

## On the semantics of an *even*-based polarity sensitive item, *wh-(N)-lato\**

Jieun Kim  
(University of Ulsan)

**Kim, Jieun. 2020. On the semantics of an even-based polarity sensitive item, wh-(N)-lato.** *Linguistic Research* 37(2), 147-186. In this paper, we study the semantics of even-based polarity sensitive items (PSIs) in Korean that are composed of wh-indeterminates and even-corresponding particles. Korean has two types of particles, -to and -lato, alleged to correspond to -even. Upon examination of their interpretational and distributional properties, however, we suggest that -lato does not correspond to a sub-type of the English even (contra An (2007)), but rather is one of the concessive scalar particles introduced in the work of Crnic (2011a, b). We argue that -lato is morphologically complex, inducing two sentential operators, AT LEAST and EVEN, following the analysis of Crnic (2011a, b) on \*magari. This line of argument successfully explains the four characteristic properties of -lato laid out in this paper. Unlike -lato, examination of -to phrases confirms that -to is a sub-type of even. Once the meanings of -to and -lato are identified, our main concern shifts to the combination of wh-indeterminates plus -lato. The second part of this paper addresses the meaning of a bare wh-indeterminate in bidimensional semantics and the problem that occurs when a sentence with a wh-indeterminate becomes the argument of focus-sensitive operator, AT LEAST. A sentence with a wh-indeterminate in its bare form lacks an ordinary meaning, and instead has only an alternative meaning (= a set of alternatives). Considering the definition of AT LEAST, which involves two types of arguments—a prejacent and a set of alternatives—as suggested by Crnic (2011a, b), the meaning of a wh-indeterminate as forming a set of alternatives cannot form a proper argument of AT LEAST. To remedy this problem, we employ a covert existential operator, one of three types of repairing operators suggested in the work of Elerwine (2019). By establishing these basic semantics of wh-indeterminate plus -lato phrases, we can eventually understand how the distributional and interpretational properties of these phrases in various contexts are formed. (University of Ulsan)

**Keywords** wh-(N)-lato, Concessive Scalar Particle -lato, wh-indeterminate PSIs, compositional approach

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## 1. Introduction

In many languages, combinations of a specific class of alternative-inducing items (e.g., focused determiner phrases (DPs) or wh-indeterminates) and focus sensitive particles form polarity sensitive items (PSIs). One of the most famous examples appears in Hindi, closely examined in the work of Lahiri (1998), where a weak indefinite plus a particle *bii* ‘even’ exhibits behaviors of negative polarity items (NPIs) and free choice items (FCIs). That research provides compositional analysis to explain the NPI and FCI status of an indefinite+*bii* based on the respective semantics of an indefinite and the particle *bii* ‘even’. The Korean language involves the Hindi counterparts of *ek bii* ‘one-even’ and *koi bii* ‘someone-even’, corresponding to *hana-to/lato* ‘one-even’ and *nwukwu-to/lato* ‘someone-even’, respectively. Since the appearance of Lahiri’s work (1998), various analyses on weak indefinite-correspondents and focus sensitive particles, especially the correspondences of *even* in English, have been developed (Guerzoni 2003, 2004; Giannakidou 2007; Choi 2007; Nakanishi 2006; Lim 2017). Through these studies, it is quite clear that the distribution of these types of PSIs is understood to be a consequence of the validity of inferences derived from this combination in a given context. Along these lines, in this paper, we study one of the Korean PSIs, the root of which is composed of a so-called wh-indeterminate (a term from the work of Kuroda (1965)) and what is alleged to be an *even*-corresponding focus sensitive particle, *-lato* in comparison with another sub-type of an *even* particle, *-to*

Simply in a descriptive sense, both of these particles are usually glossed as *even*, roughly seeming to amount to the NPI-*even* (weak *even*) and PPI-*even* in Rooth (1995). Still, however, any analysis that treats *-to* and *-lato* in this way leaves room for much controversy. The particle *-to* is diagnosed to correspond to the English *even*, which evokes a ‘least likely’ presupposition. This is not a new idea at all, and already has been suggested in several previous studies (Lee et al. 2000; Choi 2005, 2007; Lim 2017, inter alia). However, if we look into the distribution and the inferences of *-lato* in detail, we conclude that it cannot simply be a sub-type of *even*. The inferences of *-lato* and its distributional characteristics identify it as a relatively new category, which we recognize as concessive scalar particles (CSPs), a term that first appeared in Crnic (2011). The

Spanish *siquiera* (Herburger 2003; Alonso-Ovalle 2009, 2016; Crnic 2011), the Slovenian *magari* (Crnic 2011a, b), and the Greek *esto* (Giannakidou 2007) are known to share similar interpretations and properties. The current study proposes adding the Korean *-lato* to this category. Along these lines, *-lato* does not introduce a single propositional operator like *even*, but instead introduces two operators that consequently induce more complex semantic/pragmatic processes than those involved in conceiving of the construction as an application of a single operator to a single target domain. This idea is familiar insofar as Guerzoni (2003, 2004) proposed the complex association of operators of *auch nur* in German, which appears in previous analyses of the *-lato* particle (cf. Choi 2007; Lim 2017). Herein we apply the EVEN plus AT LEAST operator analysis from Crnic (2011a, b), showing that it successfully explains the Korean *-lato* data.

Nevertheless, an obstacle emerges when we apply an EVEN plus AT LEAST operator analysis to the denotation of a *wh*-indeterminate. Unlike a focused constituent that generates two types of arguments, a preajacent proposition, and a set of propositions (thereby properly feeding the operators), a *wh*-indeterminate in its bare form cannot form the requisite two types of arguments from the operators. Discussion on how to manage this apparent semantic mismatch problem between an argument and an operator forms one of the main parts of this paper. Once this issue resolves, we explore the specific association of inferences derived from *wh-indeterminate+lato* phrases to contextual variants. Because a good description of the distributional restrictions of these phrases already exists in Choi (2007) and Lim (2017), we focus on finding a good explanation of why they appear in these environments by discerning inferences derived in pertinent compositional processes.

The discussion goes as follows. In the next section, the meaning of *-to* and *-lato* is discussed. Section three studies the composition of particles with a *wh*-indeterminate. The issue of how to form a preajacent meaning from a *wh*-indeterminate is addressed therein. Also, the problem of how the combination of *wh-indeterminate+lato* evokes inferences that determine the distribution of items is discussed. This discourse forms the main part of this paper. In section four, the shortcomings of the previous analysis of Lim (2017) on *wh-indeterminate+lato* phrases are briefly discussed. Section five summarizes and concludes.

## 2. The meaning of *-to* and *-lato*

### 2.1 *-To* and *-lato* as two types of *even*?

Korean has two types of focus particles glossed as *even*. The studies on *even* have suggested that the word triggers a scalar presupposition (Karttunen and Peters 1979; Wilkinson 1996; Rooth 1995 inter alia). Here is an example sentence involving English *even*

- (1) a. Peter won even a [GOLD]<sub>F</sub> medal.  
 b.  $[[\text{EVEN}]]^{\mathcal{C}} = \lambda C.\lambda p:\forall q\in C [p \neq q \rightarrow p <_c q].\lambda w. p(w) = \text{True}$   
 (Crnic 2011a)

In sentence (1a), the lexical item *even* introduces a propositional operator EVEN, which is defined in (1b). Because the constituent *gold* in (1a) is focused, it forms a set of alternatives—namely, {bronze, silver, gold}, which is extended to the whole sentence through point-wise application and which forms a set of alternative sentences including {Peter won a bronze medal, Peter won a silver medal, Peter won a gold medal}. The sentential operator EVEN takes two arguments: one being this set of alternatives C and the other a prejacent *p* ‘Peter won a gold medal.’ Here, the contribution of EVEN is to require the prejacent *p* to be the ‘least likely’ proposition in the set C. EVEN returns the prejacent *p* only if the condition is satisfied. The EVEN operator is basically an identity function, only evoking a specific scalar presupposition. Due to this scalarity, the usage of *even* is sensitive to the stage of scalarity at which its complement DP is placed and is sensitive to the presence/absence of a scale-reversing operator. For instance, in the above example, the focused constituent ‘gold’ causes the prejacent to be less likely than any other proposition in C (on the scale of items, gold being the highest prize), except for the prejacent itself. If ‘gold’ is substituted with silver or bronze under the same set of conditions, then the prejacent *p* does not satisfy the presuppositional requirement of the EVEN operator. Another factor on which the felicitous usage of *even* crucially depends is the interference of a scale-reversing operator, such as negation or downward entailing operators. For instance, when (1a) is negated as (2a) or when the

*even*-phrase is placed in the antecedent clause of a conditional sentence, as in (2b), the focused item that *even* is associated with should be an item in the opposite direction of the scale.

- (2) a. Peter did not even win a [BRONZE/ #GOLD]<sub>F</sub>medal.  
 b. If Peter wins even a [BRONZE/ #GOLD]<sub>F</sub>medal, then he is exempt from obligatory military service.

There are two main lines of approach to analyses of (2). One is the scope theory of *even*, which was originally suggested in Karttunen and Peters (1979) and further developed in Wilkinson (1996). These studies argue that the wide scope of *even* over scale-reversing operators only allows the lower-scale items (such as a bronze medal) to cause the association with *even* to be felicitous. On the other hand, other parties such as Rooth (1985) and Giannakidou (2007) argue that there are two distinct types of *even* one is what they call NPI-*even* and the other is PPI-*even*, which we call a lexical theory of *even*. Explicating the details of these controversies is beyond the scope of this paper; interested readers are directed toward the references above.

With this background knowledge of the English *even*, the complement DP of *-to* and *-lato* in the example sentences below are provided as two types—one as an item at the lowest end of the scale and the other as an item at the highest end of the scale. Contexts are provided in four types: (a) an affirmative episodic sentence, (b) a sentence with clause-mate negation, (c) an antecedent clause of a conditional sentence, and (d) with a possibility modal expression. *-To* phrases are exemplified in (3), hinted from the examples used in Rullman (2007).

