



subjunctive complements for the NF use of ‘know.’

In emotive factive predicates such as ‘regret’, however, their negation does not nullify their factivity. Observe (4). The complement ‘she married a foreigner’ is still true. The same holds in Korean.

- (4) Mary does not regret that she married a foreigner.

Korean is different in the negation of the epistemic factive verb *al-ta* ‘know’; the negation cannot make the verb non-factive at all, if the complement form of the factive verb *al-ta* is intact with ACC in the negative *al-ta* sentence. Examine (5) (cf. (7)).

- (5) Na-nun chinkwu-ka cwuk-un  
 I-TOP friend-NOM die-PreN  
 kes-**ul** al-ci mos hay-ss-ta  
 COMP-ACC know-CI NEG PST-DEC  
 ‘I didn’t know that my friend died.’

A question sentence cannot make *al-ta* ‘know’ with ACC NF in Korean either, unlike in English.

The Korean verb *al-ta* ‘know’ becomes non-factive in a purely positive sentence unlike in other languages if it takes the directional (DIR) (oblique) complementizer case. We try to characterize this phenomenon epistemologically.

### 3 The Non-factive Positive verb *al-ta* in Korean

This paper addresses the non-factive positive verb *al-ta* ‘know,’ as opposed to the factive positive verb *al-ta* ‘know,’ rather unique in Korean (Lee 1978), and shows how its negated complement clause can undergo neg-raising just like other non-factive epistemic verbs such as ‘think’ and ‘believe.’ It discusses how the distinction between the non-factive vs. factive uses of the verb *al-ta* occurs via difference in complementizer cases: DIR(ECTIONAL) vs. ACC. Consider the pairs.

#### 3.1 Its form

- (6) [non-factive]  
 Mina-nun chinkwu-ka cwuk-un  
 M-TOP friend-NOM die-PreN

kes-**uro** al-ass-ta  
 COMP-**DIR** know-PST-DEC  
 ‘Mina knew toward (literally) it that her friend died.’

- (7) [factive]  
 Mina-nun chinkwu-ka cwuk-un  
 M-TOP friend-NOM die-PreN  
 kes-**ul** al-ass-ta  
 COMP-**ACC** know-PST-DEC  
 ‘Mina knew that her friend died.’

Because the factive verb *al-ta* ‘know’ is a transitive verb, it is natural to expect the ACC complementizer case, as in (7). The so-called complementizer *kes* ‘thing’ involved is a dependent nominal traditionally and can take cases. The ACC complementizer case with a factive presupposition gives the sense of hitting the target even cognitively, whereas the oblique DIR case with no factive presupposition does not and rather gives the sense of going astray. In motion, ACC is telic, whereas DIR is atelic.

#### 3.2 Its epistemic nature

What would be the real difference in the epistemic states between the subject or the epistemic agent of (6) and that of (7)? How about between the speaker of (6) and that of (7)? For (7), at least the subject and the speaker must commonly know that P because it is factively presupposed. How about (6)? The speaker does not know that P but the subject = the epistemic agent of the verb in (6) may know that P possibly false so it can turn out to be false or true. Just like ‘false belief,’ ‘false knowledge’ may be involved, though like a contradiction in the traditional justified true belief (JTB) definition in (8).

- (8) S knows that p iff  
 a. p is true; (if false, you cannot know p)  
 b. S believes that p;  
 c. S is justified in believing that p.

The NF ‘know’ can be caused by the Gettier Problem:

- (9) --- the clock on campus (which keeps accurate time and is well maintained) stopped working at 11:56 pm last night, and has yet to be repaired.

On my way to my noon class, exactly twelve hours later, I glance at the clock and form the belief that the time is 11:56., thinking that I know the time--- JTB can still involve luck and thus fall short of knowledge. -[*Interenet Encyclopedia of Philosophy* ---Peer-reviewed]

Our ‘false knowledge’ may involve inductive fallacy as in white swans with no black ones attested leading to ‘know’ that swans are white. Because of this fallibility, we use hedges like ‘As far as I know.’ Our experience is limited for **justifying** our true belief. Knowledge entails belief, but not vice versa, a la Hintikka (1962). The non-factive verb *al-ta* ‘know’ is used by its epistemic agent’s epistemic state of more justification with some solid evidence than other belief type epistemic verbs such as *mit-ta* ‘believe’ and *sayngkakha-ta* ‘think’ by their epistemic agent’s epistemic state of justification.

