Linguistic Practice and False-belief Tasks

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Abstract*:* Jill de Villiers has argued that children's mastery of sentential complements plays a crucial role in enabling them to succeed at false-belief tasks. Josef Perner has disputed that and has argued that mastery of false-belief tasks requires an understanding of the multiplicity of perspectives. This paper attempts to resolve the debate by explicating attributions of desires and beliefs as extensions of the linguistic practices of making commands and assertions, respectively. In terms of these linguistic practices one can explain why desire-talk will precede belief-talk and why even older children will have difficulty attributing incompatible desires.

1. Introduction

It is now quite well established that children's success in false-belief tasks correlates with linguistic development. Also fairly well-established, although still disputed, is that somehow linguistic development leads the way. However, even among those who accept

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this direction of causation, there is no agreement on mechanisms. In particular, there has been an interesting debate between Jill de Villiers and collaborators, on the one side, and Josef Perner and collaborators, on the other, over the role played by the child's mastery of the syntax of linguistic belief attributions.

de Villiers' position has been that mastery of false-belief tasks is a consequence of a development in the understanding of the syntax (broadly speaking) of the language that we use in talking about mental states (J. de Villiers and P. de Villiers, 2000; J. de Villiers and Pyers, 2002; J. de Villiers, 2005). Early on in the debate, she proposed that the key syntactic feature was *that*-complementation; more recently she has proposed that it is the distinction between *realis* and *irrealis* mood. Perner, in contrast, holds that mastery of false-belief tasks results from an ability to appreciate differences in perspective (Perner, Sprung, Zauner and Haider, 2003; Perner, Zauner and Sprung, 2005). Acquisition of this ability may be driven by language acquisition, but what is acquired is not in itself a linguistic ability.

Our objective in this paper is to put forward a new explanatory hypothesis concerning the role of language acquisition in mastering false belief tasks that incorporates insights from both de Villiers and Perner. We will first review the basic facts about false-belief tasks in order to underscore the facts that we aim to account for. We will then review the debate between de Villiers and Perner. Our attempt to adjudicate this debate will rest on an insight due to Paul Harris (1996), who has suggested that features of the practice of attributing beliefs and desires might be traced to the characteristics of the kinds of conversations to which they belong. We will attempt to develop this insight by characterizing the special roles that the language of desire and the

language of belief play in interpersonal cooperation. We will find a connection between the language of desire and the practice of commanding, and we will find a connection between the language of belief and the practice of information sharing, and we will explain why the practice of information sharing is harder than the practice of commanding. In light of this, we will explain why the ability to attribute desires precedes the ability to attribute beliefs and why a child has a hard time attributing a desire that is incompatible with a desire that the child attributes to another person, and we will explain why mastery of sentential complements plays a causal role in producing success in false-belief tasks.

2. False-belief Tasks

A false-belief task is an experimental task intended to reveal whether a child understands that other people may possess and act on false beliefs. In this section, we review the basic facts about false-belief tasks that will concern us in our discussion of the issue between de Villiers and Perner.

False-belief tasks fall into three main categories:

Change-in-location tasks (*e.g.*, Wimmer and Perner, 1983; Baron-Cohen, Leslie and Frith, 1985): In one version of this task (the 'Sally-Anne' task of Baron-Cohen *et. al*., 1985), children watch a doll, Sally, put a marble in a basket. Sally then leaves the scene. While Sally is away, Anne moves the marble to a box, where it cannot be seen. Sally returns and the experimenter asks the child where Sally will look for the marble. The

correct answer is that Sally will look for it in the basket, where Sally put it. The wrong answer is that Sally will look for it in the box, where it is.

Unexpected-contents tasks (*e.g.*, Perner, Leekham and Wimmer, 1987; Gopnik and Astington, 1988): In one version of this task, a child is shown a smarties box (a box that they recognize as the box that candies called smarties come in) while a friend waits in another room. When the child is asked what is in the box, he or she answers 'Smarties!' Then the box is opened to reveal that actually the box contains pencils. The child is then asked what he or she formerly thought was in the box and is asked what the friend will think is in the box. The correct answer to both questions is smarties. The wrong answer is pencils.

Appearance-reality tasks (*e.g.*, Gopnik and Astington, 1988; Astington and Jenkins, 1999): The child looks at but does not touch an object that looks like something that it is not, for example, a sponge painted to look like a rock. The child is asked what the object is and is then shown what it really is. The child is asked what he or she thought it was when he or she first saw it and is asked what a friend, waiting in another room, will think it is when he or she first sees it. This type of false-belief task is much less commonly used than the other two.

A meta-analysis conducted by Wellman, Cross and Watson (2001) found that across a wide range of studies, including a variety of cultures and languages, children pass from being reliably unsuccessful in these tasks to being successful at between 40 and

55 months of age (*i.e.*, at around age 4), with a majority of studies finding success at the earlier end of this range. The finding is not merely that before that age they do not reliably give the right answer; they reliably give the wrong answer. In other words, they act as though everyone knows what they know or knows the truth. They are no better at judging what they themselves formerly believed than they are at judging what others will believe (Wellman *et. al*., 2001, p. 665).

In the change-of-location task children do not need to understand or use words like 'think' or 'believe'. They only need to make a 'prediction' about what another person, puppet or character in a story will do. In the other two types of tasks, children need to answer a question formulated in terms of 'think' (*e.g.*, 'What will X think was in the box?'), but they do not have to explain anything in those terms. In fact, it is generally supposed that in order to keep the task demands to a minimum and thereby to bring out the best in a child, it is best not to complicate the task by asking the child to explain things. In the most persuasive investigations of children's ability to explain their predictions, it is found that children who cannot predict the protagonist's action correctly also cannot correctly explain the action observed, whether in terms of the protagonist's thoughts or in terms of the prior location of objects (Wimmer and Meyringer, 1998).

Longitudinal studies clearly demonstrate that success in false-belief tasks correlates with linguistic development and strongly indicate that linguistic development plays a role in producing success in false-belief tasks. Moreover, some of these studies indicate that a particular aspect of syntax, namely, tensed complements (as in 'Sally thinks *that* the marble *was* in the basket'), plays a special role in facilitating success on false-belief tasks. Astington and Jenkins (1999) studied the longitudinal relation between

scores on measures of semantic and syntactic development and scores on false-belief tasks. They found that improvement on false-belief scores did not predict improvement on language scores but that improvement on language scores did predict improvement on false-belief scores; in particular, improvement on syntax scores was an independent predictor of improvement on false-belief scores. On the basis of another longitudinal study, de Villiers and Pyers (2002) argued that mastery of sentential complements better correlates with success on false-belief tasks than other measures of linguistic development (based on spontaneous speech) and indeed predicts future success on false-belief tasks.

A large-scale study by Lohmann and Tomasello (2003) provided children with training of several kinds and compared their subsequent performance on false-belief tasks. They found that training in sentential complements (using 'think' and 'know' as well as verbs of communication such as 'say' and 'tell') was as effective as training in the appearance-reality distinction in producing improved performance on false-belief tasks. Moreover, a study by Hale and Tager-Flusberg (2003) showed that children who received training on sentential complements in the context of verbs of communication only, and *not* in the context of mental state verbs ('think', 'believe' and 'know'), showed more improvement in false-belief tasks than children who were trained on the use of relative clauses (a presumably irrelevant feature of syntax) and just as much improvement as children trained explicitly on false-belief tasks. Finally, studies of deaf children (J. de Villiers and P. de Villiers, 2000; P. de Villiers 2005; and, especially, Schick, J. de Villiers, P. de Villiers and Hofmeister, 2007) indicate that when linguistic development is delayed, even among deaf children in a 'socially and cognitively nourishing environment'

(Schick *et. al*., 2007, p. 376), so too is success on false-belief tasks, and that of several predictors of success, the best was understanding of false complements in the context of verbs of communication (such as 'tell').

Other studies have affirmed that linguistic development predicts success in false-belief tasks while questioning the claim that it is specifically mastery of syntax or sentential complements that predicts success on false-belief tasks. Ruffman, Slade, Rowlandson, Rumsey and Garnham (2003) argued that syntactic ability no better predicts success on false-belief tasks than semantic ability or composite language scores and that language scores predict success in tests of emotion understanding as well as they predict success on false-belief tasks. However, that study did not examine specifically children's mastery of sentential complements. Cheung (2006) conducted studies showing that among Cantonese-speaking children success on false-belief tasks correlated as well with general language abilities as with mastery of 'say-that' and 'forget-that' complements (which in Cantonese need not carry tense); but since these were not longitudinal studies and since in normal development mastery of complements is a fairly good measure of linguistic ability generally, we are not sure that this result poses a significant challenge to the claim that mastery of sentential complements plays a special role.

