

Evidentiality and Intensionality: Two Uses of Reportative Constructions in Discourse

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In addition to their standard intensional use, many reportative verbs, such as *say*, *report*, *claim*, *acknowledge*, and *concede*, as well as adverbials like *according to Sharon*, have an evidential use, as pointed out by [6]:

- (1) a. A: Why is John absent from the meeting?
 b. B: Sharon said that he is out of town.

If the standard intensional use of *say* was at issue here, B's utterance would not count as an answer to A's question. It is not plausible that John is absent from the meeting because Sharon said that he was out of town; rather, what B is suggesting is that John is probably absent because he is out of town. The information that Sharon said what she did serves an evidential purpose: to support the claim that B is making.

The distinction between evidential and intensional uses of reportative constructions is important for theories of discourse interpretation, and partial implementations thereof, which aim to extract information from actual discourses. Examining the MUC6, MUC7 and ACE2 corpora, we have found a multiplicity of uses of reportative embedding verbs; moreover, we have found over 700 occurrences of various forms of *say* in MUC6 alone. Thus, a proper treatment of these verbs is necessary for a correct analysis of the semantics and discourse structure of stories in these corpora. The only extant theory that uses reportative verbs to mark segments is Marcu's version of RST [4], but it does not distinguish between the two uses of reportative verbs.

1 Evidential v. Intensional

The evidential and intensional uses of reportative verbs are clearly different semantically and discursively. Semantically, the evidential use of *say* validates,

- Say $\phi \vdash \phi$

whereas the intensional use plainly does not. This semantic difference has discursive effects. In their intensional use, non-factive embedding verbs should license modal subordination, but they need not support anaphoric links to elements in extensional contexts. In particular, they do not support anaphoric

links from indefinites under the scope of the verb to elements in extensional contexts¹.

- (2) a. Although there are no witches and what John says must be wrong, John said that a witch lives near him. #She belongs to a Wiccan society down the block.
- b. Although there are no witches and what John says must be wrong, John said that a witch lives near him. He also said that she belongs to a Wiccan society down the block.

On the other hand, evidential uses of reportative verbs allow felicitous anaphoric links from indefinites under the scope of embedding verbs to nonmodal contexts:

- (3) Fred said that John is calling about a new apartment he wants to buy. It's on the Avenue de Lespinet.

In our corpus, we have found numerous anaphoric links between anaphors and their antecedents, many in contexts under the scope of a reportative embedding verb, which would be blocked by DRT-like accessibility constraints if these verbs had their customary intensional sense. This is evidence that these embedding verbs are being used in an evidential manner. Here is an example from MUC6, after we have segmented the text into elementary discourse units (EDUs).

- (4) a. 1 :: Amr corp.'s American Airlines unit said
- b. 2 :: it has called for federal mediation in its contract talks with unions representing its pilots and flight attendants.
- c. 3 :: A spokesman for the company said
- d. 4 :: American officials "felt
- e. 5 :: talks had reached a point where mediation would be helpful"...
- f. 8 :: The president of the Association of Professional Flight Attendants, which represents American's more than 10,000 flight attendants, called the request for mediation "premature".

We first note that *mediation* in (4b) is an indefinite under the scope of an embedding verb, and that there is a reading of *mediation* in (4e) (equivalent to *such mediation*) that links (4b) and (4e) anaphorically. The MUC6 annotation concurs with this anaphoric interpretation. However, this anaphoric link looks like a reference within modal contexts, and we suppose that sophisticated theories of anaphora can handle such cases. What interests us is the link between the definite in (4f) and the eventuality introduced under the scope of the saying verb in (4b). This is not a case of modal subordination and goes against both DRT constraints of accessibility and SDRT constraints of availability.

¹They may support anaphoric links from proper names and definites, but this is assumed to be because proper names and definites take wide scope over embedding verbs.

