Say Reports, Assertion Events and Meaning Dimensions

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Abstract[1]

In this paper we study the parameters that come into play when assessing the truth conditions of *say* reports and contrast them with belief attributions. We argue that these conditions are sensitive in intricate ways to the connection between the interpretation of the complement of *say* and the properties of the reported speech act. There are three general areas this exercise is relevant to, besides the immediate issue of understanding the meaning of *say*: (i) the discussion shows the need to go beyond the simplest view of propositional attitudes, which treats them as restricted quantifiers over worlds; (ii) the complex connections that must exist between the *say* report and its source speech act show that one has to be able to differentiate between various layers of meaning for the antecedent sentences; (iii) finally, this paper is a small step towards a typology of propositional attitudes that allows us to uncover the complex web of relationships that grammatical mood is sensitive to.

1. Introduction

In this paper, we compare *belief* attributions and *say* attitude reports and propose an analysis of the latter in terms of reference to assertive speech act events that crucially involves all the meaning dimensions (presuppositions, at-issue content and implicatures) of both the *say* report and the assertive speech act reported on.

Our starting point is the observation that the truth-conditions of a *say* report involve reference to a particular assertive speech act wherein a discourse segment (e.g. a sentence) is asserted by the referent of the syntactic subject of *say*. For example, (1b) below is intuitively true relative to Sam's assertion in (1a).

1. a. Sam (on a Sunday): Mary is in San Jose.
   b. John (the following Monday): Sam said that Mary was in San Jose.

John's report, however, would not be appropriate relative to Sam's assertion in (2):

2. Sam (on Sunday): Mary is in San Francisco.

Being true or false relative to a particular assertive speech act makes the attitude verb *say* similar to the attitude verb *know* – and unlike the verb *believe*: as Kratzer (2002): 657 puts it (following Goldman 1967), an attitude report of the form *x knows p* is true iff *x* believes *p de re* of some fact that exemplifies *p*. Relativizing the truth of a *know*-report to a particular fact is motivated by Gettier-style examples (Gettier 1963), which show that knowledge is more than justified true belief.

Russell (1912) provides the earliest Gettier-type example: "If a man believes that the late Prime Minister's name began with a B, he believes what is true, since the late Prime Minister's last name was Sir Henry Campbell Bannerman. But if he believes that Mr. Balfour was the late Prime Minister, he will still believe that the late Prime Minister's last name began

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with a B, yet this belief though true, would not be thought to constitute knowledge" (p. 131 et seq[2]). Assuming that Sam is such a man, we intuitively take the *know* report in (3b) below to be false despite the fact that Sam's belief, provided in (3), is in fact true.

3. a. The late Prime Minister's name began with a B.
   b. Sam knows that the late Prime Minister's name began with a B.

The case of *say* reports is different from that of knowledge attribution in that what supports the truth of a *say* report is a very specific kind of fact, namely an assertive speech act.

The anaphoric nature of *say* reports is brought to light by the intuitive parallel between the interpretations of sentence (4) and sentence (5) below.

4. Jessica didn't say that Sam had an appointment with Ernie.

5. I didn't turn off the stove. (Partee 1973)

Intuitively, sentence (4) is anaphorically interpreted in much the same way as the Partee sentence in (5), i.e. the truth-conditions of (4) are relativized to some contextually salient conversation, e.g. the conversation that John and Jessica had in the evening of October 11, 2006 when Jessica forgot to tell John that Sam had an appointment with Ernie the following morning. In particular, note that (4) does not mean that there is a particular past assertion of Jessica's that does not say that Sam has an appointment with Ernie – these truth-conditions are much too weak: Jessica asserted many sentences before even knowing who Sam and Ernie are. Similarly, (4) does not mean that there is no past assertion of Jessica's to the effect that Sam has an appointment with Ernie – these truth-conditions are much too strong: given that Sam meets with Ernie fairly frequently, Jessica is very likely to have asserted at some point a sentence to the effect that Sam had an appointment with Ernie.

Moreover, the anaphoric component of the *say* report in (4) targets a particular past conversation and, therefore, cannot be reduced to the temporal anaphoric component instantiated by the Partee example in (5). Anaphora to a time interval is coarser-grained than anaphora to a particular conversation that occurred in that time interval. To see that the finer-grained anaphora to conversations is needed for (4), imagine that Jessica had two simultaneous conversations in the evening of October 11, 2006, one with John (which was a face-to-face conversation) and one with Nathan (which was an email or instant-messenger conversation) and that she got slightly confused and told Nathan, but not John, about Sam's appointment with Ernie. (Multiple simultaneous conversations are likely to engender this kind of confusion.) The *say* report in (4) is still a truthful, legitimate complaint on John's part about Jessica's forgetfulness *in her conversation with him*.

The present paper investigates the nature of the relationship between *say* reports, e.g. (1b) above, and their source assertions, e.g. (1a), and the consequences that this relationship has for some of the more prominent accounts of attitude reports in the previous literature. In the process, we provide a map of the similarities and differences between the interpretations of *say* reports and belief attributions.

The main result of the investigation is that, in order for a *say* report to be accurate, the meaning of the complement clause of *say* has to 'match' the meaning of the sentence asserted in the source speech act with respect to all the dimensions customarily associated with the interpretation of a sentence. Thus, we argue that there is a 'matching' requirement with respect to the at-issue meaning dimension, one with respect to the implicature (non-literal meaning) dimension and, finally, a 'matching' requirement with respect to the presupposition dimension.

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[2] Page references to the 1959 Oxford University Press edition, apud Kratzer (2002).

This generalization indicates that the received view of propositional attitude verbs as universal modal quantifiers and various refinements thereof are not fine-grained enough to capture what is involved in *say* attitude reports.

2. World and proposition based views of attitude reports

2.1. Attitude verbs as restricted universal quantifiers over worlds

The stars of the vast literature on propositional attitude predicates are the class of what we call here *cognitive* verbs, namely *believe, think* and *know.* Ever since Hintikka (1962, 1969), these verbs have been analyzed in possible world semantics as, essentially, universal quantifiers over a restricted set of worlds. Thus, (6)

6. Sam believes that Mary is sick.

is taken to be true in some world w iff the proposition expressed by the complement of *believe*, i.e. the embedded clause *Mary is sick*, is true in all the worlds compatible with what Sam believes in w. The usual way of implementing this analysis is to assume that the model contains a function *DOX* of type $s(e(st))$[3] that associates to a sentient individual x and world w the set of worlds compatible with what x believes is true in w. In (7) below, we provide the truth-conditions of (6) by means of a translation into Gallin's Ty2 (see Gallin 1975). The types of various Ty2 terms are represented by means of subscripts – as are the world arguments of lexical relations like *sick* (which is a constant of type $e(st)$).

