Children’s understanding of pretend emotions: The role of the vocabulary and the syntax of complementation with cognitive and communicative verbs

Francesc Sidera, Elisabet Serrat, Anna Amadó

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Children’s understanding of pretend emotions: The role of the vocabulary and the syntax of complementation with cognitive and communicative verbs

F. Sidera*, E. Serrat and A. Amadó
University of Girona, Girona, Spain

ABSTRACT
This work aims to study the role of the vocabulary and the syntax of complementation on a specific aspect of the Theory of Mind: children’s ability to distinguish between real and pretend emotions. A total of 70 children (37 aged four years; 33 aged six years) were individually administered the following tasks: a sentential complement sentences task, a task of understanding pretend actions, two tasks of understanding pretend emotions (in oneself and in others), and a receptive vocabulary test. The results showed significant correlations between the ability to understand pretend emotions and both the vocabulary and the syntax of complementation, but only in four-year-olds. Though pretend emotion understanding was found to be more tied to syntax of complementation than to vocabulary, this type of syntax was not a necessary or a sufficient condition to understand pretend emotions. The results are discussed in the light of the importance of the links between language and emotion understanding.

La compréhension des émotions feintes par les enfants : le rôle du vocabulaire et de la syntaxe de la complémentation des verbes de cognition et de communication

RÉSUMÉ
Ce travail vise à étudier le rôle du vocabulaire et de la syntaxe de la complémentation sur un aspect spécifique de la théorie de l’esprit : la capacité des enfants à faire la distinction entre les émotions vraies et les émotions feintes. Les tâches suivantes ont été administrées individuellement à 70 enfants (37 âgés de quatre ans et 33 âgés de six ans): une tâche de

*Corresponding author: Francesc Sidera, Department of Psychology: Plaça Sant Domène 9, 17071, University of Girona, Girona, Spain. Email: francesc.sidera@udg.edu
propositions subordonnées complétives, une tâche de compréhension d’actions feintes, deux tâches de compréhension d’émotions feintes (les siennes et celles des autres), et un test de vocabulaire réceptif. Les résultats ont montré des corrélations significatives entre la capacité à comprendre les émotions feintes et les performances aux épreuves de vocabulaire et de syntaxe de complémentation, mais seulement à l’âge de quatre ans. Bien que la compréhension des émotions feintes soit plus liée à la connaissance de la syntaxe de la complémentation qu’au vocabulaire, ce type de connaissance n’est pas une condition nécessaire ou suffisante pour comprendre les émotions feintes. Les résultats sont discutés à la lumière de l’importance des liens entre la langue et la compréhension des émotions.

1. INTRODUCTION

Understanding how linguistic abilities are related to the acquisition of concepts underpinning children’s social development is crucial to foster it. As understanding pretend emotions is an important part of children’s social development, it is relevant to investigate which variables are entailed in its development. For this purpose, this paper analyzes the relationship between two linguistic abilities (the vocabulary level and understanding the syntax of complementation with communicative and cognitive verbs) and the understanding of pretend emotions. First, the literature on children’s understanding of pretend emotions will be reviewed. Afterwards, previous studies about the relationship between the vocabulary and the syntax of complementation in children’s understanding of other minds, in general, and of simulated emotions, in particular, will be examined.

Theory of Mind (hereinafter ToM) can be defined as the fundamental ability to understand people by attributing them mental states, such as desires, emotions, beliefs, or intentions (Rakhlin et al., 2011), and has been considered essential for the adaptation to the social world (Hughes & Leekam, 2004). Many studies have shown the relationship between the acquisition of some aspects of ToM, such as the understanding of false belief (or the understanding that people can hold mistaken representations about reality), and various aspects of social competence (e.g., Dunn & Cutting, 1999; Lalonde & Chandler, 1995; Peterson & Siegal, 2002). One of the skills often considered in the study of ToM development is children’s understanding that people’s external and internal emotions may differ (e.g., Pons, Harris, & de Rosnay, 2004; Wellman & Liu, 2004). Related to that, various authors have studied children’s understanding that hiding emotions may create false beliefs on the observers of simulated emotions (e.g., Davis, 2001; Gross & Harris, 1988). On the other hand, the question of how children understand that emotions can be simulated without intention to
deceive, in pretend play contexts, has also been addressed (Sidera, Serrat, Rostan, & Sanz-Torrent, 2011). These authors have found that children aged between four and six have difficulty in understanding that people can have an internal emotion different from the external one, regardless of whether the intention of the person who simulates an emotion is to deceive another person or just to play.

