

Breaking the Black Box: Decomposable Modals in Korean

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1. Introduction

Modal concepts are typically expressed in the form of auxiliaries, adverbs, nouns, or adjectives. Despite the diversity, modal concepts were treated as black boxes, in the sense that a single lexical item accesses modal worlds and evaluates its prejacent therein. This paper presents morphosyntactic evidence from Korean which suggests that the modal concepts can be further decomposed into two subcomponents:

- (i) The best worlds given a modal base and an ordering source
- (ii) A conditional that links the best worlds to the prejacent

This paper aims to derive the meaning of deontic modality from the two subcomponents. It is shown that under the simplified view of conditionals, the compositional semantics of Korean obligation reproduces the Kratzerian account of obligation (Kratzer 1991). In other words, it corresponds to deontic necessity. However, the compositional semantics of permission points toward a different direction; it signifies the optionality of the prejacent.

2. Main data

Korean utilizes conditionals in conveying deontic modality (Wymann 1996, Ammann & van der Auwera 2002). As shown in (1) and (2), Korean deontic modal expressions consist of a conditional and a special morpheme *toy* ‘ δ ’. The special morpheme *toy* ‘ δ ’ is generally used as an inchoative, but it can also be used to signify the status of having virtue. I will gloss it as ‘ δ ’ not just for simplicity, but also to highlight the relation to the theory of deontic reduction (Anderson 1956, Kanger 1971) which will be briefly discussed in section 5.

Korean permission and obligation only differ in the conditional morphology: the former utilizes *-(e)to* ‘even if’, whereas the latter employs *-(e)ya* ‘only if’. The antecedent of the conditionals contains the prejacent, while the consequent is filled with *toy* ‘ δ ’.

- (1) John-un maykcwu-lul masi-**eto** toy-n-ta.
John-TOP beer-ACC drink-**even.if** δ -PRES-DECL
‘John may drink beer.’
- (2) John-un maykcwu-lul masi-**eya** toy-n-ta.
John-TOP beer-ACC drink-**only.if** δ -PRES-DECL
‘John must drink beer.’

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The significance of the provided data lies in that they let us probe deeper into the interior of deontic modal expressions; there is morphological evidence that deontic modality consists of more primitive elements, one of which is a conditional and the other is *toy* ‘ δ ’. The question is whether the compositional semantics of these primitive elements is compatible with extant analyses of deontic modality.

3. Proposal

I propose that Korean *toy* ‘ δ ’ is a higher-order function that takes scope over the antecedent clause of an *if* conditional; it takes the antecedent clause as its argument and feeds it the return value of the BEST operator (Portner 2009). The BEST operator takes a circumstantial modal base and a deontic ordering source, and picks out the deontically best worlds among the circumstantially accessible ones.

The semantics of *toy* ‘ δ ’ crucially depends on the semantics of conditionals. I will tentatively assume that *if* conditionals are strict implications, hence are of the type $\langle st, \langle st, t \rangle \rangle$. Under this simplifying assumption, *toy* ‘ δ ’ receives the following interpretation:

$$(3) \quad \llbracket \text{toy} \rrbracket^{c,d} = \lambda f_{\langle st, \langle st, t \rangle \rangle} \lambda w. f(\text{BEST}_{d(w)}(\cap c(w))),$$

where c is a circumstantial modal base and d is a deontic ordering source

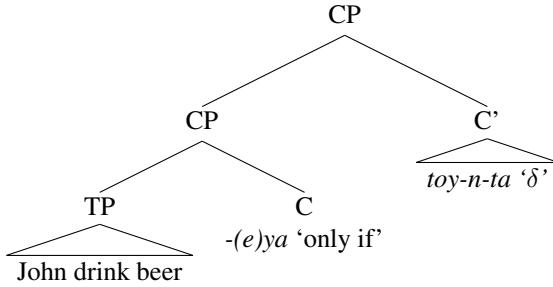
In the following section, I provide the compositional semantics of Korean obligation. It is shown that the analysis replicates the semantics of deontic necessity, thus the proposed semantics for *toy* ‘ δ ’ receives empirical support.

