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# Getting Complements on your Mental State (Verbs)

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## (1) What is a Theory of Mind?

As adults, we possess a folk theory of what motivates human behavior, namely that people have thoughts, beliefs, intentions, and desires that:
A) have content (are intentional)
B) are the proximate causes of behavior.
What this means is that it makes no sense to talk of a *belief* without specifying what it is a belief *about,* e.g.

(1) Jill has a belief that Utrecht is a city full of dangerous bicycles.

Furthermore, the content of the belief plays a role in what people do, e.g. my belief above affects my behavior whenever I step off the pavement in Utrecht. The belief is also a true one, though someone else might see Utrecht in a different way:

(2) Hans believes that Utrecht is a city ideal for slow-witted pedestrians.

In this case, I might be inclined to say Hans has a false belief, one that will guide his behavior nonetheless but with potentially unfortunate consequences.

There is a considerable body of theoretical and experimental work on how children develop a Theory of Mind. A recent meta-analysis by Wellman, Cross and Watson (2001) has revealed a consensus that children develop an awareness that other people might have *false* beliefs around the age of four years, give or take six months. Wellman and some other theorists believe that children undergo a conceptual change at this point, from a psychological theory based primarily on *desire* as the motivator of human action, to one that accords *beliefs* a causal role. Other theorists such as Leslie (1991; 1994) contend that the child has the concept of belief innately, but that certain triggering environments, and the maturation of supporting processing skills, are needed before the child exhibits the concept.

In our recent work, we have asked what role the child's language skills play in developing a mature theory of mind that incorporates beliefs as causes of another's behavior. Many theories of child development acknowledge an important role to the language that the child hears about the mind, namely talk about desires, feelings, beliefs as motivators of behavior. In fact, most theories now take it as a given that the evidence to build the theory is at least partially given by hearing discourse about the mind from the parents, siblings and teachers. Numerous studies show an advantage in the age at which children acquire false belief understanding as a function of the richness of the dialogue about the mind in which the child is immersed (Dunn, Brown, Slomkowski, Tesla & Youngblade, 1991; Ruffman. Slade, Rowlandson, Rumsey , & Garnham, 2003).

Our interest is slightly different. Bloom and Keil (2001) consider varieties of "linguistic determinism" and argue that a theory that posits language as the source of evidence for a concept is not particularly interesting. Much more interesting is if some aspect of language itself, not the information it makes available, makes possible some concept or way of thinking that was previously unattainable. Could language possibly serve that kind of role in theory of mind development?

Let me introduce a concrete case as an illustration. This case actually comes from a video we made to try to elicit talk from children about other minds, so we needed episodes in which characters made mistakes because they had a false belief. Because we wanted to show them to deaf children, the information had to come from action, not dialogue. These were silent videos, many of them shamelessly plagiarized from old silent movies of Charlie Chaplin. This one however, was our invention.

In the movie, a man enters a room wearing a hat, which he takes off and puts on top of a file cabinet. He then proceeds to sit down and read a magazine with his back to the cabinet. A small boy comes in carrying a stuffed dog. The boy reaches up and puts his stuffed dog on top of the file cabinet, pushing the hat back. The man is still reading, oblivious, while the boy leaves. The man sighs, closes the magazine, reaches behind him for his hat and instead puts the stuffed dog on his head.

With apologies to Oliver Sachs, we like to call this video "The man who mistook a dog for his hat." But consider the language that we need to explain what happened, e.g.

(3) The man thought *the dog was a hat* or
(4) The man thinks *he is picking up a hat*

Note that the embedded sentence (italics) is false, but the whole is nevertheless true. Complements are special in this regard, unlike adjuncts:

(5) ? The man is confused because *he is picking up a hat*

Once the adjunct clause is false, so is the whole. But are complement clauses really necessary to explain the events? Surely a simple lexical item could suffice, such as "mistake" or "delusion":

(6) The man made a mistake
(7) The man was deluded

But those expressions neither predict what will happen nor explain the particulars - why on earth does the man put a stuffed dog on his head? At the very least, we need to include the object of the delusion:

(8) The man was deluded about the dog

But that fares little better: can we predict his wearing the dog on his head? It comes

down to this: the best way to describe the event is to represent the full content of his belief as a proposition true in his mind but not in the world we share:

