

Two different types of inference in evidentials: efficacy vs. doxastic worlds

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Variable evidentiality. Korean evidential *-te-* (Chung 2007, Lee 2013, a.o.) and Bulgarian evidential *-l* (Izvorski 1997, Smirnova 2013, Koev 2017, a.o.) introduce what we call *variable evidentiality*. In (1), Korean *-te-* introduces the implication that the speaker perceived the event denoted by the prejacent (direct evidentiality) or the implication that the speaker infers the prejacent based on perceived evidence (inferential evidentiality), depending on the absence/presence of a tense. Similarly, (2) shows Bulgarian *-l* can be used when the speaker has inferential or hearsay evidence (inferential vs. hearsay evidentiality: Smirnova 2013, a.o.).

- (1) a. Pi-ka o-te-la. 'It is raining.'
Rain-Nom come-*te*-Decl (~> I saw that it rained)
b. Pi-ka o-ass-te-la. 'It rained.' (~> I infer that it rained from
Rain-Nom come-Past-*te*-Decl perceived evidence such as the wet ground)
- (2) Maria svirela na piano. 'Maria plays the piano.'
Maria Plays.Imperf.Pres.Ple on piano (~> I heard/I inferred)

Relative tense? Lee (2013) proposes that a tense under *-te-* should be evaluated not against the utterance time (UT) but against the time when the speaker learned the evidence (Learning Time, LT): when LT follows the time when the event of the prejacent occurred (Event Time, ET), the past tense is used, whereas when LT overlaps with ET, no overt tense is used. That is, the variability is due to the relation between ET and LT. Similarly, Koev (2017) argues that the indirectness is because *-l* requires the prejacent be spatiotemporally distant from the perceived evidence, and unlike *-l*, *-te-* allows the temporal *and* spatial overlap between the prejacent and the perceived evidence. However, with respect to the temporal relation, both Lee and Koev assume that a tense under an evidential expresses the relation between LT and ET, not UT and ET.

Puzzles. However, there are several issues which cannot be explained by relative tense analyses. (i) Both *-te-* and *-l* require the direct perception-based inference: the speaker cannot obtain evidence based on pure reasoning. This is why Smirnova claims that *-l* requires *externally experienced evidence*, and we may be tempted to apply this analysis to *-te-*. (ii) However, while *-l* can introduce variable evidentiality between hearsay and inference, *-te-* cannot. For example, neither (1a) nor (1b) is felicitous under a scenario where the speaker only heard the raining event from someone else, without having any direct evidence. Finally, (iii) a more detailed examination shows that (1a) also involves inference: in (1a), the evidence should be directly perceived before UT; (1a) can be uttered only if the speaker cannot see the raining event anymore. However, in (1a) the speaker still makes commitment to the prejacent which holds in the *present* (see the translation). Without any overt past temporal adverb, if the speaker does not believe at UT that it is raining, (s)he cannot utter (1a), which means that the tense of the prejacent is evaluated with respect to UT, not with respect to LT (Hoe et al. 2020). Now, the following issues arise. In (1a), the speaker commits the prejacent just relying on an inference based on the past perceived evidence. Then, what is the nature of such inference? And how do two inferences in (1a) and (1b) differ from each other?

Tense and the not-at-issue meaning of *-te-*. To account for these, let us assume the followings. First, we lexically specify that in *-te-*, LT should precede UT (which explains why sometimes *-te-* is classified as past: Chung 2007, a.o.). Notice that it is not a mere stipulation, since (1b) cannot be uttered when the speaker is watching the wet ground at UT even if the inference from the perception of the wet ground to the past event of raining arises properly: there should be a temporal restriction between LT and UT in using *-te-* (cf. Lee 2013; Koev 2017). Second,

we claim that the tense under *-te-* is evaluated not against LT, but against UT (contra relative tense theory). Lastly, we distinguish between the evidence source and the evidence type (Krawczyk 2012), and assume that in *-te-*, the evidence source is direct perception, but the evidence type is inference:

- (3) The not-at-issue meaning introduced by *-te-*: (i) the evidence acquired by the evidence holder via her direct perception should be efficaciously linked to the event denoted by the prejacent, and; (ii) LT should precede UT.

Given all, this, we argue that the inference of *-te-* is based on *efficacy* condition:

- (4) The efficacy condition (slightly revised from Copley & Harley 2015): for two events, e_1 and e_2 , e_1 is efficacious with respect to e_2 iff e_2 will naturally follow from e_1 if e_1 holds and there is no intervening force which prevents e_1 from holding.