- (3) An item at the lowest end vs. an item at the highest end of the scale plus *-to*

- a. *caŋyən tayhoy-eyse-nun Mina-ka #tongmyetal-to/*  
 last year's competition-at-Top Min-Nom #bronze medal-even/  
*kumnyetal-to tass-e*  
 gold medal-even won-Dec.  
 'Mina won even #a bronze medal/a gold medal in the last year's

competition.’

b. *Mina-ka tongnyetal-to/ #kumnyetal-to mos ttass-e*  
 Min-Nom bronze medal-even/ #gold medal-even Neg won-Dec.  
 ‘Mina did not win even a bronze medal/#a gold medal.’

c. *Mina-ka #tongnyetal-to/ kumnyetal-to tta-nyen,*  
 Min-Nom #bronze medal-even/gold medal-even win-if,  
*ku tayhak-ey hapkyek-i pccangtoy-n-ta<sup>1</sup>.*  
 the university-to admission-Nom *Guaranteed+Pres-Dec.*  
 ‘If Mina wins even #a bronze medal/a gold medal, the admission to  
 the university is guaranteed.’

d. *Mina-nun #tongnyetal-to/ kumnyetal-to tal-swu iss-e*  
 Mina-Top #a bronze medal-even/a gold medal-even win-able  
 be-Dec.  
 ‘Mina can even win #a bronze medal/a gold medal.’

In (3), we observe that only the *-to* phrases with an item at the highest end of the scale (here the gold medal) are felicitous. There is an exception for *-to* phrases under the clause-mate negation condition in (3b). Presuming the meaning of *-to* as *even*, let us see how felicity/infelicity is derived in respective cases. We first try to explain the sentences in (3) according to the scope theory of *even*.

- (4) a. LF of (3a): [ EVEN [Mina won a GOLD<sub>F</sub>medal]]  
 b. Assertion: Mina won a gold medal.  
 c. Scalar presupposition: that Mina win a gold medal is less likely than that Mina win silver medal or that Mina win a bronze medal.
- (5) a. LF of (3b): [EVEN [NEG [Mina won a BRONZE<sub>F</sub>medal]]  
 b. Assertion: Mina did not win a bronze medal

1 A reviewer of Linguistic Research shared his/her intuition with us that *-to* here is interpreted as an additive particle corresponding to *also* or *too* rather than a scalar one, *even*. *-To* is considered to be an additive focus-sensitive particle as well as a scalar particle in general. At this point, I cannot confirm the issue as to whether it is a case of homophony or is the same lexical item distinguished by contextual factors. If we insert *kkaci* ‘up to’ prior to *-to* the meaning of *even* becomes clearly obtained. Although this does not clarify any point regarding *-to*s ambiguity, it can help us to have an *even* reading without much difficulty, at least.

- c. Scalar presupposition: that Mina do not win a bronze medal is less likely than that Mina do not win a silver medal or that Mina do not win a gold medal.

Let us first consider these affirmative episodic sentences in a positive version and a negated version, respectively. The types of medals form a scale: if a person is capable of winning a gold medal, then he/she is capable of winning a silver medal and/or a bronze medal. This statement is not true when the conditions are the other way around. The scale of medals cannot be strictly described as having a relationship of entailment because winning a gold medal cannot entail winning a silver or bronze medal. However, if we consider the scale in terms of the capability of the medal earner, we see a relationship of entailment. Following the generalization of Lahiri (1998) on the correlation of logical strength between propositions and probability assignment, as in (6), we conclude that the asserted prejacent in (4b) is less likely than any alternative propositions in its alternative set.

- (6) If  $p \subseteq q$ ,  $p \leq_c q$ .

The explanation for (3b) illustrated in (5) is as follows. In the scope theory, the operator EVEN scopes over the negated proposition—meaning that it is not the case that Mina wins a bronze medal—thus requiring that the outcome is less likely than any of the other alternatives in C. The alternative set C would be formed with the negated propositions, comprising types of medals other than bronze. We need to check the logical strength between the alternatives to validate whether the probability relation required by EVEN is well formed.

- (7) a. Mina is not capable of winning a bronze medal  
     $\Rightarrow$  Mina is not capable of winning a gold medal. (The same logic applies for a silver medal.)  
b. Mina did not win a bronze medal  $\leq_c$  Mina did not win a gold medal.  
    (The same logic applies for a silver medal.)

The negated sentence with a bronze medal can satisfy the ‘least-likely’ scalar presupposition required by the EVEN operator. However, if the ‘bronze’ medal is replaced with a ‘gold’ medal, then the entailment relationship is reversed. Accordingly, the scalar presupposition is not satisfied.

In a lexical approach, it is assumed that there are two distinct lexical items for *even*: one is called an *even<sub>NPI</sub>*, which roughly amounts to the low-scope *even* discussed above given that it similarly evokes the least-likely presupposition. The other type of *even*—*even<sub>PP</sub>* (described in Rooth (1985))—evokes the opposite presupposition, which is that the prejacent is most likely in the alternative set C. Because the probability of the presupposition runs in the opposite direction, the scale-reversing effect of negation works successfully in the given context in (4). When the *-to* phrase is placed in the antecedent of a conditional clause, it goes well with the ‘gold’ medal because it is supposed to evoke the least-likely presupposition, as in (3c) and (3d). Scope theory explains this insofar as the EVEN operator is clause-bounded. Lexical theory can simply say that the *even<sub>NPI</sub>* appears in these contexts. Summing up the discussion so far, *-to* has been analyzed in parallel with the English *even*, with no characteristic patterns of its own. The next subsection addresses *-lato*. Unlike *-to*, *-lato* exhibits some characteristic properties worth mentioning. With observations on the characteristic properties of *-lato* phrases, we attempt a compositional explanation of this phrasal construction.

## 2.2 A *-lato* phrase

Like *-to* phrases, *-lato* phrases exhibit limited distributional patterns and are glossed as *even* in English. Naturally, some researchers conceive *-lato* phrases as corresponding to *even* when, in context, *even* takes a wide scope over negation (An 2007). By arguing that *-lato* and *-to* are Korean counterparts of wide-scope *even* and narrow-scope *even* phrases in English, respectively, An (2007) supports the scope theory of *even*. That research is contra the expectation that the presence of two distinct lexical items for *even* would support the lexical theory of *even* (*even<sub>NPI</sub>* and *even<sub>PP</sub>*). In fact, in his paper, An excludes *settle for less* (SFL) readings in considering the compositional properties of *-lato* phrases. Recently discovered



in lexical items understood to be parallel to *-lato* in Korean, however, including the Spanish *siquiera* (Herburger 2003; Alonso-Ovalle 2009, 2016; Crnic 2011), the Slovenian *magari* (Crnic 2011a, b), and the Greek *esto* (Giannakidou 2007), is that all these items share similar interpretations—SFL readings being one of them. A SFL reading should be counted as one of the characteristic properties naturally explained in the semantics of *-lato*<sup>2</sup>.

The term concessive scalar particle (CSP) refers to the class of lexical items mentioned above (Crnic 2011a). Common characteristics of these CSPs are illustrated in the following four points (Alonso-Ovalle 2016). First, CSPs are judged to be deviant in positive episodic sentences and licensed in downward entailing (DE) contexts, where a scalar meaning is conveyed. They have a restricted distribution in common. Interestingly, however, in the case of *-lato* it appears deviant in the local negation context. It only appears to be felicitous in non-veridical contexts (Lee et al. 2000). *-Lato* phrases, regardless of whether they combine with a low-scalar item or a high-scalar item, are all deviant in both positive and negative episodic sentences. The reason why the scalar status of the complement DP of a *-lato* phrase matters is because the felicity of the phrase relies on the scalar status of its complement DP as we have previously observed from the cases of *-ta*. We can confirm the validity of this in non-veridical contexts—for instance, in the antecedent clause of a conditional sentence as in (8c), with a necessity/possibility modal as in (8d-f), and in an imperative context (8e). These contexts form a necessary condition for *-lato* to be used felicitously.

- (8) An item at the lowest end vs. an item at the highest end of the scale plus

*-lato*

- a. *Mina-ka* ??*tongmyetal-ilato*/ #*kummyetal-ilato* *tta-ss-e*  
 Mina-Nom bronze medal-LATO/ #gold medal-LATO in-Past-Dec.  
 ‘Mina won even ??a bronze/#a gold medal.’
- b. *Mina-ka* #*tongmyetal-ilato*/ #*kumnyetal-ilato* *mos ttass-e*

2 This paper attempts to do a compositional analysis for a *wh+lato* phrase. Thus, the analysis is done in two folds: one is to identify the meaning of *-lato* and the other is to identify the proper meaning of *wh*-indeterminate. Considering the scope of this paper, discussion on some specific part of *-lato* the concessiveness meaning, might not be enough to clarify this point. I refer the readers interested in concessiveness of *-lato* to Kim (2020), which concentrates on explicating this point.

Mina-Nom bronze medal-LATO/#gold medal-LATO Neg in-Past-Dec.

‘Mina did not win even a bronze/#a gold medal.’

c. *Mina-ka tongnyetal-ilato/ #kumnyetal-ilato tta-myen,*

Mina-Nom bronze medal-LATO/#gold medal-LATO win-if,

*ku tayhak-ey hapkyekha-n-ta*

the university pass-Pres-Dec.

‘If Mina wins **even** a bronze/#a gold medal, then she can enter the university.’

d. *Mina-ka tongnyetal-ilato/ #kumnyetal-ilato tta-ya hay.*

Mina-Nom bronze medal-LATO/#gold medal-LATO win-should.

‘Mina should **at least** win a bronze/#a gold medal.’

e. *Mina-ya, tongnyetal-ilato/ #kumnyetal-ilato tta-la!*

Mina-Inch, bronze medal-LATO/#gold medal-LATO win-Imp.

‘Mina, win **at least** a bronze medal/#a gold medal!’

f. *Mina-nun tongnyetal-ilato/ #kumnyetal-ilato tta-to toy.*

Mina-Top bronze medal-LATO/#gold medal-LATO win-may.

‘It is okay for Mina to win **even** a bronze medal/#a gold medal.’

In (8), we find some characteristics of the complement DPs of *-lato -Lato* only combines with a low scalar item, and does not combine with a high scalar item (even with a scale-reversing operator). This feature is clearly distinguished from the characteristics of *-to* which changes its associated item depending on its context. In (3a), *-to* combines with a bronze medal, not a gold medal, placed with local-negation expression. Contrary to this, *-lato* requires only the low scalar item (the bronze medal) in any type of context, as confirmed in (8). This forms the second characteristic of a *-lato* phrase.

