# NEGATIVES AS TRANSFORMATIONS: THE CASE FOR MAORI[1]

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With the publication of *Syntactic Structures*[2] almost a decade ago, Chomsky launched an attack on the inadequacies of the Immediate Constituent (IC) or Item-and-Arrangement (IA) approach to grammatical analysis. In its place Chomsky suggested a new look at syntactic analysis, formulating as the goal of syntactic investigation "a grammar that can be viewed as a device of some sort for producing the sentences of the language under analysis".[3] In other words the grammar suggested had to generate sentences. Two of his key notions in *Syntactic Structures* were the kernel sentence and the complex or derived sentence. It is covertly postulated as a language universal that every language is comprised of a finite set of kernel sentences whose combinations form an infinity of complex or derived sentences. This postulate is given overt form by a series of ordered rules. Kernel sentences combine and transform into complex sentences.

This approach——called transformational-generative analysis by its proponents and Chomskyan linguistics by some detractors——has influenced linguistic thinking, initially in the United States and latterly in the rest of the world. The new approach, specified as Item-and-Process (IP) by many linguists, was not a complete abandonment of the tenets of Bloomfieldian IA analysis. Some IA notions were utilised and some notions of the traditional grammarians, which had been discarded by Bloomfieldians, were resuscitated. In fact, the transformational-generative approach as formalised by Chomsky,[4] Lees,[5] Postal,[6] Koutsoudas,[7] Halle,[8] Schachter,[9] *et al* furthered and diverged from the attempts of Harris to describe the structure of discourse using an IA model.[10] The divergence came, according to proponents of the transformational-generative approach, because IA analysis was not able to account satisfactorily for process relations existing between such strings as affirmative and negative, or active and passive. The relationship had been seen by earlier (or traditional, or pre-Bloomfieldian) grammarians. For example, Chomsky points out that Jespersen had seen that 'the doctor's arrival' differed in structure from 'the man's house'.[11] The former is derived from 'the doctor arrives'

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1. Revised version of a paper, *Negatives as Transformations: Some Aspects of Transformational-Generative Analysis*, presented to the Auckland Branch of the Linguistic Society of New Zealand, 28 June 1966. I am indebted to Anne Thorpe, Peter Sharples and Rangitukua Moeka?a, students in the Anthropology Department at the University of Auckland for providing information on the languages they are working on, and also to members of the Auckland Branch of the Linguistic Society of New Zealand for their comments and criticisms.

2. Chomsky 1957.
3. Chomsky 1957 : 11.
4. Chomsky 1957, 1961a, 1961b, 1962, 1964.
5. Lees 1960, 1961.
6. Postal 1964a, 1964b.
7. Koutsoudas 1963, 1964.
8. Halle 1952, 1962.
9. Schachter 1961.
10. Harris 1952 : 1-30.
11. Chomsky 1962 : 124.

whereas 'the man houses' is ungrammatical (meaning, unacceptable to a native speaker as being part of his language). Parallel process relations had also been noted by Williams for Maori. For example he noted that a formal relationship existed between affirmative and negative sentences.[12]

Whereas linguists using IA methods have not diverged from these methods, attempting instead to show that their approach could be expanded further to include the study of systematic relationships between sentences,[13] transformational-generative linguists have labelled IA theories and methods as "inadequate", have pointed out that no amount of "patching" will resolve inadequacies, and have spawned a new model. However, Chomsky himself believes that there need be no incompatibility between the IA and the IP approaches. His comments in *A Transformational Approach to Syntax* show where the two models may fuse. Following his transformational-generative grammar of a fragment of English, Chomsky states: "...the grammar sketched above is neither an item-arrangement nor an item-process grammar, in the usual sense of these terms. Such rules as Sentence ⟶ NP + VP, or *past* ⟶ *d* in the context learn _____, etc., are item-arrangement rules, while such rules as *take* + *past* ⟶ *tuk* are the paradigms for item-process rules. There is no essential difference (other than generality) between these rules in the above framework".[14] Many of Chomsky's followers——more intent on showing that their model is newer, better, more powerful, more adequate or more beautiful than the older products—have stated that the IA-IP split is permanent; they cannot be united since their respective assumptions, to quote Koutsoudas, "are logically incompatible and categorically opposed".[15]

It has been stated above that a grammar is viewed as a device for producing the sentences of a language. The grammar must (ideally) generate all and only the sentences of the language. Each sentence must be assigned a structural description showing "the elements the sentence contains, their relations to each other, the relations of the sentence to other sentences, and so on."[16] If the grammar does not do these things, it is as inadequate as a list of sentences. In any case, since the possible number of sentences in a language is infinite, it is logically impossible for an adequate grammar to consist of a corpus of sentences and a structural description of each sentence.

