The Reportative Evidential and Multiple Information States
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1. Introduction In this paper, I deal with the Japanese reportative (hearsay) evidential -soo. Evidentials encode what type of evidence the speaker has for the proposition. The reportative -soo indicates that the speaker heard the proposition from someone else. (1) is the relevant paradigm. (1a) shows that sentences of the form $\phi$-soo cannot be followed by those of the form $\neg\phi$, but can be followed by sentences containing the attitude verb believe. (1b) shows that if the reporter of $\phi$ is encoded explicitly, $\neg\phi$ can follow $\phi$-soo even if the former does not contain any attitude verb. Below, I introduce some previous studies that treat evidentials in languages other than Japanese, and show that it is inadequate to apply their analyses to -soo. After that I present my proposal and its implication.

(1) a. Ame-ga futteiru-soo-da. shikashi futte-nai/ fut-tei-nai-to-omou. rain-Nom dropping-Pres-soo-Cop. but dropping-Neg/ dropping-Neg-she-believe. ‘I heard it is raining. But #it isn’t raining/I believe it is not raining.’
b. Taro-ga iu-niwa ame-ga fut-tei-ru-soo-da. Taro-Nom according-to rain-Nom drop-Prog-Pres-soo-Cop Shikashi futte-nai. But dropping-Neg ‘From Taro, I heard it is raining. But it is not raining.’

2. Previous works Faller 2002 analyzes the Cuzco Quechua reportative evidential -si as an illocutionary operator, and argues that it alters the sincerity condition of assertions, a condition which have to be met in order for an utterance to be sincere. Specifically:

(2) Assertion[$\text{SINC} = \{\text{Bel}(s,p)\}] \rightarrow \text{Assertion plus } -\text{si } [\text{SINC} = \{\exists x(\text{Assert}(s_2, p) \land s_2 \not\in \{s,h\})\}]$

(SINC= sincerity condition, Bel(s,p)= the speaker believes p, h = the hearer) Faller suggests that a sentence of the form $\phi$-si are compatible with the following sentence which asserts $\neg\phi$, since Bel(s,p) is absent from the former. In Japanese, however, $\phi+$reportative is incompatible with the following $\neg\phi$. Therefore Faller’s analysis cannot be applied to Japanese.

Matthewson et al. 2007 treat St’át’imcets evidentials as epistemic modals, providing the reportative -ku7 with the following modal-like semantics.

(3) $||-ku7||\epsilon w$ is only defined if context c provides a modal base B such that for all worlds w, w' $\in$ B(w) iff the reported evidence in w holds in w'. If defined, $||-ku7||\epsilon w$ = $\lambda f_{s,t,h} [\lambda p_{s,t} [\forall w' [w' \in f (B(w)) \rightarrow p(w')]]$, where f is a choice function which picks out a subset of B(w).

If this modal-like analysis is applied to -soo, it will correctly predict the incompatibility of $\phi$-soo with the following $\neg\phi$, since, in Japanese, modal($\phi$) is incompatible with the following $\neg\phi$. However, modal($\phi$) is incompatible also with the following believe($\neg\phi$). If -soo is treated on a per with modals, the compatibility of $\phi$-soo with believe($\neg\phi$) (in (1a)) cannot be explained.

3. Proposal My proposal is based on dynamic semantics, specifically on the mechanism proposed by McCready 2015. In his framework, the information state is divided into substates, each of which is associated with and indexed by its evidence-type, and the substate indexed with i is updated by sentences with the indication that evidence of the type i exists.

(4) $\sigma_i \subseteq \sigma_j$ for i $\in$ Source, where Source = {reportative (Rep), inferential (Inf), …}

(5) $\sigma[E_\phi] = \sigma'$ where, for all $\sigma_i \subseteq \sigma$, $\sigma'_j = \sigma_j[\phi]$ if i = j and $\sigma'_j = \sigma_j$ if i $\neq$ j

$\sigma_G$ is the global information state, which can be considered to be the standard information state. $E_\phi$ is a proposition with the indication of the existence of evidence of the type i.)

I modify a part of McCready’s mechanism: he treats substates as members of $\sigma$, but I treat them as subsets of $\sigma$. This move allows us to assume a substate which is not indexed by any i, a substate that represents the information with no evidence, that is, an agent’s belief. This substate is represented as $\sigma_B$. McCready also introduces the plausibility ordering of worlds, and forms of update that take into consideration the ordering between worlds contained in substates.
(6) $\sigma[\phi] = \sigma'$, where $S' = \{ s \in S \mid s \models \phi \}$ and $s \leq_a t$ iff $s \leq t$ & $s, t \in S'$

(7) $\sigma[\phi] = \sigma'$, where $S' = S$ and $s \leq_a t$ iff either (i) $s \not\models \phi$ and $t \in s(a) \cap \phi$, or (ii) $s \leq t$.

