Greek children's understanding of false beliefs: The role of language

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ABSTRACT The present study examines the relation between false-belief understanding and language in Greek children. The ability of one hundred and eight four- and five-year-olds to ascribe false beliefs to others was tested with the use of the verbal form «kitazo na vro» in the critical question of the test assessing false-belief understanding. The same ability was examined in a group of one hundred and six age-matched subjects with the use of the verbal form «psahno na vro» in the critical question of the same test. The results revealed a superiority in children's performance when the critical question of the false-belief test was asked with the verbal form «kitazo na vro». These findings show that the language used in the test question examining children's understanding of other people's false beliefs influences their performance in this test. The present evidence is consistent with the widely held view that linguistic factors are fundamental to the development of understanding mental states during childhood.

Key words: Children's mental states, False-belief tests, False-belief understanding, Linguistic factors, Theory of mind.

A topic of much current interest to all developmental psychologists has been the study of children's ability to understand that their own beliefs and those held by other people may differ from reality. False-belief understanding is considered to be an indicator of a «theory of mind» which refers to children's ability to understand human activity by attributing mental states to others (see Astington, 1993).

Three trends have been apparent in recent research.

Firstly, it has been suggested that an understanding of mental states is grounded in social processes. Many studies have indicated that sibling interactions, mother - child interactions (e.g., Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Perner, Ruffman, & Leekman, 1994), daily contacts with peers, adults and even the number of a child's siblings are predictive of false-belief performance (Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, & Berridge, 1996).

Secondly, the recent meta-analysis of Wellman, Cross and Watson of 591 false belief conditions (2001) confirms the reliability of a shift in performance at around age four, but also shows consistent influences of task demands on children across the 3-4 transition period. For example, performance on the false-belief test improves if the child participates actively in the task, if the protagonist's motive is more explicit, if the experimenter alerts the child to the protagonist's mental state and if the test question contains a specific temporal reference.

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Note: The present work is partially based on previous data (see Maridaki-Kassotaki, Lewis, & Freeman, 2003) used to test alternative hypotheses.

Wellman et al. confirm the role of task demands involving experimenter – child communication in children's false-belief performance. This is complemented by a third trend, the relationship between language development and mental state understanding. In relation to this, there is evidence to suggest that three-to five-year-olds' scores on standard false-belief tasks are highly associated with scores on measures examining language ability (i.e.: Astington & Jenkins, 1999; Cutting & Dunn, 1999; Happé, 1995; Jenkins & Astington, 1996; Lewis, Freeman, Hagestadt, & Douglas, 1994; Freeman, Lewis, & Doherty, 1991; Lewis & Osborne, 1990). It has also been well documented that false-belief understanding and other aspects of language, such as semantics and syntax, are highly related. A common finding in these studies is that there is a link between performance in false-belief tasks and syntactic tasks which use complementation with mental verbs, like «think» and «believe» (e.g., de Villiers, 1995, 2000; Feldman, 1988; Tager-Flusberg, 1997). Research on the contribution of semantics to false-belief acquisition has indicated that comprehension of particular linguistic terms referring to mental states like «think», «know» and «remember» promotes false-belief thinking (e.g., Olson, 1998; Moore, Pure, & Furrow, 1990). Based on the evidence attesting to the link between false-belief and linguistic development, authors like Perner (2000) suggest that such relationships need only show that language provides a database from which the child constructs a representational theory of mind.

In the standard test examining false-belief attribution to others, children are told a story in which a protagonist puts an object in a location and leaves the scene. In the protagonist's absence, an antagonist moves the object into another location. The protagonist is unaware of the transfer. When the protagonist returns to the scene to get the object, the child is asked to predict the protagonist's action. The critical question in this test is: «Where will [the name of a person] look for an object?».

In Greek each of two verbs, «κοιτάζω» [kitazo][1] and «ψάχνω» [psahno], are used with the complement «να βρω» [na vro], which itself literally means «to find», in order to ask the critical question «Where will X look for Y?». These two verbal forms can be interchanged within any sentence frame, but were of interest to us because they operate in slightly opposite directions. «Kitazo» alerts the child to focus upon the search activity starting with the protagonist's line of gaze. The simple command «Kita!», for example, is used when the adult directs the child to an object. In slight contrast, «psahno» directs the listener to the location where an object is hidden (Babiniotis, 1998, pp. 917, 2008). With the complement «να βρω» [na vro], «psahno» and «kitazo» become intensified alternative editions of «look for». Accordingly, the question arising is whether each of these two verbal forms allows children different access to false-belief understanding.

The specific aim of the present study was to examine whether use of each verbal form in the task examining false-belief attribution to others would affect the preschoolers' performance. To achieve the above aim, two studies were conducted. Study 1 questioned mothers about their uses of the two alternative verbal forms denoting the act of looking for an object and their interchangeability. Study 2 investigated what effect on children's false-belief performance arises from having two alternative forms of the verb «look for».

