

# An HPSG Analysis on the Unbounded Dependency Constructions in Chamorro\*

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Kim, Jong-Bok & Lim, Kyung-Sup. 2008. An HPSG Analysis on the Unbounded Dependency Constructions in Chamorro. *The Linguistic Association of Korea Journal*, 16(4), 187-211. The Western Austronesian language Chamorro, spoken in the Mariana Islands, has a basic word order VSO and shows an interesting behavior in unbounded dependency constructions (UDCs). When the clause has a gap, the verb of the clause exhibits special agreement morphology: the verb can be nominalized or have a certain infix attached. To explain UDC phenomena in Chamorro, Chung (1982) proposes successive cyclic Wh-movement for wh-questions and Controlled PRO Deletion for relative clauses, respectively. In addition, her analysis also adopts non-local structural descriptions with grammatical features to account for Wh-agreement in UDCs. The purpose of this paper is to show that a constraint-based HPSG analysis can also offer us a straightforward account for Chamorro UDC phenomena in a uniform and principled way.

**Key Words:** Chamorro, unbounded dependency construction, Wh-question, long distance agreement, relative clause

## 1. Wh-agreement and Wh-questions

### 1.1. Facts about the Simple Wh-questions

Unlike the verb in ungapped sentences, the verb in Chamorro UDCs (unbounded dependency construction) shows special agreement morphology, depending on the grammatical function of the trace. Verbs in Chamorro are morphologically marked for aspect, mood, and person

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and/or number of the subject with certain infixes. The prefixes that indicate the mood have two types, realis and irrealis:

## (1) Number Agreement

	Nonplural	Plural
Realis	-um/_	man-
Irrealis	—	fan-

The irrealis mood is often marked with the marker *para*, preceding the verb, whereas the realis mood is unmarked. In accordance with this mood distinction, there are three kinds of agreement in the verb: number, ergative, and subject agreement. The number agreement appears only on intransitive verbs:

- (2) S-um-isigi      ha'    mo'na    gi    chalan si    Pedro  
 Npl-continue+Ipf    Emp    forward    Loc road    Unm  
 'Pedro is continuing along the road.'

Ergative and subject agreement are distributed complementarily according to the type of mood. The realis clauses employ ergative agreement triggered only by the subjects of transitive clauses, while the irrealis clauses exhibit subject agreement (cf. For more detail, refer to Gibbson (1980) and Chung (1982, 1983, 1994).) The following example shows that the realis transitive clause has ergative agreement:

- (3) Ha-bisita    yu'    si    Pedro  
 E3s-visit    me    Unm  
 'Pedro visited me.'

There are mainly four kinds of special morphological changes in the verbs of *wh*-questions (Chung 1982, Kaplan 2005).<sup>1)</sup> First, when the traced *wh*-phrase is the subject of a realis transitive clause, then the

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1) The data in this paper are from Chung (1982) unless indicated.

agreement is realized as the infix *-um*, even though ergative agreement should appear in such a clause type.<sup>2)</sup>

- (4) a. Ha-fagasi si Juan i kareta  
 E3s-wash Unm Juan the car  
 'Juan washed the car'  
 b. Hayi f-um-a'gasi i kareta  
 who UM-wash the car  
 'Who washed the car?'  
 (E3s: Ergative Agreement 3rd Sing, Unm: unmarked)

Second, when the traced *wh*-phrase is the subject of some other type of clauses, i.e., an intransitive or irrealis clause, then there is no special morphological change in the verb.

- (5) a. Mamaigu' i neni  
 sleep+ of the baby  
 'The baby is sleeping.'  
 b. Hayi mamaigu?  
 who? sleep+ of  
 'Who is sleeping?'
- (6) a. Para u-fa'gasi si Juani kareta.  
 Fut S3s-wash the car  
 'Juan is going to wash the car'  
 b. Hayi para u-fa'gasi i kareta?  
 who? Fut S3s-wash the car  
 'Who is going to wash the car?'  
 (Ipf: Imperfective Tense, S3s: Subject Agreement 3rd Singular)

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2) The case marking system of Chamorro has two dimensions: noun type and final grammatical relation (Gibbson 1980). Definite NPs are preceded by a case marker that indicates their lexical properties and grammatical function while indefinite NPs are not marked for case. The marker *si* in (1a) is unmarked case for proper nouns.

Third, if the traced *wh*-phrase is a direct object, then optionally the verb can be nominalized; if nominalized, the verb is marked with the infix *-in*.

- (7) a. Hafa f-in-ahan-na si Maria gi tenda?  
       what? IN-buy-LNK                   LOC store  
       ‘What did Maria buy at the store?’  
    b. Hafa ha-fahan si Maria gi tenda?  
       what? E3s-buy                   LOC store  
       ‘What did Maria buy at the store?’

In (7a), the verb is nominalized with the infix *in*, while in (7b), there is no change in the verb morphology. One thing to note in the verb morphology in (7a) is the clitic (or a linking particle) *na*. This indicates that when the verb undergoes the nominalization, the subject of the nominalized verb is also realized as a possessor.<sup>3)</sup>

Finally, when the slashed *wh*-phrase is one of several types of obliques such as locative, goal, instrument, commitative, or the complement of a stative verb, then the verb must be nominalized but is not marked with *-in*.