In a more recent study, Sidera, Amadó and Serrat (2013) found that most four-year-olds are capable of understanding that emotions simulated in pretend play contexts are not real. The authors concluded that despite young children’s difficulty in understanding that the external and internal emotions of a person may differ (emotional appearance-reality distinction), it is easier for them to understand that emotions simulated in pretend play contexts are not real (emotional pretence-reality distinction). Thus, without the need of understanding that emotions can be hidden, four-year-olds seem to be able to realize that pretend emotions might not be real. In the present study we will use the results by Sidera, Amadó and Serrat in relation to the emotional pretence-reality understanding to study what is the role of two aspects of language, the vocabulary and the syntax of complementation, in this comprehension.

It is clear nowadays that language and ToM are related, but is not so evident which of their respective components are related to each other (Astington & Baird, 2005) and these relationships may vary according the developmental moment of the children (Resches, Serrat, Rostan, & Esteban, 2010). One of the aspects of language that the literature suggests that may have an influence on ToM development is the syntax of complementation. It refers to a syntactic structure in which some verbs allow a proposition (or a sentential complement) to be embedded in the main clause, resulting in a sentential complement sentence (Walker & Shore, 2011). Mental state verbs are within the verbs that allow sentential complements, and even some of them are used almost exclusively in this type of grammatical structure (Nixon, 2005). In addition, according to Nixon, the relationship between the mental state verbs and the sentential complements lies in the syntactic, semantic and cognitive features of the verb. In this sense, the children’s development of the complementation syntax is linked, in addition to pragmatic and communicative factors, to the semantics of the verb embedded in the complement (Katis & Stampouliadou, 2009).

Some authors (de Villiers, 2005, 2007; de Villiers & Piers, 2002) have formulated a specific hypothesis according to which the ability to master the syntax of complementation with cognitive and communicative verbs provides the necessary representational format to understand false beliefs. An example of a sentential complement sentence with a communication
verb is: “John says his brother has eaten his chocolate”, while an example with a cognitive verb is: “John thinks his brother has eaten his chocolate”. According to de Villiers (2005), in both cases, the complement is of the realis type. In this kind of complements, the main clause can be true or false, but the subordinate clause allows the representation of the mental state of the person in relation to reality regardless of its concordance. From this perspective, mastering the syntax complementation is essential for understanding false beliefs, and consequently, for the development of the ToM. Several studies have indeed found that understanding false beliefs and mastering sentential complements are related, both in normally developing children (e.g., de Villiers & Piers, 2002; de Villiers & de Villiers, 2012) and in deaf children who have delayed language development (e.g., de Villiers & de Villiers, 2000).

Ruffman, Slade, Rowlandson, Rumsey and Garnham (2003) suggested that the relationship found between the mastering of the syntax of complementation and false belief understanding does not mean that the former causes or enables the latter, as the direction of the effect could be the opposite, so that the understanding of false beliefs would allow children to master sentential complements. Conversely, Lind and Bowler (2009) commented that it does not seem very plausible that false belief understanding facilitates the understanding of the syntax of complementation, since in their study they found that a group of children with autism had difficulty in understanding false beliefs, but not in a memory task of sentential complements. On the other side, despite having social and communication difficulties, the autistic children from their study were able to understand false belief tasks, presumably as a consequence of mastering sentential complements. In the same direction, several training studies have showed that instructing children in the mastery of sentential complements helps them to understand false beliefs (Lohmann & Tomasello, 2003; Hale & Tager-Flusberg, 2003), especially when these sentences involve a false representation of the reality (Serrat et al., 2013).

