Disjunction and Indeterminate-based Quantification in Korean

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1 Introduction

The last few years have seen a revival of interest in the grammar of indeterminate based quantification. By *indeterminate-based quantification* we understand the process whereby an indeterminate pronoun such as Korean *nwukwu* (who/one) or Japanese *dare* (who/one) associates either locally or in certain cases at a distance with an operator-like element to form a quantificational expression. A simple case of this process is exemplified by the Japanese examples in (1) and (2):[1]

(1)   Haruko-wa   dare-ka-ni   tegami-o   okutta
       Haruko-TOP who-DISJ-DAT invitation-ACC sent
       'Haruko sent an invitation to someone'

(2)   Taka-wa   nani-mo   yoku tabe-na-katta
       Taka-TOP who-CONJ well eat-NEG-PAST
       'Taka ate nothing well'

In (1), and (2) the indeterminate pronouns *dare* and *nani* combine with the operators *ka* and *mo* and receive as a result existential and universal force respectively. Interestingly, the particles *Mo* and *Ka* function also independently as conjunction and disjunction morphemes (3), (4):

(3)   John-wa Mary-ga   kita-to-mo Bill-ga   inakunatta-to-mo itta
       John-TOP Mary-NOM came-CONJ Bill-NOM disappear-CONJ   said
       'John said that Mary came and Bill disappeared.

(4)   John-wa eigo   ka nihongo-wo   hanasenai
       John-TOP English DISJ Japanese-ACC speak-able-NEG

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[1]Note on the glosses: As is well known, indeterminate pronouns are homophonous with *wh* words. In order to facilitate understanding we will use the corresponding *wh* form in the glosses. Thus for instance, Japanese *dare* will be glossed *who* rather than, say *indeterminate-human*. This is standard practice in the literature.

'John cannot speak English or Japanese'

Disjunction and existential quantification are logically intimately related and so are conjunction and universal quantification. The following equivalences are often repeated as a matter of course:

(5) $\exists x(\phi x) \leftrightarrow \phi(x_1) \vee \phi(x_2) \vee \phi(x_3) \vee \phi(x_4) \vee \ldots \vee \phi(x_\infty)$

(6) $\forall x\, \phi(x) \leftrightarrow \phi(x_1) \wedge \phi(x_2) \wedge \phi(x_3) \wedge \phi(x_4) \wedge \ldots \wedge \phi(x_\infty)$

Now, the possibility that the logical equivalences in (5) and (6) might offer the key to understanding of the mechanisms involved in the interpretation of the indeterminate-based quantifiers is intriguing. It would be very satisfying to be able to draw the conclusion that the equivalences established in logic, in studying the laws of thought and inference, are sometimes directly reflected in the grammar of natural languages. This paper aims to show that this is indeed the right conclusion.

Most current accounts of indeterminate-based quantification take their point of departure from Kuroda (1965) and his intuition that indeterminate pronouns have a role similar to that of *'as yet unbound logical variables'*. Nishigauchi (1986,1990) has substantiated this intuition further by likening indeterminate pronouns to Kamp/Heim indefinites which need to be bound by a higher operator. The issue that has arisen subsequently has been, in part, whether the operator that binds/associates with the indeterminate relates directly to the notions of conjunction and disjunction or, instead, whether it should be represented similarly to a quantificational determiner like *every* or *some*.[2] Thus, on the one hand, Jayaseelan (2001) proposed that the indeterminate-based quantifiers of Malayalam should be accounted for in terms of an infinite conjunction or disjunction which is the result of the application of the conjunction/disjunction morpheme to the indeterminate and, in a similar vein, David Gil in a series of papers (1993, 1995, 2001) has developed an approach to the conjunctive quantifiers like the one in (2) where the operator is analyzed as a conjunctive operator. On the other hand, Nishigauchi (1986,1990), Watanabe (2005), and also Shimoyama (2001), have assumed that the operator under discussion is indeed a quantificational operator akin to $\forall$.[3]

It seems to us that a theory which captures the connections expressed in the logical equivalences in (5), (6) but also the more tangible grammatical connection between the use of certain lexemes in conjunction/disjunction and their use in the expression of quantification would be, all other things being equal, preferable to one which does not recognize any such connection

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[2]Without necessarily implying that it is syntactically a D^0 category.

[3]Most of the discussion has focused on the Japanese element *Mo*, this is why we mention the universal mainly. Presumably, however, the same kind of reasoning would apply to the element *Ka*.

and takes them as accidental. For simplicity, we will refer to theories of the former type as *type A* and theories of the latter type, *type B* theories. Now, of course, the fact that a *type A* theory would be in principle preferable does not mean that it is also empirically correct. Furthermore, it is also the case that the *type A* theories that we have mentioned are somewhat lacking in formal clarity, which is not the case with *type B* theories.

In this paper our aim is twofold, first, from a theoretical point of view, to formulate a formally adequate *type A* theory for the interpretation of indeterminate-based quantifiers and, second, to consider the application of the theory to a set of problematic data from Korean.

In a nutshell, the puzzle is the following: a *type A* theory predicts that when indeterminates combine with disjunctive operators the result will be equivalent to an existential quantifier, and there's no two ways about that. Korean, on the surface, seems to falsify this prediction. Quantifiers formed by indeterminates and disjunction in Korean are interpreted as distributive universal quantifiers which, in addition, seem to receive an interpretation similar to English free-choice *any* (7).

(7)   Nwukwu-na kimchi-lul   cohahan-ta
       who-DISJ   kimchi-ACC like-DECL
       'Everyone/anyone likes kimchi'

How can a *type A* theory account for such data? We will argue here that the interpretation observed here falls out naturally from the interaction of the disjunctive operator with a covert distributive operator, and that, furthermore, crosslinguistically this is by no means an exceptional state of affairs.

The structure of the paper is as follows. In section 2 we will review the empirical data motivating the plausibility of a theory of *type A*. We will establish the crosslinguistic support for the fact that conjunctive morphemes give rise to universal interpretations and disjunctive ones to existential interpretations. In section 3 we will present the formal details of the semantic framework that we assume. Essentially this is the Hamblin framework developed by Kratzer and Shimoyama (2002) and Kratzer (2005) and we will introduce a couple of minor modifications regarding the status of the operators. Basically we will define the conjunctive and disjunctive operators in this framework. With this much empirical backing and theoretical development we will turn to the problematic data in Korean in section 4. We will first discuss the interpretation that disjunctive quantifiers in Korean can receive. Then we will show that despite appearances the items under discussion cannot be considered free-choice items. We show this by applying a battery of distributional and interpretive tests from Giannakidou (2001). In section 5 we present our analysis which is based on the interaction between a distributive operator and the disjunctive operator and we address the issue of the *free-choice* flavor of these items. Section 6 shows that the

same patterns can also be seen in other languages such as Malayalam and Chinese. Section 7 concludes the paper.

