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Perspectives on Truth: The Case of Language and False Belief Reasoning

Jill de Villiers
Smith College, jdevilli@smith.edu

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Smith College

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Abstract

Many theorists take language - vocabulary, mental verbs, syntax, counterfactuals, discourse - to be a significant help in the development of explicit Theory of Mind. Does conversation, with all its Point of View indicators, betray another's perspective? By comparing how different linguistic markers behave across clausal environments, I demonstrate that they fall into distinct classes, only one of which - tense - patterns with the truth of the clause in terms of perspective. Sentences with embedded finite complements thus have a special role in representing the truth or falsity of others' beliefs. Children who master embedded sentential complements can then more readily reason about others' false beliefs.

Ten key words: Perspective, Point-of-View, Deixis, Complements, Theory of Mind, Direct speech, Syntax, Finiteness.

1.0 Introduction

There are several alternative theoretical positions for the relationship of language development to theory of mind development. Many have found a role for the child's exposure to relevant vocabulary, particularly of mental state terms such as *think* and *know* (Dunn & Brophy, 2005). Others find a role for general syntactic development, for children to follow conversations that reveal the cultural theory about the mind (Ruffman, Slade, Rowlandson, Rumsey & Garnham, 2003). Some point to conversation itself as a

major source of understanding others' mental states (Nelson, 2005). For example, Harris (2005) argues that conversation exposes children to the shifting perspectives of the parties involved, enriching their developing theory of mind. Linguistic carriers of point-of-view abound: these include evidentials, spatial and temporal deixis, pronoun shifts, mental state verbs with complements, and even the different words people use to designate entities depending on their knowledge of their properties. For example, the same object may be called “Spot”, “that beastly dog” or “the prize winning bulldog”, depending on the speaker’s knowledge.

Among these markers, only tensed sentential complements have been clearly linked as directly contributing to the cognitive achievement that occurs around age 4 in judging and making decisions on others' false beliefs (de Villiers, 2007; de Villiers & de Villiers, 2009). Comparing several different clause types: matrix clauses, adjuncts, non-finite and finite complements, and direct and indirect speech reports, I assess how the different point-of -view markers behave in each with respect to whose perspective they carry: is it the speaker’s or the subject’s? From that analysis it emerges that the carriers of perspective fall into three distinct types. I argue that there is no difference between direct and indirect speech reports in their importance for encoding false belief, but a big difference between finite and nonfinite speech reports. I discuss proposals by which tense carries truth.

Finally some experimental data are presented in support of the view that encoding and attributing speech reports linguistically is more critical than observation of conversation, even when that conversation implicitly carries differing perspectives.

2.0 Points of View

Consider the array of linguistic phenomena in items a-f. I have inadvertently worked on each of these over the course of 45 years of studying language acquisition.

a) Personal pronouns: I, you, he/she, we, they etc.

b) Spatial deixis: here/there/yonder

c) Demonstrative deixis: this/that

d) Personal taste adjectives: damned, yucky, delicious, wonderful etc.

e) Opinion adverbs: unfortunately, surprisingly, sadly, happily, etc.

f) Designators: my best friend, the president, the mayor, the Pulitzer prize winner etc.

g) Evidentials: e.g. in Tibetan, a verb marker of how the *speaker* knows the truth of a proposition he expresses

Each phenomenon raises interesting problems for acquisition.

2.1 Personal pronouns

The child's control of personal pronouns is present almost from the start of multi-word utterances in English (Clark & Sengul, 1978; Oshima-Takane, 1999). Three sets of findings suggest that acquisition is not instantaneous, however. First, there is a well-attested stage at which reversals of I/you are common, and very young children say things like "Pick you up!" when reaching to be picked up (Dale & Crain-Thoreson,

1993). These may be routinized formulae before genuine pronouns, and reversals are more common even later in children with autism (Fay, 1979). Second, although production seems good, children struggle with using pronouns as the only clue to meaning of where something is hidden ("It's under your box!" It's under her box!") for a year or two longer (Girouard, Ricard & Decarie, 1997; Thomas, 2010). The meaning of "you" remains ambiguous in dyadic conversation, because it could mean "the other person" rather than the addressee. The best circumstance in which to fix the meaning of "you" is actually to be in a triadic conversation, where the person being addressed can be identified as the referent for "you" (Oshima-Takane, 1988; Oshima-Takane, Takane & Shulz, 1999). Third, the behavior of pronouns inside embedded clauses is a source of confusion and uncertainty (Tanz, 1981; de Villiers, Nordmeyer & Kravitz, 2010), not unexpectedly given the variability in the world's languages in how pronouns behave in certain environments. For instance, In Navajo and Arabic, first person pronouns can occur as the subject of embedded clauses yet coreferent with the third person matrix subject (1), as if the clause was direct speech (2) (Speas, 2004):

(1) Martha said that I bought a house.

(2) Martha said "I bought a house".

In English we would use the 3rd person pronoun to agree as in (3).

(3) Martha said that she bought a house.

Children mistakenly allow the Navajo-style reading of coreference for a first person pronoun as in (1), at least in a truth value judgment task, in the later preschool years (O'Connor, Burgin, de Villiers, Speas & Roeper (2007).