(9) The man thought the dog was his hat

What implication does the best explanatory form have for our mental representation of the event? If the representation of the event plays a role in our thought, such as accounting for what the man did, or predicting what the man might do next, then the representation must be as rich as it needs to be to support that reasoning. To be rich enough, our representation of the man's thought must contain a representation of its content. Now in principle, one could imagine this in a pictorial fashion: a balloon over the man's head representing… what? Perhaps it could be an embedded image of himself reaching for a hat as he actually reaches for the dog. (Figure 1) Of course that is a most peculiar image of the man's imagery, as he doesn't look that way to himself. Figure 2 comes closer, but is obscure without a label saying of the thought balloon, "this is his hand!"

Figure 1 Figure 2

As in many such cases (Fodor, 1975), a linguistic-style representation wins over a pictorial one:

(10) The man thought the dog was his hat

is what we need, though perhaps in some code more abstract than English but identical in its representational power (Segal, 1998; Carruthers, 2003).The possibility then arises as a hypothesis that children may not be able to reason about such events until they have to capacity to represent them with this degree of

precision, which could be indexed by their having sentences of this degree of complexity in their language. Before pursuing this further, let me quickly review the kinds of tasks used in theory of mind research, especially the stage involving understanding others' false beliefs.

## 2. Research on the Development of Theory of Mind

In the last twenty years or so of developmental research, two tasks have been used as an index of children's mastery of false belief understanding. In *unseen-change-of-location* tasks, a character puts an object in one of two or three possible locations and then leaves the scene. While he is away, a second character moves the object to a new location. The first character then returns to the scene and wants the object. Following memory check questions, the child is asked where the character will look (or 'first look') for the object. The average 3 year old says the character will look where the object now is, but the average four year old says he will look where he last saw it, taking into account his different belief (Wimmer & Perner, 1983).

In *unexpected-contents* tasks, the child is shown a familiar container such as an M&M (or Smarties) candy box. However, when the child looks inside, the box turns out to contain something unexpected - for example, a plastic fork. The box is then closed up again and the child is asked either what he thought (or 'first thought') was in the box before he looked inside or what a friend would think was in the box before she looked inside. The 3-year-old says the friend will think there's a fork in the box, but the 4-year-old says the friend will think there are crayons in the box. 3-year-olds deny what they first thought, but four-year-olds remember their previous false belief.

Several researchers have considered the role of language in these tasks. Most trivially, is it that the task itself contains so much complex or confusing language? Many adaptations have been tried, both simplifying the language and also devising non-verb al tasks that also rely on the child's computing the beliefs of others. In general, the consensus seems to be that it is not the language of the task that makes the difference, though small gains can be achieved by clarity (Wellman et al, 2001).

Others (e.g. Shatz, Wellman, & Silber, 1983; Bartsch & Wellman, 1995) have considered the possibility that the tasks are too artificial, and that real life opportunities to notice false belief understanding occur on a variable time table often several months before success on the tasks. These take the form of the child commenting on other's beliefs using language. Generally these are rare occasions, and usually only appear in the fourth year of life. The precocity of some of the children in the databases of child language used must also be noted, and there was no concomitant cognitive testing using the tasks, so it remains unclear how representative these spontaneous events are. Others have tried to link directly the language development of the child and their performance on false belief tasks. So, Astington and Jenkins (1999) and Farrar and Maag (1999) looked at children's language skills and traced them to their success on false belief tasks at a later age. The problem is that their measures of language – general vocabulary and syntax indices - were not precise enough to test the hypothesis at stake here.

Children do use multi-clause structures from quite an early age, and often these structures contain verbs of mental state or communication. But we must be cautious in attributing full mastery of the embedded structure on the basis of such productions. Several years ago, studying children's understanding of wh-questions, we noticed the following phenomenon. If we give the child a story such as:

(11) The Mom said she bought apples, but look, she really bought oranges.
What did the Mom say she bought?

Three-year-old children say "oranges", but four-year-olds say "apples". It is as if the younger children do not yet know that though the *what* question is the object of "bought", both verbs must take scope over it:

(12) The Mom said *she bought apples*
The Mom said *she bought what?*
What did the Mom say *she bought (trace)?*

By late threes, children can make the appropriate computation across the structure, falsehood and all. If we then consider this achievement, not just production, and not using *mental* verbs per se, as the index of mastery of the embedded structure, we can ask whether passing this task predicts anything about false belief mastery. In a longitudinal study of 3-4 year olds (de Villiers & Pyers, 2002) we found preschool children pass the standard false belief tests *after* acquiring the structures of communication verbs with complements. Complement comprehension was the best single predictor of the false belief score in regression analyses.

