The Effect of Prosody on Veridicality Inferences in Korean

Talk presented at LENLS 16

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https://github.com/sunwooj/veridicality/

Veridicality inferences

The inference that the propositional argument of an attitude predicate (*know*, *regret*, *forget*, *remember*, *be right*, etc.) is true

(1) Wheein *knows* that Moonbyul went home.
⇝ Moonbyul went home.

(2) Wheein *is right* that Moonbyul went home.
⇝ Moonbyul went home.

Veridicality inferences

The inference that the propositional argument of an attitude predicate (*know*, *regret*, *forget*, *remember*, *be right*, etc.) is true

(1) Wheein *knows* that Moonbyul went home.
$\rightsquigarrow$ Moonbyul went home.

(2) Wheein *is right* that Moonbyul went home.
$\rightsquigarrow$ Moonbyul went home.

(3) Wheein *believes* that Moonbyul went home.
$\not\rightsquigarrow$ Moonbyul went home.

Factive inferences

Veridical inferences that show characteristic behaviors of presupposition

(4) a. Wheein knows that Moonbyul went home.
⇝ Moonbyul went home.

b. Wheein doesn't know that Moonbyul went home.
⇝ Moonbyul went home.

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(5) a. Wheein is right that Moonbyul went home.
$\rightsquigarrow$ Moonbyul went home.

b. Wheein isn't right that Moonbyul went home.
$\not\rightsquigarrow$ Moonbyul went home.

Factivity: Issues

Source?

- Verb ('factive' verbs) Hintikka (1962), Karttunen (1974)
- Complement clause Kiparsky and Kiparsky (1970)
- Interaction between verb and complement Ozyildiz (2017)

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Derivation?

- Conventionally encoded e.g., $\ldots \lambda p : p \ldots$
- Pragmatically derived
- (Underspecified) Conventions + Pragmatics

The Korean data

Veridicality inferences arise systematically from certain V+CP combinations, but only under certain prosody

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(6) Solar-neun Moonbyul-i noraeha-n-jul <u>án-da</u>
Solar-NOM Moonbyul-NOM sing-PP-C <u>know</u>-DEC

≈ 'Solar knows that Moonbyul sang.'
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When they arise, they behave like presuppositions

The Korean data

Prosodically-conditioned factive inference

When veridicality inferences that are presuppositional in nature arise only under certain prosody, even within local contexts

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Prosodically-conditioned factive inference

When veridicality inferences that are presuppositional in nature arise only under certain prosody, even within local contexts

Implications to theories of factive inferences

- Systematic variation in factivity below the level of projection
- The role of prosody and alternatives on generating factive inferences

Overview: The account

- Posits a general pragmatic reasoning process that targets discourse salient alternatives
- Proposes a principle that governs how alternatives come into contrast with each other
- Interpretations of verbs that are presuppositionally underspecified can come to obtain factive interpretations when they enter into contrast with factive alternatives
- Asymmetries in meaning between positive vs. negative attitude verbs play a role

Complementizer: *geot*

Types of complementizers may systematically affect factive inferences (Ozyildiz 2017, Lee 2018a, i.a.): e.g., nominal complementizer *geot* in Korean

(8) Solar-neun Moonbyul-i noraeha-n-geot-eul an-da
Solar-NOM Moonbyul-NOM sing-PP-NC-ACC know-DEC
≈ 'Solar knows (the fact) that Moonbyul sang.'
⇝ Moonbyul sang.

Complementizers: *geot*

Factive inference arises regardless of the choice of attitude verbs (cf. Turkish):

- *al-* 'know, believe (based on evidence)'
- *mit-* 'believe'

(9) Solar-neun Moonbyul-i noraeha-n-geot-eul mitneun-da
Solar-NOM Moonbyul-NOM sing-PP-NC-ACC believe-DEC
≈ 'Solar believes (the fact) that Moonbyul sang.'
⇝ Moonbyul sang.

Connection between nominalization morphology and factivity (Moulton 2009, Kastner 2015, Hanink and Bochnak 2017, i.a.)

