On the (In)dispensibility of Senses

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Abstract

Of all the time-honoured issues of semantics, the distinction between sense and reference ascribed to Frege is without doubt the most famous one. It has been applied time and again in the analysis of belief contexts. During many years the usefulness of the notions 'sense' and 'reference' have hardly been called into doubt. Only quite recently, however, (say, since Kripke) has there been a trend to question it. To mention only one example, Richard (1990, p. 60) writes 'Frege's view of content and attitude ascription seems to me to be mistaken. So do its modern descendants'.

On the other hand, Fregeanism has also quite recently been defended by a number of philosophers. Forbes, to mention just one of those modern descendants, has written a series of books and articles, one of which carrying the programmatic title 'The indispensibility of *Sinn*'. Compare Forbes (1991).

The present paper is mainly about the question of whether Forbes is right in his conviction that senses are indispensable. After a few introductory section I will give an extensive discussion of Forbes' so-called logophoric account. My conclusion will be that it, in spite of all its ingenuity, is too complex. Modal logic offers much more elegant ways to model the semantics of belief ascriptions. This is not to deny that senses are indispensable. Perhaps the most powerful argument in favor of senses may be found in intentional identity contexts. However, it would appear, however, that King (1993) is a viable analysis of intentional identity which does not make use of senses.

1 Belief ascriptions

Verbs such as *believe*, *know*, or *doubt* are verbs of propositional attitudes (henceforth PA-verbs). PA-verbs can be used in what we call PA-sentences. From a grammatical point of view, a PA-sentence is an instance of oblique narration. Here is an example of a belief sentence:

Pierre believes that London is a pretty city

We must distinguish between a PA-sentence and the type of speech act that may be performed by uttering the sentence. PA-sentences are typically used in order to describe a person's attitude (such as belief, knowing or doubt) towards a proposition. In a belief sentence we expect to find at least the name or a description of the person whose beliefs are described (here: 'Pierre'), the PA-verb ('believes'), and a description of the belief ('London is a pretty city'). Since the latter are usually subsentences introduced by the connective 'that', they are often referred to as 't-clauses'. Of course, not all PA-verbs behave in the same way. Yet, we will use the verb 'believe' as a representative for the entire class of PA-verbs when the differences are not in focus.

Note that also a sentence like

Pierre winks in order to draw Odile's attention

harbors an implicit belief description. In uttering this sentence Speaker describes Pierre's belief that if he winks he may draw Odile's attention[1].

2 Belief descriptions and belief ascriptions

It almost goes without saying that in order for belief descriptions to be adequate they should offer a faithful description of the belief entertained by the believer. Let us call this the faithfulness requirement. In this context it is important, however, to distinguish two different types of speech acts which can be performed by using a belief sentence: a) belief reports or belief descriptions, b) belief ascriptions. Belief ascriptions have a peculiarity which has not escaped attention as it was noted a.o. by Richard (1990) and Quesada (1992), but has not always been taken seriously. The question is: when can we be said to faithfully ascribe beliefs? Two things come to mind. First, the belief ascribed must be a belief entertained by the believer, and, second, the belief must be ascribed in terms that the ascribee him/herself would have or could have used.

Remarkably enough, belief ascriptions do not comply with the second requirement, and that may indeed constitute the main difference between belief descriptions and belief ascriptions. Belief ascriptions may be inherently extensional: instead of giving a 'literal' report, belief ascriptions may merely describe the *contents* of other people's minds. A story clarifying this point is due to Quesada (1992). A and B follow Ralph who in his turn is walking behind Bernard J. Ortcutt. Ortcutt is wearing his brown hat. A asks B: 'Why does Ralph follow Ortcutt?' B answers: 'Because Ralph believes Ortcutt to be a spy'. In this sentence, B clearly describes a belief entertained by

[1]An interesting property of belief is that it need not be closed under logical consequence. Hence, people may hold inconsistent beliefs. Moreover, it is in general not allowed to substitute synonymous terms for one another. This will be called the substitution problem. These two features should well be taken into account when devising a formal language in which to describe beliefs. A theory is a set of sentences in language L. Hence, belief sets are theories. Any inconsistent theory consists of all sentences of L. Hence, consistent sets are proper subsets of L and are closed under logical implication. Belief sets need not be consistent and need not be closed under logical implication. Yet, a belief set must be a proper subset of L. Many a fine-grained logic has been devised to yield adequate belief descriptions. Cf Fagin and Halpern (1988), or Moore (1989). Fagin and Halpern (1988) distinguish between explicit and implicit belief. Implicit belief is closed under logical consequence. An explicit belief is the belief that the believer is aware of. We may think of explicit belief as a list of sentences. Fagin and Halpern (1988) call such lists 'awareness sets'.