Third, in some contexts, *-lato* is glossed as ‘at least’ (see (8d) and (8f)), while in other contexts it is glossed as ‘even’ (see (8c) and (8e)). This is also observed in other CSPs in Crnic (2011). When a *-lato* phrase is glossed with ‘at least’, its so-called ‘concessive reading’ is revealed. The question then becomes whether the environments/contexts where this concessive reading appears can be systematically listed, and how the contextual division can be connected to the contribution of *-lato* to the propositional meaning. In the following pair of sentences from an example in Crnic (2011a), *-lato* in (9a) is translated as ‘at least’

and *-lato* in (9b) is translated as ‘even’.

- (9) a. *yekwen-ul mantuly-nyen, Jwun-i sacin poksapon-ilato*  
 Passport-Acc make-if, June-Nom picture copy-at least  
*ponay-ya ha-n-ta*  
 send-should-Pres-Dec.  
 ‘In order to make a passport, June should send me at least a  
 photocopy.’
- b. *yekwen-ul mantul-ttay Jwun-i sacin poksapon-ilato*  
 Passport-Acc make-when, June-Nom picture copy-even  
*ponay-to toy-n-ta*  
 send-may-Pres-Dec.  
 ‘When making a passport, June can send me even a photocopy.’

Fourth, in a DE context, a strengthening effect is derived from using a *-lato* phrase, which is subsumed to be an effect of any scalar inference that *-lato* evokes. For instance, in (8f), the silver medal and the gold medal, as well as the bronze medal, are the targets of Mina’s efforts to win in the speaker’s desire worlds. In fact, the former options are actually preferred to the latter one. In the imperative sentence in (8e), the direction is to win a medal, even if it is a bronze medal. Nevertheless, the conditions of the sentence do not require that Mina win only a bronze medal. As emphasized in Crnic (2011), any analysis that tries to explain the meaning of CSPs should be able to explain this point: the scalar meaning is not included in the assertion itself, but should be part of the speaker’s instruction. With this background understanding of these characteristics of *-lato* let us turn to compositional analysis on *-lato* and *wh*-indeterminate to elucidate these four points in the following subsection.

### 2.3. Crnic (2011a, b) on concessive scalar particles (CSPs)

This subsection shows how the properties of *-lato* phrases can be successfully analyzed following the work of Crnic (2011a, b). Crnic uses *magar\** as an abstract cover term for various types of CSPs. The crucial idea of *magar\** is that the term

is morphologically complex and expresses two components, a scalar component and a weak existential component. These two components are derived by two propositional operators, EVEN and AT LEAST, with which the Logical Form (LF) of a sentence with *magar<sup>f</sup>*, (10a), appears as (10b).

- (10) a. Peter read *magar<sup>f</sup>* ONE book.  
 b. [EVEN C<sub>1</sub>][AT LEAST C<sub>0</sub>][Peter read ONE<sub>F</sub> book]

In (10b), the two operators evoked by *magar<sup>f</sup>* manifest with AT LEAST being placed lower than EVEN. The relative order of these operators matters, because which argument an operator takes relies on its placement. Both EVEN and AT LEAST take two arguments—one is a prejacent proposition and the other is a set of propositions, C<sub>n</sub>. The lower operator, AT LEAST, in (10b), takes the prejacent 'λw. Peter read one book in w', and the contextual set is formed from the set of propositions in which 'one' is substituted with available numeric values in the context. AT LEAST, which takes a proposition (*p*) and a set of propositions (C<sub>n</sub>), requires the proposition *p* to be more likely to occur than any of the other propositions in C<sub>n</sub>. Once the requirement is satisfied, the resulting proposition is that there is one proposition in the C<sub>n</sub> (including *p*) that is true, as shown in (11a). Application of denotation of the AT LEAST operator and its argument C<sub>n</sub> to the above sentence (10a) yields the construction appearing in (11b).

- (11) a. [ AT LEAST ]<sup>C</sup> = λC. λp: ∀q ∈ C [q ≠ p → q ≤<sub>C</sub> p]. λw. ∃q ∈ C [p ≤<sub>C</sub> q ∧ q(w) = 1]  
 b. Abbreviation: C<sub>0</sub> = {λw. Peter read one book in w, λw. Peter read two books in w, λw. Peter read three books in w} = {1, 2, 3}  
 [ AT LEAST ]<sup>C</sup> ({1, 2, 3}) (1) = If 1 ≤<sub>C</sub> 2 ∧ 1 ≤<sub>C</sub> 3, then 1 ∨ 2 ∨ 3.

The upper operator, EVEN, takes the consequences of application of the lower operator as the bare-form proposition and forms another set, C<sub>1</sub>, based on the new prejacent. Accordingly, the proposition argument does not correspond to '1' but to '1 ∨ 2 ∨ 3'. The alternative set argument C<sub>1</sub> does not simply correspond to the set {1, 2, 3}, but to {1 ∨ 2 ∨ 3, 2 ∨ 3, 3}. This set is formed by substituting the numeric value of the proposition in (11b). The meaning of

EVEN and its composition with the arguments appears as in (12).

- (12) a.  $[\text{EVEN}]^C = \lambda C. \lambda p. \exists q \in C [p \leq_c q]. \lambda w. p(w) = 1.$   
 b.  $[\text{EVEN}]^C ((1 \vee 2 \vee 3, 2 \vee 3, 3)) (1 \vee 2 \vee 3) = \text{If } 1 \vee 2 \vee 3 \leq_c 2 \vee 3$   
 or  $1 \vee 2 \vee 3 \leq_c 3$ , then  $1 \vee 2 \vee 3.$

Let us examine whether *-lato* can be characterized by the same analysis for *magar*<sup>\*</sup> (Crnic 2011a, b). Because the discussion appears in detail in Crnic (2011a, b), we provide only a brief illustration of *-lato* in the following two types of environments: 1) why *-lato* is not used felicitously in positive episodic sentences (= (8a)) and 2) why it is fine with necessity modality (= (8e)). First, let us examine the sentence (8a), repeated here as (13a).

- (13) a. *Mina-ka tongmeydal-ilato ttass-e*  
 b.  $[\text{EVEN C2}][\text{AT LEAST C1}][\text{Mina wins a bronze medal}]$   
 (14) a. Presupposition of  $[\text{AT LEAST C1}][\text{Mina won a bronze medal}]$   
 $\lambda w. \text{Mina wins a bronze medal in } w \succeq_c \lambda w. \text{Mina wins a silver medal}$   
 in  $w, \lambda w. \text{Mina wins a gold medal in } w.$   
 b. Assertion of  $[\text{AT LEAST C1}][\text{Mina won a bronze medal}]$   
 $\lambda w. \text{Mina wins a bronze medal in } w \vee \lambda w. \text{Mina wins a silver medal}$   
 in  $w \vee \lambda w. \text{Mina wins a gold medal in } w.$

In satisfying the presupposition in (14a), the meaning is well composed up to the point of application of the lower operator. However, see the following process afterwards, as show in (15).

- (15) a. Presupposition of  $[\text{EVEN C1}][\text{AT LEAST C0}][\text{Mina wins a bronze medal}]$   
 $\lambda w. \text{Mina wins a bronze medal in } w \vee \lambda w. \text{Mina wins a silver medal}$   
 in  $w \vee \lambda w. \text{Mina wins a gold medal in } w \leq_c \lambda w. \text{Mina wins a silver medal}$   
 in  $w \vee \lambda w. \text{Mina wins a gold medal in } w \text{ or } \lambda w. \text{Mina wins a gold medal in } w.$   
 b. No proper assertion due to presupposition failure.

The presupposition evoked by EVEN requires the disjunctively connected three propositions to be less likely than at least one of the two other alternative propositions, as in (15a). The logical strength of ‘Bronze  $\vee$  Silver  $\vee$  Gold’ is the weakest in the set. Accordingly, it must be the most-likely proposition, which is placed in the opposite direction from what is required by EVEN. The suggestion in Crnic (2011a, b) turns out to successfully explain the infelicity of the usage of *-lato* in a positive episodic sentence. Let us move on to the second case—the felicitous usage of *-lato* with a necessity modal expression.

(16) a. *Mina-ka tongmyetal-ilato tta-ya hay.*

Mina-Nom bronze medal-LATO win-must. ‘Mina must win at least a bronze medal.’

b. [EVEN C<sub>1</sub>][ $\square$  AT LEAST C<sub>0</sub>][Mina win a bronze<sup>F</sup> medal]

If a necessity modal is placed under AT LEAST, then a crash of the presupposition of AT LEAST is induced. Let us place it above AT LEAST and below EVEN. The presupposition and assertion up to the point of AT LEAST are the same as (13)-(14), as illustrated above. What crucially changes from the positive episodic case would be the C<sub>1</sub> and the proposition generated by the interruption of a necessity operator. Having full versions of the sentences in (14) and (15), an abbreviated version is used below.

(17) a. C<sub>1</sub>in(16b)={ $\square$ Bronze $\vee$ Silver $\vee$ Gold, $\square$ Silver $\vee$ Gold, $\square$ Gold}

b. The presupposition of [EVEN C<sub>1</sub>][ $\square$  AT LEAST C<sub>0</sub>][Mina wins a **bronze<sup>F</sup>** medal]

$\square$  (Bronze  $\vee$  Silver  $\vee$  Gold)  $<_C$   $\square$  (Silver  $\vee$  Gold) or  $\square$  (Bronze  $\vee$  Silver  $\vee$  Gold)  $<_C$   $\square$  Gold

The presumed C<sub>1</sub> and the presupposition predicted from the discussion thus far appear in (17). However, in this case, the presupposition is not satisfied. The logical strength of each alternative and their likelihood scales are not shown to be correct (see(6)). A crucial point in the work of Crnic (2011a,b) lies in that Crnic does not merely use bare alternative forms, as in (17). Instead, he suggests that the strengthened alternatives be used in the compositional process, as in (18).

$$(18) C_1 = \{\Box (\text{Bronze} \vee \text{Silver} \vee \text{Gold}) \wedge \Diamond \text{Bronze} \wedge \Diamond \text{Silver} \wedge \Diamond \text{Gold}, \Box (\text{Silver} \vee \text{Gold}) \wedge \Diamond \text{Silver} \wedge \Diamond \text{Gold}, \Box \text{Gold}\} \wedge$$

The presupposition posed by EVEN is that there exists a non-prejacent alternative that is more likely than the prejacent. In considering the logical strengthening relationship, however, a ‘more likely’ relationship is not established from the alternatives in (18). Instead, Crnic pragmatically conceives this ‘more likely’ property, thereby discerning the speaker’s ‘more likely’ priority over other options. Applying this idea to the example above, we interpret the sentence as ‘Mina has to win one of the medals—bronze, silver, or gold—and it can be a bronze medal and it can be a silver medal and it can be a gold medal.’ The speaker is more likely to want silver or gold medals than a bronze medal, but it is perfectly okay to get even a bronze medal. This describes the so-called ‘settle for less’ reading, mentioned above. It is naturally explained as being derived in this process.