2.2 Spatial deixis

The spatial terms *here* and *there* behave like the personal pronouns *I* and *you* in that their reference is linked to who is speaking. But their use is relative to the context: I could say "Here it is!" if I find a pen right beside me and you are across the desk from me, or I could say "Here in the US" if I am talking to you on Skype half way across the globe (Fillmore, 1975). The terms also have abstract metaphorical reference, "*Here's* the problem with such a proposal", in which the location is in discourse, that is, mental rather than physical. Finally, "there" is also used as an existential. A child must filter out these cases to make sense of the primary locational use (Roeper, 2007)..

One important thing to notice: *here* and *there* are not like *I* and *you* in simply switching between speakers. If I am sitting next to you, *here* is *here* and *there* is *there* for both of us. The rule is not simply to switch meanings depending on the speaker. Many languages have more than two distinctions, as in Latin hic / iste / ille (near speaker / near hearer / away from both). Like the archaic English *yonder*, this choice adds genuine point of view considerations, in that the deictics require attention not just to one's own perspective but whether the listener shares it. "Yonder" means away from *both* of us, even if we are apart.

In this category as well certain direction-shifting verbs occur, such as *come* versus *go*, *bring* versus *take,* but they also have neutral meanings, and the directional distinction can be lost in some English dialects Fillmore,1997).

2.3 Demonstrative deixis

The same set of considerations apply to *this* and *that* as demonstratives, but a) a large part- perhaps a majority - of their uses is related to discourse focus rather than location e.g. "That's a good idea!" b) *that* has other common uses e.g. as a complementizer, to cloud code-cracking (for child data, see de Villiers & de Villiers, 1974).

2.4 Personal taste adjectives

Expressive adjectives take the point-of-view of the speaker, at least most of the time. For example, in a sentence such as (4):

(4) She brought her damn dog to the party.

"she" does not hold the negative attitude towards the dog, but rather, the speaker does. A tricky case is the word *beloved,* which has to be anchored to the subject of the sentence in (5):

(5) She brought her beloved dog to the party.

It is even possible to embed the adjectives:

(6) She brought her damn beloved dog to the party.

wherein the speaker's attitude is overlaid on that of the matrix subject. Enticingly, the possibility of embedding is not so clear in (7) when the order of adjectives is reversed:

(7) ?She brought her beloved damn dog to the party.
(Roeper, p.c.)

How is the referent for these points of view fixed for the ordinary personal taste adjectives words like *delicious*, *yucky*, *wonderful* and so forth? A vast semantics literature is blossoming about these forms, but a fundamental idea is that a salient "judge" in the context - the speaker, the hearer, the sentence subject -can be chosen as the point of view for the adjective of personal taste (Potts, 2007; Lasersohn, 2005) But as we will see, syntax plays a constraining role in this assignment (Stephenson, 2007; Pearson, 2015)

2.5 Opinion adverbs

Richards (1976) discusses speaker-oriented adverbs like *luckily* that reflect the attitude of the speaker rather than the subject of a sentence. For example, one might say:

(8) Luckily, my roommate did not get accepted into Yale.

where it is not true that the roommate benefited from his rejection (see also Gu & Roeper, 2011). Adverbs appear fairly late in child language and these types have not been fully investigated to date.

2.6 Designators

Noun phrases themselves have a point of view not often recognized. A straightforward nominal like “the dog" is usually neutral, but when one uses a DP that is descriptive in regards to some non-perceptible attribute, that description is determined by the knowledge and beliefs of the speaker. If I refer to the same dog as the "Westminster prize winner", that is a particular description that someone else might not know. Role nouns have this quality: the President, the Mayor, the baker, the dentist. Normally any co-referring noun can be substituted in an ordinary sentence like (9) and preserve truth (Frege, 1948). In the Greek myth, the Queen of Thebes is Oedipus's mother, though he does not know that.

(9) Oedipus married the Queen of Thebes--> Oedipus married his mother.

But in embedded sentences such as (10), substitution of co-referring terms does not necessarily preserve truth (11) because the word used depends on the knowledge not of the speaker but of the matrix subject.

(10) Oedipus knew he married the Queen of Thebes.

(11) Oedipus knew he married his mother.

A sizeable and contentious literature covers when children understand how to use the right noun phrases, namely understand the conditions of *referential opacity* (Russell,1987; Apperly & Robinson, 1998; Kamawar & Olson, 1999). Most studies find that children succeed at understanding the conditions on substitution at a later age than they succeed at mastery of truth conditions in complements, and later than success on false belief tasks.

Depending on what is already established in discourse, a speaker could also choose to use pronouns instead of nouns, definite instead of indefinite articles, and so forth. In fact, young children have a notoriously hard time with devices that require keeping track of a listener's existing knowledge in a discourse (Karmiloff-Smith, 1981; Berman & Slobin, 1995). The forms involve additional considerations than just switches in perspective. (For further analysis of the complexity of determiners see Klein, 1998; Van Hout , Harrigan & de Villiers, 2010; for pronouns, see e.g. Hendriks & Spenader 2005/6).