The syntax of complementation has been related to the development of the ToM, arguing that the representation of embedded propositions in language is similar to the way our mind embeds propositions to understand mental states (de Villiers & de Villiers, 2000). However, some authors have suggested that the general understanding of language is more important in the development of the ToM than the syntax of complementation itself (e.g., Cheung et al., 2004; Perner, Sprung, Zauner, & Haider, 2003; Ruffman et al., 2003). Others focus more on the influence of vocabulary on ToM development. Olson (1998) suggests that ToM development is influenced by the acquisition of metacognitive and mentalinguistic terms referring to
mental states. In this line, Slade and Ruffmann (2005) proposed that the semantics is as important as the syntax in this development. Several studies have found indeed a relationship between the receptive vocabulary and the understanding of false beliefs (e.g., Carlson & Moses, 2001; Doherty, 2000; Perner, Lang, & Kloo, 2002; Schick, de Villiers, de Villiers, & Hoffmeister, 2007). Moreover, in children with specific language impairment, Farrar et al. (2009) found that the vocabulary and the general grammar, but not the understanding sentential complements, predicted by themselves children’s performance in ToM tasks.

Hence, as commented above, both the vocabulary and the syntax of complementation are linked with the development of ToM. Furthermore, some authors have specifically pointed out the importance of language in one of ToM aspects: children’s understanding of emotions. Some studies show that children’s receptive vocabulary is connected to children’s ability to understand the expression and causes of emotion (Bosacki & Moore, 2004; Cutting & Dunn, 1999). On the other hand, the grammatical ability also seems to be related to children’s emotion understanding. For instance, Pons, Lawson, Harris and de Rosnay (2003) found that children’s language ability, as measured by the Test for the Reception of Grammar (TROG), accounted for 27% of the variance in emotion understanding in children, measured through the Test of Emotion Comprehension. Similarly, Ruffman et al. (2003) found a relationship between children’s level of syntax and emotion recognition. Moreover, Sidera, Amadó and Serrat (2012) found that children’s ability to understand that external and internal emotions might differ was related to their production of sentential complement sentences. These authors also found that the former was not a necessary or a sufficient condition for the latter, but it can be argued that children might not produce sentential complement sentences and still understand them. For that reason, in the present work it will be studied how the understanding of sentential complement sentences (and not the production) is related to the understanding of pretend emotions.

Previous research has found that both the receptive vocabulary and the comprehension of the syntax of complementation are related to both children’s ToM and emotion understanding. However, to date, no study has focused on the influence of these linguistic variables in children’s understanding of pretend emotions. As suggested, different aspects of language could be related to different aspects of ToM. Therefore, the results of the present study will permit a better understanding of this link. In this sense, the first hypothesis is that both the receptive vocabulary and the syntax of complementation will be related to the understanding of pretend emotions.
As commented before, de Villiers (2005) suggested that mastering realis sentential complements is needed to understand people’s false beliefs. Under this consideration, the present work is aimed at studying whether mastering this type of syntax is a necessary or sufficient condition to understand that pretend emotions are not real. In the light of the results by Sidera, Amadó and Serrat (2012), who found that the production of sentential complement sentences was not necessary or sufficient to understand the emotional appearance-reality understanding, our second hypothesis is that understanding sentential complements will not be a necessary or sufficient condition for the children to understand the pretence-reality distinction in the domain of emotions. To test this hypothesis we will seek whether: a) there are children who understand pretend emotions without mastering the syntax of complementation (this would refute that the latter is a necessary condition for the former); b) there are children who despite mastering the syntax of complementation, don’t understand pretend emotions (this would refute that mastering the syntax of complementation is a sufficient condition for understanding pretend emotions).

2. METHOD

2.1. Participants
A total of 70 children participated in the study. Participants were divided into two groups: 37 four-year-olds (22 girls; age range: 48 to 56 months; mean age: 51.32 months, SD: 1.634), and 33 six-year-olds (16 girls; age range: 74 to 80 months; mean age: 76.97 months, SD: 1.489). Participants, who attended schools in Spain, were included in the sample only if succeeded in a task of understanding real and pretend actions. This criterion was used to ensure that participants understood the vocabulary used to test their understanding of pretend emotions. A total of 16 participants aged four were excluded for this reason. A letter explaining the experiment was handed in to the parents through the school, and they were asked written consent for their children to participate in the study and to be audio and video recorded.