2 Disjunction/Conjunction morphemes and quantifiers

In this section we provide empirical evidence for the claim that the morphemes used in conjunction with indeterminates are indeed conjunction/disjunction morphemes. We draw our evidence from Japanese, Korean, and Malayalam. Indeterminate pronouns combine with the morphems *mo/ka* in Japanese, *to/na* in Korean, and *um/oo* in Malayalam. In Japanese the morpheme *mo*(CONJ) can associate either locally or long distance with an indeterminate and produce a universal quantifier.

(8)   Yoko-wa dono hon-mo   yonda
       Yoko-TOP which book-CONJ read
       'Yoko read every book'

(9)   [[Dono hon-o   yonda] kodomo]-mo yoku nemutta
       which book-ACC read   child-CONJ   well slept
       'For every book x, the child who read x slept well'

The same mode of combination is found with the morpheme *Ka* except that in this case the result is an existential quantifier. cf. (1) repeated in (10).

(10)   Haruko-wa dare-ka-ni   tegami-o   okutta
       Haruko-TOP who-DISJ-DAT invitation-ACC sent
       'Haruko sent an invitation to someone'

As for long distance association of the morpheme *ka* and the indeterminate, Shimoyama (2001) points out that, for some reason, it seems difficult. She gives the following examples:

(11)   *[Dono gakusei-no   okaasan]-ka-ga   kita
       which student-GEN mother-DISJ-NOM came
       'Some students's mother came'

(12)   *[[Dono gakusei-ga   ∅ syootaisita] sensei]-ka-ga   kita
       which student-NOM   invited   teacher-DISJ-NOM came
       'A teacher that some student invited came'

The reason for the ungrammaticality of (11)/(12) is unclear. However, Shimoyama also points out the following example from Nishigauchi (1990) which seems like long distance association of *ka* with the indeterminate:[4]

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[4]Note that Shimoyama expresses doubts that (13) is indeed a case of long-distance association; she does not offer a full alternative account though. we will not discuss this

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(13)   Dare-kara-ka   henna   tegami-ga todoita
         who-from-DISJ strange letter-NOM arrived
         'A strange letter arrived from God knows who'

The same morphemes are used in conjunction and disjunction as we pointed out in connection with examples (3) and (4).

The same pattern is observed in Korean with the morphemes *To* and *Na*. As mentioned earlier the combination of indeterminate and *Na* gives rise to unexpected results. We do not discuss this at this point, and will examine these facts in detail in sections 4 and 5. (14)-(15) show the use of these morphemes in phrasal conjunction and disjunction and (16), (17) their use in sentential disjunction and conjunction.

(14)   John-un   yenge-to   cwungkwuke-to cal hanta
         John-TOP English-CONJ Chinese-CONJ   well speak
         'John speaks English and Chinese well'

(15)   John-ina Mary-na   ne-taysin   cwukcey-lul   ha-lcesita
         John-DISJ Mary-DISJ you-instead homework-ACC do-will
         'Either John or Mary will do the homework instead of you'

(16)   John-un   [Mary-ka   on]-ces-to   [Anna-ka kan]-ces-to
         John-TOP Mary-NOM came-COMP-CONJ Ann-NOM left-COMP-CONJ
         morunta
         don't-know
         'John doesn't know that Mary came and that Anna left'

(17)   John-un   [Mary-ka   o]-na   [Anna-ka   ka]-na sinkyengssuci
         John-TOP Mary-NOM come-DISJ Anna-NOM go-DISJ care
         anhnunta
         doesn't
         'John doesn't care whether Mary comes or Anna goes'

Their quantificational use is exemplified below:

(18)   Nwukwu-to ku-uy   email-ey dap-haci anh-ass-ta
         who-CONJ   he-GEN email-to reply-do NEG-PAST-DECL
         'Nobody replied to his email'

(19)   Nwukwu-na Chelswu-lul   manaci anh-ass-ta
         who-DISJ   Chelswu-ACC meet   not-PAST-DECL
         'Everyone did not meet Chelswu'

Turning now to Malayalam, we have, again, a round of the same kind of pattern. Examples (20), (21) and (22) show the combination of the indeterminate pronouns *entho* and *aar* with the disjunction morpheme -*oo*. the result is, as expected, an existential quantifier.

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particular aspect of Japanese indeterminates any further.

(20) innale   nii entho-oo   vangiccu ennu ñaan vaciriccu
      yesterday you what-DISJ bought   that I   thought
      'I thought you bought something yesterday'

(21) avan innale   enth-oo   kaliccu
      he   yesterday what-DISJ ate
      'He ate something yesterday'

(22) ñaa<u>n</u> iruTT-il   aar-e-(y)oo   toTTu
      I   darkness-in who-ACC-DISJ touched
      'I touched someone in the dark'

Correspondingly, with the conjunction denoting morpheme -*um* we get a universal (23), (24).

(23) aar-kk-um   innathe meeting-il var-aam
      who-DAT-CONJ today's meeting-to come-can
      'Anybody can come to the today's meeting'

(24) Anili aar-e-um   kant-illa
      Anili who-ACC-CONJ saw-NEG
      'Anili met nobody'

The following tables summarise the results of this section for the three langiages mentioned.

