third level (labelled reflective), children from about 8 to 9 years of age are found to have acquired the three remaining components of EU: the effect of morality on emotions, awareness that emotions can be regulated through cognitive control strategies, and an appreciation of concurrent mixed feelings. Each transition from one level to another represents an increase in the child’s ability to understand the effect of internal states on emotional experience.

The main purpose of this study was to investigate the link between competence in ESL and EU in 7- to 10-year-olds. We wished to verify correlations between both use and comprehension of ESL and EU. Furthermore, we wished to investigate how use and comprehension of ESL contributed to explaining children’s performance on EU, once language ability, age and gender had been controlled for. Moreover, we compared the children’s performance as a function of age, dividing the sample into two age groups on the basis of the EU developmental model presented above.

METHOD
Participants
A total of 100 school-age children (53 boys and 47 girls) displaying typical development took part in the study. They were 7- to 10-year-old pupils ($M = 8$ years and $10$ months; $SD = 15.3$ months) at three different primary schools in a predominantly
middle-class urban district of Northern Italy. Participants were equally distributed by gender and required to have basic reading and writing skills. The children were divided into two age groups on the basis of the developmental model of EU: the younger group (N = 44) was composed of children from 7 to 8.8 years old (M = 7 years and 8 months; SD = 7.67 months) and the older group (N = 56) consisted of children from 8.9 to 10.5 years old (M = 9 years and 9 months; SD = 9.84 months).

**Instruments, procedure and coding**

Participants completed four measures evaluating receptive language competence, use of ESL, comprehension of ESL, and EU respectively. Three of the measures were conventional tests involving right or wrong answers, while that evaluating production of ESL was a freestyle writing task. The latter was administered to the whole class group simultaneously, while the other three tests were administered individually to each participant, at one sitting and in counterbalanced order.

*Peabody Picture Vocabulary Test (PPVT; Italian standardised version by Stella, Pizzoli, & Tressoldi, 2000).* The PPVT (Dunn & Dunn, 1981) was administered to control for language ability, given that language skills are known to be associated with EU and ToM. This test evaluates the receptive vocabulary of children between the ages of 3 and 12 years.

*My best friend task.* This written task was a modified version of the describe-a-friend instrument, an oral interview devised by Meins et al. (2006). In order to encourage use of ESL, children were asked to write answers to the following questions:

1. Please write down everything that comes to mind about your best friend.
2. In particular, describe your best friend’s personality.
3. What do you like, and what do you not like, about him or her?

Two types of coding were applied to the texts: one to measure the length of the narratives and another to assess the frequency of the emotional lexicon. Specifically, the length of the texts was calculated by counting the total number of words used by each participant to answer the three questions. The ESL was coded following the scheme proposed by Meins et al. (2006) that includes verbs such as *be brave, be confident* and adjectives such as *cheerful, confident, friendly.* The judges first read and coded the texts independently, then discussed discrepancies in coding until mutual agreement was attained (the inter-rater reliability was satisfactory: κ = .83). Two specific criteria were applied during the coding process: only terms denoting inner emotional states (e.g., sad) as opposed to external manifestations (e.g., crying) were coded, and terms repeated within the same answer were counted only once.

*Emotional Lexicon Test (ELT; Grazzani, Ornaghi, & Piralli, 2009).* This is a validated Italian test for children between the ages of 3 and 10 years with an analogous structure and design to the Metacognitive Language Task of Astington and Pelletier (1998), which evaluates children’s comprehension of cognitive-state language. The researcher reads a story and then asks the child to indicate which of two cognitive terms (e.g., *remember vs. wonder*) better describes the mental state of the protagonist. The ELT used here is designed to evaluate children’s comprehension of the emotional state lexicon. It consists of 14 cards with short illustrated stories, of which six feature basic emotions (*joy, sadness, happiness, anger, fear, disgust*) and eight sociomoral emotions (*shame, contempt, guilt, hate, envy, jealousy, pride, loneliness*). The illustrations were specifically drawn so as not to display the facial expression of the protagonist (portrayed from the side or from behind) to avoid influencing the children’s responses. The examiner first reads the short story to the child, in which an external cause leads the protagonist to have an emotional experience. He or she then invites the child to choose which of
two emotional terms (e.g., joy vs. fear) better describes the feeling of the character, and finally asks the child to justify its choice via an explanation question with a control function. The emotional terms in the multiple-choice questions are counterbalanced so that each target expression is cited the same number of times; in addition the choices between alternative terms are designed to be as unambiguous as possible. A score of 0 or 1 is awarded for each test item. To obtain a score of 1, the child must select the correct emotional term and provide an appropriate explanation, for example “... sadness because she could not find her dog”. A score of 0 is awarded when the child chooses the wrong emotional term or when it chooses the correct term but fails to explain its choice in terms of the internal states of the protagonist, for example “... sadness because the dog is black”. Scores for the individual items are summed to yield a maximum total score of 14. Inter-rater agreement was 95% and disagreement was resolved through discussion.

