DISJUNCTION AND ALTERNATIVE CONDITIONALS IN KOREAN*

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1 Introduction

The particle *-na* in Korean connects two or more noun phrases to yield a disjunctive interpretation as illustrated in (1). Interestingly, if *-na* is repeated after the last disjunct, the sentence receives a conjunctive reading instead as in (2).

(1) *Angie-**na** Brad-ka cikum Nagoya-ey issta.*
Angie-NA Brad-NOM now Nagoya-in exist[1]
'Angie **or** Brad is in Nagoya now.'

(2) *Angie-**na** Brad-**na** cikum Nagoya-ey issta.*
Angie-NA Brad-NA now Nagoya-in exist
'Angie **and** Brad are in Nagoya now.'

Before delving into the analysis of the conjunctive usage of the particle *-na*, it should be noted that repeating *-na* after each conjunct as in (2) is not a typical way to make a conjunctive expression in Korean. A run-of-the-mill conjunctive nominal is constructed with a genuine conjunctive particle such as *-wa* between each conjunct.

(3) *Angie-**wa** Brad-ka cikum Nagoya-ey issta*
Angie-and Brad-NOM now Nagoya-in exist

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[1] In this paper, the internal structure of verb phrases is omitted for simplicity since it is irrelevant to our purposes.

'Angie **and** Brad are in Nagoya now.'

Compared with ordinary conjunction such as (3), conjunctive expressions with repeating *-na* as in (2) seem to appear in more restricted contexts. Thus, I will call the repeated *-na* type of conjunction *na*-conjunction, in order to distinguish it from ordinary conjunction. Then several questions arise with respect to the nature of *na*-conjunction:

i) What are the syntactic and semantic properties of *na*-conjunction? How is *na*-conjunction different from ordinary conjunction?
ii) How is the meaning of *na*-conjunction derived compositionally? Especially, what is the function of the particle *-na* in this construction?
iii) Why does a marker used to make a conjunction have the same form with a disjunction marker?

The aim of this paper is to provide adequate answers to these questions. The paper is organized as follows: Section 2 explores some distinctive properties of *na*-conjunction. Section 3 explains the source of those peculiar properties and provides the formal semantic representation of *na*-conjunction. Section 4 extends the discussion to some other construction involving the same particle *-na* and refines the semantic interpretation of the particle *-na* so that a strictly compositional explanation for *na*-conjunction is possible. Section 5 draws conclusions and identifies future work.

2 Data: distinctive properties of *na*-conjunction

In this section I point out several characteristic properties of *na*-conjunction that distinguish *na*-conjunction from ordinary conjunction. First of all, as exposed in the previous example, a case marker does not follow *na*-conjunctive nominals.[2] The examples are repeated below to show this point clearly: the nominative marker *-ka* appears after the subject with ordinary conjunction in (4), whereas it cannot be attached to *na*-conjunction as in (5):

(4) *Angie-**wa** Brad-ka cikum Nagoya-ey issta.*
Angie-and Brad-NOM now Nagoya-in exist
'Angie and Brad are in Nagoya now.'

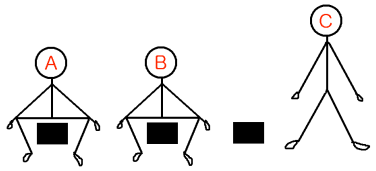
(5) *Angie-**na** Brad-**na**-(*ka) cikum Nagoya-ey issta.*
Angie-NA Brad-NA-(*NOM) now Nagoya-in exist
'Angie and Brad are in Nagoya now.'

Also, the entities denoted by the conjuncts in *na*-conjunction comprise a set of compatible entities that constitute the topic in the discourse, and every such compatible entity should be exhaustively listed in *na*-conjunction. For instance, suppose that you observe there are three guys, Andrew, Brad, and Chris, and Andrew and Brad are sitting in the chair, while Chris is standing

[2] Although no case marker can occur after *na*-conjunction, some case markers such as *-ekey* (dative) can intervene between the nominal and the particle *-na*. It suggests that the restriction is not on co-occurrence but on ordering, as will be explained later in this paper.

next to them. You can describe the situation you are observing with ordinary conjunction as in (6a) but cannot with its *na*-conjunction counterpart in (6b). To rescue (6b) from pragmatic oddness, an additional appropriate context should be provided to limit the topic to Andrew and Brad.