7. $\textit{Sam believes that Mary is sick} \rightsquigarrow DOX(sam_e, w_s) \subseteq \lambda w'_s.\ sick_{w'}(mary_e)$
$\rightsquigarrow \forall w'_s \in DOX(sam_e, w_s)\ (sick_{w'}(mary_e))$

Work on the semantics of propositional attitudes has always gone hand in hand with work on modality, where possibility and necessity operators are standardly analyzed as existential and universal quantifiers over a set of restricted worlds. An important issue on both the modal and propositional attitude front is the way one arrives at the relevant set of worlds. In other words, the question is how the restrictor of modal quantifiers is established. Following Kratzer (1977, 1981) and Karttunen (1974), it is standardly assumed that the worlds compatible with what x believes in w are given indirectly, by first having a function **dox** of type $s(e((st)t))$ that associates a set of propositions to any sentient individual x in w, namely the propositions x takes as true of w. The function **dox**(x, w) gives us the *doxastic modal base* of x in w. The set of worlds compatible with what x believes in w is then $\cap$**dox**(x, w). Under these assumptions, the truth conditions of (6) are as in (8):

8. $\textit{Sam believes that Mary is sick} \rightsquigarrow \cap\mathbf{dox}(sam, w) \subseteq \lambda w'.\ sick_{w'}(mary)$
$\rightsquigarrow \forall w' \in \cap\mathbf{dox}(sam, w)\ (sick_{w'}(mary))$

We are not concerned here with how the denotation of the complement sentence is arrived at, and therefore we leave issues of scope, tense etc. outside the scope of our discussion[4].

Following the terminology in Farkas (1992), we refer to the individual argument x of modal base functions as the *individual anchor* of the modal base, and to their world argument w as their *modal anchor.* The modal base functions needed for the interpretation of modal (ad)verbs are similar to those deployed in the interpretation of propositional attitude predicates, except that the former have no individual anchor.

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[3] Here s is the type of possible worlds, e is the type of individuals and t the type of truth-values {T(rue), F(alse)}.

[4] For more discussion of the issues raised by tense interpretation in attitude reports, see Abusch (1997), Schlenker (2003), Bittner (2007) and Altshuler (2007) (among others) and references therein.

Thus, the received view of modal (ad)verbs and propositional attitude predicates is that they are quantifiers over possible worlds with the domain of quantification provided either (i) directly by functions like *DOX*, which we call *world based functions*, or (ii) indirectly by functions like **dox**, which we call *proposition based functions.*

We argue here that, contrary to what the received view assumes, analyzing attitudinal predicates in terms of proposition based functions is an empirically and conceptually motivated move – and not a needlessly complicated implementation that should ultimately be rejected in favor of the simpler world based function analysis.

We know since McCawley (1978), Farkas (1985) and Heim (1992) that the standard intersective approach to propositional attitude predicates cannot be generalized to bouletic predicates such as *want* and *wish* or to their bouletic modal auxiliary counterparts – an observation that can be traced back, on the one hand, to the analysis of conditionals in Lewis (1973), who argues for an analysis of counterfactuals in terms of a similarity ordering of the set of possible worlds and, on the other hand, to the analysis of graded modality in Kratzer (1977, 1981) who argues for ordering sources as a parameter in the interpretation of modal quantification over and above modal bases.

Here, we do not discuss these more complex cases. We will only address the issue of whether the world based analysis successfully generalizes to what seems a simpler case closer to cognitive predicates, namely the case of the verb *say* and the other *verba dicendi*. The naïve characterization of these verbs is that they report on an assertive speech act performed by the referent of their syntactic subject. We will argue that the world based analysis cannot be extended to them and then suggest an alternative approach. The background goal of this investigation is to identify sub-divisions within the large class of propositional attitude verbs that are linguistically relevant, e.g. relevant for the interpretation and distribution of verbal moods in their complement clauses.

2.2. A proposition based account of *believe*

Realistic models of belief change have to be able to model both monotonic and non-monotonic belief updates. Monotonic belief update results in the addition of a doxastic commitment consistent with the input belief state. World based accounts model this by intersecting the new doxastic commitment with the set of worlds representing the input belief state. Proposition based approaches add the proposition to the set of propositions that represent the input belief state.

Non-monotonic belief updates involve belief contraction brought about by the removal of a doxastic commitment (due to either the fact that the commitment in question is abandoned or the fact that a new commitment is made that is inconsistent with the old commitment). World based accounts run into difficulty with such changes (which worlds that were mistakenly excluded in a previous update should be brought back in?), whereas proposition based accounts can handle them easily, by simply defining an operation that removes a proposition from a set of propositions. The need for belief contraction is exemplified below:

9. When Sam was a child, he believed that Santa Claus existed, but he is not so sure anymore.

Another problem for world based accounts of belief attribution is non-closure under logical consequence, exemplified below.

10. Little Johnny believes that 2 plus 2 equals 4, but he does not believe that 16 times 7 is 112.

The computer science and philosophical literature converged on a proposition based account of belief states in the classical Alchourrón, Gärdenfors & Makinson (1985). The beliefs held by an agent are represented by a set of formulas in a given formal language or, following the

possible world semantics reformulation of Groove (1988), as a set of propositions (i.e. as a set of sets of possible worlds). Kratzer (1977) is an early proposition based account of modal necessity and possibility, where necessity is defined in terms of logical consequence of a modal base and possibility is defined in terms of consistency with such a base.

We can account for the non-closure under logical consequence of belief states by distinguishing between: (i) the set of *basic* propositions that an agent takes to be true together with the logical consequences that *the agent her/himself can infer* from these basic propositions and (ii) the *belief-set* of an agent, which is the set of all propositions that the agent is committed to believe, which includes the *basic* propositions and *all* their logical consequences.

Let us call the former set of propositions *x*'s doxastic modal base, associated with *x* in a world *w* by the function **dox** introduced above. We take a belief attribution of the form *x believes p* to be true iff *p* is an element of *x*'s doxastic modal base. For example, sentence (6) receives the truth-conditions in (11) below.

11. *Sam believes that Mary is sick* $\rightsquigarrow \lambda w'.\ sick_{w'}(mary) \in \mathbf{dox}(sam, w)$

An early proposition based analysis of attitude reports in this spirit that distinguishes between different necessary truths (e.g. *2 plus 2 equals 4* and *16 times 7 is 112*) was proposed in Thomason (1980)[5].

