N-BONDING AS A MORPHOPHONOLOGICAL ORNAMENT IN MALAGASY*

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This paper discusses a process in Malagasy called N-bonding in which nominals are mophologically bound to certain heads (Keenan 2000). I propose that N-bonding can be analyzed as a morphophonological process which reflects a particular configuration in Malagasy, namely head-head adjunction. Following previous work, I assume that head-head adjunction configurations can be derived (i) post-syntactically through Local Dislocation and (ii) motivated by licensing requirements (Levin 2015, Embick & Noyer 2007, Erlewine 2018). I further propose that the resulting head-head configuration then feeds a language-specific morphophonological operation that inserts a bundle of features which surface as the N-bonding element.

1. Introduction

N-bonding refers to a morphophonological process in Malagasy in which nominals are morphologically bound to certain heads (Keenan 2000). This process is shown in (1) in which a segment *n* is used as a bonding element between a non-active verb and the following external agent (1a), between a possessee and its possessor (1b), and between a preposition and its complement (1c). Here and throughout, the N-bonding element is glossed as N.[1]

(1) a. Voavoha-**n**'-ny vavy ny varavarana.
VOA.open-N-DET girl DET door
'The girl opened the door.' **Non-AT +EA**

b. trano-**n**'-ny olona
house-N-DET person
'the person's house' **Possessee +Possessor**

c. ami-**n**'-ny seza
PREP-N-DET chair
'on the chair' **Preposition +Complement**

Although this distribution of N-bonding is seen regularly in the literature on Malagasy, it's unclear what the role of the N-bonding element is and whether N-bonding arises due to syntactic or mophophonological reasons, or both. Moreover, questions regarding its possible variation and pho-

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[1] Glosses follow Leipzig conventions with the following additions: AV – agent voice; PV – patient voice; CV – circumstantial voice; PFX – verbal prefix; N – N-bonding element; APPL – applicative.

netic realization require further exploration. The primary goal of this paper is to provide a unified account of N-bonding that explains how N-bonding is derived, accounts for its distribution, and is consistent with the observed phonological patterns. I propose that N-bonding reflects a particular configuration, namely head-head adjunction. Following Levin 2015, I assume that Malagasy employs the application of a licensing strategy called Local Dislocation (Embick & Noyer 2001), a post-syntactic operation that yields a complex head. This strategy is used when an argument cannot be licensed by the structural licensing mechanisms available in the language. I propose that the resulting configuration of Local Dislocation then feeds a language-specific morphophonological operation within Ornamental Morphology (Embick & Noyer 2007). The final product of these operations is the insertion of a bundle of phonological features that surface as the N-bonding element. Under this approach, the distribution of N-bonding is accounted for and the associated phonological patterns follow straightforwardly. Moreover, the analysis of N-bonding presented here provides additional empirical support to existing theoretical accounts on nominal licensing and morphological operations, while offering an alternative view of underlying clausal structure and voice morphology in Malagasy.

The remainder of the paper is organized as follows. Section 2 provides an overview of the distribution and phonetic realization of N-bonding. Section 3 spells out the analysis of N-bonding as a reflection of nominal licensing. Section 4 overviews the post-syntactic processes required for N-bonding and provides an analysis which characterizes the insertion of the N-bonding element as a language-specific morphophonological rule. Section 5 concludes.

2. Distribution and realization of N-bonding

I begin by illustrating the distribution of N-bonding in Malagasy across the verbal and nominal domains. The constructions in which N-bonding is found are listed below in (2). I start by showing the patterns of N-bonding in the verbal domain in section 2.1. I then show that the same patterns are reflected in the nominal domain in section 2.2. Crucially, the environments in which N-bonding occur are all descriptively "genitive". I return to the ties between N-bonding and nominal licensing in section 4. In section 2.3, I present production data showing that the N-bonding element is phonetically realized and contributes to overall duration of an N-bonded nasal sequence.

(2) N-BONDING ENVIRONMENTS
   a. between non-active verbs and non-trigger agents
   b. between possessees and possessors
   c. between certain prepositions and their complement
   d. between certain adjectives and their complement[2]

2.1. N-bonding in the verbal domain

Malagasy has three distinct voices: Agent Voice (AV), Patient Voice (PV) and Circumstantial Voice (CV). N-bonding occurs in both PV and CV sentences, but not in AV sentences, as shown in (3). In both PV (3b) and CV (3c) sentences, the non-active verb often takes a suffix voice morpheme.

[2] I follow Rajemisa-Raolison's (1971) description of Malagasy for which the highest nominal following a predicative adjective is referred to as a complement. This nominal is also referred to as a *cause* (see e.g. Travis 2005) since it shares similar structural properties with root passives and following agents.

For example, the verb *didy* 'to cut' takes the PV suffix *-an* in (3b), and the CV suffix *-an* in (3d).[3] When the N-bonding element comes between the agent and preceding verb, where the verb takes a suffix that ends in *n*, it is not always clear that the N-bonding element is independent from the voice morphemes. I include (3c) to show the presence of the N-bonding element in the absence of a voice suffix. Rather than taking the PV suffix *-Vn*, the non-active verb in (3c) takes the prefix *voa-*. This prefix is not traditionally reported as a PV morpheme but is also used when the theme is the trigger and has been analyzed as the telic counterpart to the PV *-Vn* suffix. See Travis 2005 for more discussion on *voa-* in Malagasy.