Ralph, but, as we all know, Ralph does not have the slightest idea as to the name of the man he is following[2].

It follows that in order for an ascription to be adequate it need not be phrased in terms that the ascribee himself or herself would or could have chosen[3]. Kripke (1979) coined the turn 'puzzling beliefs'. Following this usage we will call an ascription of a belief described in terms the ascribee would not have used himself or herself a 'puzzling (belief) ascription'[4]. Puzzling or not, the best thing to do is to take the facts for granted. It may be noted that denying belief ascriptions this extensional character would make belief ascriptions to animals completely impossible.

3 Frege or Russell?

The discussion about belief ascriptions is dominated by the question of whether such ascriptions should be taken to be Fregean or Russellian. To see what these terms stand for, we best consider the semantics of t-clauses. There are two standard points of view here which, taken at face value, are both equally plausible. Together they constitute what we shall refer to as 'the principal predicament'.

The Fregean point of view says that the t-clause as a whole stands for a thought wheras its constituents stand for notions (concepts). The Russellian point of view says that both t-clauses and their constituents stand for their normal denotata: truth values, entities, and relaties between entities[5]. To see the plausibility of the Fregean

[2]Of course, the Ortcutt-story is due to Quine. Compare e.g. Quine (1971): 'There is a certain man in a brown hat whom Ralph has glimpsed several times (···) Ralph suspects he is a spy. Also there is a grey-haired man, vaguely known to Ralph as rather a pillar of the community, whom Ralph is not aware of having seen except once at the beach. Now Ralph does not know it, but the men are one and the same. (···) Can we say of this *man* (Bernard J. Ortcutt, to give him a name) that Ralph believes him to be a spy?'

[3]In this context it may be good to add that exactly the same situation obtains with respect to verbs of saying. Citing a person's words may amount to either quoting or merely paraphrasing. In paraphrasing one may, again, phrase what the 'citee' has said in terms that the citee may not have cared or even been able to use him/herself. I refer to De Mey (1990) for more details. In both cases the only condition on adequate ascriptions is that the sentence used to report what the ascribee believes or the citee said have the same meaning as the sentence these persons used or would have used. In this case we may say that direct citations give a literal report, whereas indirect citations do not necessarily give a literal report.

[4]It may be clear from the phrase 'literal report' used earlier, and also from the formulation 'the sentence the ascribee would have used' that belief ascriptions raise a particularly nasty problem. For what do we mean by 'literal' or by 'would have used'? To be sure, in many cases it may be clear what Ascribee could *not* have said, as in the example above: according to the story, Ralph is totally ignorant of the name Bernard J. Ortcutt. Yet, this may not be enough to solve all problems. Richard (1990, p.44ff) discusses this point and I have little to add to his remarks.

[5]It was Russell who, in a letter to Frege, stressed that in the sentence 'The Mont Blanc is high' the word 'Mont-Blanc' stands for the mountain, and not for the knowledge the user has of this mountain. Exactly the same holds of the sentence 'Pierre believes that the Mont Blanc is high'. Accordingly, such a view is often referred to as a Russellian view. If we want to stress the fact that the referent of a word is just the thing itself we may call it 'a Russellian referent'. I refer to Richard (1990, in particular p. 108ff) for more discussion.

point of view, reconsider the sentence

Pierre believes that London is a pretty city

We can paraphrase this sentence as

Pierre's concept of something being pretty applies to his concept of London

This paraphrase reflects the Fregean point of view: both 'London' and 'pretty' stand for ideas of Pierre's, Pierre's idea of London and Pierre's idea of pretty, whereas the t-clause as such stands for a thought entertained by Pierre. However plausible, this commits us to the view that there are expressions in specific contexts which do not have their regular reference.

On the other hand, if we stick to the plausible Russellian principle that expressions always have the same reference in whatever context they occur, we can no longer distinguish between the different thoughts people may have of one and the same state of affairs. The conclusion must be that neither the Fregean nor the Russellian point of view are satisfactory as they stand.

As a result, people have come up with new analyses, which sometimes are and sometimes are not advertized as neo-Fregean or neo-Russellian. The differences between such analyses, however, turn out to be much smaller than one might expect them to be[6]. The reason is the following. In order to find a way out of the predicament, researchers have introduced unarticulated constituents of belief ascriptions. These unarticulated constituents can be malignantly described as intended to build in Fregean elements into allegedly Russellian accounts, and *vice versa*. Whether the resulting analyses can be considered (genuinely) Fregean, or (genuinely) Russellian is a question that I do not think is profitable to discuss[7]. Many people still seem to think that senses are indeed indispensable. Let us agree to call theories that introduce concepts and thought 'Fregean' theories. Fregean theories share a number of problems with genuinely Fregean theories. We now turn to a discussion of these problems.

