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## I. Introduction

An impasse in extensional semantics is its failure to account for verbs that create *attitude contexts*.<sup>1</sup> Sentential complement taking verbs, like 'say', 'think', 'believe', etc. have the property that extensional substitution fails within their complement. In sentences like 'Hesperus is a planet', we can substitute 'Phosphorus' for 'Hesperus' without changing the truth-value of the sentence. In the sentence 'John believes that Hesperus is a planet', at least for certain readings, we cannot substitute 'Phosphorus' for 'Hesperus' without changing the truth-value of the sentence. In the context of the verb 'believes' the extensional equivalence of the two sentences 'Hesperus is a planet' and 'Phosphorus is a planet' is not the only thing that matters. This has led Frege and intensional semanticists who followed him to stipulate a second realm of entities called *senses* or *intensions* as referents of expressions in intensional contexts. The resulting duplication of entities in our ontology is problematic. It contradicts what Davidson has called *semantical innocence*, that is, the desire to be able to solve the problem of the attitudes with no other ontological resources than those that suffice for the analysis of the rest of the language.

The subject of my thesis is the investigation of the question of semantical innocence against the background of a recent article by two scholars, Richard Larson and Peter Ludlow, who claim to have found a way to eliminate all intensional entities such as propositions, properties, individual concepts, etc., with the aim of establishing a recursive truth-theory for natural language.

Davidson and his adherents, amongst whom are the two aforementioned authors, believe that a Tarski-style definition of the truth-predicate is sufficient as a theory of meaning for natural language (Tarski 1935). The followers of the Davidsonian school of semantics take our intuitions about the truth of a sentence as basic and try to define the *meanings* of the sentential constituents in abstraction from the meaning (truth-value) of the whole sentence. *Meanings*, in the simplest case, are no entities at all. The meaning of a predicate, for example, is its contribution to the truth-conditions of the sentence in which it figures. The contribution of the predicate *green* to the truth-conditions of every sentence in which it occurs is the condition that, whatever its subject may be, it be green. The contribution that a predicate makes to the truth-conditions of the sentence that contains it is called its *satisfaction-condition*. Meanings as entities only feature as the referents of singular terms. In a more elaborate metalanguage, we may allow sets to be

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<sup>1</sup> Most terms for 'the attitudes' are biased. An attitude is called 'propositional', 'intensional', or, *pars pro toto*, 'belief report', or 'indirect speech'. I shall restrict myself to the neutral albeit

the referents of predicates. Anyhow, the Davidsonian spirit has a penchant towards nominalism and shrinks away from unidentifiable objects.

Before reaching the main part of the thesis, the discussion of Larson and Ludlow's theory, I approach the problem of the attitudes from two sides. One approach is syntactically oriented. The theories that mark this path are called *quotational theories*. Approached from the other side, the treatment of the problem appears to involve no syntax. Taking a closer look at meaning oriented theories, however, we will notice that structured meanings mimic some of the syntactic behavior of natural language.

I shall start, in section II, with the *paratactic analysis* of indirect discourse presented by Davidson (1968). Davidson formulates two desiderata concerning the task of logical-form analysis. First, the LF analysis has to provide the recursive mechanism for a Tarskian truth-definition on a finite basis. Secondly, we want the theory of logical form to tell us about the logical relations between the sentences of the object language. I use the two desiderata as a standard for the theories that I am discussing in this thesis. We shall see that Davidson's own account, the paratactic analysis, fails to meet the second criteria. Davidson's analysis also fails on another account. We shall see in III(ii.) that a version of Church's (1950) *translation argument* defeats the paratactic analysis. The argument was originally designed to falsify Carnap's analysis of belief sentences, but has subsequently been used by Cresswell (1980) and Bigelow (1978) against any kind of *quotational theory*. III(i.) is a discussion of the translation argument. We shall see that there is reason to believe that the argument is not convincing in the way in which it was used against Carnap. Carnap's analysis can be dismissed on a different account: *Mates' puzzle* will in fact prove to be fatal, and not only to Carnap's proposal. Mates (1950) shows that no analysis of attitudes that is based on meaning alone will be able to account for concepts of intensional equivalence such as Davidson's same saying relation or Carnap's relation of intensional isomorphism. The alternative suggestion is to spice the meaning-based analysis of attitude ascription with structure more or less similar to natural language syntax. Examples for theories in this vein are those based on *structured meanings*, *structured propositions*, and *interpreted logical forms*.

Section IV(i.) contains the application of Mates' puzzle to Carnap; in section IV(ii.), I apply the puzzle to an analysis proposed by Cresswell. Cresswell's theory (among others) contains the seed of an idea that was developed (among others) by Larson and Ludlow. I discuss Larson and Ludlow's proposal at length in section VI. Section V. contains a few historical remarks on the development of the idea of semantico-syntactic treatments of attitude reports. Section VI is self-contained and includes its own introduction.

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vague term 'attitude'.

In section VI(ii.), I introduce the recursive mechanism of the ILF calculus.

The ILF theory appeals to a notion of similarity of ILFs that can be seen as an equivalent of the Davidsonian samesaying relation (VI(iii.)). In VI(iv.), I discuss different attempts to account for this similarity relation. One attempt is pragmatical, the other semantical. Cresswell raised an interesting objection against the ILF theory. The idea is to apply Church's translation argument to it. We shall see in section VI(v.) that the argument cannot serve to dismiss the ILF analysis. Serious problems for the ILF theory are raised in VI(vi.) and VI(vii.). In these sections I aim to show that the similarity relation that is required to account, for example, for attitude reports from different languages cannot be made intelligible. Further difficulties arise from the fact that the ILF theory is not in itself a *logic* of the attitudes. We shall see that the stipulation of supplementary axioms is necessary whenever possible, to account for the logic of attitude sentences. In VII, VIII, and IX, some strong points of the semantico-syntactic analysis will become apparent. I have chosen (somewhat arbitrarily) three examples from recent literature including problems raised by Lewis, Cresswell, and Schiffer.

## II. The Paratactic Analysis of Attitude Sentences

In a well-known article, Davidson poses the question of what is to be the logical form of attitude sentences (Davidson, 1968). The following may serve as an example (*pars pro toto*) for all sentences containing verbs like 'think', 'believe', 'see', 'know', etc.:

- (1) Galileo said that the earth moves.

An analysis of logical form, according to Davidson, has to yield two explanations. First, it has to show how the truth-conditions of the sentence can be compositionally derived from a finite stock of elementary constituents by finite application of a finite number of rules.<sup>2</sup> In practice, this means that we have to find a recursive mechanism that gives us the value of every constituent by some combination of the values of its parts. We shall see that Davidson wants to question the apparent fact that 'the earth moves' in (1) is a proper constituent of the sentence. Secondly, the logical form analysis has to account for the features of a sentence that determine which other sentences can be inferred from it and of which sentences it is a logical consequence. The following list gives an impression of the variety of inferences that are relevant with regard to attitude sentences.

- (i) From *a.* to infer *b.-e.*:

- a.* John believes Joe and Jill are free.
- b.* John believes Joe is free.
- c.* John believes Jill is free.
- d.* John believes Jill and Joe are free.
- e.* John believes something.

(and maybe:)

- f.* John believes Joe and Jill are unconstrained.

- (ii) From *a.* to infer *b.* and *c.*:

- a.* Socrates said that all men are mortal.
- b.* Socrates said that there is no man that is not mortal.
- c.* Socrates said that either something is not human or it is mortal.

- (iii) From *a.* to infer *b.*:

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<sup>2</sup> This desideratum was formulated by Davidson in his article Davidson (1964).

- a. The menu shows that no fish is available.
- b. The menu does not show that (any) fish is available.

(iv) From a. to infer b.:

- a. John expects that Joe hands the book to Jill.
- b. John expects that the book is handed to Jill by Joe.

(v) From a. to infer b.:

- a. Peter knows that he failed.
- b. Peter failed.

(vi) From a. to infer b.

- a. Anton believes everything that's in the Odyssey.
- b. Anton believes that Circe lured Odysseus.

We shall see whether Davidson's proposal meets the two above-mentioned desiderata.

Davidson rejects any account of attitude ascriptions that treats the complement sentence as a constituent of the main clause. Instead, the pronoun 'that' of the complement sentence is analyzed as a deictic pronoun that refers to the sentence by which it is followed. Davidson proposes (2) as the logical form of (1).

(2) Galileo said that. The earth moves.

The predicate 'said' in (2) is interpreted as a three-place relation that holds between the speaker of (1), Galileo, and an utterance pronounced by Galileo. Davidson calls it the 'samesaying relation'. The truth-conditions that Davidson attributes to (1) are cited in (3).

(3) '( $\exists x$ ) (Galileo's utterance  $x$  and my utterance  $y$  make us samesayers)' (Davidson, 1984: 105),

where  $y$  is the utterance of 'the earth moves'.

Davidson motivates his analysis hinting at the role of demonstrative pronouns in sentences like 'I wish I had said *that*'. The plausibility of this argument is lessened if we glimpse at other languages. In French, for example, the syntax of attitude sentences is very similar to that in English, thus suggesting a similar semantic treatment. The French relative pronoun 'que', however, bears no similarity to the demonstrative pronoun 'ça'.

The analysis of the French counterpart of (1) 'Galilée a dit que. La terre tourne'; is ungrammatical.<sup>3</sup>

If Davidson's analysis is correct, the problem with the substitution of coextensive terms in attitude contexts is explained. Coextensive substitution of equivalent terms in the complement sentence fails, because the truth of the main sentence depends not only on the content of the complement sentence, but also on its form. Consider the (invalid) inference in (4):

- (4) \*From a. and b. to infer c.:
- a. Galileo said that<sub>i</sub>.
  - b. [The earth moves]<sub>i</sub> is true if and only if [The blue planet moves]<sub>j</sub> is true.
  - c. Galileo said that<sub>j</sub>.

Intuitions foretell that (4) is invalid. The theory predicts it. The explanation is as follows. In (4a) the demonstrative pronoun refers to the utterance of 'the earth moves', in (4c) it refers to the utterance of 'the blue planet moves'. For simplicity, we can regard the demonstratives as names of the respective utterances. What happened on the way from *a.* to *c.*? We have substituted one name for the other. The two names are not co-referential. 'that<sub>i</sub>' names '[The earth moves]<sub>i</sub>' while 'that<sub>j</sub>' names '[The blue planet moves]<sub>j</sub>'. The substitution is invalid and so is the inference. (4b) is not a premise that licenses the inference. The two sentences are equivalent, but it is the identity of the sentence, not its truth-value, that matters.