1. «Κοιτάζω» [kitazo] is defined as «to look, to observe, to regard, to watch», while «ψάχνω» [psahno] is defined as «to look for, to search for, to try to find» (Madeson, 1995).

Study 1

The aim of the study was to identify which of the two verbal forms («kitazo na vro», «psahno na vro») mothers would choose when asking their child to find an object and to see whether these terms can be used interchangeably.

Method

Participants

The mothers of 63 nursery school children from three nursery schools in Athens participated in the study. The mean age of the children was 4 years and 7 months (3.9-4.6, *sd* = 0.36). They were largely from middle-class homes.

Procedure

A short questionnaire containing the questions which follow was given to each mother. Mothers were asked to respond to the questions in the order in which they appeared.

1. Suppose that your child has lost an object (for example, a toy). How would you ask him/her to find it?
2. In what circumstances might you use each of the following verbs:
   a) kitazo na vro,
   b) psahno na vro?
3. Which of the following verbal forms do you use more often in order to ask your child to find a lost object:
   a) psahno na vro,
   b) kitazo na vro?
4. How does your child ask you to find her/him an object (e.g., a toy) which he/she has lost?

Results and discussion

The answers given by the mothers will be briefly summarised here. Regarding the first question, 55 of the 63 mothers used a sentence which contained the verbal form «psahno na vro» to report the command they would give to their child. When asked specifically about the two verbal forms, 52 confirmed the fact that they used «psahno na vro» to urge their children to find a hidden or mislaid object and 11 did not respond. Fifty-four said that they would use «kitazo na vro» to ask their children to look carefully to find a hidden or mislaid object and 9 said that they would use «kitazo na vro» to warn the children that, if they did not search, they would be in trouble. In response to question 3, 58 mothers said that they and their child would use «psahno na vro» in order to ask the other to help find a lost object, thus confirming their spontaneous comments on question 1. The fourth question, of how the child would tell the mother to search, also favoured «psahno na vro» (42 to 11).

In keeping with previous findings (see Maridaki-Kassotaki, Lewis, & Freeman, 2003), the results suggest that most parents of pre-schoolers appear to use «psahno na vro» as a means of saying to look for an object and also report their child using the same term in response. However, the mothers responded to question 2 by clearly identifying that the existence of «kitazo na vro» presents Greek parents with a clear lexical choice. While both terms mean «look for», the phrase «kitazo na vro» directs the child upon the searcher looking carefully, whereas «psahno na vro» directs the child to the location an object is hidden.

Study

Study 2 sought to explore whether the use of two verbal forms in a false-belief test would influence children's performance. Two additional false-belief tasks were given as a means of checking whether the performance of children was a result of their linguistic competence rather than a reflection of their general theory of mind problems.

Method

Subjects

Two hundred and fourteen children from six state kindergartens (two in Athens and four in Crete) participated in the experiment. They were mainly from white-collar families. The sample was randomly divided in two. The one group, comprising of 47 four-year-olds (*mean* = 4.5 years, *sd* = 0.31 years, *range* = 49 to 60 months) and 59 five-year-olds (*mean* = 5.5 years, *sd* = 0.33, *range* = 61 to 74 months), was given the unexpected transfer test with the verbal form «psahno na vro». The other group, consisting of 48 four-year-olds (*mean* = 4.7 years, *sd* = 0.30, *range* = 49 to 60 months) and 60 five-year-olds (*mean* = 5.6 years, *sd* = 0.32, *range* = 61 to 74 months), was given the unexpected transfer test with the verbal form «kitazo na vro».

Design and procedure

Each child was individually given the three theory of mind tasks in a quiet room off the main play area of the kindergarten. The order of presentation was determined by a Latin square design:

1. The *unexpected transfer test* (following Wimmer & Perner, 1983) was enacted with a classroom scene made out of toy furniture and two dolls. One doll put his ball onto the table and left. In his absence, the other doll moved the ball into a cupboard. Half the children were asked «Where will X look for his ball?» with the verbal form «kitazo na vro». The other half were asked the same question, but substituting «kitazo na vro» with «psahno na vro». Both groups were also asked a control question («Where did X put his ball?») and a reality control question («Where is the ball now?»).

2. The *deceptive box test* (following Perner, Leekam, & Wimmer, 1987) involved showing the child a familiar candy box (Smarties) and pictures of the candy on its side. She/he was asked what was inside and, in keeping with previous experiments, each child reported the brand name or «chocolate». Having been asked to open the box, the child discovered that it contained some pencils. The lid was replaced. The test question was: «What did you think was inside the box?». The reality control question was: «Can you remember what was inside the box?».

3. The *deceptive object task* (following Gopnik & Astington, 1988) involved the child being shown what looked like a bread roll and being asked to identify it with the question «What do you think this is?». All gave an appropriate label. The child was instructed to inspect the roll and squeeze it, to discover that it was a plastic squeaky toy. She/he was then asked to identify her/his previous belief with the question: «What did you think it was?». The reality control question was: «What is it really?».