Contexts for (6) above, NF, may be either a or b: a. Mina saw her friend’s name in the toll list (evidence), so (6), but later she got a call from him. So Mina’s initial justified belief (which led her to use *al-ta* ‘know’) that he died has been falsified. b. Mina rushed to her friend who collapsed with cardiac arrest beyond the critical point, so (6). Transport with desperate continuing CPR could not save him. Death was confirmed. For (6), the complement proposition can turn out to be either false or factual.

### 3.3 Crosslinguistically scarce

The non-factivity of non-factive (NF) *al-ta* ‘know’ in Korean is not caused by nonveridicality or explicit negation of the epistemic verb ‘know’ as elsewhere. Japanese lacks any **NF ‘know’** and has only factive *siru*, as in (10). Even if the negation of *siru*, *sirana-i* ‘not know’ replaces ‘know’ in (10a), the factive presupposition still holds. In (10b), ‘thinks’ cannot be replaced by ‘know’ because of the reportative complementizer ‘-to,’ assuring NF.

- (10) a. *Mia-wa tomodachi-ga sinda-koto-o sitte-iru*  
M-TOP friend-NOM die-COMP-ACC know  
‘Mia knows that her friend died.’  
b. *Mia-wa tomodachi-ga sinda-to omotte-iru*  
M-TOP friend-NOM die-COMP think  
‘Mia thinks that her friend died.’

In Greek and Bulgarian, subjunctive complementizers, which are nonveridical, make distinction. Hungarian *tud* ‘know’ with DELATIVE ‘about’ as NF and with Def ACC COMP as factive, alone behaves similarly to Korean (Kiefer 1978). NF *al-ta* takes an oblique DIRrectional (atelic in space) case. It is opposed to factive *al-ta* (and emotive ‘regret’), with the ACC marker (telic) attached to *kes*, event NOM/COMP. NF *al-ta*, though neg-raising, is different from the ‘think’/‘believe’ type neg-raisers and the ‘say’ type that takes a reportative complementizer as a non-neg-raiser; the speaker’s epistemic state of NF *al-ta* ‘know’ is justified with solid evidence than for *sayngkakha-ta* ‘think’ type verbs. The Sejong Korean corpus data attest this. A clause with *sayngkakha-talmit-ta* may lack evidence.

### 4 NF Neg-Raising

The high negation sentence in (11) and the low negation sentence in (12), both NF, with the DIR COMP case, are in neg-raising relation. This syntactic relation semantically strengthens formal contradictory negation to contrariety (reading left to right), i.e.,  $\neg f(X) \Leftrightarrow f(\neg X)$ , as shown by Zwarts (1986), as cited by Horn. Horn objects to strict syntactic derivational relation, based on properties of non-factive “know.” (11) with high negation entails (12) with low negation. The high negation sentence is argued to have the pragmatic effect of ‘toning down’ (Horn 2014).

- (11) [NF]  
Mina-nun chinkwu-ka cwuk-un  
M-TOP friend-NOM die -PreN  
*kes-uro* alkoiss-ci- an-ess-ta  
COMP-DIR know-CI-NEG-PST-DEC  
‘Mina didn’t know toward (literally) it that her friend died.’ [high negation]

- (12) [NF]  
Mina-nun chinkwu-ka an cwukun  
M-TOP friend-NOM NEG die  
*kes-uro* alkoiss-ess-ta  
COMP-DIR know-PST-DEC  
‘Mina knew toward (literally) that her friend didn’t die.’ [low negation]

## 5 A Formal Treatment

The factive presupposition and lack of it (NF) may be represented as below. In (13), *f* is like ‘fact’ in Kiparsky and Kiparsky (1970) (cf. Schueler (2016)).

### 5.1 Factive

(13)  $[[al\text{-}ta]]$  ‘know’ =  $\lambda f\lambda x\lambda w. x$  knows *f*.

(14) a.  $[[chikwu\text{-}ka\ cwuk\text{-}un\ kes\text{-}ul]] = \lambda w.$

Mina’s friend died in *w*; where defined  
= the unique fact that Mina’s friend died  
in *w*.

b.  $[[kes\text{-}ul\textsubscript{F}]] = \lambda p\lambda w. \text{fact}(p, w)$ , where  
*p*(*w*) cannot be 0. (Kratzer:  $\lambda p\lambda e$ )  
[*kes* COMP *-ul* ACC]

(15)  $[[moru\text{-}ta]] = \sim[[al\text{-}ta]] = \lambda f\lambda x\lambda w. x$  ~knows *f*.

(16)  $[[hwuhoyha\text{-}ta]]$  ‘regret’ =  $\lambda f\lambda x\lambda w. x$  feels  
remorseful about *f*. (Schueler (2016))

If (14) matches (15), then it attains factive presupposition, as in (14) and in its higher ‘not know’ as well.