We may ask ourselves the question how Davidson's analysis meets the two desiderata concerning logical form that were set out in the beginning of this section. Is (2), for example, recursively definable based on the lexicon and the axioms of the metalanguage? It certainly is. (2) consists of two sentences that are both very simple in structure. The reference of the pronoun in the first sentence has to be contextually determined like in any other expression containing deictic terms. However, what about the licensing of inferences as in (i) to (vii)? How can (i.b.) be inferred from (i.a.)? The inference in (5) seems just as defective as the one in (4).

- (5) \*From a. and b. to infer c.:
- a. John believes that<sub>i</sub>.
  - b. [Joe and Jill are free]<sub>i</sub> is true iff [Joe is free]<sub>j</sub> is true.

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<sup>3</sup> See Segal and Speas (1986) for further syntactic counterevidence against Davidson's analysis.



- c. John believes that<sub>j</sub>.

The logical form for attitude sentences that Davidson proposes, seems to block all the inferences mentioned above except, maybe, (i.a.) to (i.d.) and (i.f.), (ii.), and (v.). It could be argued that the respective complement sentences samesay each other. Consider

- (6) From a. and b. to infer c.:
- a. John believes that<sub>i</sub>.
- b. [Joe and Jill are free]<sub>i</sub> is true if and only if [Jill and Joe are free]<sub>j</sub> is true.
- d. John believes that<sub>j</sub>.

The truth-conditions of (6a) and d. are e. and f. respectively:

- e.  $(\exists x)$  (John's utterance x and my utterance y make us samesayers), where y = 'Joe and Jill are free'.
- f.  $(\exists x)$  (John's utterance x and my utterance z = 'Jill and Joe are free' make us samesayers)

If the samesaying relation is transitive, and both y and z samesay the same utterance by John then y and z samesay one another. We could redefine the premise in (6b) as '[Joe and Jill are free]<sub>i</sub> samesays [Jill and Joe are free]<sub>j</sub>' and assume an inference rule that makes use of equivalence with respect to the samesaying relation.

- (7)  $aRthat_x$  (where *a* is some individual and *R* is some attitude relation) follows from  $aRthat_y$  if and only if  $that_x$  and  $that_y$  refer to two sentences  $S_x$  and  $S_y$  such that  $S_x$  samesays  $S_y$ .

However, there is no way that the samesaying relation could account for the inference in (i.b.).

It seems the case that Davidson's account fails in one respect that he himself considers most important. There is a further problem with the suggested analysis that has been pointed out by Bigelow (1978). We shall have a look at it in the next section.

### III. The Translation Argument Against Davidson

#### (i.) Introduction

In 1950, Church published an article that contained, among others, one argument that was directed against Carnap's theory of attitude ascriptions. The argument is known under the name of the *translation argument*. It has two parts. The first part that I shall call the main point, contains the claim that Carnap's theory, when applied to a pair of sentences that are translations of one another, yields a pair of truth-conditions that are not themselves translations of each other.

It is important to stress that this part of the argument is independent of the second part. The latter is concerned with Carnap's analysis of sameness of content (the analogue of the samesaying relation in Davidson's approach.) According to this analysis, two sentences have the same content if and only if they are *intensionally isomorphic* to one another. Tentatively, two sentences are intensionally isomorphic if and only if every corresponding syntactic constituent is paired with the same semantic value. In Carnap's theories, these would be intensions.

In the second part of the argument, Church attempts to show that Carnap's analysis, when applied to a pair of repeatedly-embedded attitude sentences that belong to different languages and are translations of one another, yields results that not only do not translate each other, but possibly even differ in truth-value.

Let me explain the two points in more detail. In 'Meaning and Necessity' Carnap suggests the following schema for the derivation of truth-conditions of attitude sentences (Carnap, 1947).

- (C) "John believes that D" in [a *semantical System*] **S** can be interpreted by the following semantical sentence: "There is a sentence  $s_i$  in a semantical system **S'** such that (a)  $s_i$  in **S'** is intensionally isomorphic to 'D' in **S**, and (b) John is disposed to an affirmative response to  $s_i$  as a sentence of **S'**".'

Consider the sentences (1) and (1'). Let them be analyzed in a theory that respectively uses English or German as its metalanguage. According to (C) the truth-conditions of (1) are (2), and those of (1') are (2').

- (1) Seneca said man is rational.

- (1') Seneca sagte, der Mensch sei vernunftbegabt.
- (2) There is a sentence  $s_i$  in a semantical system L [Latin] such that (a)  $s_i$  in L is intensionally isomorphic to 'Man is rational' in E [English] and (b) Seneca is disposed to an affirmative response to  $s_i$  as a sentence of L.
- (2') Es gibt einen Satz  $s_i$  in einem semantischen System L, so dass gilt: (a)  $s_i$  in L ist intensional isomorph zu 'Der Mensch ist vernunftbegabt' in G [German] und (b) Seneca ist disponiert, auf  $s_i$  als Satz von L zustimmend zu reagieren.

Church's main point is that although (1') translates (1) it is not the case that (2') translates (2). The reason is that the quoted sentence 'Man is rational' in (2) names an English sentence while the quoted sentence in (2') 'Der Mensch ist vernunftbegabt' names a German one.

Church presupposes an intuitive notion of translation according to which referential terms in one sentence have to be translated by co-referential terms in the other sentence. Nothing hinges on the notion of translation. It could be replaced by any other relation that expresses intensional equivalence. That is, we also could say that although (1) and (1') are intensionally isomorphic it is not the case that (2) and (2') are intensionally isomorphic.

We have reached the second part of the argument. This part is concerned with extensional equivalence, unlike the first part that was concerned with intensional equivalence. Church claims that the analysis of (a) and (a'), see below, yields truth-conditions that may be contradictory '[...], we see that the sentences to which we are led as supposed analysis of (a) and (a') may even have opposite truth-values in their respective languages' (Church, 1950: 99). John is supposed to be bilingual.

- (a) John believes Seneca said man is rational.  
 (a') John glaubt, Seneca habe gesagt, der Mensch sei vernunftbegabt.

Let us wrongly assume Carnap's theory would yield (b) and (b') as the truth-conditions of (a) and (a'):

- (b) \*There is a sentence  $s_i$  in a semantical system L [Latin] such that John believes (a)  $s_i$  in L is intensionally isomorphic to 'Man is rational' in E [English]

and (b) Seneca is disposed to an affirmative response to  $s_i$  as a sentence of L.

- (b') \*Es gibt einen Satz  $s_i$  in einem semantischen System L, so dass John glaubt (a)  $s_i$  in L sei intensional isomorph zu 'Der Mensch ist vernunftbegabt' in G [German] und (b) Seneca ist disponiert, auf  $s_i$  als Satz von L zustimmend zu reagieren.

Under the assumption that (b) and (b') are derived from (a) and (a') the truth-conditions are indeed non-equivalent. It might be the case that John believes that  $s_i$  in Latin is intensionally isomorphic to 'Man is rational' in English, but that he does not believe that  $s_i$  in Latin is intensionally isomorphic to 'Der Mensch ist vernunftbegabt' in German. In this case (b) would be true and (b') false.

It seems, though, that Church's conclusion was drawn hastily. Carnap's theory does not yield (b) and (b'), but (c) and (c') as truth-conditions of (a) and (a'):

- (c) There is a sentence  $s_i$  in a semantical system E [English] such that (a)  $s_i$  in E is intensionally isomorphic to 'Seneca said man is rational' in E and (b) John is disposed to an affirmative response to  $s_i$  as a sentence of E.
- (c') Es gibt einen Satz  $s_i$  in einem semantischen System E, so dass gilt: (a)  $s_i$  in L ist intensional isomorph zu 'Seneca sagte, der Mensch sei vernunftbegabt' in G [German] und (b) John ist disponiert, auf  $s_i$  als Satz von E zustimmend zu reagieren.

These are extensionally equivalent truth-conditions. Here the relation of intensional isomorphism is scoped out of the outermost attitude context. We can only (once again) apply part one of Church's argument to the pair of truth-conditions. Part two of Church's argument does not seem convincing.

In concluding this section we may want to go back to the main point of the argument and ask ourselves how convincing it is. We may ask ourselves whether we find it evident that the statements of a theory in two different languages have to be intensionally equivalent whenever the sentences that are the subject of the two statements are intensionally equivalent. I am inclined to deny this for the following reason.<sup>4</sup> Assume a

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<sup>4</sup> Hilary Putnam (1954) came to the same result when he treated the translation argument in

semanticist would indeed believe an attitude-theory in English, but not in German. Would he be justified in doing so? In other words, does this make one of the two theories wrong? Of course not. The theories are constructed in the same way in both cases. If he would rebuild his ('English') theory using German as his metalanguage, he would certainly believe this 'German' theory just as he believes the 'English' counterpart. It does not matter that they are not translations of one another. I conclude that the first part of Church's argument lacks force. The second part is simply wrong in application to Carnap.

(ii.) *Bigelow's Argument*

In a section of his article where he discusses what he calls quotational theories of belief, Bigelow attempts to dismiss Davidson's paratactic analysis of attitude sentences based on an argument inspired by Church's translation argument (Church, 1950: 108ff.). Bigelow subsumes Davidson's proposal under the label of a *quotational theory*. This is justified if we regard statements as purely syntactic entities and if we define 'language' without appeal to semantic features. The demonstrative pronoun 'that' in Davidson's analysis thus has as its referent nothing but the sentence. Under this assumption, Bigelow's argument does defeat Davidson's analysis.

Later Bigelow grants that in Davidson's theory 'that' could refer to some semantico-syntactic entity. In this case it would no longer be quotational, but 'Fregean', as Bigelow calls it. Under this assumption, his argument does not defeat Davidson's analysis. Instead, as Bigelow points out, Davidson would fail to clarify what would be the referent of 'that'. The argument against quotational theories is as follows. Instead of considering a sentence-pair from different languages, Bigelow chooses a pair of sentences that belong to the same language, but differ in the interpretation of one of their non-logical constants. Consider (3) and (3'). The latter differs from the former in that 'wins' means 'loses'.

(3) Marian believes that Robin wins.

(3') Marian believes that Robin wins.