(25)

a. *wh*+CONJ= '*every ...*'		b. *wh*+DISJ = '*every/any ...*'	
nwukwu-to	WHO-CONJ	*nwukwu-na*	WHO-DISJ
mwues-to	WHAT-CONJ	*mues-ina*	WHAT-DISJ
eti-to	WHERE-CONJ	*etiey–na*	WHO-DISJ
encey-to	WHEN-CONJ	*encey-na*	WHEN-DISJ
ettehkey-to	HOW-CONJ	*ettehkey-na*	HOW-DISJ

Combinations of *wh*-elements and conjunctive/disjunctive markers in Korean

(26)

a. *wh*+CONJ = '*every ...*'		b. *wh*+DISJ = '*some ...*'	
dare-mo	WHO-CONJ	*dare-ka*	WHO-DISJ
nani-mo	WHAT-CONJ	*nani-ka*	WHAT-DISJ
doko-mo	WHERE-CONJ	*doko-de-ka*	WHERE-AT-DISJ
itu-mo	WHEN-CONJ	*itu-ka*	WHEN-DISJ
dooyatte-mo	HOW-CONJ	*dooyatte-ka*	HOW-DISJ

Combinations of *wh*-elements and conjunctive/copular-conjunctive markers in Japanese

(27)

a.	*wh*+CONJ = *'every ...'*		b.	*wh*+DISJ = *'some...'*	
aar-um	WHO-CONJ		*aar-oo*	WHO-DISJ	
ent-um	WHAT-CONJ		*ent-oo*	WHAT-DISJ	
ewiDe-(y)um	WHERE-CONJ		*ewiDe-(y)oo*	WHERE-DISJ	
ennooTT-um	(to) WHERE-CONJ		*ennooTT-oo*	(to) WHERE-DISJ	
eppozh-um	WHEN-CONJ		*eppozh-oo*	WHEN-DISJ	
ennine-(y)um	HOW-CONJ		*ennine-(y)oo*	HOW-DISJ	

Combinations of *wh*-elements and conjunctive/disjunctive markers in Malayalam

It seems then that all three languages are employing a clear cut strategy to express basic quantificational notions. The data presented in this section lend empirical support to the idea that the semantics of the indeterminate-based quantifiers should be captured within a *type A* theory, i.e. a theory that makes the most of the connection between coordination and quantification. Furthermore a theory that would explain the whole range of these patterns by providing one basic meaning for the conjunction/disjunction morphemes is also the more elegant and economical theory. In the next section we will provide and discuss the basic semantic framework within which such a theory will be developed.

3 Hamblin semantics for indeterminates

The basic framework that we will adopt here is the Hamblin framework developed in a series of works by Shimoyama (2001), Kratzer and Shimoyama (2002), Kratzer (2005). This framework is based on the proposals first put forward by C. Hamblin in Hamblin (1973). The basic idea of the Hamblin account is that indeterminate pronouns denote sets of individual alternatives. It is important, as Kratzer reminds us, not to look at these sets of alternatives as properties. They are alternatives of type $< e >$.[5] As a result, a sentence containing an indeterminate pronoun denotes a set of propositional alternatives which keeps growing until it meets an operator that selects alternatives. To see how the system works, consider the following simple example from Kratzer and Shimoyama (2002)/Kratzer (2005). Take the simple Japanese sentence (28):

(28)   Dare-(ga) nemutta.
        who-nom slept
        'Someone slept'

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[5]In fact, in a Hamblin semantics all expressions denote sets. We restrict the presentation to the aspects most relevant to our purposes.

Kratzer's lexical entries for **Dare** and **Nemutta** are as follows:

(29)   a. $[\![dare]\!]^{w,g} = \{x : \; human(x)(w)\}$
        b. $[\![nemutta]\!]^{w,g} = \{\lambda x \lambda w'. \; slept(x)(w')\}$

Now, the denotations of the subject and the VP combine via Hamblin functional application[6] resulting in (31).

(31) $[\![dare \; nemutta]\!]^{w,g} = \{p : \exists x \; human(x)(w) \wedge p = \; \lambda w'. \; slept(x)(w')\}$

Under this view, the sentence in (28) denotes a set of propositional alternatives like (32)

(32)

$$
\text{Dare-ga nemutta} \quad = \quad
\left\{
\begin{array}{c}
Haruko \; slept \\
Akira \; slept \\
Koji \; slept \\
Satoshi \; slept \\
\dots
\end{array}
\right\}
$$

This expanding set of propositional alternatives grows until it meets an operator that selects it. What can this operator be? Leaving aside any altogether different possibilities, the morphemes *Mo* and *Ka* seem like good candidates. Shimoyama (2001) analyses *Mo* as a universal quantifier, in our classificatory terms, hers is a *type B* theory. However, this is not necessary. Here we will depart from Shimoyama's analysis and take the operator selecting propositional alternatives to be a conjunctive or disjunctive operator rather than a straight universal quantifier. In other words, ours will be a *type A* theory. We propose that the conjunctive operator ($\bigwedge$) conjoins the propositional alternatives and the disjunctive one ($\bigvee$) disjoins them, resulting in a conjunction and a disjunction of the propositional alternatives which is equivalent to universal and existential quantification respectively:

(33)   a. $\bigwedge p = \{p1 \wedge p2 \wedge p3 \dots\}$
        b. $\bigvee p = \{p1 \vee p2 \vee p3 \dots\}$

We can provide formal definitions for the operators as follows:[7]

(34) $[\![\bigwedge \alpha]\!]^{w,g} = \{\lambda w'.[p_1 \dots p_n \in \; [\![\alpha]\!]^{w,g} \; \rightarrow \; (p_1(w') \wedge p_2(w') \wedge \dots \wedge p_n(w')) = 1]\}$

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[6] Hamblin functional application is defined as follows:

(30)   Hamblin Functional Application
        If α is a branching node with daughters β and γ, and $[\![\beta]\!]^{w,g} \subseteq D_\sigma$ and $[\![\gamma]\!]^{w,g} \subseteq D_{\sigma,\tau}$ then:
        $[\![\alpha]\!]^{w,g} = \{a : \exists b \exists c[b \in \; [\![\beta]\!]^{w,g} \wedge c \in \; [\![\gamma]\!]^{w,g} \wedge a = c(b)]\}$

This definition is taken from Kratzer (2005, p.122).
[7] Cf. Groenendijk and Stokhof (1984), Kratzer (2005).

(35) $\llbracket \bigvee \alpha \rrbracket^{w,g} = \{\lambda w'.[p_1 \ldots p_n \in \llbracket \alpha \rrbracket^{w,g} \wedge (p_1(w') \vee p_2(w') \vee \ldots \vee p_n(w')) = 1]\}$

This small departure has two distinct advantages. First it clearly captures the connection betweeen connectives and quantificational meanings. Secondly, and perhaps more controversially, given that the quantificational meanings are now derivative, this approach is in a way more consistent with the Hamblin framework in that it dispenses, in these contexts, with the need for generalised quantifiers. Kratzer (2005) expresses clear doubts that natural languages have a need for generalised quantifers quite generally. She stops short of proposing that this is the case for the indeterminate-based quantification because of Shimoyama's 2001 analysis. If the proposal put forward here is along the correct lines then this reservation also disappears. Our proposal can thus be seen as strenghtening Kratzer's case for *sentential* quantification and against pure nominal quantification.