2.2. Material
The following tasks¹ were administered:

¹In fact, children were administered six tasks, but as it is not related to the aim of the present study, the results of a belief-desire emotion attribution task are not reported here.
a) Real versus pretend actions
This task, adapted from Rosen, Schwebel and Singer (1997), was used to measure children's ability to distinguish between real and pretend actions. Participants watched three pairs of videos. In each pair a girl performed, in one video, a real action, and in the other video, the same action in a pretend way, without the object she used in the real action. The actions the girl performed were eating a banana, combing her hair and brushing her teeth. After each video a test question was asked to the children:

“Is this girl really brushing her teeth or is she just pretending to brush her teeth?”

b) Own pretend emotions task
The aim of this task was to study whether children understand that the emotions they simulate in pretend contexts are not real. Two tasks were administered: the car task and the mouse task. Before starting the tasks, the researcher introduced a puppet to the participants. In each of the tasks, the puppet brought a toy, a mouse or a car, and said: “Look X, I brought a car/mouse”. Then, the experimenter asked the children whether they liked the toy, and they were asked about their internal emotion: “How do you feel now, happy or sad?” This question was to make sure that they were not sad, as they would afterwards be asked to simulate a sad face. The difference between the two tasks was that, after having given the toy to the child, the puppet either stayed to participate in a symbolic game with the child and the experimenter (mouse task) or left the scene during the pretend game (car task). After the children received the toy, the researcher asked them to participate in a pretend game. Within this game, they were asked to pretend to be sad, either because the car was broken or because the mouse got hurt in his leg. In this context, the experimenter showed a sad face and asked the participants to show a sad face as well (e.g., “Oh, the mouse got hurt, what a pity... Come on X, let’s see how you put on a sad face”). When children showed a sad face, the experimenter asked them first about the puppet’s beliefs about their facial expression (not discussed here), and then, whether their sad emotional expression was pretended or real: “X, when you were putting on a sad face, were you really sad or were you pretending to be sad?” (Real emotion question).

c) Others’ pretend emotions task
This task deemed to investigate children’s understanding that the emotions simulated by other people in pretend play contexts may not be real. For this purpose, children were given four tasks, adapted from Sidera et al. (2011). Children were told four stories, each of them accompanied by two drawings of children pretending emotions. However, whereas children from Sidera et al.’s study were asked about the external and internal emotions of the character (emotional appearance-reality distinction), in the present study children were asked

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2 The reason for this difference was to study children’s comprehension of the effects of the emotional simulation on the beliefs of the observer. The results related to this question were reported in Sidera, Amadó & Serrat (2013) and are not taken into account in the present study.
whether the character’s emotion was pretended or real (emotional pretence-reality distinction). In two of the tasks the protagonist pretended to be happy while actually feeling sadness, and in the other two tasks the protagonist pretended to be sad while really feeling happiness. Two memory questions were made in each task to ensure that children understood the stories. Children failing one of the memory questions were repeated the story a second time, but if they did still not understand it they were told the next story. Children who understood the stories were asked first about the external emotion question (“How does the character look like, happy or sad?”) and then the real emotion question (“Is the character really happy/sad, or is she just pretending?”). After that, the children were asked about the beliefs of one observer about the character’s emotions (these results are not reported here).

d) Sentential complement sentences task

This task consisted of four stories accompanied by narratives (see Appendix), based on the stories used by Hale and Tager-Flusberg (2003). In each story the protagonist performed an action but said instead, using direct speech, that he had done a different action. After each story children were administered questions that require the mastering of the complementation syntax. In two of the four stories a communicative verb (say) was used to ask children about the distinction between saying versus doing. So they were asked first what the protagonist had said (e.g., “What did the character say that he/she has done?”), and then what he had really done (e.g., “What did the character really do?”). In the other two stories a cognitive verb (belief) was used to ask children about the distinction between believing versus doing. So they were asked, first, what the observer had believed that the protagonist had done (e.g., “What did the father/mother think that the character has done?”), and after, what he had really done (e.g., “What did the character really do?”). In both types of stories, two possible responses were offered when children did not answer the test questions (e.g.: “Did the character say a story, or he said the TV?; “Did the character watched TV or he read a story?”)

e) Receptive Vocabulary Task (ELI)

The receptive vocabulary subtest of the ELI, a Catalan standardized language test, was used to study children’s level of receptive vocabulary (Saborit & Julian, 2005). The task tests children’s ability to identify among five black and white drawings which corresponds to the word labelled by the experimenter. A total of 30 words are tested. Regarding the construct validity of the vocabulary subtest, it has a correlation of 0.75 with the test TVIP (Dunn, Padilla, Lugo, & Dunn, 1986), and concerning the reliability, it has a correlation of 0.70.