Thus (3) and (3') have opposite truth-values if we do not want to attribute a self-

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'Synonymy, and the Analysis of Belief Sentences'. He writes: 'These [the two analyses] are, of course, 'not intensionally isomorphic'. Yet there would be no contradiction involved in regarding both analyses as correct, for they are logically equivalent' (p. 115). Logical equivalence here means extensional equivalence. Extensional equivalence and nothing more is, I think what we can demand of a theory that is stated in two different languages. For a similar evaluation of the translation argument see Thomason (1977).

defeating belief to Marian. A modification of Davidson's account, that adapts it to the analysis of belief instead of saying, would yield identical truth-conditions as in (4) and (4'):

- (4)  $(\exists x)$  (Marian's belief  $x$  and my hypothetical belief as uttered in  $y =$  'Robin wins' would make us same-believers)
- (4')  $(\exists x)$  (Marian's belief  $x$  and my hypothetical belief as uttered in  $y =$  'Robin wins' would make us same-believers)

A theory that yields identical truth-conditions for a pair of contradictory sentences must be wrong. One is tempted to say that the objection is met if 'Robin wins' refers to some meaning-structure like the one underlying Carnap's concept of intensional isomorphism. The meanings corresponding to the different versions of 'win' would emerge in the structure and serve to discern the truth-conditions (4) and (4'). In the following section, we shall see in what respect such a Carnap-style analysis would fail to give an adequate account of attitude ascriptions.

## IV. Structured Meanings

### *(i.) Carnap's Idea*

We have encountered Carnap's notion of isomorphism of intensional structures above, but we have not yet defined it. I shall resume the discussion of this notion with the definitions of two concepts that are essential in Carnap's analysis of attitude sentences: the concept of intensional structure and that of logical equivalence of terms, meanings, and sentences. Carnap defines the notion of intensional structure by his concept of logical equivalence (L-equivalence). Two sentences are isomorphic with respect to their intensional structure if and only if every corresponding part of the pair is L-equivalent.

Intensional structure: In the artificial languages that Carnap discusses, the semantic structure of a sentence informs us of its composition out of sub-phrases, connectives, predicate functors (designator matrices), and individual constants. It is hard to say how this is to be applied to the case of natural language. It should be noted, however, that although the notion of correspondence of parts within a pair of sentences appeals to some kind of syntactic structure, Carnap does not regard the syntax of the sentence to be essential for its intensional structure. This can be seen from an example he uses on page 56 (*loc. cit.*) '[...] it seems advisable to apply the concept of intensional isomorphism in a somewhat wider sense so that it also holds between expressions like '2 + 5' and 'sum(II,V)', because the use in the second expression of a functor preceding the two argument signs instead of one standing between them or of parentheses and a comma may be regarded as an inessential syntactic device'. The reason for his reservation toward the syntactic structure is plain: Carnap wants the content of the attitude to be neutral as to the language in which it is expressed. The syntax of an expression is however extremely language-contingent.

Carnap defines L-equivalence roughly as follows. Terms, meanings, and sentences are logically equivalent, if and only if they have the same intensions. Thus, two sentences are L-equivalent if and only if they express the same proposition; two designator matrices, or predicators, are L-equivalent if and only if they express the same property; two individual expressions are L-equivalent if and only if they express the same individual concept.

We now understand the truth-conditions of attitude sentences as in (C). The truth of an attitude report depends on the content of the subordinate clause that is indicated by an intensional structure. The intensional structure is a kind of structured meaning

and I take it to contain no syntactic information. The structured meaning of the complement sentence of the attitude report has to be isomorphic to the intensional structure of the sentence in which the *reportee* would presumably express himself. An example for the structured meaning of an ordinary subject-predicate sentence would be (5) where  $\Pi^n$  is a n-ary property and  $\chi_1 \dots \chi_n$  the sequence of individual concepts that exemplify that property.

(5)  $[\Pi^n[\chi_1 \dots \chi_n]]$

The following argument will show why such an account of attitude ascriptions is insufficient. The argument is taken from Mates' article on *Synonymity* and is known as *Mates' puzzle* (Mates, 1950).

Suppose there are two sentences  $S_1$  and  $S_2$  with the same intensional structure;  $[M^1[\varepsilon]]$ . Let  $S_1$  be (6) and  $S_2$  equal (6').

(6) The earth moves,

(6') La terra si muove.

Now consider the sentences (7) and (7'). Since  $S_1$  and  $S_2$  are identical with respect to their intensional structure (7) and (7') should be intensionally isomorphic.

(7) Whoever believes 'the earth moves' believes 'the earth moves'.

(7') Whoever believes 'the earth moves' believes 'la terra si muove'.

The embedding of two intensionally isomorphic sentences in another attitude context should yield extensionally equivalent results. Yet (8) and (8') can differ in truth-value.

(8) Nobody doubts that whoever believes 'the earth moves' believes 'the earth moves'.

(8') Nobody doubts that whoever believes 'the earth moves' believes 'la terra si muove'.

There has to be another property apart from meaning-structure that distinguishes the two content sentences (7) and (7'). The only discernible difference between them is their syntactical and morphological form.

We conclude from the preceding that structured meanings alone do not suffice to



distinguish attitude content. Syntactic features of the sentences  $S_1$  and  $S_2$  also play a role in differentiating between attitudes.

*(ii.) Cresswell's Structured Meanings*

A prominent and more recent version of a structured meaning analysis was offered in Cresswell (1985a). Let me attempt to summarize in a few lines, what he has in mind. Cresswell's semantics is functionally compositional. That is, every expression refers to either a function or an individual that can be the argument of a function. In the simplest case, the referent of a sentence is its truth-value. The referent of a connective, say 'and', is the function that takes a pair of truth-values as argument and yields another truth-value. The meaning of a compound expression, say '5+7', is a function from the meaning of its parts to the referent of the whole expression. In this case the referents of the parts are the referent of '5', which is the number 5, the referent of '7', which is 7, and the referent of '+', which is the function that takes a pair of numbers as argument and yields the sum of the two numbers.

The problem of the attitudes arises, when the referent of a compound expression, as in (8), were a function of the referents of its parts. For example

(8) Helen believes that  $12 = 12$ ,

i.e. a function of an individual, Helen, a function from an individual and a truth-value into the set of truth-values, and the truth-value of ' $12 = 12$ '. In such a case, every sentence with the same truth-value as ' $12 = 12$ ' would preserve the meaning of the whole sentence.

As a consequence, Cresswell gives up the idea that the complement sentence of an attitude report is a proper constituent of the whole sentence. The truth-value of the attitude report is rather a function from the person who has the attitude, the attitude, and some parts (or every part) of the constituent clause. In the case above, the truth of (8) would depend on Helen, the belief function, the number 12, and the identity function. Thus, instead of only considering the meaning of the whole clausal complement, Cresswell considers the sequence of meanings of its sub-parts. Such a sequence is called a structured meaning.

An interesting idea in Cresswell's theory is that attitude sentences are said to be ambiguous as to the gestalt that the structured meaning of the complement sentence can take. In our example, the structured meaning of ' $12 = 12$ ' can be one of the following se-

quences, where  $M(\dots)$  denotes the meaning of ' $\dots$ ',  $\langle M(12=12) \rangle$ , or  $\langle M(12), M(12), M(=) \rangle$ .  $M(12=12)$  is the proposition that 12 equals 12; in other words, the set of possible worlds where ' $12=12$ ' holds true. Thus, sometimes, the meaning of the attitude sentence depends only on the proposition expressed by the complement clause; sometimes it depends also on the meanings of the constituents of the complement sentence. For example  $\langle M(12), M(12), M(=) \rangle$  may be used to express that Helen believes of 12 the proposition expressed, and not of  $5+7$ . For  $M(12=12)$  and  $\langle M(5+7=12) \rangle$  express the same proposition, but  $\langle M(12), M(12), M(=) \rangle$ , and  $\langle M(5+7), M(12), M(=) \rangle$  are distinct structured meanings. Now  $\langle M(5+7), M(12), M(=) \rangle$ , and  $\langle M(6+6), M(12), M(=) \rangle$  express the same structured meaning, but we can further differentiate between the structured meanings  $\langle M(5), M(7), M(+), M(12), M(=) \rangle$ , and  $\langle M(6), M(6), M(+), M(12), M(=) \rangle$ .

In this analysis, an important role is played by the word 'that'. The meaning of the word is a function that works on the meanings of the parts of the complement sentence and yields a structured meaning. Since in different sentences different parts of meaning of the constituents matter, 'that' has to be ambiguous as to the number and kind of arguments the function takes. Cresswell therefore stipulates a number of lexical items, 'that<sub>1</sub>', 'that<sub>2</sub>', etc. underlying surface structure 'that' on the level of logical form.

I believe that Mates' puzzle poses a threat to Cresswell's analysis. Consider

- (9) Whoever believes that  $5+7 = 12$  believes that  $5+7 = 12$
- (9') Whoever believes that  $5+7 = 12$  believes that  $6+6 = 12$ .

There is more than one reading in which (9) and (9') express the same structured meaning. Take the reading in which the beliefs are about the structured meanings  $\langle M(5+7), M(12), M(=) \rangle$ , and  $\langle M(6+6), M(12), M(=) \rangle$ . Thus  $M(\text{that}_i 5+7 = 12) = M(\text{that}_i 6+6 = 12)$ . As a consequence, the structured meanings of the whole sentences also could be identical:

- (10)  $\langle M(\text{Whoever}), M(\text{believes}), M(\text{that}_i 5+7 = 12), M(\text{believes}), M(\text{that}_i 5+7 = 12) \rangle$
- (10')  $\langle M(\text{Whoever}), M(\text{believes}), M(\text{that}_i 5+7 = 12), M(\text{believes}), M(\text{that}_i 6+6 = 12) \rangle$

However, their embeddings could very well differ in truth-value. Thus 'nobody doubts that (10)' could be true, and 'nobody doubts that (10)' false. There is a way out for Cresswell, and his theory contains the key to the solution. The idea is to amalgamate the structured meaning theory with the quotational theory. I shall cite the relevant passage from Cresswell's book and then go on to the next section where I shall elaborate the idea

with the *Interpreted Logical Form* theory of attitude reports.

'[...]there exist cases in which both the syntactically specified sentence and its meaning appear to be involved. The best examples I have seen are due to Barbara Partee:

- (11) She giggled that she would feel just too, too liberated if she drank another one of those naughty Martinis.<sup>[5]</sup>

In a case like (11) the meaning of the that-clause would seem to have to be something like the pair consisting of the sentence itself, or at least certain parts of it, and its meaning' (Cresswell, 1985a: 43f.).

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<sup>5</sup> Cresswell cites from Partee (1973).