In an extension of this work, oral deaf children and ASL-learning deaf show a several-year delay in false belief reasoning, and their performance on both standard and non-verbal theory of mind tests is most closely predicted in regression analyses by their mastery of complements. Notice that these data are not well accommodated by a maturational theory of the development of false belief understanding (de Villiers & de Villiers, 1999; de Villiers & de Villiers, 2003; P. de Villiers, in press)

Taking the idea to its extreme form, two training studies have demonstrated that training on false complements with communication verbs can increase children's performance on standard false belief tasks, at least when they are old enough to be on the cusp of that reasoning (Hale & Tager-Flusberg, 1999; Lohmann & Tomasello, 2002).

In another extreme test, Pyers (2001) tested first generation Nicaraguan signers who had been exposed to no formal signed language, and whose sign language may not yet contain complex enough structures. These adult subjects failed nonverbal ToM tasks. Their younger peers who acquired more evolved versions of Nicaraguan sign language pass such tasks with ease (Pyers, 2001).

Nevertheless, there are counter-arguments, both theoretical and empirical (Carruthers, 2003; Perner, Sprung, Zauner & Haider, 2003; Tomasello & Lohmann, 2003; Tardif & Wellman, 2000; Smith, Apperly & White, 2003). These arguments have spurred rethinking the nature of the complement structures in question, and how their special nature can be defined precisely. For instance, is the mastery of

*any* kind of embedding sufficient, or does it have to be complement structures? Smith et al (2003) have evidence that mastery of certain relative clauses also correlates with FB understanding, and their argument is that both are reflections of the need to manage two event representations at once, regardless of whether one is true or not. Obviously, many developments occur between ages 3 and 5 and it is common to find inter-correlations among tasks, especially when they both involve complex language. Unfortunately the study did not pit success on relative clauses against complements as predictors. In the studies that have done this, complements "win" over relative clauses. For example, when Hale and Tager-Flusberg (1999) trained children on relative clauses, it did not result in any change in the children's FB understanding, unlike the case of complement training. Nevertheless, there may be some overlapping component of linguistic or memory skill involved across relatives and complements.

Others have argued about whether it is the *syntax* of the complement that matters, or the *semantics* of the complement. There are two sets of arguments here. One involves the nature of the embedded proposition: does it have to be false (Lohmann & Tomasello, 2003)? That is, if children can be shown to use complement forms that involve true propositions, is that sufficient to give them the representational capacity to handle false beliefs? The difficulty is that there is no obvious way to judge the embeddedness of the true proposition: it could be an adjunct to the verb. However, as Lohmann and Tomasello show, coaching children in the production of two-clause sentences involving communication verbs and true propositions does lead to a minor improvement in their false belief reasoning, though not as successfully as with false propositions.

The second question that has arisen is the relationship of the embedded proposition to the verb. In previous work (de Villiers, 1995, 2000) I have argued that verbs of communication such as *say* provide the useful step in the acquisition of real complementation that allows false propositions. Both *say* and *think* allow true and false embedded propositions with full tensed sentences. The advantage of *say* is that the evidence is overt, both for the act of saying and the content of what was said. In the case of *think*, everything is invisible and inferred. So a child might learn the appropriate structures, both syntax and semantics, using *say*, and then by analogy, understand the structure of the verb *think*.

However, Perner et al (2003) note that in German *want* takes the same structure as *think*:

(13) Mütter will dass Andreas ins Bett geht
"Mother wants that Andreas in bed goes"
Mütter glaupt dass Andreas ins Bett geht
"Mother thinks that Andreas in bed goes"

In their study, Perner et al found that German children can answer questions about what Mother wants several months before they can answer what Mother thinks, that is, they can answer:

(14) What does Mother want that Andreas do(es)? before

What does Mother think that Andreas do(es)?

Since the syntax is identical, Perner et al argue that this gap between *want* and *think* complements cannot be syntactic, but instead the gap must be "conceptual". Thus Perner argues that only when children get the full *conceptual* understanding of belief, as opposed to desire, can they master the complements of mental state verbs.