2.3. Procedure and scoring

All the tests, administered in Catalan, were carried out in one session in a quiet room of the children’s schools. It took between 15 and 25 minutes for the children
to complete all the tasks. Children were audio-recorded in all the tasks except in the vocabulary test. In addition, the Own pretend emotions task was video-recorded.

In the Real versus pretend actions task all participants watched the three pairs of videos in the same order. Yet, half of them always watched, within each pair, first the real action videos, albeit the other half watched always first the pretend action videos. Participants obtained one point in each pair of videos where they answered correctly to the test questions of both videos. Thus, the score could range from zero to three points. Only participants scoring two or three points were included in the sample.

In the Own pretend emotions task, the order of presentation of the two tasks was counterbalanced. One point was given to the participants who responded correctly to the real emotion question of each task, saying that the sad emotion they had displayed was not real. Thus, the total score in this task ranged from zero to two.

In the Others’ pretend emotions task, the order of presentation of the four tasks was counterbalanced using a Latin-square design. One point was given to each task in which participants detected correctly the external emotion of the protagonist and said however that this emotion was not real. Therefore, the score ranged from zero to four.

Regarding the two tasks of pretend emotions, two other analyses were executed. First, an overall score summing the two tasks (overall pretend emotion score), ranging from zero to six, was calculated. In addition, the participants were divided in those who performed correctly at least one of the six test questions (real emotion tests) about the pretend emotions and those who didn’t.

In the sentential complement sentences task, the presentation of the four stories was counterbalanced also using a Latin-square design. Similarly, when children were given possible responses for their answers, they were counterbalanced. As far as the scoring is concerned, children were assigned one point for each of the stories where they responded correctly to both test questions. Thus, children scored from zero to four in the tasks with communicative verbs and also from zero to four in the tasks with cognitive verbs. Also, a score considering the four sentential complement tasks, ranging from zero to four, was considered. Moreover, we classified the participants in those who performed correctly at least in one of the four tasks and those who didn’t.

In the vocabulary task, the participants scored one point for each correct answer, so the total raw score varied from zero to 30. This raw score was used in the results section for the analyses. Data were analysed using the program IBM SPSS Statistics 19.

3. RESULTS

As the data obtained in the study were not normally distributed and variances were not homogeneous, non-parametric tests were used to analyse the results. In order to compare the results between the two age groups, the statistical test used was Mann-Whitney’s U, while the Wilcoxon
test was used to compare repeated-measures results. On the other side, to establish relationships between discrete variables, Spearman’s Rho was the chosen measure. Finally, the binomial test was used to study the relationship between the understanding the syntax of complementation and the understanding of pretend emotions.

3.1. Understanding pretend emotions

The results of the tasks about pretend emotions are reported in Table 1\(^3\). Comparing the two age groups (Mann-Whitney’s U), significant differences emerged between four- and six-year-olds in favour of the latter group in the Others’ pretend emotions task \((U = 336.500, p = .003)\), though differences were not significant in the Own pretend emotions task \((U = 534,000, p = .512)\).

<table>
<thead>
<tr>
<th>Own pretend emotions task(^a)</th>
<th>Others’ pretend emotions task(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>four-year-olds</td>
<td>1.47 (.84)</td>
</tr>
<tr>
<td>six-year-olds</td>
<td>1.63 (.71)</td>
</tr>
<tr>
<td></td>
<td>2.36 (1.53)</td>
</tr>
<tr>
<td></td>
<td>3.42 (.99)</td>
</tr>
</tbody>
</table>

Table 1. Children’s scores in the pretend emotions tasks

Note: Numbers are mean scores (and standard deviations).

\(a\). Scores range: 0-2.

\(b\). Scores range: 0-4.

