

Factivity and Veridicality in Korean Predicates

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Abstract Recent work in analyzing inference patterns has suggested that factive predicates exist in English (Kane, Gantt & White 2022). In this paper, we investigate factivity and veridicality projection of 30 Korean predicates by gathering gradient judgments from native speakers. The result shows that Korean predicates follow a major projection pattern of English predicates that factivity is observed in emotives and miratives. However, some classes of predicates, such as speculatives and communicatives, do not display a similar pattern, suggesting a difference in general inference pattern between the two languages. Overall, we claim that there exists distinguishable clusters of factive predicates in Korean.

Keywords: factivity, veridicality, inference patterns, Korean

1 Introduction

Presupposition projection differs depending on the type of predicate used. For example, the reading of (1) triggers an inference (3) while (2) does not.

- (1) Alfonso knows that Joanna came.
- (2) Alfonso pretends that Joanna came.
- (3) Joanna came.

Factive predicates trigger an inference that the content of the embedded clause is true and are consistent under the projection test (Kiparsky & Kiparsky 1970, Karttunen 1971). For example, the verb *knows* from (1) is often called cognitive factive and it produces consistent inferences under entailment canceling operators such as negation (4), question (5) and conditionals (6) that (3) is true.

- (4) Alfonso doesn't know that Joanna came.
- (5) Does Alfonso know that Joanna came?
- (6) If Alfonso know that Joanna came, he will be surprised.

In English, it is claimed that there are factive predicates (Kane, Gantt & White 2022) while some doubts exist due to the difficulty in formulating a categorical distinction with the unsettled definition of factive predicates (Degen & Tonhauser 2022). In Korean, however, this claim has not been studied yet. There exists a previous study on factive predicates, but it focuses on analysis in intersection with prosody (Jeong 2021), rather than isolating the effect of the predicate itself.

Our central aim of this paper is to investigate the factive predicates in Korean. We first provide an additional support to the claim that responsivity (Lahiri 2001) does not relate with factivity (White & Rawlins 2017). Then we conduct an experiment to collect judgements on factive predicates by native Koreans to analyze which clusters of predicates are factive while comparing other projection patterns with English.

2 Background

2.1 Matrix Sentence Construction

In Korean, *-tako* is a suffix that functions as a connective ending (Kang 2017). This suffix, similar to the English word *that*, allows the construction of a matrix clause like (7) where (8) is grammatical as well.

- (7) 조-는 보-가 공부-했-다고 믿-었다.
 Jo-NOM Bo-NOM study-PST-C know-PST
 'Jo believed that Bo studied.'
- (8) 보-가 공부-했다.
 Bo-NOM study-PST
 'Bo studied.'

In this paper, we utilize this suffix to keep the consistency of the complex sentence formation as *-tako*, not *-myeo* or *-n jul*.

2.2 Inference Frames

The construction of two inference frames is necessary in order to determine factivity and veridicality of a given predicate. In this paper, we adopt frames used in (Kane, Gantt & White 2022) to construct frames that test veridicality (9), entailment inference, and antiveridicality (10), projection inference. By performing such matrix negation, we can identify whether the verb is factive or not (Kiparsky & Kiparsky 1970, White 2019). Factivity of a predicate can be observed if a predicate triggers an inference of an embedded clause under both frames while veridicality of a predicate can be observed if a predicate triggers an inference under only the veridicality frame.

- (9) Veridicality Frame: A {*predicate*} that C happened.
{ \rightsquigarrow C happened., \nrightarrow C happened.}
- (10) Antiveridicality Frame: A didn't {*predicate*} that C happened.
{ \rightsquigarrow C happened., \nrightarrow C happened.}

3 Factivity and Responsivity in Korean

The responsivity of a predicate, whether the verb takes both interrogative and declarative complements (Lahiri 2001), has been found not to correlate factivity and veridicality in English (White & Rawlins 2017). In Lahiri (2001), factive predicates like *know*, *forget*, and *remember* are classified as veridical-responsive predicates, as well as non-factive predicates like *tell* and *communicate*. These communicative verbs, however, display factivity under certain contexts (Spector & Egré 2015).

- (11) Sue told someone that she is pregnant. \rightsquigarrow Sue is pregnant. (S&E ex. 27)

Here, we further support this claim by presenting the use of communicative verbs in Korean also displaying ambiguity between factive and non-factive use. We present a minimal pair in Korean using two communicative predicates *알리다* and *전하다*. Both verbs have a very close meaning of 'tell'; however, *전하다* has a stronger factivity compared to *알리다*.