(3) a. **Agent Voice**
M-an-didy ny trondro amin'ny antsy ny vavy.
AV-PFX-cut DET fish with'DET knife DET girl
'The girl cuts the fish with the knife.'

b. **Patient Voice** (*-Vn*)
Didi-a(n)-**n**'-ny vavy amin'ny antsy ny trondro.
cut-PV-N-DET girl with'DET knife DET fish
'The girl cuts the fish with the knife.'

c. **Patient Voice** (*voa-*)
Voa-didi-**n**'-ny vavy amin'ny antsy ny trondro.
VOA-cut-N-DET girl with'DET knife DET fish
'The girl cut the fish with the knife.'

d. **Circumstantial Voice**
An-didi-a(n)-**n**'-ny vavy ny trondro ny antsy.
PFX-cut-CV-N-DET girl DET fish DET knife
'The girl cuts the fish with the knife.'

In the verbal domain, N-bonding does not occur between a verb and an adjacent argument if that argument is the trigger. This is shown in (4) where the theme is the sole argument of the clause and is therefore the trigger. Similarly, N-bonding does not occur between a verb and an adjacent prepositional phrase, as shown in (5). In other words, within the verbal domain it is not the case that N-bonding occurs between non-active verbs and any adjacent constituent. Rather, N-bonding occurs only between a non-active verb and the highest DP argument that is not the trigger of the clause.

(4) *No N-bonding: verb and Trigger*
Voa-didy ny trondro.
voa-cut DET fish
'The fish was cut.'

(5) *No N-bonding: verb and PP*
voa-didy amin'ny antsy
voa-cut PREP'DET knife
'cut with the knife'

2.2. N-bonding in the nominal domain

In the nominal domain, N-bonding is observed in possessive constructions, as shown in (6a). N-bonding also occurs between certain prepositions and adjectives and their complement, as shown in (6b) and (6c).

[3] Note the PV suffix is *-Vn*, where the vowel is lexically determined. For the verb *didy*, the suffix is realized as *-an*.

(6) a. **Possessee +Possessor**
trano-**n**'-ilay olona
house-N'-DEM person
'that person's house' (Keenan & Polinsky 1998)

b. **Prep +Complement**
ami-**n**'-ilay seza
PREP-N'-DEM chair
'on that chair' (Pearson 2005)

c. **Adj +Complement**
mainti-**n**'-ny molaly
black-N'-DET soot
'blackened by (the) soot' (Paul 1996)

The observation that N-bonding occurs with *certain* prepositions and adjectives requires further explanation. In Malagasy, complements of prepositions and adjectives are marked for one of three distinct cases. These are traditionally labeled as 'nominative', 'accusative', and 'genitive'. I adopt these labels for descriptive purposes, but will return to the distribution of case in Malagasy in section 4. Distinct case morphology occurs most consistently in the pronominal system, which is presented in Table 2.

	Nominative	**Accusative**	**Genitive**
1st SG	aho	ahy	-ko/-o
2nd SG	ianao	anao	-nao/-ao
3rd SG	izy	azy	-ny
1st PL Incl	isika	antsika	-ntsika/-tsika
1st PL Excl	izahay	anay	-nay/-ay
2nd PL	ianareo	anareo	-nareo/-areo
3rd PL	izy (ireo)	azy (ireo)	-ny/izy ireo

Table 1: Malagasy pronoun series

I illustrate the distribution with prepositions, noting that a similar pattern is found for adjectives. A given preposition can assign either nominative, accusative, or genitive case to its complement. The sentences in (7)-(9) below show that patterns of N-bonding emerge only when the complement is marked for genitive case. In (7) for example, the complement of the preposition *noho* 'because of' is marked for nominative case and no N-bonding occurs; no additional N-bonding element is found in the construction. The same pattern is found when the complement of a preposition is marked for accusative case, as in (7) for the preposition *lavitra* 'far from'. In contrast, the examples in (9) show the presence of N-bonding when the complement of a preposition is marked for genitive case.

(7) **Preposition + nominative complement**
a. noho izy
because.of 3SG.NOM
'because of him/her'

b. Vaky ny vilia noho ilay zaza.
broken DET plate because.of DEM child
'The plate is broken because of that child.'

(8) **Preposition + accusative complement**

a. lavitra azy
far.from 3SG.ACC
'far from him/her'

b. Mipetraka lavitra ny tsena ny vavy.
AV.live far.from DET market DET girl
'The girl lives far from the market.'

(9) **Preposition + genitive complement**

a. aloha-ko
in.front-1SG.GEN
'in front of me'

b. aloha-**n**'-ny fiara
in.front-N-DET car
'in front of the car'

Taken together, the data provided in this section show that the patterns of N-bonding in the nominal domain mirror those described in the verbal domain. To summarize the discussion so far, N-bonding occurs across the verbal and nominal domains in Malagasy and is found between a non-active verb and following non-trigger agent, a possessee and possessor, and between certain prepositions and adjectives and their complements. Crucially, these are all environments that are descriptively "genitive". I argue that these facts can be explained under a licensing approach.

It is important to note here that in many cases, the N-bonding element is followed by another /n/ segment (the initial /n/ segment of the definite determiner *ny*). Given that the language does not allow geminates, one question that arises is whether the realization of the N-bonding morpheme is reflected only in the orthography. In the following section I show preliminary results from production data comparing the duration of independent /n/ segments to the duration of /n/ sequences that include the N-bonding element. The results indicate that the N-bonding element contributes to an overall longer nasal duration.

2.3. The phonetic realization of 'n'

When the N-bonding element surfaces as *n*, it is often followed by the definite determiner *ny*, resulting in the orthographic sequence *n'ny*. To my knowledge, there have been no reports on how the N-bonding element is phonetically realized. The results discussed here provide some initial steps toward a better understanding of how N-bonding is realized and how it can be represented. Since the language does not allow consonant clusters (Erwin 1996), there are a number of ways in which the two adjacent *n*'s may be reconciled in the language. One option would be to epenthesize a vowel, which is a process that occurs regularly in the language (see e.g. Erwin 1996 on word-final epenthesis). If this strategy was used in the context of N-bonding, we would expect to see the N-bonding element followed by an epenthetic vowel when the following segment is a consonant

(e.g. *nV'ny*). However, this is not what is observed. A second option would be to delete one of the nasals, in which case we expect no differences in the production of an N-bonded vs. non-N-bonded construction, other things being equal. Investigating the phonetic realization of these segments will tell us more about the underlying representation of the N-bonding element.