4 Problems besetting Fregean theories

According to a Fregean view, words used in belief ascriptions do not stand for their usual reference, but, rather, for their sense. The sense of an expression α differs from its reference in that it involves 'the particular way of referring to this reference which α provides'. Hence, although the expressions 'the morning star' and 'the evening star'

[6]Compare e.g. Oppy (1992) who concludes that 'there is very little which distinguishes' the views defended by Salmon and by Soames (which are declared direct reference theories) and the one defended by Forbes, which is advertized as neo-Fregean.

[7]I refer to Salmon (1990) for a discussion of such points. Salmon rejects the suggestion by Evans that his theory is just a Fregean theory in disguise. However well-taken his point of view may be, it seems to me to be completely respectable to call a theory which quantifies over different ways of thinking about objects a Fregean theory.

have the same reference (the planet Venus), they differ in their sense, that is, in the way they refer to Venus. According to a Fregean analysis, only expressions having the same sense can replace one another in a belief ascription. A Fregean may appeal to the fact that

The morning star is the evening star

and

The morning star is the morning star

must of necessity differ in meaning: whereas the latter sentence simply cannot be informative, the former can. This is accounted for by assigning 'the morning star' and 'the evening star' different senses. The same holds *a fortiori* of belief ascriptions. Suppose Hammurabi is a Babylonian king who does not know that the first star visible at the evening sky, and the last star visible at the morning sky, are one and the same star. Then

Hammurabi believes that the morning star is the first star visible at the evening sky

is an incorrect belief ascription according to a traditional Fregean view. Replacing in the above sentence 'Hammurabi' by the name of some moderner may turn this sentence into a correct belief ascription.

Of course, this is no more than a verbal explanation: it just expresses that the two expressions are different. One may add some content by assuming that different expressions may stand for different ways of thinking, for different thoughts. We can even go further and maintain that the senses of these expressions differ in being labels of different amounts of knowledge. That is to say, if A's knowledge of the morning star is exactly the same as A's knowledge of the evening star, (and, hence, A knows that both 'the morning star' and 'the evening star' are merely different names for Venus) then the senses of these two descriptions do not differ for A and such expressions can replace one another in a belief ascription assigned to A while preserving the truth value of the report. However, if A takes these expressions to stand for different stars, then their senses do differ for A and substituting the one expression for the other in a belief ascribed to A would not preserve the truth value[8].

A number of objections can be brought in against such Fregean solutions, of which the following is the most important one. If this theory is true, it follows that whenever two language users use the same term T, T may have different meanings according as the amounts of knowledge which the users have of the entity that T stands for differ. Such a view is not attractive. Second, if we call sense and reference 'dimensions of meaning', Fregean semantics would appear to be two-dimensional. However, turning

[8]Compare Richard (1990, chapter 2) for such an interpretation. In this context it is very useful to distinguish between various senses of the notion of 'sense'. Compare Oppey (1992), who defends that the Fregean 'sense' is composed of what he calls '$sense_1$', '$sense_2$' and '$sense_4$'.

to iterated belief ascriptions of the form 'A_1 believes that $\cdots$ that A_n believes that p' we see that we really need a $n-1$-dimensional semantics (for any n). This is called the iteration problem in Forbes (1993). The problem arises because of Frege's definition of 'senses'. Put in a modern way, a n-times embedded term has as its reference the sense that it has in a n–1 times embedded context. Hence, it is not enough to distinguish between senses and references; we should keep track of whether senses are senses of objects or of other persons' concepts.

A third problem, one very much related to the previous one, is the so-called analysis problem. Suppose we ascribe A a belief concerning B's beliefs, say:

A believes that B believes that London is pretty

Suppose furthermore, that we analyze belief in some way making use of some rather technical concept δ. Now this inevitably commits us to the view that A knows that beliefs have to be analyzed using δ.

Fourth, even the slightest and tritest mistake in the ascriber's assessment of the ascribee's conception of the world makes an ascription inadequate. Compare Saul (1993) for applications of this argument. We will refer to it as the flawed ascription problem. There must somehow be a possibility to refer to an entity in spite of the fact that the description we give of it does not really apply to it.