4. Analysis

4.1. Deriving obligation

I assume that the Korean obligation example in (2) has the following syntactic structure:

(4) The syntax of Korean obligation



In order to lay out the compositional analysis of (2), we first have to interpret *-(e)ya* ‘only if’. As the gloss suggests, it is widely regarded as a logical *only if*, i.e., the converse of an *if* conditional. Continuing to assume that *if* conditionals are strict implications, *-(e)ya* ‘only if’ is analyzed as follows:

$$(5) \quad \llbracket -(e)ya \rrbracket = \lambda p_{\langle s, t \rangle} \lambda q_{\langle s, t \rangle} . \forall w' : q(w') = 1 \rightarrow p(w') = 1$$

Having provided the semantics of *-(e)ya* ‘only if’, (2) is analyzed as in (6). The formula asserts that in all of the deontically best worlds, the prejacent ‘John drinks beer’ is true.

$$(6) \quad \llbracket (2) \rrbracket = \llbracket -(e)ya \rrbracket^{c,d}(\llbracket \text{John drink beer} \rrbracket^{c,d})(\llbracket \text{toy} \rrbracket^{c,d})$$

$$= (\lambda p_{\langle s, t \rangle} \lambda q_{\langle s, t \rangle} . \forall w' : q(w') = 1 \rightarrow p(w') = 1)(\llbracket \text{John drink beer} \rrbracket^{c,d})(\llbracket \text{toy} \rrbracket^{c,d})$$

$$= \lambda w. \forall w' : \text{BEST}_{d(w)}(\cap c(w))(w') = 1 \rightarrow \text{drink}(\text{beer})(\text{John})(w') = 1$$

where c is a circumstantial modal base and d is a deontic ordering source

Compare the analysis in (6) with Portner’s (2009) account of deontic necessity provided in (7). This view is a variation of Kratzer’s (1991) original formulation, which differs from the Kratzerian view in that it additionally makes the *Limit Assumption* (i.e., the assumption that the existence of the best worlds is guaranteed). Feeding the prejacent *drink(beer)(John)* to the formula in (7) yields the one in (6).

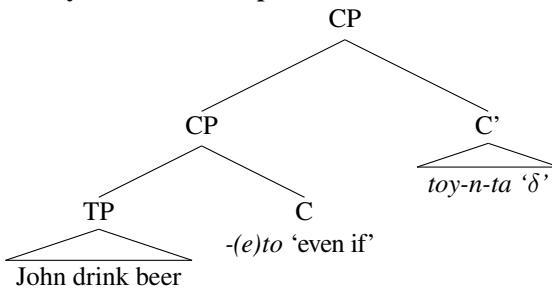
(7) **Portner's (2009) analysis of deontic necessity**

$$\llbracket \text{must}_{\text{Portner}} \rrbracket^{c,d} = \lambda p_{\langle s,t \rangle} \lambda w. \forall w' : \text{BEST}_{d(w)}(\cap c(w))(w') = 1 \rightarrow p(w') = 1$$

What I have shown is that we can compositionally build up the semantics of deontic necessity without any stipulation. This suggests that the analysis of *toy* 'δ' put forth in (3) is on the right track. The remaining question is whether the compositional semantics of Korean permission is compatible with extant theories of permission. Despite the success in reconstructing deontic necessity, if we continue to assume *the very same semantics* for *toy* 'δ', it turns out that the compositional semantics of Korean permission does not convey deontic possibility.

4.2. *Interpreting permission*

I assume that the syntax of Korean permission is identical to that of Korean obligation. Accordingly, the two only differ in the selection of the conditional morpheme. Korean permission employs *-(e)to* 'even if' instead of *-(e)ya* 'only if'.

(8) **The syntax of Korean permission**

I claim that the consequent-entailment property of *even if* gives rise to the inference that we are in the deontically best world regardless of whether the prejacent is true or not. Thus, (1) conveys that we would be in the deontically best world irrespective of John drinking beer.