## V. Meaning and Structure

Cresswell uses quotation in structured meanings only to accommodate special cases like the one in Barbara Partee's example or direct speech report. Bigelow, in contrast, takes the problem more seriously. He suggests a blend of the structured meaning approach with a quotational theory. Bigelow attributes the idea to Putnam who shows that the logical structure or syntax of a sentence is a factor in its meaning (Putnam (1954) pp. 118ff.) Putnam offers a revised version of Carnap's definition of intensional isomorphism 'Two expressions are intensionally isomorphic if they have the same logical structure, and if corresponding parts are L-equivalent'. (p. 119). Accordingly, Bigelow postulates *semantic structures* serving as the content of attitude ascriptions. The semantic structure of a compound expression is the sequence of the semantic structures of its components; the semantic structure of a non-composite expression is the ordered pair containing the symbol itself, together with a marker representing the value of that symbol.<sup>6</sup> With the symbols of the language the sentence itself enters into the attitude content. At this point two apparently incompatible traditions converge. On the one hand we have the meaning oriented analysis followed, among others, by Carnap, Bigelow and Cresswell; on the other hand we have a tradition that originates with Quine and includes Davidson, Harman, Higginbotham, and others. The next chapter is devoted to a discussion of the latest variant of this latter tradition, the ILF-theory offered by Richard Larson and Peter Ludlow in their forthcoming article.

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<sup>6</sup> Bigelow uses semantic markers as representatives of the actual values in order to avoid set theoretical paradoxes. Compare Bigelow (1978) pp. 114f.

## VI. Interpreted Logical Forms as Attitude Content

### (i.) Introduction

In their recent paper, Larson and Ludlow (henceforth *L&L*) present a new analysis of sentential complement taking verbs. The theory is developed within the framework of a Davidsonian approach to semantics. According to Davidson, the language of the theory has to be extensional.

Larson and Ludlow attempt to bypass the difficulty with co-extensional substitution by stipulating a new kind of entity, the *Interpreted Logical Form* (ILF). The ILF of a sentence is just like its syntax chart, but with an ordered pair consisting of the name of the syntactic category and the corresponding semantic value at every node of the structure.<sup>7</sup> The theory treats this entity as of the same type as, for example, tables and pigeons and seesaws. Thus, no duplication of semantic values is needed as it is in intensional semantics. The ILF theory is designed to combine the virtues of a sparse ontology with the merits of fine-grained structured propositions. I shall give a brief sketch of the ILF theory in section (ii.).

Larson and Ludlow's analysis solves the problem of substitution of identicals in an elegant way. It seems natural to distinguish what is said (or believed...) by reference to the way it is said (or believed...), that is, by reference to the linguistic form in which the content is represented in the language.

The ILF theory provides maximal finegrainedness for the distinction of propositional content in terms of linguistic representation. There are cases, however, where fine-grainedness is not called for. As an example, we may consider the case where the content of an utterance in a foreign language is reported. We want to say that the speech report in our language gives the content of the utterance made in the foreign language. Hence, we need a notion of equivalence of attitude content in spite of linguistic differences. The ILF theorist has two options. One is to give a pragmatistical account of similarity. This is the route that Larson and Ludlow take in following Segal (1989). Segal's suggestion will be discussed in section (iv.). The other option is to address the problem semantically. This is the line I shall consider in section (iii.). What I call ILF theory does hence not always correspond to Larson and Ludlow's notion of it.

Max Cresswell has suggested a possible problem with the ILF theory, namely, the

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<sup>7</sup> In syntax, Larson and Ludlow are working within a Chomskian framework.

*translation argument* that Church applied to Carnap's analysis of belief sentences.<sup>8</sup> In section (v.), I shall discuss the translation argument in application to the ILF theory. This section will conclude by showing how the translation argument in application to the ILF theory fails to be convincing. In section (vi.), I shall raise one problem that emerges when we try to elaborate the idea of similarity of ILFs. The problem is salient, no matter whether the account be pragmatical or semantical. There exist further potential difficulties that an ILF theorist may have to face, but I shall not go into these problems. One is connected with foundation axiom of set theory that forbids functions to take themselves as arguments. Specialists may aid an escape. Another problem could emerge from the objections that Montague and Thomason raised against any form of syntactic treatment of intensional and hyperintensional contexts. The latter problem has to do with the logic of the attitudes. Since L&L are not so much concerned to give a logic of the attitudes, I shall ignore the problem for the purpose of this thesis. In section (vii.) we will see, that L&L's Theory fails to meet the second Davidsonian desideratum of any theory of logical form: that it provide us with a logic of the attitudes. Section (viii.) is the conclusion of this chapter.

*(ii.) The ILF Theory of Attitude Ascriptions*

Let me introduce a simple language L with the sentential functions 'Seneca', 'man', 'said', and 'is rational'. The syntax of L shall be sketched by the following phrase structure rules.

Syntax of L:

1.  $S \rightarrow NP VP$
2.  $NP \rightarrow N$
3.  $N \rightarrow \underline{\text{Seneca}}, \underline{\text{man}}$
4.  $VP \rightarrow V$
5.  $VP \rightarrow V S$
6.  $V \rightarrow \underline{\text{said}}, \underline{\text{is rational}}$

(Satisfaction-)Semantics of L:

The valuation function  $V$  assigns a value in  $\{f, t\}$  to an expression  $\alpha$ , in case  $\alpha$  is a sentence. If  $\alpha$  is an  $n$ -place sentential function (for any natural number  $n$ )  $V$  assigns to  $\alpha$

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<sup>8</sup> See Cresswell's criticism of the quotational theory of propositional attitudes in Cresswell (1985a). While he was in Tübingen in the summer of 1992, Cresswell brought to my attention

a value from  $D^n$  through the variable assignment  $\sigma$ . A value  $\sigma(i)$  of a variable assignment  $\sigma$  is a value of the sentential function  $\xi(x_i)$  if and only if  $\xi(\sigma(i))$ . The value of the variable  $x_i$  is the  $i$ -th element of the sequence  $(\sigma(i))$ . Variables are numbered ( $x_1, x_2, \text{etc.}$ ). The value of a variable is determined relative to the sequences  $\sigma$  from  $D^n$  that satisfy the sentential function containing these variables. I shall use  $\sigma(x)$  instead of  $\sigma(i)$  (where  $x$  has the index  $i$ .) For short I shall use  $x, y, z$  for  $x_1, x_2, x_3$ . Thus  $\sigma(1)$  becomes  $\sigma(x)$ ,  $\sigma(2)$  becomes  $\sigma(y)$ , etc. Variables, individual constants, and quantifiers belong to the metalanguage that contains the object language. The following conditions must hold:

Non-terminal Nodes:

1.  $V(t, [S \text{ NP VP}], \sigma)$  iff  $\exists x(V(x, \text{NP}, \sigma) \ \& \ V(x, \text{VP}, \sigma))$ <sup>9</sup>
2.  $V(x, [VP \text{ V S}], \sigma)$  iff  $\exists yz(y \text{ is similar to } z \ \& \ z=I(S) \ \& \ V(\langle x,y \rangle, V, \sigma))$ . The ILF-function **I** assigns a value from  $D$  to  $\alpha$  according to the rules specified under 8.
3.  $V(x, [{}_\gamma \beta], \sigma)$  iff  $V(x, [\beta], \sigma)$ , where  $\gamma$  is a non-branching node: NP, VP, V or N, and  $\beta$  its constituent.

Terminal Nodes:

4.  $V(x, \text{Seneca}, \sigma)$  iff  $\sigma(x)$  is identical to Seneca
5.  $V(x, \text{man}, \sigma)$  iff  $\sigma(x)$  is a man
6.  $V(\langle x,y \rangle, \text{said}, \sigma)$  iff  $\sigma(x)$  said  $\sigma(y)$
7.  $V(x, \text{is rational}, \sigma)$  iff  $\sigma(x)$  is rational

8. Recursive definition of **I**( $\alpha$ ):

Let  $\alpha$  be a syntactic structure with  $S$  as its root node and let  $\beta$  be a partial structure of  $\alpha$ , then

- i.  $I(\beta)=\langle \beta, x \rangle$  iff  $\beta$  is a terminal node and there is exactly one  $x$  such that ' $V(x, \beta)$ ' can be derived from ' $V(\alpha)$ '.
- ii.  $I(\beta)=\langle \beta \rangle$  iff  $\beta$  is a terminal node and there is no  $x$  such that ' $V(x, \beta)$ ' can be derived from ' $V(\alpha)$ '.
- iii.  $I(\beta)=\langle \beta, x \rangle [I(\delta_1), I(\delta_2), \dots, I(\delta_n)]$  iff  $\beta$  is a non-terminal node and there is ex-

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that the objection might also defeat the ILF theory.

<sup>9</sup> Read "'True' is the Value of a sentence composed of a nominal phrase and a verb phrase [ $S$ NPVP] relative to the sequence sigma if and only if there is an  $x$  such that  $x$  is the value of the NP relative to sigma and  $x$  is the value of the VP relative to sigma."

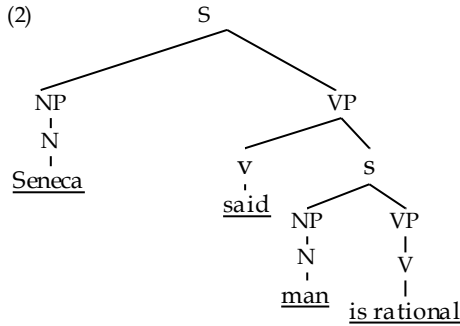
actly one  $x$  such that ' $V(x, \beta)$ ' can be derived from ' $V(\alpha)$ '.

- iv.  $I(\beta)=[\langle \beta \rangle I(\delta_1), I(\delta_2), \dots, I(\delta_n)]$  iff  $\beta$  is a non-terminal node and there is no  $x$  such that ' $V(x, \beta)$ ' can be derived from ' $V(\alpha)$ '.

A sample derivation of the truth-conditions for (1) yields (1'):

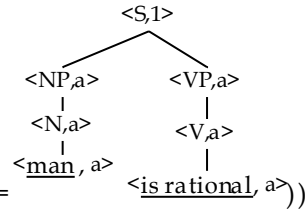
- (1) Seneca said man is rational.  
 (1') Seneca said [ $\langle S, 1 \rangle$  [ $\langle NP, a \rangle$  [ $\langle N, a \rangle$   $\langle \underline{\text{man}}, a \rangle$ ]] [ $\langle VP, a \rangle$  [ $\langle V, a \rangle$   $\langle \underline{\text{is rational}}, a \rangle$ ]]]'.  
 <u>is rational</u>]]]']'.