Now, this development brings into sharper focus two related questions. The first concerns the syntactic realisation of the sentential quantificational operators. The second question concerns the status of the conjunctive and disjunctive operators when they apply locally to an indeterminate pronoun. The two questions are closely connected since it would seem that in order for the Hamblin analysis to work properly the quantificational operator should be realised at some position above VP, so that it ends up applying on sets of propositional alternatives. This is exactly what we see in Japanese (and Malayalam for that matter) constructions of non-local quantification. Cf . example (9) repeated in (36).

(36) [[Dono hon-o   yonda] kodomo]-mo yoku nemutta
       which book-acc read   child-CONJ well slept
       For every book x, the child who read x slept well

In these cases long distance application of *-mo* yields exactly the right results, i.e. *Mo* functions as the operator that selects the propositional alternatives. But what about the local application seen in the basic quantificational expressions of the form indeterminate + operator? Shimoyama (2001) accounts for them easily enough by assuming that Japanese *mo* is indeed a universal quantifier whose restrictor is its sister. Therefore, both a single indeterminate and a more complex constituent would do equally well; but if we take, as we do, the operator to be a conjunctive/disjunctive one this avenue is no longer open. We would like to propose here that the operator can apply locally as a conjunction or disjunction and create a conjunctive/disjunctive set of individual alternatives. The status of the disjunctive set of alternatives is similar to the *or*-lists studied by Jennings (1994).[8] Thus, if the set of alternatives given by the indeterminate is equiv-

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[8]For similar ideas, see Ramchand (1996).

alent to, say, [ind]={*Chelswu, Satoshi, Kimon*}, then we will have:

(37)   a.   [ind-$\bigwedge$]= {*Chelswu and Satoshi and Kimon*}
        b.   [ind-$\bigvee$]= {*Chelswu or Satoshi or Kimon*}

So, our proposal is that although the operators are of the same nature they apply slightly differently in the local and long-distance cases. In fact this behavior of the operators mirrors directly, as is natural, the behavior of the basic connectives *and/or*, i.e. they can connect propositions as well as terms/DPs.

We can now turn to the first of our questions regarding the syntactic realisation of the operators. Within the framework of ideas developed above, the most natural suggestion is that the operators are realised in functional (quantificational) heads in the clausal structure. The existence of functional heads that are involved in quantification in the clausal domain is not a new idea. A proposal along these lines, worked out in some detail, is due to Beghelli and Stowell (1997)[9] who propose that a number of heads exist in the clause in whose specifiers different types of QPs end up and it is thus that their scope properties are derived. Abstracting away from Beghelli and Stowell's 1997 specifics we would like to propose, following Kratzer (2005), that indeterminate-based quantification is instantiated in a structure like the following:

(38) $[_{FP}$ Q ... $[_{VP}$ V $[_{DP}$ Det NP]]]

The exact label of the FP is immaterial here. If the above is correct, long distance cases of quantification would always involve structures like (38). This is Kratzer's claim. As for the local cases, we can make a parallel claim following Szabolcsi (1983; 1989) and much subsequent work. If we take DP to be the analogue of CP then a similar set of quantificational heads can be assumed within the DP. This is, however, not necessary, and we can simply consider the operators as D^0 type elements as Watanabe (2005) does. Be that as it may. The important point here is that the operator, when applying locally to an indeterminate will create a conjunctive/disjunctive set of alternatives. For concreteness, let us assume that the operator directly applies to the indeterminate and occupies the D position (39):

(39)

$$
\begin{array}{ccc}
 & \text{DP} & \\
 & \diagup \quad \diagdown & \\
\text{NP} & & \text{D} \\
| & & | \\
\textit{indeterminate} & & \bigvee / \bigwedge
\end{array}
$$

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[9]Different instantiations of the same ideas, based on Beghelli and Stowell's 1997 architecture can be found in Tsoulas (2003), Butler (2004) among others.

Now, with this much theoretical development under our belt, we will turn in the next section to the problematic Korean data involving indeterminate-based quantifiers formed with the disjunctive operator.

4   Indeterminate-based quantifiers in Korean

As we have shown in section 2 by and large Korean conforms to the general pattern seen in those languages that consistently employ the indeterminate-based strategy of quantification. But we have also pointed out that quantifiers using the disjunction operator fail to conform to the pattern as example (7), repeated in (40) shows:

(40)   Nwukwu-na kimchi-lul   cohahan-ta
        who-DISJ   kimchi-ACC like-DECL
        'Everyone/anyone likes kimchi'

If the general idea that conjunction leads to universals and disjunction to existentials is on the right track, and the Japanese and Malayalam data seem to point exactly to that conclusion, then Korean seems like a counter-example. Let us examine cases like (40) a little more closely. The first point to note is that in the literature *nwukwu-na* is interchangeably glossed as 'everyone', 'anyone', or 'whoever',[10] often in the same piece of work just a few pages apart. Moreover, Korean speakers (linguists and nonlinguists alike) consistently prefer to translate *nwukwu-na* by 'anyone'. The same speakers, when asked to provide a sentence representatively exemplifying a felicitous use of *nwukwu-na* , again with remarkable consistency, offer contexts where the free-choice reading is most salient. In fact, the most common example offered is (41):

(41)   nwukwu-na ke ces-ul   ha-lswuissta
        who-DISJ   the thing-ACC do-can
        'Anyone can do it'

One option then, given the consistency in the reported intepretation is to consider disjunction based elements in Korean free choice items on a par with English *any*. Such a move would, however, raise a number of different questions. First of all it is not obvious how an FCI would come about from the combination in question without any extra specification. Second, one might wish to assume that just as indeterminates combine with other operators and become existentials or universals there is also a *Free Choice* operator. Finally, one might simply claim that these elements are FCIs *tout court* and there is no reason to search for any reason *why* they are FCIs. They just are. None of the above options is attractive, however. This is in

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[10]Or even other varieties with the same kind of meaning such as 'no matter who'

fact good news since we will show here that these elements are *not* FCIs. They no doubt convey an FC meaning but they are not like English *any* in an important sense. They are not distributionally restricted to certain environments. This distributional restriction has been argued to be essential to the definition of FCIs. If the items under discussion do not display the kind of restricted distribution that FCIs show then in what sense are they FCIs? So we will proceed now to examine the distribution of disjunction based quantifiers in Korean. Giannakidou (2001) shows FCIs have a limited distribution, distinct from NPIs and Affective Polarity Items in general. In the next section we apply Giannakidou's (2001) distributional criteria to the disjunction based quantifiers.