A grammar, says Chomsky, has three components; syntactic, phonological, and semantic.[17] The syntactic component is concerned with generating an infinite number of morpheme strings, the phonological component gives such morpheme strings rules for their correct pronunciation, while the semantic component gives their semantic interpretation. These are the formal components, or the mere trappings, or the outward expression of what a grammar is *qua grammar*. In most instances people define grammars heuristically and judge them according to their usefulness, for example for language teaching, for translating, for comparative analysis, and so on. A grammar *per se* is a theory of sentence structure. It gives generalisations about the language under study;

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12. Williams 1956 : 27-30.
13. Harris 1952, 1962. Longacre 1960, 1964.
14. Chomsky 1962 : 151-152.
15. Koutsoudas 1963 : 162.
16. Postal 1964 : 137.
17. Postal 1964 : 138 differs: "a grammar may be conceived of as having a syntax and a phonology."

it characterises the features of the language; it makes predictions; it demarcates sentences from non-sentences.[18] The acceptability of a grammar is measured by transformational-generative linguists in terms of its relative generality, its simplicity, its precision, and its power of prediction.[19]

The notion of "generating utterances" neither means that the human being is likened to a sentence-producing machine, nor does it mean that the grammar is a reflection of human neural-vocal, or even of language-learning, processes. The transformational-generative grammar is a description of the structure of a language in the form of a meta-language. It is a neutral description, independent of the linguist and the speaker. The conventions are stylised, the format is a set one, rules can be checked for internal inconsistencies or can be verified with the aid of a native speaker.[20] Consider, for example, the following set of rules for English. If we consider as our corpus the three sentences:- the dog bit the girl; the boy hit the dog; a girl bit the boy; a transformational-generative grammar would, if we consider the three sentences as the total utterances elicited, appear thus:[21]

#S#

1. S ——> NP + VP
2. VP——> V + NP
3. NP——> A + N
4. V ——> hit, bit, ...
5. A ——> the, a, ...
6. N ——> boy, girl, dog, ...

This grammar can generate 69 other sentences besides the three used for constructing the grammar, and since all 69 other sentences are unelicited, but can be checked with informants as being grammatically possible, the grammar is adequate in generality, simplicity, precision, and power of prediction. That is all that is required of this grammar. Note that the rules are phrase structure rules only; transformational rules will later take the terminal strings; i.e. the strings of morphemes such as "the dog bit the boy" and convert (or transform) them to such sentences as "the boy was bitten by the dog", or "the boy was not bitten by the dog". It seems that two sets of transformation rules are required; one set to transform from the active to the passive, and another set to transform from the passive to the passive negative.

Generally, Chomsky's views on how English negative constructions are handled in transformational-generative analyses have prevailed. To quote from his *Syntactic Structures*, "as it stands, the transformational treatment of negation is somewhat simpler than any alternative treatment within phrase structure."[22] Chomsky later explains why he considers John arrives, John can arrive, and John has arrived as kernel sentences (i.e. outputs of phrase structure rules) which by transformations become John doesn't arrive, John can't arrive, and John hasn't arrived.[23] The formal rules are given in his

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18. Chomsky 1961b : 219.
19. Chomsky 1957 : 49-60.
20. By the simple mechanism of producing sentences and asking an informant "Is this possible?" or "can you think of any occasion when this sentence can be said?"
21. For key to symbols, ref. pp. 63-65.
22. Chomsky 1957 : 62.
23. Chomsky 1957 : 65.

later paper, *A Transformational Approach to Syntax.*[24] Chomsky's views differ little from those of Klima. Klima's constituent structure rules include negation as an optional element of a kernel expansion, while later transform rules produce various complex negative sentences.[25]