In (15), the lexical negative verb *moru-ta* ‘not know’ is semantically the negation of the factive verb *al-ta* ‘know’ and retains its factive presupposition all the time, taking the COMP ACC constantly. By contrast, the long form negation *-ci mos-ha-ta* ‘do not know’ can take the DIR NF *al-ta* freely. The lexical negative verb *moru-ta* ‘not know’ is an interesting case of fossilization in conventionalization, blocking the NF use.

### 5.2 Non-factive

If the verb *al-ta*, with no  $\lambda f$ , takes the following complementizer:

(17)  $[[kes\text{-}uro\textsubscript{T}]] = \lambda p.p$  (a la Kratzer 2006)  
[*kes* COMP *-uro* Directional]

Then, it becomes NF *al-ta*, as exemplified in (6) with its context given.

Overall, *al-ta* is identified as an epistemic factive or NF predicate, determined by its complement case marking. Its NF realization is not by nonverifical/negative contexts as in other languages. Its unique ‘part time’ (Beaver and

Geurts 2011) or ‘soft’ predicate nature awaits further exploration. In English, In English, we see the following relation in the *know---as* construction (found in corpus). The *as* part here is not a full complement clause (as Larry Horn indicates, being against neg-raising, p.c.) needed for neg-raising and some view the negated one as marginal, although it is still a small clause and (18) and (19) are not truth-conditionally identical, as Ken Turner, Andrew Simpson, Bruce Wakdman (biologist), and ten American grad students confirmed. In contrast, the high neg S and the low neg S of the *regard---as* construction in (18’) and (19’) are in NR, being truth-conditionally identical. It is interesting to see the high neg S of the *know--as* construction alone is NF at least, adding one more item to the ‘cloud’ of not knowing in English. The NR relation between the *regard---as* construction in (18’) and (19’) has not been treated so far either, as far as we know.

The item *as* appears to be similar to one meaning from the DIRECTIVE COMP case in Korean. DIR ‘toward’ seems to develop to QUA ‘as’ (in Korean *-uro* is now lexically ambiguous between ‘toward’ and ‘as’). In Korean, DIR *-uro* constitutes NF with a positive *al-ta* ‘know.’

(18) I don’t know him as being a good student.

---non-factive

(19) I know him as not being a good student.

---factive

(18’) I don’t regard him as being a good student.

(19’) I regard him as not being a good student

:

## 6. Experiments

We show how native speakers react to the neg-raisability of the NF *al-ta* ‘know’ along with belief type epistemic predicates and to (no) factive presupposition. We conducted an experiment with non-factive verb NF *al-ta*, factive verb *al-ta*, factive emotive verb *hwuhoyha-ta* ‘regret’, non-factive verb *mit-ta* ‘believe,’ and non-factive verb *sayngkakha-ta* ‘think.’ For Experiment 1, we constructed it with contexts given in (high negation) [*-uro al-ta al-ta p~*] (11) and asked a question in (low negation) [*~uro al-ta al-ta p*] (12). 20 participants were asked to choose one of the three answers ‘yes,’ ‘no,’ and ‘don’t

know’ to indicate whether the two sentences had the same meaning or not.

(20) = (12) given in the context.

Q: Mina-nun chinkwu-ka an cwukun  
 Mina-NOM friend-NOM NEG die  
 kes-*uro* alkoiss-ess-supnikka?  
 COMP-DIR know-PST-Q  
 ‘Did Mina know toward (literally) it that  
 her friend died?’

The results of all the verbs are shown in figure 1. The results show that non-factive verb *al-ta* ‘know’ has the same patterns of non-factive verbs *mit-ta* ‘believe’ and *sayngkakhata* ‘think’ since the percentages of the answer ‘yes (neg-raising, henceforth NR)’ are about 40~50% and ‘no (non-neg-raising, henceforth NNR)’ are around 50~60%. It seems that the answer ‘no (NNR)’ is