I assume the following syntactic structure:



Derivation:

1.  $V(t, [S [NP \underline{\text{Seneca}}] [VP \underline{\text{said man is rational}}]], \sigma)$  iff
2.  $\exists x (V(x, [NP \underline{\text{Seneca}}], \sigma) \ \& \ V(x, [VP \underline{\text{said man is rational}}], \sigma))$  iff |by 1.
3.  $\exists x (V(x, \underline{\text{Seneca}}, \sigma) \ \& \ \exists y (V(\langle x, y \rangle, \underline{\text{said}}, \sigma) \ \& \ y = I([S \underline{\text{man is rational}}], \sigma)))$  iff |2.&3.(3x)
4.  $\exists x (\sigma(x) = \text{Seneca} \ \& \ \exists y (\sigma(x) \text{ said } \sigma(y) \ \& \ y = I([S \underline{\text{man is rational}}])))$  iff |6.&4.

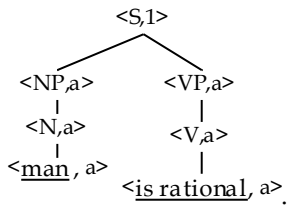


5.  $\exists x (\sigma(x) = \text{Seneca} \ \& \ \exists y (\sigma(x) \text{ said } \sigma(y) \ \& \ y = b = \langle \underline{\text{man}}, a \rangle \ \& \ \langle \underline{\text{is rational}}, a \rangle))$  |8.

where  $a$  is an individual constant denoting an entity that both satisfies 'man' and 'is rational', and  $b$  is an individual constant denoting the ILF that follows it.

6. 'Seneca said man is rational' is true if and only if Seneca said





The T-sentence 6. is a paraphrase of 5. that is derived from 4. as follows. (Assume that (3) is true.)

(3) Man is rational

then  $V(t, [\underline{\text{Sman is rational}}], \sigma)$ . Thus (3) and 8.iii. applied twice give us

(4)  $[\langle S,1 \rangle \mathbf{I}([\text{NP } \underline{\text{man}}]), \mathbf{I}([\text{VP } \underline{\text{is rational}}])]$ .

Now, (4) and 8.iii. applied four times give us

(5)  $[\langle S,1 \rangle [\langle NP,a \rangle [\langle N,a \rangle \mathbf{I}(\underline{\text{man}})]] [\langle VP,a \rangle [\langle V,a \rangle \mathbf{I}(\underline{\text{is rational}})]]]$ ,

where  $a$  is some individual in  $D$  that makes all of the sentential functions in (3) true (existential generalization). Finally, (5) and 8.i. applied twice give us

(6)  $[\langle S,1 \rangle [\langle NP,a \rangle [\langle N,a \rangle \langle \underline{\text{man}}, a \rangle]]] [\langle VP,a \rangle [\langle V,a \rangle \langle \underline{\text{is rational}}, a \rangle]]]$

a chart that is identical to  $b$  in step 5. in the above T-sentence derivation.

### (iii.) Similarity

The ILF theory has to accommodate the fact that sentences (2) and (3) should on some occasions be understood to convey the same content.

(2) Mary thinks John is an unmarried man.

(3) Mary thinks John is a bachelor.

Larson and Ludlow consider an analysis in which a relation of similarity holds between the ILF of *John is unmarried* and the ILF of *John is a bachelor*. Larson and Ludlow do not

themselves believe in this analysis, but in an analysis of 'usage' of ILFs (L&L p.21). According to them, semantics is not concerned with the question of similarity of beliefs. They refer to an article by Segal for justification (op. cit.). Segal makes a case for a pragmatic account of similarity of belief content. I shall, however, take similarity of belief content as a semantic problem. This also seems to be Davidson's approach. Keep in mind his appeal to the samesaying relation.<sup>10</sup> What I call ILF theory in the following, can no longer be identified with Larson and Ludlow's version of it, for they are following Segal's line.

According to our assumptions, (2) and (3) should be paraphrased respectively as (2') and (3').

(2') There is an  $x$  and a  $y$  such that  $x$  is similar to  $y$ ,  $y$  is the ILF of 'John is an unmarried man', and Mary believes  $x$ .

(3') There is an  $x$  and a  $y$  such that  $x$  is similar to  $y$ ,  $y$  is the ILF of 'John is a bachelor', and Mary believes  $x$ .

#### *(iv.) Segal's Objection*

In his 1989 article, Segal formulates an objection to an account of similarity of beliefs proposed by Higginbotham (1986). He attempts to show that similarity of belief is not an issue that can be dealt with adequately in a semantics of the attitudes, but has to be treated as a distinctly pragmatic problem. Segal's argument shall be examined so as to decide whether it also applies to the account of similarity put forth in this thesis.

The example that Segal employs is

(4) Ralph believes Tanya is a terrorist.

Higginbotham attributes the following truth-conditions to sentence (4):

(5)  $\exists i(i$  is similar to  $a$  & Ralph believes  $i$ ) where  $a$  is the logical form of 'Tanya is a terrorist' and  $i$  is a variable ranging exclusively over ILFs.

Segal is bothered by the fact that this description of what Ralph believes, implies that

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<sup>10</sup> See p. 105 of his 'On Saying That' in Davidson (1984).

there must be one specific interpreted logical form that Ralph believes, one that resembles the logical form *a*; i.e. the LF(Tanya is a terrorist). In this formulation Ralph could not believe two ILFs, neither is he said to believe a whole set of interpreted logical forms. Yet, according to Segal, the object of Ralph's belief is the whole set of ILFs that resemble *a*.

The idea of introducing the similarity relation was to validate equivalence between belief ascriptions. If Patty and Tanya denote the same person, then Ralph's belief also could, if only in a different context, be reported as him believing that Patty is a terrorist. Thus, in some sense, he does believe the whole set of ILFs that resemble *a*. According to Segal, for our theory to claim that Ralph actually has one particular ILF *in his head*, is going too far: it is intruding into pragmatics, psychology, and other realms of science. The question of what Ralph has *in his head* when he believes that Tanya is a terrorist is nothing for the semanticist to decide and nothing that we need to know in order to understand the belief report.

Segal claims that Higginbotham's interpretation of belief changes the meaning of the English word *believe*. Higginbotham, according to Segal, does not give an interpretation of the English *believe*, but of some word *believe\**. *Believe\** differs from the English *believe* just as *uttering* differs from *saying* something. I can say the same thing by generating different types of utterances. Hence, following Higginbotham, we would have to claim that Ralph can *believe* the same thing by *believing\** different ILFs. It is unclear to Segal what *believe\** means. We want an account of *believe*, not of *believe\**.

Segal's critique of Higginbotham's analysis makes essential use of the distinction between ordinary objects of reference and ILFs. The ILF theory put forth in this thesis does not draw this distinction. If in Higginbotham's truth-conditions 'i' would only be an ordinary variable ranging over a rich domain of seesaws, thunderbolts, and ILFs there would be no ground on which to claim that Ralph has a specific ILF in mind. In the ILF theory, this is the case. We just say that there is something (yet to be discovered) that has some features (yet to be discovered) in common with the interpreted logical form of 'Tanya is a terrorist'. Consider what are, roughly, the truth-conditions of (4) in our theory:

$$(6) \quad \exists x(x \text{ is Ralph} \ \& \ \exists yz(y \text{ is similar to } z \ \& \ x \text{ believes } y \ \& \ z=[\langle S, t \rangle[\langle \underline{\text{Tanya}}, a \rangle[\langle \underline{\text{terrorist}}, a \rangle]]])).$$

There is no implicit claim that *y* is a particular ILF, nor that *y* is an ILF at all.

So far, we have seen no ground for rejecting the account of similarity of attitude content based on Segal's argument. We shall investigate, now, another possible weak-

ness of our theory that could be hiding in the complexities of iterated attitude reports.

(v.) *Church's Translation Argument Applied to the ILF Theory*

We have seen that substitution of extensionally equivalent expressions fails in intensional contexts. The ILF theory predicts this correctly. Expressions that correspond in their extensions are distinguished via their syntactic form. Their distinctions can be very fine-grained. Every distinction that can be made on the level of syntax, or even phonology, can be used to distinguish beliefs. Expressions that have identical linguistic forms, but differ in interpretation, for example deictic expressions and pronouns, can be distinguished via their extensions. However, natural language speakers do not always make such distinctions. We demand of the theory that it allow for substitution of intensionally equivalent expressions. For example, the two sentences 'the earth moves' and 'the earth is non-stationary' can be regarded as intensionally equivalent. Both serve equally well to report Galileo's dictum 'la terra si muove'. There is thus a certain ambiguity as to how painstakingly the discriminative power of the theory is to be applied. Equivalence of attitude content in spite of linguistic differences introduces some ambiguity into the ILF theoretical notion of attitude content. The question is where to place the ambiguity.

With a different theory, the ambiguity could be located in the objects themselves. We could give a uniform analysis of 'say' and let the objects vary in fine-grainedness just as we analyze 'eating' homogeneously even though eating may be of sausages or of muffins. In this theory, the objects of the attitudes must not be partly linguistic because then they would vary depending on the language in which the attitude is reported. This option is not open to the ILF theorist because his objects are partly linguistic.

In Larson and Ludlow's outline of a semantical treatment of similarity, the same one that they later dismiss in favor of a pragmatistical analysis, the ambiguity is located in the verb 'say'. Their meaning rule for the verb 'say' was ' $V(\langle x, y \rangle, \text{said}, \sigma)$  if and only if  $\sigma(x)$  said some ILF similar to  $\sigma(y)$ '. This version abandons a uniform analysis of the attitude verb. The discriminative power of the theory is qualified by allowing similar ILFs to be substituted in the object position of the verb. However, in doubly embedded attitude contexts, this similarity relation enters the scope of the outermost attitude verb. For example, if the outermost attitude verb is the verb 'believe' then the similarity of ILFs becomes a matter of belief and is no longer a linguistic fact. As a result, substitution of intensionally equivalent expressions fails if they are embedded in attitude contexts several times.

A natural way to solve this problem is to place the similarity relation out of the

scope of the outermost attitude verb and to move it up front in the logical form as in (7) and (7').<sup>11</sup> We thereby locate the ambiguity further up in the syntax tree, namely at the branching node [<sub>VP</sub> V S].

(7)  $\exists x(x \text{ is similar to } a \ \& \ \text{John believes } x)$

(7')  $\exists x(x \text{ \u00e4hnelt } a' \ \& \ \text{John glaubt } x)$

where  $a$  is the ILF of 'Seneca said man is rational' and  $a'$  is the ILF of 'Seneca sagte, der Mensch sei vernunftbegabt'.