This, of course, is not to infer that all affirmative-negative correlations in all languages should be handled transformationally. For Russian, Koutsoudas gives convincing reasons for handling positive and negative transitive sentences in the Phrase Structure Rules. Stress shifts and vowel change accompanying negation are all incorporated in his rules portraying phrase structure.[26]

This same problem of deciding whether to treat negation in the Phrase Structure Rules or else treat them in the Transformation Rules is met with in Polynesian and some other Oceanic languages. From cursory inspection of the material for Samoan,[27] Luaŋiua (Ontong Java),[28] Sikaiana,[29] and Tongan and Niuean,[30] it seems that negation in these languages is best treated in kernel sentences, i.e. in the Phrase Structure Rules. For these languages the position of the negation marker (whether analysed as a major or a minor morpheme) is fixed, and the presence of a negation marker does not result in agreement adjustments in other phrases. Conversely, the order of phrases in the rest of the sentence does not affect the shape of the negative. For example, Sikaiana /hee/ is a preposed minor morpheme occupying decade 20, and may precede Verb bases and act in surrogates in Noun Phrases.[31] The Luaŋiua minor morpheme /se/, marking negation, follows Noun Phrase markers and precedes Locative and Verb Phrase markers.[32] The addition of the negative marking particle /se/ does not affect the rest of the sentence (cf. the processes involved when negation is added to Russian and English affirmative sentences).[33] Such factors justify including negation markers in Samoan, Tongan, Niuean, Luaŋiua and Sikaiana in the Phrase Structure Rules.

Pukapukan seems to handle negation in a slightly more complicated manner.[34] /kaale/ (alternating freely with /kole/), shows partial agreement with the verb phrases in the same sentence; /ðe/, another negative marker, occurs only when /e/ is used as a Verb Phrase marker. The problems are minor; they can be handled in the Phrase Structure Rules. With Rarotongan[35] and Maori,[36] however, complexities are handled better by means of transformations.

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24. Chomsky 1962.
25. Klima 1964 : 246-323.
26. Koutsoudas 1964 : 166-167, 178.
27. Pawley, 1966 : 25.
28. Thorpe, personal communication.
29. Sharples, person communication.
30. Hohepa, in press.
31. Sharples, personal communication.
32. Thorpe, personal communication.
33. Ref. footnotes 24 & 26.
34. Moeka?a, personal communication.
35. Buse 1963a, 1963b.
36. Hohepa, in press.

In Maori, there are five morphemes marking negation:

| | |
|---|---|
| /kaahore ~ kaaore ~ kaare ~ hore/ | *'not', descriptive, non-time* |
| /kore/ | *'not', emphatic imperative, non-past time* |
| /eehara/ | *'not', declarative imperative, non-time* |
| /kaua ~ kauaka/ | *'not', caveat imperative, non-past time* |
| /kiihai/ | *'not', descriptive, past-time* |

For heuristic purposes I consider each negative as a phrase nucleus (or major morpheme) initiated by one of a set of particles or affixes. For /hore/ the permanent particle is /kaa/, marking *descriptive, non-time* (i.e. the inceptive marker);[37] and /kaua/ and /eehara/ have the zero allomorph of /ee/ *imperative, non-past time* . The zero allomorph occurs when the following base contains three or more vowel phonemes. /kore/, marked solely for *imperative*, is preceded by /ee/, the same imperative marker mentioned previously. The problem child, /kiihai/, is tentatively analysed as having /i/ *descriptive past-time* as a prefix which, through infixation or internal transposition, resulted in vowel lengthening. In any case, there is some permanent agreement between the negative and its adjacent particle. Note, for example, that the verbal particle /i/ *descriptive, past-time* cannot precede /kaua/ which is a *caveat imperative* marking *non-past time.*

More importantly, agreement rules function at the sentence level. /kore/, /kiihai/, and /kaua/ are used only when a Verb Phrase is one of the sentence components. Either the initiating particles of the Negative Phrase and the Verb Phrase must be identical, or the particle marking the Verb Phrase must share the functional gloss of the negative. In the following examples the Maori text is given in phonemic form, with final juncture indicated by # and non-final juncture by // :

| | |
|---|---|
| # kiihai // te taŋata // i haere # | *'the man did not go'* |
| # ee kore // te taŋata // ee haere # | *'the man won't go'* |
| # kua kore // te taŋata // ee haere # | *'the man refuses to go'* |
| # kaua // te taŋata // ee haere # | *'the man must not go'* |