Let us list the problems discussed:

- the substitution problem
- the iteration problem
- the analysis problem
- the flawed ascription problem

To this we should add

- the ontological problem
- the *de re* problem

The ontological problem is the problem of how to model propositions. How many propositions are there and how do we individuate them? The *de re* problem is the problem of how to account for the difference between *de re* and *de dicto* readings. In a *de re* reading we read certain terms in the t-clause as standing for their reference whereas other constituents may stand for their sense.

5 The substitution problem

If we accept what we said earlier about puzzling belief ascriptions, we should also acknowledge the possibility that puzzling belief ascriptions are true. Substitution is possible not only in case the terms are synonymous according to Ascribee, but also when they are synonymous according to Ascriber[9]. Hence, there is no such problem as the substitution problem. The sentence cited above 'Hammurabi believed that the morning star is visible at the evening sky' is simply true. However, not everybody seems prepared to accept this. Now modern theories about belief ascription have found elegant ways to circumvent the need to cite the sentence Ascribee 'would have used' and we are going to discuss such theories in the section next. It may be good to point out that discarding the substitution problem in our way does not solve the flawed ascription problem.

There is one further thing that should be discussed in the present context. One of the strongest arguments in favor of Fregean senses is the fact that sentences such as 'The morning star is the morning star' are said to be uninformative in comparison to sentences such as 'The morning star is the evening star'. In order to show that that is not true we can revive any of the Twain/Clemens-type stories and add a line of roughly the following content[10]

X still does not know that Twain is Twain

What it comes down to is that the claim to the effect that sentences of the form 'A is A' do not carry any information turns out to be wrong in the case of puzzling ascriptions.[11]

6 Recent neo-Fregean analyses

Kaplan may be said to have been the first one to attempt a neo-Fregean analysis. Kaplan (1971) offers the following representation

$$\exists\alpha[\Delta(\alpha, Ortcutt) \wedge B_{Ralph}\ {}^{m}\alpha\ is\ a\ spy^{m}]$$

for the sentence

Ralph believes Ortcutt to be a spy

[9]A question arising in this context is whether the differences between implicit and explicit beliefs and between puzzling and non-puzzling ascriptions coincide. If that were so, we should be able to say that it is an implicit belief of Ralph's that he is following Ortcutt. That, however, does not seem a natural usage of the term 'implicit belief'.

[10]For a full version of such a story I refer to De Mey (1993, 1994). To put it very shortly, suppose Odile is in love with Twain, she meets him at a party but Twain has introduced himself as Clemens. Her lover is afraid that he will loose her when she learns that the person she knows as Clemens is Twain. So he may ask people 'Does Odile already know that Twain is Twain'?

[11]An extremely interesting example of how wary we should be in such matters is the so-called telephone-booth story invented by Richard. Compare Richard (1990:117, 131).

where

- Δ is Church's denotation predicate,
- α ranges over expressions
- ^{m} is the 'meaning mark': $^m\alpha$ is a spy^m is the meaning of the expression arising from substituting an NL-expression for α.

The expression 'the man in the brown hat' is an instance of an α making the above sentence true, whereas 'the man seen at the beach' is one turning it into a false sentence. Kaplan offered this analysis in order to account for the differences between *de re* and *de dicto* readings. Note the clever use that Kaplan makes of the meaning marks. They enable us to combine senses and references. Because of the existential generalization this avoids the flawed ascription problem. On the other hand, the existential quantifier causes a new problem. As Kaplan himself has noted, this is a trivial formula; there is always an expression making it true. In our case this is 'a spy'. Hence, we have to do better.

Forbes has proposed an account that fares better in this respect. Cf Forbes (1987, 1989, 1990, 1993). With his so-called logophoric account Forbes addresses all problems mentioned above.

Reconsider

> *Ralph believes Ortcutt to be spy*

Its analysis according to the logophoric account is

> $[(\text{Ortcutt is a spy})_e]_\sigma]$ (the proposition $\lambda : so_e$-labeled $(A, \lambda) \wedge$ Think-of $(A, \sigma, \lambda); Believe(A, \lambda)$

which we may paraphrase as

> *There is an expression e, and a state of affairs σ, such that σ = [[e]] = [[Ortcutt is a spy]], and σ is such that Ralph believes his so_e-labelled way of thinking of σ*

Here is a list of constituents of which only the second one and the last one are overt:

- A, the ascribee
- p, an sentential constant (p is the expression used by the *ascriber*, not the *ascribee*!)
- e, a sentential variable, the index of p
- σ, a states of affairs variable, e's denotation [12]

[12] In what follows, we shall refer to 'the denotation of e' as [[e]].