3. Say *vs.* believe

We turn in this section to the blandest of all *verba dicendi*, *say*. This is a bland 'reported assertion' predicate which encodes no further constraints concerning the manner in which the communicative act took place. We concentrate on its pure indirect uses exemplified in (12),

12. Sam said that Mary was sick.

rather than on its parenthetical or direct quotative uses first discussed in Bolinger (1968) and exemplified in (13):

13. a. 'Mary is sick', John said.
    b. John said: 'Mary is sick.'

The direct quotative use of this predicate is wider than that of other predicates reporting assertions, such as *claim, assert, state* because, as a quotative, *say* can be used in the wider meaning of *quoth*, to report non-assertive speech acts (e.g. questions and commands):

14. John said, his voice filled with anger: 'Who broke the glass?' /'Go away!'

We also leave out of the discussion issues connected to pseudo-quotative uses of this verb.

The first question we address is whether *say* should be given a world based or a proposition based account. We ultimately argue that not even the proposition based view is fine-grained enough to capture the behavior of *say* reports.

To begin, note that *say* does not exhibit the non-monotonic update behavior of *believe*: what once was said cannot be unsaid. Therefore, at first blush, it appears that the restricted universal quantifier analysis sketched above for *believe* and its fellows can easily generalize to the indirect speech act verb *say*. Thus, (12) would be true in *w* iff the proposition denoted by the complement clause *Mary was sick* is true in all the worlds compatible with what John said. We would then have to have a function of type $s(e(st))$, call it *SAY*, that associates with an individual *x* and a world *w* a set of worlds *SAY*(*x*, *w*) (namely the worlds compatible with

[5] See also Muskens (2005) for more discussion.

what John said) and the attitude verb *say* in (12) would quantify over these worlds, as shown in (15) below.

15. *Sam said that Mary was sick* $\rightsquigarrow SAY(sam, w) \subseteq \lambda w'.\ sick_{w'}(mary)$
$\rightsquigarrow \forall w' \in SAY(sam, w)\ (sick_{w'}(mary))$

We show next that this simple extension of the world based analysis of attitude reports is empirically inadequate. Obviously, *say* (just as *believe*) is not closed under logical consequence. Were it thus closed, we would make the unfortunate prediction that the report in (16b) below, based on Sam's utterance in (16a), is felicitous.

16. a. Sam: I liked the movie *Lives of Others*.
b. Mary: Sam said that 2 plus 2 equals 4.

The non-closure under logical consequence exhibited by *say* provides evidence for a proposition based account of *say*. However, we show in the remainder of this section that even the proposition based analysis is not fine-grained enough to account for *say* reports.

What is specific to speech act reports is that they have a source speech act that the report is about. Our main observation is that *say* reports (just like other speech act reports, e.g. *order* or *ask*) have a requirement of *faithfulness to the meaning dimensions* of the linguistic expression that the source speech act takes as argument. More precisely, the entailments associated with the complement clause of a *say* report (be they at-issue entailments, presuppositions and / or implicatures) must be within the purview of the corresponding entailments associated with the source sentence. In particular, the at-issue entailments of the former must follow from the at-issue entailments of the latter, the implicatures of the former must follow from the implicatures of the latter and, finally, the presupposition/at-issue content division of the source speech act must be preserved in the report.

Intuitively, the "faithfulness to meaning dimensions" requirement follows from the basic fact that *say* is a speech act reporting verb – therefore, what the report says and how the report says it (i.e. as an at-issue content / presupposition / implicature) has to correspond to what the source assertive speech act says and how the source assertive speech act says it. Respecting the presupposed/at-issue content divide is imposed on *say* reports because these reports specifically target assertions, which are primarily about the at-issue content. We will see, however, that faithfulness to other meaning dimensions, namely presuppositions and conversational implicatures, is also relevant. It might very well be that *say* reports also need to keep track of additional meaning dimensions, e.g. the conventional implicature dimension investigated in Potts (2004) – but we leave this issue for future research[6].

3.1. Say, *at-issue entailments and implicatures*

This section introduces two generalizations about the interaction between *say* reports, at-issue content and implicated content.

The first observation is that the implicatures of the source sentence cannot be reported as having been *said*[7], as shown by the infelicitous reports in (17b) and (18b) below based on the paradigm implicature-triggering examples in (17a) and (18a) respectively.

17. a. Mary: Peter ate some of the cake.
b. Sam: #Mary said that there is some cake left.
(or: #Mary said that Peter didn't eat the whole cake).

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[6] For an early discussion of the multi-dimensional nature of "what is said", see Ziff (1972).

[7] To our knowledge, this first detailed exploration of this Gricean observation can be found in Wagreich (2007).

18. a. Recommender: Mr. X has a very legible handwriting.
b. #The recommender said that Mr. X is an unexceptional philosopher.

The observation that the implicatures of the source sentence cannot be characterized as having been *said* does not come as a surprise. After all, it is an essential feature of implicatures that they are not conveyed in the heavy-handed manner of assertion, but that they are merely… well, implicated.

What is surprising is that the implicatures contributed by the *say* report have to be faithful to, i.e. have to follow from, the implicatures of the source sentence. To see this, consider the following situation: John, Mary and Sam are the TA's for Semantics 1 and, as soon as the first class on presupposition is over, John says to Mary:

19. John: Everybody in the class understood the notion of presupposition.

Next, assume that Susan is a student in Semantics 1 (a fact well known to all the TA's) and compare Mary's utterances in (20a) and (20b) below, assumed to be based solely on John's statement in (19):

20. a. Mary: John believes that Susan understood the notion of presupposition.
b. Mary: #John said yesterday that Susan understood the notion of presupposition.

While Mary's belief attribution in (20a) is entirely unobjectionable, her *say* report in (20b) is open to attack. For one thing, Mary's report in (20b) is not entirely accurate since John literally said something more informative. In addition, the explicit mention of Susan in (20b) can be misleading. Were John (a TA) under the suspicion of talking too much of Susan (one of his students), we would find Mary's report quite objectionable: John's statement in (19) cannot be taken as evidence for his having developed an unhealthy obsession with Susan, while Mary's report could be taken as providing such evidence.

Note that the infelicity of the *say* report in (20b) is not due to the fact that the at-issue content of the complement clause is less informative than (i.e. entailed by) the at-issue content of the source sentence in (19). *Say* reports of this kind are felicitous, as shown by the pair in (21a, b) below.