In what follows, I will first introduce the consequent-entailment property of *even if*, along with Guerzoni & Lim's (2007) analysis. Guerzoni & Lim break down English *even if* into *even* and *if* and demonstrate how the consequent-entailment property arises. While staying agnostic on the semantics of the *if* conditional, I will plug in Guerzoni & Lim's (2007) account of *even if* to the Korean permission example and interpret the result. Lastly, I will argue that the strict implication analysis of conditionals is oversimplified and cannot provide the full picture. Alternatively, I show that the variably strict view (Stalnaker 1968, Lewis 1973) gives the desired interpretation.

4.2.1. *The consequent-entailment property of even if*

The consequent-entailment property of *even if* refers to a phenomenon where an *even if* conditional implies the truth of its consequent, as in (9). In this example, the speaker implies that s/he would not cross. Whether the bridge is standing or not, the consequent 'I wouldn't cross' is true.

- (9) Even if the bridge were standing, I wouldn't cross. (Introduced-if)
 \Rightarrow I wouldn't cross the river.

It is noteworthy to mention that the *even if* conditional does not always entail its consequent. In (10), *one ounce* is focused, and it cannot be inferred that she would fire John no matter what. Bennett (1982) distinguishes the two types of *even if* conditionals and refers to the kind in (10) as a *standing-if* conditional. On the other hand, *even if* conditionals that exhibit the consequent-entailment property are categorized as *introduced-if* conditionals.

- (10) Even if John drank [_F one ounce] of whiskey, she would fire him. (Standing-if)
 $\not\Rightarrow$ She would fire him.

The consequent-entailment property of *even if* has been discussed in a number of works including Bennett (1982), Lycan (1991), Barker (1994), Lycan (2001), Bennett (2003), and Guerzoni & Lim (2007). I will introduce Guerzoni & Lim's (2007) account, which is adopted in this paper.

Guerzoni & Lim assume that *even* is a propositional focus associating operator that introduces two presuppositions, namely a *scalar presupposition* and an *existential presupposition* (Horn 1969, Karttunen & Peters 1979). The scalar presupposition requires that the asserted proposition is the least likely one to be true among the alternatives. On the other hand, the existential presupposition requires that one of the contextually salient alternatives is true.

- (11) $\llbracket \text{even} \rrbracket (C)(p)(w)$ is defined iff
- | | |
|-------------------------------------------------------------------------|-----------------------------------|
| $\exists q \in C : q \neq p \wedge q(w) = 1 \wedge$ | Scalar presupposition |
| $\forall q \in C : q \neq p \rightarrow p <_{\text{likely/expected}} q$ | Existential presupposition |
| If defined, then $\llbracket \text{even} \rrbracket (C)(p)(w) = p(w)$ | |

(12) **Application of the proposed semantics of *even***

- a. Gil invited even _[F Mac].
- b. **Assertion:**
Gil invited Mac.
- c. **Existential Presupposition:**
Gil invited at least one contextually salient person other than Mac.
- d. **Scalar Presupposition:**
Mac was the least likely (most noteworthy) person among the contextually salient people for Gil to invite.

Guerzoni & Lim propose that the standing-if vs introduced-if distinction is made based on the focus associate of *even*. Specifically, when *even* associates with *verum focus*, the consequent of the *even if* conditional is entailed (introduced-if). On the other hand, if *even* associates with an item other than *verum focus*, the consequent is not entailed (standing-if). *Verum focus* (AFF) generates a set containing only the following two alternatives: (i) the asserted proposition and (ii) its logical opposite. This is illustrated in (13).

(13) **Ordinary and focus semantic value of *verum focus***

$$\begin{aligned} \llbracket \text{AFF} \rrbracket^o &= \lambda t.t \\ \llbracket \text{AFF} \rrbracket^f &= \{\lambda t.t, \lambda t.t = 0\} \end{aligned}$$

Returning to the introduced-if example in (9), Guerzoni & Lim posit the schema in (14):

- (14) Even [if _[F AFF] the bridge were standing, I would not cross]

Associating the *verum focus* AFF with *even* triggers the following two alternatives: the asserted proposition 'if the bridge were standing, I would not cross', and its logical opposite 'if the bridge were not standing, I would not cross'. Accordingly, (14) receives the interpretation in (15).