What certainly does have a bearing on the thesis that mastery of sentential complements stimulates success on false-belief tasks is the finding that children understand words for desire ('want' in English, 'will' in German, 'yao' in Mandarin) long before they are able to succeed at false-belief tasks. That children make frequent use of words for desire long before they make frequent and varied use of words for belief has been documented by Bartsch and Wellman (1995, esp. pp. 96-102), who closely

studied the spontaneous speech of a small number of children over a period of years. Tardif and Wellman (2000) likewise found that young Mandarin and Cantonese speakers 'acquire terms for, and talk about, people's desires well in advance of acquiring terms for and talking about people's thought' (pp. 34-35). The case of German-speaking children is important for our purposes, because the German verbs for desire often require tensed sentential complements. Perner, Sprung, Zauner and Haider (2003) demonstrated experimentally that German-speaking children ranging in ages from 2 years 5 months to 3 years 7 months did very well in tests of understanding of the syntax of 'want' (in German 'will', pronounced *vill*) even while performing very poorly on tests of understanding of the syntax of 'thinks' ('glaubt'). The significance of this result for the debate between de Villiers and Perner will be discussed in the next section.

There are many eddies of controversy in the false-belief literature that we cannot attempt to review here, some of which might seem to call into question certain assumptions underlying the issue between de Villiers and Perner. For example, some researchers claim to elicit false-belief understanding from prelinguistic infants (Onishi and Baillargeon, 2005; Southgate, Senju and Csibra, 2007; Surian, Caldi and Sperber, 2007). The interpretation of such results is disputed (Perner and Ruffman, 2005; Perner *et. al*., 2007), but, in any case, our tack here is to distinguish between traditional false belief paradigms that we have outlined above and others, such as the violation of expectation paradigms, and to restrict ourselves to an account of what is required for success in the traditional paradigms. In addition, some theorists defend theories of false-belief attribution that are in one or another way nativistic about the concept of belief (*e.g.* the *curse of knowledge* hypothesis—Birch and Bloom, 2004; Robinson 1994, or a theory

of mind module—Roth and Leslie, 1998; Leslie, German and Polizzi, 2005). If those theories are correct, then the role of language will be somewhat different from what we propose, but the task we have set ourselves is to explain what the role of language might be on the assumption that the concept of belief is strictly acquired.

A different sort of doubt about the link between linguistic ability and the understanding of other people's beliefs comes from the study of aphasic adults who are able to pass false belief tasks despite severe linguistic impairment (Varley, 1998; Varley and Siegal, 2000; Apperly, Samson, Carroll, Hussain and Humphreys, 2006). These results do conflict with the most simple-minded account that might be given of the role of sentential complements in false-belief tasks, according to which false-belief processing requires actually saying to oneself in *inner speech* sentences containing sentential complements. But since these aphasics had been functionally normal until well into adulthood, these studies leave room to maintain that success on false-belief tasks is the effect of a kind of language-based thought that remains intact while the abilities to parse and put together sentences in speech are significantly diminished.

3. de Villiers versus Perner

Jill de Villiers defends the bold theory that children's success on false-belief tasks is due to their mastering a particular syntactic structure: tensed sentential complements (J. de Villiers and P. de Villiers, 2000; J. de Villiers and Pyers, 2002; J. de Villiers and P. de Villiers, 2003; J. de Villiers 2005). Sentential complements are linguistic structures consisting of embedded clauses which (in English) follow 'that'-clauses, such as,

'Melinda believes *that the earth is flat*'. An important feature of complements is that the complement clause can be false and yet the whole sentence true, and this feature is relevant to the false-belief task since understanding false belief requires understanding that it is sometimes correct to describe people as believing something that the describer takes to be false.

We will not attempt to give a precise syntactic characterization of the kinds of sentential complements at issue. In the lingo of contemporary syntax, sentential complements are complementizer phrases (CP), but the category of complementizer phrases comprises much more than the kinds of 'that'-clauses at issue here. The 'that' in what we are calling a 'that'-clause may often be omitted, as in, 'He thinks it's time to go'. What we call *sentential* complements are always finite, that is, tensed (or, more generally, inflected). We will also have occasion to speak of a broader class of phrases that we will call *clausal complements*. These include not only the finite clauses that follow 'thinks that' but also the infinitival clauses that follow 'wants', as in 'He wants to build a sandcastle', as well as the subordinate clauses of Cantonese belief- and desire-attributions, which are not marked for tense.

A child's understanding of the syntactic structure of sentences containing sentential complements can be measured in a number of ways. One way (J. de Villiers and Pyers, 2002, p. 1039) is to ask children questions such as the following:

The Mom said she bought apples, but look, she really bought oranges.

What did the Mom say she bought?

Three year olds typically answer 'oranges', while four year olds say 'apples'. We can call this a *long-distance question* because in order to get the answer right children have to

look past the verb of the embedded clause and look 'up' to the verb of the embedding clause. Another way to test for understanding of sentential complements is through a memory test (J. de Villiers and Pyers, 2002, pp. 1043-44). Children are told a simple story with the help of two pictures and then are asked questions such as the following:

> *She said she found a monster under her chair, but (second picture) it was really the neighbor's dog.*
>
> *What did she say? (Pointing back at the first picture).*

Children are scored as answering correctly in this task even if they give simple answers such as 'A monster!' de Villiers and Pyers (2002) found that understanding of sentential complements, as measured by the memory task just described, was a better predictor of later success in false-belief tasks than general language ability.

On the basis of her studies with Pyers, de Villiers has argued that mastery of sentential complements is what provides the young child with the ability to succeed in false-belief tasks. Only by means of sentential complements can the child represent another person's state of mind as containing a false representation of the world. Here is how de Villiers and Pyers put it:

> We wish to argue that the child needs the full syntax of mental verbs plus sentential complements in order to *represent* in his own mind the belief states of other people, not simply to *encode* them for reporting about them in speech (2002, p. 1056; their emphasis).

The meaning of this is perhaps not entirely clear, but in context their point seems to be that mastery of sentential complements does not merely enable the *expression* of thoughts

about people's beliefs but is rather what first makes it possible for children to *have* such thoughts. (See also the discussion in J. de Villiers and P. de Villiers, 2003.)

In addition, de Villiers has speculated that mastery of sentential complements in the context of verbs of communication provides a critical stepping stone into mastery of sentential complements in the context of mental verbs (J. de Villiers and P. de Villiers 2000, pp. 196-197; J. de Villiers and Pyers, 2002, p. 1056). In a sentence about what someone has said, what is reported on is an overt speech event (as opposed to a thought hidden in someone's head). So a child could see for herself that while the report was supposed to be true, the sentence used in the speech event reported on was false. In this way, the child could learn that true sentences can contain false complements. The transition from understanding 'say' to understanding 'think' is facilitated by hearing 'think' on occasions when the speaker might just as well have said 'say' (de Villiers, 2005, p. 202). Her own research with Pyers did not support this speculation (because the mastery of sentential complements in the context of mental verbs was highly correlated with the mastery of sentential complements in the context of verbs of communication, and the two could not be separated as predictors of success in false-belief tasks). However in support of her hypothesis she was able to cite (in J. de Villiers and P. de Villiers, 2003, p. 378) a conference report of the study by Hale and Tager-Flusberg (later published, 2003) in which training on verbs of communication alone produced improvements on false-belief tasks.

A serious challenge to de Villiers' theory was thrown down by Perner, Sprung, Zauner and Haider (2003), who pointed out that in German words for desire take a tensed complement just like verbs for beliefs. As noted in the previous section, it is well-

established that children talk about people's desires (by means of words like 'wants') well before they make much use of words for belief (such as 'thinks'). If we consider only the case of English, this need not indicate any problem for de Villiers' theory, because in English 'wants' takes an infinitival complement not a tensed (*finite*) complement. For instance, we say, 'Mommy wants Andy *to* go to bed' not 'Mommy wants *that* Andy goes to bed'. So children learning English could learn how to talk about desires without mastering the syntax of tensed sentential complements that de Villiers had said provides the child the resources for understanding false belief. In their 2000 paper (p. 199), de Villiers and de Villiers even cited this fact in support of their theory. The trouble is that in German the words for desire ('will' and 'möchte' in third-person singular) do obligatorily take a tensed sentential complement when the subject of the main clause is not the same as the subject of the subordinate clause. One says 'Die Mutter will dass Andreas ins Bett geht', which, translated word-for-word, means 'The mother wants that Andreas in the bed goes'. (In German, the word order in the sentential complements differs from that in English and from that of a stand-alone clause in German, but that is equally true for verbs of belief as for verbs of desire.) In German it would be strictly ungrammatical to say 'Die Mutter will Andreas ins Bett gehen' ('The mother wants Andreas in the bed to go'). (However, such constructions are allowed, and even preferred, when the subject of the main clause is the same as the subject of the subordinate clause: 'Die Mutter will ins Bett gehen'.)