Production data from one female native speaker of the Merina dialect of Malagasy was analyzed. The data includes sentences recorded in elicitation sessions, where sentences were produced as read speech in a normal speech rate with broad focus.

2.3.1. Stimuli

The target comparison is between N-bonded sequences that orthographically include multiple *n*'s and non N-bonded sequences wherein only a single orthographic *n* is present. N-bonded sequences always included the N-bonding element and a following definite determiner *ny*. Single *n* sequences include a variety of instances of intervocalic *n*. Some examples are included in Table 2 below.

Sentence	Target Words
Didian'ny vehivavy ny trondro.	didia**n'n**y; **n**y
Didiana ny trondro.	didia**n**a; **n**y
Didian'ilay vehivavy ny trondro.	didia**n'**ilay; **n**y
Mividy fiara vaovao isan'andro ny mpanan-karena.	isa**n'a**ndro; **n**y; mpa**n**an-kare**n**a

Table 2: Example sentences recorded for production data

2.3.2. Results

Nasals were identified and measured in Praat (Boersma & Weenink, 2016) using a range of cues (e.g. anti-formants, changes in amplitude, etc.) observed in the spectrogram and waveform. Examples of measurements for an N-bonded sequence and a non-N-bonded sequence for target words *didian'ny* and *ny* are shown in Figure 1 below. The analysis included 98 measurements. Figure 2 shows the distribution of the nasal duration across the two conditions (bonded vs not bonded). As shown in Figure 2, N-bonding overall contributes to longer nasal duration.

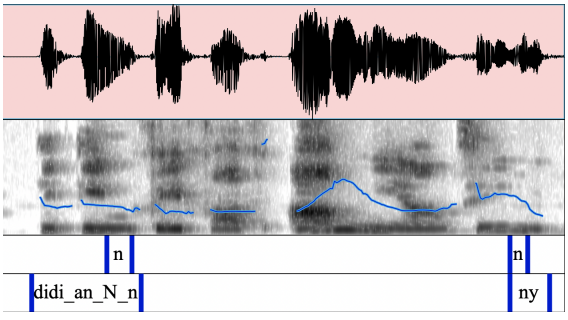


Figure 1: Annotated textgrid for nasal segments

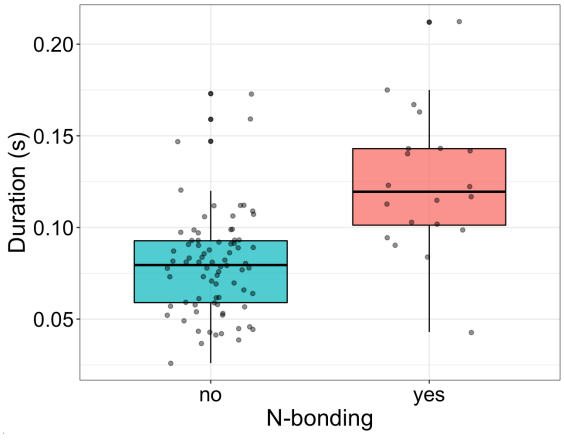


Figure 2: Duration of *n* with/without N-bonding

Statistical analyses were conducted in R (R Development Core Team, 2013) and the *lmer* function of the *lme4* package was used (Bates, Maechler, & Bolker 2011). A linear regression model was fit for the data, with duration as a dependent variable and presence vs absence of N-bonding (0.5, -0.5; centered) as a fixed factor. Random effects included by-item random intercepts. The model showed a significant effect of N-bonding (β = 0.045, SE (β) = 0.007, p<0.001), with longer duration of *n* when N-bonding occurs. Much more data is needed, particularly from a range of speakers and phonological contexts, before we can make conclusions about the differences in duration associated with N-bonding. However, the preliminary data presented here provides some supporting evidence that the N-bonding element has an underlying representation and motivates the need for a more detailed phonological account. I leave this as an avenue for future work.

3. Structure and Licensing in Malagasy

I turn next to the analysis of N-bonding as a process motivated by nominal licensing restrictions in Malagasy. I propose that N-bonding arises as a reflection of a particular syntactic construction, namely one in which a nominal cannot be structurally licensed, and that this occurs in Malagasy due to the absence of abstract genitive case. I begin by outlining my assumptions for the basic clausal structure of Malagasy.

3.1. Malagasy clause structure

3.1.1. The Malagasy Trigger in Spec, CTP

Like many other Western Austronesian languages, Malagasy clauses contain a referentially and/or structurally prominent constituent, which I call the TRIGGER following Schachter (1987) and Pearson (2005).[4] Much discussion in the Austronesian literature has centered around whether the trigger, the agent, or both/neither constitutes the grammatical subject of the sentence. I adopt an analysis similar to that of Guilfoyle, Hung, and Travis (1992) wherein the 'subject' function is associated with both the trigger and the agent. Following Guilfoyle et al., I assume that the agent is generated in a *v*P-internal subject position, a position associated with the thematic and binding properties of subjects. The trigger is located in the nominative case position, a position associated with the case- and extraction-related properties of subjects. Following previous work (e.g. Aldridge 2004, Rackowski & Richards 2005, among others), I assume that structural nominative case is assigned in Malagasy by a high functional head to the trigger.

