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Evidentials and Questions in Cheyenne

Recent research on evidentials has led to formally explicit semantic analyses of various languages, including Cuzco Quecha [2, 3], St'át'imcets [5], Kalaallisut [1], and Japanese [6]. Interaction with questions and other diagnostics distinguish *illocutionary* evidentials from *propositional* evidentials. Roughly speaking, illocutionary evidentials (found e.g. in Cuzco Quechua [2, 3] and Kalaallisut [1]) are interpreted like English parentheticals, whereas propositional evidentials (found e.g. in St'át'imcets [5] and German [3]) are more like modals.

My fieldwork on Cheyenne (15 weeks over three field trips) reveals a more complex semantic typology. Cheyenne evidentials behave like illocutionary evidentials in declaratives, but not in questions, where they can shift the illocutionary force. Building on [4], I propose a semantic analysis of Cheyenne evidentials in declaratives and questions that satisfies three desiderata: (i) it is fully compositional (like [4]); (ii) it distinguishes the evidential and the propositional contributions without positing a separate level of illocutionary meaning (contra [2]), and (iii) it accounts for the intuition that both contributions affect the truth conditions (contra [2]).

Cheyenne Data: Crosslinguistically, illocutionary reportatives do not imply that the proposition in their scope is true, false, or even possible ([2], [3], [1], a.o.). In contrast, propositional reportatives imply that it is at least an open possibility [5]. Cheyenne exhibits the illocutionary pattern, shown in (1). However, as shown in (2), illocutionary reportatives do imply that the speaker has heard the proposition in their scope (both diagnostic examples are based on [2]).

(1) *É-hááána-sėstse* *naa+oha* *é-sáa-hááána-he-∅*
3-hungry-RPT.3SG but 3-NEG-hungry-*h(an)e*-DIR
'He's hungry, they say, but (in fact) he isn't hungry,'

(2) # *É-hááána-sėstse* *naa+oha* *ná-sáa-né-néstó-he-∅*
3-hungry-RPT.3SG but 1-NEG-that-hear.B-*h(an)e*-DIR
'He's hungry, I hear, but I didn't hear that'

In declaratives, Cheyenne reportatives (and other evidentials) consistently exhibit illocutionary (parenthetical-like) behavior (see [3], [1]). In both yes/no and wh-questions, however, one expected reading (reported question) is missing. Instead, wh-questions have a novel reading, which shifts a wh-question Q to an *I wonder* Q statement. Yes/no questions are unambiguous

Yes/no questions in Cheyenne can be formed with a suffix, *-he* (Q_1 in (3)), or a clitic, *mo=* (Q_2 in (3)). The suffix *-he* fills the evidential slot, so *-he* questions are incompatible with evidentials. In contrast, *mo=* questions allow evidentials, e.g. the reportative *-séstse* in Q_2.

(3) Q_1: *É-háeana-he?* ✓A_1/✓A_2
3-hungry-*he*
'Is he hungry?'

Q_2: *Mó=é-hááána-sėstse?* ✓A_1/# A_2
mó=3-hungry-RPT.3SG
'Is he hungry? (asks for reportative answer)'

(4) A_1: *Héehe'e é-hááána-sėstse*
Yes 3-hungry-RPT.3SG
'Yes, he's hungry, I hear.'

A_2: *Héehe'e é-hááána-∅*
Yes 3-hungry-DIR
'Yes, he's hungry.'

This contrast affects the felicitous answers. A *-he* question can be answered with any evidential – e.g. Q_1 in can be answered by either A_1 or A_2 in (4). In contrast, the evidential in a *mo=* question specifies the type of evidence for the requested answer – e.g. only A_1 is a felicitous answer to Q_2, A_2 is not. Q_2 cannot be interpreted as a reported question, e.g. '[she] asked, is he hungry?', a common interpretation of illocutionary reportative evidentials in questions ([2], [1]).

Analysis of Declaratives: I propose to account for the distinction between the propositional and the evidential contributions by treating declarative sentences as denoting (characteristic functions

of) sets of propositions (a la [4]). If the evidential condition is met, this set is the singleton of the proposition in the evidential's scope. If the evidential condition is not met, this set is empty.

This idea is implemented in Ty_2 with type-driven translation. I use the assignment function to represent context: the variables i, x, and $\mathsf{x'}$ are assigned to the actual world, the speaker, and the addressee respectively. Third person morphology translates as a free variable ('3_n' $\rightsquigarrow \mathsf{z_n}$). The translations of sentences (1) and (2) are given in (5): (5i) is the translation of the first conjunct of both (1) and (2), (5ii) is the second conjunct of (1), and (5iii) is the second conjunct of (2).