/eehara/ is used only in non-verbal kernel sentences or when, in derived sentences, one of the kernel components does not contain a VP:

# eehara // teenei // i te taŋata // [i taria // ki pooneke] #
*'this is not the man [who was taken to Wellington]'*

# eehara // noo te taŋata // te fare // [i riro] #
*'it was not the man's house [which was taken]'*

/kaahore/ may occur in the same environment as /kore/ and /kiihai/ but not in that of /eehara/:

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37. This is also the view of Biggs (Biggs 1961 : 25).

# kaahore // te taŋata // e haere # *'the man won't go'*

# kaahore // te taŋata // i haere # *'the man did not go'*

There are other agreement transformations; when /kaahore/ is the negative used, and /kua/ is the verb phrase initiator in the affirmative sentence, /kua/ is obligatorily replaced by /kia/ in the negative sentence. In cases where a VP + NP + X sentence is transformed by negation, there is an optional re-ordering so that the usual order becomes Neg + NP + VP + X.

To summarise then, the transformational-generative (TG) grammar must, in handling negatives, allow for selection of the appropriate negative, allow for agreement changes in other phrases, and allow for optional re-ordering. These complexities are more easily handled by treating negation in Maori as transformations of affirmative sentences.

A few comments concerning the following TG grammar are pertinent at this point. The formal rules make no attempt to handle the phonological components of morpheme strings. All morphemes are written phonemically. The kernel sentences were selected according to two criteria; firstly according to native intuition; secondly according to economy and algorithmic simplicity; that is, according to which sentence will transform in the fewest number of rules to other sentences. If there was a conflict between the two criteria, the principle of economy was invoked. This in no way conflicts with Chomskyan viewpoints. In his *Transformational Approach to Syntax* Chomsky states, "...one of the decisions to be made concerning a class of sentences is whether to consider them to be kernel or derived sentences. I know of no general mechanical procedure for arriving at an answer to this question ... we must apparently do what any scientist does when faced with the task of construeting a theory to account for particular subject matter, namely, try various ways and choose the simplest that can be found. In studying English structure, I have found that in each case I have investigated, there are quite compelling reasons that lead one to assign particular sentences to the kernel or to derive them transformationally."[38] This then was the crux for kernel selection in Maori.

One further point; since the possible number of sentences in any language is infinite, a grammar of a language is a theory of the language, and is always subject to verification or correction. The rules given are in no way exhaustive, they may well be incorrect, they may well be superseded, but they are an attempt to formalise the structure of negation in Maori. In the following set of rules, the relevant transformation rules are rules 29 through 35. The other rules are necessary and sufficient for generating the strings to be transformed.[39]

The symbols used in the formal grammar are of no intrinsic significance. A key to symbols used precedes the formal rules. Apart from Topt. and Tob., the symbols which use Roman letters represent cover terms which ultimately expand to Maori morphemes. The remaining symbols are formal instructions, and they are ordered according to first occurrence in the grammar. Symbols which use Roman letters are alphabetically listed; they differ from the others in that, although they are strictly definable by their expansions, some attempt has been made to represent grammatical features mnemonically.

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38. Chomsky 1962 : 137.
39. The full set of rules and the kernel sentences used in their construction are in Hohepa (in press).