Test of Emotion Comprehension (TEC). This test was devised by Pons and Harris (2000) and the current study used the standardised Italian version (Albanese & Molina, 2008). It is a cognitive test that evaluates EU in children between the ages of 3 and 11; more precisely, it assesses children’s developing understanding of the nature of emotions, their causes and the possibility of regulation. The theoretical model proposed by Pons et al. (2004) envisages three developmental stages (external, mental and reflective levels). These three macro-components of the theoretical construct of EU break down into nine specific components, each of which is assessed by the TEC. The components of the external level are: recognition (capacity to recognise and name basic emotions), external causes (awareness that emotions may be caused by external circumstances, such as receiving a gift), and desire (understanding of the role of desires in emotion). The mental level includes: beliefs (awareness that individuals’ beliefs, whether true or false, influence their emotional reactions), memories (awareness of the role of memories in emotional experience), and regulation (awareness that emotion may be controlled and regulated by the use of specific strategies). Finally, distinguishing between: apparent and felt emotions (awareness that there may be a discrepancy between what an individual really feels and the outward expression of emotion), mixed emotions (awareness that individuals may sometimes experience multiple or even contradictory emotions), and moral emotions (awareness of the role of moral precepts in determining emotional experience) belong to the reflective level. Only the first two components do not require EU in terms of ability to link internal emotional states to outward actions (emotional ToM). Of the remaining seven components, understanding of the role of desires in emotion is usually acquired at preschool age. Therefore, in this study with school-age children we only took into account scores for the last six, more advanced, components of EU. However, the test was administered in its entirety, because the content of successive items is inter-related in most cases.

To administer the TEC, the researcher reads a very short illustrated story to the child. He or she then shows the child, in systematically rotated order, four illustrations of faces representing different emotional states. On the basis of four expressive cues, the child is asked to choose, by pointing or naming, the appropriate face in relation to how the protagonist feels. For instance for the hidden emotion component the scenario is as follows: “This is Mark and this is Paul. Paul is teasing Mark because Paul has lots of marbles and Mark does not have any. Mark is smiling because he doesn’t want to show Paul how he is feeling inside”. Finally, the experimenter asks how Mark really feels inside.

For each component, children obtained a score of 0 for a wrong answer and a score of 1 for choice of the correct option. Coding was only applied to the items regarding the six components included in our research design. Summing the correct answers, a total score ranging from 0 to 6 was obtained. In addition, we calculated partial scores for the mental and reflective levels, each ranging from 0 to 3.
RESULTS

The results are presented in two sections, covering descriptive and preliminary statistics and regression analyses, respectively.

Descriptive statistics and age comparisons

Means and standard deviations for each variable are reported in Table 1, both for the overall sample and for each of the two age groups.

Correlational analyses were carried out to explore the relationship between use and comprehension of ESL, on the one hand, and EU, on the other (Table 2). With regard to the use of ESL, the total number of words produced by children in the “Describe a friend task” was controlled through partial correlation analyses. Both use ($r = .43, p < .001$) and comprehension ($r = .55, p < .001$) of ESL were positively associated with EU. The correlation between use (a) of such language and EU (b) was statistically significant even when the total number of words (c) was partialled out ($r_{ab,c} = .41; p < .001$).

We also carried out correlational analyses within each age group. Findings for the younger group confirmed the results obtained for the overall sample. In fact, both use ($r = .48; p = .001; r_{ab,c} = .38; p = .01$) and comprehension ($r = .69; p < .001$) of ESL were highly correlated with EU. Analyses carried out with the older group showed a low positive correlation between both use ($r = .29; p = .03; r_{ab,c} = .37; p = .005$) and comprehension ($r = .25; p = .05$) of ESL, on the one hand, and EU, on the other.