21. a. Sam: The Chancellor fired the Provost yesterday.
b. John: Sam said that the Provost was fired yesterday.

Thus, we take the infelicity of (20b) above to show that the attitude report verb *say* contributes a "faithfulness to meaning dimensions" requirement, whereby the at-issue and implicated contents of the complement clause have to follow from the at-issue and implicated contents of the source sentence respectively[8]. This "sentence-to-sentence correspondence" requirement indicates that we need a semantics for *say* that is finer-grained than the received world based semantics and that is at least as fine-grained as the proposition based account sketched in section **2** above.

We end this sub-section with the observation that the "faithfulness to meaning dimensions" requirement is not simply a fancy reformulation of the pedestrian "don't put words in another person's mouth" injunction. As the examples in (22), (23) and (24) below show, *say* reports can felicitously put words in the utterer's mouth (or add new discourse referents – see in particular the indefinite *a car* in example (24)) as long as the "faithfulness to meaning" requirement is satisfied, i.e. as long as, *in the context of interpretation*, the at-issue and

[8] We ignore here the problem of computing the implicatures of an embedded clause; see Chierchia (2001) and Russell (2006) (among others) for a detailed discussion of whether this computation is part of the grammar or not.

implicated contents of the complement clause are entailed by the at-issue and implicated contents of the source sentence respectively[9].

22. a. Sam: The Provost was fired yesterday.
b. John: (?)Sam said that the Chancellor fired the Provost yesterday. (felicitous if we know that the only person who can fire the Provost is the Chancellor)

23. a. Sam: John understood the problem and Sue and Jane also understood it.
b. John: Sam said that every student in Gigi's section understood the problem. (felicitous if we know that the only students in Gigi's section are John, Sue and Jane)

24. a. Sam: Sue wants a Porsche.
b. John: Sam said that Sue wants a car.

3.2. Say, *at-issue entailments and presuppositions*

This section extends the above observation about the faithfulness to the at-issue and implicated meaning dimensions to the presupposition dimension. Importantly, it turns out that the "presupposition faithfulness" requirement is different from the faithfulness / 'matching' requirement that applies to the at-issue and implicature dimensions. The latter requirement is essentially based on entailment: the at-issue and implicated contents of the complement clause must follow (in the given context) from the at-issue and implicated contents of the source sentence respectively.

By contrast, the "presupposition faithfulness" requirement is not entailment based: we only require the complement clause of the *say* report to preserve the presupposed/at-issue division of content of the source sentence, i.e. of the sentence asserted in the source speech act. In particular, contentful presuppositions of the source sentence cannot appear as part of the at-issue content of the complement clause. This distinction is necessary in order to account for the infelicity of the reports in (25b) and (25c) below when they are interpreted relative to the source sentence in (25a)[10].

25. a. Sam: Mary stopped smoking.
b. Sue: #Sam said that Mary used to smoke.
c. Sue: #Sam said that Mary used to smoke and then she stopped.

Note that, unlike the *say* reports in (25b, c) above, the belief report in (26) below is felicitous – to the extent to which, by the maxim of Quality, we take Sam's assertion in (25a) to reflect what Sam takes to be true in the actual world[11].

26. Sue: Sam believes that Mary used to smoke.

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[9] See Brasoveanu (2006b, 2007) for a precise definition of a notion of context-sensitive entailment independently needed for the interpretation of particles like *hence* and *therefore*.

[10] Examples of this kind are discussed in Wagreich (2007).

[11] See Forbes (1997) for a discussion of differences between *say* reports and belief attributions that are complementary to the ones noted here. For example, assuming that both the *say* report in (ii) below and the belief attribution in (iii) are based on the assertive speech act in (i) and assuming that Sam mistakenly believes that a fortnight is an interval of ten consecutive days, the *say* report is intuitively accurate, while the belief attribution is not (this pattern is the exact opposite of the one exemplified in (25) and (26) above).

(i) Sam: I will return in a fortnight.

(ii) Sue: Sam said that he will return in fourteen days.

(iii) Sue: #Sam believes that he will return in fourteen days.

Two felicitous *say* reports based on the source sentence in (25a) are provided in (27a, b) below; note in particular that the presupposition trigger in (27b), i.e. *no longer*, is different from the presupposition trigger in (25a).

27. a. Sue: Sam said that Mary stopped smoking.
b. Sue: Sam said that Mary no longer smokes / smoked.

The above formulation of the "presupposition faithfulness" requirement makes a distinction between contentful and anaphoric presuppositions: we only need to preserve the contentful, but not the anaphoric presuppositions of the source sentence[12]. The felicitous reports in (28b, c) below show that the anaphoric presuppositions of the source sentence in (28a) need not be preserved: they can be resolved in the complement clause of the report (see (28b)) or they can be substituted by other presuppositions (see (28c)).

28. a. Sam: John and Mary came to the party and he invited her to dance.
b. Sue: Sam said that, at the party, John invited Mary to dance.
c. Sue: Sam said that, at the party, my deskmate invited my neighbor to dance. (where all the participants in Sue's conversation know that Sue's deskmate is John and Sue's neighbor is Mary).

Note that the issue here is not one of quotation or pseudo-quotation. As is well known, the complement of *say* is not immune to standard NP scope ambiguity cases. Moreover, the example in (28c) is an unobjectionable report of what Sam said in (28a) even if Sam himself is unaware of the fact that Sue's deskmate is John and Sue's neighbor is Mary.

The infelicity of the *say* reports in (25b, c) above is all the more surprising given that, on the one hand, as (28b) shows, the complement clause can resolve some of the presuppositions of the source sentence and, on the other hand, as (21b), (24b) and (27b) above show, the at-issue content and presuppositions of the complement clause are not required to be identical to the at-issue content and presuppositions of the source sentence.

Finally, note that the "presupposition faithfulness" requirement is compatible with a complement clause that introduces more presuppositions (contentful or not) than its corresponding source[13].

29. a. Sam: Mary visited Santa Cruz last week.
b. John: Sam said that Mary visited Santa Cruz again. (assume that all the participants in John's conversation know that Mary has been visiting Santa Cruz every year for the last twenty years)

30. a. Sam: Mary visited Santa Cruz last week.
b. John: Jane was in Santa Cruz last week and Sam said that Mary was here too.