[4] uses a relation of Attribution to capture evidential uses. It’s unclear what the arguments of this relation are but we can fit such a relation into the SDRT framework by letting the relation be 1) the constituent given by matrix clause, with the *that* clause’s argument slot filled with an existentially quantified variable, and 2) the constituent given by the embedded clause. The matrix clause is a satellite in RST; therefore, when two segments are related by Attribution, the constituent under the scope of the embedding verb remains on the right frontier of the discourse structure and is predicted, if a Right Frontier Constraint is adopted, to be available for further attachment, to be a source for antecedents in the text, and to function as an argument for previous relations. It’s not clear what the semantics of Attribution is in the RST framework, nor exactly what the scope or the interpretation of the reportative verb is. Let us suppose that it’s veridical in the SDRT sense ([1]) with respect to the embedded clause argument. This gets us the right result for (1b): it attributes John’s absence to the fact that he is out of town. It also provides an intuitive analysis of the discourse structure in (4): it licenses the anaphoric link between *mediation* in (4e) and its intended antecedent and also allows (4b) and (4f) to be related by Narration or Continuation. This analysis respects the annotators’ intuitions about the relation between (4b) and (4f): the president’s comments are a response to American’s calling for mediation—not to American’s saying that they are calling for mediation.

On the other hand, this analysis, which treats reportative verbs univocally as evidentials, cannot make sense of simple examples like:

- (5)
- a. 24 :: Rep. James Traficant (D., Ohio), said
 - b. 25 :: the amendment, which passed 271-147, would “let the American worker know that we consider them occasionally.”
 - c. 26 :: But Rep. Hammerschmidt said
 - d. 27 :: that the provision, which he dubbed a “special interest” amendment, was likely to make the bill even more controversial.

In (5), the two views are contrasting and the author means to endorse neither view. Nor can this analysis explain the contrast in (2).

Now suppose that [4] intends Attribution to be non-veridical. In this case, the analysis will not be able to handle evidential uses of reportative verbs, as these uses demand a veridical interpretation of the embedded clause. An even worse problem is that if Attribution is not veridical, no contents can be attached to the embedded clause with a veridical relation such as Result, without greatly complicating the semantics. It is difficult to see how the embedded clause can factor into relations that entail that it is veridical, if we do not interpret the clause veridically.

An alternative way to treat evidential uses of reportative verbs is to omit the matrix clause from the discourse content altogether, as in [7]. [7] is concerned with relating only abstract objects in discourse and argues that attributions are not genuine discourse relations because they relate individuals to abstract objects, namely propositions. [7] does not, however, omit the matrix clause

when the intensional use of a reportative verb is at issue. (Nor does [7] segment such uses between the matrix clause and the embedded clause.) We like that this analysis is sensitive to the two uses of reportative verbs and sympathize with the concerns about the ontological nature of discourse segments. However, we think there are overriding concerns which support the claims that both the matrix clause and the embedded clause should be contributed to discourse content in all cases and that both intensional and evidential uses of reportative verbs should be segmented at the matrix clause. Thus we agree with [4] in leaving the matrix clause in the discourse content for evidential uses; but we agree with [7] in holding that a clear distinction needs to be drawn between intensional and evidential uses of reportative verbs.

2 Content and Segmentation

Like [5], we believe that compositional semantics contributes the contents of both the matrix clause and the embedded clause to discourse interpretation, regardless of whether the use of the reportative verb turns out to be evidential or intensional. It is the discourse context—that precedes the report and also what attaches to it—that determines whether a report counts as intensional or evidential. Once a report is introduced in discourse, a speaker can choose to pick up on either the saying itself or on the embedded content. Which content the speaker will choose cannot be known beforehand, so both contents must be available.

- (6)
- a. A: Why didn't Louise come to the party?
 - b. B: Henry thinks she left town.
 - c. C: She hasn't left town. I saw her at the market today.
 - d. C: He doesn't think that. I talked to him yesterday.

In (6c), C is assuming that B used the reportative verb as an evidential and is correcting and presenting counterevidence to B's claim that Louise left town. In (6d), C is assuming that B used the reportative verb in its intensional sense, and is correcting and presenting counterevidence to B's claim that Henry thinks that Louise left town. Both responses are equally felicitous, so both contents must be available.

Moreover, sometimes it may be unclear as to which use is at issue given the preceding discourse context and the EDU with the reportative clause. Alternatively, speakers may comment on the content of the matrix clause and the content of the embedded clause at the same time, as the following examples reveal.

- (7)
- a. Why didn't Louise come to the party?
 - b. B: Henry said she left town.
 - c. C: He's wrong. I saw her at the market today.

(7b) is clearly to be understood as an evidential given that it is the content of the embedded clause that determines the answer to the *why* question. On the other hand, to fully understand C's response the reportative verb clause must be part of the discourse structure.