(6)



a. *Andrew-wa Brad-ka uica-ey ancaissta.*
Andrew-and Brad-NOM chair-in sit
'Andrew and Brad are sitting in a chair.'

b. *#Andrew-**na** Brad-**na** uica-ey ancaissta.*
Andrew-NA Brad-NA chair-in sit
'Andrew and Brad are sitting in a chair.'

Another distinctive property of *na*-conjunction is that it is strictly distributive. Ordinary conjunction is ambiguous between a collective reading and distributive reading, whereas *na*-conjunction does not have a collective reading. The sentence in (7) with an ordinary conjunction can mean either that Andrew, Brad, and Chris submitted a single paper together (i.e. collective), or that each of them submitted (separate) papers (i.e. distributive). On the other hand, its counterpart with *na*-conjunction in (8) only allows a distributive reading.

(7) *Andrew-wa Brad-wa Chris-ka nonmwun-ul hana nayssta.*
Andrew-and Brad-and Chris-NOM paper-ACC one submit
'Andrew, Brad, and Chris have submitted a paper.'

(8) *Andrew-**na** Brad-**na** Chris-**na** nonmwun-ul hana nayssta.*
Andrew-NA Brad-NA Chris-NA paper-ACC one submit
'Andrew, Brad, and Chris (each) have submitted a paper.'

3 Proposal: Alternative Conditionals

In the previous section, we have seen several distinctive properties of *na*-conjunction: incompatibility with case markers, exhaustivity of conjuncts, and distributivity. This section seeks for the answer to the question where these properties come from. To answer this question, let us first take a look at some other construction in Korean, which has a quite similar form with *na*-conjunction. The following sentence provides an example of another construction with repeated *-na*:

(9) *John-i palphyo-ha-**na** Bill-i palphyo-ha-**na***
John-NOM presentation-do-NA Bill-NOM presentation-do-NA
Mary-nun yelsimhi tul-ulkesita.

Mary-TOP attentively listen-will
'Whether John or Bill gives a presentation, Mary will be listening attentively.'

In this sentence *-na* is a clause ending rather than a nominal ending, and the two juxtaposed clauses, each of which is marked by *-na*, make a conditional-like adjunct clause together. I will call this type of construction 'alternative conditional' due to its interpretation that given any of the alternative conditions (i.e. John gives a presentation or Bill gives a presentation), the proposition denoted by the main clause is true. In other words, an alternative conditional *p-na q-na r* entails both 'if p, r' and 'if q, r'. Thus the semantic representation of alternative conditionals can be stated as conjunction of conditionals:

(10) $[[\ p_1\text{-}na\ p_2\text{-}na\ \ldots\ p_n\text{-}na\ q]] = (p_1 \rightarrow q) \wedge (p_2 \rightarrow q) \wedge \ldots \wedge (p_n \rightarrow q)$[3]

Now let us come back to the *na*-conjunction case and see how the explanation for alternative conditionals works for this case. Alternative conditionals and *na*-conjunctions are strikingly similar not only in their forms, but also in their semantic properties, especially in that both of them involve a conjunctive reading. Based on this similarity, I propose that *na*-conjunction is actually an alternative conditional with *pro*-drop. The sentence with the *na*-conjunctive subject in (11) in fact has the underlying structure (12), where the subjects of the nominal predicates and the co-indexed argument in the main clause are all omitted.

(11) *Annie-**na** Becky-**na** yeypputa.*
Annie-NA Becky-NA pretty
'Both Annie and Becky are pretty.'

(12) [e_i *Annie-**na*** e_i *Becky-**na***] [e_i *yeypputa*].
e.NOM Annie-*na* e.NOM Becky-*na* e.NOM pretty

The detailed derivation of *na*-conjunction is given in the following: I assume that the nominals that appear before *-na* are actually one-place predicates, such that they take an individual argument and return true if and only if the individual is equivalent to the denotation of the nominal.[4] In the following representation, the predicate *Annie(x)* reads as 'x is Annie'.

(13) $[[Annie]] = \lambda x.Annie(x)$ (in predicate position)

When it combines with a null subject, the subject remains a free variable whose value depends on the context.