(15) **Guerzoni & Lim's account of introduced-if**

- a. **Assertion:**
If the bridge were standing, I would not cross.
- b. **Existential presupposition:**
 $\exists q : q \in C \wedge q \neq$ 'if the bridge were standing, I wouldn't cross' $\wedge q(w) = 1,$
where $C = \left\{ \begin{array}{l} \text{'if the bridge were standing, I wouldn't cross'} \\ \text{'if the bridge weren't standing, I wouldn't cross'} \end{array} \right\}$
- c. **Scalar presupposition:**
'I wouldn't cross' is less likely 'if the bridge were standing' than 'if the bridge weren't standing'

The consequent-entailment property arises due to the existential presupposition. The assertion corresponds to the proposition ‘if the bridge were standing, I wouldn’t cross’, and the existential presupposition requires that one of the contextually salient alternative apart from the assertion is true. Since there are only two alternatives, the assertion and its logical opposite, ‘if the bridge weren’t standing, I wouldn’t cross’ is true. Given that ‘if the bridge were standing, I wouldn’t cross’ and ‘if the bridge weren’t standing, I wouldn’t cross’ are both true, it can be inferred that ‘I wouldn’t cross’, hence the consequent is entailed.

In the case of *standing-if* conditionals exemplified in (10), the consequent is not entailed because the logical opposite of the asserted proposition is not presupposed. As depicted in (16), it is asserted that ‘if John drank one ounce of whiskey, she would fire him’, and at least one of the contextually salient alternatives is presupposed.

(16) **Guerzoni & Lim’s account of standing-if**

a. **Assertion:**

If John drank one ounce of whiskey, she would fire him.

b. **Existential presupposition:**

$$\exists q : q \in C \wedge q \neq \text{‘if John drank one ounce of whiskey, she would fire him’} \wedge q(w) = 1,$$

$$\text{where } C = \left\{ \begin{array}{l} \text{‘if John drank one ounce of whiskey, she would fire him’} \\ \text{‘if John drank two ounces of whiskey, she would fire him’} \\ \text{‘if John drank three ounces of whiskey, she would fire him’} \\ \dots \end{array} \right\}$$

c. **Scalar presupposition:**

It is less likely that she would fire John if he drank one ounce of whiskey than if he drank any other amount of whiskey.

[Guerzoni & Lim (2007): 283]

However, due to a different selection of alternatives, the logical opposite of the assertion is not presupposed. For example, suppose that the alternative ‘if John drank two ounces of whiskey, she would fire him’ is true. Then if John drank one or two ounces of whiskey, she would fire him, but it does not follow that she would fire him no matter what. In this way, Guerzoni & Lim reduces the standing-if vs introduced-if distinction to the matter of association with focus.

4.2.2. Preliminary analysis

In this section, I will plug in Guerzoni & Lim’s analysis of *even if* to the Korean permission example in (1). I abstract away from the semantics of the *if* conditional at the moment, but will elaborate in the following section.

I suggest that the *even* component of *-(e)to* ‘even if’ associates with verum focus, as in (17).

(17) Even [if [_F AFF] John drinks beer, δ]

Applying the same logic as Guerzoni & Lim, we are led to the interpretation in (18). The sentence asserts that ‘if John drinks beer, δ ’, and presupposes that ‘if John doesn’t drink beer, δ ’.

(18) **Preliminary analysis of Korean permission**

a. **Assertion:**

If John drinks beer, δ .

b. **Existential presupposition:**

$$\exists q : q \in C \wedge q \neq \text{‘if John drinks beer, } \delta \text{’} \wedge q(w) = 1,$$

$$\text{where } C = \left\{ \begin{array}{l} \text{‘if John drinks beer, } \delta \text{’} \\ \text{‘if John doesn’t drink beer, } \delta \text{’} \end{array} \right\}$$

c. **Scalar presupposition:**

It is less likely that John drinking beer would result in the deontically best world than not drinking beer.

Under the simplified view that *if* conditionals are strict implications, the conjunction of the assertion and the existential presupposition implies that ‘ δ ’ is true. But what does it mean for ‘ δ ’ to be true? Does it mean that we are in the deontically best world no matter what? Evidently, this should not be the case.