This is in disagreement with the data from the longitudinal study, in which the forms came before the reasoning, and of course discrepant with the protracted delay in the deaf children, a delay tightly tied to their mastery of the linguistic forms. Once could argue that the oral deaf children are deprived of access to information about the theory of mind because of their language input problems, but even so, one might expect them to pass nonverbal tasks of false belief reasoning before the linguistic tasks, as surely the linguistic tasks cause more problems for them. Instead, the reverse is the case: the nonverbal tasks rest on the achievement of the linguistic competence.

However, the success of the German children on *want that* complements is a sticking point for the argument that children do not have the linguistic skill for these kinds of representations until around the time they can pass false belief tasks. Why is *want that* not a sufficient representation? In particular, why does the child fail to make an analogy between *want that* and *think that* in German, just as I posited they might make an analogy between *say that* and *think that* in English? The children who fail to understand *think* in Perner et al do not treat *think* as *want*, instead, they answer with the truth, not counter to current reality. Despite the superficial equivalence in structures, there is no analogy across them. Why?

**3. Learning complement structures**

Gleitman (1990) has argued cogently that verb meaning is not learned by ostension. Instead, Gleitman and colleagues (Fisher, Gleitman & Gleitman, 1991) place a large burden on the syntax of the verb's argument frame to narrow down the possible meaning, namely "syntactic bootstrapping". The argument structure of the verb – how many arguments and how they are arrayed - plays a vital role in cueing the child to its meaning. Children could use complements to figure out that a verb is a mental state (or communication) verb, because of the unique syntax. So, a form such as:

(15) Big Bird meeped that Grover was here or

(16) Big Bird meeped Grover to be here

should allow the listener to infer some mental state or communication of Big Bird about Grover. However, there are significant differences between these two forms – the tensed complement and the infinitival complement- that children may not be able to use in isolation to distinguish important subtypes of verb meaning. In English, the *that*-complement signals a proposition with a truth value, signifying an event that can be compared to reality. The infinitival form signifies an irrealis event, with no truth value because it is hypothetical, or still in the future. Once cannot

judge the truth of 'Grover to be here'.

Asplin (2002) arranged scenarios in which there were two possible agents, one of whom could be most easily described by one of the complement forms and one by the other. For example, she gave children the complement frame:

(17) Somebody meeped *the raccoon to eat the corn*

After three exposures across varying content scenarios, 4 and 5 year olds could figure out which character did the action of meeping, namely the one who *invited* or *tempted* or *wanted* the raccoon to eat the corn. But when exposed to the form:

(18) Somebody meeped *that the raccoon ate the corn*

even six year olds only chose correctly 50% of the time. That is, they thought meeped could be like *tempted* or *wanted* in such a frame, rather than the intended meaning of *discovered* or *believed* or *figured out* that the raccoon ate the corn. To summarize, the complement may let the child guess that the verb is a mental state or communication verb, as Gleitman and her colleagues have argued. But the experimental evidence shows also that a *that*-complement is not *in itself* enough to determine what *kind* of reading a complement receives under a novel mental state verb, for young children. With an *unknown* verb it remains ambiguous without further evidence (Asplin, 2002). But what kind of evidence would let the child differentiate the possible meanings?

It is very evident that complement forms vary significantly across languages. Therefore, whatever particular proposal is made about what children need to represent false beliefs adequately, it must be robust against these variations, and the form must be learnable. This is a challenging task that has only just begun, but we can first recognize two things: that the surface form of a complement is often ambiguous without more information, and that the learner must glean evidence from multiple frames of verb use to figure out the underlying structure (Gleitman, (1990). So we, as well as Perner's small German children, recognize that *will dass* is not the same form as *glaupt dass* even if the surface form looks the same: they are underlyingly distinct. And hearing a novel verb in a single frame, like *meeped that p*, isn't enough to tell a learner which underlying form is involved.

Felser's (2002) analysis of verbs of perception provides a nice illustration of the first point. These verbs take "small clauses":

(19) She saw *him fall*

as do causative verbs:

(20) She made *him fall*

Hence, they seem to take identical structures. However, when one considers other frames such as the expletive, the forms differentiate:

(21) She made *it seem likely that he fell*
*She saw *it seem likely that he fell*

So the complements in (19) and (20) may look alike, but they are underlyingly distinct.