The next construction considered here is a *-lato* sentence with local negation. Comparing the previous two constructions analyzed under the EVEN plus AT LEAST analysis, we can tentatively conclude that *-lato* is licensed only when a proper operator intervenes between EVEN and AT LEAST, twisting the consequences of the application of AT LEAST until AT LEAST becomes the argument of EVEN. Theoretically, this makes sense. While AT LEAST weakens the prejacent entailment by making disjunctions of the alternatives, still it is required to be stronger than at least one other alternative of  $C_1$  by EVEN (because ‘likeliness’ and ‘logical strength’ run in opposite directions from one another.) The prediction that instantly comes to mind, then, would be that the intervening operator should be either a scale reverser or a scale breaker. The necessity modal case amounts to the latter case. Negation amounts to the former case, and the prediction bears out correctly in *magar\** examples (Crnic 2011a, b). However, *-lato* is not licensed with local negation (see sec.1).

We cannot attribute this to the properties of negation because the logical properties of negation cannot be varied depending on linguistic parameters. However, linguistic parameters can specify the distributional properties of negation. If we assume the position of negation in Korean in the LF to be either lower than both operators or above them, then the scale reversing effects of

negation cannot contribute to establishing a valid relationship between the EVEN presupposition and the product of an AT LEAST application. Support for this restriction on the LF placement of negation can be found in previous studies. Nakanishi (2006) addresses Japanese scalar particles, *-mo* ‘even’, *-demo* ‘even’, and *-dakemo* ‘only even’, thus extending the scope theory of *even* to the Japanese data. In forming this argument on scope theory, the taking of scope over negation by scalar particles plays an essential part in Nakanishi’s reasoning. She argues that in Japanese, negation is obliged to have a narrow scope relative to the operators induced by scalar particles, while other operators that form downward entailing contexts do not need to have a narrow scope (Nakanishi (2006) pp. 7-9). This idea of the obligatory narrow scope of negation also appears in the work of Lim (2017) for Korean *-lato* phrases. Both Nakanishi (2006) and Lim (2017) analyze *-dakemo* and *-lato* as two integrated operators corresponding to ONLY (exclusivity) and ALSO (additivity). They confirm that the behavior of negation scopes below the ONLY operator by demonstrating the position of negation in the sentence with a sole occurrence of the lexical item *only* in Japanese and in Korean, respectively. See the following examples.

- (19) a. *John-wa [Hon A]F-dake yom-ana-katta.*  
 John-Top Book A-only read-Neg-Past  
 ‘John did not read only book A.’ (=John read everything except Book A)
- b. *John-un [Barriers]F-man an ilk-ess-ta.*  
 John-Top Barriers-only Neg read-Past-Dec.  
 ‘John read everything except *Barriers*.’      Only > Neg, \* Neg > Only  
 (Lim 2017: 223)

The example shows that the argument that negation takes a narrow scope relative to propositional operators is not stipulated, but has been consistently asserted in other studies. The common argument of Nakanishi (2006), Lim (2017), and the present study is that two operators are residing in a single particle (argued to be morphologically complex). These operators generate two conflicting presuppositions, and without any additional device, these presuppositions cannot avoid having a presupposition clash. The basic approach of respective studies is similar, but the meaning of each operator is set up differently in the different



studies. More details on Lim (2017) are provided in section five.

Thus far, we have focused on explicating the particles *-to* and *-lato*. We tentatively conclude that *-to* is a counterpart of *even*, while *-lato* cannot be subsumed as a sub-type of *even* because more complex components reside therein. For that, this paper adopts a big idea of Crnic (2011a, b) on CSPs, showing that CSP theory successfully explains the distributional and interpretational properties of *-lato* phrases. As this section is devoted to explicating only the particles themselves, the argument types have been fixed as focused lexical items, which easily evoke scales (e.g., a medal type, a numeric value). Having now identified the particles, our interest turns in the next section to so-called NPIs and FCIs that use these particles and form combinations of *wh*-indeterminates and *-to/-lato* phrases.

### 3. *Wh*-indeterminates plus *-to/-lato*

This subsection focuses on *wh*-indeterminate plus *-to/-lato* constructions with an emphasis on two issues. First, the meaning and distributional properties of *wh*-indeterminates plus *-to/-lato* are explained, and second, we explain an apparent deficiency of *wh*-indeterminates as a proper argument for *-to/-lato* particles. The distributional properties of these phrases are clearly depicted in Choi (2007).

Table 1. Licensing environments of *wh-(N)-to* and *wh-(N)-lato* (Choi 2007: 268)

	<i>Wh-(N)-to</i>	<i>Wh-(N)-lato</i>
Negative episodic	OK	*
Restrictor of $\forall$	*	OK
If-clauses	*	OK
Generic	OK	OK
Can	OK	OK
Must	OK	OK
Imperative	*	OK
Affirmative episodic	*	*

Contextual environments are divided into four types including group 1: negative episodic contexts, group 2: downward entailing contexts with the

exception of local negation, group 3: free choice (FC) contexts, and group 4: affirmative episodic contexts. Based on these distributional restrictions, Choi (2007) categorizes *wh*-indefinite+*to* phrases (*wh-to* used as an abbreviation) as NPIs/FCIs and *wh*-indefinite+*lato* phrases (*wh-lato* used as an abbreviation) as FCIs. Defining these two classes of phrases as FCIs, the author notes that the “free choiceness” indicated by these items is related to our intuition that the speaker or subject of a sentence does not care about the content of the exact selection (i.e., ignorance or indifference to the exact identities expressed via these phrases). Let us first examine the *wh-lato* sentences in the subsection below. Therein we discuss the exact meaning of the sentences and how *wh-lato* contributes to generating these meanings.

### 3.1. Wh-indefinites + *lato*

According to Table 1, *wh-lato* phrases are licensed in FC contexts (group 3) and in downward entailing (DE) contexts (group 2). Below are example sentences in these licensing conditions.

(20) Group 2: Downward Entailing Contexts

a. *nwukwu-lato o-myen, kanguy-lul sicakha-kyess-ta*

Who-LATO come-if, lecture-Acc start-will-Dec.

‘If anyone comes, I will start lecturing.’

b. *mwue-lato nalha-n motun ai-tul-un sathang-ul pat-ass-ta*

What-LATO speak-Rel every child-plural-Top candy-Acc get-Past-Dec.

(21) Group 3: FC contexts

a. *etten-say-lato na-n-ta*

What-bird-LATO fly-GEN-Dec.

‘Any bird flies.’

b. *John-un etten-koki-lato mek-ul swu iss-ta*

John-Top what-meat-LATO eat-can-Dec.

‘John can eat any type of meat.’

(Choi 2007: 275)

c. *nwukwu-lato ikel chiwe-yaha-n-ta*

Who-LATO this-Acc clean-must-Pres-Dec.

- 'Someone should clean this (anyone is allowed to do this).'
- d. *mwue-lato com meke-la*  
 what-LATO little eat-Imp  
 'Eat something! (Anything is fine).'

The *wh-lato* phrases are interpreted as *any* in (20) and (21). It is well known that *any* is interpreted either universally or existentially, and the same interpretational problem appears in the above *wh-lato* sentences. In (20a, b) and (21c, d), *wh-lato* is interpreted existentially, while in (21a, b), it seems to be interpreted universally. The quantificational force of *wh-lato* is not fixed, but seems to be dependent on its licensing environment. This means that the quantificational force is not an inherent lexical property of *wh-lato* and instead, is better understood as being derived in the compositional process through the interaction of operators.

Having identified the meaning of the particle *-lato*, we need to know how *wh*-indeterminates contribute to generating a propositional meaning. The suggestion in the work of Kratzer and Shimoyama (2002) of Hamblin style semantics of *wh*-indeterminates has been influential in general. Hamblin (1973) suggests that *wh*-indeterminates do not denote a singular item, but rather a set of alternatives. This idea has been adopted in later studies in the idea that alternatives expand to a point at which they meet a proper operator with which to be associated (Kratzer and Shimoyama 2002; Shimoyama 2006). This explains cases of combinations of *wh*-indeterminates with various operators and their long-distance dependence. Sentences composed with *wh*-indeterminates exemplified in Kratzer and Shimoyama (2002) appear as follows.

- (22) a.  $[[\text{dare}]]_{w,g} = \{x: \text{human}(x)(w)\}$   
 b.  $[[\text{nemutta}]]_{w,g} = \{\lambda x \lambda w'. \text{slept}(x)(w')\}$   
 c.  $[[\text{dare nemutta}]]_{w,g} = \{p: \exists x [\text{human}(x)(w) \ \& \ p = \lambda w'. \text{slept}(x)(w')]\}$

(22a) Note that the meaning of *dare*, 'who', amounts to a set of human beings. When it meets a predicate, *nemutta*, through point-wise application, the proposition denotes a set of propositions. At this point, a default propositional operator—that is, an existential operator, turns the set of propositions into a

singleton set.  $-Mo$  ‘also’, or  $-ka$  ‘or’, introduces the quantificational operator that quantifies over propositions in an expanded indeterminate set. We find a crucial difference in focus sensitive operators induced by  $-lato$  from those induced by  $-mo$  ‘also’, or  $-ka$  ‘or’. Focus sensitive operators require two types of arguments, unlike  $-mo$  ‘also’, or  $-ka$  ‘or’. Focused lexical items can be an appropriate argument for these focus sensitive operators by generating bidimensional meanings. One meaning serves as the prejacent—the proposition with the lexical item—and the other meaning is a set of propositions, which are formed by substituting the focused lexical item with the alternatives available in a context. Wh-indeterminates, however, lack an ordinary meaning, and instead form just a set of alternatives. Thus let us see how the sentence is composed.