4.1 Indeterminate+Disjunction and Free Choice

Giannakidou (2001) establishes the comparative table in (42) where the distribution of typical FCIs is compared side by side with that of Affective Polarity Items (APIs) and of *any*. Although English *any* has been the source of the study and the controversy about free choice, Giannakidou (2001) quite convincingly establishes that the distribution of *any* is not typical of free choice items cross-linguistically.

(42)

Environments	any	FCIs	APIs
Episodic Negation	OK	*	OK
Episodic Questions	OK	*	OK
Conditionals	OK	OK	OK
Restriction of Universal	OK	OK	OK
Future	OK	OK	OK
Modal verbs	OK	OK	OK
Directive Intensional Verbs	%	OK	OK
Imperatives	OK	OK	OK
Habituals	OK	OK	OK
Disjunctions	OK	OK	OK
Perhaps	OK	OK	OK
Stative verbs	OK	OK	*
Generics	OK	OK	OK
NP-Comparatives	OK	OK	OK
Only	OK	*	*
Negative Factives	OK	*	*
Affirmative Episodic Sentences	*	*	*
Existential Constructions	*	*	*
Epistemic Intensional Verbs	*	*	*
Progressives	*	*	*
Factives	*	*	*

Distribution of *any*, FCIs and APIs.

12

Using this taxonomy as a guide we will consider the Korean facts.

4.1.1 [*ind*+DISJ]: Distribution

The product of combining an indeterminate with -*(i)na* has an interpretation intuitively very close to that of English FC *any* as we already mentioned. The distributional patterns of [*ind*+DISJ] compared to FCIs and API is given in (43), where we add to Giannakidou's (2001) table (42) the distribution of [*ind*+DISJ]:[11]

(43)

Environments	any	FCIs	APIs	[*ind*+DISJ]
Episodic Negation	OK	*	OK	?
Episodic Questions	OK	*	OK	OK
Conditionals	OK	OK	OK	OK
Restriction of Universal	OK	OK	OK	*
Future	OK	OK	OK	OK
Modal verbs	OK	OK	OK	OK
Directive Intensional Verbs	%	OK	OK	OK
Imperatives	OK	OK	OK	OK
Habituals	OK	OK	OK	OK
Disjunctions	OK	OK	OK	-
Perhaps	*	OK	OK	OK
Stative verbs	OK	OK	*	OK
Generics	OK	OK	*	OK
NP-Comparatives	OK	OK	*	?
Only	OK	*	*	??
Negative Factives	OK	*	*	OK
Affirmative Episodic Sentences	*	*	*	?
Existential Constructions	*	*	*	?
Epistemic Intensional Verbs	*	*	*	OK
Progressives	*	*	*	OK
Factives	*	*	*	OK

Comparison of the distribution of *any*, FCIs, APIs, and Korean [*ind*+DISJ].

Although some speaker variation exists, the general picture is fairly clear. With the exception of the context *restriction of universal*, disjunction based quantifiers in Korean are fully grammatical in the whole range of contexts, and crucially, even in contexts where no other polarity sensitive items are acceptable. As far as we can see and as far as our data allow us to conclude, [*ind*+DISJ] in Korean are not items with restricted distribution. This,

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[11]In order to facilitate the presentation, we provide here the data in summary form, i.e. as part of the table (43). The actual examples for the contexts in the table are given in the appendix.

however, does not tell us anything about how the FC and universal interpretations arise out of a fundamentally existential structure. What we really know now is that [*ind*+DISJ] is not a free choice item, but we know also that it is interpreted like one. Even if we assume now that the distribution and the interpretation of FCIs are to be divorced, i.e. that it is *not* the context that affords the FC interpretation (contra Giannakidou (2001)) the question still remains: are these items elements whose lexical semantics is that of FC but whose other (syntactic) specifications are such that they do not require any special licensing? In the next section we will propose that the interpretations of the problematic items should be analysed in two steps by divorcing the universal interpretation from the free-choice *flavour* that they take.

5 Analysis

At the end of the last section we hinted at our strategy in analysing the problematic elements in Korean. Our hypothesis is that the universal intepretation and the free-choice meaning that they seem to acquire have in fact different sources. In other words, given their distribution, it is in fact injudicious to think of items like [*ind*+DISJ] as free choice items unless we weaken the definition of FCI so much as to make it useless as a tool of analysis. Let us first discuss the universal intepretation. As a first step recall from section 2 that disjunctive quantifiers in Korean are intepreted as *distributive* universals. The following examples show that with collective predicates disjunctive quantifiers are ungrammatical (44) and that with ambiguous predicates they only produce the distributive reading (45):

(44)   *Nwukwu-na manh-ta
       who-DISJ   numerous-DECL
       '*Everyone is numerous'

(45)   Nwukwu-na Kimon-uy   sayngil-uluyhay cha-lul   sass-ta
       who-DISJ   Kimon-GEN birthday-for   car-ACC bought-DECL
       'Everybody bought a car for Kimon's birthday'

(45) is only true if there are as many cars as people visiting Kimon for his birthday. How does the distributive interpretation arise? Surely, disjunction alone cannot be responsible. One view on the representation of distributivity holds that distributivity is a feature of particular quantificational determiners, thus English *Each* and *Every* are supposed to be inherently distributive whereas *All* is not. This fairly standard view has however been challenged even for English. Matthewson (2001) proposed that the source of distributivity might in fact be in a covert distributive operator. This idea has also been substantiated by Lin (1998) for Chinese and Yeo (2005) for Singapore English. Also, Kratzer (2005, pp. 136-7) has this to say about distributivity:

(46)   In addition to modifiers dressing up as quantifiers we also
         cannot completely exclude the possibility that items that
         look like distributive quantifiers might not be distributive
         after all. The true source of distributivity could be a non
         overt adverbial operator that obligatorily co-occurs with
         the apparent quantifier.