3.2. Receptive Vocabulary

Differences were observed between the raw scores of the participants as a function of age \((U = 142.000, p = .000)\), obtaining the older children higher scores. The mean scores were 17.7 \((SD = 3.37)\) in the four-year-olds group and 23.09 \((SD = 3.16)\) in the six-year-olds group.

3.3. Relationship between vocabulary and pretend emotions

We observed that the correlation between the vocabulary and the Own pretend emotions task was close to significant at the age of four \((r_s (34) = .304, p = .072)\), whereas it was not significant at all at the age

\(^3\)These data appear in detail in the article by Sidera, Amadó and Serrat (2013).
of six ($r_s (30) = .101, p = .581$). On the other side, the correlation between the vocabulary scores and the scores in the Others’ pretend emotions task was not significant in any age group (four-year-olds: $r_s (34) = .153, p = .374$; six-year-olds: $r_s (29) = -.040, p = .829$).

### 3.4. Sentential complement sentences

The scores on the sentential complement sentences task are reported in Table 2. According to the Wilcoxon test, no significant differences existed between the tasks involving communication and cognition verbs, in any age group (four-year-olds: $Z = -.877, p = .380$; six-year-olds: $Z = -1.127, p = .260$).

When we compared children’s scores as a function of age (Mann-Whitney), we observed a significant differences in understanding both the cognitive sentential complement sentences ($U = 364,500, p = .001$) and the communicative sentential complement sentences ($U = 439,500, p = .025$).

**Table 2. Children's scores in the communicative and sentential complement sentences tasks**

<table>
<thead>
<tr>
<th></th>
<th>Cognitive sentential complement sentences</th>
<th>Communicative sentential complement sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>four-year-olds</td>
<td>.86 (.98)</td>
<td>1.03 (.90)</td>
</tr>
<tr>
<td>six-year-olds</td>
<td>1.64 (.78)</td>
<td>1.48 (.83)</td>
</tr>
</tbody>
</table>

Notes: Numbers are mean scores (and standard deviations). The range is 0-2 in both tasks.

### 3.5. Relationship between sentential complement sentences and pretend emotions

At the age of four, different significant correlations were observed between children’s understanding of sentential complement sentences and their performance in the pretend emotions tasks. Specifically, in the Own pretend emotions task, this correlation was significant both with the understanding of cognitive sentential complement sentences ($r_s (34) = .400, p = .016$) and with the understanding of communication sentential complement sentences ($r_s (34) = .596, p = .000$).

In the Others’ pretend emotions task, the correlation was significant with the understanding of cognitive sentential complement sentences ($r_s (34) = .331, p = .048$) but not with the understanding of communicative sentential complement sentences ($r_s (34) = .236, p = .165$).
At the age of six, no significant correlations were found between the understanding of pretend emotions and the understanding of cognitive sentential complement sentences (own pretend emotion task: $r_s (30) = .092$, $p = .618$; other’s pretend emotions task: $r_s (29) = .044$ $p = .813$) or with the communicative sentential complement sentences (own pretend emotions task: $r_s (30) = .098$, $p = .594$; other’s pretend emotions task: $r_s (29) = -.117$, $p = .532$).

In order to analyse whether the understanding of the syntax of complementation is a necessary or a sufficient condition to understand pretend emotions (see Table 3), we examined the relationship between children who were capable (or not) to understand at least one of the pretend emotion tasks and children who were capable (or not) to understand at least one of the sentential complement sentences tasks. The binomial test was used to study whether the actual distribution of our data corresponded to our theoretical distribution.

<table>
<thead>
<tr>
<th>Pretend emotions tasks</th>
<th>All Incorrect</th>
<th>At least one correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive an communicative sentential complement tasks</td>
<td>All incorrect</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>At least one correct</td>
<td>2</td>
</tr>
</tbody>
</table>

To support the view that the understanding of sentential complement sentences is a necessary condition to understand pretend emotions, two propositions needed to be accomplished (see: Braumoeller & Goertz, 2000): (a) children who understood pretend emotions should also understand sentential complement sentences; and (b) children who didn’t understand sentential complement sentences shouldn’t understand pretend emotions.

In order to test proposition (a) we took into account the right column of Table 3. There were 54 children out of 63 who confirmed our expectations.