$S$ is a set of worlds in state $\sigma$. $s, t$ are worlds, $s \leq t$ represents that agent $a$ considers $t$ to be at least as plausible as $s$. $s(a)$ is a set of worlds comparable to $s$. (6) is a familiar form of update plus the designation that ordering between worlds must be left intact. (7) means that as a result of update, $\phi$-worlds are ordered higher than $\neg \phi$-worlds.

With this framework, I assume that the form of update by $\phi$ is (6), and that of update by $E\phi$ is (7). That is, $\phi$-sooo, which indicates that there is some Reportative evidence for $\phi$, updates $\sigma_{Rep}$, resulting in $\phi$-worlds being ordered higher than $\neg \phi$-worlds in $\sigma_{Rep}$. I also assume that sentences without evidential markers update $\sigma_G$ (the global update). In addition, when it is explicit who the reporter is, as in (1b), the sentence updates not only what the agent knows, but what she knows that the reporter knows, i.e., the information state associated with the reporter, represented as $\sigma_{Rep}$. (Maier 2015 adopts a similar operation in the framework of DRT). Even if an agent acquires $\phi$, it does not follow that what she knows that others know is updated, so that sentences with no indication of reporters do not update any of $\sigma_{Rep}$. All of these are formulated as follows (Reporter($x$)) means that $x$ is the reporter of the proposition:

(8) $\sigma_{Rep} \not\subseteq \sigma_G$

(9) $\sigma[\phi] = \sigma_G[\phi]$ if $\phi$ is of the form $\psi$, and $\sigma[\phi] \models \psi$ if $\phi$ is of the form $E_i\psi$

(10) $\sigma_G[\phi] = \sigma'[\phi]$ for every $i \in$ Source

(11) $\sigma[\phi] = \sigma_G[E_i\psi]$ and $\sigma'[\psi]$ if $\phi$ is of the form Reporter($x$)$\wedge E_i\psi$.

Allowing the global update raises a question. In McCready’s mechanism, every information acquisition accompanies some evidence. For example, if an agent hear $\phi$ from someone, her information state is updated by $E_{Rep}\phi$, since $\phi$ is acquired from reportative evidence. Thus, it follows that we cannot deal with information with no evidence. I will address this crucial problem in the presentation.

4. Illustration In the first case of (1a) (without attitude verbs), the first sentence orders rain-worlds higher than $\neg$rain-worlds in $\sigma_{Rep}$, and the second sentence eliminates all the rain-world. In this case, even if the first sentence does not exist, the resulting state is the same: there remain only $\neg$rain-worlds. This means that the first sentence does not make any contribution, which is conversationally inefficient. Thus, it is natural to assume the following pragmatic principle, which makes the first case of (1a) deviant:

(12) If the ordering by $\sigma[\phi]$ does not affect $\sigma[\phi \wedge \psi]$, it is conversationally uneconomical.

Why is the second case of (1a) (with the attitude verb believe) acceptable? I propose that the update by $\text{believe}(\phi)$ targets $\sigma_B$, ordering $\phi$-worlds in $\sigma_B$ higher than $\neg \phi$-worlds. This assumption is justified given the characteristic of $\sigma_B$. Thus, since $\text{believe}(\text{rain})$ updates $\sigma_B$, the contribution of the first sentence remains after the second update, hence acceptability. In (1b), since the first sentence is of the form Reporter(Taro)$\wedge \text{rain}$, not only $\sigma_{Rep}$ but also $\sigma_{Taro}$ get updated. The second sentence, which accompanies no indication of reporters, updates only $\sigma$, without influencing $\sigma_{Taro}$. Thus the contribution of the first sentence remains in $\sigma_{Taro}$, not violating (12).

5. Implication The key of my analysis lies in dividing the information state and introducing $\sigma_{Rep}$. Given that $\sigma_{Rep}$ represents what an agent knows that reporters know, it will be updated by sentences with attitude verbs whose subjects are not the speaker, e.g., John believes that it is raining will not update $\sigma$ but $\sigma_{John}$. To my knowledge, studies in update dynamic semantics have not focused on attitude verbs. This paper will be a basis of future dynamic studies in them.