It is this line of approach - consistent with the Hamblin framework that we
have adopted - that we would like to pursue. Suppose then that alongside
other quantificational operators syntactically realised in the clausal spine
we also have a distributive operator *Dist*. In (47) we give the structure of a
simple sentence containing $[ind+\text{DISJ}]$ (irrelevant details ommited):

(47)
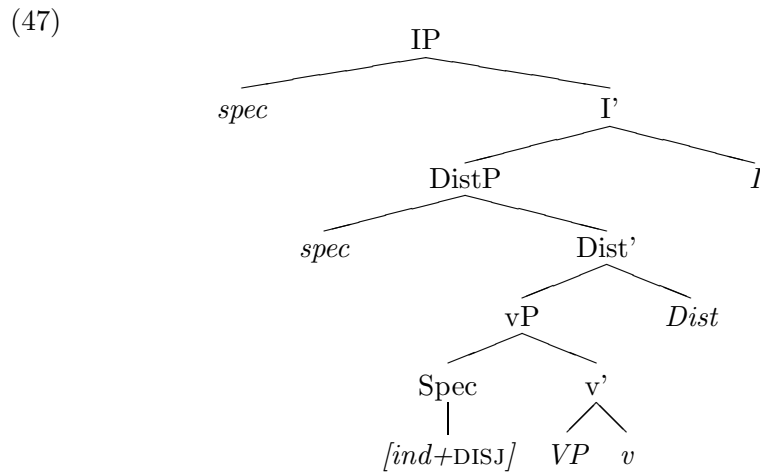
An adverbial distributive operator may be a universal feature of natural
language. This is what Kratzer (2005) suggests. Focusing more specifically
on Korean, there are two ways of expressing distributivity. The first one
involves the morpheme *-ssik* which attaches to nominals as in the following
example from Gil (1990):

(48)   Salam twu myeng-i kapang sey   kay   ssik-ul
         man   two CL-nom suitcase three ssik-acc carry-dc
         wunpanha-ess-ta

         'Two men carried three suitcases'

These examples are discussed in detail by Gil (1990), Choe (1987), and
McKercher and Kim (1999). Although there is some debate concerning how
many readings these sentences have they clearly, and most prominently, have
the readings in (49):

(49)   a.   Two men carried three suitcases each (number of suitcases car-
              ried = 6)

b. Two men carried the suitcases three at a time; (number of suitcases $= 3n$ where n is the number of events determined by the context.

Now interestingly the morpheme *-ssik* cannot be attached to an indeterminate or indeterminate-based quantifier:

(50) a. *nwukwu-ssik
      b. *mwues-ssik

(51) a. *nwukwu-ssik-ina
      b. *nwukwu-ssik-to
      c. *nwukwu-na-ssik
      d. *nwukwu-to-ssik

The second way to express distributivity in Korean involves the adverbial operator *kakkak* (roughly, *each*):

(52) Haksaying se-myeng-i   kakkak se-kwen-uy   chayk-ul
      student   three-CL-NOM DIST   three-CL-GEN book-ACC
      ilk-ess-ta
      read-PAST-DECL
      'Three students read three books each'

This adverbial operator is *not* incompatible with indeterminates:

(53) Nwukwu-na kakkak chayk han-kwen-ul sass-ta
      who-DISJ   DIST   book one-CL-ACC bought-DECL
      'Everyone bought a book each'

Based on this kind of data we would like to propose that the distributive operator involved in disjunctive indeterminate-based quantifier is a phonetically unrealized version of *kakkak*. This immediately explains why indeterminate-based quantifiers like *nwukwu-na* are incompatible with *ssik*, compare here the English case in (54):

(54) ??/* Every child got a book each

Returning now to the derivation, when the disjunctive operator applies *na* applies locally to the indeterminate, it gives a disjunctive set of alternatives, say (55):

(55) $[_{VP}[_{DP}\{Chelswu\ or\ Satoshi\ or\ Kimon\}]\ [\ldots]\ V\ ]$

The distributive operator then applies to the VP. We asume a standard semantics for the distributive operator based on Link (1987) (56), taking X to no longer represent a plural noun but rather a set of individual alternatives:
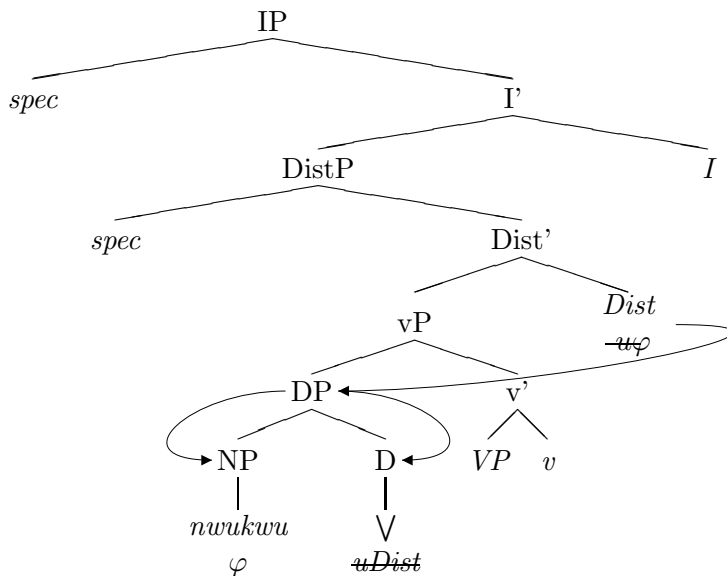
(56) $Dist = \lambda P \lambda X \forall y [y \in X \rightarrow P(y)]$

Clearly now, the result of applying $Dist$ to the VP denotation is distributive universal quantification. It is worthwhile pointing out here that this account could not possibly work if the denotation of *nwukwu-na* corresponded to a real existential quantifier. There is no such thing as a distributive existential quantifier. This lends further support to the idea that we have been developing here that indeterminate-based quantifiers are no quantifiers at all really. Only to the extent that in certain configurations the semantic value of the sentences in which they occur is *equivalent* to that of a quantifier they can be said to be quantificational. If this proposal is correct then there is nothing particularly strange about the Korean disjunctive quantifiers as the fact that they receive a universal rather than the more expected existential interpretation is attributable to the presence of a distributive operator.