Complementizers: *go*

- Has a quotative flavor
- Embeds a clause which is fully inflected in mood
- Can combine with a wide range of attitude verbs

(10) Solar-neun Moonbyul-i noraeha-ess-da-go an-da
Solar-NOM Moonbyul-NOM sing-PAST-DEC-C know-DEC
≈ 'Solar believes (based on evidence) that Moonbyul sang.'
?⇝ Moonbyul sang.

Factive inference may or may not arise when combined with verbs such as *al-*, *gieokha-*, etc.

See also Lee (2018a)

Complementizers: *jul*

- Combines with a more restricted range of attitude verbs: *al-* 'know', *moreu-* 'not know', *gieokha-* 'remember', *ggameok-* 'forget', *yaegyeonha-* 'predict', etc.
- Embeds a clause which is not fully inflected in mood

(11) Solar-neun Moonbyul-i noraeha-n-jul an-da
Solar-NOM Moonbyul-NOM sing-PP-C know-DEC
≈ 'Solar believes (based on evidence) that Moonbyul sang.'
?⇝ Moonbyul sang.

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Complementizers: summary

- Certain complementizers (e.g., *geot*) can function as an independent source of factivity.
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- Others however (e.g., *go* or *jul*), do not reliably generate factive inferences. $\rightarrow$ Source of factivity must trace back to factors other than (just) complementizers.
- Key factors: verb type and prosody.

Attitude verbs

Cases with complementizers like *go-* and *jul-*: presence of factive inference depends partly on verb type

- Combined with *al-* 'know/believe based on evidence', *gieokha-* 'remember', etc.: Factive inferences may reliably emerge, depending on prosody
- Combined with *saengakha-* 'think' and *mit-* 'believe', etc.: Factive inferences do *not* arise, regardless of prosody

Attitude verbs: *al-*, *gieokha-*

(12) Solar-neun Moonbyul-i noraeha-n-jul an-da
Solar-NOM Moonbyul-NOM sing-PP-C know-DEC

≈ 'Solar believes (based on evidence) that Moonbyul sang.'
?⇝ Moonbyul sang.

(13) Solar-neun Moonbyul-i noraeha-ess-da-go gieokhan-da
Solar-NOM Moonbyul-NOM sing-PAST-DEC-C remember-DEC

≈ 'Solar remembers that Moonbyul sang.'
?⇝ Moonbyul sang.

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Solar-NOM Moonbyul-NOM sing-PAST-DEC-C remember-DEC

≈ 'Solar remembers that Moonbyul sang.'
?⇝ Moonbyul sang.

- Translations correspond roughly to (semi-)factives in English: *know*, *remember*, etc.
- Factive inference may systematically arise, depending on prosody

Attitude verbs: *saengakha-*, *mit-*

(14) Solar-neun Moonbyul-i noraeha-ess-da-go saengakhan-da
Solar-NOM Moonbyul-NOM sing-PAST-DEC-C think-DEC
≈ 'Solar thinks that Moonbyul sang.'
$\not\rightsquigarrow$ Moonbyul sang.

(15) ?Solar-neun Moonbyul-i noraeha-n-jul mitneun-da
Solar-NOM Moonbyul-NOM sing-PP-C believe-DEC
≈ 'Solar believes that Moonbyul sang.'
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- Translations correspond roughly to (non-)factives in English: *think*, *believe*, etc.
- Factive inference cannot arise, irrespective of prosody

The meaning of *al-*

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≈ 'Solar believes (based on evidence) that Moonbyul sang.'

a. Context: The tour manager told Solar that Moonbyul sang.
b. #Context: Solar is convinced that Moonbyul sang because she had promised so before.

See also the Turkish data from Ozyildiz (2017)

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Attitude verbs: summary

- Certain attitude verbs such as *al-* and *gieokha-* appear to contribute some meaning component that plays a role in deriving factive inferences
- Other attitude verbs such as *mit-* and *saengakha-* do not appear to contribute any analogous factivity-deriving meaning component
- Given the variation in factive inferences, verbs such as *al-* and *gieokha-* likely do not directly encode factivity