2.7 Evidentials

Evidential morphology indicates the means by which a speaker knows something. Evidentials have attracted a lot of attention partly because they seem "exotic", though almost a quarter of the world's languages are estimated to have linguistic evidential markings (Aikhenwald, 2004). In languages with evidentials these markings can be as obligatory as tense is for English: the speaker has to commit to how they know the truth of it as they articulate a proposition. Furthermore, these are not "hedges" on truth, that is, the speaker is committed to the truth of the proposition (de Villiers, Garfield, Gernet Girard, Roeper & Speas, 2009). Evidentials are speaker-centered in ordinary sentences, that is, they are based on the information the speaker has available to her in the situation. However, in some language like Tibetan, a "reflection principle" requires consideration of the point of view of the listener when asking a question of that listener. In Tibetan, you anticipate the evidential that your listener will use in reply (Garrett, 2001; de Villiers & Garfield, in press).

3.0 Conversation and Perspective

All of these elements (and there are undoubtedly more) are indicators of the speaker's perspective: on identity, location, discourse focus, source of evidence, linked to existing sentiment, opinion, or knowledge. In order to be a competent speaker, the child must understand these devices and use them from his or her own perspective. Is that enough to appreciate and understand other minds?

In order to answer questions about what others believe, know, or feel, that is, explicit Theory of Mind, the child has to be able to take the perspective of the other and answer *as if* s/he were that other person. That is, the child must NOT take the ordinary tack of considering one's own perspective, but rather take a contrasting one. In the Theory of Mind literature, considerable attention has been given to the possibility of Simulation: that a child must step into the shoes of the Other and answer like that person (Gordon, 1986). But other theorists contend that there must be a more explicit, not implicit, representation of the Other's perspective to answer appropriately (Carruthers, 1996; Hutto, 2009). Some even propose that language provides that representation (de Villiers & de Villiers, 2000; Collins, 2000; Segal, 1999).

Do the devices described above not already supply that? I conjecture here that they do so only when seen metalinguistically, from above. The young child who responds appropriately to pronouns, deixis, evidentials and so forth is not yet representing anything about the Other. It is only when the child can set the forms in contrast as belonging to another person that they serve the right function for representing false beliefs. That becomes clear when one looks at how (un)successful young children are at making judgments with respect to appropriate use by a separate dyad, a task that is considerably harder than the child's own production (Clark & Sengul, 1978; O'Connor et al, 2007; de Villiers et al 2010). In this and so many other domains, it is as if there is an implicit understanding that is sufficient to drive production and even its mirror in comprehension. However explicit decisions in a judgment task, or a task involving a computation beyond what is said, lag behind and require a higher level of representation.

The use of complement structures that attribute a propositional content to an individual may offer the right kind of representation. I make that case next.

4.0 Embedded Complements

4.1 Propositional Attitudes

The acquisition of false belief reasoning has been linked to the acquisition of sentential complements (de Villiers & de Villiers, 2009; Segal, 1999; Collins, 2000). These arguments are first, theoretical, in that the propositional attitudes have a set of properties that would seem to require a representation as rich as they are. For example, propositional attitudes like belief have an indicator of the holder of that attitude: Phil believes. Furthermore, a propositional attitude has content (its crucial property of intentionality: Brentano, 1874):

(12) Phil believes *p.*

where p is a proposition. Furthermore, that p may contain reference to nonexisting elements such as:

(13) Phil believes there is a unicorn.

And *p* might be false:

(14) Phil believes the sun is square

In addition, the contents of the proposition, the entities in it, are under a certain description that is tightly tied to the holder of the belief, e.g.:

(15) Phil believes *his aunt's dog* is a nuisance.

Finally, they can be recursive:

(16) Phil believes his aunt thinks the dog is a nuisance.

Therefore, propositional attitudes have the properties of potential *intentional nonexistence*, *falsity*, *opacity*, and *recursion*. Whatever medium of representation they are in needs also to have those properties, and images and words - not to mention neural networks or embodiment - do not seem to fit the bill. This led Fodor (1975), among other philosophers, to propose the existence of a Language of Thought. Yet other philosophers resist the positing of yet another layer of cognitive representation. Some argue that *natural* language has the right properties for the representation of propositional attitudes and the reasoning that proceeds from it (Segal, 1998; Collins, 2000; Hutto, 2009).

4.2 Infant Theory of Mind (ToM)

If this argument holds, then one might expect that a child has to reach a certain level of linguistic competence with complementation in order to succeed at reasoning about other's beliefs, and there are a number of supportive findings reviewed in section 4.3 below. But before that review, there are results troublesome for this story from several studies that find apparent false belief understanding in much younger children who do not know even rudimentary syntax (Onishi & Baillargeon, 2005; Southgate, Senju & Csibra, 2007; Baillargeon, Scott & He, 2010; Southgate 2013).

The theorists in this area of infant ToM fall into two major camps, characterized by Scott, Richman and Baillargeon (2015) as "mentalists" versus "minimalists". The mentalists believe that the infant research proves that very young children, well before language is established, can represent the beliefs of others. In contrast the minimalists argue that one cannot draw such a firm conclusion because other simpler explanations might suffice. Almost all of these studies use the infant's looking time or direction of looking as the index of understanding, and the worry is always that what the infants are responding to may not be a person's false beliefs but instead an intention (Fenici, 2014) or a registration of an object (Apperly & Butterfill, 2013).

