BARBARA E. HOLLENBACH

SUMMER INSTITUTE OF LINGUISTICS

0. Introduction
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0. Flip-flop phenomena are relatively common in natural languages. In this article, I present an example from Copala Trique,[1] the interchange of completive and potential tense-aspects when negated, and show one way to account for it in a generative semantics model of language.

1. Copala Trique verbs have three distinct surface structure tense-aspect forms: continuative (unmarked root or stem), completive (gV- prefix plus root or stem), and potential (completive form plus a tone drop formative).[2] For example, the root učuh^{34} *to lay (something) down* has the three forms učuh^{34}, gučuh^{34}, and gučuh^{4}.[3] I con-

sider this three-member tense-aspect set to be a grid through which all verbs must pass as a derivation proceeds from logical structure to surface structure. They are presumably supplied by a set of tense-insertion rules, which operate under very complex conditions.[4]

Copala Trique has two negative particles. The particle nę^{3} cooccurs with continuative forms, and also with potential forms, but in environments where completive would be expected. The particle zę^{4} cooccurs with completive forms, but in environments where potential would be expected. Consider the following examples:

(1) učuh^{34} žini^{3} yuwe^{21} âh

   The boy is laying the palm mat down.

   (žini^{3} *boy,* yuwe^{21} *palm mat,* âh *declarative*)

(2) nę^{3} učuh^{34} žini^{3} yuwe^{21} âh

   The boy isn't laying the palm mat down.

(3) gučuh^{34} žini^{3} yuwe^{21} âh

   The boy laid the palm mat down.

(4) nę^{3} gučuh^{4} žini^{3} yuwe^{21} âh

   The boy didn't lay the palm mat down.

[2] The tone drop formative is realized by a moderately complex set of tonal replacements. Copala Trique has eight tone contours: 21, 32, 3, 34, 35, 4, 5, 53. The first five of these occur on the ultima of the continuative and completive forms of most verbs, and the tone drop formative replaces these with one of the last three. Sometimes h is also added or deleted.

[3] Copala Trique has the following phonological units: fortis stops p, t, k; lenis stops b, d, g; affricates ¢, č, ç; fortis sibilants s, š, ş; lenis

sibilants z, ž, r; nasals m, n; lateral l; semivowels y, w; laryngeals ʔ, h; long vowels a, e, i, o, u; short vowels ą, ę, ǫ; nasalization ˜; tone contours 21, 32, 3, 34, 35, 4, 5, 53; utterance-final tone contours ´, `, ^, ˇ, ´.` (disyllabic sequence).

[4] For example, both habitual and present progressive actions and present and past states are encoded as continuative. Both termination of a predicate and completed entrance into a state are encoded as completive. Furthermore, information that will be encoded as tense is likely to be found as predicates linking two clauses as complements in logical structure. For example, a past action that is future to another past action (i.e., the two clauses are linked by a predicate of sequence) in the same sentence is sometimes encoded as potential.

(5) guǯuh^4 žini^3 yuwe^{21} âh
    The boy will lay the palm mat down.
(6) ze^4 guǯuh^{34} žini^3 yuwe^{21} âh
    The boy won't lay the palm mat down.

For some verb roots or stems, contrast between continuative and completive tense-aspect is neutralized, because the gV-prefix does not occur. For example, the stem nanuwą^{32} *to sew, to mend* (na-repetitive, nuwą^{32} *to sew*) has only the two forms nanuwą^{32} and nanuwą^5. In spite of this neutralization, however, such verbs undergo the flip-flop. Consider the following examples:

(7) nanuwą^{32} žini^3 goto^{32} âh
    The boy is mending/mended the shirt.
    (goto^{32} *shirt*)
(8) nę^3 nanuwą^{32} žini^3 goto^{32} âh
    The boy isn't mending the shirt.
(9) nę^3 nanuwą^5 žini^3 goto^{32} âh
    The boy didn't mend the shirt.
(10) nanuwą^5 žini^3 goto^{32} âh
    The boy will mend the shirt.
(11) zę^4 nanuwą^{32} žini^3 goto^{32} âh
    The boy won't mend the shirt.

All three tense-aspects must therefore be assigned to all verbs, including those like nanuwą^{32}, by the tense-insertion rules. Completive is then merged with continuative for verbs like nanuwą^{32} by a late rule, probably by a zero spelling rule for gV-.