Perner *et. al.* (2003) showed that German-speaking children, just like English-speaking children, do understand the language of desire well before they understand the language of belief and before they are successful on false-belief tasks. They showed this

using precisely the kind of long-distance question that de Villiers had taken as a test of mastery of sentential complements (but did not use in her study with Pyers). The German-speaking children reliably gave correct answers to questions on the order of 'What does Mom *want* Andy to do?' ('Was *will* die Mutter *dass* Andreas tut?') before they reliably gave correct answers to questions on the order of 'What did Mom *say* that Andy is doing?' or 'What did Mom *think* that Andy is doing?' Similar observations can be made on the basis of German language for pretense. In German, the usual term for 'pretend to' ('spiel dass', literally, *play that*) is followed by a tensed sentential complement, but, as Rakoczy, Tomasello and Striano (2006) demonstrate, understanding of the language of pretense strictly precedes success on false-belief tasks, and training in the language of pretense does not produce improved performance on false-belief tasks.

What the Perner *et. al*. (2003) and Rakoczy *et. al*. (2006) results mean is that understanding sentential complements cannot have quite the exclusive role in facilitating success on false-belief tasks that de Villiers had seemed to suppose they had. In view of these results, one can still maintain that mastery of sentential complements is *necessary* for success on false-belief tasks (and that is not just the trivial claim that one has to be able to speak false complements in order to speak about false beliefs, because, recall, on the change-of-location task no talk of mental states need be involved). However, one can only say that mastery of sentential complements *plus* some mystery ingredient is *sufficient* to bring about success on false-belief tasks.

In a subsequent paper, de Villiers (2005) responded to the challenge. Acknowledging the results of Perner *et. al*. 2003, she proposed that the important distinction between sentences about desire and sentences about belief is a syntactic

feature of the verb taking a clausal complement. 'Wants', or German 'will', is supposed to be marked as *irrealis*, while 'says', or German 'sagt', and 'thinks', or German 'glaubt', are marked as *realis*. Unfortunately, it is not very clear what distinction this is supposed to draw. What she says is that *irrealis* complements (or 'objects') are 'potential' (2005, p. 200), but it is also not clear what that means. If the belief verbs are supposed to be *realis*, then *realis* cannot mean that the complement is true, because the complements of sentences that attribute false beliefs are not actual, but false. If the desire verbs are supposed to be *irrealis*, then *irrealis* cannot mean that the complement is false, because one may very well want things to be as they are. Nor can the pertinent distinction be that a *realis* complement is always *supposed* to be true. The person who attributes a belief need not assume that the complement is true. If a belief attribution is true, then certainly the *subject* of the attribution believes that the complement clause is true, while the subject of a 'want' sentence may know that the proposition expressed by the complement (infinite or finite) is not (yet) true. But the distinction between what the speaker supposes and what the attributee supposes is not a distinction that one can grasp without understanding what belief is, and so it is not a distinction that the child can make use of to bootstrap into an understanding of belief.

In any case, the *realis*/*irrealis* distinction is not a distinction in surface syntax. At least in the case of German, it does not show up as a surface syntactic distinction between 'will' (wants) and 'glaubt' (believes) when the subject of the main clause is not the subject of the subordinate clause. It is supposed to be one of those sorts of distinctions in syntax, commonplace in linguistics, that show up only in the syntactic analysis of a sentence. But as de Villiers acknowledges (2005, pp. 193-196), one cannot legitimately

posit hidden, below-the-surface features of syntax without providing some kind of syntactic evidence for their existence. One has to show that a distinction in permissible movements or embeddings under operators — or something — warrants the positing of the hidden syntactic features. Perhaps this is what de Villiers intends to provide in pointing out that the sentential complements of 'thinks' are referentially opaque (2005, p. 211). (From 'Oedipus thought he married Jocasta', we cannot infer 'Oedipus thought he married his mother'.) On the basis of this opacity, de Villiers concludes that sentential complements carry a syntactic *subject point of view marker*, whereas main clauses carry a *speaker point of view marker*. (In certain special cases, she claims, elements in the sentential complement can carry the speaker point of view marker. These are cases of *de re* belief sentences.) In these terms, she offers an account of the *realis*/*irrealis* distinction: Complements marked by subject point of view, as opposed to speaker point of view, are *realis*. The trouble with this account of the distinction is that by the very same token the complements of 'want' should be *realis* as well, since the complements of 'want'-sentences are also referentially opaque. (From 'Oedipus wanted to marry Jocasta', we cannot infer 'Oedipus wanted to marry his mother'.) More recently, de Villiers (in de Villiers and de Villiers forthcoming) has conceded that the *realis/irrealis* distinction might be 'entirely semantic', but we are also not sure what semantic distinction she thinks it draws, and in view of this concession we wonder whether anything at all remains of her original theory.

Meanwhile, Perner has had his own ideas about the missing ingredient. Perner emphasizes that attributing a false belief to a person involves more than interpreting a person as entertaining a false proposition. Children understand others as entertaining

false propositions when they engage with others in pretense, which they are able to do well before they are able to succeed on false-belief tests. What is additionally required in order to understand false belief is understanding that another person *takes* a false proposition for *true* (Perner 2000, pp. 376-377). In other words, according to Perner, the crucial development that allows children to pass false-belief tasks is that they come to appreciate that different people may have different *perspectives* on the world. He characterizes this as a conceptual advance rather than as a linguistic one (Perner, Sprung, Zauner and Haider, 2003, p. 186; Perner, Zauner and Sprung, 2005, p. 221), although he of course acknowledges that the kind of interpersonal interaction that language facilitates plays a role in bringing about this conceptual advance (Perner, 2000, p. 378, Perner *et. al*. 2005, p. 222).

Perner finds confirmation for this theory in studies of desire attribution. Just as children younger than four years have trouble recognizing false beliefs, so too they have trouble recognizing desires that conflict with their own. Perner cites a study by Moore, Jarrold, Russell, Lumb, Sapp, and MacCallum (1995) in which children played a game in which at a certain point Fat Cat would want the next card to be turned over to be blue while they themselves would want it to be red (Perner *et. al*. 2005, p. 234). In that condition, the three-to-four year old children were unable to correctly report Fat Cat's desire. They likewise performed poorly in standard false belief tasks. Moreover, Perner argues (contrary to the conclusion that Moore *et. al.*, themselves draw) that the difficulty does not stem simply from the child's preoccupation with his or her own desire. This suggests that three-to-four year olds are not any better at entertaining the thought that someone else has *desires* the satisfaction of which precludes the satisfaction of their own

desires than they are at entertaining the thought that someone else has *beliefs* that conflict with their own. Perner interprets this failure to understand that others may have desires incompatible with their own as another failure to grasp differences in perspective.

The Moore *et. al.* (1995) finding that children have as much difficulty with incompatible desires as they have with false beliefs seems to conflict with other studies, such as that of Repacholi and Gopnik (1997), in which it is shown that even 18 month old infants can be made to understand that adults have different tastes in food from themselves. (They might prefer broccoli over crackers.) Perner suggests that such studies do not demonstrate that young children understand the possibility of incompatible desires; rather, young children may be *objectivists* about value and allow that what is objectively good for another person (broccoli) may not be what is objectively good for themselves (crackers) (Perner *et. al.,* 2005, 239).

The Moore *et. al.* result has been challenged by Rakoczy, Warneken and Tomasello (2007). In that study children had to attribute desires to protagonists in two conditions: one in which two protagonists were in the same boat and one in which they were in different boats. In both conditions protagonists expressed divergent desires (*e.g.*, Susi says the boat should go to the tree and Tom says the boat should go to the house), but these desires were 'incompatible' only in the condition where the two protagonists were in the same boat since only in that condition could the two divergent desires not both be fulfilled. In contrast, in the two-boat condition both Susi's and Tom's desires could be fulfilled and were thus 'compatible'. There are two relevant results here. First, subjects were better at attributing incompatible desires than at attributing false beliefs in a standard (change-in-location) false belief task. Second, children were no worse at

attributing incompatible desires than compatible desires. This challenges Perner's interpretation of the Moore *et. al.* results, according to which there is a kind of symmetry between false belief attribution and incompatible desire attribution.