The semantic rule for the [<sub>VP</sub> V S] node is 2. (repeated below)

2.  $\forall(x, [\text{VP V S}], \sigma)$  if and only if  $\exists yz (y \text{ is similar to } z \ \& \ z = I(S) \ \& \ V(\langle x, y \rangle, V, \sigma))$

Under this treatment, we maintain the uniform analysis of 'say' as in 6. (repeated below).

6.  $\forall(\langle x, y \rangle, \text{said}, \sigma)$  if and only if  $\sigma(x)$  said  $\sigma(y)$

The translation argument does not fully apply. Only part one (the main point) does. The sentences (8) and (8') above are analyzed as (8) and (8'). The analysis of iterated attitudes yields (9) and (9'):

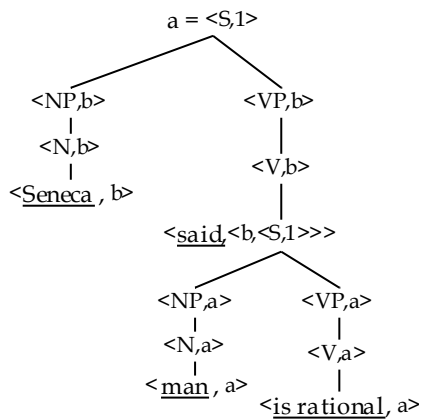
(8) There is an ILF  $x$  similar to  $b$  and Seneca said  $x$ .

(8') Es gibt eine ILF  $x$ , die  $b'$  \u00e4hnelt und Seneca sagte  $x$ .

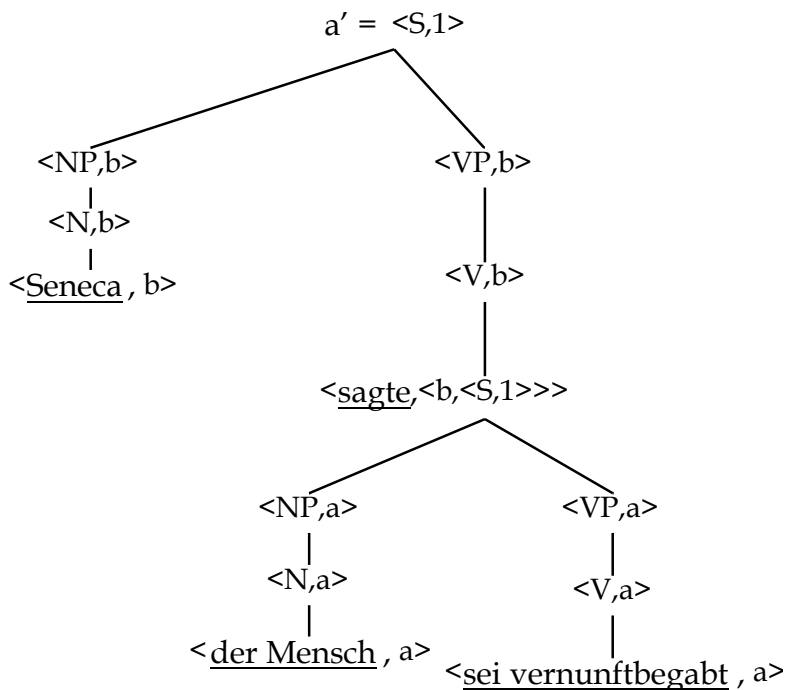
(9) There is an ILF  $x$  similar to  $a$  and John believes  $x$ .

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<sup>11</sup> A similar formulation of the truth-conditions of sentences with sentential complement taking verbs can be found in Higginbotham (1986: 3).



(9') Es gibt eine ILF x, die a' ähnelt und John glaubt x.



The content of John's belief is here indicated with the variable x. In Larson and Ludlow's theory, variables of quantification are non-referential (L&L p.13). The ILF of x is <x> itself. Thus the contents of John's beliefs in (9) and (9') are identical. Therefore, in (9) and (9') we do not say to which language the words in the ILF belong that John believes. We are not claiming that one or the other ILF are believed to be similar by John. Thus, we cannot falsely attribute any belief to John concerning the resemblance of two ILFs.

The problem with the incorrect translation remains. Still (8') is not a correct translation of (8) for the same reason as above. (8') is the translation of (8).

(8') Es gibt eine ILF x, die b' ähnelt und Seneca sagte x.

A pair of sentences that belong to different languages and that are translations of each other are interpreted by the same theory, each in its language. Both interpretations correctly express what we intuitively expect to be the truth-conditions of the two sentences. The two interpretations are similar in that they never differ in truth-value, contrary to what was expected from Church's argument. The two interpretations convey the same content, except for the representation of the content in the theory of belief report. This representation is relative to the language of the theory. It is the representation of the content of the reported belief for us, not for the believer. Therefore, the analogous interpretations of the two sentences that are translations of each other are not themselves translations of each other. Nevertheless, they are equivalent in an important sense, perhaps even for all that matters.

The two interpretations of (8) and (8') are extensionally equivalent. They are not intensionally equivalent. They are both sentences of the theory. What does it mean for two theories to be intensionally non-equivalent? If we embed the theory itself in a belief context, the believer may believe the theory in English, but not in German. However, it is the same theory. Intuitively, for two theories to be the same it suffices that they be extensionally equivalent, i.e. that they be both true or false at the same instances.

*(vi.) More Trouble*

We saw that the two objections that were raised by Segal and Cresswell failed to defeat the ILF analysis of attitude reports. In this last section, I shall ask a question that might challenge the ILF analysis if it cannot be answered. The question is; how is the account of similarity to be spelled out in detail? What are the relevant features with respect to which ILFs have to be similar in order to count as vehicles that carry the same content?

I shall start with an assumption. I shall assume that ILFs count as similar if and only if either their syntactic components or their semantic components are identical. Consider *a* and *b*. The two ILFs convey the same content, because they resemble each other in that they have identical meaning components.

*a:* [<sub>S,t</sub>>[<homo,a><animal rationale est,a>]]

*b:* [<sub>S,t</sub>>[<man,a><is rational,a>]]

I shall further assume that the similarity of two ILFs (with regard to their meaning component or their syntactic component) licenses their mutual substitution. Thus, if someone believes an ILF similar to *x* and *x* is similar to *y* (with respect to its meaning compo-

ment or its syntactic component) then it is also true that she believes an ILF similar to *y*. The similarity relation so defined is reflexive, transitive, and symmetric.

Difficulties arise when we consider examples with non-referential expressions in the subordinate clause. To take a famous example, consider the case of Rudolph Lingens.<sup>12</sup> Rudolph Lingens suffers from amnesia. Because he knew he would soon forget where he was, he quickly wrote the following sentence on a piece of paper and put it on his desk 'Rudolph Lingens is in aisle five, floor six, of Main Library, Stanford'. But now, the unfortunate has not only forgotten where, but also who he is. He does not know that he is Rudolph Lingens and he does not remember that he wrote that sentence. Nevertheless, he believes the sentence written on the piece of paper. We should represent his belief as in *c*.

*c:* [<sub>S,t</sub>>[<Rudolph Lingens><is in Main Library...>]]

In the truth-conditions that our theory yields, *d* figures as the ILF that resembles the thing that Lingens believes.

*d:* [<sub>S,t</sub>>[<Rudolph Lingens,*r*><is in Main Library...,*r*>]]

According to our substitution rule, Rudolph Lingens also believes *c*. So far so good. Now consider a sentence such as (10).

(10) Jung-Goo said the dragon flies away?

In order for this sentence to report correctly Jung-Goo's saying, the ILF

*e:* [<sub>S,t</sub>>[<the dragon><flies away>]],

presumably, has to resemble

*f:* [<sub>S,t</sub>>[<lóng><fêi zôu lè>]].

What is the relevant feature with respect to which *e* and *f* are similar? It cannot be the semantic pole of the ILF because there is none. Neither can it be the syntactic pole. The two predicates bear no resemblance whatsoever.



I shall not discuss any solutions to this puzzle in detail. The obvious way out would be to introduce a meaning component with entities other than real-life things, say Fregean senses, intensions. etc. But this was what we wanted to avoid in the beginning.

Note that the above puzzle frustrates not only the semantical account of similarity, but also the pragmatical account envisaged by Larson, Ludlow, and Segal. Larson and Ludlow outline a *theory-of-use* regarding ILFs (LL p. 21ff.). We can use similar ILFs that differ in content to report the same beliefs. For example, the ILF(The earth is non-stationary) and the ILF(The earth moves) can be used to report the belief that was held by Galileo. Galileo's belief is characterized by the whole set of ILFs that resemble each other in the relevant respect. We can use any sentence that corresponds to one of its members to report Galileo's belief. Concerning our puzzle, the question arises as to whether  $e$  is in the set of Jung-Goo's beliefs and, consequently, as to whether we can report Jung-Goo's saying by stating (10).

### (vii.) *Logical Consequence*

In the second section of this thesis, I mentioned two desiderata for a theory of attitude reports. One of them was the requirement that an analysis of logical form has to account for the features of a sentence that determine which other sentences can be inferred from it and of which sentences it is a logical consequence. We should ask the same of the ILF theory.

L&L's stance on the subject is the following (p. 11).

- (A) [...]two distinct attitude reports  $\alpha$  and  $\beta$  will be logically equivalent when the following two conditions are met: (i) the values assigned to the subparts of the complement clauses of  $\alpha$  and  $\beta$  are identical, (that is,  $\alpha$  and  $\beta$  differ at most in the forms of (some of) their sub constituent parts); and (ii)  $\alpha$  and  $\beta$  are evaluated under structures in which their formally distinct (but co-referring) subparts are given scope out of the complement clauses, beyond the highest attitude verb.

The first condition corresponds to our definition of similarity of ILFs with respect to the meaning component (see (vi.) above). The difference is that similarity with respect to meaning only licenses substitution of ILFs. Similarity with respect to syntax does not license any inferences. The second condition is meant to assure the equivalence of ex-

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<sup>12</sup> The original example is from Perry (1977). I have modified his version for this thesis.

amples like (11a.) and (11b.) where on the level of logical form the co-referential names are moved up front.

- (11) a.  $\exists x (x = \text{Judy Garland} \ \& \ \text{Max believes ILF}(x \text{ sang 'Somewhere Over the Rainbow'}))$   
b.  $\exists x (x = \text{Frances Gumm} \ \& \ \text{Max believes ILF}(x \text{ sang 'Somewhere Over the Rainbow'}))$

We have seen that Davidson's theory fails to license a simple inference like (i.b.) repeated below.

- (i) From *a.* to infer *b.*:  
*a.* John believes Joe and Jill are free.  
*b.* John believes Joe is free.