- (12) 보-는 조-에게 모-가 공부-했-다고 알-렸다.
Bo-NOM Jo-DAT Mo-NOM study-PST-C tell-PST
'Bo told Jo that Mo studied.'
- (13) 보-는 조-에게 모-가 공부-했-다고 전-했다.
Bo-NOM Jo-DAT Mo-NOM study-PST-C tell-PST
'Bo told Jo that Mo studied.'
- (14) 모-가 공부-했-다.
Mo-NOM study-PST
'Mo studied.'

Both (12) and (13) triggers a factive inference (14). However, (14) inferred from (13) appears to have more 'factivity' compared to that from (12), which could be a supporting claim for the Gradient Projection Principle (Tonhauser, Beaver & Degen 2018). Apart from the comparative factivity between predicates, it is observed that there is no relationship between responsivity and factivity in Korean as well. However, no relationship does not suggest the unclear distinction between factive and non-factive predicates.

4 Experiment

To examine and provide additional support to the claim made in section 3, we have conducted an experiment on native Korean speakers to analyze the projection judgment in gradient scale.

As this paper targets to perform a cross-linguistic study of inference projection that was done for English in Kane, Gantt & White (2022), we utilize the list of clusters labeled with examples in that paper. The list has 15 clusters with 2 examples and the exhaustive version of the list with translations for each English example to Korean can be found in Appendix A.

Each translated predicate was put under one of the two frames: veridicality (15) or antiveridicality frame (16). In constructing these frames, we utilize the template bleaching method used in White & Rawlins (2016) to minimize the noise in one’s judgment and thus isolate predicate-specific effects. The construction below uses the predicate *think* as an example.

(15) Veridicality Frame in Korean

누군가-는 무언가-가 일어-났다고 생각-했다.
Somebody-NOM something-NOM happen-PST-C think-PST

‘Somebody thought that something happened.’

(16) Antiveridicality Frame in Korean

누군가-는 무언가-가 일어-났다고 생각하지 않-았다.
Somebody-NOM something-NOM happen-PST-C think NEG-PST

‘Somebody didn’t think that something happened.’

4.1 Methods

4.1.1 Participants

A total of 6 native Korean speakers were recruited as participants. Then the participants were randomly split into half where one group evaluated predicates under the veridicality frame and the other group evaluated predicates under the antiveridicality frame.

4.1.2 Materials

We utilize the list mentioned in section 4. From each cluster, each word is randomly assigned into either frame (15) or (16). A total of 15 frames were included in each

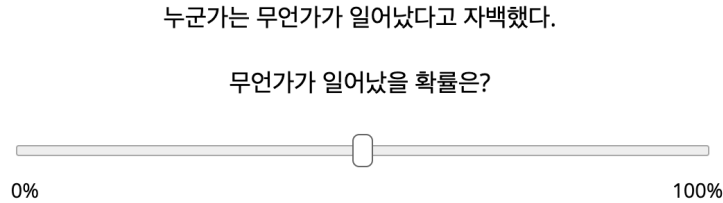


Figure 1 An example of the trial for veridicality frame

trial while participants did not see predicates from the same cluster. The order of predicates was randomized as well. We also restrict the tense of verbs to be in the past only.

Inspired by the method used in [Degen & Tonhauser \(2022\)](#) and [Kane, Gantt & White \(2022\)](#), we constructed a slider bar that captures a gradient of one's judgment in scalar value from 0 to 100.

As Figure (1) shows, each trial includes a stimuli, a question, and a slider bar. Translation of the stimuli and question in Figure 1 are in (17) and (18). Each participant gave their responses on a slider marked 0% on the left end and 100% on the other end. Participants were forced to use the slider in order to move on to the next stimuli.

(17) Translation of Stimuli in Figure (1):

누군가-는 무언가-가 일어-났-다고 자백-했다.
 Somebody-NOM something-NOM happen-PST-C confess-PST

'Somebody confessed that something happened.'

(18) Translation of Question in Figure (1):

무언가-가 일어-났-을 확률-은?
 Something-NOM happen-PST-ACC possibility-NOM

'What is the probability for something happened?'

Each participant was randomly given an experiment in the veridicality or anti-veridicality frame. The average completion time of each experiment was 2 minutes.