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3) In Chamorro, there are two ways to express possession relation. One involves the possessive pronouns and the other makes use of the head modifier construction. The possessive pronouns are realized as postnominal clitics which reflect the person and number of the head noun. The paradigm for the clitic agreement is shown in the below. (Chung 1981: 127–129)

	Sng	Pl
1 per	-hu/-kku	-ta/-mami0
2 per	-mu	-miyu
3 per	-na	-niha

When the possessor is a pronoun, it is realized by one of the clitics only.

- (a) i patgon-hu (\*yu) ‘the child-my’  
 (b) i lepblo-nna (\*gui) ‘the book-his/her’  
 (c) i lapex-na si Antonio ‘the pencil-his Antonio’

The pronoun subject is not realized in the surface as in (a) and (b). But, when the possessor is a non pronoun, it is linked with the modifier by the clitic that agrees with the subject in person and number as in (c).

- (8) a. Hafa puno'-mu ni lalu?  
 what? kill+ [mlz-your Obl fly  
 'What did you kill the fly with?'  
 b. Hayi para akentuse-na i haga-m?  
 who? Fut speak+ [mlz-her the daughter-your  
 'Who is your daughter going to speak with?'

The data we have seen so far indicate that the verb in wh-questions employs special morphology depending on the grammatical function of the trace. In other words, the specific wh-agreement is triggered by the nature of the trace.

## 1.2. An HPSG Analysis

To explain such wh-agreement phenomena, Chung (1982, 1990) first adopts features such as [+ + + oblique] on NPs to represent their grammatical functions in addition to the following structural description rule:

- $$(9) \begin{array}{c} X \ V \ (NP)^* \ t \ Y \\ [+ \ F \ \alpha \end{array} \rightarrow \begin{array}{c} X \ V \ (NP)^* \ t \ Y \\ [+ \ F \ \alpha \end{array}$$

This rule means that the grammatical function of the trace is co-indexed with that of the verb. Such a structural description seems to bring us some problems. First, representing grammatical functions as features yields a redundancy in the EST framework since the grammatical function is already defined in the configurational structure. The above schema alone does not guarantee that proper morphological changes appear on the verb. The rule itself is incomplete in capturing all the relevant constraints in the formation of wh-questions.

We can interpret this kind of morphological processes more directly in terms of lexical rules. That is, together with the basic assumption that a certain lexical entry can encode the information that one of its complements is gapped, we can assume the following lexical rules for

the four kinds of wh-agreement phenomena in the language.

(10) a. Realis Subject-Slash Lexical Rule (RSSLR)

$$\left[ \begin{array}{l} \text{FORM } \langle \bar{S} \rangle \\ \text{SUBCAT } \langle \text{NP, NP} \rangle \\ \text{FORCE } \textit{realis} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM } \langle \text{um} + \bar{S} \rangle \\ \text{SUBCAT } \langle \text{NP} [ \text{LOC} \bar{I}, \text{INH} | \text{SLASH } \langle \bar{I} \rangle ], \text{NP} \rangle \\ \text{FORCE } \textit{realis} \end{array} \right]$$

b. Irrealis Subject-Slash Lexical Rule (ISSLR)

$$\left[ \begin{array}{l} \text{FORM } \langle \bar{S} \rangle \\ \text{SUBCAT } \langle \text{NP, NP} \rangle \\ \text{FORCE } \textit{irrealis} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM } \langle \bar{S} \rangle \\ \text{SUBCAT } \langle \text{NP} [ \text{LOC} \bar{I}, \text{INH} | \text{SLASH } \langle \bar{I} \rangle ], \text{NP} \rangle \end{array} \right]$$

c. Object Slash Lexical Rule (OSLR)

$$\left[ \begin{array}{l} \text{FORM } \langle \bar{S} \rangle \\ \text{SUBCAT } \langle \text{NP, NP} \rangle \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM } \langle (\text{in}) + \bar{S} + \text{Clitics} \rangle \\ \text{SUBCAT } \langle \text{NP, NP} [ \text{LOC} \bar{I}, \text{INH} | \text{SLASH } \langle \bar{I} \rangle ] \rangle \end{array} \right]$$

d. Oblique Slash Lexical Rule (Oblique SLR)

$$\left[ \begin{array}{l} \text{FORM } \langle \bar{S} \rangle \\ \text{SUBCAT } \langle \text{NP, NP, NP} [\text{Obl}] \rangle \\ \text{FORCE } \textit{realis} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM } \langle \text{Nmlz} + \bar{S} + \text{Clitics} \rangle \\ \text{SUBCAT } \langle \text{NP, NP, NP} [ \text{LOC} \bar{I}, \text{INH} | \text{SLASH } \langle \bar{I} \rangle ] \rangle \end{array} \right]$$

All the outputs of the lexical entries encode the information that one of the selected complements contains a nonempty SLASH value. It is also specified that the LOCAL value of this slashed complement is identical with the INHER|SLASH value. This will guarantee that the complement is realized as a trace. Even if we have four rules, these are essential to build a precise Chamorro grammar.