\footnote{All pretend emotions tasks (oneself and others) and all sentential complement sentences tasks were taken into account to analyse whether the syntax of complementation is a necessary or a sufficient condition to understand pretend emotions.}
and 9 children who contradicted them. In this case, according to our hypotheses, all the children should be placed in the lower part of the row. An expected probability of 0.99 was entered in the binomial test of the SPSS. As the observed probability was 0.86, and the p-value was lower than 0.05 \((p = 0.000)\), we concluded that the observed probability was lower than the expected probability. As a result, the proposition (a) was not accomplished.

To test (b) we considered the upper row of Table 3. For (b) to be true, all children ought to be placed in the left cell. Instead, we found 9 children out of 14 who were located in the right cell, reversing our expectations. The expected probability of having all the children in the left cell was 0.99, and the observed probability was 0.36 \((p = .000)\). Thus, we concluded that the proposition (b) was not supported.

To back up the suggestion that the understanding of sentential complement sentences is a sufficient condition for the understanding of pretend emotions, 2 propositions needed to be fulfilled: (c) children who understood sentential complement sentences should also understand pretend emotions; and (d) children who didn’t understand pretend emotions should not understand sentential complement sentences either.

To test (c) we took into consideration the lower row of Table 3. Here, we expected all the children to be located in the right cell of the row. We observed that 54 out of 56 children confirmed our expectations, and only 2 didn’t. The observed probability (0.96) and the expected probability (0.99) were not statistically different \((p = .108)\), so we concluded that the proposition (c) was supported by the data.

To test (d) we needed to analyse the left column of Table 3. A total of 5 children out of 7 confirmed our expectations (they were placed in the upper cell), while 2 didn’t. The observed probability 0.71 was significantly lower \((p = .002)\) than the expected probability (0.99), and hence we determined that the proposition (d) was not accomplished.

4. DISCUSSION

The aim of this work is to study the role of two aspects of language, namely the vocabulary and the syntax of complementation with cognitive and communicative verbs, in children’s understanding of pretend emotions. The results obtained support our first hypothesis, but only partially. A significant relationship was found between children’s understanding of
pretend emotions and the syntax of complementation, but the relationship between understanding pretend emotions and vocabulary was only close to significance. This finding, consistent with many of the studies reporting a relationship between the syntax, and more specifically the syntax of complementation, with false belief understanding (Astoning & Jenkins, 1999; de Villiers & Piers, 2002), corroborates that the syntax of complementation is also important for understanding pretend emotions.

Sidera, Amadó and Serrat (2012) found that the use of sentential complement sentences with cognitive or communication verbs, it was not a necessary or sufficient condition for the development of understanding of the distinction between real and apparent emotion. In the present work we wanted to study the comprehension (not the use) of this type of syntax in the understanding of the distinction between pretend and real emotions. Accordingly, in our second hypothesis we predicted that mastery of the syntax of complementation would not be a necessary or a sufficient condition to understand that pretend emotions are not real. In the results section we observed that the two propositions needed to confirm the necessary condition were not accomplished, and only one proposition confirmed the sufficient condition. As a consequence, our second hypothesis was not supported. On the one hand, despite the majority of the children showing some understanding of sentential complement sentences also showed an understanding of pretend emotions, a few children showed an understanding of sentential complements without understanding pretend emotions at all. Therefore, mastering the syntax of complementation, despite being clearly related, it is not a sufficient condition to understand pretend emotions. On the other hand, we found that some children who did not master the syntax of complementation were still able to understand pretend emotions, and hence, the former is not necessary condition for the latter. Other cognitive tools may be used to develop an understanding of pretend emotions. In this sense, it would be interesting to investigate which aspects, not only linguistic but also contextual and behavioural, children use to develop their understanding that some emotional expressions are just expressed with the intention to play, and thus, they are not real. Pretend play studies suggest, for instance, that some behavioural aspects such as looks, smiles, some sounds (Lillard & Witherington, 2004; Richert & Lillard, 2004) or speech (Friedman, Neary, Burnstein & Leslie, 2010) can help children to distinguish reality from fiction. Up to now, no study has addressed this question in the case of emotions, but doing so would shed some light to whether children also use these kind behavioural aspects to distinguish real from pretend emotions.
De Villiers and Piers (2002) suggested that the syntax of complementation is mastered in English before with communicative verbs than with cognitive verbs, because the communicative complements are more likely to be contradicted by environmental evidences. Yet, these authors did not find any advantage for the communicative complements, and argued that since in their study there was no “direct talk” about what the protagonists had said this could not favour the communicative verbs. In this regard, in spite of the fact that in the sentential complement sentences tasks of the present work we have used direct speech, we found no significant differences in the understanding communication and cognition complements. Additionally, whereas our tasks involving communicative verbs didn’t require making any inference about the mental state of the characters, this was necessary in the tasks containing cognitive complements. Moreover, it would be interesting that future studies analysed whether the tasks that require children to infer the belief of the protagonist are more difficult for children than the Memory for complements tasks used by de Villiers and Piers (2002). If they were equally difficult, it might imply that for remembering correctly sentential complements children have actually to understand them.