It has long been known that factive verbs (*forget, remember, know*), which require their tensed complements to be true, do not behave syntactically like non-factives, which lack that presupposition (Cattell, 1978). Wh-movement is allowed from non-factives but not from factives:

(22) When did she think that he arrived (t)?
*When did she forget that he arrived (t)?"

Most importantly, the time of the event in the complement is determined by the verb class. Verbs of desire take complements that have the property that their tense is 'forward' from the time of the desire, captured in English by a to-infinitive:

(23) He wanted *to go to the party*

and in many languages such as Russian by a subjunctive (Avrutin & Wexler, 1999):

(24)Marija xocet ctoby ona sela jabloko
"Maria wants that (subjunctive) she has-eaten apple"

Avrutin and Wexler point out that in Russian there is a feature of complement clauses under desire verbs that the pronoun subject cannot be co-referential with the subject of the main clause, namely, *Maria* in (24) must be wanting someone else to eat the apple, or the sentence would be ungrammatical. Avrutin and Wexler argue that the complementizer '*ctoby*' orders the events in a specific way with the second event following the first, despite the tense marking. In Russian, there are binding constraints that follow as a result of this reordering at the level of LF.

These details are necessary to point out that *syntactic* properties of complements are dictated by the particulars of the verb in question. Where does the child get an understanding of these fundamental particulars? In the next section a solution is proposed, that involves integrating information across several sources: lexical/conceptual meaning, insufficient in itself without information from the variety of argument structures in which the verb appears, and in the case of mental state verbs, that syntactic evidence is insufficient at least for children without a concrete analogy to more observable verbs, namely those of communication.

**4. The steps in acquiring mental verbs**

First, the child has to discover a rough lexical meaning, for instance that the verb *think* refers to some hidden activity or state of the mind. Secondly, the child has to recognize that *think* takes propositions as its *content*, by observing it across many syntactic contexts. This allows the child to distinguish *think* from some

feeling-state that does not have propositional content. Compare the forms:

(25) He thought that the man was playing the violin.

(26) He relaxed now that the man was playing the violin.

But thirdly, the child has to discover that the embedded propositions can be *false* compared to the world. These three discoveries are intertwined: the argument structures, *if properly identified*, can clue the child that the verb must be a mental one. Only *complements*, not adjuncts, can be false. If the man was not playing the violin, (25) can still be true but (26) is rendered false. So the potential of falsehood fixes the true nature of the clause as a complement! How can we break into this cycle and make it learnable?

I argue that the converging surface syntactic evidence allows the child to place *think* in the same subclass as *say*, and there is *overt evidence* that *say* can take false complements. The child extends this to treat *think* complements analogously: their logical underlying form is equivalent.

If this is the case, how does the German child avoid the potential false analogy with the verb *will (want)*? In English, *want* and *think* take a different set of structures:

| | | |
|---|---|---|
| (27) | He wants icecream | * He thinks icecream |
| | He wants to leave | * He thinks to leave |
| | He wants her to leave | * He thinks her to leave |

But in German, the *want that* form exists. What is to stop the child making a syntactic analogy between *want* and *think*? It must be the case that the child has already sorted *want* into a class that takes irrealis objects. Most theorists agree that children understand desire from an early age (Perner, 1991; Schwitzgebel, 1999), and language plays only a minimal role in this understanding. That is, probably infants and apes and possibly our domestic pets are perfectly capable of recognizing a state of yearning towards an object of desire, since there are behavioral accompaniments of an obvious sort - reaching, persistence of effort, whining until the desire is satisfied. The child hears the verb *want* used in such contexts and then hears it extended to objects not present in the here-and-now e.g. “he wants a cookie” when no cookies are visible. It is not a complex move to substitute for the irrealis NP, an irrealis VP, IP or even CP:

(28) He wants to play
He wants her to play
He wants that she play (German).

In no case is the issue of truth or falsity invoked: the state of events outside the subject is irrelevant.

The verb *say* has a different history. The verb is mapped to speech acts of two sorts, one with an irrealis complement e.g. with the modal *should*:

(29) Mom said you should clean your room

in which the truth of the complement is not something we can judge by observation, and one realis:

(30) Mom said that you cleaned your room

The latter complement type maps onto the world present and past, and the proposition can be seen as false with respect to that world even while the whole sentence is true.