- (8)
- a. Why didn't Louise come to the party?
 - b. B: Henry said she left town.
 - c. C: No, no. I saw her at the market today.
 - d. C: And furthermore, that's not what he said.

In the context of (8a,c) (8b) is interpreted evidentially. B offers (8b) as an answer to the *why* question, and C corrects the content of what B said Henry said. C then goes on to correct B's claim that Henry said what B claims. Without having the information that Henry said something in B's conversational contribution, along with the content of what Henry said, we cannot interpret (8d).

The deletion of the content of the matrix clause in evidential uses, as in [7], involves a deletion of compositional semantic content—content which, we have seen, is often needed for the interpretation of discourse. A further point is that it seems that deletion of the matrix clause in evidential uses can only take place *after* the appropriate rhetorical structure has been inferred between two already extant constituents. To give a semantic and pragmatic story of reportative verbs and their arguments, we need to have both the constituent given by the matrix clause and the constituent given by the embedded clause in order to reason appropriately about their combined contributions to the discourse context.

In addition to our claim, supported by the examples above, that the contents of both the matrix clause and the embedded clause are contributed to the discourse content in all cases, we maintain that reports should be segmented between the matrix clause and the embedded clause in all cases, contra [7] Again, when the report is given, both the matrix content and the embedded content are available for further conversational turns or further discourse to comment on, contrast with or correct. Which of these two contents will be chosen cannot be known beforehand. That is, the distinction between the intensional use and the evidential use of reportative verbs is one that is made when it comes time to integrate the report and its matrix clause in the discourse context. A theory of attachment like SDRT's glue logic needs to be able to reason about the two constituents in order to determine what relation holds between them and what relations hold between the report as a whole and the discourse context. Thus to hold, as we do, that reports should be segmented in the evidential case but not in the intensional case would be unmotivated.

3 Our Account

Using SDRT we account for evidential and intensional uses of reportative verbs, as well as their discourse structure, by using two different discourse relations between the matrix clause content and the embedded clause. For the evidential

use, we postulate an evidence relation, based on the Counterevidence relation in [1]. For the intensional reading, we introduce an Attribution relation. Evidence, like Counterevidence, is a subordinating relation; but unlike Counterevidence, it is veridical in both arguments ([2]). Attribution, however, is a relation that is non-veridical with respect to its right argument. Another difference between the two relations is that while Attribution yields a discourse structure in which the embedded clause is subordinate to the main claim, with the evidential use it's the other way around.

Nevertheless, the two uses of the verbs are clearly related. We postulate in fact that the evidential use derives from the intensional use using Gricean reasoning from SDRT. Specifically, Competence and Sincerity give us a derivation that what is said is true. We assume that if the subject of the report says something then, defeasibly, he believes it and if he believes it, then so should we, unless we have reason to think otherwise. This derivation takes us quickly to the evidential, or veridical, use. In this way, the intensional use is conceptually primary, while the evidential use is derivative.

In order to make explicit the core similarity between the two discourse structures and how the two structures come about, we underspecify the way the syntax of the report construction contributes to compositional and discourse context. Normally, when we have an argument of an intensional verb given by a *that* clause or CP, we have a single logical form of the following kind:

- (9) a. John said that ϕ
 b. $say(j, \wedge \phi)$

If this is the contribution of lexical and compositional semantics to discourse, however, segmentation and the two ways of construing the discourse contributions of reportative constructions requires revising this logical form and “cutting it into two”. It makes more sense to take the semantic contribution to be two constituents whose relation is not yet specified:

- (10) a. $\pi_1 : \exists p say(j, p)$
 b. $\pi_2 : p = \wedge \phi$
 c. $R(\pi_1, \pi_2) \wedge R = ?$

The syntax semantics interface makes it clear that the embedded clause is an argument of the intensional verb; the contents of the embedded clause and matrix clause must be related to each other and further the variable in the second argument of the reportative verb must be identified with the proposition expressed by the embedded clause. However, the interface underspecifies the way in which the contents of the matrix and embedded clauses are to be related to each other. That is left up to the glue logic in SDRT. Depending on the discourse context and the sort of clues we discuss, we end up with one of the two following discourse structures.