The same holds true of the ILF theory. There is no way in which the ILF(Joe and Jill are free) and the ILF(Joe is free) have identical referents. The failure to account for an inference such as (i.b.) shows that the logic of the ILF theory is nowhere near being fully worked out. There is no room for a lengthy discussion of the subject in this thesis. Let me just mention a few points.

We could account for (i.b.) by introducing an axiom of the sort in (B):

- (B) A belief whose content is given by an ILF containing the conjunction of two sub-ILFs implies a belief whose content is given by one of the conjunct-ILFs,

(and similarly for other attitude verbs and for the other junctors.) An inference rule as mentioned in the above cited passage gives us too many inferences. Take the example in (12) below.

- (12) \*From *a.* to infer *b.*:  
*a.* John believes Joe flies.  
*b.* John believes Joe cries.

The ILF(Joe flies) and the ILF(Joe cries) contain the same semantic values and differ only 'in the forms of (some of) their sub constituent parts'. Thus (12a) and (12b) are equivalent according to (A).

*(viii.) Concluding Remark*

The long history of the discussion of attitude reports by itself has shown that there is no simple solution to the problem. The preceding investigation has confirmed this outcome. None of the current theories are without serious defects. The ILF theory is no exception. I believe, however, that this theory should be taken seriously and that it deserves to be developed further. In the following section, I shall point out some of the strengths of the ILF theory taking some arbitrary examples from the recent literature.

## VII. Attitudes *De Se*

In his article 'Attitudes *De dicto* and *De se*', David Lewis (1979), describes a type of knowledge that cannot be reduced to what he calls propositional knowledge (*de dicto*). Lewis defines propositions as sets of possible worlds. Knowledge of a proposition is defined as knowledge of the set of possible worlds in which the proposition is true. Propositional knowledge is thus called self-locating knowledge with respect to logical space. Knowledge *de se* consists in the self-attribution of a property, most likely a property that locates one in physical space.

Lewis is concerned with the problems that a particular proposition theory faces. These troubles need not concern us here for the interpreted logical form theory stipulates individuals, and not propositions, as objects of the attitudes. It shall be shown, however, that the ILF theory avoids problems that are fatal to the proposition theory ((i.) and (ii.)).

### (i.) *Expressing Knowledge of One's Own Location*

According to Lewis the sentence  $s =$  'I am in aisle five, floor six, of Main Library, Stanford' expresses no proposition since it can be true and false in the same world for different people. The content of the sentence is no distinguishing feature of sets of worlds that are thought to be the contents of beliefs. Instead, Lewis writes, attitudes are self ascriptions of properties. In the ILF theory, a comparable problem does not arise. It is apt to describe the content of  $s$ . The ILF corresponding to it is roughly,  $[\langle S, t \rangle [\langle L, a \rangle] [\langle \text{in aisle five} \dots, a \rangle]]$ , where  $a$  is the speaker of the utterance of  $s$ .

### (ii.) *Necessary False Beliefs*

Proposition theories, as defined by Lewis, have difficulties in representing beliefs whose content is necessarily false. Since necessary falsehoods have no world in which they are true, there can be no set of worlds representing the proposition expressed by a necessary falsehood. Take Perry's (1977) example that is cited in Lewis' article;

- (1) Heimson believes he is Hume.

The belief reported in sentence (1) is necessarily false. Assuming that the names refer to

whom they do, we cannot, according to Lewis, imagine a world in which Heimson is Hume. The ILF theory, by contrast, has little difficulty in representing belief reports like

(1a) Heimson believes he is Hume,

(1b) Hume believes he is Hume.

Their representation in (1c) and (1d) meets Lewis' demand that 'there had better also be a central and important sense in which Heimson and Hume believe alike' (Lewis (1983) p.142).

(1c)  $\exists x(x \text{ is Heimson} \ \& \ \exists yz(y \text{ is similar to } z \ \& \ x \text{ believes } y \ \& \ z=[\langle S,t \rangle [\langle \underline{he},x \rangle [\langle \underline{Hume},x \rangle]])])$

(1d)  $\exists x(x \text{ is Hume} \ \& \ \exists yz(y \text{ is similar to } z \ \& \ x \text{ believes } y \ \& \ z=[\langle S,t \rangle [\langle \underline{he},x \rangle [\langle \underline{Hume},x \rangle]])])$

The sense in which they are similar is represented in the syntactic part of the structure, the sense in which they are dissimilar in the referential part.

Another difficulty of theories that are based on propositions as attitude content is the problem of *logical omniscience*. The problem is that, necessary truths are defined as truths that hold in all worlds. If someone believes a necessity, her belief is represented by the set of all worlds. But the set of all worlds represents not only this necessity, but all necessary truths. Hence, if one believes a single necessity the theory ascribes to the person a belief of the whole set of necessities. Assuming that Descartes discovered a necessary truth in his *cogito* then (2) implies (3).

(2) Descartes said that he existed.

(3) Descartes said that life sucks and then you die.

By contrast, the ILF theory distinguishes the two beliefs with ease. The two ILFs bear really no resemblance.

(2')  $\exists x(x \text{ is Descartes} \ \& \ \exists yz(y \text{ is similar to } z \ \& \ x \text{ said } y \ \& \ z=[\langle S,t \rangle [\langle \underline{he},x \rangle [\langle \underline{exist-} \underline{ed},x \rangle]])])$

(3')  $\exists x(x \text{ is Descartes} \ \& \ \exists yz(y \text{ is similar to } z \ \& \ x \text{ said } y \ \& \ z=[[\langle S,t \rangle [\langle S,t \rangle [\langle \underline{life},a \rangle [\langle \underline{sucks},a \rangle]]] \ \& \ [\langle S,t \rangle [\langle \underline{you},b \rangle [\langle \underline{die},b \rangle]]]])])$

### VIII. Cresswell's Objection

The following objection to the ILF theory was pointed out to me by professor Cresswell at the Fourth European Summer School in Logic Language and Information, in Colchester, England, 1992. It was previously formulated in Cresswell's (1985a) *Structured Meanings*. Take the sentences

- (1) Seneca said man is rational.
- (2) Seneca said man is mortal.

Sentence (1) is English; sentence (2) is English\*. English and English\* differ only in the meaning of the word 'rational'. In English, 'rational' means rational, in English\* it means what 'mortal' means in English. The English sentence is true, the English\* sentence is false. Let us suppose Seneca did not say man is mortal. The ILF theory interprets the sentences alike. The truth-conditions are, roughly;

- (1')  $\exists x(x \text{ is Seneca} \ \& \ \exists yz(y \text{ is similar to } z \ \& \ x \text{ believes } y \ \& \ z = [ \langle S, t \rangle [ \langle \underline{\text{man}}, a \rangle [ \langle \underline{\text{ra-}} \underline{\text{tional}}, a \rangle ] ] ) )$ ,
- (2')  $\exists x(x \text{ is Seneca} \ \& \ \exists yz(y \text{ is similar to } z \ \& \ x \text{ believes } y \ \& \ z = [ \langle S, t \rangle [ \langle \underline{\text{man}}, a \rangle [ \langle \underline{\text{ra-}} \underline{\text{tional}}, a \rangle ] ] )$ .

Cresswell claims that the ILF theory is unable to distinguish the truth-conditions of (1) and (2). It attributes the same truth-conditions to one sentence that is false and to another that is true. I believe this is not true. The ILF theory does distinguish between the two words. It distinguishes the two words that may be written and pronounced identically, via their meaning rules. As applied to English and English\*, the meaning clauses are

- (3)  $V(\text{rational}) = x$  if and only if  $x$  is rational,
- (4)  $V(\text{rational}) = x$  if and only if  $x$  is mortal

respectively, the metalanguage being English in both cases. Nothing hinges on the way we represent the two words in our theory. Let us mark the English\* rational with an asterisk (thus writing 'rational\*'.) Now the truth conditions for (2) do differ from those for

(1), i.e.

(2')  $\exists x(x \text{ is Seneca} \ \& \ \exists yz(y \text{ is similar to } z \ \& \ x \text{ believes } y \ \& \ z = [ \langle S, t \rangle [ \langle \text{man}, a \rangle [ \langle \text{rational}^*, a \rangle ] ] ] )$ .

In subsequent correspondence, Cresswell concedes that, of course, 'a word + its meaning will do the trick'. He objects to the practice of building the meaning of a word into its identity conditions. This method would beg the question of semantics: we want semantics to tell us what the meaning of a word is and not presuppose differences of meaning in defining what words are. Semantics, according to Cresswell, has to explain what meanings are. The explanation would be circular if it were based on partly semantic concepts. If we take a more holistic stance on the issue of linguistic explanation, I believe we can afford to be circular in some of our explanations. Only the theory as a whole, comprising syntax, semantics and pragmatics, gives an account of natural language phenomena.<sup>13</sup>

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<sup>13</sup> It is common practice among linguists to define words not only based on syntactic criteria, but to also use semantic criteria.

## IX. Modes of Presentation

In a recent article, Stephen Schiffer presents what he calls the best theory of semantics for propositional attitudes given the assumption that a compositional truth theory underlies our (natural) language (Schiffer, 1992). According to this theory the logical form of a sentence such as (1) would be (2);

- (1) Ralph believes that Fido is a dog.
- (2)  $\exists m (\Phi^*m \ \& \ B(\text{Ralph}, \langle \text{Fido}, \text{doghood} \rangle, m))$ ;

where  $m$  refers to a mode of presentation (that plays the role of a Fregean *sense*),  $\Phi^*$  is the contextually determined type of the mode of presentation, and  $\langle \text{Fido}, \text{doghood} \rangle$  refers to the Kaplan-style structured proposition that Fido is a dog, with Fido and doghood as the referents of 'Fido' and 'is a dog'.

The suggested analysis and its criticism have some bearing on L&L's theory. The two theories, although very different, are similar in two respects. First, the meaning component in both theories contains the things themselves, Fido for instance; secondly, both suggest a mode-of-presentation component. In the case of the ILF theory, this is a linguistic mode of presentation.

If we assume that the linguistic forms contained in the ILFs of L&L's theory play the role that modes of presentations play in Schiffer's theory, then one is inclined to think that a problem for the ILF theory arises from Schiffer's Fido/Fifi example.

The story is as follows. Ralph meets a dog every morning and calls it Fido. He believes that Fido is male. Every evening Ralph is visited by a dog he names Fifi. He believes that Fifi is female. Contrary to Ralph's belief, Fido and Fifi are identical. One morning, Ralph utters (3). He utters (3') in the evening of the same day:

- (3) This dog is male.
- (3') This dog is female.

Schiffer claims that Ralph can consistently believe (3) and (3'). The ILF theory yields, roughly, (4) and (4') as ILFs of (3) and (3').