The lexical rule (10a) says that a realis transitive verb undergoes a morphological change with the attachment of the infix *um*, and its subject is gapped. The lexical process (10b) tells us that an intransitive verb or an irrealis verb can subcategorize a slashed subject with no morphological change.<sup>4)</sup> (10c) indicates that a realis or irrealis transitive verb can select a slashed object either with the attachment of the *in*

nominalizer or without it. Finally the output (10d) specifies that when a verb subcategorizes for an oblique complement, this argument can be gapped with the nominalization of the verb. The output FORM value is obtained by the application of the morphological function 'Nmlz' which takes the input FORM value as its argument.

The nominalization process is rather complex in both (10c) and (10d). In both cases, when the nominalization process undergoes, the subject is realized as a possessor. This is indicated by the clitic following the nominalized verb. As we have seen in the footnote 4, the clitic agrees with the person and number value of the subject. This agreement is indicated by the coindexation between the clitic and the subject in (10c) and (10d).<sup>5)</sup>

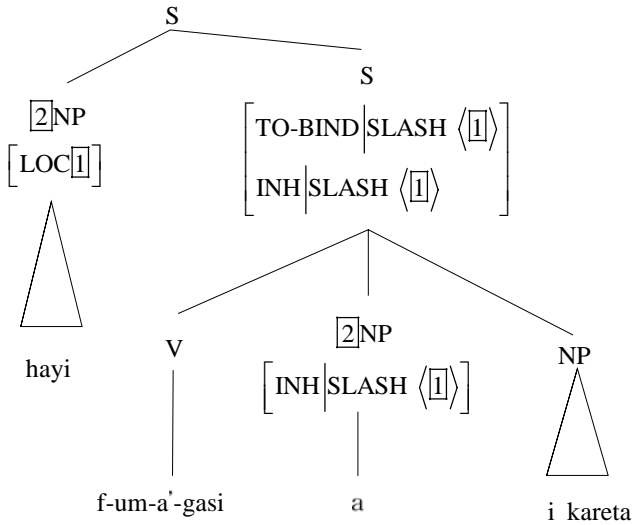
Now, let us see how our approach can account for simple wh-questions with the proposed lexical rules. The following is the structure for the sentence (4b):

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4) We tentatively assume that the semantic content of the verb has the feature value FORCE whose value can be one of the two moods: realis and irrealis.

5) In addition to this coindexation relation, we may need a condition that when the subject is a pronoun, it does not appear in the SUBCAT value. Also for the output of (10c), we need to specify that when the nominalization process is selected, then the clitic should be attached to the verb. Otherwise, the clitic should not appear.

(11)



First the RSSLR in (10a) will generate from the input verb *fagasi* (wash) the output *f-um-a-gasi* which selects a gapped subject NP. The inherited SLASH value of this NP will be percolated up to the lower S, according to the following Nonlocal Feature Principle (NFP):<sup>6)</sup>

- NONLOCAL Feature Principle: For each nonlocal feature, the INHERITED value on the mother is the union of the INHERITED values on the daughters minus the TO-BIND value on the head daughter.
- Head-Filler Rule:  

$$X \rightarrow [LOCAL<1>], S [INH|SLASH<1>, <1>]$$

There are two nonlocal values in the lower S. They are introduced by the Head-Filler Rule above. The TO-BIND|SLASH's value in the higher S is identical to the INHER|SLASH value passed up from the subject NP. Both of these values are structure-sharing with the LOCAL

6) See Pollard and Sag (1994) for details of the HPSG principles and rules.



value of the preposed NP *hayi*. The analysis thus correctly captures the dependence relationship between the gap and the preposed element. The lexical rule (10a) further ensures that the output verb is realized with the correct morphological form, ruling out sentences with no proper wh-agreement.

Our approach also predicts that a verb does not agree with a wh-phrase that occurs to its right in surface structure.

- (12) a. Parehu yan hayi?  
 similar with who?  
 'who does (she) look like?'  
 b. \*Parehu-na yan hayi?  
 similar+ [mlz-her with who

According the lexical rules we proposed, the predicate *parehu* can undergo the Ob-SLR in (10d):

$$(13) \left[ \begin{array}{l} \text{FORM} \langle \text{parehu} \rangle \\ \text{SUBCAT} \langle \text{NP, NP}[\text{Obl}] \rangle \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM} \langle \text{parehu} + \text{na} \rangle \\ \text{SUBCAT} \langle \text{NP, NP}[\text{LOC} \square, \text{INH} \mid \text{SLASH} \langle \square \rangle] \rangle \end{array} \right]$$

The nominalized output predicate *parehu + a* requires a subject and a slashed oblique object NP as its complement. The sentence (12b) is ruled out since the predicate combines with the unslashed oblique complement.

Consider one more example where the wh-phrase is the direct object of an embedded question.

- (14) a. Ha-sangan-i yu' si Maria [hafa f-in-ahan-na t  
 E3s-say-Dat me Umk what IN-buy+ [mlz-her  
 gi tenda]  
 LOC store  
 'Maria told me what she bought at the store'  
 b. \*S-in-angan-c-nna si Maria [hafa f-in-ahan-na gi tenda]  
 IN-say-DAT+ [mlz-her

In (14), the direct object Wh-agreement should appear not on the matrix verb but on the embedded verb only. According to the lexical rule (10c), we can predict that the embedded verb can be optionally nominalized with the infix *in*. This is the case in both (14a) and (14b). However, the matrix verb does not select for a slashed object. The object is a fully saturated embedded question. Hence, (14b) is ruled out since the matrix verb is nominalized though its direct object is not gapped.