- λ, a propositional variable, whose linguistic counterpart is e
- so-labeled, a relation taking A, e and λ as arguments
- T(hink-of-with), a relation taking A, [[e]] and λ as arguments
- Bel(ieve), a relation taking A and λ as arguments

T has been defined in such a way that it is impossible to think of two different states-of-affairs by way of the same proposition.

λ and T are typically Fregean features; σ, however, is a typically Russellian feature, and its presence characterizes the logophoric solution as a mixture of a Fregean and Russellian account. The pragmatics defines a linguistic counterpart relation which Forbes uses in order to account for puzzling belief ascriptions: the expression used by Ascriber is not necessarily the one with which Ascribee thinks of a proposition. By introducing the *so-labeled* relation Forbes not only avoids the need to specify the kind of sentence that Ascriber would use (and, in fact, this is not too different from what Kaplan proposed), but also solves the flawed ascription problem, and it is easy to see why that is so. Ascriber refers just to a state of affairs σ and does not overtly refer to a sentence as the label of the proposition λ, which is the way Ascribee thinks of σ. Yet Ascriber acknowledges that Ascribee may think of σ in his or her own idiosyncratic way, and even covertly refers to that way.

The philosophy behind Forbes' very complex formalism amounts to the following. First, note that this is not a normal semantics for an abstract language. Rather, it is a semantics for *language use*, and a very particular kind of language use ('ascriptive language use') at that. Interpreted sentences constitute one of the essential parts of this type of language use. Sentences stand for states of affairs, and the semantics defines an assignment function called Ref which assigns states of affairs to sentences. There is, moreover, an indirect relation between sentences and propositions which we can picture in the following way:

$$sentence \longrightarrow stateofaffairs \longleftarrow proposition$$

where the $\longrightarrow$ stands for the denoting relation, whereas the $\longleftarrow$ stands for the thinking relation. There is also a relation between propositions and sentences in that sentences function as labels of propositions.

The essential speech situation we have to model, then, is the following: A, by using a sentence of the form 'B believes that p', ascribes B the belief that p. Such an ascription is true iff p stands for a state of affairs σ according to the model, and A, B, S and p stand in the counterpart relation to one another given by the context of use[13].

[13] Matters are considerably complicated by the introduction of indices. If I understand it properly, indices are only really needed in order to label proper parts of t-clauses. In this way Forbes attemtps to solve the *de re* problem. Maybe, it would not run counter to the spirit of the proposal if we considered the conjunction 'that' as a natural language sign for the index, remotely reminiscent of Davidson's construal of 'that'. We can then translate 'that P(a)' as $[(\mathrm{P})_e(a)]$ or as $[\mathrm{P}((\mathrm{a})_e)]$ or as $[(\mathrm{P}(\mathrm{a}))_e]$, thereby treating the indices as the reflects of overt constituents.

It may be worth our while to enter into some more formal detail. As to the *syntax*, the language consists of terms (constants and variables) and formulas. There are terms for *individuals*, *states of affairs*, *propositions*, and *(NL)-sentences*. From among the *formulas* we mention the following five types:

- $\lambda e, \sigma[e = S \wedge [[S]] = \sigma]$, abbreviated to: $[S_e]_\sigma$.
- (the $\lambda[p \wedge q \Rightarrow r]$), abbreviated to: (the $\lambda : p \wedge q; r$)
  (λ a p-variable, p,q and r formulas)
- so_e-labeled (x, λ)
  (x an i-variable, λ a p-variable, e an expression variable)
- T (x, σ, λ)
  (x an i-variable, σ a state-of-affairs variable, and λ a p-variable)
- Bel (x, λ)
  (x an i-variable, λ a p-variable)

As to the *semantics*, a *model* M = ⟨ A, S, P, Ref, Int⟩ , where

- A = a set of actors,
- S = a countable set of states-of-affairs,
- P = a countable set of propositions,
- Ref = an interpretation function assigning states-of-affairs to sentences,
- Int = an interpretation function for language L

As to the *pragmatics*, a *context* C is a pair $\langle C_A, C_L \rangle$ such that

- C_A is the agent (ascriber) of that context, and
- C_L is a function f $\epsilon\, ((A \times P)^2)^{Sentences}$

The latter function is of particular importantance. It maps, in fact, pairs ⟨ Ascriber, $S\rangle$, consisting of an agent[14] and a sentence, to a relation between thinkers and propositions; each such relation is the extension of the relation so_e-labeled for S. Put differently, for each agent A and sentence S this function delivers a list of pairs consisting of a thinker x and the unique proposition λ such that x thinks of the state [[S]] with λ, provided, of course that S has been labeled by e.