The relationship between the Rakoczy *et. al.* and Moore *et. al.* studies is complicated and calls for more investigation. What we will take from the Moore *et. al*. study is that children have more difficulty in attributing incompatible desires than they have in attributing compatible desires. So the Rakoczy *et. al.* finding that attribution of incompatible desires precedes attribution of false belief will not pose any special challenge to our own claims. As for their other result, that children have no more difficulty with incompatible desires than they have with compatible desires, we think there is a problem with the methods used. Subjects could have succeeded by employing a simple tactic in both the incompatible and conflicting desires conditions, that of reformulating the protagonist's explicit expression of desire (*i.e.*, 'my boat should go to the tree/house') in order to correctly answer the desire question (*i.e.*, 'Susi/Tom wanted the boat to go where?'). This interpretation would account for subjects' equal performance in each condition while denying that subjects had any appreciation for the difference between the conditions.

Rakoczy *et. al.* acknowledge this objection (2007, p. 62) but claim that if children were using 'dumb echolalia' then we should expect them to succeed in other false belief tasks where beliefs are explicitly expressed, which they do not (*e.g.* Perner *et. al.,* 1987). However, we think that there are enough differences between these false belief tasks and incompatible desires tasks to make this response implausible. For example, one of the difficulties that children have to overcome in the false belief tasks that Rakoczy *et. al.*

cite is squaring what is incorrectly asserted with what the child currently apprehends—a difficulty not encountered in incompatible desire tasks. Since the false belief tasks are more difficult in this way, the fact that children fail to solve false belief tasks when a belief has been explicitly expressed should not lessen the force of the 'echolalia' objection to the Rakoczy *et. al.* incompatible desire task. We think this is a point Rakoczy *et. al.* would be inclined to accept given that the thrust of their arguments is to oppose Perner's perspective-based symmetry account of desire and belief attribution. Thus, we think that the result that incompatible desires are more difficult for children to attribute than compatible desires stands.

Perner's theory of perspectives receives some confirmation from the details of the Lohmann and Tomasello study (2003) mentioned earlier. Lohmann and Tomasello compared four training conditions. Children were exposed to 16 different objects, 12 of which looked like one thing (*e.g.*, a stone) but were really another (*e.g.*, a sponge). In the *no language* condition, the experimenter drew the child's attention to the object but otherwise did not say much. In the *sentential complements* condition, the deceptive aspect of the objects was not emphasized but children were encouraged to use 'that'-clauses. For a instance, a puppet, Ernie, might say, 'This belongs to my grandfather; I know that', and the experimenter would ask, 'What does Ernie know?' In the *appearance-reality* condition (that's not what Lohmann and Tomasello call it), the deceptive aspect of the deceptive objects was emphasized, but 'that'-clauses were not used. The *full-training* condition combined the sentential-complements condition and the appearance-reality condition. The finding was that the sentential complements condition and the appearance-reality condition worked about equally well and both produced more

improvement on false-belief tasks than the no language condition, but that the full training condition outperformed all others. These results indicate that the kind of understanding of differences in perspective that the appearance-reality condition highlights is a source for understanding of false-belief independent of the mastery of sentential complements.

One possible shortcoming of Perner's idea is that he has nothing special to say about why mastery of sentential complements should have a special role to play in bringing about success in false-belief tasks, as several studies seem to show they do (de Villiers and Pyers, 2000; Hale and Tager-Flusberg, 2003; Lohmann and Tomasello, 2003). Moreover, Perner has little to say about what kind of thing a 'perspective' is supposed to be or what the child understands in understanding that different people have different perspectives. He has sometimes explicated this grasping of perspective as a matter of the child's understanding that people contain causally efficacious mental representations (*e.g.*, Perner, 2000, p. 377). More recently Perner has suggested that children's understanding of belief-desire reasoning is the result of the 'metarepresentational insight' that 'action is not determined by circumstances and goals but by their mental/representational specifications, beliefs and desires' (Perner, Rendl and Garnham, 2007, p. 496). But we think that it is not obvious that four-year olds have such a sophisticated (and quite possibly false) philosophical theory. However, we will not attempt to criticize Perner's representationalism here but, rather, will offer an alternative account.

Our objective in the remainder of this paper will be to articulate a third position that we think will capture what is best in both de Villiers' theory and Perner's theory.

We will begin by setting out a conception of the role in discourse of attributions of desire and attributions of belief. In terms of that we will be able to provide a comparison of the prerequisites for participation in the practice of desire attribution and the prerequisites for participation in the practice of belief attribution. In light of that we will then be able to account for several of the basic empirical results that have emerged in the debate over the psychology of false-belief attributions.

4. Levels of Complexity in Belief/Desire Attribution

With few exceptions, contemporary philosophers of mind assume that the function of attributions of beliefs and desires is the explanation and prediction of behavior. (A prominent exception is Ruth Millikan. See, for example, her 2004, p. 22.) Supposedly, agent A's attributions of beliefs and desires to agent B enable agent A to explain and predict agent B's behavior. We will call this functional hypothesis the *explanation/prediction theory*. Notoriously, this philosophy of mind has been highly influential in the study of cognitive development (*e.g.*, Wellman, 1990, pp. 100, 109; Astington, 1993, pp. 74-78; Gopnik and Meltzoff 1997, pp. 43, 78). We think that, on the contrary, explanation and prediction are at best the last stop on a long sequence of stages. In this section, we offer a speculative account of those stages. In terms of this hierarchy of levels we will subsequently offer our explanations of some of the developmental facts that we have reviewed in previous sections.

To see that there might be something missing from the explanation/prediction theory, consider the following ordinary-looking fictitious scenarios in which one person attributes a belief or a desire to another.

Scenario One: Billy and Sally are playing with their toys in the living room. Mother is expecting guests in half an hour. Sally steps into the kitchen where her mother is preparing food. Mother says to Sally, 'You and Billy, please pick up all your toys in the living room and take them to your own rooms'. Sally returns to the living room and says to Billy, 'Mom wants us to put away the toys'.

Scenario Two: Billy and Sally are playing in the yard. They expect to attend a friend's birthday party later in the afternoon, but they are not sure when it starts. They see another friend, Markie, at the end of the block. Sally walks down the street to ask when the party starts. When she returns, she says to Billy, 'Markie thinks the party starts at four o'clock'.

In neither of these two scenarios does an attribution of belief or desire (with 'think' or 'want') serve to explain or predict the behavior of the attributee. The role of attributions of belief and desire in these scenarios is one of facilitating interpersonal cooperation rather than one of explanation and prediction. In Scenario One, Mother has made a command, or request, and in telling Billy what Mother wants, Sally conveys that command to Billy while crediting Mother as the source. So we could say that the attribution of desire serves to convey a command. In Scenario Two, there is a question of

fact, 'When does the party start?', Markie offers an answer to the question, and Sally, in speaking as she does to Billy, conveys Markie's answer on his behalf. The reason we put it that way — she 'conveys Markie's answer on his behalf' — is that Sally does not literally *convey* Markie's answer, as she might do if she just repeated what he said by asserting 'The party starts at four o'clock'. Rather, she conveys the content of Markie's answer while tagging it with its source, Markie. The reason she does this, rather than just repeating what he says, may be that Markie is not very reliable. Since Markie is not very reliable, she may not wish to take responsibility for the claim that the birthday party starts at four o'clock in case that turns out to be false.

With that much indication of an alternative to the explanation/prediction theory, we now detail a hierarchy of *uses* of attributions of desire and belief. We will go through the hierarchy of desire attributions first and then take up the hierarchy of belief attributions. (For partially competing taxonomies, see Shatz, Wellman and Silber 1983 and Bartsch and Wellman 1995.)

4.1 The Hierarchy of Desire Attributions

An important distinction is that between 'want' when it takes a direct object ('want an apple') and 'want' when it takes a clausal complement ('want to find the candy'). Here we will discuss only the cases of 'want' taking a clausal complement, which is clearly the case at issue in the debate between de Villiers and Perner.

1. Expressive attributions of desire. A person may say 'I want to *X*' as a way of alerting others that he or she will soon *X* or as a way of enlisting help in *X*-ing. A child may say 'I want to watch TV' as a way of alerting another child that he or will she will

no longer participate in the game they have been playing and will instead watch TV. Or a child may say 'I want to get up there' as a way of enlisting the help of an adult in getting up on the bed. We will call such attributions of desires *expressive* attributions of desire. They are always first-person attributions, that is, attributions of desire by the speaker to him- or herself. In many contexts, such expressive self-attributions of desire are no evidence at all of an understanding of the concept of desire. They are just idiomatic alternatives to declarations such as 'I will watch TV' or commands such as 'Get me up there!'. What the sentence uttered literally means, in the public language, may still be that the speaker has a certain desire, and we may evaluate the utterance as objectively true or false on that basis. But young speakers can use these sentence forms without understanding that they have such truth conditions.