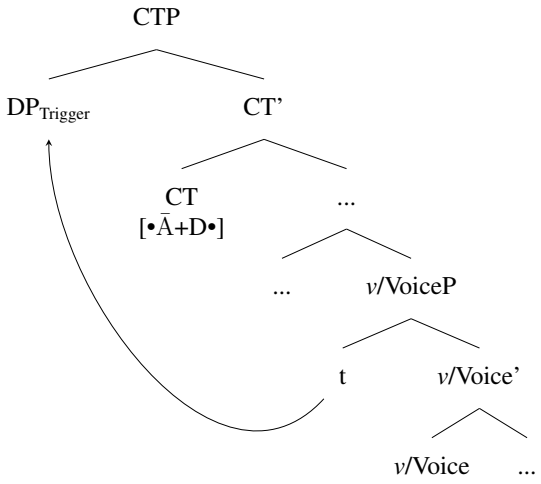
Although it is common across many languages for C^0 (COMPLEMENTIZER) and T^0 (TENSE) to be independent from one another, this division is not as apparent in Austronesian languages exhibiting voice systems that interact with extraction asymmetries. A joint CT^0 head has been proposed for other Austronesian languages (see e.g. Aldridge 2017 and Erlewine 2018). Following ths line of work, I assume that C^0 and T^0 are bundled into a single head in Malagasy, which I call CT^0 following Martinović 2015, 2017. The CT^0 for an Actor Voice clause is schematized in (10) with the relevant feature being one that can trigger movement of a DP to its specifier position (standardly proposed to be an [EPP] feature associated with A'-features of C^0 or A-features of T^0).[5] I

[4] Other names for the trigger include Focus DP, Pivot, or Topic (see Guilfoyle et al. 1992 and Schachter 1987).

[5] Some analyses place the Trigger in a specifier position to the right of the head which projects it (see e.g. Guilfoyle et al. 1992). The current analysis does not depend on whether this Spec position is to the left or right. To obtain the correct surface order for the structures proposed in this paper, I assume a predicate-fronting analysis as proposed by

propose that the feature on CT^0 probes for a target that simultaneously bears A'- and D-features. In the following structures, this feature is represented as [•$\bar{A}$+D•] (notation adapted from Adger 2003, Heck & Muller 2007, and Branan & Erlewine (submitted)). How do we account for different arguments raising to trigger position (i.e. Spec, CTP)? In the following section, I will illustrate that these different outcomes occur as a result of the properties of a lower *v*/$Voice^0$.

(10)



For the current analysis, I assume that movement and Case assignment occur as a result of probe-goal relationships between functional heads and target nominals (Chomsky 2001) (see also Erlewine 2018 for a similar account of probing used for triggering movement and licensing nominals in Toba Batak). Functional heads are merged with features which constitute probes that search their c-command domain for a goal with matching features. When a probe finds a goal, it enters into an Agree relationship with it. Two types of probes are relevant for this discussion: the first has the ability to Case-license its goal and the second triggers movement of its goal to the (outer) specifier position of the probing head.

In Malagasy, I propose that the two functional heads that participate in these probe-goal relationships (and are consequently the only available Case licensors in the language) are CT^0 and *v*/$Voice^0$. Starting with CT^0, I assume that this bundled CT^0 contains both types of probes. The first is a Case-licensing probe which searches for the structurally closest DP argument, Agrees with it, and assigns it nominative case. In the following trees, I represent this probe as [NOM:D]. The second, as we saw above, is a movement-triggering probe which is responsible for attracting its goal to its specifier, represented as [•$\bar{A}$+D•]. In AV, the agent DP will receive nominative case and raise to Spec, CTP to become the trigger. In PV, it will be the theme that moves to Spec, CTP to become the trigger. The same would be true of a CV sentence for an argument other than the agent or theme. I propose that these differences arise as a consequence of the feature specifications of *v*/$Voice^0$, described next.

3.1.2. *v*/Voice

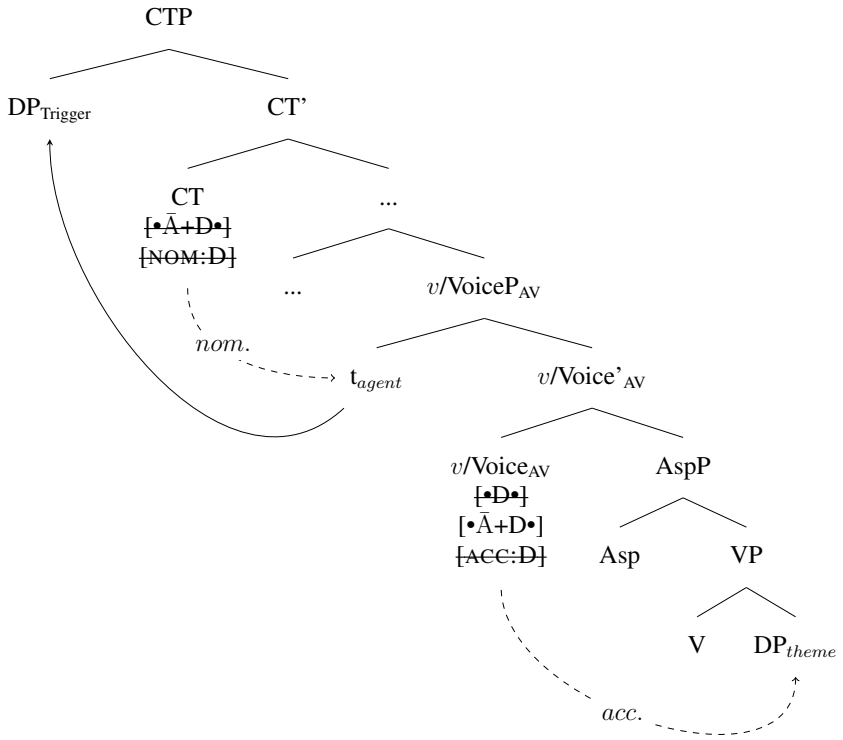
Following proposals by Pylkkanën (2008) and Harley (2017), I assume that Malagasy exhibits different flavours of a bundled *v*/$Voice^0$. That is, rather than a division of labour between separated