It is intriguing to speculate how such a flip-flop developed in the history of Trique. One possible hypothesis is that at some point, potential was used with verbs that were unrealized, rather than just with those that were future. This explains half of the flip-flop: the change from completive to potential for a negated completive. At that point, potential was used for positive potential, negated potential, and negated completive, while completive was used only for positive completive. This situation was asymmetrical. In addition, negated completive and negated potential differed only by the two distinct negative particles. The situation was unstable, perhaps for the above reasons, and the instability was resolved by completing the flip-flop: a negated potential was changed from potential to completive.[5]

Synchronically, how should a grammar of Copala Trique handle this flip-flop? As noted above, it is possible to consider the change from completive to potential for a negated completive to represent directly information from logical structure. This change could therefore be handled as part of the tense-insertion rules. The change from potential to completive for a negated potential, however, does not appear to represent any logical structure information. This change has to be supplied by some rule that follows tense-insertion, but precedes the merger of continuative and completive for verbs like nanuwą^{32}. Since half of the flip-flop must be supplied by a special rule, it seems both more economical and more accurate a representation of the generative process to handle the other half of it in this way also, rather than as part of the tense-insertion rules.

2. Manner adverbs provide syntactic evidence that the flip-flop is supplied by a rule. In Copala Trique surface structure, they are usually identical in form with adjectives. They form part of the verb phrase and can either directly precede or directly follow the verb. There is no apparent meaning difference between the two positions, except perhaps a slight degree of focus in preverbal position.[6] Presumably,

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    [5] One weakness of this hypothesis is that a negated continuative is unaffected by the flip-flop, even though such a predicate is also unrealized. It should be noted, however, that completive and potential share the gV- prefix morphologically, and perhaps shared some meaning associated with this (punctiliar?) at some stage historically.
    [6] Some specific lexical adverbs occur only in preverbal position, while others occur only in postverbal position, and still others occur

one order is basic and the other is derived by an optional permutation rule. If focus is involved, the postverbal position is basic and the preverbal position is derived by a rule that fronts a constituent (adverb or noun phrase) in focus. In logical structure, manner adverbs are state verbs that serve as higher predicates having the remainder of the clause as an embedded complement clause. Consider the following examples:

(12) za$^{?5}$ učuh^{34} žini^3 yuwe^{21} âh

    The boy is laying the palm mat down well.

    (za$^{?5}$ *good*)

(13) učuh^{34} za$^{?5}$ žini^3 yuwe^{21} âh

    The boy is laying the palm mat down well.

(14) za$^{?5}$ gučuh^{34} žini^3 yuwe^{21} âh

    The boy laid the palm mat down well.

(15) gučuh^{34} za$^{?5}$ žini^3 yuwe^{21} âh

    The boy laid the palm mat down well.

(16) za$^{?5}$ gučuh^4 žini^3 yuwe^{21} âh

    The boy will lay the palm mat down well.

(17) gučuh^4 za$^{?5}$ žini^3 yuwe^{21} âh

    The boy will lay the palm mat down well.

With the exception of (16), all of the above have negative counterparts. (Manner adverbs do not intervene between ze^4 and a following verb.) The flip-flop applies, however, only to negated forms in which the negative particle is followed directly by the verb. Manner adverbs, being tenseless, cannot undergo the flip-flop, yet they block it from applying to a following verb. Consider the following examples:

(18) ne^3 za$^{?5}$ učuh^{34} žini^3 yuwe^{21} âh

    The boy isn't laying the palm mat down well.

(19) ne^3 učuh^{34} za$^{?5}$ žini^3 yuwe^{21} âh

    The boy isn't laying the palm mat down well.

(20) ne^3 za$^{?5}$ gučuh^{34} žini^3 yuwe^{21} âh

    The boy didn't lay the palm mat down well.

(21) ne^3 gučuh^4 za$^{?5}$ žini^3 yuwe^{21} âh

    The boy didn't lay the palm mat down well.

(22) ze^4 gučuh^{34} za$^{?5}$ žini^3 yuwe^{21} âh

    The boy won't lay the palm mat down well.