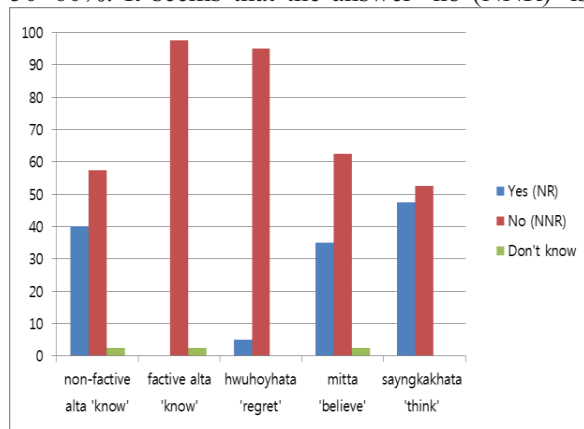


Figure 1. The neg-raisability of factive and non-factive verbs

quite high (50~60%). That is because some subjects may have been sensitive to the pragmatic meaning difference of 'toning down' by raising. Therefore, non-factive verb *al-ta* ‘know’ is also a neg-raising verb along with *mit-ta* ‘believe’ and *sayngkakhata* ‘think.’ Also, factive verb *al-ta* ‘know’ has the similar pattern of the (factive) emotive verb *hwuhoyhata* ‘regret.’ The percentages of the answer ‘yes (NR)’ of these verbs are over 90%. We can conclude that the factive verb *al-ta* ‘know’ is a non-neg-raising verb like emotive verb *hwuhoyhata* ‘regret.’ These results are indirectly supported by the experiments in Lee and Hong (2016) of reaction times of no significant difference between non-factive NR verbs and factive NNR verbs, implying the

participants’ no difficulty deciding which verb is neg-raising and which not.

In this paper, another experiment was conducted to verify whether the non-factive verbs bear the presumption that can turn out to be false. The second experiment asked questions whether the P is true or not. Consider (20).

(20) = (6) given in the context.

Mina-nun chinkwu-ka cwuk-un  
 M-TOP friend-NOM die-PreN  
 kes-*uro* al-ass-ta  
 COMP-*DIR* know-PST-DEC  
 ‘Mina knew toward (literally) it that her  
 friend died.’

Q: ku ttay chinkwu-ka cwuk-ess-supnikka?  
 At that moment friend-NOM die-PST-Q  
 ‘At that moment, did her friend die?’

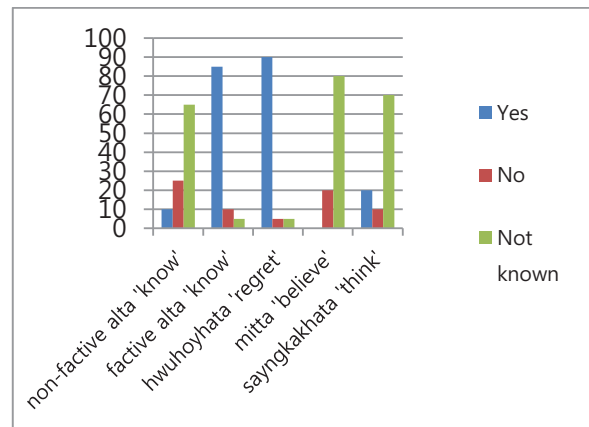


Figure 2. Bearing possibly false knowledge of the non-factive verbs and factive verbs

Figure 2 clearly shows that the non-factive verbs involve a possible ‘false knowledge’ presumption while the factive verbs do not.

For the non-factive verbs *al-ta* ‘know,’ *mit-ta* ‘believe’ and *sayngkakhata* ‘think,’ the answers are mostly ‘not known’ which means the presumption can be either true or false. For the factive verbs *al-ta* ‘know’ and the emotive verb *hwuhoyhata* ‘regret,’ over 80~90% of the answers are ‘yes,’ which indicate that the factive verb *al-ta* and the emotive verb *hwuhoyhata* only bear the presupposition that is granted to be true. Especially, the emotive verb *hwuhoyhata* has a stronger tendency of involving presupposition since its factive presupposition is far way from the at-issue assertion unlike epistemic verbs.

The results of the two types of experiments show that Korean *al-ta* ‘know’ bears two types of meanings, non-factive and factive, depending on the oblique/ACC cases. As a consequence, non-factive *al-ta* is a neg-raising verb unlike factive *al-ta*.

A further experiment will be conducted to verify that non-factive *al-ta* ‘know’ and *mit-ta* ‘believe’ can be contradicted if one of them negated in the same sentence. The experiment will be given contexts, asking about contradiction tests like “Mina-nun p-uro al-ass-una Mina-nun p-rako mit-ci ahn-ass-ta (‘Mina knew toward p but did not believe p’)”, a sheer contradiction, and vice versa, puzzling.