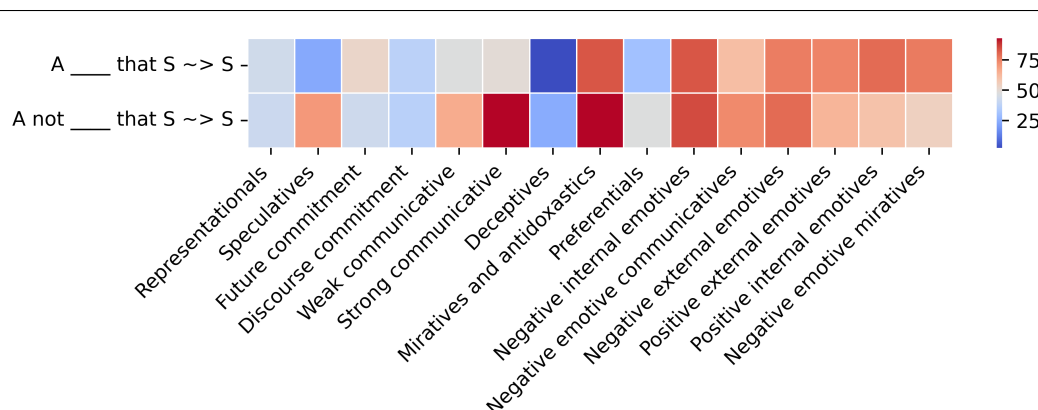


Figure 2 Veridicality and antiveridicality inference patterns for each cluster

4.2 Results

In Kane, Gantt & White (2022), it was concluded that there is a distinguishable subclass of factive predicates (emotives and miratives) while some classical factive predicates fall under 'weaker' inferences, agreeing to the gradience in projection.

The result of the experiment shows that inference patterns in Korean share some key features with English. To interpret Figure 2, factivity can be demonstrated as both cells being dark orange, veridical as only the top cell being dark orange, nonveridical as both cells being light orange or white, and antiimplicative as the top cell being blue and the bottom cell being orange.

The first key feature is that emotives and miratives are subclasses for factivity as predicates under that cluster resulted in high probability that an event happened. The second key feature is that deceptives demonstrated the strongest unlikelihood that the event happened under the veridicality frame. This pattern is similar to English while deceptives were not antiimplicative as it demonstrated moderate unlikelihood under the antiveridicality frame as well. Instead, speculatives is a possible candidate for antiimplicatives in Korean. Another notable point is that discourse commitment did not demonstrate the most similar pattern to factivity while communicatives (especially strong communicatives) were better candidates. However, these points may have risen due to the small number of participants recruited for this experiment, which is further discussed in section 5.

Still, interpreting the result of this experiment shown in Figure 2, we can claim that there are some classes of predicates that follow a similar pattern compared to English predicates. Thus, there are factive predicates in Korean as well.

5 Discussion

The scale of this experiment for this paper is small. As mentioned in section 4.1.1, only 6 native Korean speakers were recruited, compared to 300 for [Degen & Tonhauser \(2022\)](#) and 272 for [Kane, Gantt & White \(2022\)](#). As the number of participants is small, variability in each mean judgment is high, as is evident in Figure 3. Clusters such as representationals, discourse commitment, and negative internal emotives show higher inter-annotator agreement compared to speculatives and strong communicatives.

However, despite the scale of the experiment in this paper, the result still resembles some major features of inference projections of English may suggest that Korean might have some different inference projection patterns for clusters other than emotives, miratives, and deceptives. One notable pattern is found in speculatives and communicatives. In English, it has been claimed that no communicative predicates are factive ([Anand & Hacquard 2014](#)). Considering the inference pattern shown in Figure 2, this might not be the case for communicatives in Korean, especially strong communicatives which include *confess* (자백하다) and *admit* (인정하다).

Another point to mention is the difference between the basic syntactic structure between English and Korean. In the English construction of a matrix clause, readers view the target predicate before looking at the subordinate clause. Meanwhile, in Korean, readers view the content of the subordinate clause before looking at the target predicate. For instance, assuming that readers read sentences sequentially from left to right, the construction of (19), shows the difference in the order of the placement of a predicate. Square brackets were used to visualize the boundary of the subordinate clause. The effect of this syntactic structure has not been studied in this paper but could be an influential feature to some differences in inference projection patterns between two languages.

- (19) 조-는 [보-가 놀-았-다고] 의심-했다.
 Jo-NOM [Bo-NOM play-PST-C] suspect-PST
 'Jo suspected that [Bo played].'