31. a. John: Sam solved the most difficult problem on the Semantics 1 exam.
b. Mary to Sue: John said that it was Sam who solved the problem. (assume that all the participants in Mary's conversation know that someone solved the most difficult problem on the Semantics 1 exam)

32. a. Sam: The patients in hospital X live in rat infested rooms with mold on the ceilings and crumbling walls.
b. John: Sam said that the conditions in hospital X were horrible. (assume a suitably civilized contextually salient standard for horribleness)

Thus, the "presupposition faithfulness" generalization indicates that a felicitous *say* report needs to be sensitive to the way in which the literal meaning of the source sentence is actually *represented*, in particular, the way in which the content of the source sentence is divided into a presupposed and an at-issue component. Neither the world based nor the proposition based analyses proposed in section **2** above are expressive enough to record these distinct meaning

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[12] For a similar distinction between two types of presuppositions due to their different accommodation behaviors, see van der Sandt (1992) and Beaver & Zeevat (2004).

[13] Sentence (28c) above can already be taken to provide such an example.

components and capture the fact that *say* reports seem to be sensitive to the presupposition/at-issue content division of labor introduced by their corresponding source sentences.

3.3. *Summary:* say *vs.* believe

In sum, the main (and rather obvious) difference between *say* reports and *belief* attributions concerns the different ways in which they can be true. There is only one way for a *say* report to be true: there must have been an assertive speech act performed by the referent of the subject of *say*. In the case of belief attributions, on the other hand, evidence of other people's beliefs is necessarily indirect. Thus, there are many possible grounds for inferring what the beliefs of an agent are: the agent's assertions, her questions / commands as well as her non-linguistic actions.

This, we think, is the reason behind the difference in behavior with respect to implicated meaning between the belief attribution in (20a) above and the *say* report in (20b): only the *say* report comes with an "implicature faithfulness" requirement that targets the particular way in which the report is linguistically expressed; in contrast, the "implicature faithfulness" issue is irrelevant for belief attributions, which are concerned with *what* is the expressed and not with *how* this content is expressed. Belief reports do not require the presence of a linguistic expression and therefore there is nothing relative to which faithfulness can be measured.

We can justify in a similar way the contrast between *say* and *believe* exemplified in (25b) and (26) above: the "faithfulness to the presupposed/at-issue content division" applies only to *say* because what is *stricto sensu* said, i.e. at-issue, in an assertive speech act is different from what is presupposed, i.e. taken for granted and backgrounded – while both the at-issue content and the content that is taken for granted are equally suitable sources for belief attributions. Belief attributions concern only the truth commitments of individuals and not the manner in which those commitments were made.

Turning now to the similarities between *say* and *believe*, we observe that both *say* reports and belief attributions can be (in fact, *say* reports must be) based on an assertive speech act. And, when they are based on an assertive speech act, both *believe* and *say* allow for under-informative reports, i.e. complement clauses that are asymmetrically entailed by the source sentence – see the *say* reports in (21b) and (24b) above and the parallel *belief* attribution examples in (33b) and (34b) below.

33. a. Sam: The Chancellor fired the Provost yesterday.
    b. John: Sam believes that the Provost was fired yesterday.

34. a. Sam: Sue wants a Porsche.
    b. John: Sam believes that Sue wants a car.

In contrast to *say* reports, however, the truth of the belief attributions in (33b) and (34b) above depends not only on the assertive speech acts in (33a) and (34a) respectively, but also on the Gricean maxim of Quality, i.e. on the additional assumption that, as far as Sam knows, his utterances are actually true.

Which brings us to another similarity between *say* and *believe*: both require the referent of the subject to be *in some sense* committed to the proposition expressed by the complement clause. The nature of the commitment, however, is different in the two cases: *say* requires commitment *qua* participant in the conversation, while *believe* requires commitment *qua* cognitive agent. The two kinds of commitments enforce two different kinds of consistency requirements. Commitments of a cognitive agent encompass the entire belief system of the agent: since the propositions in these doxastic states are taken to be true by the agent, the entire doxastic system has to be consistent. Commitments of conversation participants, on the other hand, are a much more limited set of propositions; they are the propositions the

participant has publicly committed to during a particular conversation. Since these are propositions that the conversation participant presents herself as taking to be true, they are also supposed to be consistent.

Doxastic bases and discourse commitments have in common the property of being "commitments", that is: their individual anchor takes the propositions in the base to be true of the modal anchor. The difference is that discourse commitments are linked to a conversation and a participant's role in it. The two types of commitment are connected by the Quality maxim requiring the discourse commitments of conversational participant to be a subset of her doxastic base.

We elaborate on these issues in the next section, which sketches an analysis of *say* reports and an account of the similarities and differences between *say* reports and belief attributions.

4. *Towards an analysis of* say *reports*

We have seen above that in order to give an adequate account of *say* reports we have to go not only beyond the world based analysis that, in fact, falters even for *believe,* but also beyond a simple-minded proposition based view of attitude reports. Finding the right analysis for *say* reports and capturing the contrast between them and belief attributions would take us one step further along the long road towards finding the adequate general approach to the semantics of attitudinal predicates in general, one that would help us account for the dimensions along which they differ as well as those along which they contrast.

Such an approach should, ultimately, help us understand the distribution of the grammatical features that attitudinal predicates govern, e.g. the particular verbal mood they require in their complements. These features group propositional attitudes in complicated subclasses[14]. Once we uncover the basic semantic parameters that are involved in characterizing the meaning of propositional attitudes, we will be in a better position to characterize the semantic natural classes they fall into, and therefore understand the semantic underpinnings of grammatical mood.

As we have seen above, the lexical meaning of *say* requires the existence of a speech event whereby the referent of the subject of the *say* report asserted a sentence. The interpretation of this sentence acts as source for the complement of *say.* The existence of the source sentence is an essential component of a felicitous *say* report, just as the assertive nature of the speech act featuring the source sentence is: questions or imperatives cannot act as sources for *say*.

We do not try to capture here the non-literal meaning vs. literal meaning or the assertion vs. presupposition distinctions involved in the 'matching' requirements associated with *say* reports. We simply assume that all these distinctions are somehow drawn and focus on the similarities and differences between *say* and *believe*.