## 7 Corpus and Acquisition Support

### 7.1 Corpus

Our claims are also supported by contextual data collected from *Sejong Korean Corpus* for factive and NF *al-ta*. In the corpus data, as in (13), *al-ta* with *-uro* is used to imply that the speaker has uncertainty or false belief about the complement content he/she is talking about but she has some piece of evidence for her belief unlike in the case of other neg-raising weaker epistemic verbs such as *mit-ta* ‘believe.’ Consider the following:

(21) e~ malchalyey-ka congkyeltoyessum-ul  
 Uh~ conversation turn-NOM finish-ACC  
 phyosihanun, malcharyey tanwi phyoci-ka  
 represent conversation turn unit sign-NOM  
 nathanaca, hyencay hwaca-uy palhwa-ka  
 appear present speaker-POSS utterance-NOM  
 kkuthnan kes-*uro* alko mal-ul  
 finish **COMP-DIR** know utterance-ACC  
 sicakha-ciman hyencay hwaca-ka  
 start-but present speaker-NOM  
 mal-ul kyeysokhayse sayngkinun  
 utterance-ACC continue generate  
 kyepchimul malha-pnita.  
 overlap indicate-DEC

‘Uh~ as soon as a conversation turn unit marker that indicates the utterance is finished appears, the next speaker is starting to talk ‘knowing towards’ it that the present speaker finished his/her utterance. Therefore, the utterances of the present speaker and the next speaker overlap since the

present speaker continues the utterances.’

In (21), *al-ta* with *-uro* is used to indicate that the next speaker misunderstood that the present speaker was finishing his/her utterance because of the unit marker, so the next speaker was starting his/her speech. Here, *uro* is used instead of *-ul* because the verb *al-ta* ‘know’ with *-uro* has a distinctive implicational meaning that the information is not confirmed and may be falsified. However, it must be noted that the speaker witnessed the piece of evidence i.e., turn unit completion marker. That’s why *al-ta* with *-uro* has been employed rather than a weaker epistemic verb.

On the other hand, if the ACC marker *-ul* had been used in this context, the sentence would not contribute to the coherence of the discourse. Since *-ul* is for confirming the truth of the complement information, the sentence becomes contradictory. This example clearly shows that *al-ta* with *-uro* implies uncertainty of the complement information, which can turn out to be false. The speaker often uses the NF verb *-uro al-ta* after realizing she was mistaken. (21) is one such case.

In corpus, the occurrence rate of *-uro al-ta* NF DIR ‘know’ (90%, 18 out of 20) is far higher than that of *-ul al-ta* factive ACC ‘know’ (10%, 2 out of 20). The rarity of the latter should be this: when you know that p, you make an assertion that p. If you have some piece of evidence, you often use *al-ta* with *-uro* to justify your position often defensively. You also often use it out of politeness, even if you actually know, to mitigate the hardness of fact. For instance, if the hearer (often senior) firmly believes that Mia is too poor to be admitted to a college, and the speaker knows that she has been actually admitted, the speaker may use the following NF *al-ta* with *-uro*, avoiding the factive *al-ta* with ACC (or even the declarative assertion), not to stand against the hearer.

(22) Mia-ka iphak-ha-n kes-*uro* al-ko iss-um-ni-ta  
 M-NOM admitted-COMP-DIR know-DEC  
 ‘(I) know toward it that Mia has been admitted.’

### 7.2 Acquisition

Dudly et al (2015) reports the interesting experimental results, showing that some three-

year-olds' can distinguish between *know* as factive and *think* as NF, whereas the remaining three-year-olds' treat both *know* and *think* as NF. They, therefore, suggest that early representations of *know* may be NF.

When we consider the developmental stages, the divergence of NF *al-ta* with DIR and factive *al-ta* with ACC is not surprising, typologically.

## 8. Concluding Remarks

In conclusion, we distinguished the two different uses of factive and NF in the verb *al-ta* 'know' in Korean and the distinction is crucially made by the different complement cases of factive *-ul* ACC and NF *-uro* Directional (oblique). The NF use is possible with nonveridical/negative contexts in English and other languages but it is possible with a positive sentence with the Directional case in Korean uniquely (Hungarian only is similar in this respect and Japanese has no NF 'know'). The NF *-uro al-ta* verb, however, is different from other weaker epistemic verbs meaning 'believe'/'think' in that it strongly tends to show some piece of evidence for JTB but the evidential justification may turn out to fall short of knowledge.

We conducted experiments to clearly show that the NF *-uro al-ta* has the relation of neg-raising between the high neg S and the low (complement) neg S, which are truthconditionally equivalent. It implies that this NF verb *-uro al-ta* is identical in neg-raisability with other weaker epistemic verbs meaning 'believe' and 'think' in Korean. An excerpt from *Sejong* Corpus indicates that the NF 'know' in Korean typically accompanies some piece of evidence that led the speaker to hold a firmer belief than other epistemic verbs meaning 'believe'/'think' in Korean.

This research sheds new light to the issue of knowledge and evidential justification.

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