The meaning of *al-* & *gieokha-*

- $\mathscr{K}$: Some kind of extended epistemic accessibility relations which govern beliefs/knowledge formed based on 'conclusive' or 'sufficient' evidence (conclusive/sufficient from the point of view of the agent); i.e., akin to 'know' but without the factive inference
- $\mathscr{M}$: Some kind of mnemonic accessibility relations akin to 'remember', but without the factive inference

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Working gloss:

- *al-*: '$\mathscr{K}$'
- *gieokha-*: '$\mathscr{M}$'

Prosody

go, jul + *al-, gieokha-*:

Prosodic effects: generalizations

- Veridicality inferences arise when the matrix attitude verb bears the nuclear pitch accent (henceforth NPA)
- Veridicality inferences do not arise when any element of the embedded clause bears the primary accent instead

(17) Solar-neun Moonbyul-i noraeha-n-jul án-da
Solar-NOM Moonbyul-NOM sing-PP-C know-DEC
≈ 'Solar knows that Moonbyul sang.'
⇝ Moonbyul sang.

See also Lee (2018b)

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Solar-neun	Móonbyul-i	noraeha-n-jul	an-da
Solar-NOM	Moonbyul-NOM	sing-PP-C	know-DEC

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See also Lee (2018b)

Prosody

When veridicality inferences do arise, they appear to be *factive* in nature

(19) Eojjeomyeon Solar-neun Moonbyul-i noraeha-n-jul
perhaps1 Solar-NOM Moonbyul-NOM sing-PP-C
ál-jidomo-la
know-perhaps2-DEC
≈ 'Perhaps Solar knows that Moonbyul sang.'
⇝ Moonbyul sang.

Presuppositional behaviors, as long as the NPA remains on the matrix verb

Cross-linguistic observations

Akin to prosodic effects on factive inferences documented in Turkish (Ozyildiz 2017) and English (Beaver 2010, Tonhauser 2016, and Simons et al. 2017); the latter though at the level of projection

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(20) a. If the TA discovers that your work is $\underline{[\text{plagiarized}]_F}$, I will be [forced to notify the Dean]$_F$.

b. If the TA $\underline{[\text{discovers}]_F}$ that your work is plagiarized, I will be [forced to notify the Dean]$_F$.

Beaver (2010)

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Generalization for English: Not-at-issue content projects (Simons et al. 2010, Simons et al. 2017)

Variation in factivity

- Much previous work: capturing variation in factivity *projection*
  - Local vs. global accommodation (Heim 1983, Van der Sandt 1992, i.a.)
  - Pragmatic, discourse-based accounts (Abusch 2010, Simons et al. 2017, i.a.)

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  - Pragmatic, discourse-based accounts (Abusch 2010, Simons et al. 2017, i.a.)
- The current analysis: in the vein of pragmatic accounts

Key ingredients

Components of the analysis

1. Prosody (NPA) marks focus, and focus constrains relevant pragmatic alternatives

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Key ingredients

Components of the analysis

1. Prosody (NPA) marks focus, and focus constrains relevant pragmatic alternatives
2. There exists a general pragmatic reasoning process which gives rise to the presupposition that the disjunction of these alternatives is true (see also: Abusch 2010, Simons et al. 2017)
3. Alternatives of attitudinal predicates that feed into the above pragmatic process cannot contrast along more than one semantic dimension.

Focus & pragmatic alternatives

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(21) a. $[\![\text{Moonbyul}]\!]^o = \text{MOONBYUL}$

b. $[\![\text{Moonbyul}]\!]^f = \{x \mid x \in D_e\}$
$= \{\text{MOONBYUL}, \text{WHEEIN}, \text{HWASA}, \text{SOLAR} \ldots\}$

Back to the examples

Pointwise functional applications, generating the following focus alternatives:

(22) $[\![$ Solar-neun Moonbyul-i noraeha-n-jul [an$_F$]-da $]\!]^f$
$[\![$ Solar-NOM Moonbyul-NOM sing-PP-C know-DEC $]\!]^f$
$= \{ p : \text{Solar } R \text{ that Moonbyul sang} \}$
$= \{$ Solar *al-* that Moonbyul sang, Solar *moreu-* that Moonbyul sang, Solar *gieokha-* that Moonbyul sang, $\ldots \}$

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Pointwise functional applications, generating the following focus alternatives:

(22) ⟦Solar-neun Moonbyul-i noraeha-n-jul [an$_F$]-da⟧^{f}
⟦Solar-NOM Moonbyul-NOM sing-PP-C know-DEC⟧^{f}

= { p : Solar R that Moonbyul sang }
= { Solar *al-* that Moonbyul sang, Solar *moreu-* that Moonbyul sang, Solar *gieokha-* that Moonbyul sang, . . . }

(23) ⟦Solar-neun [Moonbyul$_F$]-i noraeha-n-jul an-da⟧^{f}
⟦Solar-NOM Moonbyul-NOM sing-PP-C know-DEC⟧^{f}

= { p : (Solar *al-* that) x sang }
= { (Solar *al-* that) Moonbyul sang, (Solar *al-* that) Hwasa sang, (Solar *al-* that) Wheein sang . . . }

Back to the examples

ALT_φ: Context-sensitive pragmatic alternatives of $\varphi \rightarrow$ Non-empty, non-singleton subset of $[\![\varphi]\!]^f$, which includes φ itself (Simons et al. 2017)

(24) Solar-neun Moonbyul-i noraeha-n-jul [an$_F$]-da
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(25) Solar-neun [Moonbyul$_F$]-i noraeha-n-jul an-da
Solar-NOM Moonbyul-NOM sing-PP-C know-DEC

$\text{ALT}_{(25)}$ = { (Solar *al-* that) Moonbyul sang, (Solar *al-* that) Hwasa sang }

Negative suppletive counterparts necessarily included in cases like (24)

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(26) Who sang?

a. $\text{ALT}_{(26)} = \{$ Moonbyul sang, Solar sang, Wheein sang ... $\}$

b. $\rightsquigarrow$ Someone sang

(27) [Moonbyul]$_F$ sang

a. $\text{ALT}_{(27)} = \{$ Moonbyul sang, Solar sang, Wheein sang ... $\}$

b. $\rightsquigarrow$ Someone sang

Abusch (2010), Simons et al. (2017)

Pragmatic analyses

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If ψ embeds a clause φ which introduces ALT_φ, then the local context of φ entails the disjunction of ALT_φ

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Simons et al. (2017)

ALT_φ = Question Under Discussion (Roberts 1996, Ginzburg 1996)

- A factive presupposition φ projects iff the current Question Under Discussion (QUD), as indicated by focus, entails φ
- A question entails φ if a disjunction of its elements (i.e., possible answers to the question) entails φ

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(28) $[\![al\text{-}]\!]^{o} = \lambda p.\lambda x.\lambda w.\mathscr{K}_{w}(x, p)$

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(28) $[\![al\text{-}]\!]^o = \lambda p.\lambda x.\lambda w.\mathscr{K}_w(x, p)$

(29) Working analysis – to be discarded
$[\![(24)]\!]^f = \{\, \mathscr{K}_w(S, p) \wedge p,\ \neg\mathscr{K}_w(S, p) \wedge p, \ldots \}$

Extending the ALT-based account

(30)

Solar-neun	[Moonbyul$_F$]-i	noraeha-n-jul	an-da
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(30) Solar-neun [Moonbyul$_F$]-i noraeha-n-jul an-da
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a. $\text{ALT}_{(30)}$ = { Solar *al-* that Moonbyul sang, Solar *al-* that Hwasa sang }

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a. $\text{ALT}_{(30)}$ = { Solar *al-* that Moonbyul sang, Solar *al-* that Hwasa sang }

b. $[\![al\text{-}]\!]^o = \lambda p.\lambda x.\lambda w.\mathscr{K}_w(x, p)$

c. $\vee\text{ALT} = \mathscr{K}_w$(Solar, Moonbyul sang) $\vee$ $\mathscr{K}_w$(Solar, Hwasa sang)

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(30) Solar-neun [Moonbyul$_F$]-i noraeha-n-jul an-da
Solar-NOM Moonbyul -NOM sing-PP-C know-DEC

a. $\text{ALT}_{(30)}$ = { Solar *al-* that Moonbyul sang, Solar *al-* that Hwasa sang }

b. $[\![al\text{-}]\!]^o = \lambda p.\lambda x.\lambda w.\mathscr{K}_w(x, p)$

c. $\vee\text{ALT} = \mathscr{K}_w$(Solar, Moonbyul sang) $\vee$ $\mathscr{K}_w$(Solar, Hwasa sang) $\rightsquigarrow$ Solar $\mathscr{K}$s that someone sang.