We now say that a formula Φ is true w.r.t. M and C iff there is a function *val* such that

[14]The agent is an unarticulated argument here. This is so because each context has an unique agent, and the parameter already mentions the context.

$$(\mathrm{M, C}) \models_{val} \Phi$$

where *val* is a valuation function assigning values to variables of all kinds, and, moreover, both assigns values to i-constants and sentences to indices.

As an example, I venture the following definition of the truth conditions of 'Ascribee believes that p'[15]:

$$\text{the } \lambda[[\exists e, \sigma : LCP(e, p, A^{ber}, A^{bee}) \wedge \sigma = [[e]] = [[p]] \wedge \text{ Label-of } (e, \lambda, A^{bee}) \wedge \text{ Label-of } (p, \lambda, A^{ber}) \wedge \text{ Think-of-with } (A^{bee}, \sigma, \lambda) \wedge \text{ Think-of-with } (A^{ber}, \sigma, \lambda)] \Longrightarrow Believe(A^{bee}, \lambda)]$$

Note the clever way Forbes circumvents the need to mention the sentence which 'Ascribee would have used'. What it comes down to is this: in ascribing Ascribee a belief Ascriber just says that there is an expression e which is (among other things) the label of the proposition with which Ascribee thinks of σ.

In essence, then, Forbes quantifies over expressions, just like Kaplan did. However, to avoid the problem Kaplan ran into, Forbes cannot make do without a counterpart relation, which, hence, is the core of the logophoric theory. I introduced LCP here in order to make visible that this theory is indeed a counterpart theory. However, the counterpart relation is in fact a very hidden constituent of belief ascriptions according to the logophoric account. Let me explain this.

Counterpart relations are well-known from other theories, e.g. the one proposed by Richard (1990)[16]. However, we should not overlook the specific character of the counterpart relation in this theory. It is not a relation relating, in a straightforward way, expressions to expressions. Instead, the context defines the function Cl providing values for the signs marked by indices. Although, for all practical purposes, we may think of Cl as providing the 'counterpart' relation, there is in fact an fairly intricate web of relations (made up of the so-labeled relation and the Think-of-with-relation) in which Ascriber and Ascribee stand to sentences, state of affairs, and propositions. In short, it is what we might call a Fregean counterpart theory.

In spite of all this ingenuity, there are a number of critical notes to be made. Here is what I think is the most important one. Forbes' proposal resembles the proposal made in Richard (1990) in a number of essential features. Also Richard (1990) has a counterpart relation, and in Richard's theory it is also the context which provides the counterpart relation. In De Mey (1993, 1994) I criticized Richard because of this Kaplanesque pragmatics. As far as I can see, the criticism carries over to Forbes' proposal. We can recapitulate it in the following way. For more details I refer to the papers cited.

Both Richard and Forbes (and several others) want the context to decide on the truth conditions of belief ascriptions. In certain contexts the expression 'the morning star' is the counterpart for Hammurabi of my expression 'Venus'; in others it is rather

[15]LCP stands for 'linguistic counterpart'

[16]Counterpart theorists were inspired by Kaplan's theory of demonstratives in which contexts of use provide values for '$that_i$'. Compare Kaplan (1989).

'the evening star'. When I say that Hammurabi believes the morning star is the first star visible at the evening sky, this ascription is false because in this context 'the morning star' is not a counterpart for Hammurabi of my 'Venus'.

Although this can be said to solve the problem, the solution can hardly be considered gratifying. It is a just a worst-case-strategy. What it comes down to is that, unless we are able to constrain the counterpart relation in suitable ways, we require our semantics to determine for each agent separately the truth value of each sentence in each context.

What is moreover remarkable is that both Richard and Forbes use counterpart theory. Forbes has not shown that Richard's theory does not work, in fact Forbes does not even mention Richard's work. As far as I am aware, both theories work equally well (or equally bad): everything we can do with a Fregean theory can be done with a non-Fregean theory. If that is so, this points to the conclusion that the Fregean character of Forbes' logophoric account serves no specific purpose.