Rackowski and Travis (2000), Pearson (1998), among others, not represented in the trees for simplicity.

v^0 and Voice^0, I assume the bundled *v*/Voice^0 bears the responsibility of introducing an external argument, assigning accusative case, and raising an argument to its outer specifier position. I argue that it is the different combinations of these functions of *v*/Voice^0 that derive the correct patterns of trigger and Case assignment in Malagasy. Across the three voices (AV, PV, and CV), I assume that in addition to introducing an external argument (here represented as the result of a Merge feature [•D•]), *v*/Voice^0 has the same movement-triggering probe as the higher CT^0, namely [•$\bar{\text{A}}$+D•]. What differs between the three voices is (i) whether the movement-triggering probe finds a target, and (ii) whether *v*/Voice^0 has an additional feature that assigns accusative case.

Starting with AV, the Agent DP of an AV clause is the referentially prominent argument and is merged in Spec, *v*/VoiceP. Since there is no lower DP that simultaneously has A'- and D-features, the [•$\bar{\text{A}}$+D•] feature on *v*/Voice$^0{}_{\text{AV}}$ will probe its c-command domain and will not find a matching target. The analysis rests on the proposal that if a feature does not find a goal, this not lead to ungrammaticality or a crash of the derivation (as in Preminger 2014). Finally, I assume that *v*/Voice$_{\text{AV}}$ additionally has a Case-licensing feature which finds the structurally closest DP argument and assigns it accusative case. I represent this Case-licensing feature as [ACC:D]. In an AV clause, the goal for this probe will be the internal argument. Following the assumptions described above, once CT^0 merges, the features on CT^0 will Agree with the Agent DP as it is the highest DP in the clause with both A'- and D-features, assign it nominative case, and raise it to Spec, CTP to become the trigger. A transitive AV sentence thus has the structure in (11).[6]

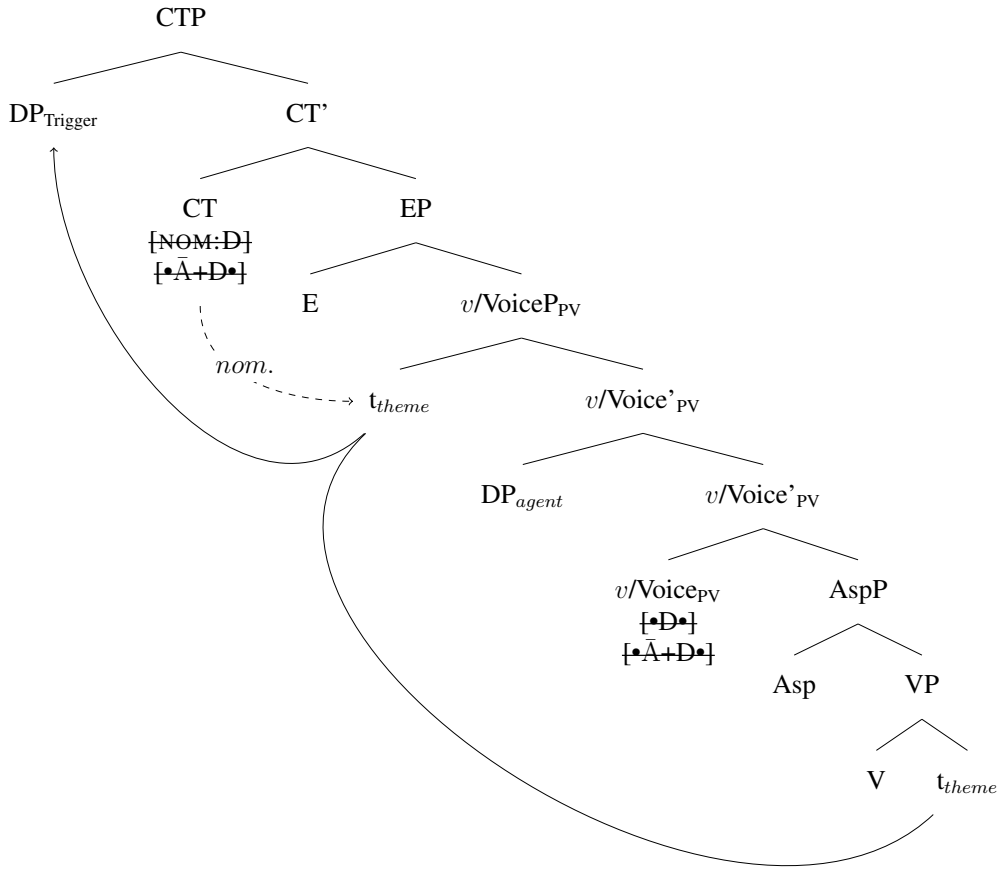
(11)



[6] Note that the ordering of these features on *v*/Voice$^0{}_{\text{AV}}$ does not affect the end result of the derivation. That is, the same result is obtained regardless of how the three features are ordered in (25). However, ordering of certain features will be crucial in obtaining the correct representation for CV, discussed below. I maintain the ordering throughout the examples for consistency.