Finally, a series of analyses of variance (ANOVAs) were run to compare the two groups of age. With regard to the use of ESL, in order to control for the effect of the huge variation in text length, the raw data were converted into percentage frequencies, calculated in relation to the total number of words used by the participants. In addition, the data were transformed into arcsine values to normalise the distribution.

As shown in Table 1, the older group obtained significantly higher mean scores for language ability, $F(1, 99) = 70.64; p < .001$, ESL comprehension, $F(1, 99) = 14.05; p < .001$, and EU, $F(1, 99) = 10.35; p = .002$. With regard to the latter measure, we found significant differences for both the mental, $F(1, 99) = 8.64, p = .004$, and reflective, $F(1, 99) = 4.35; p = .04$, levels of the TEC. Specifically, older participants obtained higher scores on the items assessing their understanding of the role of beliefs in emotion, $F(1, 99) = 8.66, p = .004$, mixed feelings, $F(1, 99) = 8.87, p = .004$, and the effect of morality on emotion, $F(1, 99) = 6.11, p = .01$. No significant differences between the two age groups emerged for use of ESL, although the older children produced significantly longer narratives than the younger children, $F(1, 99) = 37.04; p < .001$.

Table 1. Means and standard deviations for all variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Younger group</th>
<th>Older group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
</tr>
<tr>
<td>Language ability (Peabody)</td>
<td>112.16 (14.05)</td>
<td>137.66 (15.80)</td>
<td>126.44 (19.66)</td>
</tr>
<tr>
<td>Use of emotional language (Best-friend task)</td>
<td>2.27 (2.08)</td>
<td>3.82 (2.45)</td>
<td>3.14 (2.41)</td>
</tr>
<tr>
<td>Comprehension of emotional language (ELT)</td>
<td>11.88 (1.06)</td>
<td>12.80 (0.65)</td>
<td>12.34 (0.91)</td>
</tr>
<tr>
<td>Emotion understanding (TEC)</td>
<td>4.50 (1.04)</td>
<td>5.12 (0.89)</td>
<td>4.85 (1.01)</td>
</tr>
<tr>
<td>Mental level (TEC)</td>
<td>2.61 (0.62)</td>
<td>2.89 (0.31)</td>
<td>2.77 (0.49)</td>
</tr>
<tr>
<td>Reflective level (TEC)</td>
<td>1.88 (0.86)</td>
<td>2.23 (0.78)</td>
<td>2.08 (0.83)</td>
</tr>
</tbody>
</table>

*Note: Standard deviations are given in parentheses.*
Testing the extent to which use and comprehension of ESL explain EU

Regression analyses were conducted to investigate in greater depth the relationship between ESL and emotion understanding. Specifically, we wished to explore the respective contributions of use and comprehension of ESL to explaining variance in EU, when controlling for age, gender and language ability.

Two separate hierarchical linear regression models were run, using the enter method to add the independent variables step by step in the desired order so as to obtain two full models. In both models, the variables age and gender (treated as dummy variables with the following values: 0 = younger and 1 = older; 0 = male and 1 = female) were entered at Step 1 and language ability at Step 2. The two complementary regression models were then continued as follows: in one model (A) the comprehension of ESL was entered at Step 3 and use of ESL at Step 4, while in the other model (B) these two variables were entered in reverse order (Table 3). Finally, in both models we controlled for interactive effects of age and gender with use and comprehension of ESL; however, given that $F$ did not vary significantly and the increase in explained variance was negligible, these interactions were excluded from the models.1

Model A. The variables age and gender were entered together at Step 1, $F(2, 99) = 5.85; p = .004$, yielding a multiple correlation coefficient of $\beta = .33 (R^2 = .09)$. Of the two variables, only age was found to be statistically significant ($\beta = .32; p = .001$). At Step 2, $F(3, 99) = 12.02; p < .001$, on entering language ability ($\beta = .54; p < .001$) the explained variance increased by 16% ($R^2 = .52$; $R^2 = .25$) while the contribution of age lost statistical significance. At Step 3, $F(4, 99) = 13.27; p < .001$, with the entry of ESL comprehension ($\beta = .37; p = .001$) the explained variance increased by a further 8% ($R^2 = .60$; $R^2 = .33$) while the contribution of language ability decreased ($\beta = .20; p = .05$). Use of ESL, entered at Step 4, $F(5, 99) = 11.36; p < .001$, yielded a negligible increase in the value of $R^2 (R = .61; R^2 = .34)$, with comprehension of ESL remaining the only statistically significant indicator of EU.