In their synthesis, Apperly and Butterfill (2009) argued that the character of the infant's understanding of mind might have a fundamental signature - some limitation - that differentiates it from that of 4 year olds and adults. By analogy, they point out that infants can do elementary arithmetic, but the signature that betrays the nature of their understanding is that they are only successful with numbers less than four (Carey, 2004). Low & Watts (2013) contend that such a signature in the Theory of Mind domain might

be that infants cannot represent the *contents* of false beliefs, perhaps just appreciate someone's intention to act towards a location. Butterfill & Apperly concur (2013) that it is identity that is key, not just location, perhaps because object identity means the person is *seeing as*. Philosophers of science (Hanson, 1958) made interesting distinctions between plain *seeing*, versus *seeing* an object *as* something, versus *seeing that* something is the case. Interestingly, only the latter is the level at which propositions can be asserted.

That is why recent papers on infant's appreciation of deceptive appearance are important in challenging this synthesis. These recent empirical findings promise to stretch our understanding even further, as they show that infants can recognize the other's "registration" of an object as having a deceptive appearance (Scott et al, 2015).

Southgate (2013) makes the very interesting claim that infants may succeed in reading the other's intent - perhaps even their belief state- precisely because they do not consider the alternative PoV, namely their own! In other words, infants may be especially attentive to the attention that others pay towards an object and its location, and follow it keenly, ignoring what they themselves know. As this diminishes over time, they begin giving attention primarily to their own knowledge access. Only at around age four can children juxtapose the two representations and make a reasoned choice between them, allowing them to pass the classic false belief tasks. The time between these achievements entails many developments: in attention, in social understanding, in executive function, and of course in language: in vocabulary, pragmatics, semantics and syntax.

Space limitations, the fast moving empirical and theoretical literature on the infant ToM results, and the focus of this volume, require me to lay the issue aside, and make the assumption that the four year old who passes a false belief reasoning task is doing

something explicit with beliefs, and whatever that something is, it seems to entail the use of language. It is to that issue that we turn next.

4.3 When do complements emerge?

Rudimentary embedded forms such as small clauses, lacking tense or even a verb, emerge early, when the child is around 2. Nonfinite forms come in early, sometimes around the same time with certain common verbs like *wanna* or *hafta* in invariant form, hinting that these might serve as auxiliaries not matrix verbs (Brown, 1973). The point at which the nature of the embedding becomes clearer is when the sentence has a second subject, such as "he wants her to do it" is, but those do not typically come in until age 3-4 years. Tensed complements also emerge at 3 or 4, and the complementizer (e.g. *that*) is frequently absent (Bloom, Rispoli, Gartner & Hafitz, 1989). For a fuller account see de Villiers & Roeper (2016).

Semantically, it has been claimed that the first tensed complements may not express the full range of meanings in adult English. For example they are often first person, "I think..", and they do not express false beliefs, but opinions. For those reasons some writers e.g. Diessel and Tomasello (2001) argue that some of the earliest complements are idiomatic, thus not truly flexible, embedded, forms. A thorough survey of the CHILDES literature in English by Bartsch & Wellman (1995) suggested that the tensed complements under mental verbs emerge gradually, only achieving full status as forms that can carry the false beliefs of others by around 3;5 years.

It is difficult to elicit complements from young children, so in my own work comprehension has been the method to test embedding. This began serendipitously in a series of studies done with Tom Roeper, looking at the development of the syntax and semantics of wh-questions (e.g. de Villiers, Roeper & Vainikka, 1990; Roeper & de Villiers, 1991). We designed some sentences to see if the child was appropriately interpreting long distance questions such as 17):

(17) How did he say he rode the horse?

We provided stories to contrast the long distance reading (how he rode the horse) with the short distance reading (how he said it), but the character in our early stories never mis-spoke, that is, he always correctly reported on his riding. Juan Uriagereka was the person who suggested in conversation that we make the lower clause false in a sentence such as:

(18) What did the mother say she bought?

in order to test whether the children were appropriately applying scope to the wh-word, namely, that both verbs need to be taken into account in answering. To our surprise, young children (below age four) were very prone to answer simply what the mother bought (de Villiers, 1999). The full account is developed in several papers (de Villiers & Pyers, 2002; de Villiers, 2005; Roeper & de Villiers, 2011), and for yet more varied

opinions based on the child's problems with pragmatics, see Lewis, Hacquard and Lidz (2013) and Van Cleave and Gauker (2010).