2. Attributions of expressions of desire. Person A may say 'I want to *X*' as an expressive attribution of desire of the sort described in the previous paragraph. Person B may then report to person C, 'A wants to *X*'. For instance, a child might say to an older sibling, 'I want to get up there', and then the older sibling may say to a parent, 'She wants to get up there'. Such attributions of expression depend on an understanding of the effects of expressive attributions of desire and an ability to repeat what others have said in order to achieve the effects that the original utterance might have been expected to have on the present audience. More generally, for any of the sorts of attribution described below, in addition to the ability to *originate* attributions of that kind, there is the possibility of being able to usefully *repeat* attributions of that kind in second- or third-person.

3. Command-conveying attributions of desire. These are the sorts of attributions of desire illustrated in Scenario One. Person A tells person B to *X*. Person B then says to person C, 'A wants me to *X*'. Or person A tells person B, 'C should *X*', and person B then says to person C, 'A wants you to *X*'. Or person B then says to person D, 'A wants C to *X*'. To make such attributions of desire, the attributor presumably must be capable of taking and giving commands, must be able to identify the source of a command and must be able to recognize whether a command is *in force*. In understanding who is the source of the command the attributor must presumably have some sense that the source is the person responsible for the outcome of a command and that the source is the person whose authority motivates obedience. This sense for responsibility includes a sense of who is to blame if things go badly. Only in case the attributor possesses this understanding of who is responsible and who has authority will the attributor have a reason to assign responsibility for the command to another by saying 'A wants . . .' rather than simply repeating the command himself or herself. Being able to recognize whether a command is in force means being able to tell when the command has been fulfilled, but also being able to tell if it has been rescinded or overridden. Only in case the attributor possesses this understanding of the conditions under which a command is in force will the attributor be able to tell whether the command conveyed in attributing a desire is still in force.

4. Need-conveying attributions of desire. Person A is engaged in some activity that involves a number of discrete steps and which is characterized by some typical result. For example, A may be engaged in a crafts project that entails at some stage gluing together pieces of paper. Where some activity *X* is necessary in order to carry out

the plan, person B may attribute to A a desire to do *X*. For instance, when B observes A rummaging around in a desk drawer, B may say, 'A wants to find the glue-stick'. Such attributions of desire rest on an ability to grasp the stages and outcomes of a plan and to recognize that another person is executing such a plan. The typical function of such attributions of desire at this stage will presumably be to elicit help for the attributee in completing the plan. For example, by telling a parent that another child wants a glue-stick the attributor may help that child obtain a glue-stick. A limiting case in this category is the attribution of wanting the outcome of a discrete action. For example, if A is turning the doorknob on a door while pushing on it, B may say, 'A wants to open the door'.

5. *Explanatory attributions of desire*. In cases where A has made an expressive attribution of desire to himself or herself, B may repeat that attribution of desire to A not in order to help A achieve his or her goal but in order to explain A's behavior. Or in cases where A (*e.g.*, a sibling) is obeying some command, B may attribute a desire to the source of the command (*e.g.*, Mother) in order to explain A's behavior. For example, Sally may explain why Billy is picking up toys by saying, 'Mom wants us to put the toys away'. (Note that in this case the *child*'*s* behavior is explained by citing the *mother*'*s* desire. Perhaps a more *complete* explanation requires a reference as well to Billy's desires, but we suppose that children may learn to offer partial explanations before they are in a position to offer more complete explanations.) Or in cases where A is engaged in some plan, B may attribute a desire to A not in order to elicit help in achieving the goal of the plan but in order to explain B's behavior. For example, if Sally is rummaging around

in the desk drawer and Mother asks Billy why Sally is doing that, Billy may reply 'She wants to find the glue-stick'.

6. Predictive attributions of desire. Perhaps there is yet a further stage, at which people are able to make attributions of desire that enable them to predict other people's behavior. No doubt, people are sometimes able to predict other people's behavior, and in certain circumstances their success may not be simply coincidence but due to the exercise of some reliable ability to predict. But we are not confident that attributions of desire ever play an essential role in the exercise of this predictive ability. Sometimes an attribution of desire may describe a behavioral tendency (as in, 'He always wants to eat the french fries first'), and then we may predict that a person will do what we say he or she desires to do; but in such cases the basis for the prediction is not the attribution of desire but the behavioral tendency that the desire describes. Sometimes a desire may be attributed in advance of a behavior that can be explained by reference to it, but even in that case, it is not obvious that the attribution of desire is the means by which a successful prediction is achieved. We know of no empirical studies supporting the hypothesis that attributions of desire play an essential role in a reliable method of *predicting* people's behavior, as opposed to merely providing an explanation for behavior that is predicted on some other basis.

We speculate that the practice of making desire attributions of type 3, command-conveying attributions of desire, is the primary practice of attributing desires on which the others depend. It is primary in the way that the social practice of playing baseball is primary vis-à-vis the practice of collecting baseball cards or playing catch with a mitt or glove. One learns to play catch before one learns to play baseball and one might know a

lot about baseball card collecting (*e.g.*, what constitutes a card in 'mint condition' or why 1984 Fleer sets are more valuable than Topps or Donruss) without knowing very much about professional baseball. But although one might engage in these practices without ever learning to play baseball or even to watch professional baseball games, these practices are dependent on the primary practices of playing baseball and watching baseball games.

In a similar way, we claim that attributions of type 1 and 2 may be dependent on but developmentally prior to attributions of type 3. Children will have reason to express their own desires even if they do not yet attribute desires to others. But the reason why the verb 'to want' is used in this way in expressing desires may be only that it also has another role in the population at large such as that of desire attributions of type 3. Moreover, the ability to make attributions of type 4, which entails being able to recognize needs as elements of a plan and to attribute them by using the verb 'to want', may be understood as an extension of the ability to convey commands that is employed in attributions of type 3. A situation in which the child is looking for a glue-stick in a desk drawer may be conceived as one in which the child commands (to the world, as it were) 'Give me the glue-stick!', and, in that case, when we say, 'She wants to find the glue-stick' we are, in effect, conveying the content of a command. Further, we speculate that the explanatory attributions of type 5 rest on a prior ability to make other kinds of attributions of desire. It is only by learning to make and comprehend attributions of other kinds that children come to understand what it is they are talking about when they cite a person's desires in explaining a person's behavior.

4.2 The Hierarchy of Belief Attributions

1. Expressive attributions of belief. If I say, 'It's raining', I *express* my belief that it is raining. I do not attribute a belief to myself. If I say, 'I *think* it's raining', the point of my utterance *might* be to tell people that it is a fact about me that I believe that it's raining. But more likely, my objective is merely to *express* my belief that it is raining. I begin with the words 'I think' only as a way of indicating that my belief is not very strong. Or even if my belief is very strong, it may be impolite for me to express it strongly, so that adding 'I think' may be more polite. We will call such self-attributions of belief, in which 'I think' is used as a hedge, *expressive* attributions of belief. Children may pick up this use of 'I think' as a hedge before they have any other use for expressions of the form, '*X* thinks'.

2. Repetitions of expressive attributions of belief. If someone says 'I think that *p*', thereby expressing the belief that *p*, then we may attribute a belief to the speaker just by putting some other term that refers to the speaker in place of the speaker's term 'I'. So if A says, 'I think the candy is in the box', and we ask a child, 'What does A think?' the child may readily answer, 'A thinks the candy is in the box'. It does not take much understanding of the practice of attributing beliefs in order to be able to do this. Similarly, other attributions of belief, grounded in higher stages of the hierarchy, can be simply repeated by a child who has little grasp of the practice of attributing beliefs.

3. Indirect discourse attributions of belief. These are the sorts of attributions of belief illustrated in Scenario Two above. In these cases, 'thinks' serves as an alternative to 'says' in indirect discourse. Person A says that *p*. Person B reports what A has said by saying either 'A said that *p*' or 'A thinks that *p*'. 'Thinks' may be preferred to 'says'

when the words that B uses in the 'that'-complement only express the gist of what A said and do not correspond closely to A's own words. An interesting question in its own right is the utility of the practice of indirect discourse. We may say that other people have said things as a way of corroborating our own claims. If Sally tells Billy that the friend's birthday party has been cancelled, Billy may not believe her. So Sally may say, 'Mom said that the party is cancelled'. Billy may be willing to believe Sally's claims about what Mom said and on the basis of Mom's authority believe that the party is cancelled. Or we may say that other people have said things when we ourselves are not in a position simply to accept their testimony but recognize that others may be in a better position to do so. Scenario Two above might be viewed as such a case. Markie tells Sally that the party starts at 4 o'clock. Sally is not prepared to simply accept what Markie says and tell Billy, 'The party starts at 4 o'clock', thereby putting her own credibility at risk. Instead, she says to Billy, 'Markie thinks that the party starts at 4 o'clock' and leaves it to Billy to decide whether he wishes to accept Markie's opinion on the matter.