- (23) a. *nwukwu-lato anyer..*  
       who-LATO come-if,...  
       ‘If anyone comes,...’  
       b. [EVEN  $C_1$ ][[AT LEAST  $C_0$ ][who come] → lecture start]  
       c. [ who comes ]<sup>w.g</sup> = {Ann comes, Ben comes, Chris comes}

The meaning of a sentence with a wh-indeterminate amounts to a set of propositions, as in (23c), and lacks an ordinary meaning. Without a prejacent meaning that corresponds to an ordinary meaning (in (23c), ‘who comes’), it is not possible to proceed with only the meaning in (23c). This type-mismatch between an operator and its complement—in this case, the wh-indeterminate—should be solved. Thus the example shows that the understanding of Kratzer and Shimoyama (2002) regarding the operator’s association with a wh-indeterminate cannot be applied to the  $-lato$  case. compose the sentence involving *wh-lato* phrases properly.

In a bidimensional alternative semantics view (advocated in the work of Rooth (1985, 1992) and in the work of Beck (2006), among much other research), Elerwine (2019) asserts that having an undefined ordinary semantic value (a proposition) violates the interpretability requirement, defined in that research as an essential requirement in the formation of any grammatical sentence. This is not a fresh idea original to our field, and in fact, has been widely presumed in studies using alternative semantics frameworks. Nevertheless, Elerwine’s

contribution has been to provide a systematic pattern observed from various types of data on combinations of *wh*-indeterminates and focus particles, providing explanations for the felicity/infelicity status of sentences based on this interpretability requirement. In the process, Elerwine suggests that three types of covert operators be present to remedy the interpretability problem. Elerwine (2019) uses his strategy in solving the undefinedness problem of *wh*-indeterminates plus focus particles found in various languages. The starting point from which he approaches this problem is to ask “why” focus particles or disjunctive particles are specifically designated to combine with *wh*-indeterminates in forming polarity sensitive items, such as NPIs and FCIs, cross-linguistically. Accordingly, we can have a theoretical question in dealing with alternative semantics, and at the same time, can apply the framework to numerous cross-linguistic cases. The issue raised in (23) is in this same vein. While we basically agree with Elerwine’s suggestion of utilizing type-raising or type-resetting operators, in forming an alternative meaning at the second stage, an interesting phenomenon appears. This aspect of analysis requires more scrutiny, which we turn toward now.

### 3.2. How to deal with the lack of ordinary semantic value of *wh*-indeterminates

This subsection takes a small detour in considering the problem of the lack of ordinary semantic value and in evaluating the suggestion of Elerwine (2019) to solve this problem. Observing the prevalent *wh*-quantifications via focus particles cross-linguistically, Elerwine (2019) suggests an understanding of the mechanism that underlies the process of composing the proper *wh*-quantification structure. He establishes ‘interpretability’ as a required criterion for sentences in two-dimensional alternative semantics:

(24) Interpretability

To interpret  $\alpha$ ,  $[\alpha]^0$  must be defined and  $\in [\alpha]^{\text{alt}}$ .

This generalization instantly raises a problem in our conventional way of

interpreting an interrogative sentence as a set of propositions (Hamblin 1973). Indeed, it is “uninterpretable” in the above sense by having its ordinary meaning,  $[\alpha]^0$ , undefined. To remedy this problem, Kotek (2016, 2019) makes use of an operator ‘ALTSHIFT’, defined as follows.

- (25) ALTSHIFT (Kotek 2016, 2019)
- a.  $[[\text{ALTSHIFT } \alpha]]^0 = [\alpha]^{\text{alt}}$
  - b.  $[[\text{ALTSHIFT } \alpha]]^{\text{alt}} = \{[\alpha]^{\text{alt}}\}$

This reminds us of the use of a type-shifting operator to remedy the type-mismatch that occurs in the compositional process of noun phrases (NPs) with predicates in Partee (1987). *AltShift* lifts the type of an ordinary meaning one step up, thereby making the alternative meaning an ordinary one. As for the original alternative meaning, it has added an additional layer to the set, as in (25b). Adding a layer to a set is a process that here we call Reset. This forms the second generalization in the work of Elerwine (2019), as follows.

- (26) Reset:

*Op* is “resetting” if it specifies  $[[Op \alpha]]^{\text{alt}} := \{[Op \alpha]^{\text{alt}}\}$

This use of an *AltShift* operator supplies an ordinary meaning to the conventional meaning of questions or a set of propositions, thereby facilitating compliance with the interpretability principle. This problem of a lack of ordinary meaning in bidimensional alternative semantics is not restricted only to question-semantics, but is applicable to any constructions involving wh-quantification. As the work of Kratzer and Beck (2002) shows, if there are only constructions associated with simple existential, universal, or negation operators, then there are no problems. This is because these operators function to turn the set of propositions into a single proposition. However, if there is an operator that does not simply quantify over propositions in alternative meanings, but instead takes both an ordinary meaning and an alternative meaning in order to convey its point, then problems necessarily arise. Because the work of Kratzer and Shimoyama (2002) does not deal with these types of particles (but only deals with simple quantifying operators), we cannot simply extend their analysis

to the types of particles that require two types of arguments.

Elerwine (2019) tries to solve the problems arising from the lack of ordinary semantic value by employing three types of operators. One is the *AltShift* introduced above, and the other two operators are what he calls  $\exists$  and  $\exists_{\text{reset}}$ . The former one, a bare existential operator, forms an ordinary meaning by making a disjunction of each member in the alternative set. The alternative meaning, however, remains the same. While the  $\exists$  operator-applied meaning can remedy the ‘undefined’ problem of ordinary meaning, it subsequently causes another problem by violating the interpretability principle, as shown in (24). Example (27) shows how the  $\exists$ -operator works.

- (27)  $[\alpha]^{\circ}$  : undefined,  $[\alpha]^{\text{alt}} = \{a, b, c\}$   
 a.  $[\exists\alpha]^{\circ} = \vee [\alpha]^{\text{alt}}$       ordinary meaning:  $[\alpha]^{\circ}$ : undefined,  $[\exists\alpha]^{\circ} : a \vee b \vee c$   
 b.  $[\exists\alpha]^{\text{alt}} = [\alpha]^{\text{alt}}$       alternative meaning:  $[\alpha]^{\text{alt}} = \{a, b, c\}$ ,  
 $[\exists\alpha]^{\text{alt}} = \{a, b, c\}$

The ordinary meaning, ‘ $a \vee b \vee c$ ’, is not included in the set of its alternative meanings, thus rendering the violation shown in (23). It cannot be used as it is, so it requires some operator to remedy this specific part. Elerwine (2019) provides a case study wherein this type of operator is used in Tibetan *wh-even* NPIs. Here, Elerwine shows that application of an existential operator alone causes an interpretability problem, but by having an EVEN operator and an obligatory negation, the problematic part is remedied. He argues that the contribution of EVEN and negation in Tibetan is to repair interpretability. Otherwise, according to Elerwine, the combination does not contribute to the overall meanings of sentences, as shown in *even*-associated constructions in other languages.

The third type of operator amounts to a combination of the previous two operators,  $\exists$  and reset, rendering  $\exists_{\text{reset}}$ . This reset existential operator lets  $\alpha$  form its alternative meaning from a newly formed ordinary meaning, and forms a set by resetting the consequence, as follows.

- (28)  $[\alpha]^{\circ}$  : undefined,  $[\alpha]^{\text{alt}} = \{a, b, c\}$

- a.  $[\exists_{\text{reset}} \alpha]^{\circ} = \vee [\alpha]^{\text{alt}}$   
 ordinary meaning:  $[\alpha]^{\circ}$  :undefined,  $[\exists_{\text{reset}} \alpha]^{\circ} : a \vee b \vee c$
- b.  $[\exists_{\text{reset}} \alpha]^{\text{alt}} = \{\vee [\alpha]^{\text{alt}}\}$   
 alternative meaning:  $[\alpha]^{\text{alt}} = \{a, b, c\}$ ,  $[\exists_{\text{reset}} \alpha]^{\text{alt}} = \{a \vee b \vee c\}$

These three operators are saviors for any  $\alpha$  whose ordinary meaning is undefined. Depending on which type of operators  $\alpha$  is composed with, or which syntactic/semantic restrictions it gets, the choice of a saving operator can vary. The problem that emerges in discussing the composition of *wh*-indeterminates and *-lato* amounts exactly to the problem that Elerwine tries to solve based on his previous research in various types of data (Elerwine 2017, 2019, inter alia.) Here we focus on the *wh-lato* problem and check whether Elerwine's suggestion can also be extended to our case, which would be ideal.

### 3.3. *Wh-lato* in downward entailing (DE) contexts

Let us return to our problem in (23) and apply the bare existential operator to our example sentence below.

- (29) a. [EVEN  $C_1$ ][[AT LEAST  $C_0$ ][who come]  $\rightarrow$  lecture start]
- b. Abbreviation:  
 'Ann comes' = a, 'Ben comes' = b, 'Chris comes' = c, lecture starts = LS  
 $[\exists[\text{who comes}]]^{\circ} = a \vee b \vee c$   
 $[\exists[\text{who comes}]]^{\text{alt}} = \{a, b, c\}$
- c.  $[\text{AT LEAST}]^C = \lambda C. \lambda p. \forall q \in C [q \neq p \rightarrow q \leq_C p] \lambda w. \exists q \in C [p \leq_C q \wedge q(w) = 1]$
- d.  $[\text{AT LEAST}]^C (\{a, b, c\}) (a \vee b \vee c) =$   
 If  $a \leq_C (a \vee b \vee c) \wedge b \leq_C (a \vee b \vee c) \wedge c \leq_C (a \vee b \vee c)$ , then  $a \vee b \vee c$
- e.  $[\text{EVEN}]^C = \lambda C. \lambda p. \exists q \in C [p \leq_C q]. \lambda w. p(w) = 1.$
- f.  $[\text{EVEN}]^C (\{(a \vee b \vee c) \rightarrow \text{LS}, (b \vee c) \rightarrow \text{LS}, c \rightarrow \text{LS}\}) ((a \vee b \vee c) \rightarrow \text{LS}) =$  If  $(a \vee b \vee c) \rightarrow \text{LS} \leq_C (b \vee c) \rightarrow \text{LS}$  or  $(a \vee b \vee c) \rightarrow \text{LS} \leq_C c \rightarrow \text{LS}$ , then  $(a \vee b \vee c) \rightarrow \text{LS}$ .