Is this mistake because the children do not yet have a theory of mind? That is, perhaps they cannot yet understand lies and mistakes because they do not understand the point of view on truth of another individual, so they "fix" it to their truth. We undertook several major studies to test this, and arrived at a most disturbing conclusion. The result was the other way around, namely, it is *after* children master these structures that they can pass classic false belief tasks (de Villiers & Pyers, 2002). The important parallel findings with language delayed deaf children (Schick , Hoffmeister, de Villiers & de Villiers, 2007; Pyers & Senghas, 2009) and children with autism (Tager Flusberg & Joseph, 2005) are often neglected in reviews. A meta-analysis of language and ToM concluded that the contribution of complement mastery to false belief understanding is a fairly robust finding, though studies were scarce (Milligan, Astington and Dack, 2005). Two training studies in English (Lohmann & Tomasello, 2003; Hale & Tager-Flusberg 2003) showed that teaching complements of the right sort can pay off in passing false belief tasks, though teaching other complex structures such as relative clauses does not. There is supportive evidence from other languages (Aksu Koç, Avca, Aydin, Sefer & Yasa, 2005; Lohmann & Tomasello, 2003; Perner, Zauner & Sprung, 2005).

However, there are some failures to replicate the result that complements play a decisive role. In some studies other indices of general syntax outweigh the contribution of a complement task as a predictor (Milligan et al, 2007; Ruffman, 2003; Cheung et al, 2004). Unfortunately many of the existing studies lack sufficient power to detect the contributions of different prerequisite skills. In a recent large longitudinal study, we have

confirmed that complement mastery is a major *independent* predictor of passing false belief tasks (de Villiers, de Villiers, Lindley & Chen, 2015), though as is found in other studies, vocabulary and general syntax also have roles to play,

Yet tensed complements - not infinitival complements - play the crucial role. Critically, it is *realis* complements, for which there is a truth value (de Villiers, 2005; de Villiers and de Villiers, 2009). The next section will begin to address that.

5.0 Point of View across Clauses

It turns out that all perspective-taking elements are not alike in how they interact with syntactic embedding. Most, but not all, of the PoV elements take a speaker's perspective in ordinary matrix sentences, but then can switch to the matrix subject's perspective once embedded. A succession of tables is presented that shows how the PoV phenomena fall into at least three types when one considers how each one behaves in different types of clauses.

"@@ Insert Table 1.docx here"

The rows in Table 1 constitute the type of sentence structures that are in question: simple matrix sentences/ adjoined clauses, nonfinite complements, finite complements and direct speech under a verb. Then a representative sentence containing the PoV elements is given. The next column represents the perspective on truth of the clause: in whose world is it true? The speaker, the matrix subject, or is it indeterminate? The last columns represent the types of PoV phenomena under consideration, namely, a group from those considered earlier, such as tense, pronouns, spatial deixis, reference, and so

forth. (Evidentials are excluded because their syntactic behavior, especially in regard to sentential complements, is still unclear). In each case the question is asked, whose perspective is represented by the element (boldface) in the particular clause (the one italicized) under consideration? From whose point of view is this taken, as indicated by the particular PoV elements? Each clause type is considered.

Take the sentence in (19) containing several different PoV indices. It is unwieldy, but necessarily so, to be able to show the contrasts in how the various elements behave:

(19) He threw out the food in her fridge over there yesterday.

(19) is then modified to reflect the various syntactic contexts, in the first column.

5.1 Truth and Tense

First consider whose *truth* is represented by the clause: is it the matrix subject, the speaker, or is it indeterminate? The whole sentence in (19) expresses the truth asserted by the speaker. In the nonfinite complement of sentence (20):

(20) She said *to throw out the food in her fridge over there yesterday.*

there can be no determination of truth: it refers to an irrealis event, we cannot determine whether the event in the clause - the throwing out- happened or not. In the tensed

complement (21), as argued in section 4.1, the truth is from the matrix subject's perspective:

(21) She said *he threw out the food in her fridge over there yesterday*

From our perspective, or the speaker's, (21) could report a lie, or a mistake, and so the event in the complement might never have happened. In the Direct speech case in Table 2 the truth parallels that for the indirect speech: indeterminate for the irrealis (imperative) case, and subject-oriented for the directly quoted tensed clause.

Now consider the point of view attached to the Tense on the verb in Table 1. Whose time perspective is it from? Clearly, in the matrix or adjunct clause, the tense is from the speaker's perspective. That is, the throwing out of food happened in the past with respect to the speaker, not the matrix subject. In the untensed complement, the tense is not determinable. When did the event happen, or did it even happen? It is certainly not connected to the speaker's time of utterance. But in the tensed complement variant in 22) the tense is the matrix subject's perspective. The *saying* event is the speaker's tense, but the *throwing* event is prior to that. If it was coincident, it would more likely be in the past progressive as in (22):

(22) She said he was throwing out the food in her fridge over there yesterday.

(22) shows the phenomenon of sequence-of-tense, wherein the two tenses agree when there is an embedded clause. Sequence of Tense occurs in some but not all languages (Hollebrandse, 2000).

In Direct speech, this patterns similarly with the indirect complements,that is, indeterminate for the non-finite (imperative), and subject PoV for the tensed version. Inspecting the two rows in Table 1, it is evident that Tense and Truth pattern identically. In addition, no difference occurs between direct and indirect speech reports. Importantly, the tensed variety explicitly provides a different perspective, namely that of the matrix subject.