Now, one question that naturally arises here is the following: given that the disjunctive indeterminate-based quantifier has a perfectly sound inteprpretation in isolation, i.e. in the absence of the distributive operator, how come it never occurs alone? Put differently, how can we ensure that these two will always occur together? One way to understand the obligatoriness of the relationship is in syntactic terms. Suppose that the relationship between the distributive operator and the disjunctive quantifier is similar to that holding between negation and a negative concord item. Although the inherent negativity of NCIs is controversial, we will follow, for the purposes of this paper, Giannakidou (2000) and Gill and Tsoulas (2006) more specifically on Japanese/Korean and assume that they are not, they are just universal quantifiers; this is consistent with our approach here. Similarly, then, a disjunctive quantifier is not inherently *a distributive* element but functions as a *distributive concord item*. Syntactically we implement this idea by proposing that the disjunctive quantifier is endowed with an uninterpretable Dist feature [$uDist$] which gets checked under AGREE with the Dist head which has its uninterperetable φ features valued by the same token as in (57):

(57)

IP
spec   I'
      DistP   I
  spec   Dist'
          vP   *Dist*
                      ~~uφ~~
      DP   v'
    NP   D   VP   v
  nwukwu   ∨
    φ   ~~uDist~~

Thus, distributivity also falls under Kratzer general structural proposal for the expression of quantificational notions in (38) repeated in (58):

(58) $[_{FP}$ Q ... $[_{VP}$ V $[_{DP}$ Det NP]]]

Interestingly, we can now recapture Beghelli and Stowell's (1997) system regarding scopal differences between different kinds of DPs by simply assuming that the default scope orderings are provided by the order of the operators and non default scope relations are obtained through movement. This would mean that unlike in Beghelli and Stowell's (1997) system movement to the specifier of the quantificational heads will be only the result of the need to express a non default scope relation which, in turn, will be encoded by an EPP feature on the appropriate quantificational head. See Tsoulas (2003) for an implementation along these lines. Having now dealt with the source of the universal meaning, let us now turn to free choice.

5.1 Free choice

What about free-choice then? Why is it that speakers feel that the interpretation is closer to the one given to FC-*any*? We would like to suggest here that the free-choice flavour comes from the disjunction. In this we follow a long tradition in recognising a connection betweeen disjunction and (free) choice. Bertrand Russell for instance in (Russell, 1937, p. 59) writes:

> *Any a* denotes a_1 or a_2 or a_3 or ... or a_n where *or* has the meaning that it is irrelevant which one we take.

And again, in Russell (1940, p. 73):

But how about "or"? You cannot show a child examples of it in the sensible world. You can say: "Will you have pudding or pie?" but if the child says yes, you cannot find a nutriment which is "pudding-or-pie". And yet "or" has a relation to experience; it is related to the experience of choice.

Almost four decades later Jackendoff (1972) was expressing the same kind of intuition:

'... *any of these*, then, we claim to be equivalent to *this one or this one or this one or ... or this one*, **exhausting** the set described by *these*.'[12]

It thus seems rather natural to suggest that, if a universal can be constructed making use of disjunction, as we saw with respect to [*ind*+DISJ], then the FC aspect of the universal will be highlighted, but probably not as an integral part of its semantics in the sense that English FC *any*, or Greek *Opjosdipote* (anyone) is a FCI. In other words, we conceive of the FC-meaning of these items as an implicature here rather than attempt to reduce the semantics of such elements to the semantics of FC items. Note that we therefore remain rather agnostic in what concerns the semantics of FC, it can arise from an explicit disjunction but may be also conveyed in, dedicated items, in different ways. However, a conception of the FC meaning as an implicature is not far from the conclusions of both Giannakidou (2001) and Kratzer (2003).

6   Beyond Korean

Let us take stock first. So far in this paper we have first proposed a slight modification of the Hamblin framework of Kratzer and Shimoyama (2002), Kratzer (2005) in order to take into account the basic conjunctive/disjunctive meaning of the operators that associate with indeterminate pronouns. We applied the theory to some apparent counterexamples from Korean and saw that the unexpected intepretations can be naturally derived from the presence of a distributive operator which is free to apply to the set of alternatives as the expression denoting that set is not in itself quantificational. In this way, one might think that Korean is just exceptional. In this section we want to ask just how exceptional is Korean ? As it turns out other languages seem to exemplify exactly the same pattern. Consider first Malayalam. Jayaseelan (2005) shows that a distributive universal quantifier can be formed by suffixing the disjunctive operator onto the determiner meaning *one* and the conjunctive operator on the NP which is the complement of *one*. An example of this is (59):

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[12]Italics are from the original, the boldface emphasis is ours.

(59)   Oor-oo   kuTTi-(y)um awan-te amma-ye   kaNDu
       One-disj child-conj   he-gen   mother-acc saw
       'Each child saw his mother'

If we set aside the issue of the realisation of each suffix[13] this seems to instantiate the same pattern as the Korean case with the difference that the distributive operator is realised DP internally. Unlike Jayaseelan we will assume that the conjunctive operator here is another realisation of the distributive operator.[14] A similar pattern can also be found in Chinese in the *Mei . . . dou* construction exemplified in (60):

(60)   mei-(yi)-ge   xuesheng *(dou) lai-le
       MEI-one-CL student   DOU   come-ASP
       'Every student came'

dou has frequently been analysed as a distributive operator. Cheng (2005) proposes that *mei* should in fact be analysed as a disjunctive operator parallel to Malayalam's *-oo*. If this is correct then we have again the same kind of pattern. A disjunctive set of alternatives which is input to a distributive operator with a distributive universal interpretation as a result. We should note, however, that Cheng (2005) disputes the analysis of *dou* as a distributive operator. Instead, she claims that Chinese is a lot closer to Malayalam in that although neither *mei* nor *dou* are distributive on their own they form a distributive expression together like in Malayalam. Her proposal is given in (61). The suggestion here is that the structure of the construction on the lefthand side of the arrow is the one on the right.

(61)   mei yi-ge . . . dou → DISJ one-CL N CONJ

It should be obvious, however, that whether or not *dou* turns out to be best analysed as a distributive or a conjunctive operator is immaterial to the general pattern seen in all three languages. The same is true of Malayalam. Perhaps an exhaustivity operator might do the trick in the end. We will leave that particular issue in these languages for further work.

7   Conclusion

In this paper we have proposed a coherent theory of indeterminate based quantification which is based essentially on Kratzer's revival of Hamblin's semantics for questions. We have proposed a modification/extension to the

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[13]We follow Jayaseelan (2005) in this. He suggests that the reason why the disjunctive operator is attached to *one* whereas the conjunctive one is attached to the noun is due to some not particularly relevant morphological constraints.