Also, we do not want to claim that every world in which John drinks beer is one of the deontically best worlds. What if John drinks beer and murders someone? Such an vicious act must be prohibited. For this reason, a refined view of conditionals is called for.

4.2.3. *Permission as counterfactual reasoning*

I argue that the conditionals in Korean deontic expressions receives a counterfactual interpretation. More specifically, I adopt the variably strict analysis of counterfactuals that was independently developed by Stalnaker (1968) and Lewis (1973).

The Stalnaker/Lewis account introduces an ordering over a given set of worlds that ranks the worlds based on their similarity to the world of evaluation. A conditional of the form *if p, then q* is true iff the most similar *p*-worlds with respect to the ordering are *q*-worlds. Thus, unlike the strict implication analysis, the conditional only quantifies over a subset of the antecedent worlds.

Stalnaker and Lewis disagree on whether there exists a set of most similar antecedent worlds for every world of evaluation. Stalnaker assumes that there is a unique most similar antecedent world, but Lewis argues that such a set cannot be identified. I will take the intermediate position that there is a set of most similar antecedent worlds (not necessarily unique) for every world of evaluation. This view can be represented by a choice function *g*, which takes a world *w* and a proposition *p*, and returns the set of *p*-worlds most similar to *w*.

(19) **Variably strict conditionals**¹

$$\llbracket \text{if}_{cf} \rrbracket = \lambda p_{\langle s,t \rangle} \lambda q_{\langle s,t \rangle} \lambda w. \forall w' \in g(w, p) : q(w') = 1,$$

where g(w, p) returns the p-worlds most similar to w

The non-monotonic nature of this view is known to invalidate certain undesirable inferences. Among them, the inference known as strengthening of the antecedent is particularly relevant to our discussion.

(20) **Strengthening of the antecedent**

$$\begin{aligned} & \text{if } p, \text{ then } q \\ \Rightarrow & \text{if } p \wedge r, \text{ then } q \end{aligned}$$

One of the problems encountered in the previous section was that the strict implication analysis validates the inference from ‘if John drinks beer, δ ’ to ‘if John drinks beer and murders someone, δ ’. This implies that permitting John to drink beer ends up giving permission to perform any act as long as John drinks beer. Indeed, this is the case of strengthening of the antecedent. Such an inference is invalidated under the variably strict view.

In order to interpret the *if* conditional in (17) as a counterfactual *if_{cf}*, we have to modify the semantics of *toy* ‘ δ ’ (cf. (3)) to avoid a type mismatch; strict implications are of the type $\langle st, \langle st, t \rangle \rangle$ but counterfactuals are of the type $\langle st, \langle st, st \rangle \rangle$. Accordingly, the semantics is adjusted as in (21).

$$(21) \llbracket \text{toy} \rrbracket^{c,d} = \lambda f_{\langle st, st \rangle} \lambda w. f(\text{BEST}_{d(w)}(\cap c(w)))(w),$$

where c is a circumstantial modal base and d is a deontic ordering source

We are now ready to reason about (18). As shown in (22), it is asserted that every closest world where John drinks beer is a deontically best world. The existential presupposition requires that every

¹ Lewis (1981) shows that his ordering semantics for counterfactuals is equivalent to the account in premise semantics (Kratzer 1979, Kratzer 1981). Since I am utilizing Portner’s (2009) BEST operator which is based on premise semantics, it is more natural and coherent to formulate counterfactual semantics in premise semantics. Nevertheless, I chose to use the choice function *g* because premise semantics for counterfactuals requires us to add an empty modal base and a totally realistic ordering source to the parameter set, in addition to what are already required for modal semantics (i.e., the circumstantial modal base and the deontic ordering source). I opted for the choice function *g* to keep the formulae simple, but the choice function can be understood as a shorthand for Kratzer’s analysis of counterfactuals.

closest world where John does not drink beer is a deontically best world. In sum, regardless of whether John drinks beer or not, we are in one of the deontically best worlds.