5.2 Deixis

The second group of phenomena contains pronouns, spatial and temporal deixis. Whose PoV is "he" and "your"? Whose Pov are "there" and "yesterday"? (See Table 2). In matrix clauses and direct complements of either tensed variety, the speaker's PoV is imposed throughout. For indirect speech there is a switch, in which the subject's perspective is imposed (i.e. the subject who is the actual speaker). This group all pattern alike, and do not align with Truth and Tense.

"@@ Insert (Table 2 .docx) here"

5.3 Reference and Description

The third group requires fresh examples to avoid too much unnecessary clutter in the sentence. Sticking with the invidious fridge cleaner, we now focus attention on the objects he attacked to examine the phenomena of Personal Taste adjectives and Referential Opacity, or by what name a thing shall be called.

"@@ Insert (Table 3.docx) here"

Take (23) as the event for personal taste adjectives in Table 3:

(23) He threw out the yucky food.

According to recent analyses, "yucky" must be pragmatically linked to a salient judge in the context (Lasersohn, 2005). In this bare context, the most natural interpretation is a speaker interpretation: the food is yucky from the speaker's angle. In the nonfinite complement, however, there seem to be many alternatives available for a "judge", so it is marked indeterminate. The same is true for the tensed complement. Was it the speaker's, the subject's, or could it even be the embedded subject's, "his" view of the food? When we reach the direct speech cases, however, it becomes clear: the matrix subject considers the food yucky. I can also get a reading in which the instruction is:

(24) Throw out the food that you consider yucky.

but I suspect some domestic battles might result.

Finally, we reach the case of referential opacity. In this case, there must be two designations of the same object. Imagine that there is a bowl of onion dip in the fridge, but unbeknownst[1] to the fridge clearer, the onion dip is an award-winning appetizer of the speaker's, perhaps about to be transported to a cocktail party the next night. These scenarios are depicted in Table 4, and here attention must be paid to whether substitution of the coreferential term would preserve truth.

[1] This is the handiest word ever in ToM work

"@@ Insert (Table 4.doc.x) here"

In ordinary sentences, referential substitution works fine. The PoV on the noun phrase is the speaker's, as the speaker knows the referent *both* as onion dip and the award-winning appetizer. The difficulty comes with the embedded complements, where the classic problem arises of *de dicto* and *de re* (Quine, 1956). On a *de re* reading, the matrix subject may have said, "Throw out the onion dip", but in reporting it in indirect speech, the speaker can legitimately say (25):

(25) I can't believe what happened! She said to throw out the award-winning appetizer!

That is, the speaker can substitute the words and still talk about the object from the speaker's PoV. On another reading, the *de dicto*, the speaker might be challenged in court if he claims that the woman called the object an award-winning appetizer, when in fact she just said:

(26) Throw out the onion dip!

Hence, PoV is ambiguous, or indeterminate in such a case, as we do not know whose PoV is intended. When we turn to direct speech, the PoV reverts to that of the matrix subject, the actual utterer of the words. In accurately reporting the speech, I must use the words the other speaker used. The last two cases then pattern together across environments, and differently in their behavior from the pronoun/deixis set, and unlike Tense and Truth.

5.4 Summary

In summation, three distinct PoV types occur in their behavior in sentence-contexts (See summary Table 5). Hollebrandse (2000) made the proposal that there might be a PoV operator in the CP of a sentence that coordinates agreement across pronouns, spatial and temporal deixis. However that coordination is not so simple across different clauses.

"@@ Insert (Table5.docx) here"

6.0 Implications

What are the implications for the larger story of how children could acquire perspective from conversational contexts? Embedded forms - whether direct or indirect - provide crucial information about Truth, and they do so primarily via Tense markers.

Verbs are subcategorized not only for whether they take a complement at all, but also whether it is finite, nonfinite or subjunctive. Finiteness is the domain in which truth or assertion seems to operate. Klein (1998) also discusses the notion of finiteness, or abstractly, FIN, as having two distinct meaning components. One is to mark tense, specifically whether the topic time precedes, contains or follows the time of utterance. and the other, that an assertion is being made. Sentences without finiteness make no assertions (for rich elaboration, see Klein, 1998).

Hinzen (2013) also discusses naturalization of the concept of Truth. He argues persuasively that truth is a property that emerges internally, from the syntax of natural

language, not from reference or external considerations. In particular, he argues that anything less than a clause cannot have a truth value, that is cannot be evaluated as true or false: Noun phrases, Small Clauses, Infinitive Complements all lack the necessary structure.

The obvious question arises about how specific this argument is to languages like English or German. What about languages like Mandarin, which lacks tense morphology? The debate over the existence of Tense in Mandarin is a vast topic. Two alternatives exist to accommodate such languages within the current story. One is to agree with those that claim that Mandarin has a Tense node, in line with claims about universal language, but lacks overt tense morphology (Sybesma, 2007). Sybesma argues that in many respects Mandarin behaves like Dutch, but lacks overt tense agreement. The second is to argue with those who claim that Aspect plays the role in Mandarin that Tense does in English (Lin, 2010). Importantly, Mandarin speakers can make the linguistic distinction between complements that are realis or irrealis (see also Lin, 2011).