Results

On all three false belief tasks children's performance was assessed by their ability to attribute the protagonist and themselves with a false belief and were rated either as correct or incorrect. Table 1 shows these response types in the two age brackets (age 4 vs. age 5) across the two «question groups». Table 1 shows consistently successful performance by all the subgroups on these tests. Each succeeded above chance (binomial, $p < .001$, 2 tailed, in every case).

Logistic regression analyses were carried out on the GLIM4 package (Francis, Green, & Payne, 1993). Success vs. failure in each false belief task was the outcome measure. Group («psahno na vro» vs. «kitazo na vro») and age (four-year-olds vs. five-year-olds) were the explanatory variables. The analyses showed that on the deceptive-object tasks there were no significant effects of age, group or interaction of the two explanatory variables (x^2 = or < 1 in each case). A significant

Table 1
Performance in the three false-belief tasks by age

Task		Groups			
		«psahno»		«kitazo»	
		4 years (N = 47)	5 years (N = 59)	4 years (N = 48)	5 years (N = 60)
Unexpected transfer	Pass	11	20	37	48
	Fail	36	39	11	12
Deceptive object	Pass	36	49	33	51
	Fail	11	10	15	9
Deceptive box	Pass	35	47	37	47
	Fail	12	12	11	13

effect of age (as measured by the change in deviance from the null model in the x^2 value below), accounting for 83% of the predicted change in variance [x^2 (1, N = 214) = 4.12, p < .05] was revealed for the deceptive box test. In the unexpected transfer test there was no main effect or interaction involving age. There was, however, a highly significant effect for group [x^2 (1, N = 214) = 55.18, p < .0001], which accounted for 97% of the change in deviance from the null model, showing that performance was enhanced when the critical question of the test was asked with the verbal form «psahno na vro».

General discussion

The reported results have established that when we ask the critical question of the unexpected transfer test with «kitazo na vro», which is one of two alternative verbal forms describing the act of looking for an object in Greek language, children's performance in this test is much more successful than when the related term, «psahno na vro», is used. This pattern of results shows that Greek pre-schoolers make a clear lexical contrast, which is present in dictionary definitions, but not conscious in everyday adult usage, as observed in the data provided by mothers in this study and previous studies (see Maridaki-Kassotaki et al., 2003).

What do the present findings inform us about the development of the child's understanding of mind?

Firstly, the present data tie in with other findings, which stress the role of language in the accessibility of mental states. For example, they comply with results which show a link between comprehension of a number of linguistic and mental terms and false-belief acquisition during childhood. They are also congruent with findings reported in a recent study with Chinese speaking children. According to Lee, Olson and Torrance (1999), the use of two alternative Chinese linguistic terms («yiwei» and «dang») denoting

that the belief referred to may be false enhanced children's performance, while the use of a more neutral belief term («xiang») resulted in poor performance. Therefore, taken together, the present findings and those reported in previous work introduce, or reintroduce (Moore, Pure, & Furrow, 1990), onto the agenda the role of the child's decomposition of the semantics of verbs which refer explicitly (in the case of Lee et al.) or implicitly (in the case of this study) to mental states.

Secondly, we hope that we have shown implicitly that the unexpected transfer procedure can be used to test for a difference in children's understanding of two verbal forms. In language development, children have to unpack semantic distinctions like those between the two forms explored here. Given the consistency in the shift in performance on the standard false-belief problem across the 3-4 year age group, the test can be used to explore just how children come to make fine semantic distinctions, which adults cope with so easily as to treat as synonyms.

Thirdly, the present findings are consistent with the argument that language is fundamental to the development of an understanding of mental states. The very volatility of children's performance reported here has unfortunately been characterised as an attempt to show that no interesting changes take place in mental state understanding – this is Camp 1 described by Perner (2000) in his recent overview of Mitchell and Riggs' collection on reasoning and the mind. We wish to distance ourselves from such a camp. The failure of five year old children in Study 2 to access a false belief shows that there is indeed a profound problem to be overcome. Children have two monumental tasks, which are inherently intertwined and most probably are constituent of one another. They have to come to understand that propositions can be true or false –what Perner (2000) describes simply as «aboutness»–, but they also have to negotiate their way through the quagmire of linguistic terms and constructions in which «aboutness» is constructed. Not only do children have to overcome these goals simultaneously, it is the acquisition of the language of mind that is the key to their understanding of mental states. We conclude by agreeing with Peter Hobson's (2000, p. 23) recent claim that the *grounding* of symbols in the child's everyday interactions is crucial: «Just as a symbol does not have a direct relation to its referent, so the symbol-referent relationship need not be explicitly articulated in the child's mind; what does need to be explicitly amenable to articulation is the relation between the child and her "decoupled meanings" as "decoupled meanings"». The data presented here suggest that such a process of decoupling is likely to be a gradual process than a sudden revolution in the child's intellectual development.

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