Extending the ALT-based account

(31) Solar-neun Moonbyul-i noraeha-n-jul [an$_F$]-da
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(31) Solar-neun Moonbyul-i noraeha-n-jul [an$_F$]-da
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a. $\text{ALT}_{(31)} = \{$ Solar *al-* that Moonbyul sang, Solar *moreu-* that Moonbyul sang $\}$

b. Working analysis – to be discarded
$[\![(31)]\!]^f = \{ \mathscr{K}_w(S, p) \wedge p,\ \neg\mathscr{K}_w(S, p) \wedge p, \ldots \}$

Extending the ALT-based account

(31) Solar-neun Moonbyul-i noraeha-n-jul [an$_F$]-da
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$[\![(31)]\!]^f = \{ \mathscr{K}_w(S, p) \wedge p,\ \neg\mathscr{K}_w(S, p) \wedge p, \ldots \}$

c. $\vee$ALT = ($\mathscr{K}_w$(Solar, Moonbyul sang) $\wedge$ (Moonbyul sang)) $\vee$ ($\neg\mathscr{K}_w$(Solar, Moonbyul sang) $\wedge$ (Moonbyul sang))

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a. $\text{ALT}_{(31)} = \{$ Solar *al-* that Moonbyul sang, Solar *moreu-* that Moonbyul sang $\}$

b. Working analysis – to be discarded
$[\![(31)]\!]^f = \{ \mathscr{K}_w(S, p) \wedge p,\ \neg\mathscr{K}_w(S, p) \wedge p, \ldots \}$

c. $\vee\text{ALT} = (\mathscr{K}_w(\text{Solar, Moonbyul sang}) \wedge (\text{Moonbyul sang})) \vee (\neg\mathscr{K}_w(\text{Solar, Moonbyul sang}) \wedge (\text{Moonbyul sang}))$
$\rightsquigarrow$ Moonbyul sang.

Extending the ALT-based account

But these assumptions seem stipulative!

(32) $[\![al\text{-}]\!]^o = \lambda p.\lambda x.\lambda w.\mathscr{K}_w(x, p)$

(33) Working analysis – to be discarded
$[\![(24)]\!]^f = \{\, \mathscr{K}_w(S, p) \wedge p,\ \ \neg\mathscr{K}_w(S, p) \wedge p, \ldots \}$

Can we motivate the reason why verbs such as *al-* may obtain enriched factive interpretations only when they are evaluated as an element of the alternative set?

Lexical asymmetry

Positive/negative counterparts!

- *al-* '$\mathscr{K}$', *moreu-* 'not know'
- *gieokha-* '$\mathscr{M}$', *ggameok-* 'forget'

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Negative verbs do appear to lexically encode factivity:

(34) Hwasa-neun Wheein-i ga-n-jul móreun-da
Hwasa-NOM Wheein-NOM leave-PP-C notknow-DEC
≈ 'Hwasa doesn't know that Wheein left.'
⇝ Wheein left.

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(35) Hwasa-neun Whéein-i ga-n-jul moreun-da
Hwasa-NOM Wheein-NOM leave-PP-C notknow-DEC
≈ 'Hwasa doesn't know that Wheein left.'
⇝ Wheein left.

The analysis

A new interpretive principle:

Unidimensional Heterogeneity of Alternatives

Elements of a discourse salient set of alternatives ALT that enter into the disjunctive pragmatic inference $\vee$ALT can vary only along a single semantic dimension.

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A new interpretive principle:

Unidimensional Heterogeneity of Alternatives

Elements of a discourse salient set of alternatives ALT that enter into the disjunctive pragmatic inference $\vee$ALT can vary only along a single semantic dimension.