(22) **Permission as counterfactual reasoning**

a. **Assertion:**

$$\lambda w. \forall w' \in g(w, \text{drink}(\text{beer})(\text{John})) : \text{BEST}_{d(w)}(\cap c(w))(w') = 1$$

where $g(w, p)$ returns the p -worlds most similar to w

b. **Existential presupposition:**

$$\exists q : q \in C \wedge q \neq (22a) \wedge q(w) = 1,$$

$$\text{where } C = \left\{ \begin{array}{l} \lambda w. \forall w' \in g(w, \text{drink}(\text{beer})(\text{John})) : \text{BEST}_{d(w)}(\cap c(w))(w') = 1 \\ \lambda w. \forall w' \in g(w, \neg \text{drink}(\text{beer})(\text{John})) : \text{BEST}_{d(w)}(\cap c(w))(w') = 1 \end{array} \right\}$$

5. Theoretical connection

The conditional reasoning of deontic modal expressions is not entirely novel. In the philosophical tradition of deontic reduction (Anderson 1956, Kanger 1971, von Wright 1968, Lokhorst 2006), deontic modality has been formulated in terms of a conditional and a special proposition δ , where δ corresponds to a deontically ideal state; it has been formerly glossed as ‘the good thing’, ‘all obligations are fulfilled’, or ‘OK’. In this framework, p is obligatory iff δ necessarily implies p . Deontic reduction posits two types of permission: *strong permission* and *weak permission*. A proposition p is strongly permitted iff it necessarily implies δ . On the other hand, p is weakly permitted iff it is possible that $\delta \wedge p$.

(23) **Permission and obligation in deontic reduction**

a. $\text{OB } p \equiv \Box(\delta \rightarrow p)$

b. $\text{PE}_{\text{strong}} p \equiv \Box(p \rightarrow \delta)$

c. $\text{PE}_{\text{weak}} p \equiv \Diamond(\delta \wedge p)$

Strong permission has been useful in handling the inference of *free choice permission*. Asher & Bonevac (2005) suggest that free choice permission is not a purely pragmatic phenomenon, and utilize strong permission to advocate a semantic approach. Along this line of research, Barker (2010) replaces the strict implication in (23b) with a linear implication and explain how a resource-sensitive inference arises in free choice permission.

(24) **Free choice permission**

You may eat an apple or a pear.

\Rightarrow You may eat an apple.

\Rightarrow You may eat a pear.

Korean permission resembles strong permission in that the prejacent is rendered as a sufficient condition of a deontically ideal state. But Korean permission is stronger in a sense that the logical opposite of strong permission is presupposed. Nonetheless, it serves as natural language evidence that the conditional reasoning of permission is on the right track.

6. Modal possibility in Korean

Having discussed the notion of permission, one might wonder how modal possibility is expressed in Korean. Possibility modals involve a copula construction as in (25). Considering the fact that copulas signify existential quantification, the idea that *might*, *may*, and *can* existentially quantify over accessible worlds receives support from the morphosyntax of Korean.

(25) John-un maykcwu-lul masi-l swu iss-Ø-ta.

John-TOP beer-ACC drink-REL way **exist**-PRES-DECL

‘John might/can drink beer.’

(epistemic/ability/weak permission?)

What I would like to point out is that (25) can be naturally understood as an epistemic or ability modal, but the deontic reading is restrictively available. Specifically, (25) does not have a performative effect. In deontic contexts, one can only use the sentence to *report* that drinking beer is permitted. For instance, (25) is felicitous when one intends to say “John is over 21 so according to the law, he is allowed to drink beer”. But the speaker is not a lawmaker and is just reporting that John is allowed to drink beer. Thus, (25) does not have the full expressive power of permission.

7. Conclusion

This paper presented a decompositional analysis of Korean deontic modal expressions. The morphosyntax of Korean permission and obligation evidenced that the two concepts can be reduced to reasoning on conditionals, and it was shown that we can compositionally build up the semantics of deontic necessity. However, the compositional semantics of Korean permission showed no relevance to deontic possibility, but more or less resembled what has been termed strong permission in the philosophical tradition of deontic reduction.

The proposed analysis hints that permission has a special status and should be distinguished from modal possibility. This amounts to saying that permission is not a dual of obligation, and absence of prohibition does not imply permission. Thus, it calls for an articulated system which allows a ‘deontic gap’, where things can be neither permitted nor forbidden.

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