Tom Roeper and I, elaborating on Klein, proposed that Tense (covertly) moves to the edge of the clause, carrying with it the Point of View of the subject to be represented (Roeper & de Villiers, 2011). If the construction has no Tense, such as an infinitive, then it will also carry no POV shift. We predicted significant differences in how children treat Tensed and Nonfinite/irrealis clauses, and only the former should be linked to mastery of false beliefs. This is exactly what we found, when we tested children on scenarios containing discrepancies between what was said and what happened (de Villiers, Harrington, Gadilauskas & Roeper, 2012). Children had relatively little difficulty answering questions posed with nonfinite complements e.g. (27):

(27) What did the boy say to buy?

versus finite complements (28):

(28) What did the boy say his Dad bought?

In both cases, the event of *buying* was other than the one ordered/described by the boy. The disparity between finite and nonfinite complements is confirmed in a much larger sample (N=674) of children aged 3 through 5 years who were given two of each kind as part of a new language assessment (de Villiers et al, 2014). Children are much more competent with the nonfinite than the finite complement, even when the scenarios are well matched, and the verb (say) is the same.

An interesting case arises with modals. The contrast was tested in de Villiers (2005) between (30)-(32):

30) Mom thinks that Bella was playing on the computer.

31) Mom thinks that Bella should play on the computer.

32) Mom wants Bella to play on the computer.

These occurred in scenarios where Mom could not see Bella, and Bella was doing something else, say painting. Responses to the modal case in 30) were found to pattern exactly like the infinitival case with *want* in *(32)*. Three-to-five year olds found it easy to judge them true, unlike the case in (31) of *think that*. The case of modals in intentional contexts still requires further theoretical and empirical exploration.

7.0 Is linguistic encoding required?

As a final point, consider again whether direct speech or indirect speech encoding matters. Table 5 would suggest not, in that both sentence types are linked to truth in the same way. However, here we are talking about fully encoded direct and indirect speech complements. What about witnessing speech acts directly? Is that sufficient for children to learn that others have beliefs different than their own, or do children learn by hearing the description of the speaker and the speech act encoded?

Consider these contrasts in how it might be presented, in 33) - 35). The quotation marks indicate what the child hears, and the remaining parts of the scenarios are not expressed, but witnessed directly.

(33) Mom: (witnessed saying) "Dad is outside"

Child sees Dad upstairs.

"What did Mom say?"

In (33), the person speaking is not linguistically encoded. The contradiction is also not marked overtly in language, therefore the participant must encode the discrepancy between what Mom says about Dad, and what the child sees about his location.

34) "Mom said 'Dad is outside.'"
Child sees Dad upstairs.
"What did Mom say?"

In (34), who the speaker is gets directly encoded, and a direct quotation is used rather than just a speech act being witnessed. However, the participant must still encode the discrepancy between Mom's statement about Dad and what the child sees.

(35) "Mom said Dad is outside.
But look, Dad is upstairs.
What did Mom say?"

In (35), everything is overtly encoded: Mom is identified as the speaker, and the content of her speech is formed as indirect speech rather than a quotation. In addition, the discrepant fact that Dad is in a different location is expressed in speech, rather than leaving the inference to the participant to encode.

The type (35) is what we have traditionally used in the complement comprehension task (de Villiers & Pyers, 2002). But in designing a new language assessment (de Villiers et al, 2014), we had the opportunity to use animated events with

cartoon speakers, and therefore to drop the narration. To check that this would be equivalent, we piloted type 35) (events only with speakers) and 37) (linguistic encoding and indirect report) on a sample of children (N=56) aged 3-4 to see if the difference in scenarios mattered (See Figure 1).

"@@ Insert (Perspective Figure 1.doc) here"

To our surprise, young children had much *less* difficulty answering the question if they had NOT heard it encoded in an indirect report (type 35). It is not clear that they even noticed any discrepancy; they just answered what the Mom said. It is my strong suspicion that success on this version of the task would pattern very poorly with False Belief tasks, because the children did not engage in any comparison of two representations. Children may succeed on scenario type (33) in the same way that infants succeed in the eye-gaze studies (Southgate, 2013), because *attributing* an intention or an utterance to someone does not necessarily engage with **truth** without an additional step of comparison of representations.

8.0 Conclusion

Writers such as Harris would argue that discrepancies in conversation reveal point of view/perspective and hence lead to development of Theory of Mind. I have made two arguments against the sufficiency of this claim. First, I demonstrate that not all linguistic elements that mark point-of-view indices are alike, by showing how each behaves in different clauses. There are several interesting subtypes that pattern together, and the tense or finiteness of a clause seem especially significant in its connection to truth, or

assertion. In addition I argue that observation of speech is not enough, and suggest that *linguistically encoded speech reports* are needed to help the child along towards the contrast in representations necessary for explicit, rather than implicit, false belief reasoning. That is why mastering tensed complements is implicated as a predictor of that cognitive achievement.