Notice that we have not introduced any structural description, nor any grammatical function features. We just enriched the information of lexical entries by the lexical rules. This enables us to capture the wh-agreement phenomenon in Chamorro as well as the dependency relationships between the gap and its filler without resorting to any derivational processes.

## 2. Long Distance Wh-Movement Constructions

### 2.1. Basic Facts

What is interesting in long distance Wh-questions in Chamorro is that the higher clauses of long distance wh-questions also require the Wh-agreement. The agreement of the higher verb is determined not by the grammatical function of the trace in the embedded clause, but by that of the sentential complement which contains the traced wh-phrase. It is thus expected that the most deeply embedded verb agrees with the grammatical function of the original wh-trace while the higher verb agrees with that of the sentential complement which contains the original trace:

- (15) a. Hafa um-istotba hao [ni malago'+ a i  
 what UM-disturb you [COMP want+ + NK the  
 lahi-mu \_ ]?  
 son-your  
 'What does it disturb you that your son wants?'

- b. Hayi si Juan ha-sangan-i hao [b-um-isita \_ si Rita]?  
 who E3s-say-DAT you UM-visit  
 'Who did Juan tell you visited Rita?'
- c. Hafa s-in-angan-na si Juan [para godde-tta  
 what? IN-say+ 'mlz Fut tie+ 'mlz-our  
 ni chiba\_]?  
 OBL goat  
 'What did Juan say that we should tie up the goat with?'
- d. Hayi ma'a nao-na si Manuel [para u-lalatdi \_]?  
 who? fear+ 'mlz-his Fut S3s-scold  
 'Who is Manuel afraid to scold?'

Let us consider the embedded verbs first. In (15a), the trace is the oblique complement of the embedded verb, and the verb exhibits oblique wh-agreement (nominalized without *in*.) In (15b), the trace is the subject of the embedded verb, and the verb is infixed with *um* as expected. In (15c), the trace is an instrument while the verb is nominalized without *in*. And in (15d), the trace is the direct object of the embedded verb, and the verb is marked with no special morphology. The special morphology in these embedded verbs is correctly predicted from our lexical rules in (10).

Now consider the matrix verbs. In (15a), the sentential subject complement of the matrix verb contains a gap and it is infixed with *um*. In both (15b) and (15c), the sentential direct object contains a gap. But only in (15c) the matrix verb is nominalized with *in*. Meanwhile, in (15d), the sentential oblique complement contains a gap and the verb is nominalized without *in*.

From these data, we can draw two informal generalizations for the wh-agreement in Chamorro. First, the verb in wh-questions employs special morphology either when one of its complements is realized as a gap or when it contains a gap in the subconstituent of the complements. Second, the morphological change in the verb is dependent on the grammatical function of its complement which itself is a gap or which contains the gap information inherited from one of its daughter.

We can observe that further data support the generalizations. Consider the examples where both the *wh*-trace and the sentential complement containing it are the direct object:

- (16) a. Hafa si nana-mu ha-sangan-i hit [ha-fahan \_]?  
           what mother-your E3s-say-Dat us E3s-buy  
           ‘What did your mother tell us that she bought?’  
       b. Hafa si nana-mu ha-sangan-i hit [f-in-ahan-na \_]?  
   IN-buy+ |mlz-her  
       c. ?Hafa si nana-mu s-in-angan-e-nna nu hit [ha-fahan \_]?  
   IN-say-Dat+ |mlz-her  
       d. ?Hafa si nana-mu s-in-angan-e-nna nu hit [f-in-ahan-na \_]?

The direct object *Wh*-agreement should appear on the embedded verb as well as on the matrix verb, since both have the slashed direct object as their complements. This is what we can find in (16). Because the nominalization is optional in this type of *wh*-questions, we can further see four possible synonymous *wh*-questions as shown here.

The prediction that each higher verb agrees with the sentential complement, dependent on its grammatical function, is further supported by a sentence like following.

- (17) Hayi s-in-angan-e-nna si Antonio nu hami [S2 ma’a nao-na  
       who? IN-say-DAT+ |mlz-his OBL us fear+ |mlz-his  
       [S1 para u-chiku \_]  
       Fut S3s-kiss  
       ‘Who did Antonio tell us that he is afraid to kiss \_?’

The *wh*-trace in S1 is the direct object of the verb *kiss*, and hence the verb can appear with no special morphology. S1 is the oblique complement of *fear* that contains a gap, thus requiring the verb to have the oblique *wh*-agreement (nominalized without *in*). S2 is the direct object of *say* with a gap in it, allowing the matrix verb to encode the direct-object *wh* agreement (nominalized with *in*).