Variable evidentiality of *-l*. Similar to *-te-*, we argue that *-l* does not utilize relative tense (Arregui et al. 2017), and its evidence source is direct perception, and its evidence type is inference. To explain differences, however, we further argue that the inference introduced by *-l* is based on the possible worlds compatible with evidence, like (epistemic) modals (Izvorski 1997; Smirnova 2013; cf. Koev 2017). This also explains why *-l* allows hearsay evidentiality: as a modal, it introduces an independent attitude holder, whose report of the prejacent the speaker perceives. Due to a perspective shift from the speaker to this attitude holder (Ander-Bois 2014; Pancheva & Rudin 2019, a.o.), this attitude holder makes commitment to the prejacent, while the speaker does not. The variability on *-l*, then, can be explained in terms of the *optionality* of the perspective shift.

Korean *-te-* explained. In (1a), because of (3ii), the speaker should perceive the raining event (e_1 : it was raining) before UT (that is, LT<UT). Since there is a covert present tense marker in (1a), the speaker ‘infers’ that e_1 before UT should be naturally extended to the event denoted by the prejacent (e_2 : it rains), to satisfy (3i) and (4). Here a minimal inference obtains, which we think has been misread as direct evidentiality. In contrast, (1b) is acceptable when the speaker can infer the past raining event (e_3 : it rained) from the perceived event of the ground being wet (e_4). Since e_4 entails that it is not raining any more at LT, due to (4), we can expect that e_4 is extended up to UT, and this is why the past tense *-ess-* is used: before UT (and before LT) it rained, but it is not raining any more at UT. Furthermore, in (1b), while perceiving e_4 , the speaker can expect that there was a stronger event which prevented e_3 from holding up to LT. Finally, we can explain why (1b) cannot be read as if it conveyed the direct evidentiality. By using the garden-variety past tense *-ess-* (evaluated with respect to UT), the prejacent in (1b) becomes *it rained* (e_3), implying that the rain must stop at some time point t_1 (before UT). However, suppose that the speaker saw the pouring rain at LT (<UT): e_5 . Here, due to the efficacy condition (which says that an event should be extended if there is no stronger force preventing it from happening), e_5 is not guaranteed to stop at t_1 , but it should be extended after t_1 : hence infelicity.

Not a variability on *-te-*. Our analysis implies that there is no genuine variable evidentiality in Korean *-te-*. In (1a) the speaker minimally infers the prejacent at UT from the perceived event at LT(<UT), and in (1b) the speaker infers the prejacent at ET(<LT) from the perceived one at LT(<UT). In both cases, the speaker makes inference based on the efficacy. Furthermore, since efficacy-based inference is based on the inertia of events in the external world (Copley & Harley 2015), it does not need to employ an independent attitude holder, unlike doxastic based one; hence there can be no perspective shift. This explains why *-te-* excludes hearsay evidentiality.

Two predictions on *-te-*. First, since the speaker with *-te-* makes an inference based on efficacy, the behavior of *-te-* is different from epistemic modals. Second, the speaker’s commitment to the prejacent becomes weaker than the plain declaratives. Both predictions seem born out. As shown in (5a), A’s statement based on the plain declarative can be echoed by an inquisitive

rising declarative (IrD) in the sense of Jeong (2018). In (5b), even if *-te-* is used, only the prejacent can be echoed, in parallel with (5a). A statement with an epistemic modal, however, behaves differently as shown in (6). Note that, since a rising declarative requires a *dependent* commitment (Gunlogson 2008, a.o.), using an IrD is different from the well-known assent/dissent test regarding evidentials (Faller 2002, a.o.) or epistemic modals (Papafragou 2006, a.o.). Thus, we can conclude that A's commitment to the prejacent in (5b) differs from the one in (6), considering B' *dependent* commitment; rather, it is similar to the one in (5a). However, A's response to the IrD further reveals that it is still *weak*: only in (5b), *amato* 'probably' can be uttered, signaling A's relatively low credence level to the prejacent.

- (5) (After seeing that it is raining outside, A comes into the room, and B asks A what's the weather like outside now. A answers...)
- a. A: Pakk-ey pi-ka o-a. 'It is raining outside at UT.'
 Outside-Loc rain-Nom come-Decl
 B: Cincca pi-ka o-n-tako? 'It is really raining?'
 Really rain-Nom come-Pres-Q.ECHO
 A: Ung, cincca. / #Amato. 'Yes, really. / #Probably.'
- b. A: Pakk-ey pi-ka o-te-la. 'It is raining outside at UT.'
 Outside-Loc rain-Nom come-*te*-Decl (with direct evidentiality)
 B: Cincca pi-ka o-n-tako? 'It is really raining?'
 A: (?)Ung, cincca. / Amato. '(?)Yes, really./ Probably.'
- (6) A: Pakk-ey pi-ka thullim.epsi o-a. 'It must be raining
 Outside-Loc rain-Nom necessarily come-Decl outside at UT.'
 B: # Cincca pi-ka o-n-tako? '#It is really raining?'

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