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Figure 1

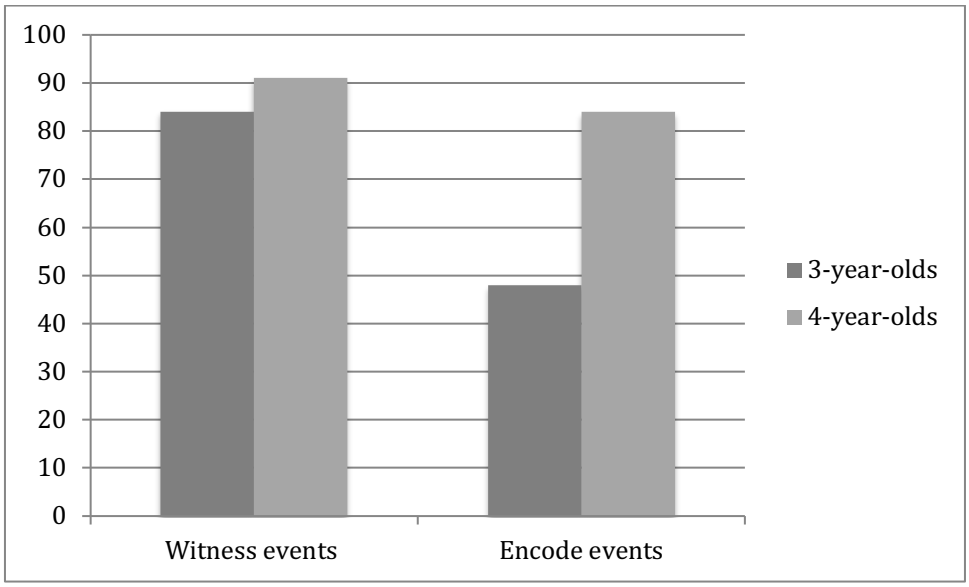
100
90
80
70
60
50
40
30
20
10
0
Witness events
Encode events
3-year-olds
4-year-olds

Table 1: Types of clause and perspective of Truth and PoV indices inside them

Type of clause:	**Example**	**Truth**	**Tense**
Matrix or adjunct clause	*He threw out the food in **her** fridge over **there** **yesterday***	speaker	speaker
Non finite complement	She said *to throw out the food in **her** fridge over **there** **yesterday***	indeterminate	indeterminate
Finite complement	She said *he threw out the food in **her** fridge over **there** **yesterday***	subject	subject
Direct speech: nonfinite	She said *"Throw out the food in **my** fridge over **here** **today"***	indeterminate	indeterminate
Direct Speech: finite	She said *"He is throwing out the food in **my** fridge over **here today"***	subject	subject

Table 2: Types of clause and perspective of deictic PoV indices inside them.

Type of clause:	Example	Pronouns	Spatial Deixis	Temporal Deixis
Matrix or adjunct clause	*He threw out the food in **her** fridge over **there** **yesterday***	speaker	speaker	speaker
Non finite complement	She said *to throw out the food in **her** fridge over **there** **yesterday***	speaker	speaker	speaker
Finite complement	She said *he threw out the food in **her** fridge over **there** **yesterday***	speaker	speaker	speaker
Direct speech: nonfinite	She said *"Throw out the food in **my** fridge over **here** **today"***	subject	subject	subject
Direct Speech: finite	She said *"He is throwing out the food in **my** fridge over **here today"***	subject	subject	subject

Table 3: Types of clause and perspective of personal taste adjectives indices inside them.

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Type of clause:	Example	Personal Taste adjective
Matrix or adjunct clause	*He threw out **the yucky food***	speaker
Non finite complement	She said *to throw out **the yucky food***	indeterminate
Finite complement	She said *he threw out **the yucky food***	indeterminate
Direct speech: nonfinite	She said "*throw out **the yucky food"***	subject
Direct Speech: finite	She said "*he's throwing out **the yucky food"***	subject

Table 4: Types of clause and transparency of referential substitution permitted in them.

.

Type of clause:	**Example**	**Substitute designation for referent**	**Referential substitution allowed by:**
Matrix or adjunct clause	*He threw out **the onion dip***	*He threw out **the award winning appetizer***	speaker
Non finite complement	She said *to throw out **the onion dip***	She said *to throw out **the award winning appetizer***	indeterminate
Finite complement	She said *he threw out **the onion dip***	She said *he threw out **the award wining appetizer***	indeterminate
Direct speech: nonfinite	She said "*throw out **the onion dip"***	She said "*throw out **the award winning appetizer"***	subject
Direct Speech: finite	She said "*he's throwing out **the onion dip"***	She said "*he's throwing out **the award winning appetizer"***	subject

.

Table 5: Three different classes of behavior of PoV types across clauses

Type of clause:	**Matrix or adjunct clause**	**Non finite complement**	**Finite complement**	**Direct speech: nonfinite**	**Direct Speech: finite**
Truth	speaker	indeterminate	subject	indeterminate	subject
Tense	speaker	indeterminate	subject	indeterminate	subject
Pronouns	speaker	speaker	speaker	subject	subject
Spatial Deixis	speaker	speaker	speaker	subject	subject
Temporal Deixis	speaker	speaker	speaker	subject	subject
Personal Taste	speaker	indeterminate	indeterminate	subject	subject
NP designation	speaker	indeterminate	indeterminate	subject	subject