## 2.2. An HPSG Analysis

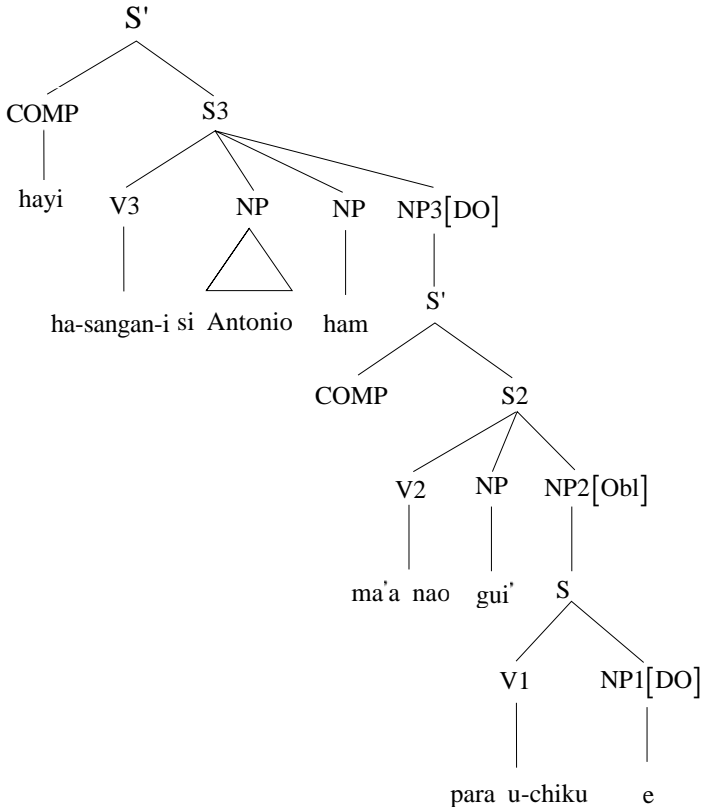
To account for such *wh*-agreement in long-distance *wh*-questions, Chung (1982) revises the structural description (9) as in (18).

$$(18) \quad \begin{array}{cccccccc} 1 & 2 & 3 & 4 & & 5 & 6 & 7 & 8 \\ \text{Wh} & X & V & (\text{NP})^* & & [\text{np} & Y & t & Z] & W \rightarrow \\ & & & & & & & & & [+ F \alpha] \end{array}$$

$$\begin{array}{cccccccc} \text{Wh} & X & V & (\text{NP})^* & & [\text{np} & Y & t & Z] & W \\ & & & & & & & & & [+ F \alpha] \end{array}$$

This descriptive structural schema first requires the exocentric phrasal rule “ $S \rightarrow NP$ ” and successive applications of the structural description. The following is the tree structure of the sentence (17) assumed under the ETS framework.

(19)



Within Chung's analysis, the tree needs to be factored into three ways to apply the structural description (18). First, V1 is chosen as term 3 in (18) and it is indexed with the grammatical function of the wh-trace direct object. Second, V2 becomes term 3, co-indexed with the grammatical function of the oblique NP2. Finally, V3 is selected as term 3 and indexed with the grammatical function of the direct object NP3. Her approach also needs to have a wh-word in all COMP positions to meet the description (18). If we assume that the trace left after the cyclic wh-movement can be a wh-word (term 1), this problem may be

solved. However, we must still stipulate the ordering application – wh-movement and then wh-agreement rules.

Instead, in our HPSG approach, all we need to do is a slight revision of the lexical rules proposed for the simple wh-questions, so that a complement selected by the lexical head can either be a gap or contain a gap:

(20) a. Realis Subject–Slash Lexical Rule (RSSLR)

$$\left[ \begin{array}{l} \text{FORM } \langle \boxed{5} \rangle \\ \text{SUBCAT } \langle \text{NP}, \text{NP} \rangle \\ \text{FORCE } \textit{realis} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM } \langle \text{um} + \boxed{5} \rangle \\ \text{SUBCAT } \langle \text{NP} [\text{LOC} \boxed{1}, \text{INH} | \text{SLASH} \langle \boxed{1} \rangle], \text{NP} \rangle \\ \text{FORCE } \textit{realis} \end{array} \right]$$

b. Irrealis Subject–Slash Lexical Rule (ISSLR)

$$\left[ \begin{array}{l} \text{FORM } \langle \boxed{5} \rangle \\ \text{SUBCAT } \langle \text{NP}, \text{NP} \rangle \\ \text{FORCE } \textit{irrealis} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM } \langle \text{um} + \boxed{5} \rangle \\ \text{SUBCAT } \langle \text{NP} [\text{LOC} \boxed{1}, \text{INH} | \text{SLASH} \langle \boxed{1} \rangle], \text{NP} \rangle \end{array} \right]$$