I turn next to PV. Unlike *v*/Voice$_{AV}$, I propose that the *v*/Voice^0 in PV (*v*/Voice$_{PV}$) *cannot* assign accusative case to the internal argument (see Legate 2014 for a similar analysis of Acehnese Object Voice). Instead, *v*/Voice$_{PV}$ bears only the features [•D•], which merges the external argument, and [•$\bar{A}$+D•], which triggers movement of a target to its outer specifier. In PV, the internal argument is the referentially prominent DP and is the highest DP with matching features in the c-command domain of *v*/Voice^0. Thus the internal argument will raise to the outer specifier position of *v*/VoiceP and will be the highest DP in the clause. Therefore in a PV sentence, once CT^0 merges, the [•$\bar{A}$+D•] feature on CT^0 will Agree with the theme DP, assign it nominative case, and raise it to Spec, CTP to become the trigger. The structure for a PV sentence is illustrated in (12).[7]

(12)

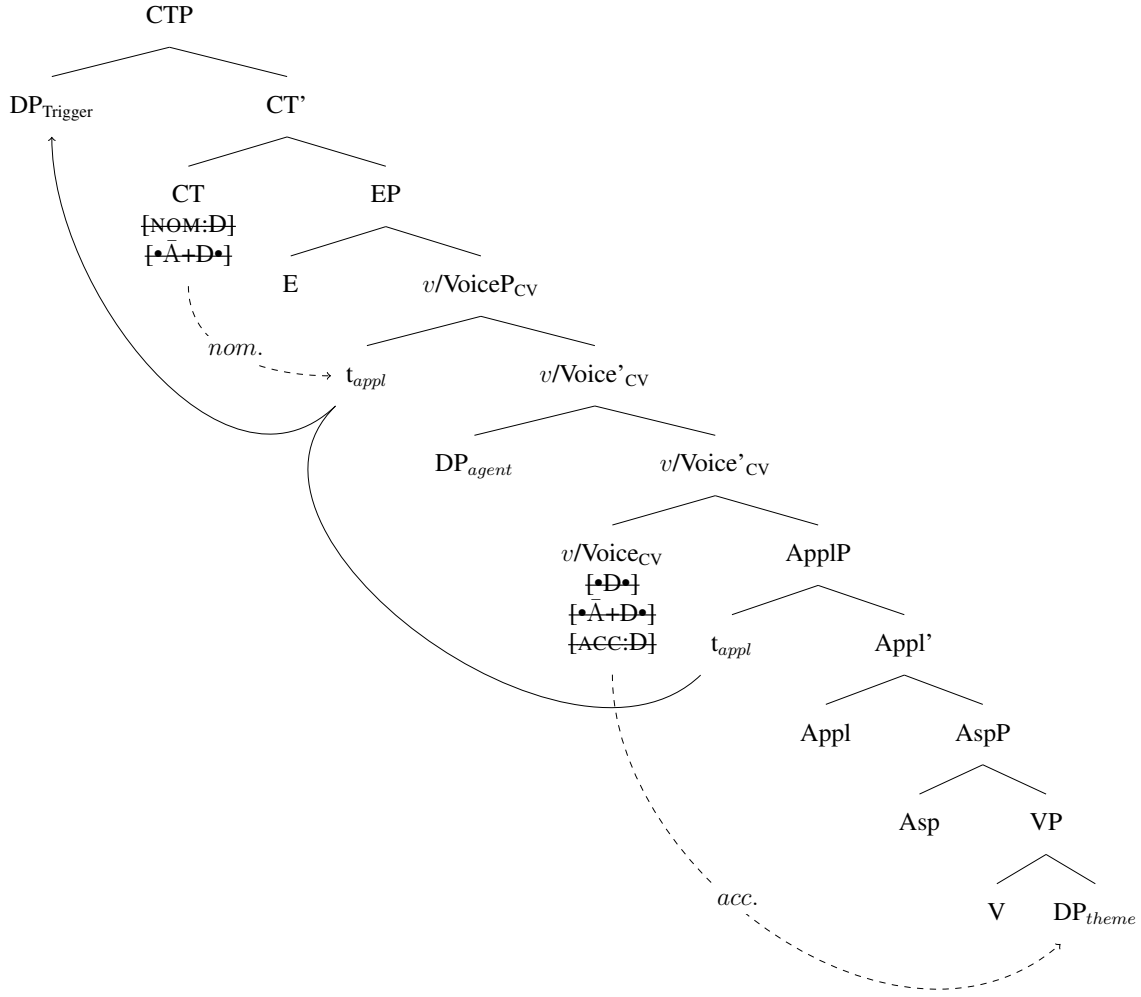


Finally, I turn to CV which displays a combination of AV and PV *v*/Voice^0 properties. That is, *v*/Voice$_{CV}$ behaves like *v*/Voice$_{AV}$ in that it is able to assign accusative case to the theme, but is like *v*/Voice$_{PV}$ in that the movement-triggering feature [•$\bar{A}$+D•] will find a goal. Since it is the applied argument that must raise to trigger position, the [•$\bar{A}$+D•] feature on *v*/Voice$_{CV}$ must first raise the applied argument to its specifier position. Following Pearson 2005, I assume that the applied argument is in the specifier of an Applicative Phrase (ApplP) that merges directly below *v*/VoiceP. Hsieh 2020 makes a similar proposal for Tagalog wherein peripheral arguments

[7] The structures outlined here illustrate the external argument merging first and the internal argument moving to the outer specifier position of *v*/Voice^0 second. However, if the internal argument was to move to the specifier position of *v*/Voice^0 before the external argument is merged, the intended structure can be achieved under a tucking-in approach. This possibility also applies to CV clauses, discussed below.

are introduced into the derivation as applied objects only if they later become the trigger and are otherwise general PP arguments (see also Nie 2019 and Rackowski 2002). The applied argument will then raise to the outer Spec, *v*/VoiceP position, becoming the trigger in the same way as agents in AV sentences and themes in PV sentences. Upon merge of CT^0, the [•Ā+D•] feature on CT^0 will Agree with the applied argument, assign it nominative case, and raise it to Spec, CTP to become the trigger. Once the applied argument has raised, *v*/Voice_{CV} can agree with the internal argument and assign it structural accusative case. The structure for a CV sentence is shown in (13).[8]

(13) *v*/Voice_{CV} raises applied argument *then* assigns accusative case to the internal argument



A summary of the features on the different *v*/Voice heads is provided in (14) below. In terms of Case-licensing, *v*/Voice_{AV} and *v*/Voice_{CV} can assign accusative case to the internal argument, whereas *v*/Voice_{PV} *cannot*. In terms of movement, *v*/Voice^0 across all three voices has a feature which probes for a target that simultaneously bears A'- and D-features. Once found, *v*/Voice^0 raises the matching goal to its outer specifier position.