Our account relies on the following two basic observations. First, speech act reporting verbs in general assert the existence of a speech event whose author is the referent of the subject of the reporting verb, and whose linguistic content has to 'match' the content of the complement of the report. We agree with the justification put forth in Poesio & Muskens (1997) for analyzing speech acts as events: "[…] treating speech acts in the same way that events are treated in DRT means that we can explain anaphoric reference to speech acts just as anaphoric reference to events is treated in DRT. Such references can be explicit or implicit, just as in the case of reference to events; both forms force us to assume that speech acts are explicitly

[14] See Farkas (1985, 1992) and Brasoveanu (2006a) for an investigation of the distinction between indicative, subjunctive A and subjunctive B in Romanian and their associated classes of attitudinal predicates.

recorded in the conversational score" (p. 248). The second observation is that we need to take into account the nature of the speech act that is reported on. In the case of *say*, this speech act must have been assertive.

4.1. *Preliminaries: assertive speech acts*

Following Stalnaker (1978) and much work since, we take conversation to unfold against a background consisting of a set of propositions, called the *common ground* (*cg*), whose intersection is the *context set*. The propositions in the *cg* are the propositions that the participants in the conversation jointly assume, for the purposes of the conversation, to be true of *w*, the world in which the conversation takes place.

These propositions form the conversational community's doxastic base. The base is doxastic because the propositions in it are taken by the participants to be true in the world in which the conversation takes place. And it is the base of the conversational community because it is made up of the joint *public* commitments of the participants *qua* participants in that conversation.

A standard assumption in the literature is that the essential change in the context associated with the act of an individual *A* asserting a sentence *S* with an at-issue propositional content *p* is to create a new context set $cs_o = cs_i \cap p$, where cs_i and cs_o are the input and output context sets respectively. In a move parallel to the switch from a world based to a propositional-based analysis of *believe* in section **2** above, we take the essential component of the discourse to be the common ground rather than the context set. Under this view then, the essential effect of assertion would be to add the asserted proposition to the common ground of the input context: $cg_o = cg_i \cup p$.

We in fact adopt an elaboration of this view, following Gunlogson (2001) and Bruce & Farkas (in prep). Discourse commitments for us are divided into the following subcomponents: (i) the *cg*, made up by joint commitments of the discourse participants; (ii) the *DC* list of each participant in the conversation. For each participant *A* in a conversation (at any time *t*) DC_A is made up of the list of propositions *A* has publicly committed to up to *t*, and which are not yet joint commitments in the conversation. The public commitments of a participant in the conversation are the propositions in $DC_A \cup cg$.

When a discourse participant *A* asserts a sentence *S* with an at-issue propositional content *p*, *p* is added to DC_A and at the same time the context registers the proposal to add *p* to the *cg*. If *S* has presuppositions, those should be already in the common ground or should be accommodatable therein. The proposal part of the effect of assertions does not play any role in our discussion and therefore will be ignored below.

The crucial change brought about by an assertive speech act is given in (35), where the subscripts *i* and *o* distinguish the input and output discourse commitments of *A* respectively:

35. $DC_{A,o} = DC_{A,i} \cup p$

The addition of a proposition to a discourse commitment (*DC*) list is parallel to the addition of a proposition to a doxastic base: in both cases, the agent is committed to the truth of that proposition relative to the world that individual locates herself in *qua* cognitive agent (in the case of *belief* attributions) or in her role as participant in a particular conversation (in the case of *say* reports).

We take speech acts to be (non-deterministic) relations between an input context (a.k.a. input information state) and an output context. The precise definition of the required notion of

context is left for future research[15]. We distinguish between different types of speech acts by means of distinct speech act operators that relate the author *A* of the speech act and a linguistic expression *S*. In particular, the assertion speech act operator α relates an input context *c*, an individual *A* and a declarative sentence *S* to an output context *c'* where: (i) the at-issue propositional content *p* of *S* has been added to *A*'s discourse commitments and (ii) the proposal to add *p* to the *cg* of the conversation has been registered. As mentioned above, we are interested here only in the first condition, stated in (36) below.

36. If $\|\alpha(A, S)\|(<c, c'>) = \mathrm{T}$, then $DC_{A,c'} = DC_{A,c} \cup p$ (where *p* is the content of *S* relative to *c*).

However, the assertion update in (36) above is not fine-grained enough to capture all the meaning components that we need in the analysis of *say* reports. First, the content *p* of the asserted sentence *S* is in fact multi-dimensional: on the one hand, we distinguish presuppositions (i.e. the content taken for granted) from the other contents (which are not taken for granted); on the other hand, we need to distinguish implicatures, i.e. non-literal content, from the literal content (i.e. from the presupposed and at-issue content).

Consequently, we will ultimately have to define the interpretation function $\|\cdot\|$ in such a way as to associate with any sentence *S* a triple of propositions $<S_{presup}, S_{at\text{-}issue}, S_{implic}>$ relative to a context *c* and not only a single proposition $S_{at\text{-}issue}$.[16] When *A* asserts *S* in some conversation *V*, $<S_{at\text{-}issue}, S_{implic}>$ are added to DC_A, while S_{presup} is either already present in the *cg* of the conversation or added to it by accommodation.

Second, following Poesio & Muskens (1997), we analyze speech acts as events – and, just as events have participants that are identified in a neo-Davidsonian approach by means of theta-role functions, we will use suitable functions to identify the participants / arguments and their roles in an assertive speech act event. In particular, an assertion event ε has the following characteristics: it occurs in a conversation *V* (which we can model as a process, namely a sequence of speech act events[17]), and it has an author *A* and a linguistic expression *S*. This expression in turn has a form S_{form} (necessary to account for quotation) and a multi-dimensional content $<S_{presup}, S_{at\text{-}issue}, S_{implic}>$; the pair $<S_{at\text{-}issue}, S_{implic}>$ constitutes the assertive change of the speech act.

The update conditions listed above are given in (37) below; for simplicity, we omit the form of the speech act S_{form} and ignore the dynamics of presupposition resolution. In (38), we summarize the update conditions that are relevant for the analysis of *say* reports, to which we turn in the following section.

37. If $\|\alpha(A, S)\|(<c, c'>) = \mathrm{T}$, then:
add to *c* the event discourse referent ε and new propositional discourse referents S_{at_issue} and S_{implic} such that, in the output context *c'*, ε is an assertion event that is a move in the on-going conversation *V*, the author of ε is *A* and the (non-presupposed) content of ε is S_{at_issue} and S_{implic}. Finally, we update the discourse referent DC_A that stores *A*'s current discourse commitments with the pair of discourse referents $<S_{at\text{-}issue}, S_{implic}>$.

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[15] We will only remark here that the context required to model speech acts has to incorporate both the notion of *utterance* context involved in the account of demonstratives (Kaplan 1989a, b among others) and the notion of *discourse* context employed in dynamic semantics (Kamp 1981, Heim 1982, Groenendijk & Stokhof 1991, Kamp & Reyle 1993 among others) – in addition to the *cg* and DC_A sets of propositions mentioned above. See also the discussion in Poesio & Muskens (1997).