(36) Attitudinal predicates in ALT can contrast with each other in only one of the two following semantic dimensions:

a. relation between proposition p and agent x's mental state

b. relation between proposition p and the actual world

The analysis

(37) Semantic dimensions of attitude verbs:

a. relation between p and agent x's mental state **R1**

b. relation between p and the actual world **R2**

Attitude verbs may lexically encode both **R1** and **R2**, or just **R1**

- *moreu-* specifies both: $\neg\mathscr{K}$ relation between x and p, and $w \in p$ relation between w and p
- *al-* specifies only the former: $\mathscr{K}$ relation between x and p; it is underspecified with regards to whether $w \in p$ (i.e., whether p is true)

Back to the data

When *al-* is not focused: observes the principle

(38)

Solar-neun	Móonbyul-i	noraeha-n-jul	an-da
Solar-NOM	Moonbyul -NOM	sing-PP-C	know-DEC

≈ 'Solar believes (based on evidence) that Moonbyul sang.'

$\not\rightsquigarrow$ Moonbyul sang.

Back to the data

When *al-* is focused: violates the principle

(39) Solar-neun Moonbyul-i noraeha-n-jul [an$_F$]-da
Solar-NOM Moonbyul-NOM sing-PP-C know-DEC

Back to the data

When *al-* is focused: violates the principle

(39) Solar-neun Moonbyul-i noraeha-n-jul [an$_F$]-da
Solar-NOM Moonbyul-NOM sing-PP-C know-DEC

(40) $\text{ALT}_{(39)} = \{ \mathscr{K}_w(S, p),\ \neg\mathscr{K}_w(S, p) \wedge p \}$

- **R1** and **R2** aspects of *moreu-* is already fixed
- **R1** aspect of *al-* already contrasts with that of *moreu-*
- The only possible enrichment: *al-* in $\text{ALT}_{(24)}$ in effect interpreted as $\mathscr{K}_w(S, p) \wedge p$

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- **R1** aspect of *al-* already contrasts with that of *moreu-*
- The only possible enrichment: *al-* in $\text{ALT}_{(24)}$ in effect interpreted as $\mathscr{K}_w(S, p) \wedge p$
- $(\mathscr{K}_w(S, p) \wedge p) \vee (\neg\mathscr{K}_w(S, p) \wedge p) \rightsquigarrow p$ (Moonbyul sang)

Pragmatic motivation

Regarding the factive presupposition of *know*, Stalnaker (1977) notes:

> *If a speaker were to assert that x knows that P where the truth of P is in doubt or dispute, he would be 'saying in one breath something that could be challenged in two different ways', thus leaving unclear 'whether his main point was to make a claim about the truth of P, or to make a claim about the epistemic situation of x'*

Stalnaker (1977): 206

See also Abusch (2010)'s discussion of this analysis

Pragmatic motivation

Comparison with Stalnaker (1977): the drive to convey a single dimension of meaning arises only when it is at-issue

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Comparison with Stalnaker (1977): the drive to convey a single dimension of meaning arises only when it is at-issue

- Arises when the associated expression enters into active contrast with alternatives (i.e., when the expression is ALT-generating)
- Under many views of how alternatives function in the discourse, ALT-generating property is considered to be closely associated with the 'at-issue' status of a given meaning
- Need for the core contrast that is at-issue to be *uniquely* identified by the listener

Conclusion

- Provided an analysis of *prosodically conditioned factive inferences* in Korean, focusing on:
  - non-factive complementizer *jul*
  - verbs such as *al-* 'know', *moreu-* 'not know', *gieokha-* 'remember', and *ggameok-* 'forget'

Conclusion

- Provided an analysis of *prosodically conditioned factive inferences* in Korean, focusing on:
  - non-factive complementizer *jul*
  - verbs such as *al-* 'know', *moreu-* 'not know', *gieokha-* 'remember', and *ggameok-* 'forget'
- Certain verbs may not directly encode factivity, but nevertheless come to reliably obtain factive inferences when information-structurally, they enter into active contrast with their factive alternatives
- Asymmetric lexical encoding of factivity among pairs of verbs plays a role

Looking ahead

- Can the analysis be extend to cover analogous data involving other complementizers, e.g., *go*?
- A controlled experiment gathering patterns of veridical inferences in Korean across a wide range of verbs, complementizers, and prosody is currently underway

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Thank you!!

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