[14]Jayaseelan suggests that the conjunctive operator's import is exhaustiveness. This will not, however, yield the right results in an obvious manner since the result will again be disjunctive.

framework so that the relationship between quantification and connectives can be captured in a transparent way. We also investigated some apparent counterexamples to the theory and saw that they rather represented yet another common solution to the question of quantification and distributivity. In the begining of the paper we took as our underlying hypothesis that the quantificational readings of the combinations of indeterminate pronouns and conjucntive/disjunctive morphemes are based on the logical equivalences between an infinite conjunction/disjunction of terms and a universal/existential quantifier. We can now say that this hypothesis proved a useful tool in the investigation but needs qualification. The point is that the quantificational readings are in fact *derivative*; what the linguistic form provides us with is in fact a conjunction or disjunction of terms. Not an infinite one but one that exhausts the members of the set of alternatives. Thus we really have no *quantifier* to speak of. This is an important point since the interaction of conjunctive/disjunctive sets of alternatives with other operators crucially relies on them being just that, conjucntive and disjunctive sets of alternatives not quantifiers. The fact they are equivalent to a quantifier is there but is separate. The confusion of the two facts can indeed lead to misunderstanding of the structures of natural language. As Reichenbach (1947) pointed out:

(62)   However, it would be incorrect to say that (5) and (6) [our (5) and (6)] are definitions of the operators. Conjunction and disjunction are operations defined for only a finite number of terms. To extend these operations to an infinite number of terms requires new primitive terms. The correct form of statement is therefore that a conjunction and a disjunction of an infinite number of terms is defined by the operators.

The examination of the facts of natural language highlighted in this paper shows the deep wisdom of Reichenbach's comment.

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Appendix: Data

The following examples show instances of the ind+na composite in all of Giannakidou's (2001) contexts.

(63) **Episodic Negation**
Nwukwu-na Chelswu-lul manaci anh-ass-ta
who-DISJ Chelswu-ACC meet not-PAST-DECL
'Everyone did not meet Chelswu'

(64) **Episodic Question**
Nwukwu-na ku tisyechu-lul sass-ni?
who-DISJ the T-shirts-ACC bought-Q
'Did everyone buy the T-shirts?'

(65) **Conditionals**
Nwukwu-na-wa heypsang-ul han-ta-myen, coyonghi issci anh-keyss-ta
who-DISJ-with negociation-ACC do-DECL-if silently be not-FUT-DECL

'If you negotiate with everyone, I won't keep silent'

(66) **Restriction of universal**
Nwukwu-na pokhayngha-n motun haksayngtul-i tomang-ul kass-ta
who-DISJ attack-REL every student-NOM run-ACC went-DECL

'Every student who attacked everyone ran away'

(67) **Future (obj)**
Chelswu-nun pati-ese nwukwu-na mana-lke-ya
Chelswu-TOP party-at who-DISJ meet-FUT-DECL
'Chelswu will meet everyone at the party'

(68) **Modal verbs**
Nwukwu-na keluhkey malha-lcesi-ta
who-DISJ so say-would-DECL
'Everyone would say so'

(69) **Directive intensional verbs**
Younghee-nun [Chelswu-ka nwukwu-na pipanhan-ta]-ko cwucangha-ss-ta
Younghee-TOP Chelswu-NOM who-DISJ criticize-DECL-COMP insist-DECL

'Younghee insisted that Chelswu criticizes everyone'

(70) **Imperatives**
Ku pati-e ka-myen, nwukwu-hantey-na insa-hay
the party-to go-if, who-to-DISJ bow-IMP
'If you go to the party, talk to everyone'

(71) **Habitual**
Swunhi-nun nwukwu-uy meri-na cosimsurepkey mancin-ta
Swunhi-TOP nwukwu-GEN hair-DISJ carefully handle-DECL
'Swunhi handles eveyone's hair carefully'

(Swunhi is a hairdresser in the context)

(72) **Perhaps (sentential)**
ama   nwukwu-na nuc-ulcesi-ta
perhaps who-DISJ   late-FUT-DECL
'Perhaps everyone will be late'

(73) **Generic**
Nwukwu-na massinun kimchi-lul   mantun-ta
who-DISJ   delicious kimchi-ACC make-DECL
'Everyone makes delicious kimchi'

(74) **NP-Comparatives**
Chooja-ka   yyesangchi-anhkey nwukwu-na-pota sengcek-i   cal
Chooja-TOP unexpectedly   who-DISJ-than   mark-NOM good
naoass-ta
turn.out.to.be-DECL
'Unexpectedly, Chooja got a better mark than everyone (in the context of an exam)'

(75) **Only**
Chooja-man ocen-ey   nwukwu-na poass-ta
Chooja-only morning-in who-DISJ   saw-DECL
'Only Chooja saw everyone in the morning.'

(76) **Negative Factive**
sacanghim-un cakseyn-e   nwukwu-na sungcinhaci mosha-ncesey-tayhay
president-TOP last.year-in who-DISJ   promote   not.able.to-the-fact-that
ukamsurepkey sayngkakhanta
regrets   thinks-DECL
'The President regrets the fact that everyone could not be promoted last year.'

(77) **Affirmative episodic sentence**
Nwukwu-na George sayngil-ul-wihaye catu-lul   sa-aa-ta
who-DISJ   George birthday-ACC-for card-ACC buy-PAST-DECL
'Everyone bought a card for George's birthday'

(78) **Existential**
Nwukwu-na pang-ey iss-ta
who-sc disj room-in exist-DED
'Everyone is in the room'

(79) **Epistemic Intensional sentence**
Chelswu-nun nwukwu-na silmangha-yss-ta-ko   sayngkakhan-ta
Chelswu-TOP who-sc disj disappointed-PAST-COMP think-DECL

'John thinks that everone was disappointed'

26

(80) **Progressive**

Hyengpu-ka ocen-naynay nwunwu-na chiryo-lul

Brother.in.law-NOM morning-throughout who-DISJ treatment-ACC

haycwuko issess-ta

giving was-DECL

'Brother-in-law was treating everyone all morning'

(Context: Brother-in-law is a dentist in the context)

(81) **Factive**

Chooja-ka nwukwu-na anta-nunces-i cinca nollap-ta

Chooja-TOP who-DISJ know-fact-NOM really surprising-DECL

'It is really surprising that Chooja knows everyone'