If we look back at the list of problems we see the following. There is no substitution problem because of the clever way Forbes indirectly refers to the expression Ascribee 'would have used'. In this way, the flawed ascription does not arise either. As to the ontological problem, we note that Forbes postulates a countable set of propositions. However, are there only countably many propositions? As to the *de re* problem, let us assume that Forbes solved it; the texts themselves are not too clear on this. Forbes (1993) is devoted to the solution of the two remaining problems: the iteration problem and the analysis problem. Forbes can be said to have succeeded in solving the former of these two. His solution to the analysis problem, however, is hard to understand and I have doubts that it is correct. However, I would say that there is no such problem as the analysis problem. The reason is the same as the one we adduced in the case of the substitution problem. It would be a problem if Ascriber and Ascribee had to share the same theory about beliefs. However, we can say here the same thing we did in the Ralph cases: I can ascribe Ralph a belief about Ortcutt in spite of the fact that Ralph does not know the man he is following is called Ortcutt. The same applies here. Ascriber uses his or her theory about beliefs all the way down the hierarchy of the belief ascriptions we find in sentences of the form 'A_1 believes that $\cdots A_n$ believes that p'.

If realism is its virtue, complexity is the price we have to pay. It is to be feared that any attempt to extend Forbes' account in order to do still better, will of necessity even more complex. The question arises: are there frameworks which lack the excessive complexity of Forbes' logophoric account, and yet are able to solve the problems? My idea is that modal logic offers suitable ways to model belief ascriptions and that these are much simpler, and, hence, are to be preferred to Forbes' logophoric account. That is what we turn to in the section next.

7 A possible world semantics for belief ascription

We assume familiarity with Kripke semantics and pay attention only to certain extensions. Kripke semantics can be extended in such a way that agents have access to different sets of worlds. A can be said to know (or: believe) that p if all the worlds A has access to are p-worlds. A can be said to know whether p if A has access to only p-worlds if p is true in the actual world, and has access to only ¬-p-worlds if ¬p is true in the actual world. If A has access to both p-worlds and ¬-p-worlds A does not know whether p.

Fagin and Halpern (1988) show how to extend modal logic, say S5, in order to cover such facts. Yet, there is a problem: it does not provide a workable model of knowledge state. The explicit aim of Fagin, Halpern and Vardi (1991) (henceforth FHV) is just to do this: the FHV-framework introduces belief-structures, which are models for states of knowledge. In this logic all 'believe'-sentences of the form 'A believes that B believes that $\cdots$ p' can be evaluated.

A belief-structure is a sequence $\langle b_0, b_1, \ldots, b_n, \ldots\rangle$ in which b_0 is a possible world in the traditional sense (a set of well-formed elementary sentences); all the other b_i are belief assignment functions assigning each actor a set of $(i-1)$-ary worlds. The notion of a n-ary world is defined recursively. I merely give some examples. A unary world is just a possible world, that is, a set of elementary sentences. A binary world is a pair $\langle b_0, b_1\rangle$ in which b_0 is a unary world and b_1 is a belief assignment function mapping each actor A to a set of unary worlds, the set of worlds A has access to. A ternary world is a pair $\langle\langle b_0, b_1\rangle, b_2\rangle$, consisting of a binary world and a function mapping each actor to a set of binary worlds. Hence, an initial segment of a belief-structure of length n is a n-ary world.

Binary worlds are used in evaluating sentences with one embedding, that is sentences of the form, say,

p but A does not know that p

whereas ternary worlds are used in evaluating sentences with two embeddings ('with degree 2 of embedding') that is, sentences of the form

p, A knows that q, and B knows that C knows that r

A very useful postulate is the extension postulate (K3) which demands that any actor A's higher-order knowledge be an extension of A's lower-level knowledge. To give a simple example, suppose we have a belief structure $(b_0, b_1, \ldots)$ and b_1 assigns actor A the set consisting of w_1 and w_2. Then b_2 has to assign A a set of binary worlds such that all the worlds in this set have either w_1 or w_2 as their first member, at least one of these has w_1 as its first member, whereas at least one other world has to have w_2 as its first member. Belief structures cannot be intermitted. This is reasonable, for suppose otherwise. Then there are belief-structures in which only sentences of specific degrees of embedding can be evaluated. But what reasons could there be for admitting such deficient belief-structures? (K3) also means that we do not need to consult a n-ary world if we can already evaluate a sentence with respect to a $(n-1)$-ary world. As Groeneveld (1993) puts it: 'if $k > n$, the n-th order belief as represented at level k is exactly the n-th order belief. Thus the beliefs of a world are fully determined by the last constituent of that world'[17].

Suppose the first member of some initial fragment $\langle b_0, b_1 \rangle$ of a belief structure is w_1 (that is, w_1 is the actual world according to this structure) and b_1 assigns A a set consisting of w_1 and w_2. Furthermore, suppose w_1 is a p-world but w_2 is a $\neg$p-world. Hence, p is true in the actual world, but p is not true in all the worlds that A has access to, and the sentence 'p but A does not know that p' is true in this binary world, and, by extension, true in this belief structure. If A learns that p is actually true, the belief assignment function is updated such that it assigns A the set consisting of just w_1 instead of w_1 and w_2. Note that updating a higher-level world has as a consequence that we must also update lower-level worlds, and vice-versa. Compare Groeneveld (1993).