[8] Note that the movement-triggering feature [•Ā+D•] and case-assigning feature [ACC:D] on *v*/Voice_{CV} must probe in the order specified to make correct predictions for the language; see Ting (submitted) for further discussion.

(14) **Distribution of Movement-triggering and Case-licensing probes on *v*/Voice**

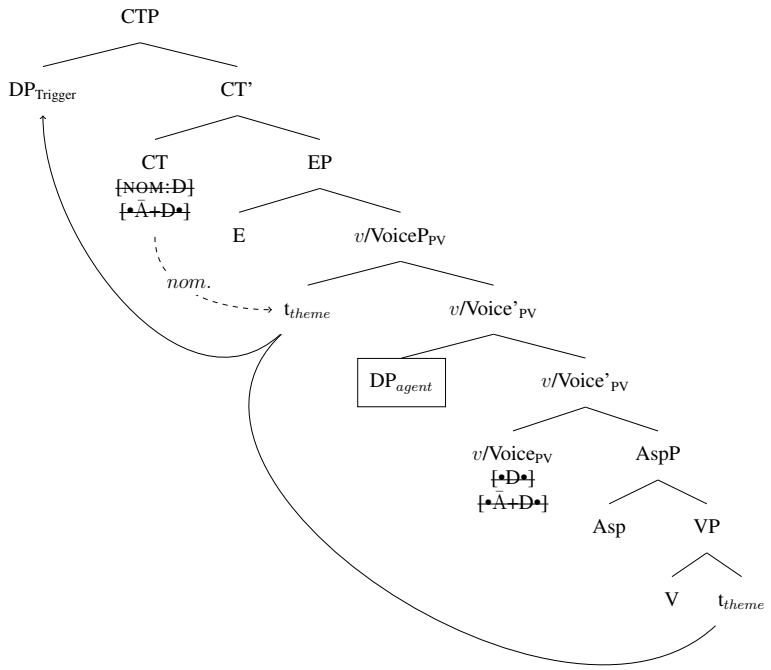
Voice	[•Ā+D•]	[CASE]
v/Voice$_{AV}$	✓	✓
v/Voice$_{PV}$	✓	✗
v/Voice$_{CV}$	✓	✓

3.2. Case and licensing in Malagasy

3.2.1. Licensing in the verbal domain

When we consider the availability of structural nominative and accusative case from CT^0 and *v*/Voice^0, respectively, the main properties that underlie the process of N-bonding emerge. If nominative case is available only to the trigger and accusative case to the internal argument, any DP argument that is not in one of those two positions is left unlicensed. Additionally, I propose that *v*/Voice^0 in Malagasy cannot license an argument in its specifier. In other words, there is no inherent ergative case assignment available in Malagasy like there is in some other languages (see e.g. Aldridge 2008 on Tagalog, Legate 2014 on Acehnese, and Legate 2008 more generally). Therefore, in-situ agents that are merged in Spec, *v*/VoiceP and *do not* raise to Spec, CTP cannot be licensed by the structural mechanisms available in the language. This occurs when a DP other than the agent raises to trigger position (i.e. PV and CV sentences). The structure of a PV sentence is repeated in (15) highlighting the in-situ agent that cannot be licensed in its structural position.

(15)



When we consider the patterns of N-bonding in the verbal domain within the current proposal of structural licensing in Malagasy, we see that the arguments that do not receive structural case are exactly the arguments that undergo N-bonding. In the following section I extend this analysis to the nominal domain.

3.2.2. Licensing in the nominal domain

Under the current analysis the only types of structural case assignment that are available in Malagasy are nominative and accusative, with the result being that N-bonding occurs when a nominal cannot receive either one. In these nominal domain, N-bonding appears between a possessor and possessee, and in some cases between a preposition or adjective and its complement. The data is repeated in (16) below.

(16)a. **Possessee +Possessor**
trano-**n**'-ilay olona
house-N'-DEM person
'that person's house' (Keenan & Polinsky 1998)

b. **Prep +Complement**
ami-**n**'-ilay seza
PREP-N'-DEM chair
'on that chair' (Pearson 2005)

c. **Adj +Complement**
mainti-**n**'-ny molaly
black-N'-DET soot
'blackened by (the) soot' (Paul 1996)

Extending the licensing proposal of N-bonding from the verbal domain to the nominal domain, we predict that the bonded elements in (16) do not reflect genitive case assignment but rather a lack thereof. Taking prepositions as an example, if the language possesses only abstract nominative and accusative case, we can reframe the distribution of nominal complements to prepositions as follows: some prepositions assign nominative case, as shown in (17) for the preposition *noho* 'because of', other prepositions assign accusative case, as in (18) for the preposition *ohatra* 'such as', and yet other prepositions do not assign case at all, as seen in (19) for the preposition *aloha* 'in front of'. I propose that N-bonding occurs only when the preposition does not assign case.

(17) **Prep + nominative marked nominal**

a. noho izy
because.of 3SG.NOM
'because of him/her'

b. Vaky ny vilia noho ilay zaza.
broken DET plate because.of DEM child
'The plate is broken because of that child.'