Model B. This second model was identical to Model A, but with reversed order of entry in Steps 3 and 4. Thus use of ESL ($\beta = .26; p = .01$) was entered at Step 3, $F(4, 99) = 11.06; p < .001$, yielding a significant increase of 4% in explained variance of EU ($R^2 = .56$; $R^2 = .29$), while language ability continued to play a significant role ($\beta = .34; p = .005$). At Step 4, $F(5, 99) = 11.36; p < .001$, with the entry of ESL comprehension, the explained variance increased by 5%. The beta

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1With the entry of the interactive effects (age $\times$ use, age $\times$ comprehension, gender $\times$ use, and gender $\times$ comprehension) in the two regression models, a negligible increase of the explained variance emerged ($R^2 = .36$) and comprehension of emotional-state language was confirmed to be the most important variable in explaining performance on the EU task ($\beta = .61; p < .001$). Specifically, only the interaction age $\times$ comprehension was significant ($\beta = -3.56; p = .02$) given that the power of ELT scores to explain performance on the TEC was higher in the younger group (intercept baseline value = $-5.99$) than in the older one (intercept baseline value = $-2.43$).
coefficients for language ability and use of ESL were no longer significant, again leaving ESL comprehension as the sole statistically significant factor ($\beta = 0.32; p = .004$).

In sum, taking the two models together we may conclude that once age, gender, and verbal ability have been controlled for, comprehension of ESL is the variable that best explains variance in children’s performance on the EU task.

**DISCUSSION**

As far as we know, no previous studies have simultaneously investigated use and comprehension of emotional terms in middle childhood in relation to EU, while also examining the roles of age and gender. We obtained two main findings that we will briefly discuss. First, both use and comprehension of ESL are correlated with EU. Second, comprehension of ESL plays a key role in explaining children’s performance on an EU task, whereas use does not.

Our finding that use of ESL correlates with EU is in line with the results regarding overall psychological lexicon obtained by Lecce et al. (2009) and ourselves (Grazzani & Ornaghi, 2012) all studies including the administration of the TEC. In contrast, Meins et al. (2006) and Charman and Shmueli-Goetz (1998) did not find correlations. In addition to the fact that their studies were different to ours, in that they examined all types of psychological lexicon (and therefore caution is required in making comparisons), a further plausible explanation for the contrasting findings could be the small sample size used in both cases, which may have given rise to problems of statistical power. It is to be noted that the correlation found in our study is stronger in younger participants, possibly because with older children more advanced cognitive and metacognitive abilities have to be taken into account.

We also found that comprehension of ESL is correlated with EU. As far as we know no studies in childhood have examined this relationship. Nonetheless, our finding is in line with the results of an earlier study of our own that examined how comprehension of cognitive psychological lexicon explains school-age children’s performance on traditional ToM tasks (Grazzani & Ornaghi, 2012). Similarly to use, the correlation of comprehension with EU tends to diminish with age despite remaining statistically significant. This

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**Table 3. Hierarchical regression analyses examining the effect of use and comprehension of ESL on EU, controlling for age, gender, and language ability**