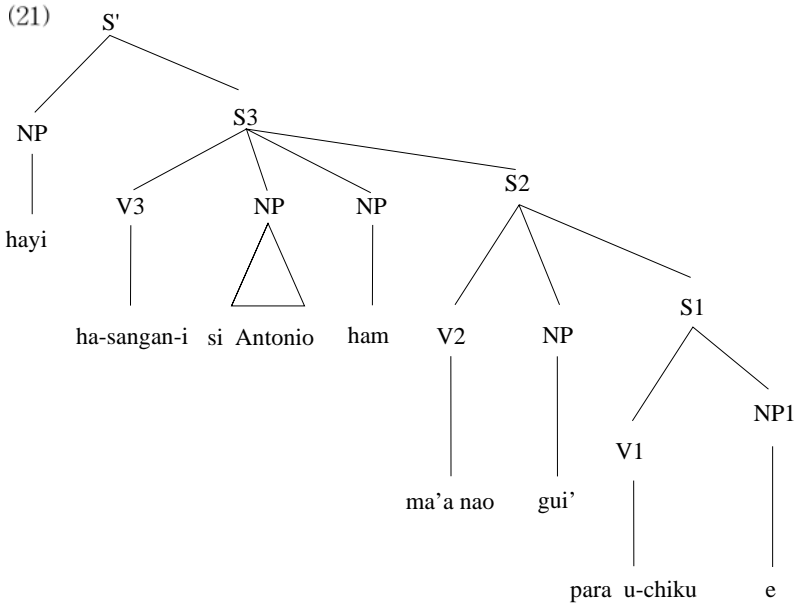
c. Object Slash Lexical Rule (OSLR)

$$\left[ \begin{array}{l} \text{FORM } \langle \boxed{5} \rangle \\ \text{SUBCAT } \langle \text{NP}, \text{NP} \rangle \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM } \langle \text{um} + \boxed{5} \rangle \\ \text{SUBCAT } \langle \text{NP} [\text{LOC} \boxed{1}, \text{INH} | \text{SLASH} \langle \boxed{1} \rangle], \text{NP} \rangle \end{array} \right]$$

d. Oblique Slash Lexical Rule (Oblique SLR)

$$\left[ \begin{array}{l} \text{FORM } \langle \boxed{5} \rangle \\ \text{SUBCAT } \langle \text{NP}, \text{NP} \rangle \\ \text{FORCE } \textit{realis} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{FORM } \langle \text{um} + \boxed{5} \rangle \\ \text{SUBCAT } \langle \text{NP} [\text{LOC} \boxed{1}, \text{INH} | \text{SLASH} \langle \boxed{1} \rangle], \text{NP} \rangle \end{array} \right]$$

The revised lexical rules (20) just specify that a complement XP (which can be either an NP or an S) can have its own LOC value identical with the SLASH value or it can have an independent SLASH value in accordance with the optional condition on the LOC value. Our approach then assigns the following structure for the sentence (17):



The revised lexical rules will correctly predict that each verb is marked with an appropriate *wh*-agreement, dependent upon which complement is gapped or contains a gap. The gapped NP1 is the direct object, thus requiring the V1 to have the direct object *wh*-agreement according to (20c) (optionally not nominalized). This SLASH information originated from this NP is percolated up to the tree until it is discharged by the TO-BIND feature, in accordance with the NONLOCAL Principle. The sentential complement S1 is an oblique complement of the predicate *fear* and contains a gap. Therefore, the predicate needs to be nominalized without *in*. S2 is the direct object of the matrix verb, and it is thus nominalized with *in*.

### 3. More on UDCs

If the generalization is viable that a specific predicate encodes the information that one of its complements is slashed, we are expected to



find the same *wh*-agreement constraint in other UDCs, such as relative clauses and topicalization. In this section, we will briefly consider them.

### 3.1. Relative Clauses

Relative clauses in Chamorro are introduced by the relativizers, *ni* and *nai*, which can also be used as linking particles. They are called relativizers because they introduce a relative clause.<sup>7)</sup> When *ni* is used, it replaces either the subject or the object of the relative clause (data from Gibbson 1980).<sup>8)</sup>

- (22) a. I taotao [ni tata-hu] humanao para Guam.  
           the man REL father-my went GOAL Guam  
           ‘The man who is my father went to Guam.’  
       b. Si Pedro [ni hu-li’e] huumanao para Guam.  
                   REL saw went GOAL Guam  
           ‘Pedro who I saw went to Guam.’

When the relativizer *nai* is used it usually replaces the locative NP of the relative clause.

- (23) Humanao gue’ para i lancho [nai machocho’cho’ i amigu-na.]  
       went he to the ranch REL working the friend-his  
       ‘He went to the ranch where his friend is working.’

The lexical entries for the these two relativizers can be something like the following:

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7) Though Chung (1982, 1983) treats *ni* as a complementizer, this paper, following Topping (1973), takes it to be a relativizer.

8) The relativizer *ni* is a different morpheme from the article *ni*. Only the article *ni* can be replaced by *nu i* (Topping 1973)

(24) a. Lexical entry for the relativizer *ni*:

PHON	⟨ni⟩				
CAT	<table style="border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">POS</td> <td style="padding: 2px 5px;">noun</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">CASE</td> <td style="padding: 2px 5px;">nom ∨ acc ∨ obl</td> </tr> </table>	POS	noun	CASE	nom ∨ acc ∨ obl
POS	noun				
CASE	nom ∨ acc ∨ obl				
CONT INDEX	<i>i</i>				
NONLOC INH REL	<i>i</i>				

b. Lexical entry for the relativizer *nai*:

PHON	⟨nai⟩				
CAT	<table style="border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">POS</td> <td style="padding: 2px 5px;">noun</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">CASE</td> <td style="padding: 2px 5px;">loc</td> </tr> </table>	POS	noun	CASE	loc
POS	noun				
CASE	loc				
CONT INDEX	<i>i</i>				
NONLOC INH REL	<i>i</i>				

From the fact that a relative clause also contains a gap coindexed with the relative head, we can predict that the morphology on the verb of the relative clause then will follow the same pattern as we observe in *wh*-questions. The verb form in relative clauses is expectedly determined by the grammatical function of the gap (data from Gibbson (1980) and Chung (1982)):

- (25) a. Hu-tungu' ha' i palao'an [ni f-um-a'tinas t i sashimi.]  
 1s-know EM the woman REL UM-make the sashimi  
 'I know the woman who made the sasimi'
- b. In-kannuu' i nengkanu' [ni f-n-ahan-na si Maria t gi tenda]  
 E3-eat the food REL IN-buy+ mlz-her Unm LOC store  
 'We ate the food that Maria bought at the store'
- c. Na'i yu' ni hapbun [ni para fa'gase-mmu ni kareta' t]  
 give me the soap REL Fut wash+ mlz-your the car  
 'Give me the soap that you are going to wash the car with'

In (25a), the relative NP is coindexed with the subject of a realis transitive clause. Since its subject is slashed, its verb is also marked with the *wh*-agreement with the infix *um*. In (25b), the relative NP is the object,

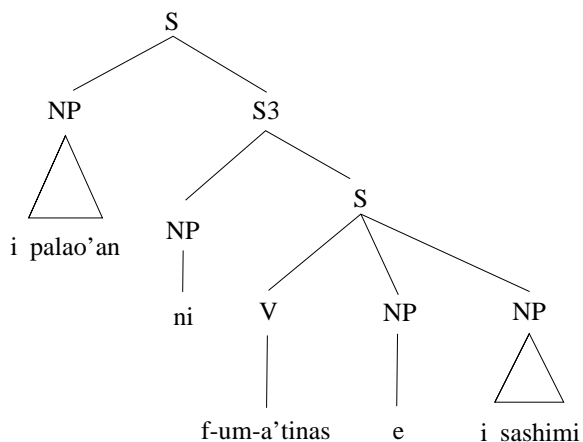
and the verb is thus nominalized with *in*. In (25c), the relative NP is the oblique object of the predicate, making the verb be nominalized without *in*.

The data show that the verbs of relative clauses also agree with the grammatical function of the trace. This agreement has the same morphological realization as Wh-agreement in questions, as expected from the lexical rules in (20). The fact that the agreement found in relative clauses exactly parallels the agreement found in wh-questions tells us that both should be governed by the same Wh agreement rule and accounted for by the same principles or rules. However, Chung (1982) claims that the relative NP is realized as an underlying PRO whereas an unbounded rule of Controlled PRO Deletion replaces the PRO with a trace by the following rule:

(26) NP [s X PRO Y] → NP [s X t Y]

As we have seen, the present system need not adopt such a different approach for relative clauses. The same principles and lexical rules will explain relative clauses, as we can observe from the following structure for (25a):

(27)



Since the subject of the realis transitive verb *made* is slashed, it is infixed with *um*, according to the SSLR in (20a). Also notice that the inherited SLASH value whose index value is in turn identical with that of the relativizer as well as of the head noun. The present analysis thus captures the dependency relationships between head noun and the gap as well as the wh-agreement in relative clauses. Notice that the analysis here does not introduce an additional rule like Chung's Controlled PRO Deletion for wh-relative clauses: relative clauses are explained by the exactly same way as wh-questions.

There remains one issue in relative clauses. Unlike in long-distance Wh-questions, the higher verbs in relative clauses need not always mark with a special agreement morphology. The wh-agreement appears on the most deeply embedded verb of a long distance relative clause. However, the relative clause is also grammatical where wh-agreement does not appear on higher verbs within the relative clause structure. Consider the following examples:

- (28) a. Ti in-baba i kahun [ni si Juan malagu' nu hita  
 not Elp-open the box REL want OBL us  
 [na ta-baba-]]  
 [COMP Slp-open]]  
 'We didn't open the box that Juan wanted us to open'
- b. Um-asudda ham yan i patgun [ni ma'a nao si Maria  
 Npl-meet we with the child REL fear  
 [para u-lalatdi \_ ]]  
 Fut S3s-scold  
 'I met with the child who Maria is afraid to scold'
- (29) a. Ti in-baba i kahun [ni si Juan malago'-na  
 not Elp-open the box [REL want+ 'mlz-his  
 nu hita [na ta-baba-]]  
 OBL us [Comp Slp-open]]
- b. Um-asudda ham yan I patgun [ni ma'a nao-na si Maria  
 Npl-meet we with the child REL fear+ 'mlz-her  
 [para u-lalatdi \_ ]]  
 Fut S3s-scold

Unlike in (29), the higher verbs in the relative clauses of (28), *want* and *fear*, are not nominalized. This is unexpected since these verbs select an oblique complement containing a gap. To explain such a variation, Chung (1982), with the Controlled PRO Deletion rule for relative clauses, claims that the relative NPs are realized as underlying PROs which are either + or -wh. PRO undergoes Wh-movement and is locally deleted when co-referred with the head NP. The successive cyclic Wh-movement leaves traces in every complementizer position along the path of a + wh relative NP. This process triggers Wh-agreement on every verb of the relative clause structure, generating the surface pattern like (29). In contrast, when the PRO is -wh, the unbounded Controlled Pro Deletion applies, leaving a trace only in the relative clause. Hence, only the verb of that clause exhibits Wh agreement like in (28).