(14) $[[e\ Annie]] = Annie(x)$

[3] I use the right arrow in this paper for the denotation of a conditional such as *if p, then q*.
[4] For this purpose, we can assume that an implicit copula verb exists between the nominal and the particle *-na*. The idea is based on the fact that *-na* has an allomorph *-ina*, which seems to contain the copula verb in Korean *i-* (see Chung 1996 for a clausal analysis for the construction *wh-na*).

Then we can derive the interpretation of the alternative conditional in (12) according to (10), as given below. Note that the null subjects in the adjunct and main clauses are all co-indexed, as they are represented by the same letter.

(15) [[e_i *Annie*]-***na*** [e_i *Becky*]-***na*** [e_i *yeypputa*]]
= [(*Annie*(x) → *pretty*(x)) ∧ (*Becky*(x) → *pretty*(x))]

I further assume that the free variables in (15) are bound by an unselective universal operator, adopting the claim that a conditional introduces an unselective universal operator if no explicit quantification is provided in the context (Heim 1982). Thus the ultimate semantic representation of the sentence (11) will be like (16): for every individual, if the individual is Annie, she is pretty, and if the individual is Becky, she is pretty, which brings the conjunctive implication that both Annie and Becky are pretty.

(16) ∀ [(*Annie*(x) → *pretty*(x)) ∧ (*Becky*(x) → *pretty*(x))]

The alternative conditional analysis of *na*-conjunction also provides explanations for its special properties that have been mentioned in Section 2. First, the incompatibility with case markers of *na*-conjunction is predicted because it is not a noun phrase but an adjunct clause, despite its apparent nominal-like appearance due to *pro*-drop. Second, the exhaustivity of *na*-conjunction is also a property of alternative conditionals. In alternative conditionals, all the compatible conditions that could possibly occur should be listed. For instance, the alternative conditional in (9) may not be uttered if there is some other person who might give a presentation. Although further investigation is needed to explain why alternative conditionals involve exhaustivity in the first place, the alternative conditional account suffices to account for why exhaustivity is observed only in *na*-conjunction but not in ordinary conjunction. Finally, distributivity of *na*-conjunction is well explained by the representation of alternative conditionals in (10); in alternative conditionals, the main clause holds under each condition stated in the conditional clause. Thus, for instance, the sentence with *na*-conjunction in (8) 'Andrew, Brad, and Chris have submitted a paper' has the following interpretation, which yields a distributive reading.

(17) □[(*Andrew*(x) → *submit_paper*(x)) □ (*Brad*(x) → *submit_paper*(x)) □
(*Chris*(x) → *submit_paper*(x))]

Before finishing the section, I have a speculation to make here about the morphological similarity between the alternative conditional marker *-na*, which brings a conjunctive reading, and the ordinary disjunction marker *-na*. It is indeed one of our questions in the beginning of the paper why the marker used to make a conjunctive expression have the same form with a disjunction marker.[5] In order to answer this question, I would like to note that it is commonly assumed that a conditional with a disjunctive antecedent is equivalent with the conjunction of two conditionals as in the following representation:

(18) SDA (simplification of disjunctive antecedent) (Loewer 1976)

[5] Note that the English translation *whether p or q* also contains disjunction expression but has a conjunctive interpretation (cf. Gawron 2001).

$(p \vee q) \rightarrow r \equiv (p \rightarrow r) \wedge (q \rightarrow r)$

Notice that the right hand side formula is exactly the same as the representation of alternative conditionals. If we assume that the basic semantic representation of alternative conditionals is a conditional with a disjunctive antecedent, it is conceivable that it might have something to do with its morphological marking that is similar to disjunction.

4 Extension: *wh-na*

Further advantage of the alternative conditional approach to *na*-conjunction is that it can be extended to provide a novel account for another puzzling construction, namely, *wh-na*. In Korean, a *wh*-word is interpreted as a universal quantifier if the particle *-na* is attached:

(19) *nwukwu-**na** aisukhulim-ul cohahanta..*
who-NA ice cream-ACC like
'Everyone likes ice cream.'

Since the universal reading of *wh*-words has attracted interest of many researchers, the particle *-na* in *wh-na* has been analyzed in various ways: as a question marker (Chung 1996), a concessive marker (Lee 2003, Yoon 2004), or a disjunction marker (Haspelmath 1995, Choi 2007). It is interesting that some researchers have claimed that *-na* in *wh-na* is a disjunction marker, although a satisfactory compositional semantic account has not been made.