In (29), the bare existential operator generates an ordinary meaning of ‘who comes’ as ‘Ann comes or Ben comes or Chris comes’ under the assumption that these three people are all the available people in the context. The alternative meaning amounts to a set of these three people. By constituting the bidimensional meaning of ‘who comes’, (29b) is in an appropriate form to proceed with the application of AT LEAST, defined in (29c). In (29d), the disjunctively connected ‘Ann comes  $\vee$  Ben comes  $\vee$  Chris comes’ is logically weaker than any disjunct. Accordingly, (29d) satisfies the presupposition imposed by AT LEAST. The subsequent procedure is the same as the procedure explored in the ‘bronze’ medal case (in the previous example using types of medals, the most-likely medal to obtain—the ‘bronze’—is focused on). Remember that what is crucial here is the order of operators: EVEN >  $OR_{DE}$  > AT LEAST: between EVEN and AT LEAST, a downward entailing operator, or a conditional operator, is placed. EVEN takes the whole clause, including the antecedent clause and the consequence clause (not just the antecedent one).

Both EVEN and AT LEAST impose requirements on the likelihood relationship between the prejacent (an ordinary meaning) and propositions in its alternative set (an alternative meaning). The difference between them lies in the direction of the likelihood. At the stage of a lower operator’s application, the prejacent should be the most likely one. In contrast, at a higher stage, the prejacent should be the least likely one. This means that, for the sentence to survive, the likelihood direction should be reversed or modified in the process. In (29), the proposition whose antecedent is the weakest while achieving the same results as other propositions should be less likely than other propositions with the same results and with stronger conditions. In other words, weaker conditions should cause it to be harder for a proposition to achieve the same results. Accordingly, that proposition is the least likely one overall. It would be more likely for a lecture to start under conditions of an audience of greater and more significant quality/quantity than with a smaller audience of less significant quality/quantity. Recall that a gold medal is also more likely to be celebrated than a bronze medal in the medal example. In this conditional sentence example, we have confirmed that the application of an  $\exists$ -operator successfully remedies the unavoidable mismatch problem between the meaning of a bare-form *wh*-indeterminate and the proper argument types of *-lato*. Now let us determine

whether the covert existence of an  $\exists$ -operator can be confirmed with *-to* particles. If the operator turns out to work with *-to* particles, too, strong supportive evidence for Elerwine (2019) will be provided. The following is a simple example, *nwukwu-to anh wa-ss-ta* ‘nobody(who+*-to*) came.’

- (30) a. [EVEN C<sub>0</sub>][NEG [who come]]  
 b. Abbreviation: ‘Ann comes’ = a, ‘Ben comes’ = b, ‘Chris comes’ = c  
 $[\exists[\text{who comes}]]^o = a \vee b \vee c$   
 $[\exists[\text{who comes}]]^{\text{alt}} = \{a, b, c\}$   
 c.  $[\text{EVEN}]^C = \lambda C. \lambda p: \exists q \in C [p \leq q]. \lambda w. p(w) = 1.$   
 d.  $[\text{EVEN}]^C(\neg(a \vee b \vee c))(\{-a, \neg b, \neg c\})$   
 $= \text{If } (\neg(a \vee b \vee c)) \leq_c \neg a \text{ or } (\neg(a \vee b \vee c)) \leq_c \neg b \text{ or } (\neg(a \vee b \vee c)) \leq_c \neg c$   
 $\text{then } (\neg(a \vee b \vee c)) \text{ is true.}$

As confirmed previously, negation is placed at a propositional operator position lower than EVEN. The *wh*-indeterminate sentence forms its ordinary meaning with the aid of a bare-existential operator as ‘Ann comes or Ben comes or Chris comes’ in (30b). The disjunctive coordination of these three propositions is logically weaker than each atomic proposition. Negation reverses the logical strength between them. Negated disjunctively coordinated propositions ( $\neg(a \vee b \vee c)$ ) become stronger than each atomic negated proposition, which forms a member of the set of alternative meanings. This satisfies the presupposition imposed by EVEN, as shown in (30d). Here, the way that a prejacent and its alternative set are formed corresponds perfectly with the compositional process. Without presuming the presence of a covert  $\exists$ -operator, the composition process crashes at the stage before it meets the EVEN operator. By examining *wh*-indeterminate plus *-lato/-to* combinations in modal and negation contexts, we confirm that the bare-existential operator is a default ordinary-meaning-generator of Korean *wh*-indeterminates. Satisfied, we move on to the next puzzle of alleged free choice effects (universal quantificational readings) of *wh-lato* in modal contexts.

### 3.4. *Wh-lato* in modal contexts

*Wh-lato* phrases are licensed in both existential and universal modal contexts, as shown in (21). Interestingly, the interpretations of *wh-lato* phrases in (21a, b) and those in (21c, d) seem to have different quantificational forces: the prior ones express a universal quantificational meaning, while the latter ones express an existential quantificational meaning. The denotation of a *wh*-indefinite applied by an existential operator corresponds to an existential quantifier (a disjunction phrase). The operators associated with *-lato* EVEN and AT LEAST, do not add any quantificational force to the prejacent meaning. How the interpretations—specifically, the different quantificational readings—are derived from different types of contexts must be clarified. In this process, the role of an *Exh* operator as a grammatical device rather than a pragmatic device (Chierchia 2006; Chierchia et al. 2012; Fox 2007; Fox and Hackl 2006, among many others) is highlighted. Let us first see an existential modal context. The following is the sentence from (21b), renumbered as (31a).

- (31) a. *John-un etten-koki-lato mek-ul swu iss-ta*  
 John-Top what-meat-LATO eat-can-Dec.  
 ‘John can eat any type of meat.’
- b. [EVEN C<sub>i</sub>[ $\forall$ [AT LEAST C<sub>o</sub>][John eats *wh*-meat]]]
- c. Available Meat = {Beef, Chicken, Pork}  
 Abbreviation: ‘John eats beef’ = b, ‘John eats chicken’ = c, ‘John eats pork’ = p  
 $[\exists[\text{John eats } wh\text{-meat}]]^o = b \vee c \vee p$   
 $[\exists[\text{John eats } wh\text{-meat}]]^{alt} = \{b, c, p\}$
- d. [AT LEAST]<sup>C</sup> ({b, c, p}) (b  $\vee$  c  $\vee$  p) =  
 If  $b \leq_c (b \vee c \vee p) \wedge c \leq_c (b \vee c \vee p) \wedge p \leq_c (b \vee c \vee p)$ , then  
 $b \vee c \vee p$ .

In (31b), we have determined the LF structure of an existential modal sentence, (31a). Assuming that the available types of meat in a given context are beef, chicken, and pork, the ordinary meaning applied by an existential operator

amounts to the disjunction of these three types of meat. Likewise, the alternative meaning is still a set of these. The application of AT LEAST to these two arguments returns the ordinary meaning of 'John eats beef  $\vee$  John eats chicken  $\vee$  John eats pork' by satisfying the presupposition. The process up to this point is the same as what we have seen in the DE environment. A crucial difference appears now.

A possibility modal,  $\diamond$ , intervenes between EVEN and AT LEAST. As discussed in the DE context, the role of an intervening operator is to reverse or crash (twist) the direction of the likelihood scale established between a prejacent and the alternatives in a set. However, neither a possibility modal nor a universal modal seem to qualify for this crashing function, because both modals are simply upward entailing operators. The key to understanding this puzzling phenomenon lies in taking into account an *Exh* operator. *Exh* is a grammatical device that, by default, can be inserted anywhere that is necessary (Chierchia et al. 2012 and references therein). The existence of *Exh* is rooted in the pragmatic grounds of Grice's quantity maxim. Disjunction well exemplifies the function of *Exh*. In a logical sense, disjunction of  $\alpha$  and  $\beta$  is entailed by the conjunction of  $\alpha$  and  $\beta$ , and accordingly, should not exclude the conjunctive meaning. However, in the linguistic usage of disjunction, the conjunctive meaning of  $\alpha$  and  $\beta$  is excluded in processing a disjunction phrase of  $\alpha$  and  $\beta$ . This is because linguistic usage considers pragmatic factors such as the intention of an interlocutor in using a specific expression out of many other alternative expressions. For instance, in (32) (Alonso-Ovalle 2006), a sentence with a possibility modal and a disjunction phrase can be connected conjunctively with two clauses with a possibility modal, as in (32a). This is not available in modal logic, but is only possible in the interpretation of natural language expression. This is a consequence of the reasoning shown in (32b)-(32d).

- (32) a. You can eat ice cream or cake for dessert.  
       =  $\diamond$  (ice cream  $\vee$  cake) =  $\diamond$ ice cream  $\wedge$   $\diamond$ cake  
       b.  $\{\diamond$ (ice cream  $\vee$  cake),  $\diamond$ ice cream,  $\diamond$ cake,  $\diamond$ (ice cream  $\wedge$  cake) $\}$   
       c. Innocently Excludable Alternatives =  $\{Exh(\diamond$ ice cream),  $Exh(\diamond$ cake),  
        $\diamond$ (ice cream $\wedge$ cake) $\}$   
       d.  $\diamond$  (ice cream  $\vee$  cake)  $\wedge$   $\neg$  ( $\diamond$ ice cream  $\wedge$   $\neg$   $\diamond$ cake)  $\wedge$   $\neg$  ( $\neg$  $\diamond$  ice cream

$$\begin{aligned} \wedge \diamond \text{cake} \wedge \neg \diamond (\text{ice cream} \wedge \text{cake}) &= \diamond (\text{ice cream} \vee \text{cake}) \wedge (\diamond \text{ice cream} \\ \rightarrow \diamond \text{cake}) \wedge (\diamond \text{cake} \rightarrow \diamond \text{ice cream}) \wedge \neg \diamond (\text{ice cream} \wedge \text{cake}) &= \diamond \text{ice} \\ \text{cream} \wedge \diamond \text{cake} \end{aligned}$$

The disjunctive phrase ‘ice cream  $\vee$  cake’ evokes an alternative set (in a pragmatic sense, a listener considers why the speaker has chosen a ‘disjunctive’ expression instead of other alternative expressions, as in (32b)). The alternatives in a set, (32b), which is not a disjunction phrase, are supposed to be denied with the same predicate based on the pragmatic reasoning that the speaker has not chosen that expression for some reason. To this process, Fox (2007) adds a crucial suggestion. Fox (2007) introduces the concept of ‘innocently excludable alternatives.’ For instance, in (32b), if we deny the proposition with an alternative ‘ice cream’, then it is directly implied that cake is the only possible option for dessert, which contradicts the initial assertion. As for the alternative, ‘cake’, the reasoning is the same. Fox (2007) suggests that the kinds of alternatives that contradict an assertion should be excluded from the calculation of overall propositional meaning. Alternatives that do not belong to this class are called innocently excludable alternatives, and they can only participate in the process to form inferences.