The relationship between Kripke structures and belief structures is straightforward. Each Kripke structure M can be transformed into a set f_M of belief structures such that each world s in M corresponds to a belief structure in f_M. We have then that for each sentence ϕ:

$$M \models \phi \textit{ iff } f_M \models \phi$$

Also the converse holds. Belief structures can be partially looked upon as a special way of displaying the accessibility relations from Kripke structures. Moreover, belief structures are a very convenient and insightful way of modeling belief states, as they classify true epistemic propositions according to their depth of embedding (that is, according to their modal degree).

Let us go back to the list of problems besetting Fregean theories given above:

- the substitution problem[18]
- the iteration problem
- the analysis problem
- the flawed ascription problem
- the ontological problem
- the *de re* problem

[17]The title of 'extension' is well-chosen here, as the Extension postulate warrants that we can, in any well-formed belief-structure, evaluate sentences of any degree of embedding. On the other hand, it introduces a lot of redundancy. FHV prove that belief structures, in spite of all their reduncy, are nevertheless the simplest ones to achieve what they are meant for.

[18]We came across a problem that we may dub the *Pierre*-problem. The *Pierre*-problem arises in all contexts in which some ascribee is under the illusion that two appearances of the same person correspond to two different persons. In a sense this is a reversal of the substitution-problem.

We have already dealt with the substitution problem. As there is no reference to thoughts nor to concepts here, the analysis problem does not arise. Neither do the ontological problem or the iteration problem.

Of course, such epistemic logical systems can only be fruitful in combination with a system of updating. That is, what we need is a dynamic logic. If we have a viable method for that we do not have to resort to the ugly contexts that we find with Richard and Forbes. However, as long as such epistemic logical systems are restricted to just propositional logic, we remain stuck with the flawed ascription problem and the *de re* problem. As long as we do not wish to quantify over thoughts or concepts, however, it cannot be too difficult to extend the system to a satisfactory form of dynamic first order logic.

In this context, it is necessary to pay attention to a specific type of sentences. That is what we turn to in the final section.

8 Intentional identity

In spite of the various problems that a Fregean account gives rise to, senses seem indeed indispensable. Compare the following sentence brought up by Edelberg

> *Detective A thinks someone murdered the mayor and detective B thinks he murdered the commissioner*

Compare Edelberg (1992), King (1993). Such sentences will be called II-sentences, where 'II' is short for 'intensional identity'. Whatever analysis one deems suitable, one cannot deny that the personal pronoun ''he' in the second conjunct has to be tied up with the concept that A has of the mayor's murderer (on a coreferential reading, of course, which King dubs a 'Geach reading'). Note that the t-clause of the first conjunct is to be read *de dicto*. One might expect that such problems are typically the kind of problems that Discourse Representation Theory should be able to solve, and indeed there are proposals to that effect in Asher (1987, 1988). However, as King remarks, 'Asher's analysis suffers from the lack of any account of the conditions under which a 'quasi-external anchor' exists between the DRS's representing the cognitive states of two agents'. His own theory seems to be promising in this respect. King's analysis is not Fregean in the sense that it does not take into account concepts or thoughts. In fact, it uses the direct reference theory from Soames (1987). The II-pronouns are construed as 'context dependent quantifiers'. They depend on the context in the sense that they derive their scope and predicative material from the quantifiers preceding them.

9 Summary

I discussed the problems besetting Fregean analyses of belief ascription. One such theory was examined in greater detail, the one proposed by Forbes. I criticized Forbes for the introduction of a context yielding a counterpart relation, arguing that such counterpart theories are just worst case strategies. They may be necessary in certain cases, say, the *Pierre*-cases, but should not be used in more regular cases. I pointed out that most of the problems discussed do not arise in the context of theories based on Kripke structures. In that context I discussed the Fagin-Halpern-Vardi framework. This is admittedly a propositional logic, hence it does not cope with *de re* problems. For a solution we should try and extend the FHV-framework into a predicate logic. It might appear that 'senses' are absolutely indispensable once we turn to intensional identity contexts. However, the most promising analysis of such contexts, King (1993), is based on the direct reference theory developed by Soames. If this turns out to be a viable proposal, we may feel convinced that senses are, after all, dispensable.

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