- (4) [ $\langle S, t \rangle$  [ $\langle \underline{\text{this dog}}, f \rangle \langle \underline{\text{male}}, f \rangle$ ]]
- (4') [ $\langle S, t \rangle$  [ $\langle \underline{\text{this dog}}, f \rangle \langle \underline{\text{female}}, f \rangle$ ]]



Suppose we had a calculus for ILFs, then this calculus would presumably yield (5) and (5') as a consequence of Ralph's believing (4) and (4').

(5) Ralph does not believe [<sub>S,t</sub> [<this dog,f><female,f>]]

(5') Ralph does not believe [<sub>S,t</sub> [<this dog,f><male,f>]]

But this would contradict the requirement that Ralph can consistently believe (3) and (3') together. The problem with the ILF theory seems to be that it cannot differentiate between the modes of presentation of Fido (alias Fifi) in the two examples. The linguistic form as mode of presentation is not enough.

One viable solution for the ILF theorist would be to claim that the problem does not arise because ascribing the beliefs (3) and (3') to Ralph is false from the side of the speaker of the belief ascription; *Ralph believes (3) and (3')*. If Ralph would believe (3) and (3') together, Ralph would have an inconsistent set of beliefs. But Schiffer claims that the situation justifies the consistent attribution of both, (3) and (3'). The salient point is, that in reporting Ralph's beliefs the reporter uses *his* knowledge in determining the mode of presentation that he implicitly refers to in using the demonstrative 'this'. In stating (6) and (6') the demonstrative 'this' makes implicit reference to what *he* believes is the mode of representation of Fido/Fifi:

(6) Ralph believes [<sub>S,t</sub> [<this dog,f><male,f>]].

(6') Ralph believes [<sub>S,t</sub> [<this dog,f><female,f>]].

In the reporter's mouth 'this dog' simply refers to the one dog that visits Ralph twice a day and that Ralph believes to be two. Just like the word *I* in *He saw that I was waiting* refers to the reporter, not the reportee of the utterance. Thus if the reporter utters (6) and (6') he simply attributes an inconsistent set of beliefs to Ralph. If he wants to say in what sense Ralph may utter (3) and (3') consistently, he has to be more informative about the mode of presentation under which Ralph knows Fido/Fifi. He might say,

(13) Ralph believes [<sub>S,t</sub> [<the dog he calls Fido,f><male,f>]]

(13') Ralph believes [<sub>S,t</sub> [<the dog he calls Fifi,f>  
<female,f>]]

The two ILFs ' $[\langle S, t \rangle [\langle \underline{\text{the dog he calls Fido}}, f \rangle \langle \underline{\text{male}}, f \rangle ]]$ ' and ' $[\langle S, t \rangle [\langle \underline{\text{the dog he calls Fifi}}, f \rangle \langle \underline{\text{female}}, f \rangle ]]$ ' are different and no contradiction arises.

The apparent difficulty could be circumvented in another and simpler fashion.<sup>14</sup> In order to interpret demonstratives we need indices for times, persons, and maybe acts of reference. L&L (p. 11) favor an analysis of demonstratives by Tyler Burge (1974) where 'that dog is an animal' is paraphrased as 'For any  $e, p, x, t$ , if  $e$  is an act of reference by  $p$  at time  $t$  with that in that dog is an animal, then that dog is an animal is true with respect to  $p$  and  $t$  if and only if the object that is  $x$  and that is a dog is an animal.' L&L suggest that ILFs containing demonstratives also should contain acts of referents as their values. Thus the value of this dog becomes the ordered pair  $\langle d, e \rangle$  with  $d$  for the dog and  $e$  for the event of reference. The corresponding part of the ILF would look like  $\langle \underline{\text{this}}, \langle d, e \rangle \rangle$ . The truth-conditions for (3) and (3') become a distinguishable pair with  $e_i$  and  $e_j$  as events of reference:

(14) Ralph believes  $[\langle S, t \rangle [[\langle \underline{\text{this}}, \langle f, e_i \rangle \rangle \langle \underline{\text{dog}}, f \rangle ] \langle \underline{\text{male}}, f \rangle ]]$ .

(14') Ralph believes  $[\langle S, t \rangle [[\langle \underline{\text{this}}, \langle f, e_j \rangle \rangle \langle \underline{\text{dog}}, f \rangle ] \langle \underline{\text{female}}, f \rangle ]]$ .

Schiffer addresses three problems that exist with the mode-of-presentation theory of attitude ascriptions. The remainder of this section will show whether the ILF theory, taken as a special kind of a mode-of-presentation theory, can handle these difficulties.

The first problem is that Schiffer's favored theory fails to state exactly what a mode of presentation is, independently of its function as a distinguishing feature between objects of belief. The ILF theory does not precisely answer this question, but it narrows it down. A mode of presentation (a way of believing something) is something that resembles an interpreted logical form in an important respect. The ambiguity is deliberate. We have no language-independent evidence of what an object of belief could be. Therefore, I believe, the best model of an attitude-object is a linguistic model.

The ILF plays the role of a mode of presentation as it is functionally defined by Schiffer '[...]something is a mode of presentation if it plays the role defined by Frege's constraint, and nothing can be a mode of presentation unless it plays that role' (Schiffer, 1992: 503).<sup>15</sup> The ILF theory also defines what a mode of presentation is in terms of

<sup>14</sup> This was pointed out to me by Fritz Hamm.

<sup>15</sup> Frege's constraint has two parts. First it says that a rational person  $x$  may both believe and disbelieve that a certain thing or property  $y$  is such and such only if there are distinct modes of presentation  $m$  and  $m'$  such that  $x$  believes  $y$  to be such and such under  $m$  and disbelieves it to be such and such under  $m'$ . Then it says that there are distinct modes of presentation  $m$  and  $m'$  such that rational person  $x$  believes  $y$  to be such and such under  $m$  and disbelieves it to be such and such under  $m'$  only if  $x$  fails to realize that  $m$  and  $m'$  are modes of presentation of one and

something other than that role.

The second problem discussed by Schiffer is the *meaning-intention problem*. It is not easy, however, to apply it to the ILF theory. The problem states that we can reasonably doubt that people do in fact have a conscious awareness of the mode of presentation under which they believe a certain proposition. Since in the ILF theory the mode of presentation is not separable from the object believed, the meaning-intention problem in application to the ILF theory would be that we can reasonably doubt that anyone's object of belief is the particular ILF to which the theory relates her. The problem was discussed at length in the section on Segal (see *Segal's objection* above). I believe that it poses no serious threat to the ILF theorist. The solution lies in the similarity relation that qualifies the attitude ascription. The theory is not committed to any particular object as the object of one's belief. Whatever it is, it just has to resemble the ILF in question in an important respect.

The third problem is the assumed threeplaceness of the relation underlying attitude verbs on the level of logical form. Schiffer holds that such a stipulation is relatively unmotivated compared to the case of the verb 'give' where in some occurrences its threeplaceness is revealed on the surface. Since the ILF theory analyses attitude verbs as two place relations, the objection does not apply.

From the results of his investigation, Schiffer draws a fatal conclusion for the whole project of compositional semantics (Schiffer, 1992: 519) 'If it [Schiffer's favored mode-of-presentation theory] is both conditionally correct and false, then it follows that natural languages do not have compositional truth-theories'. Then he offers two further possible solutions: (i.) Schiffer's favored mode-of-presentation theory may not be so favorable, or (ii.) the problems can be answered eventually. I hope to have shown that the second option is viable. The ILF theory may lead to other problems, but it answers the three problems raised by Schiffer.

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the same thing'. (p. 502).

## X. Conclusion

The problem of the attitudes presents itself in the form of a dilemma, we have the choice between two equally undesirable alternatives. The first is to seize horn (A) and to be gored by (B), the second is, to account for (B) and not be able to account for (A).

(A) We want to be able to distinguish between different attitudes. Distinctions among attitudes can be as fine-grained as our linguistic discriminations are, including semantic, syntactic, morphologic, and phonologic distinctions. An extreme case is the phonological difference in (1) and (1').

- (1) Jason believes [harv<sup>a</sup>rd] is a fine school.
- (1') Jason believes [ha:v<sup>a</sup>d] is a fine school.

One could hold that (1) is true, but (1') is false.

(B) We want to be able to identify attitudes in spite of all these distinctions. A good example is the report of an utterance from a different language. We want (2) and (2') to express the same content despite their linguistic difference.

- (2) Terra si muove.
- (2') The earth moves.

Our critical investigation has shown that the ILF theory is unable to explain two things:

(i) What is the relevant aspect with respect to which ILFs are similar. In other words, with respect to what can we treat ILFs as conveying the same content and with respect to what do they have to be treated as distinct? We have seen that neither the syntactic aspect nor the meaning component suffice to account for the relevant examples. One example has proven particularly illuminating. It is the example containing vacuous reference (see VI(vi.)). In this case the ILF contains only words (and syntax). Those words (and syntax) may bare no resemblance to the corresponding parts of an ILF that is constructed from the translation of the original sentence. Since there is no meaning component to appeal to for the similarity of those two ILFs it is unclear in what sense they can be said to be similar. The ILF theory gets caught up in the dilemma.

(ii) How does the proposed analysis of the logical form of attitude sentences yield

an account of the *logics* of attitudes. The ILF theory fails to meet an important requirement that was formulated by Davidson, in spite of the fact that the ILF theory is claimed to be a *Davidsonian* theory.

Intensional semanticists will be tempted to draw from (i) the conclusion that we need an intensional semantics for the attitudes because intensions are the only conceivable values of vacuous singular terms. It would be interesting to investigate whether the intensional theory proposed by Cresswell (1985a) would solve the problems that were raised against the ILF theory. The theory could be repaired to solve Mates' puzzle using the quotation operator.

ILF theorists will abstain from their desire to account for any logic of the attitudes. If we give up the idea that an analysis of logical form also has to license the intuitively valid inferences that are connected with attitude ascriptions, then we can abandon the concept of similarity of ILFs and get around the second horn of the dilemma. This seems a radical consequence. It is not so drastic, however, if one considers that no theory to date has managed to account for the logic of the attitudes. Main stream possible worlds semantics face the problem of logical omniscience that is only an extreme example of a class of undesirable inferences.

This investigation has shown, that beliefs (and other attitudes) are as manifold as the language that expresses them. Beliefs can be distinguished on any linguistic level, let it be the level of meaning, use, structure, or sound. An adequate account of the attitudes has to make reference to this language, either by quoting it directly or by miming its structure in the metalanguage.

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