## KEY TO SYMBOLS

| | |
|---|---|
| # | *sentence boundary* |
| 1, 2, etc. | *read rules in this order* |
| ——> | *rewrite as* |
| ( ) | *enclosed symbol/s optional* |
| + | *a boundary occurs* |
| { } | *one line of the enclosed obligatory* |
| ± | *adjacent straddling items are permutable* |
| : | *instruction follows* |
| —— | *(under Roman letter/s) phoneme string of Maori* |
| ^ | *affix boundary* |
| ⟹ | *transforms to* |
| —— | *(under list) end of closed set* |
| [ ] | *choice of same line throughout rule obligatory* |
| —— | *(after or before symbol) item occurs in this slot* |
| Adj | *adjectives, or qualifiers of Noun Phrase nucleus* |
| Adv | *adverbs, or modifiers of Verb Phrase nucleus* |
| Comp | *complement, or major morpheme modifiers of Noun Phrase nucleus* |
| C | *possessive markers* |
| $L_p$ | *Location-in-Place Phrase* |
| Loc | *Location-in-Time Phrase* |
| M | *phrase nucleus* |
| N | *nucleii of various phrases plus some modifiers* |
| $N_a$ | *kinship terms marking plural by vowel lengthening* |
| $N_{aa}$ | *subclass of $N_a$, take "a – category" when marked for possession* |
| $N_{ao}$ | *subclass of $N_a$, take "o – category" when marked for possession* |
| $N_b$ | *subclass of N, take ^tia as passive suffix* |
| $N_{ba}$ | *subclass of $N_b$, take "a – category" when marked for possession* |
| $N_{bo}$ | *subclass of $N_b$, take "o – category" when marked for possession* |
| $N_c$ | *subclass of N, list of place-names* |
| $N_d$ | *all major morphemes capable of occurring as personal names* |
| $N_{da}$ | *subclass of $N_d$, list of personal names* |

| | |
|---|---|
| $N_e$ | *subclass of N, take ^hia as passive suffix* |
| $N_f$ | *subclass of N, take ^a as passive suffix* |
| $N_g$ | *subclass of N, take ^ŋia as passive suffix* |
| $N_h$ | *subclass of N, take ^ina as passive suffix* |
| $N_i$ | *subclass of N, take ^mia as passive suffix* |
| $N_j$ | *subclass of N, take ^ria as passive suffix* |
| $N_k$ | *subclass of N, take ^kia as passive suffix* |
| $N_l$ | *subclass of N, take ^na as passive suffix* |
| $N_m$ | *subclass of N, optional ordinal marker plus cardinal numerals (No)* |
| $N_x$ | *cover term for subclass of N from $N_e$ to $N_m$* |
| Neg | *Negative Phrase* |
| NP | *Noun Phrase* |
| Num | *definite and retrospective articles* |
| Numa | *definite articles* |
| P | *initial Noun Phrase, or initial Location-in-Place Phrase initiated by ko* |
| Poss | *Possessive Phrase* |
| Post | *position-marking particles* |
| Pp | *possessive pronouns* |
| Pr | *personal pronouns* |
| Pra | *subclass of Pr, singular personal pronouns* |
| Prb | *subclass of Pr, non-singular personal pronouns* |
| Pred | *Predicate, or non-subject phrase/s* |
| Prep | *Location-of-Place markers* |
| Prepa | *subclass of Prep* |
| Prepaa | *subclass of $Prep_a$* |
| Prepb | *inherent Locatives-of-Place plus $Prep_{aa}$* |
| Prev | *Verb Phrase initiators* |
| Preva | *subclass of Prev* |
| Prevb | *subclass of Prev* |
| R | *inherent Locatives-of-Place* |
| Ret | *retrospective particles* |
| S | *Sentence* |
| Subj | *Subject Phrase* |

| | |
|---|---|
| Tob. | *Obligatory Transformation* |
| Topt. | *Optional Transformation* |
| $V_i$ | *major morphemes which cannot take passive suffix* |
| VP | *Verb Phrase including Agentive Phrase* |
| X | *cover term for strings specified under relevant rule* |
| Y | *cover term for strings specified under relevant rule* |