These data strongly suggest that the flip-flop is supplied by a rule, and also that it is a rather late rule that operates automatically whenever the conditions for its application (i.e., ne^3 directly followed by completive verb or ze^4 directly followed by potential verb) are met, without regard to the logical structure underlying the sentence.[7] In other words, the flip-flop rule

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[7] An entirely different explanation for the different behavior of the flip-flop rule with manner adverbs in preverbal and postverbal position is that these two orders do not represent an optional or focus permutation, but rather a basic difference in the logical structure tree. In the case of preverbal adverbs, the negative has only the adverb in its scope; thus the verb does not undergo the flip-flop rule. In the case of postverbal adverbs, however, the negative has both the adverb and the verb in its scope; thus the verb does undergo the flip-flop rule. It should be noted, however, that even if this hypothesis should prove to be correct, the flip-flop rule would not necessarily need to be reformulated. Even though its operation is conditioned by a difference in tree structure, this difference will have been realized by a different linear order at the time the rule applies. (The adverb permutation rule would, of course, no longer exist.)

Given the basic tenets of "pure" generative semantics, in which only predicates and indices are permitted in logical structure trees, it is difficult to see how different trees can be drawn to show such differences in scope. In order to do so, it appears to be necessary to permit the introduction of some new symbol.

In the analysis proposed in the body of the article, I presume that there is no way to distinguish the two meanings at the level of the clause, i.e., in either position both adverb and verb are within the scope of the negative. The distinction can, however, be expressed by contrasting one

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in either position. I consider only the third type in this article.

does not appear to be a global rule. Note that it must be ordered after the adverb permutation rule.

3. The flip-flop rule also affects certain pairs of verbs within a sentence which share a single negative and which are restricted to five of the nine possible tense sequences. These tense sequences are: continuative–continuative, continuative–potential, completive–completive, completive–potential, and potential–potential. In other words, a given tense may be followed only by itself or by potential. One such kind of verb pair is found in surface structure paratactic sentences expressing simultaneous action (by a sequence of like tenses) or purpose (by a sequence with potential as the second member). There is no overt conjunction linking the two clauses of such sentences; they are simply juxtaposed. In logical structure, however, the two clauses are embedded complement clauses of predi-

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clause with another, for example, *The boy didn't lay the palm mat down well; he laid it down sloppily* or *The boy didn't lay the palm mat down well; he went out to play.*

In support of the analysis proposed in the body of the article is the fact that the two positions are not used consistently for the two distinct meanings. In addition, different adverbs require one or the other position, while still others permit both, and there does not seem to be any reason for this restriction that correlates with the scope of a negative. For example, za$^{\jmath 5}$ *good* occurs in either position, while gunah^5 *good*, a close synonym, occurs only in preverbal position. Also, it is difficult to see what difference in meaning the two orders realize in positive clauses.

Both of the meanings mentioned above should be distinguished from an evaluative meaning, for example, *I think that it is good that the boy laid the palm mat down*, with deletion of *I think that it is...that.* This is not the meaning of the examples given in the article, because non-evaluative adjectives such as nanah^{34} *slow, soft* or yo^{53} *fast* can be substituted for za$^{\jmath 5}$ in either position.

cates of simultaneous action or purpose. The two verbs of such pairs are therefore at the same level of the logical structure tree. Consider the following examples:

(23) $^{\jmath}$na$^{\jmath 3}$ žini^3 ača^{21} žini^3 âh
The boy comes singing.
($^{\jmath}$na$^{\jmath 3}$ *to come*, ača^{21} *to sing*)

(24) ga$^{\jmath}$na$^{\jmath 3}$ žini^3 gača^{21} žini^3 âh
The boy came singing.

(25) ga$^{\jmath}$na$^{\jmath 5}$ žini^3 gača^4 žini^3 âh
The boy will come singing.

(26) $^{\jmath}$na$^{\jmath 3}$ žini^3 gača^4 žini^3 âh
The boy comes to sing.

(27) ga$^{\jmath}$na$^{\jmath 3}$ žini^3 gača^4 žini^3 âh
The boy came to sing.

(28) ga$^{\jmath}$na$^{\jmath 5}$ žini^3 gača^4 žini^3 âh
The boy will come to sing.

Note that (25) and (28) are identical in surface structure.