(5) i. $\lambda\mathsf{p}.\,(\mathsf{p} = \lambda\mathsf{j}.\mathsf{hungry}(\mathsf{j},\mathsf{z_1})) \wedge \mathsf{hear}(\mathsf{i},\mathsf{x},\mathsf{p})$
ii. $\lambda\mathsf{p}.\,(\mathsf{p} = \lambda\mathsf{j}.\neg\mathsf{hungry}(\mathsf{j},\mathsf{z_1})) \wedge \mathsf{i} \in \mathsf{p} \wedge \mathsf{believe}(\mathsf{i},\mathsf{x},\mathsf{p})$
iii. $\lambda\mathsf{p}.\,(\mathsf{p} = \lambda\mathsf{j}.\neg\mathsf{hear}(\mathsf{j},\mathsf{x},\lambda\mathsf{j'}.\mathsf{hungry}(\mathsf{j'},\mathsf{z_1}))) \wedge \mathsf{i} \in \mathsf{p} \wedge \mathsf{believe}(\mathsf{i},\mathsf{x},\mathsf{p})$

Given these representations of declaratives, truth value is defined as follows.

D1. $P \in D_{(st)t}$ has a truth value in $\mathcal{M}$ under g iff $\exists p \in D_{st}([\![P]\!]^{\mathcal{M},g} = \{p\})$.
D2. $P \in D_{(st)t}$ is true in $\mathcal{M}$ under g iff $\exists p \in D_{st}([\![P]\!]^{\mathcal{M},g} = \{p\}\ \&\ g(i) \in p)$.

The evidential contribution determines if an expression has a truth value (D1). Both contributions determine what the truth value is (D2). The proposition in the evidential's scope is asserted only if it is entailed by the evidential contribution – not true of the contribution of the reportative.

Analysis of Yes/No Questions: Given this analysis of declaratives, questions ask for a proposition and an evidential relation that the addressee bears to that proposition. To implement this idea, I translate questions as functions from evidential relations to sets of propositions. The translations of the yes/no questions in (3) and the answers in (4) are given below.

($3Q_1'$) $\lambda\mathsf{R}.\lambda\mathsf{p}.\ \mathsf{EVI}(\mathsf{R}) \wedge (\mathsf{p} = \lambda\mathsf{j}.\mathsf{hungry}(\mathsf{j},\mathsf{z_1}) \vee \mathsf{p} = \lambda\mathsf{j}.\neg\mathsf{hungry}(\mathsf{j},\mathsf{z_1})) \wedge \mathsf{R}(\mathsf{i},\mathsf{x'},\mathsf{p})$

($3Q_2'$) $\lambda\mathsf{R}.\lambda\mathsf{p}.(\mathsf{p} = \lambda\mathsf{j}.\mathsf{hungry}(\mathsf{j},\mathsf{z_1}) \vee \mathsf{p} = \lambda\mathsf{j}.\neg\mathsf{hungry}(\mathsf{j},\mathsf{z_1})) \wedge \mathsf{R} = \mathsf{hear} \wedge \mathsf{R}(\mathsf{i},\mathsf{x'},\mathsf{p})$

($4A_1'$) $\lambda\mathsf{p}.(\mathsf{p} = \lambda\mathsf{j}.\mathsf{hungry}(\mathsf{j},\mathsf{z_1})) \wedge \mathsf{hear}(\mathsf{i},\mathsf{x'},\mathsf{p})$ ($4A_2'$) $\lambda\mathsf{p}.(\mathsf{p} = \lambda\mathsf{j}.\mathsf{hungry}(\mathsf{j},\mathsf{z_1})) \wedge \mathsf{i} \in \mathsf{p} \wedge \mathsf{believe}(\mathsf{i},\mathsf{x'},\mathsf{p})$

Given these representations of questions, answerhood conditions are defined as follows.

D3. $Q \in D_{(se(st)t)(st)t}$ is answerable in $\mathcal{M}$ under g iff $\exists R \in D_{se(st)t} \forall h(\varnothing \subset [\![Q]\!]^{\mathcal{M},h}(R))$.
D4. $P \in D_{(st)t}$ is an answer to $Q \in D_{(se(st)t)(st)t}$ in $\mathcal{M}$ under g iff
$\exists R \in D_{se(st)t}(\varnothing \subset [\![P]\!]^{\mathcal{M},g} \subseteq [\![Q]\!]^{\mathcal{M},g}(R)\ \&\ \forall h([\![P]\!]^{\mathcal{M},h} \subseteq [\![Q]\!]^{\mathcal{M},h}(R)))$.

Parallel to declaratives, the evidential contribution in questions determines whether the question can be answered (D3). Both contributions determine what an answer is (D4).

WH-Questions: Cheyenne wh-questions, as in (6), display the same pattern as yes/no questions but have an additional, novel interpretation.

(6) *Tósa'e* *é-vo'éstanéheve-sėstse* (i) 'Where does he live? (asks for reportative answer)'
where 3-live-RPT.3SG.A (ii) 'He lives somewhere, I wonder where'

Interpretation (i) of (6) is parallel to the yes/no questions discussed above: it is a question, analyzed as a function from evidential relations to a set of propositions. Interpretation (ii) of (6), typically distinguished by context, is a statement – not a question. Like other declaratives, it is treated as a set of propositions. The other Cheyenne evidentials have similar effects on wh-questions: they shift the illocutionary force but contribute an attitude other than wondering.

Selected References

[1] Bittner, M. 2008. Grammatical centering. `http://rci.rutgers.edu/~mbittner/`.
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[6] McCready, E. & N. Ogata. 2007. Evidentiality, modality and probability. *L&P*, 30(2):147–206.