Such indirect discourse attributions of belief rest on a rather high level of linguistic competence. The child who makes such attributions must be able to engage in planning and collecting information pertinent to the plan. The child must be able to recognize pertinent questions and be able to take answers to those questions as providing guidance in the execution of the plan. Further, the child must recognize relations of credibility between speakers. In Scenario Two, what has to be planned is getting to the birthday party. The plan involves Billy and Sally's finishing up what they are doing and starting to get ready for the party (*e.g.*, changing clothes). A relevant fact toward the execution of this plan is the time at which the party begins. Billy and Sally must

recognize that the start time of the party is a relevant fact that they do not possess; they must recognize that they can obtain the guidance they need by asking 'When does the party start?', and they must be able to understand the words 'The party starts at 4 o'clock' as offering an answer to the question. Further, Sally must recognize that although Markie has not established enough credibility with herself to allow her to simply repeat what he has said, Markie may have enough credibility with Billy to warrant Billy in acting in accordance with Markie's claim.

4. Paraphrasing attributions of belief. Closely related to indirect discourse attributions of belief are those cases in which we say 'A believes that *p*' not because A uttered any single sentence that means or logically implies that *p* but only because A has said other things from which we can infer that A would agree that *p* if A were asked and were free to speak candidly. For example, if A highly praises *Harry Potter, volume 7*, but harshly criticizes *Harry Potter, volume 6*, then we may infer that A thinks that *Harry Potter, volume 7* is better than *Harry Potter, volume 6*. We can say that the ability to attribute beliefs in this way rests on an insight into other people's states of mind. But this insight into other people's states of mind might often take the form of an understanding of the linguistic commitments that a person has acquired on the basis of the things he or she has said. A person who praises *Harry Potter, volume 7* and harshly criticizes *Harry Potter, volume 6* is *committed* by what he has said to the conclusion that the former is better than the latter.

Bartsch and Wellman (1995, chapter 6) observed that many of children's earliest uses of the language of belief and desire occur not in the context of explaining people's behavior but in the context of resolving disputes. These uses can often be viewed as

indirect discourse attributions or paraphrasing attributions. Interlocutors may assert 'You think that *p*' and 'I think that *q*' as a way of defining a conflict in opinions before attempting to resolve it. The same might be said about command-conveying and need-conveying attributions of desire: They may often occur in the context of a conflict of goals as a means of identifying a conflict in goals before attempting to resolve it.

5. Explanatory attributions of belief. Explanatory attributions of belief often occur in the context of excusing a mistake. For example, if Billy and Sally show up for the birthday party an hour early, we may say, 'They thought the party started at 3 o'clock'. An ability to attribute beliefs as explanations of mistakes in this way rests on an ability to recognize plans and to understand how assertions of purported facts feed into the manner in which the plan is executed. In order to make this attribution, we have to understand how statements about start time affect the execution of a plan to attend an event. We may also have to know something about sources of information and what sources of information were available to the attributees. For example, if Billy and Sally show up at 3 o'clock, the explanation may be that they thought the party started at 3, or it might be instead that they thought it started at 4, but also thought that the time of their arrival *was* 4 o'clock. To rule out the latter explanation it may suffice to know that people get their information about time from clocks and watches and then to observe that all of the clocks or watches to which Billy and Sally had access showed the correct time.

6. Predictive attributions of belief. As we questioned whether there really are predictive attributions of desire, so too we question whether there are predictive attributions of belief. We are not persuaded that studies with chimpanzees and children provide such empirical evidence (see Povinelli and Vonk, 2004; Andrews, 2005). When

children in studies of false belief predict that, for example, the puppet will look for the chocolate in the cupboard and *say* that the puppet *thinks* that the chocolate is in the cupboard, we have no evidence that the child's attribution of belief to the puppet is the *means* by which the child predicts that the puppet will look in the cupboard. On the contrary, the child's knowledge of where the puppet will look for the chocolate may be what enables the child to say where the puppet thinks the chocolate is.

We speculate that type 3 belief attribution, indirect discourse attributions, is the primary practice of attributing beliefs. The relationship between type 3 belief attributions and type 1 and 2 belief attributions is like the relationship we pointed to between baseball and collecting baseball cards and between type 3 desire attributions and type 1 and 2 desire attributions. The reason why 'I think' can be used as a hedge in expressive attributions of thought may be that 'think' also has a use in a kind of indirect discourse. People say that so-and-so thinks that *p* when they wish to call on so-and-so as a witness and when they are not prepared to accept so-and-so's testimony but recognize that others might be prepared to do so. So the use of 'thinks that *p*' comes to be associated with doubt about the truth of *p*; so we can express such doubt as well about our own assertions by hedging them with 'I think'. That society's use of 'think' as a hedge rests on its use in a kind of indirect discourse does not mean that individuals have to learn the use of 'think' in this kind of indirect discourse prior to learning to use 'I think' as a hedge; on the contrary, the use as a hedge may be learned first. Moreover, we speculate that the use of 'think' in indirect discourse underlies the uses of 'think' at higher levels of the hierarchy, in explanation and (if this happens) in prediction, for they are extensions and exploitations of the practice of indirect discourse attributions.

4.3 An Alternative Account of False-Belief Tasks

In terms of our characterization of indirect discourse attributions of belief, we can characterize the child's achievement in the unexpected contents task described in section 2. In asking the child, 'What will Kaitlyn think is in the smarties box?' (Kaitlyn being the friend who waited in the other room), the experimenter is in effect asking the child for Kaitlyn's contribution to a conversation concerning the contents of the box. The child has to understand that in a conversation about the contents of the box, Kaitlyn would assert, 'There are smarties in the box' (not 'There are pencils in the box'). The basis for the child's understanding this might be an understanding that people's assertions about the contents of a container will be based on the typical contents for such containers. In this instance, the answer to the question about what Kaitlyn would say does not answer any question the child might have about the contents of the smarties box (since the child knows that there are pencils in the box). But in order to have taken an interest in and discovered such relations between a person's observations and his or her assertions, the child will have to have had experience with discussions in which he or she had to decide whether to accept and act on another person's assertions.

Similarly, we can characterize the child's achievement in the change-in-location task described in section 2. In this task, it is not entirely obvious that the child has to attribute a belief to Sally at all. We have no decisive reason to think that the child predicts where Sally will look *by means* of attributing a belief to Sally. The child might simply have learned that people tend to look for things where they last saw them. But if we take success on the change-in-location task as a test of the child's understanding of

the concept of belief (on the grounds that success on this kind of false-belief task is well correlated with success on others), then we must be supposing that the child in effect says to itself 'Sally thinks the marble is in the basket'. In that case, by the present account of indirect discourse attributions of belief, when the experimenter asks the child, 'Where will Sally look for the marble?', the child understands the experimenter as in effect asking the child for Sally's contribution to a conversation concerning the location of the marble. The child has to understand that in a conversation about the location of the marble, Sally would assert, 'The marble is in the basket' (not 'The marble is in the box') and, having asserted that, would look for the marble in the basket. The basis for the child's understanding of this might be an understanding that people's assertions about the location of a thing will be based on their most recent observations of its location.

5. Success on False-Belief Tasks Explained

We now want to use our account of attributions of desire and attributions of belief to explain some of the empirical facts that have emerged from the false-belief literature that we have reviewed. The targets of our explanation are the following three facts:

1. Generally speaking, the language of desire developmentally precedes the language of belief.
2. Children have more difficulty in attributing desires that are incompatible than they have in attributing desires that are compatible.
3. Mastery of sentential complements plays a causal role in producing success in false-belief tasks.

Target 1: The explanation we will offer for the time lag between desire-talk and belief-talk was partially anticipated by Paul Harris (1996). According to Harris, the explanation lies in the fact that a 'precondition for the understanding of beliefs', but not for the understanding of desires, is 'children's understanding of other people as epistemic subjects', which develops 'in the context of their increasing proficiency at conversation involving the deliberate exchange of . . . information' (1996, p. 208). While we accept Harris's theory so far as it goes, we will be more specific about the way in which the context of information exchange preconditions an understanding of belief.

That the language of desire emerges earlier than the language of belief is due to the 'easier' prerequisites of the central case of desire attribution compared to the prerequisites of the central case of belief attribution. Type 3 attributions of desire require an understanding of the practice of taking and giving commands. This understanding involves an understanding of relations of authority and of responsibility for the results of the command as well as an understanding of the conditions under which a command is in force. Type 3 attributions of belief, on the other hand, require an understanding of the practice of contributing information to a cooperative plan. Not only that, but they require an understanding of relations of credibility between one person and another. The attributor needs to understand that, while he or she may not be entirely credible for his or her audience, somebody else may be more credible for the audience, or that while a person is not credible for himself or herself, that person may be credible for someone else. We take for granted that the ability to participate in joint activity based on pooled information requires a more advanced level of cognition than the ability to take and give commands, and we take for granted that recognizing relations of credibility requires a

more advanced level of cognition than recognizing relations of responsibility and authority and conditions under which a command is in force.