In such pairs of verbs, only one negative may occur; it precedes the first verb and includes both in its scope. When such pairs of verbs are negated, the following tense changes occur: ne^3 + completive–completive → ne^3 + potential–potential; ne^3 + completive–potential → ne^3 + potential–potential; ze^4 + potential–potential → ze^4 + completive–potential. In other words, a change from potential to completive extends only to the first verb of the pair, while a change from completive to potential extends to both. Consider the following examples:

(29) ne^3 $^{\jmath}$na$^{\jmath 3}$ žini^3 ača^{21} žini^3 âh
The boy doesn't come singing.

(30) ne^3 ga$^{\jmath}$na$^{\jmath 5}$ žini^3 gača^4 žini^3 âh
The boy didn't come singing.

(31) ze^4 ga$^{\jmath}$na$^{\jmath 3}$ žini^3 gača^4 žini^3 âh
The boy won't come singing.

(32) ne^3 $^{\jmath}$na$^{\jmath 3}$ žini^3 gača^4 žini^3 âh
The boy doesn't come to sing.

(33) ne^3 ga$^{\jmath}$na$^{\jmath 5}$ žini^3 gača^4 žini^3 âh
The boy didn't come to sing.

(34) ze^4 ga$^{\jmath}$na$^{\jmath 3}$ žini^3 gača^4 žini^3 âh
The boy won't come to sing.

Note that (30) and (33), the negative

counterparts of (24) and (27) respectively, are identical in surface structure. Examples (31) and (34) are also identical in surface structure, as are their positive counterparts, (25) and (28) respectively.

Although this pattern seems at first to be totally capricious, it can be accounted for quite neatly by positing an additional rule, which I will call tense adjustment. If we posit this additional rule, then the flip-flop rule formulated above needs no modification; it applies automatically to the immediately following verb, which is the first one of the pair. In the cases of nę^3 + completive–potential and zę^4 + potential–potential, the results of the flip-flop rule are potential–potential and completive–potential sequences, respectively, both of which are permitted surface structure sequences. In the case of nę^3 + completive –completive, however, the result of the flip-flop rule is *potential–completive, which is not a permitted surface structure sequence. The tense-adjustment rule therefore changes the remaining completive to potential, which results in a permitted potential–potential sequence. Thus, the tense-adjustment rule did apply in the derivation of (30), and for this reason it is identical to (33) in surface structure.

If, on the other hand, we attempt to expand the flip-flop rule to include the change to potential in the second verb, rather than posit a separate tense-adjustment rule, we find that the flip-flop rule becomes quite complex. Such complexity runs strongly counter to the simple, automatic way in which the rule seems to work.

If the tense-adjustment rule is needed elsewhere in the grammar, this would constitute an additional reason for separating the two rules. Although I cannot at present establish that the tense-adjustment rule applies elsewhere, it may well apply to cases such as the following. Any syntactic environment that requires potential in the

first verb of a related pair requires it in both. Consider the following examples:

(35) ata^3 ga$^\prime$na$^{\prime 5}$ žini^3 gača^4 žini^3 âh

> *The boy hasn't come singing/to sing yet.*
>
> (ata^3 *to be lacking,* with embedded complement clause in potential)

(36) mę^3 rą^{32} žini^3 ga$^\prime$na$^{\prime 5}$ žini^3 gača^4 žini^3 âh

> *The boy wants to come singing/to sing.*
>
> (mę^3 rą^{32} *to want,* with embedded complement clause in potential)

It is possible that all the tenses in (35) and (36) are supplied by the tense-insertion rules. It seems more likely, however, that verbs such as ata^3 and mę^3 rą^{32} carry a feature "+potential in verb of complement." This feature could either supply potential for both ga$^\prime$na$^{\prime 5}$ and gača^4 or only for ga$^\prime$na$^{\prime 5}$. In the latter case, the tense-adjustment rule would supply it for gača^4.

The basic function of the tense-adjustment rule is to preserve the surface structure constraints on tense sequence by changing (or supplying) the tense of the second verb. In all instances I have observed to date, it applies only to change *potential–completive sequences to potential–potential, and possibly to supply potential for an as yet unspecified tense following another potential. (The three other nonpermitted sequences, *continuative–completive, *completive–continuative, and *potential–continuative, which might supply further environments for the operation of the tense-adjustment rule, are never generated by the flip-flop rule, nor, to my knowledge, elsewhere in the grammar.) The tense-adjustment rule can probably best be formulated to replace any specified or unspecified tense by potential in the second verb of a related pair, if the first verb of the pair is potential. This is a broader environment than the ones actually observed, but it seems to be

the simplest statement that generates correct forms.