Although the present results show that both the vocabulary and the syntax of complementation with communicative and cognition verbs are related to children’s understanding of pretend emotions, the direction of this relationship could not been established. As suggested by Slade and Ruffman (2005), it is plausible that not only the language plays an important role in the development of the ToM, but also that the acquisition of concepts, which is besides not language-independent, encourages language development. In his regard, future work should establish how the different aspects of children’s language involved in children’s communication may favour the construction of both the implicit and explicit understanding of pretend emotions, and at the same time, how this construction may favour the development of certain linguistic components.

Some limitations of the study need to be pointed out. First, we took as a measure of receptive vocabulary a test which does not contain words about mental states. It is thus possible that the understanding of pretend emotions is more tied to the acquisition of specific vocabulary about mental states. This seems very plausible in light of a recent research showing that children’s comprehension of mental-state language is strongly related and explains the variance of children’s emotion understanding better than a measure of verbal ability including receptive language and knowledge of the rules of language usage (Grazzani & Ornaghi, 2012). On the other side, it needs to be taken into account that the results of the present article were
obtained in Catalan language, and that research in different languages needs to be carried out to extent the validity of the obtained results. Furthermore, it is to be noted that while in the present work we have studied the role of the vocabulary and the syntax of complementation in children’s understanding of pretend emotions, other aspects of language, such as pragmatics, could also be related to it, in the same way as other aspects of language are related to the understanding of false beliefs (Milligan, Astington & Dack, 2007).

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REFERENCES


APPENDIX. SENTENTIAL COMPLEMENT SENTENCES
TASK (TRANSLATED FROM CATALAN)

Communicative verbs

1. The Sun

Picture 1: The father says to Ricard: “Go to the table and draw a house”.
Picture 2: But Ricard does not want to draw a house. Thus, he draws a sun.
Picture 3: When Ricard meets his father, the father asks him: “Did you draw a house?” Ricard says: “Yes, I drew a house”.
Test question 1: What did Ricard say that he has drawn?
Test question 2: What did Ricard really draw?

2. The TV

Picture 1: The mother says to Anna: “Go to the sofa and read a story”.
Picture 2: But Anna does not want to read a story. Thus, she watches TV.
Picture 3: When Anna meets her mother, the mother asks her: “Did you read a story?” Anna says: “Yes, I read a story”.
Test question 1: What did Anna say that she has watched/read?
Test question 2: What did Anna really watch/read?

Cognitive verbs

3. The tree

Picture 1: The mother says to Naira: “Go to the garden and water the plants”.
Picture 2: But Naira does not want to water the plants. Thus, she waters the tree.
Picture 3: When Naira meets her mother, the mother asks her: “Did you water the plants?” Naira says: “Yes, I watered the plants”.
Test question 1: What did the mother think that Naira has watered?
Test question 2: What did Naira really water?

4. The chocolate

Picture 1: The father says to Juli: “Go to the kitchen and eat cookies”.
Picture 2: But Juli does not want to eat cookies. Thus, he eats chocolate.
Picture 3: When Juli meets his father, the father asks him: “Did you eat cookies?” Juli says: “Yes, I ate cookies”.
Test question 1: What did the father think that Juli has eaten?
Test question 2: What did Juli really eat?

Notice that in Catalan it was used the same verb for “reading a story” than for “watching TV”, which could be translated in English as “look”.

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