Another crucial point to consider in this process is that the *Exh* operator applies recursively up to the point that it does not bear any new result. In the above example, the disjunct competitors of the disjunction phrase, ‘ice cream’ and ‘cake’, can be innocently excluded alternatives only after application of the *Exh* operator. Once they undergo *Exh* operator application, they are innocently excludable, subsequently undergoing a second application of *Exh*. This bears the results of the so-called ‘free choice effects’, as illustrated in (32d).

Now let us come back to our *-lato* examples under a modal context. We stopped processing the compositional procedure at the point of application of a possibility modal in order to study the system in which *Exh* operates in cases where a modal expression and a disjunction phrase are present together. Considering that the operation of *Exh* is universal, it is necessary for *Exh* to be considered at the stage where the possibility modal is introduced. More specifically, we are at the stage of having the configuration of (33a) as the result of the procedure in (31d). In (33a), the alternative meaning of ‘ $\diamond(b \vee c \vee p)$ ’,  $C_1$ ,

should be formed. The question, then, is what does this set,  $C_1$ , consist of? Having ‘ $\diamond$ ’ and a disjunction phrase, we confront the same question discussed in the free choice case. Let us disregard what we have observed in the free choice case, and instead proceed with a naïve view that  $C_1$  amounts to  $\{\diamond b, \diamond c, \diamond p\}$ .

- (33) a. [EVEN  $C_1[\diamond(b \vee c \vee p)]$ ]  
 b. Assumption I:  $C_1 = [\diamond(b \vee c \vee p)]^{\text{alt}} = \{\diamond b, \diamond c, \diamond p\}$   
 c. [EVEN]<sup>C</sup>( $\diamond(b \vee c \vee p)$ )( $\{\diamond b, \diamond c, \diamond p\}$ ) =  
 If  $\diamond(b \vee c \vee p) \leq_c \diamond b$  or  $\diamond(b \vee c \vee p) \leq_c \diamond c$  or  $\diamond(b \vee c \vee p) \leq_c \diamond p$   
 then  $\diamond(b \vee c \vee p)$  is true: PRESUPPOSITION FAILURE : Assumption  
 I failed!

In (33c), with the naïve view on the formation of  $C_1$ , not considering the function of *Exh* bears a prediction of sentence invalidity by not satisfying the presupposition of EVEN. The logical strength between the prejacent and a member of  $C_1$  runs in the opposite direction from what is required by EVEN. Accordingly, this sentence should be predicted to be invalid. This actually is not the case. Let us assume that, with the insertion of *Exh*,  $C_1$  is formed differently from (33b). The newly suggested form of  $C_1$  would appear as follows.

- (34) a. Assumption II:  $[\text{Exh } \diamond(b \vee c \vee p)]^\circ = \diamond(b \vee c \vee p) \wedge \neg(x \in \text{IEA (Innocently Excludable Alternatives)})$   
 b. IE ( $\diamond(b \vee c \vee p)$ ) =  $\{\diamond b \wedge \neg \diamond(c \vee p), \diamond c \wedge \neg \diamond(b \vee p), \diamond p \wedge \neg \diamond(b \vee c), \diamond(b \wedge c \wedge p)\}$   
 c.  $[\text{Exh } \diamond(b \vee c \vee p)]^\circ = \diamond(b \vee c \vee p) \wedge \neg(\diamond b \wedge \neg \diamond(c \vee p)) \wedge \neg(\diamond c \wedge \neg \diamond(b \vee p)) \wedge \neg(\diamond p \wedge \neg \diamond(b \vee c)) \wedge \neg(\diamond(b \wedge c \wedge p))$   
 $= \diamond(b \vee c \vee p) \wedge (\neg \diamond b \vee \diamond(c \vee p)) \wedge (\neg \diamond c \vee \diamond(b \vee p)) \wedge (\neg \diamond p \vee \diamond(b \vee c)) \wedge \neg(\diamond(b \wedge c \wedge p))$   
 $= \diamond(b \vee c \vee p) \wedge (\diamond b \rightarrow \diamond(c \vee p)) \wedge (\diamond c \rightarrow \diamond(b \vee p)) \wedge (\diamond p \rightarrow \diamond(b \vee c)) \wedge \neg(\diamond(b \wedge c \wedge p))$   
 $= \diamond b \wedge \diamond c \wedge \diamond p \wedge \neg(\diamond(b \wedge c \wedge p))$

With the operation of *Exh* together with the possibility modal and disjunction, we have a different prejacent meaning from the prejacent in (33) as

an argument of EVEN. Unlike other intervening operators such as NEG, which does not invoke any logically strengthened alternatives in processing modal operators with disjunction phrases, logical strengthening occurs in this process. Consequently, we feed the prejacent formed in (34c) as an argument of EVEN as follows.

- (35) a. Assumption II: [EVEN  $C_1$ [*Exh*  $\diamond(b \vee c \vee p)$ ]]  
 b.  $C_1 = [ \diamond b \wedge \diamond c \wedge \diamond p \wedge \neg \diamond (b \wedge c \wedge p) ]^{\text{alt}} = \{ \diamond b \wedge \diamond c \wedge \neg \diamond (b \wedge c), \diamond c \wedge \diamond p \wedge \neg \diamond (c \wedge p), \diamond b \wedge \diamond p \wedge \neg \diamond (b \wedge p), \diamond b \wedge (\neg \diamond (c \vee p)), \diamond c \wedge (\neg \diamond (b \vee p)), \diamond p \wedge (\neg \diamond (b \vee c)) \}$   
 c. [EVEN]<sup>C</sup>( $\diamond b \wedge \diamond c \wedge \diamond p \wedge \neg \diamond (b \wedge c \wedge p)$ )( $C_1$ )=  
 If  $\diamond b \wedge \diamond c \wedge \diamond p \wedge \neg \diamond (b \wedge c \wedge p) \leq_c \diamond b \wedge \diamond c \wedge \neg \diamond (b \wedge c)$   
 or  $\diamond b \wedge \diamond c \wedge \diamond p \wedge \neg \diamond (b \wedge c \wedge p) \leq_c \diamond b \wedge (\neg \diamond (c \vee p))$ , then  
 $\diamond b \wedge \diamond c \wedge \diamond p \wedge \neg \diamond (b \wedge c \wedge p)$  is true.

First, a note on  $C_1$ , the alternative meaning of the new prejacent: because the new prejacent is the conjunction of three possibilities, *b*, *c*, and *p*, the alternatives would be the conjunction of two possibilities and the sole possibility, as shown in (35b). Noticeable here is that the work of *Exh* has changed the pre-*Exh*-version of disjunctively connected possibilities to the post-*Exh*-version of conjunctively connected possibilities. This changes the members of  $C_1$ , and eventually, changes the logical strengthening between a prejacent and the members of  $C_1$ . In (35c), the prejacent amounts to the conjunction of three possibilities, and the members of  $C_1$  are the conjunction of ‘less than three’ possibilities. Accordingly, the proposition, ‘it is possible to eat beef and it is possible to eat chicken and it is possible to eat pork, but not at the same time’ would be logically stronger than ‘it is possible to eat beef and it is possible to eat chicken, but not at the same time.’ Considering that logical strength and the likeliness condition going opposite directions from one another, we can conclude that the prejacent is true.

This also naturally explains the appearance of free choice effects of *wh-lato* in modal contexts. We remind ourselves that the universal quantifier-like interpretation of *wh-lato* in possibility modal contexts was not predictable prior to our consideration of the role of the *Exh* operator. The overall meaning obtained from (35) is roughly that John can eat any type of meat. Our analysis explains this.

#### 4. A short review of the previous research

Before closing the discussion on *wh-lato* phrases, a short review of previous research in this topic is provided. The semantics of *-lato* have been dealt with in many studies—most representatively, Lee et al. (2000), Choi (2005, 2007), An (2007), Giannakidou and Yoon (2016), and Lim (2017). The work of Lee et al. (2000) is a short paper that examines three types of focus particles, *-na*, *-to* and *-lato* which are argued to share properties of concessiveness and arbitrary choice. Lee et al. (2000) provides good observations on the particles' common and distinct patterns, but falls short of providing compositional analysis in depth. Because the present paper specifies our research target as only *wh*-indefinite plus *-lato* constructions, Lee et al. (2000) cannot be considered a direct ancestor of this study. We have referenced Lee et al. (2000) in our descriptions of the patterns of *-lato* data, together with the environments in which they appear, but this analysis is not reviewed here. The work of An (2007), which argues a simple scope theory to distinguish *-to* and *-lato* does not deal with exactly the same issue as this paper. That research has also been well reviewed in Lim (2017), which provides a persuasive explanation of why An's scope theory does not work for *-to* and *-lato*.

Giannakidou and Yoon (2016) and Lim (2017) are the most recent versions of analysis on this issue. Giannakidou and Yoon (2016) makes a clear contrast with the current proposal by arguing that a *wh*-indefinite plus *-lato* makes a new type of NPI, being non-scalar and non-exhaustive. Their core argument is that the whole *-lato* phrase expresses referential vagueness property, a sub-category of anti-specificity. FCIs also express anti-specificity but with the exhaustive property in general (Alonso-Ovalle 2006 and references therein) while this new class of NPI, to which *wh(N)-lato* belongs, is not formed out of exhaustivity and scalarity. They focus on identifying and demonstrating the concept of referential-vagueness (and related concepts). Examination on the validity of these concepts are above the scope of this paper. I only mention a couple of clear contrastive points here. In their proposal which employs a Heimian indefinite for a *wh*-indefinite, a *wh*-indefinite denotes a variable indexed with a world variable and the meaning of function of the particle *-lato* bleaches (more specifically, grammaticalized). A *wh(N)-lato* can be modalized through this world-indexing



and convey referential-vagueness. That is, the meaning of the whole *wh-(N)-lato* phrase is not composed from the meaning of each component, *wh*-indeterminate and *-lato*. There is a non-compositional approach and the current one is to explain the meaning of *wh-(N)-lato* compositionally. The reason why I argue for the compositional analysis appear in two respects: first, the characteristic properties and restricted distribution of *-lato* with focused lexical items in (8) appears the same with those of *wh-(N)-lato* in (20)-(22). I am skeptical that *-lato*'s function is bleached. Secondly, it is not uncommon to find cases for a *wh*-indeterminate to form polarity sensitive items by combining with focus-sensitive particles or co-ordinating particles inter-linguistically and cross-linguistically. In Korean, we find the following cases: *wh*-indeterminate *+na*, *-inka*, *-to* etc. For cross-linguistic data, there are numerous references (Haspelmath 1997; Lahiri 1998; Szabolci 2015 and references therein). I cannot find a strong motivation to deny the contribution of the particle *-lato* only in this case. For this non-compositional approach to be established firmly, there must be either strong argument (with supporting evidence) for only *wh-(N)-lato* not to be compositional or a generalized non-compositional analysis for other *wh*-indeterminate phrases at least in Korean.