## RULES FOR PRODUCING NEGATIVE TRANSFORMATIONS

# S #

1. S ⟶ (Neg) Pred + Subj
2. Pred ⟶ $\left\{\begin{matrix}(VP)\\P\end{matrix}\right\}$ $(L_p)$ ± (Loc) : choose one
3. P ⟶ ko + $\left\{\begin{matrix}NP\\R\end{matrix}\right\}$ *specifier, non-time, future location*
5. VP ⟶ Prev $\left\{\begin{matrix}V_i\ (i + VP)\\(faka\hat{}\ )\ M\ (\hat{}tia\ (e + NP))\end{matrix}\right\}$ (Adv)
6. Prev ⟶ $\left\{\begin{matrix}Prev_a\\Prev_b\end{matrix}\right\}$ : when VP = Prev + $V_i$ (i + NP)
9. Subj ⟶ NP
10. NP ⟶ $\left\{\begin{matrix}Pr\\N\ (Adj)\ (Post)\ (Poss)\end{matrix}\right\}$
11. N ⟶ $\left\{\begin{matrix}Num_a\ \hat{}Post\ (Comp)\\\left\{\begin{matrix}Num\\Pp\\he\end{matrix}\right\}\ \left\{\begin{matrix}N_a\\N_b\\N_x\end{matrix}\right\}\\N_c\\\left\{\begin{matrix}Pp\\a\end{matrix}\right\}\ N_d\ (maa)\end{matrix}\right\}$

12. Poss ⟶ $\left\{\begin{matrix}(\underline{m}\hat{\ }) \\ (\underline{n}\hat{\ })\end{matrix}\right\}$ C $\left[\begin{matrix}\text{Num} & \left\{\begin{matrix}\text{Na} \\ \text{Nb} \\ \text{Nx}\end{matrix}\right\} \\ & \left\{\begin{matrix}\text{Nc} \\ \text{Nd} \\ \text{Pr}_b \\ \hat{\ }\text{Pr}_a\end{matrix}\right\}\end{matrix}\right]$

13. he ⟶ $\left\{\begin{matrix}\underline{\text{he}}\ \text{sing} \\ \underline{\text{he}}\text{plural}\end{matrix}\right\}$

14. Num ⟶ $\left\{\begin{matrix}\text{Num}_a \\ \text{Ret}\end{matrix}\right\}$

15. Na ⟶ $\left\{\begin{matrix}\text{Naa} \\ \text{Nao} \\ \text{Nx}\end{matrix}\right\}$

16. Nb ⟶ $\left\{\begin{matrix}\text{Nba} \\ \text{Nbo}\end{matrix}\right\}$

17. Pr ⟶ $\left\{\begin{matrix}\text{Pr}_a \\ \text{Pr}_b\end{matrix}\right\}$

18. Pp ⟶ $(\underline{t}\hat{\ })$ C $\left\{\begin{matrix}(\hat{\ }\text{Pr}_a) \\ (\hat{\ }\text{Pr}_b)\end{matrix}\right\}$

19. Prep ⟶ $\text{Prep}_a$ $(\text{Prep}_b)$

25. Topt. X + Y + Subj ⟹ X + Subj + Y
: X = Prev $\left\{\begin{matrix}\text{V}_i \\ (\underline{\text{faka}}\hat{\ })\ \text{M}\ (\hat{\ }\underline{\text{tia}})\end{matrix}\right\}$ (Adv)
: Y = any string

26. $\text{Prev}_a$ ⟶

| | |
|---|---|
| <u>e</u> + <u>ana</u> | *imperfective, non-time* |
| <u>i</u> | *descriptive, past-time* |
| <u>ka</u> | *inceptive, non-time* |
| <u>kua</u> | *perfective, non-time* |
| <u>me</u> | *prescriptive, non-time* |

27. $\text{Prev}_b$ ⟶ <u>ee</u> *imperative, non-past-time*

28. Tob. <u>ee</u> + X + Subj ⟹ <u>ee</u> + X + <u>e</u> + Subj
: X = any string

29. Topt. (Neg) [i / ka / me] + M^tia + Subj + e + NP + X

===> (Neg) [naa / maa / maa] + NP + [i / ee / ee] + M ± Subj + X

: X = any string

31. Tob. Neg + [i / kua / e + ana / ka] + X + Subj + Y

===> [kaahore / kaahore / kaahore / ee + kore / kaahore] + Subj ± [i / kia / e + ana / e / i] + X + Y

: X = $V_i$ (i + NP), (faka^) M (^tia (e + NP) )

: Y = any string

32. Tob. Neg + ee + X + e + Subj ===> kaua + ee + X + e + Subj

: X = $V_i$ (i + NP), (faka^) M (^tia (e + NP) )