INTENSIONAL USE	EVIDENTIAL USE
$\begin{array}{c} \tau : x \text{ say } p \\ \\ \tau_\varphi \\ p = K_\varphi \end{array}$	$\begin{array}{c} \tau_\varphi \\ \\ \tau : x \text{ say } p \\ p = K_\varphi \end{array}$

In order for the compositional semantics to do this, we need to specify this discourse semantics at the lexical level. The entry for a reportative verb V must be something like this:

- (11) a. $\lambda P \lambda x \{$
 b. $\pi_1 : \exists p V(x, p),$
 c. $\pi_2 : p = P$
 d. $R(\pi_1, \pi_2) \wedge R = ? \}$

Having sketched our account of what lexical and compositional semantics gives to discourse interpretation in the case of reportative constructions, we now turn to the discursive features of this construction. In annotating our texts, we assume that the evidential use is more probable because in most cases that we have encountered so far, there is no reason offered to disbelieve the embedded content of a given report. The move to an intensional use is triggered by discourse cues which precede or follow a particular use of a reportative verb. For example, if we have a contrast between two points of view, the intensional use is preferred, especially if the two views clash semantically. On the other hand, if the content under the scope of the embedding verb is used to determine a discourse relation to the next constituent or a previous constituent, the evidential reading will be preferred. Parenthetical uses of reportative verbs also signal the evidential use. SDRT's glue logic allows us to write rules to this effect.

4 Treatments of Complex Examples

Our procedure so far deals with the evidential and intensional uses separately. But what about those examples where both uses seem to be in play? We can deal with these to some extent in SDRT. Consider (8) again:

- (8) a. A: Why didn't Louise come to the party?
 b. B: Henry said she left town.
 c. C: No, no. I saw her at the market today.
 d. C: And furthermore, that's not what he said.

And furthermore provides a good clue that C's two turns are to be linked; together they form a complex constituent that corrects B's turn. More precisely, we treat the structure in the following way. (8b) is interpreted evidentially so that B's response functions as an answer to A's question. (8c) marks a Correction of the embedded clause's contribution (π_{8b1}) to the evidential construction in (8b). So thus far we have:

- IQAP(π_{8a}, π_{8b1})
- Evidence(π_{8b1}, π_{8b2})
- Correction(π_{8b1}, π_{8c})

Given Correction(π_{8b1}, π_{8c}), we cannot attach π_{8d} to π_{8b2} . However, by using the MDC principle of [1], we can first link π_{8c} and π_{8d} via Continuation and then link the resulting constituent via Correction to the complex constituent consisting of π_{8b1} , π_{8b2} , and the Evidence relation that holds between them. (We do this while also putting the IQAP relation into dispute as in [1].).

5 Conclusions

A study of embedding verbs in discourse has wider implications for the architecture of any theory of discourse interpretation. The semantics of embedding verbs is a good case study for examining the interactions between discourse and lexical semantics. Embedding verbs show that the standard pipeline architecture is not correct; discourse structure seems to be responsible for disambiguating or specifying the lexical content of reportative verbs. The study of reportative verbs suggests a complex interaction between lexical and discourse semantics of the sort postulated by [1].

References

- [1] N. Asher and A. Lascarides (2003): *Logics of Conversation*. Cambridge University Press.
- [2] M. Faller (2002): *Semantics and Pragmatics of Evidentials in Cuzco Quechua*. Ph.D. Dissertation, Stanford University.
- [3] J. Hooper (1975): ‘On Assertive Predicates,’ in J. Kimball (ed.), *Syntax and Semantics* 4, 91-124.
- [4] L. Carlson, D. Marcu, and M.E. Okurowski (2003). ‘Building a Discourse-Tagged Corpus in the Framework of Rhetorical Structure Theory,’ in J. van Kuppevelt and R. Smith (eds.), *Current Directions in Discourse and Dialogue*, Kluwer Academic Publishers, 85-112.
- [5] M. Simons (under review): ‘Observations on Embedding Verbs, Evidentiality and Presupposition,’ available on her website.
- [6] J.O. Urmson (1952): ‘Parenthetical Verbs,’ *Mind* 61, 480-496.
- [7] N. Dinesh, A. Lee, E. Miltsakaki, R. Prasad, A. Joshi, B. Webber (2005): ‘Attribution and the (Non-) Alignment of Syntactic and Discourse Arguments of Connectives.’ In *Proceedings of the ACL Workshop on Frontiers in Corpus Annotation II: Pie in the Sky*, Ann Arbor, Michigan.