It is evident that an analysis of relative clauses must be rich enough to generate both of the options illustrated in (28) and (29). However, it is doubtful whether we need two different mechanisms—the successive cyclic wh-movement (bounded) for wh-questions and the Controlled PRO Deletion (unbounded) for relative clauses, even though the agreement found in these two types of UDCs are exactly the same, except optional wh-agreement cases like (28).

Then, how can we deal with the data like (28)? One way to explain this fact may be to assume that there are two kinds of slash value: one always triggering wh-agreement, the other optionally requires wh-agreement. This in turn can mean that the FORM value of the output lexical entries in (20) is optionally changed. This optionality may be caused by a pragmatic reason. There seems to be no clear syntactic reason why the sentences like (28) with no special morphology in higher verbs are preferred to those like (29) with wh-agreement in higher verbs also. The assumption that there may be two kinds of SLASH value or the optionality of wh-agreement in higher clauses may be due to a pragmatic reason can be supported by the topicalization data in the following section.

### 3.2. Topicalization

Topicalization in Chamorro is accomplished primarily through preposing the topic at the beginning of the sentence. Let us first consider an intransitive sentence with its topicalized ones (Data from Topping 1973).

- (30) a. *Humanao i taotao para Garapan.*  
           went     the man   LOC Garapan.  
           ‘The man went to Garapan.’  
       b. [I taotao] *humanao t para Garapan.*  
       c. [I taotao] *yuhi i humanao t para Garapan.*  
       d. [Para Garapan] *i hinanao-na i taotao t.*

The sentence (30a) is an untopicalized one. In (30b), the subject is topicalized with no additional syntactic changes. Unlike (30b), the topicalization of the subject in (30c) accompanies a change in the verb morphology. The verb *humanao* is nominalized and incorporated into the subject NP, realizing as *i taotao yuhi i humanao*. Because of this additional change, the topicalized subject NP in (30c) is said to be more emphasized than the one in (30b). In (30d), the location phrase is topicalized with the nominalization of the verb *hanao*.

Now consider a transitive sentence with its topicalized ones.

- (31) a. *Ha-bende i taotao i kareta.*  
           sold         the man   the car  
           ‘The man sold the car.’  
       b. [I taotao] *ha-bende i kareta.*  
       c. [I taotao] *bumende i kareta.*  
       d. [I kareta] *binende ni taotao.*  
       e. [I kareta] *yuhi i binende ni taotao.*

(31a) is a non-topicalized one. In (31b) and (31c), the subject NP *i taotao* is topicalized. However, the verb morphology is different. While the

verb (31b) has no change, the verb in (31c) contains the infix *um* and is realized as *bumende*. In (31d) and (31e), the object NP has been topicalized. The difference is that in (31d), the verb is nominalized with the infix *in* and realized as *binende*, while the verb in (31e) it is nominalized and further incorporated into the topicalized object with *yuhi i*.

What we can see here is that in some cases (e.g., (30b) and (31b)) the only change that is involved is the topicalization of an element. In all other instances additional changes in the verb are required. When the change in the verb occurs, it follows Wh-agreement patterns as in wh-questions and relative clauses. This is an expected result from our approach. For example, in (30d) the trace is an oblique NP, so the verb is nominalized without the infix *in*. In (31c), the trace is the subject, and hence the verb is infixed with *um*. And in (31d), the trace is the object of a realis transitive clause, and hence the verb is nominalized.<sup>9)</sup> The present analysis thus allows us to account for the agreement phenomenon in topicalized sentences not different from the wh-agreement in relative clauses and wh-questions.

The topicalized data (30b) and (31b) also leave us the question why no special morphology appears on the verb even though one of its complements is gapped. As noted in Topping (1973), it may be related to the degree of emphasis on the topicalized element. When there is no special morphology in the verb, the topicalized one is less emphasized. If this is correct, we may attribute the optional wh-agreement in the verb morphology to a pragmatic reason once again.

#### 4. Conclusion

This paper has shown that to capture the interesting agreement phenomena in Chamorro we need to allow its lexical entries to encode much more sophisticated, enriched information. The enriched lexical information appears to provide us with an answer to the language

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9) Currently, we have no clear explanation on the process of the nominalization of the verb and its incorporation into the subject.

particular morphological agreement in Chamorro's UDCs.

The proposed lexical rules, interacting with other grammar rules, correctly describe the morphological agreement on the verb when its complement is gapped or contains gap (or slash) information. This kind of lexical analysis obviates the need for cyclic wh-movement for wh-questions, the Controlled PRO Deletion rule for relative clauses, and so forth. The analysis requires no structural descriptions to account for the fact that the special morphological change is dependent upon the grammatical property of the trace. The wh-agreement and dependency relationship between the filler and the gap can be accounted for in a principled and uniform way.

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