I propose that *wh-na* is an instance of *na*-conjunction, and accordingly, alternative conditional. For this purpose, I adopt the view in Hamblin (1973) that a *wh*-word denotes a set of entities.[6] According to this veiw, for instance, the word *nwukwu* 'who' indicates a set of human individuals in the given model. If the set of individuals is equivalent to the set {Annie, Becky, Cindy}, the following two sentences have the same interpretation.

(20) *nwukwu-**na** aisukhulim-ul cohahanta.*
who-NA ice cream-ACC like
'Everyone likes ice cream.'

(21) *Annie-**na** Becky-**na** Cindy-**na** aisu khulim-ul cohahanta.*
Annie-NA Becky-NA Cindy-NA ice cream-ACC like
'Annie, Becky, and Cindy all like ice cream.'

The alternative conditional analysis of *wh-na* also provides an idea to refine the compositional explanation of alternative conditionals. In the representation of alternative conditionals presented in the previous section, it is hard to extract the exact meaning of the particle *-na* and to see how the entire representation is derived compositionally.

(22) [[p_1-*na* p_2-*na* ... p_n-*na* q]] = $(p_1 \rightarrow q) \wedge (p_2 \rightarrow q) \wedge \ldots \wedge (p_n \rightarrow q)$

[6] See also Shimoyama (2001) for a Hamblin semantics analysis of Japanese quantificational expressions with *wh*-words.

Now I propose that *-na* takes a set of propositions as argument, and it appears in the semantic representation of *na*-conjunction only once as shown in (23), the revised representation of alternative conditionals:[7]

(23) $[[\{p_1, p_2, \ldots, p_n\}\text{-}na\ q]] = \Box p\ [(p \Box P) \Box (p \rightarrow q)]$,
where P is a set of propositions $\{ p_1, p_2, \ldots, p_n \}$[8]

Then we can define the semantic representation of the particle *-na* as follows:

(24) $[[\text{-}na]] = \lambda P \lambda Q [\Box p\ [(p \Box P) \Box (p \rightarrow q)]]$,
where P is a set of propositions $\{ p_1, p_2, \ldots, p_n \}$

Another evidence for the alternative conditional analysis of *wh-na* is the fact that *wh-na* shows the same rigorous distributivity as *na*-conjunction. The following sentence with *wh-na* only has a distributive reading that each person submitted their own papers.

(25) *Nwukwu-**na** nonmwun-ul hana nayssta.*
who-NA paper-ACC one submit
'Everyone has submitted a paper.'

When it comes to the compatibility of case markers with *wh-na*, the judgment is rather subtle; *wh-na* followed by a case marker is marginal, but does not seem impossible.[9] It seems that unlike *na*-conjunctive nominals, *wh-na* is syntactically more like a noun phrase rather than a clause. It could be the case that *wh-na* has been used so frequently that it is in the process of grammaticalization, losing its clause-like property and becoming a real nominal (cf. Haspelmath 1995, Yoon 2004).

5 Conclusion

[7] The apparent multiple occurrences of *-na* on the surface in alternative conditionals and *na*-conjunction need an explanation, which I attribute to morphological idiosyncrasy in the current discussion.

[8] I use the symbol □ here to indicate material implication in logic to distinguish it from the symbol → that I use for conditionals in natural languages in this paper.

[9] A Google search shows a number of instances in which *wh-na* is followed by a case marker, though this number is relatively low compared to the instances of *wh-na* without a case marker. The following is the result of the search conducted on September 1, 2009:

nwukwu-na 'everyone'	11,500,000
nwukwu-na-ka (nominative)	181,100
nwukwu-na-lul (accusative)	10,500

On the other hand, *na*-conjunction is strictly incompatible with a case marker: almost no instance is found for *na*-conjunctive nominals followed by a case marker.

ne-na na-na 'you and me'	40,300
ne-na na-na-ka (nominative)	1
ne-na na-na-lul (accusative)	0

In this paper I have shown three kinds of constructions that involve the same particle *-na*: namely, *na*-conjunction, alternative conditional, and *wh-na*, and have argued that *na*-conjunction and *wh-na* are both originated from alternative conditionals, despite their apparent differences in their forms. The alternative conditional approach gives a unified and neat explanation for the syntactic and semantic properties of both structures.

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