In other verb pairs, the first verb is the main verb and the second is the verb of an embedded complement clause within it. In spite of the difference in tree structure, the flip-flop and tense-adjustment rules apply as they did above. Consider the following examples with the main verb nari$^{?3}$ *to learn* (*how to*), which takes an embedded complement clause having a verb with the same tense:

(37) nari$^{?3}$ žini^3 nanuwạ^{32} žini^3 goto^{32} âh
   The boy learns how to mend the shirt.

(38) nẹ^3 nari$^{?3}$ žini^3 nanuwạ^{32} žini^3 goto^{32} âh
   The boy doesn't learn how to mend the shirt.

(39) ginari$^{?3}$ žini^3 nanuwạ^{32} žini^3 goto^{32} âh
   The boy learned how to mend the shirt.

(40) nẹ^3 ginari$^{?5}$ žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy didn't learn how to mend the shirt.

(41) ginari$^{?5}$ žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy will learn how to mend the shirt.

(42) zẹ^4 ginari$^{?3}$ žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy won't learn how to mend the shirt.

The flip-flop rule applied in the derivation of (40) and (42), and the tense-adjustment rule applied to (40). Other main verbs take an embedded complement clause having a verb in potential, for example, ata^3 *to be lacking*, mẹ^3 rạ^{32} *to want* (see examples [35] and [36]), and ne$^?$ẹ^3 *to know* (*how to*). Consider the following examples with ne$^?$ẹ^3:

(43) ne$^?$ẹ^3 žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy knows how to mend the shirt.

(44) nẹ^3 ne$^?$ẹ^3 žini^3 nanuwạ^5 žini^3 goto^{32} âh

The boy doesn't know how to mend the shirt.

(45) gene$^?$ẹ^3 žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy knew how to mend the shirt.

(46) nẹ^3 gene$^?$ẹ^{53} žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy didn't know how to mend the shirt.

(47) gene$^?$ẹ^{53} žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy will know how to mend the shirt.

(48) zẹ^4 gene$^?$ẹ^3 žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy won't know how to mend the shirt.

The flip-flop rule applied in the derivation of (46) and (48), but the tense-adjustment rule did not apply to any of the above examples, because the second verb was already potential.

When a manner adverb occurs with the first verb of a related pair, the flip-flop and tense-adjustment rules apply as expected. Consider the following examples with nari$^{?3}$; only completive examples are given:

(49) za$^{?5}$ ginari$^{?3}$ žini^3 nanuwạ^{32} žini^3 goto^{32} âh
   The boy learned well how to mend the shirt.

(50) nẹ^3 za$^{?5}$ ginari$^{?3}$ žini^3 nanuwạ^{32} žini^3 goto^{32} âh
   The boy didn't learn well how to mend the shirt.

(51) ginari$^{?3}$ za$^{?5}$ žini^3 nanuwạ^{32} žini^3 goto^{32} âh
   The boy learned well how to mend the shirt.

(52) nẹ^3 ginari$^{?5}$ za$^{?5}$ žini^3 nanuwạ^5 žini^3 goto^{32} âh
   The boy didn't learn well how to mend the shirt.

The flip-flop rule applied in the derivation of (52), but not (50), and because the flip-

flop rule applied, the tense-adjustment rule also applied to (52).

There are, of course, other pairs of verbs within a sentence that are unrelated, that is, they are not limited to the five permitted tense sequences, nor do they share a negative. Such pairs include: the main verb of a clause and the verb of a restrictive relative clause modifying a noun phrase in the clause, the main verb of a clause and the verb of an embedded complement clause that functions as a direct or indirect quote, and the main verbs of the two clauses in paratactic sentences that express restatement or contrast. Whether a pair of verbs is related or not is determined, in the case of pairs in which one verb is in an embedded complement clause of the other, by the main verb and, in the case of verbs in paratactic sentences, by the logical structure predicate linking them.

In order for the tense-adjustment rule to operate correctly, it must have available information that distinguishes related pairs of verbs from unrelated pairs. It is not at present clear to me in what way this information should be marked. It could be written in as an abstract symbol accompanying the second verb, which is deleted after the tense-adjustment rule. Or tense-adjustment could be a global rule.