[16] This distinction is drawn in van der Sandt & Maier (2003), for instance, in discussing partial negation.

[17] This can be viewed as a step towards the realist view of conversational score keeping advocated in Steedman & Stone (2006).

38. If $\|\alpha(A, S)\|(<c, c'>) = T$, then:
in the output context c', there are four discourse referents ε, A, $S_{at\text{-}issue}$ and S_{implic} satisfying the following four conditions: *assert*(ε), CONV_MOVE(ε, V), AUTHOR(ε, A) and CONTENT(ε, S_{at_issue}, S_{implic}).

4.2. Say *reports*

Turning now to *say* reports, their truth conditions require the existence of a source assertive speech act during which the referent of the subject of the verb *say* asserted a sentence *S*. Furthermore, the complement clause *S′* of a *say* report is systematically related to the source sentence *S* in the manner indicated in section **3** above.

Thus, we take the update contributed by a report of the form *A say S′* to be interpreted as a sequence of two updates, the first one $\|A\ say\|$ being contributed by the matrix clause and the second one $\|S'\|$ being contributed by the complement clause. The fact that the complement clause is interpreted relative to the output context of the matrix clause update provides some of the ingredients necessary to account for *de se*, *de nunc* and *de re* readings, Sequence of Tense phenomena etc. We ignore these issues here, but see Abusch (1997), Schlenker (2003), Anand (2006), Maier (2006), Altshuler (2007), Bittner (2007) and Cumming (2007) (among others) and references therein for more discussion.

As shown in (39a) below, the update $\|A\ say\|$ contributed by the matrix clause introduces a new event discourse referent ε, which is the assertion event authored by *A* and which is the source of the report. The attitude verb *say* contributes an anaphoric presupposition to the effect that there is a contextually salient conversation *V* in which the event ε was an assertion move. In (4) above, *V* is the conversation that Jessica and John had on the evening of October 11, 2006. We also introduce two new propositional discourse referents $S_{at\text{-}issue}$ and S_{implic} that are constrained to be the non-presupposed content of the assertion event ε.

Finally, as shown in (39b), the update $\|A\ say\ S'\|$ as a whole contributes a content 'matching' requirement of the kind described in section **3** above between the content $<S_{at\text{-}issue}, S_{implic}>$ of the source assertion event and the content of the complement clause as determined relative to the intermediate context that is the output of the matrix update $\|A\ say\|$.

39. If $\|A\ say\ S'\|(<c, c'>) = T$, then:
c has to contain an old discourse referent *V* for a conversation and there is an intermediate context *c″* such that:
a. $\|A\ say\|(<c, c''>) = T$, i.e. *c″* contains a new event discourse referent ε and two new propositional discourse referents S_{at_issue} and S_{implic} satisfying the following four conditions: (i) the presupposition CONV_MOVE(ε, V); (ii) the at-issue condition *assert*(ε); (iii) the at-issue condition AUTHOR(ε, A) and (iv) the at-issue condition CONTENT(ε, S_{at_issue}, S_{implic});
b. the pair $<S_{at\text{-}issue}, S_{implic}>$ matches in the relevant way the pair $<S'_{at\text{-}issue}, S'_{implic}>$, where $<S'_{presupp}, S'_{at\text{-}issue}, S'_{implic}>$ is the triple of propositional discourse referents associated by the function $\|\cdot\|$ with the complement clause *S′* in the intermediate context *c″*.

Note that the sensitivity of *say* reports to the at-issue/presupposed content divide of the source speech act follows in this account from the differentiation of at-issue content and presupposed content in assertive updates. The report *John said that Mary used to smoke*, based on John's source assertion *Mary stopped smoking* is inaccurate because (39b) is not met: the at-issue content of the source assertion is that Mary doesn't smoke, while the at-issue content of the complement clause of the report is that she used to smoke.

A welcome consequence of the analysis summarized in (39) above is that it enables us to distinguish between a discourse commitment that arises as a result of an assertion event and a commitment that arises as a result of agreeing with someone else's assertion. Thus, we capture the fact that a participant may commit to a proposition *p* in the course of a conversation by agreeing to an interlocutor's assertion of *S* without thereby providing adequate grounds for a

say report. For example, based on the conversation in (40), the report in (41) is felicitous, while the one in (42) is not.

40. Sam to John: *Lives of Others* is a good movie.

    John to Sam: I agree.

41. Sam said that *Lives of Others* is a good movie.

42. #John said that *Lives of Others* is a good movie.

The crucial similarity between belief attributions and *say* reports is that both relate the propositional contents of their complement clause to a set of commitments of their subject, namely doxastic bases **dox** for *believe* and lists of public discourse commitments for *say*. This enables us to capture the fact that both a *say* report and a belief attribution can be based on an assertive speech act – and, ultimately, it will enable us to capture why they both govern indicative in their complement clauses (for example, in Romanian – see Farkas 1985, 1992 and Brasoveanu 2006a) – assuming that indicative is associated with the kind of monotonic update of commitment-related modal bases exemplified in (35) above.

The fact that the assertions of an agent *A* update her set of discourse commitments DC_A also enables us to account for the infelicity of a conversation in which *A* first asserts (43) below and then (44). The infelicity follows from the fact that the modal base DC_A is a sub-type of commitment-related modal bases and, therefore, all the presupposed and at-issue contents stored in it have to be consistent.

43. Mary has stopped smoking.

44. Mary never smoked.

Obviously, if the two sentences in (43) and (44) above are uttered by the same agent but in different conversations, *A*'s inconsistency is not an issue. We would then assume that she changed her mind or that in one of the conversations she was not truthful. This brings gfurther support to the idea that assertion events and discourse commitments must be relativized to particular conversations, much as individual-level and temporal quantifiers are relativized to contextually provided domains.

The differences between *say* and *believe* stem from several sources: (i) a *say* report involves a multi-dimensional discourse commitment $<S_{at\text{-}issue}, S_{implic}>$ that results from an assertion, while a belief attribution involves a **dox** modal base that lumps together all the doxastic commitments of an agent, be they at-issue or presupposed; (ii) unlike *believe*, *say* contributes a "meaning faithfulness" requirement that is sensitive to all three meaning dimensions; (iii) in the case of *believe,* the at-issue content of the complement clause must be an element of the subject's *private* doxastic base, while in the case of *say*, the at-issue content of the complement clause must have been added to the set of *public* discourse commitments of the subject at some point during a conversation.