Our explanation of target 1 suggests a couple of other hypotheses about false belief tasks. First, by the present account, we should expect that a child's ability to attribute *true* beliefs to others will emerge at about the same time as the child's ability to attribute *false* beliefs. This is so since attribution of false belief is really just a litmus test for an understanding of belief *tout court*, since false belief tasks allow us to distinguish between hedging uses of 'think', in which a child's use of 'think' is just a gratuitous add-on to a report about reality, and genuine belief attributions, which involve *crediting* a person with a belief. We can draw this distinction as well in cases in which the belief attributed was true at the time of the belief, but the state of affairs believed at that time no longer obtains. Riggs and Simpson (2005) found that children do no better in correctly reporting formerly true beliefs than they do in correctly reporting false beliefs.

Second, part of the reason why children find false belief tasks difficult may be that the goal or purpose of the conversation is unclear. What could be the point of attempting to pool information about what is in the box or where the marble is if both the subject and the experimenter already know the answer? Contrast such an experimental setup with our fictional scenario 2 above. In that scenario, there is a real question about what time the party starts, and so when Sally says to Billy, 'Markie thinks the party starts at four o'clock', the question has a point since they are both engaged in a cooperative task, namely, trying to figure out what time the party starts. Thus, if our account is correct, then another parameter affecting success, in addition to the sophistication of the background linguistic practice, may be a kind of ecological validity. It is perhaps for this

reason that when the experimenter and child are engaged in a cooperative task where there is a clear goal, such as active deception of another person, children's performance on false belief tasks improves (Wellman, Cross and Watson, 2001, p. 666; Hala and Chandler, 1996). When the child is involved in actively deceiving another person there is a point to the question about what the person will say is in the box since the point of cooperative activity is precisely to elicit the incorrect response (*e.g.* 'There are smarties in the box') from the person being deceived.

Target 2: As the study by Moore *et. al.* (1995) revealed, children have much more difficulty with attributions of desire when the desire attributed conflicts with their own. The difficulty need not arise when one person merely wants something different from what the child him- or herself wants (the adult wants to eat broccoli, the child wants to eat crackers). Rather, the difficulty arises when two people's desires are incompatible in the sense that satisfaction of the one person's desire precludes satisfaction of the other person's desire. Although the Moore *et. al*. (1995) study involved scenarios where the child's own desires conflicted with another's, Rakoczy *et. al*. (2007) (study 2) found that children have just as much difficulty in attributing incompatible desires to two other people as they have in attributing desires that conflict with their own. This result is consistent with the claims we have made here and we incorporate it into our second target. We argued in section 3 that the results of Rakoczy *et. al.* (2007) (study 1) do not impugn the result that incompatible desires are relatively more difficult to attribute than compatible desires. Thus, our second target will be that children's difficulty lies not specifically in attributing desires that conflict with their *own* but, more generally, in attributing incompatible desires *tout court*. The explication of the practice of attributing

desire as centrally involving command-conveying attributions of desire offers us a way of conceiving of the child's difficulty in attributing incompatible desires.

Toward explaining this, we may define two models of *imperatival conflict*. On what we might call the *infantile model* of imperatival conflict, there are no true conflicts in imperatives. If ever two imperatives appear to conflict, then there really is no conflict because one imperative simply overrides and annuls the other. In other words, only one of the apparently conflicting imperatives is really in effect. In particular, if there is an apparent conflict between the imperatives the child issues to him- or herself and the imperatives issued to him or her by another (*e.g.*, a parent), then the self-directed imperatives may override the imperatives received from others. On the *personalized model* of imperatival conflict, by contrast, conflicts between imperatives are at least in part conflicts between persons. Imperatives may genuinely conflict, but the child can decide which imperative to obey by deciding which source of imperatives to follow. Both imperatives remain in force, but a decision is made about which one to obey, in part on the basis of a determination of the authority of the person issuing the imperative and a decision about whom it is best to follow, and perhaps also in part on the basis of an independent calculation of the utility to the agent of obeying the imperative. The child will learn to recognize in some cases that it is better to obey his or her parents or other authority figures than to obey the imperatives he or she issues to him- or herself.

In the game against Fat Cat described by Moore *et. al.* (1995), the child has to ascribe to Fat Cat a desire for the next card to be blue even though the child him- or herself wants the next card to be red. To press to an extreme the analogy between desire and imperative utterances, we may say that in wanting the next card (in the game against

Fat Cat) to be red, the child is, so to speak imploring the world: 'Let the next card be red!' or simply 'Be red!' In saying of Fat Cat, 'He wants the next card to be blue', the child is in effect attributing to Fat Cat the imperative: 'Let the next card be blue!' The transition from the stage at which the child cannot manage the attribution of this desire to Fat Cat to the stage at which the child can manage it can be conceived of as a transition from the infantile model of imperatival conflict to the personalized model of imperatival conflict. While in the grip of the infantile model of imperatival conflict, the child's own imperative to the world, 'Let the card be red!', simply overrides Fat Cat's imperative, 'Let the next card be blue!' So there is, as it were, no command in effect to be attributed to Fat Cat by means of an attribution of desire. But once the child has made the transition to the personalized model of imperatival conflict, the conflict can be resolved by attributing the command, 'Let the next card be blue!' to Fat Cat and attributing the command 'Let the next card be red!' to him- or herself. In other words, the child can interpret Fat Cat as wanting the next card to be blue and can interpret him- or herself as wanting the next card to be red.

Target 3: On the present account, both the ability to attribute desires and the ability to attribute beliefs begin with a certain critical awareness of words as such. No doubt, at a very early stage children may *accept* or *reject* what they are told to do and may *accept* or *reject* what they are told is the case (Koenig and Echols, 2003), and in this sense they may take a critical stance toward what they are told to do or what they are told is the case. But eventually they reach a higher level of critical awareness in that their acceptance and rejection of what they are told to *do* becomes sensitive to relations of authority and to the evidence in their own experience of the trustworthiness of others as

leaders, and their acceptance or rejection of what they are told *is the case* becomes sensitive to the evidence in their own experience of the reliability of others as sources of information. By *critical reflection on the authority of words* we will mean specifically this kind of reflection that involves attribution to a speaker and evaluation of the authority and reliability of the speaker.

We hypothesize that the reason why mastery of the syntax of clausal complements predicts and even promotes success in false-belief tasks is that children can critically reflect on the authority of words only by means of using language themselves in the attribution of desires and sayings and beliefs, and that they can make such uses of language only by utilizing the syntactic devices by which in their native language one formulates attributions of desires and sayings and beliefs. A child can compare the demands that are made on him or her only by registering in his or her own mind that person A *wants* him or her to do one thing and person B *wants* him or her to do something else. Our hypothesis is that this *registering* takes the form of *something like saying* in the child's own nascent native language that A wants one thing and B wants another. A child can contemplate the question whether he or she should accept another person's claims about what is the case only by registering in his or her mind that that person says or thinks that such-and-such is the case. Our hypothesis is that this registering takes the form of *something like saying* in the child's own native language that the person says or thinks that such-and-such is the case. We say that this registering takes the form of *something like* saying something to oneself, but here we will not try to decide more precisely what the likeness consists in. Of course, to *think* that another person desires or believes something, it is not necessary to *say* so out loud. We do not

assume even that it is necessary to hear an 'inner voice' attributing the desires and beliefs.

On this hypothesis, children can critically reflect on the authority of commands only insofar as they can attribute desires, and, if they speak English, they can attribute desires only insofar as they can employ infinitival complements in sentences as in, 'Mom wants us to pick up the toys; should we do it?' If they speak German they can attribute desires only insofar as they can employ finite complements in sentences such as, 'Mutti will dass wir die Spielzeuge wegtun' ('Mom wants that we the toys away-put'). Children can critically reflect on the authority of assertions only insofar as they can attribute sayings and beliefs, and if they speak English, they can attribute sayings and beliefs only insofar as they can employ tensed sentential complements in sentences such as, 'Markie thinks the party starts at four o'clock; does it?' If they speak Cantonese, the syntax that they must master is again something different.