Discussing Giannakidou and Yoon (2016), we have been noted that there are two approaches to view a *wh*-indeterminate: a Hamblin-style set of individual entities and a Heimian-style variable. A reviewer of *Linguistic Research* has pointed out that the second option has not been discussed in section three. It is because while the Heimian-style indefinite option has been taken in non-compositional approaches in general (e.g. Giannakidou and Yoon (2016)), in most compositional approaches, the Hamblin-style has been taken. I agree that it needs to be discussed whether a compositional analysis can be also made based on the Heimian-style indefinite approach, but at this point, I do not have a good idea as to how it can be applied to the compositional analysis<sup>3</sup>. Now let us

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3 The reviewer has provided the unavailable reading of *wh*-question from the following example as supporting evidence to the second approach.

- (i) *nwukwu-lato wa-ss-ni?*  
 who-LATO come-Past-Dec?  
 'Did anyone come?' (cannot be translated as 'Who came?')

move on to discuss a compositional analysis, Lim (2017).

Lim (2017), takes a compositional approach unlike Giannakidou and Yoon (2016). He identifies *-lato* as being decomposed into two sub-particles including a covert exclusive particle, *-man*, and an overt additive particle, *-lato* parallel to the German *auch nur* (and the Italian *auch solo*) following Guerzoni (2003, 2006). The alleged two particles take different scopes and induce their own inferences. One part of *-lato* alleged to correspond to *merely* or *just* in English requires a ‘most likely’ presupposition. The other part of *-lato* alleged to correspond to *auch anche* and *-deno* requires a weak additive presupposition. A ‘weak’ additive presupposition means that *-lato* requires there to be a non-false alternative to an assertion, instead of a true alternative. From the perspective of this study, what is incredible is this part from Lim’s analysis that the existence of a non-false alternative forms an additional presupposition. Let us clarify this point more in detail. In Lim (2017), the two subcomponents of *-lato* are defined as follows (Lim 2017: 218).

- (36) [ *-man* ]<sup>w</sup>(C)(p) = [ *nur/solo* ]<sup>w</sup>(C)(p) is defined iff
- (i) p is the most likely/insignificant proposition in C                      Scalarity
  - (ii) there is no other q in C that is true (unless p entails q)           Exclusivity
- If defined, then [ *-man/nur/solo* ]<sup>w</sup>(C)(p) is true iff p(w) = 1   Factivity
- (37) [ *-to* ]<sup>w</sup>(C)(p) is defined iff
- (i)  $\exists q [q \in C \wedge q \neq p] \wedge q(w) \neq 0$                                       (Weak) additivity
  - (ii) p is the LEAST likely proposition in C                                      Scalarity
- If defined, then [ *-to* ]<sup>w</sup>(C)(p) = p(w)

Examples (36) and (37) are denotations of the two particles that constitute *-lato* suggested by Lim (2017). If we apply this analysis to our bronze medal example, the sentences would be roughly as follows.

- (38) a.?? *Mina-ka tongmeydal-ilato ttass-e*

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*Wh+lato* here cannot form a wh-question. However, this cannot be counter-evidence against taking the Hamblin-style set of individuals. In our compositional analysis, the operators induced by *-lato* blocks association of a wh-indeterminate with a wh-interrogative operator. Therefore, the example (36) cannot be counter-evidence for any party.

- b. [TO(ADD)  $C_1$ ][MAN $C_0$ ][Minawinsabronzemedal]
- (39) a. Presupposition of [MAN  $C_0$ ][Minawinsabronzemedal]
- (i)  $\lambda w$ . Mina wins a bronze medal in  $w \succeq_C \lambda w$ . Mina wins a silver medal in  $w$ ,  $\lambda w$ . Mina wins a gold medal in  $w$ .                      Scalarity satisfied
- (ii)  $\lambda w$ . Mina wins a silver medal in  $w = 0 \wedge \lambda w$ . Mina wins a gold medal in  $w = 0$                       Exclusivity satisfied
- If defined,  $\lambda w$ . Mina wins a bronze medal in  $w$  is true.
- b. Assertion of [TO  $C_1$ ][Minawinsabronzemedal]
- [ TO [Mina wins a **bronze**F medal] ] is defined,
- If Mina wins no medal different from a bronze medal (from MAN)  $\wedge$   
for some  $x \neq$  a bronze medal, [ $\lambda w$ : Mina wins no medal  $\neq x$ . Mina wins  $x$ ]( $w$ ) = 1 or undefined.                      (From the definition of  $-t_0$ )

We have in fact applied Lim's finding (p. 219) to the bronze medal example. A new contribution from that research appears in the part obtained from the application of the lower exclusive operator, MAN, in (39b). We are very suspicious of the validity of (39b). As for  $x$ , in 'for some  $x \neq$  a bronze medal',  $x$  would be a silver or a gold medal. The condition that Mina wins no medal other than silver or gold cannot be satisfied because the prejacent asserts that Mina won a bronze medal. Therefore, the meaning that the sentence conveys must necessarily be false. Lim argues that the later condition of 'undefinedness' is satisfied in this case because the prejacent assertion never makes the negation of alternatives other than bronze be true. He asserts that this situation is meant 'to be undefined.' For us, this condition seems to be stipulative by making the condition itself deny what has been asserted and thus unable to avoid the contradiction. This stipulated, unavoidable contradiction does not seem to be the right compositional analysis. This theoretical reason explains why this paper does not subscribe to Lim's exclusivity plus additivity analysis.

Additionally, there are two shortcomings in the empirical explanatory power of Lim's analysis. First, one of the characteristic properties of  $-lato$  is to take only weak associates (that is, only bronze medals and not gold medals) in any type of context. No explanation is proffered regarding this property. Second, as illustrated in sections 3.2 to 3.4 (example (21)), the quantificational variability of *wh-lato* and the occurrence of free choice effects in some contexts should be

explained in the analysis of *-lato*. Because Lim (2017) does not discuss combinations of wh-indeterminates with this particle, it is hard to assert this point as a direct counterargument. Nevertheless, we cannot find any good way to explain these free choice effects of *wh-lato* phrases from the extended application of the *-lato* analysis in the present section. In explaining *wh-lato*, the AT LEAST plus EVEN analysis seems to be more advantageous than the JUST (exclusivity) plus ADD (additivity) analysis.

## 5. Summary

This paper studies combinations of wh-indeterminates with two *even*-corresponding focus particles, *-to* and *-lato*. The study is divided into two main parts: investigation of the meaning of the particles and theorization of how the lack of ordinary meaning of wh-indeterminates can be remedied in forming constituents with focus sensitive particles. We have mainly focused on the latter particle, *-lato*, because it is not simply subsumed by *even* based on its behavioral properties. The distributional properties and other behaviors of *-to* are considered to amount to a low-scope *even*. We have identified characteristic properties of *-lato* in the following four points: 1) its limited distributional restrictions appear only in non-veridical contexts (but not under the direct scope of negation), 2) it is associated only with low-scalar items, 3) its interpretations vary depending on context, sometimes as ‘at least’ and other times as ‘even’, and 4) it demonstrates strengthening effects and free choice effects in modal contexts. Our approach has been to view it as the incorporation of two sentential operators, EVEN and AT LEAST, the relative scope of which is fixed following the work of Crnic (2011a, b). In short, we suggest adding *-lato* to the list of concessive scalar particles.

The second part of this paper concerns the compositional semantics of wh-indeterminates with focus particles in general. Elerwine (2019) also finds the lack of ordinary meaning of wh-indeterminates to be problematic in terms of compositional processes by violating what Elerwine calls the interpretability requirement. Based on various types of constructions in which the interpretability requirement is violated, the work of Elerwine suggests three

types of covert operators to type-lift either the problematic ordinary meaning or an alternative meaning (sometimes both) including *altshift* (suggested in Kotek 2016, 2019), a bare existential ( $\exists$ ) operator, and a reset-existential ( $\exists_{\text{reset}}$ ) operator. This paper examines whether one of these operators can save *wh*-indeterminates from not forming proper types of arguments for the operators introduced by a focus particle. Applying the covert existential operator achieves the goal of remedying a *wh*-indeterminate to have a proper preajacent meaning. The meaning of *wh-lato* is basically configured through these processes. Following this resolution of composition issues of *wh*-indeterminates and focus particles, this paper explores the apparent quantificational variability observed from *wh-lato* phrases in modal contexts. We diagnose universal-like readings as the effects of free choice derived from the interaction of a possibility modal, disjunctively coordinated propositions, and the *Exh* operator. If we assume another operator than AT LEAST (which cannot generate a disjunctive phrase), then it is difficult to explain the appearance of free choice effects from *wh-lato* phrases. Along these lines, without explicating the work of *Exh*, it is hard to see how free choice effects can be generated under this condition. In sum, a simple *wh-lato* sentence such as '*nwukwu-lato kal-swu-iss-ta*' ['who-lato (anybody) can go'] is composed from the incorporation of various covert/overt operators: a bare-existential quantifier that generates an ordinary meaning of a *wh*-indeterminate, the AT LEAST operator, a possibility modal operator, a default *Exh* operator, and lastly, the EVEN operator. It is a linguist's great pleasure to find that these complicated and sophisticated processes underlie (mostly covertly) the composition of this short sentence of seeming simplicity.

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**Jieun Kim**

Associate Professor  
Department of English Language and Literature  
University of Ulsan  
93 Daehak-ro, Nam-gu  
Ulsan 44920, Republic of Korea  
E-mail: kimje@ulsan.ac.kr

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