<table>
<thead>
<tr>
<th>Variables</th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
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<td></td>
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<td></td>
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<tr>
<td>Age group</td>
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<td>0.19</td>
<td>0.32**</td>
<td>Age group</td>
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<tr>
<td>Gender</td>
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<td>0.19</td>
<td>0.11</td>
<td>Gender</td>
<td>0.22</td>
<td>0.19</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Age group</td>
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<td>-0.04</td>
<td>Age group</td>
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<td>0.23</td>
</tr>
<tr>
<td>Gender</td>
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<td>0.18</td>
<td>0.03</td>
<td>Gender</td>
<td>0.06</td>
<td>0.18</td>
</tr>
<tr>
<td>Language ability</td>
<td>0.03</td>
<td>0.01</td>
<td>0.54**</td>
<td>Language ability</td>
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<td>0.01</td>
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<td>Comprehension of ESL</td>
<td>0.41</td>
<td>0.11</td>
<td>0.37**</td>
<td>Use ESL</td>
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<td>0.04</td>
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<tr>
<td>Step 3</td>
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<td></td>
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<tr>
<td>Age group</td>
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<td>-0.01</td>
<td>Age group</td>
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<td>0.23</td>
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<tr>
<td>Gender</td>
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<td>0.17</td>
<td>0.04</td>
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<td>Language ability</td>
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<td>0.20*</td>
<td>Language ability</td>
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<td>0.37**</td>
<td>Use ESL</td>
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<td>0.04</td>
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<tr>
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<tr>
<td>Step 1</td>
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<td>0.17</td>
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Note: *$p < .05$; **$p < .01$ (all significance tests are 2-tailed).
suggests that although a link between the competencies measured persists throughout the primary school cycle, it tends to weaken towards late childhood.

On deeper analysis of the relationship between the variables, a second important finding is the leading contribution of ESL comprehension in explaining children's EU. That is to say, differences in performance on the EU task are not primarily explained by frequency of use but by comprehension of ESL. Specifically, comprehension is shown to play a significant role in explaining EU in both regression models, once age, gender and language ability have been controlled for. This means that children's ability to understand the emotional lexicon accounts for variation in their EU skills more than any other factor. During childhood, EU competencies become increasingly more complex (Harris, 2008) and this development goes hand in hand with a more advanced conceptualisation of the terms referring to emotional states.

In addition to the main results, we found significant age differences. Results concerning the comprehension of ESL are in line with existing research on how comprehension of the cognitive psychological lexicon develops in school-age pupils (Antonietti et al., 2006; Olson, 1994; Pelletier, 2006), with older participants displaying greater competence in identifying the correct meaning of advanced emotional terms. Similarly, the older age group outperformed the younger participants on the measures of EU in line with the findings of earlier studies (Albanese & Molina, 2008; Pons et al., 2004; Tenenbaum, Visscher, Pons, & Harris, 2004). The EU abilities of the older children include appreciation of the role of mentalistic and reflective factors in determining emotions; thus they perform better than the younger participants on tasks demanding understanding of the more difficult components: false-belief-based emotions, moral values and memories.

This study presents some critical areas of concern. The first critical aspect is intrinsic by nature to all studies on processes of comprehension mediated by language: where does the linguistic component end and the cognitive sphere begin (Vygotsky, 1962)? This issue is even more evident when, as in our study, the object of enquiry is comprehension of the components of language itself such as the psychological lexicon. In using the ELT, we asked the children to choose and justify their choice of appropriate terms, thereby bringing into play comprehension processes. For this reason, the ELT may not be considered a pure measure of language, free of the involvement of thought processes. Nevertheless, we believe that it may still provide valuable information regarding the comprehension of the emotional lexicon, similarly to analogous instruments used to evaluate comprehension of the epistemic lexicon (Astington & Pelletier, 1998), which may be also defined as metalinguistic or more specifically as metalexical tools. A second critical limit of our study could be the lack of naturalistic measures, such as observation of spontaneous interaction and conversation among children. In this view, future research design should include data collected in typical settings from the everyday lives of primary-school children. Finally, we have to mention the impossibility of characterising the causal direction among variables. To overcome this limitation, future research should also involve studies based on experimental manipulations of the ESL variable in order to evaluate different implications on children's EU.

Despite these limitations, the present findings have interesting practical implication. They suggest the importance of promoting emotional competence in school-aged children. Emotional development, up to around 6 to 7 years of age, involves the acquisition of many abilities including knowledge and use of a rich emotional lexicon, which children develop at an early age and exploit in social exchanges involving many potentially emotive situations (fights, arguments, competitions, etc.). As children grow up and enter into a greater number of more complex relationships, they need to be emotionally equipped to meet the challenges of their social environment. As suggested by O'Brien et al. (2011), adults in the family and other educational contexts have the opportunity to foster children's emotion
understanding. This can be achieved by using a conversational, metacognitive and metalinguistic approach (see Grazzani Gavazzi & Ornaghi, 2011, with preschoolers) to increase both use of and reflection on emotional-state language.

REFERENCES