But it is not the use of sentential complements or any other merely syntactic construction that all by itself that elicits the understanding of incompatible desire and false belief. Rather, it is the use of sentential complements in the context of the critical evaluation of the authority of words. For each of the kinds of mental states that children learn to attribute, what they must learn is not only the syntax of the mental state attributions appropriate to the language spoken around them but also the more basic linguistic practices that underlie the practice of attributing that kind of mental state. This is why there is no objection to our thesis in the fact that desire talk comes earlier. When German children learn to use tensed sentential complements in the attribution of desires, that does not all by itself put them in a position to attribute beliefs, because that alone

does not give them the critical awareness of other people's *assertions* that they need in order to attribute beliefs. But training in the use of sentential complements in the context of verbs of communication, such as 'say' and 'tell' (as in the training study by Hale and Tager-Flusberg, 2003), can highlight for the children the disparities between what people say and what is the case in a way that stimulates the critical awareness that is necessary for the attribution of belief.

That concludes our explanations of the three targets. We do not suppose that we have in any sense explained *how* the child succeeds on a false-belief task. We have not explained *how* it happens, because we have not explained how children acquire the necessary critical awareness of words. By the same token, neither the theory of de Villiers nor that of Perner, if correct, would constitute much of an explanation-*how*. While de Villiers takes the key to be mastery of tensed sentential complements, she does not explain how children manage to master sentential complements, beyond suggesting that they learn that true sentences may contain false tensed sentential complements in the context of verbs of communication. While Perner takes the key to be a grasp of differences in perspective, he does not offer a causal account of *how* differences in perspective come to be grasped. Perner, Rendl and Garnham (2007) present a sophisticated hypothesis concerning the mechanisms by which the child puts its mental representations to use in solving location problems, but that theory does not address the question of how the child first comes to understand that other people are repositories of representations.

Our explanations give something to de Villiers and something to Perner. What they give to de Villiers is the claim that language learning is more than a catalyst to

success on false-belief tasks – that the ability to attribute beliefs requires a linguistic medium of attribution. They even support her contention that understanding the syntax of sentential complements plays a special role, as the longitudinal and training studies seem to show. On the present account, we should expect, as she predicts, and as Hale and Tager-Flusberg in fact found (2003), that training in specifically verbs of communication, such as 'tell', would enhance success in false-belief tasks. The verbs of communication may be the first medium in which children exercise their critical awareness of assertions, and this critical awareness of assertions is a prerequisite as well, we have claimed, for children's use of mental state verbs such as 'thinks' and 'believes'. We think it must be conceded, however, that no special syntactic feature (other than taking clausal complements of *some* kind) distinguishes those verbs that play a role in people's critical awareness of assertions.

These explanations concede to Perner that something that can be called 'perspective' plays a role as well. What children have to learn, on our account, is that individuals have responsibility for commands and assertions. They learn that commands may be directed to one person and not to others, that individuals need to have a certain authority if their commands are to be in force and that under various circumstances a command may be disobeyed. They learn that assertions too have a source, that the appropriate response to an assertion may depend on the source and that an assertion may be questioned on the grounds that its source is unreliable. The child's understanding of the fact that there are different perspectives in the world can be equated with this understanding that assertions and commands have sources and may be evaluated in light of the character of the source.

6. Testable Consequences

If our manner of explaining our target facts is to be taken as truly explanatory and not just as a fancy redescription of the phenomena, then there ought to be some empirically testable consequences of our account that other conceivable accounts would not have. We think there are at least four such consequences that we can define with a modest degree of precision.

First consequence: Our theory makes the following predictions about the developmental sequence. The first thing to develop should be the ability to follow and convey commands which should not precede by much the ability to attribute desires. The second thing to develop should be the ability to evaluate and convey testimony which should not precede by much the ability to attribute false beliefs. We are noncommittal about whether incompatible desire attribution precedes false belief attribution but do maintain that the central cases of desire attribution should precede the central cases of belief attribution. Clément, Koenig and Harris (2004) present some confirmation for the second step in the developmental sequence. They found that four and five year olds were able to evaluate testifiers in terms of their reliability in giving correct answers, whereas three year olds were not. Between three and four years old is exactly the age at which we should expect these skills to emerge since that is the critical age at which children make the transition to an understanding of false belief.

Second consequence: Training in verbs of communication will promote success in false-belief tasks, but training in other verbs that take tensed sentential complements

will not do so or not do so to the same extent. Since on our account verbs of communication and verbs for belief both serve as the medium for the child's critical awareness of assertions, we would expect training on verbs of communication to promote success in false-belief tasks. This consequence has already been tested in the training studies by Hale and Tager-Flusberg (2003), with positive results. Using English-speaking children, we could also test the effect of training on sentential complements in the context of factive verbs such as 'forget', 'remember' and 'know'. Inasmuch as the main clause formed with these verbs will be true only if the subordinate clause is true ('John forgot that there was no school today' is true only if 'There is no school today' is true), attributions of forgetting, remembering and knowing belong to a linguistic practice that is quite different from the practice of attributing sayings, thoughts and beliefs. Consequently, we would not expect that training in these verbs would do as much to promote success in false-belief tasks as training in verbs of communication.

Third consequence: Training in group problem-solving should promote success in false-belief tasks. Our approach takes no special encouragement from findings that show that success on false-belief tasks correlates with number of siblings (Jenkins and Astington, 1996; Ruffman, Perner, Naito, Parkin and Clements, 1998). On anybody's theory, success in false-belief tasks should be promoted by having frequent occasions to think about other people's mental states. Nor do we take any special encouragement from the finding that success in false-belief tasks correlates with frequent use of mental state terms in interactions between children (Brown, Donelan-McCall and Dunn, 1996). More interesting from our point of view is the finding of Foote and Holmes-Lonergan (2003) that children's use of 'other-oriented arguments' in conflict resolution correlated

strongly with success in false-belief tasks (although the sample size in this particular study was clearly far too small). But what we would really like to see is a study in which children are put in situations where several interlocutors contribute *claims* to the solution of some joint task and in which sometimes those claims are mistaken and a failure to achieve the task can be credited to the mistaken claims. We would expect that experience with such situations would instill a higher level of the sort of critical awareness of assertions that we have supposed underlies the use of verbs for belief. We would expect that experience with such situations would promote success in false-belief tasks even if that experience provided no training in the use of sentential complements provided the children had at least some rudimentary grasp of the syntax of sentential complements.

Fourth Consequence: Training in the resolution of conflicting commands should promote success in desire-attribution in situations in which the satisfaction of another person's desire precludes the satisfaction of the child's own desire. Children could be put into situations where they had to take instructions, or 'commands', from several sources but could not satisfy all of these sources and had to choose. We would expect that training in such situations, quite apart from training in the use of the language of desire, would promote the higher level of the sort of critical awareness of commands that on our account underlies the ability to attribute desires and would thereby promote the child's ability to attribute desires even in situations where the desire attributed conflicts with the child's own desire.

7. Summary

We have accepted the conclusion, defended by others, that linguistic development and, in particular, training in sentential complements in the context of verbs of communication promotes success on false-belief tasks. We have sought to reconcile this fact with the fact that tensed sentential complementation is not uniquely associated with the attribution of belief but also, in German-speaking children, with the attribution of desire. We have also sought to accommodate the fact that, while the ability to attribute desires precedes the ability to attribute beliefs, younger children also have difficulty attributing desires when the desire to be attributed to one person is incompatible with the desire to be attributed to another person.

Our theoretical perspective has been that attributions of desire and attributions of belief must be understood as linguistic practices that extend the practices of making commands and making assertions. In this light we have been able to provide a sort of explanation for some basic facts about sequence of acquisition, children's difficulties with attributions of incompatible desires and the role of sentential complements. In addition, we have pointed to some testable consequences of this approach pertaining to the role of language in coordinating interpersonal cooperation.

This study offers a resolution of the debate between Jill de Villiers and Josef Perner over the role of mastery of the syntax of sentential complements in promoting success on false-belief tasks. Our account acknowledges a special role for the understanding of the syntax of sentential complements in the context of verbs of communication inasmuch as it is through this that the child first acquires the critical

awareness of assertions that we have said underlies the ability to attribute belief, although we doubt the medium of this critical awareness is distinguished syntactically. At the same time, our account provides an articulation of Perner's thesis that success on false-belief tasks requires an understanding of differences in perspective. We take the pertinent understanding of perspective to be the child's understanding of the relevance of the source of commands and assertions in deciding what to accept and what to reject.

Finally, we hope to have pointed the way to a novel approach to the philosophy of belief and desire. We have not here had any use for the explanation/prediction theory of belief- and desire-attribution and have indicated that there is an alternative, namely, to think of attributions of belief and desire as extensions of the practices of asserting and commanding. We hope to have given some life to that alternative by indicating a use for it in resolving an important debate in contemporary cognitive psychology.

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