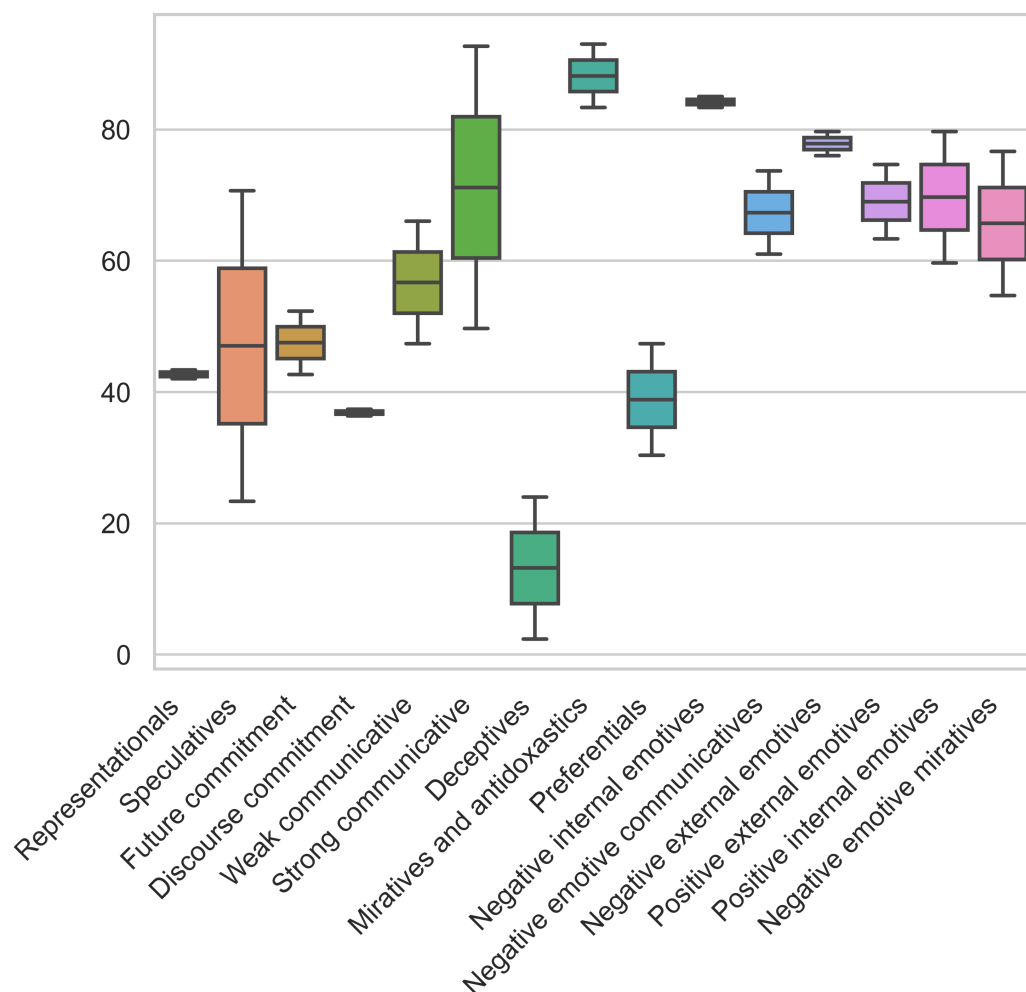


Figure 3 A box plot for inference patterns for each cluster

6 Conclusion

We have investigated factivity and veridicality projection in Korean and compared the result with English. While some clusters of predicates (emotives, miratives, and deceptives) demonstrate similar patterns, some clusters (speculatives and communicatives) do not. Overall, the paper claims that there are factive predicates in Korean as well.

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A Clusters and Example Translations

Cluster Type	English	Korean
Representationals	thought	생각했다
	believed	믿었다
Speculatives	guessed	추측했다
	gossiped	힘담을 했다
Future Commitment	promised	약속했다
	ensured	보장했다
Discourse Commitment	maintained	주장했다
	swore	맹세했다
Weak Communicative	reported	알렸다
	remarked	언급했다
Strong Communicative	confessed	자백했다
	admitted	인정했다
Deceptives	lied	거짓말했다
	misled	오해했다
Miratives and Antidoxastics	surprised	놀랐다
	stunned	어리둥절했다
Preferentials	hoped	기대했다
	recommended	추천했다
Negative Internal Emotives	frightened	겁 먹었다
	disgusted	혐오했다
Negative Internal Communicatives	screamed	소리쳤다
	ranted	고함쳤다
Negative External Emotives	whined	징징거렸다
	whimpered	흘쩍였다
Positive External Emotives	congratulated	축하했다
	whimpered	칭찬했다
Positive Internal Emotives	pleased	기뻐했다
	enthused	열광했다
Negative Emotive Miratives	dazed	멍해졌다
	alarmed	불안해했다