33. Tob. Neg [naa / maa] X ===> eehara [naa / maa] X

: X = any string

34. Topt. kaahore + Subj + i + X ===> kiihai + Subj + i + X

: X = $V_i$ (i + NP), (faka^) M (^tia (e + NP) )

35. Tob. ee + kore + X + {[e + ana / ka]} + Y

===> ee + kore + X + e + Y

: X = Subj

: Y = $V_i$ (i + NP), (faka^) M (^tia (e + NP) )

36. Tob. e + ana + X ===> e + X + ana

: X = [$V_i$ / (faka^) M (^tia)] (Adv)

38. Tob. # ee + [(faka^) M^tia + X / faka^M] ===> # [(faka^) M^tia + X / faka^M]

39. Tob. Prep + Pr ===> Prep + a + Pr

40. Tob. ko + a + Nd ===> ko + Nd

41. Topt. # X + $\begin{bmatrix} m\hat{} \\ n\hat{} \end{bmatrix}$ C + Y ===> # $\begin{bmatrix} m\hat{} \\ n\hat{} \end{bmatrix}$ C + Y + X

: X = any string

: Y = Num $\begin{Bmatrix} Na \\ Nb \\ Nc \end{Bmatrix}$, Nc, Nd

43. $Num_a$ ---> $\begin{Bmatrix} te \\ ŋaa \end{Bmatrix}$

48. Tob. e + X + ana + nei ===> e + X + nei

: X = any string

49. C ---> $\begin{Bmatrix} aa \\ oo \end{Bmatrix}$ : when N_____ = Naa, Nba
: when N_____ = Nao, Nbo, $N_X$

50. $Pr_a$ ---> au *1st p. sing.*
koe *2nd p. sing.*
iia *3rd p. sing.*

51. $Pr_b$ ---> $\begin{Bmatrix} maa \\ taa \\ kour \\ raa \end{Bmatrix}$ ^ $\begin{Bmatrix} ua \\ tou \end{Bmatrix}$

52. Tob. kour^tou ===> koutou

53. Tob. (X^) C^ $\begin{bmatrix} au \\ koe \\ iia \end{bmatrix}$ ===> (X^) C^ $\begin{bmatrix} ku \\ u \\ na \end{bmatrix}$

: X = any string

55. $Prep_a$ ---> $\begin{Bmatrix} Prep_{aa} \\ maa \end{Bmatrix}$ *by way of*

56. $Prep_b$ ---> R + $Prep_{aa}$

57. $Prep_{aa}$ ---> i *non-future*
ki *relational non-time*
kei *present location*

63. Nd ⟶ { Vi, Nda, M }

64. M ⟶ Naa, Nao, Nba, Nbo, Nx

65. Nx ⟶ Ne, Nf, Ng, Nh, Ni, Nj, Nk, Nl, Nm

66. Topt. [Ne, Nh, Ni, Nj] ˆtia ===> [Ne, Nh, Ni, Nj] ˆŋia

67. Tob. [Ne, Nf, Ng, Nh, Ni, Nj, Nk, Nl] ˆtia ===> [Ne ˆhia, Nf ˆa, Ng ˆŋia, Nh ˆina, Ni ˆmia, Nj ˆria, Nk ˆkia, Nl ˆna]

| | | | | |
|---|---|---|---|---|
| 68. | Vi | ⟶ | ea | *suffice, pay, avenge* |
| 69. | Naa | ⟶ | taŋata | *man* |
| 70. | Nao | ⟶ | matua | *parent* |
| 71. | Nba | ⟶ | aaporo | *apple* |
| 72. | Nbo | ⟶ | faaea | *mother, aunt* |
| 73. | Nc | ⟶ | aakarana | *Auckland* |
| 74. | Nda | ⟶ | hemi | *Jim* |
| 75. | Ne | ⟶ | amo | *carry* |
| 76. | Nf | ⟶ | fiu | *chase, drive, whip* |
| 77. | Ng | ⟶ | paa | *touch* |
| 78. | Nh | ⟶ | epa | *cast, throw* |
| 79. | Ni | ⟶ | aru | *follow* |

80. $N_j$ ——> mau *carry, convey*

81. $N_k$ ——> hopu *catch*

82. $N_l$ ——> hoko *buy, sell, trade*

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