The verb *think* to a child must have an obscure meaning, something to do with unstated mappings of world. There are certainly no easy clues in behavior or stimulus event. As with *say*, there are two varieties of complement, irrealis, marking personal intent:

(31) I think I should open the window

and realis:

(32) He thinks he fed the dog"

The prediction is then that *say-think* form one class of verbs based on their common syntactic behavior, while *want* is part of a different class, with its complements always irrealis by virtue of its fundamental, and evident, meaning. Depending on the language, the verb want projects this onto its complement affecting mood, modals, aspect marking, adverbs, choice of complementizer etc. In a recent chapter (de Villiers, in press), I present evidence that English-speaking children can reliably answer questions about irrealis forms even with *think* and *say*, not just with *want*, well before mastering the realis forms of *think* and *say*. These latter are the forms that just precede, and potentially enable, the representation of false beliefs for reasoning in cognitive tasks.

**5. Point of view**

In this final section, I argue that *say* and *think* introduce complements marked as having a different point of view. This position is elaborated also in de Villiers (in press) and space constraints limit the details I can provide, but the basic contention is that the functional categories CP and DP might host a feature called here Point of View, or PoV. The CP can indicate a Point-of-View: in whose world is this event represented as true? That is, all propositions have a point-of-view, and when a verb such as *say* or *think* introduces a new clause, the embedded complement can take on the subject's PoV rather than the speaker's:

(33) $_{\text{CP-PoV-SP}}$[John thinks $_{\text{CP-PoV-SU}}$ [she left]]

In addition, DPs have a PoV. Back to the beginning, let's take the case of the man and the hat. The man puts on his head an object, which unknown to him is a stuffed dog. We can legitimately say:

(34) $_{\text{CP-PoV-SP}}$ [The man thought $_{\text{CP-PoV-SU}}$ [he was wearing $_{\text{NP}}$[a hat]]]

because "a hat" is his PoV. The indefinite NP inherits the PoV of the CP in which it is embedded, in this case, the complement introduced by think and linked therefore to the subject, the man. We cannot say, at the end of the video:

(35) $_{\text{CP-PoV-SP}}$ [The man is wearing $_{\text{NP}}$[a hat]]

because that matrix CP has the speaker's PoV, and obliges the NP to be the appropriate one in the world we share:

(36) $_{\text{CP-PoV-SP}}$ [The man is wearing $_{\text{NP}}$[a stuffed dog]]

Yet definite noun phrases have long been known to introduce *de re* readings, and this shows that DPs can take a PoV independent of the complement:

(37)$_{\text{CP-PoV-SP}}$ [The man thought $_{\text{CP-PoV-SU}}$[ $_{\text{DP-PoV-SP}}$[the stuffed dog] was a bit heavy]]

Now the discrepancy doesn't worry us, because *the stuffed dog* is our word, our PoV, not the man's. There are many subtle effects here and it would be foolish to claim that I have solved all the problems, but evidence from several studies reveals that children pass false belief tasks around age 4 but still have confusion about referential opacity even at age six (Russell, 1987; Apperly and Robinson, 1998; Kamawar & Olson, 1999). Their responses can be understood as emerging from a difficulty in co-ordinating the PoV on clauses with the PoV on noun phrases, especially DP versus NP.

Imagine then that all clauses host "Point of View" markers. Normally the default is the speaker's PoV. The realis complement clauses of *say/think* take the PoV of the *subject*, reflecting the possible world in the subject's mind. This PoV marking does not apply to complements under *want* or to the irrealis complements of *say/think*. Full mastery of mental verbs and their complements entails a step-wise development, the endpoint being a full syntactic structure with complements marked by a PoV feature. At that point, children develop the capacity to engage in false belief reasoning. The mystery is exactly how. By what means does the syntactic mastery enable the reasoning? It seems unlikely that the children formulate complete sentences in their native language in the process of answering the false belief questions. But could they generate enough of the underlying representation to support the reasoning without formulating phonological forms, that is, could they use LF to reason? Carruthers (2003) argues that this is how language might in certain special cases enable thought, but that only when the language is spelled out phonologically does it become accessible to consciousness. Carruthers disagrees with us that false belief reasoning is such a special case, but his

mechanism is an attractive option to entertain.

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