The public vs. private contrast in (iii) above accounts for the fact that an assertive speech act like the one in (24a)/(34a) above can directly verify the *say* report in (24b), but can only indirectly (i.e. by means of the maxim of Quality) verify the belief attribution in (34b).

The contrasts between *say* and *believe* in (i) and (ii) above capture the differences between them summarized in section **3.3** above and, also, the fact that the *say* report in (46) below

does not intuitively follow from the *say* report in (45), while the belief attribution in (48) intuitively follows from (47)[18].

45. Sam said that Mary has stopped smoking.

46. Sam said that Mary used to smoke.

47. Sam believes that Mary has stopped smoking.

48. Sam believes that Mary used to smoke.

We conclude this section with one final observation about belief attributions and *say* reports as they relate the interpretation of the Romanian subjunctive B mood. Consider John's utterance in (49) below and the corresponding *say* report and belief attribution in (50) and (51) respectively.

49. Ion: Maria este însărcinată.
John: Mary be.ind.pres.3s pregnant.
John: Mary is pregnant.

50. Ion a spus că Maria **ar** fi însărcinată.
John HAVE.ind.pres.3s say.ppart that Mary **subjB**.3s be pregnant.
John said that Mary is/was pregnant.

51. Ion crede/credea că Maria **ar** fi însărcinată.
John believe.ind.pres/impf.3s that Mary **subjB**.3s be pregnant.
John believes/believed that Mary is/was pregnant.

Both *spune* (*say*) and *crede* (*believe*) can govern subjunctive B in their complement clauses. The intuitively most salient difference between the subjunctive B reports in (50) and (51) above and the equally felicitous indicative reports in (52) and (53) below is that the subjunctive B reports contain a *dissociation* component[19].

52. Ion a spus că Maria este însărcinată.
John HAVE.ind.pres.3s say.ppart that Mary be.**ind**.pres.3s pregnant.
John said that Mary is/was pregnant.

53. Ion crede/credea că Maria este însărcinată.
John believe.ind.pres/impf.3s that Mary be.**ind**.pres.3s pregnant.
John believes/believed that Mary is/was pregnant.

Dissociation means that in a report of the form *A says / believes that S*, where *S* is marked with subjunctive B, the speaker dissociates herself from the content of S, i.e. the speaker has reason to believe that this content might be false. Importantly, dissociation signals only that the speaker, unlike the referent of the subject of the attitude predicate, does not have the content of *S* among her doxastic commitments. This might be either because the speaker is agnostic relative to this content or because she is in fact committed to its opposite.

The first question raised by the interpretation of the Romanian subjunctive B mood is: why would such a morpheme exist at all? As McCawley (1978) observed (and Geurts 1998 iterated), the pragmatic default associated with an attitude report of the form *A says / believes that S* is that the content of *S*, call it *p*, is open for debate in the current conversation. Such reports can serve two purposes: they provide information about *A*'s commitment to *p* or they provide support for whether the participants in the current conversation should commit to *p*. The latter can be the case only if *p* is not already in the common ground of the current

[18] We ignore here many of the issues posed by presupposition projection under attitude verbs; for more discussion, see Heim (1992), Geurts (1998) and references therein (among others).

[19] The dissociation component of subjunctive B was first identified in Farkas (1992) with respect to subjunctive B conditionals; Brasoveanu (2006a) further investigates the interpretation of subjunctive B in attitude contexts.

conversation, hence, explicitly mentioning proposition *p* is by default associated with the implicature that *p* is currently open for debate, which in turn might make an overt dissociation marker like subjunctive B redundant.

However note that, since our doxastic bases are by default overlapping, another agent's assertive speech acts, e.g. John's assertion in (49) above, can be (and often are) taken as grounds for accepting the truth of the propositions they express: by their very nature, these speech acts are proposals to update the common ground of the current conversation, i.e. they are by default put forth as acceptable to every participant in the conversation (and the default reaction is to indeed accept them into the common ground). It is with respect to this default that the dissociation component of subjunctive B makes sense: unlike the indicative reports in (52) and (53) above, the subjunctive B reports in (50) and (51) explicitly indicate that the default importation of John's discourse commitments into the common ground of the current conversation should be blocked.

The situation is similar with belief attributions. Finding out that a trustworthy agent has *p* in her doxastic base may count as grounds for accepting *p* into our own base. Subjunctive B in the complement of *believe* signals that the speaker is not following this route. Subjunctive B therefore signals a discrepancy between the doxastic base of the attitude holder and that of the speaker relative to the propositional content of the complement: the attitude holder is doxastically committed to the propositional content of the complement, while the speaker is not.

5. Conclusion

In this paper, we studied the parameters that come into play when assessing the truth conditions of *say* reports and contrasted them with belief attributions. The basic observation is that a *say* report crucially refers to an assertive speech act event whose author is the referent of the syntactic subject of *say*. The two novel observations are that (i) *say* reports are anaphoric to a conversation in which the assertion event that is reported on must have occurred and (ii) the meaning of the complement clause of the *say* report has to 'match' the meaning of the linguistic expression that the source speech act takes as argument.

This 'matching' / faithfulness to the meaning requirement targets all the meaning dimensions of the sentence asserted in the source speech act event: the at-issue entailments and implicatures of the complement clause must follow from the at-issue entailments and implicatures of the source sentence respectively and the presupposition/at-issue content division of the source sentence must be preserved in the complement clause. Intuitively, the "faithfulness to meaning dimensions" requirement follows from the basic fact that *say* is a speech act reporting verb – therefore, what the report says and how the report says it (i.e. as an at-issue content / presupposition / implicature) has to correspond to what the source assertion says and how the source assertion says it.

There are three general areas this exercise is relevant to, besides the immediate issue of understanding the meaning of *say*. First, the discussion shows the need to go beyond the simplest view of propositional attitudes, which treats them as restricted quantifiers over worlds. Second, the complex connections that must exist between the *say* report and its source speech act show that one has to be able to differentiate between various layers of meaning for the antecedent sentences.

Finally, this paper is a small step towards a typology of propositional attitudes that allows us to uncover the complex web of relationships that grammatical mood is sensitive to. For example, the distribution of the three verbal moods in Romanian (indicative, subjunctive A and subjunctive B) is clearly interpretation-driven and the fine-grained distinctions drawn by

this three-mood system between different kinds of attitude predicates and conditional structures suggest the existence of previously unnoticed semantic universals.

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