(18) **Preposition + accusative marked nominal**

a. lavitra azy
far.from 3SG.ACC
'far from him/her'

b. Mipetraka lavitra ny tsena ny vavy.
AV.live far.from DET market DET girl
'The girl lives far from the market.'

(19) **Preposition + unmarked nominal**

a. aloha-ny
in.front-3SG
'in front of him/her'

b. aloha-**n**'-ny fiara
in.front-N-DET car
'in front of the car'

We can take the same approach for adjectives, which show variation between accusative case marked nominals and unmarked nominals, and for possessive constructions, which are described as being expressed in Malagasy using the 'genitive construction' (Paul 1996). In sum, N-bonding reflects a construction in which a nominal cannot receive nominative or accusative case and points to a more general property of the language, namely that it lacks abstract genitive case.

4. Deriving N-bonding post-syntactically

In this section I present N-bonding as the result of two independent morpho-phonological operations that produce (i) the 'bonding' configuration and (ii) the insertion of 'n' as the bonding element. In section 4.1, I present an analysis of 'bonding' as a result of Local Dislocation, a post-syntactic operation required to satisfy the Case Filter in Malagasy. I will then propose in section 4.2 that the result of Local Dislocation feeds an independent language-specific operation which inserts the N-bonding element.

4.1. N-bonding as a result of Local Dislocation

Recall that the deficiency of structural licensing in Malagasy leaves nominals in certain constructions unlicensed. If Malagasy complies with the Case Filter defined as requiring all nominals to receive Case within the syntactic derivation, then the current analysis suggests that the Case Filter is violated in Malagasy. Following Levin 2015, I assume that languages can make use of post-syntactic licensing strategies and that the Case Filter is satisfied not at the end of the syntactic derivation, but later along the PF branch. In Malagasy, the post-syntactic licensing strategy is Local Dislocation (see Embick & Noyer 2001). Local Dislocation was developed as a variety of Merger, or Morphological Merger, as first proposed by Marantz 1988, and is an operation that combines two linearly adjacent terminal nodes to create a complex atomic head (Embick & Noyer 2001).[9] This adjunction operation is schematized in (20), where X•Y denotes a requirement that X must linearly precede and be adjacent to Y.[10]

(20) ***Local Dislocation schema***
$X \bullet Y \rightarrow X+Y$

I assume following Levin 2015 that nominal licensing can be achieved via linear (i.e. post-syntactic) adjacency. More specifically, Levin proposes that adjunction by Local Dislocation allows the nominal to count as part of the verbal extended projection, which obviates the need for the

[9] Morphological Merger has also been referred to as Merger Under Adjacency (see Harley 2010).

[10] Note that the ordering of the two elements in (54) may or may not be affected (X+Y or Y+X) (Embick & Noyer 2007). I assume that ordering cannot be affected in Malagasy.

nominal to be Case-licensed. See Levin 2015 for further discussion on licensing by adjacency and proposals on modifying the Case Filter. For the purposes of this analysis, we can think of Local Dislocation as a last-resort licensing mechanism at PF (see Erlewine 2018 for a similar proposal for Toba Batak). This post-linearization operation is also consistent with the empirical data from Malagasy. In a non-AV sentence, for example, Local Dislocation can apply to a non-active verb and in-situ agent, which will always be linearly adjacent. An example is schematized in (21).

(21) ***Local Dislocation in the verbal domain***
   a. $[_T\ V^0] \bullet [_{DP}\ D^0\ ...\ ] \rightarrow\ [_T\ V^0 + D^0]\ [_{DP}\ ...\ ]$
   b. [T Voavoha] • [DP ny vavy ...] → [T Voavoha + ny] [DP vavy...]

We can also apply the same machinery to the nominal domain, as schematized in (22) for the preposition *aloha* 'in front of' and its complement *ny fiara* 'the car'. Since the preposition and following nominal are linearly adjacent, Local Dislocation can apply, rendering the nominal part of the extended projection of the preposition and thus licensed via adjacency.

(22) ***Local Dislocation in the nominal domain***
   a. $[_T\ P^0] \bullet [_{DP}\ D^0\ ...\ ] \rightarrow [_T\ P^0 + D^0]\ [_{DP}\ ...\ ]$
   b. [T aloha] • [DP ny fiara ...] → [T aloha +ny] [DP fiara...]

4.2. N-bonding is ornamental

Since Local Dislocation is a post-syntactic operation, I assume that the insertion of the N-bonding element must also be post-syntactic (i.e. inserted at PF). Elements of this type are described as *ornamental* by Embick and Noyer 2007, such that they introduce syntactico-semantically unmotivated structure and features which *ornament* the syntactic representation but crucially do not add or eliminate information necessary for semantic interpretation. I assume, following Embick and Noyer (2007), that the implementation of such ornamental material is governed by language-specific rules. Post-syntactic insertion operations involving ornamental elements have been discussed in recent literature for compounds (see Tat 2013 on Turkish and Dolatian 2021 on Armenian, and references therein), in which linking vowels/compound markers are semantically empty and are proposed to be added during phonological spell-out in PF. Post-syntactic insertion has also been discussed for Korean subject honorification, for which honorific agreement suffixes are implemented by so-called node-insertion (Choi & Harley 2019). More recently, this form of introducing or inserting an ornamental element has been re-dubbed *Node-Sprouting* by Choi and Harley (2019), a term that more explicitly conveys that the insertion (or 'sprouting') of such post-syntactic material can only occur when certain conditions are met.

I propose that a similar approach can be adopted for N-bonding in Malagasy. The N-bonding element is ornamental in that it is semantically empty and the condition necessary for its insertion is head-head adjunction, which we've seen can come about as a result of Local Dislocation. More specifically, I propose that the insertion of the N-bonding element can be characterized as the sprouting of a bundle of phonological features, namely [nas] and [cor], which together comprise the N-bonding element *n*. This will correctly derive the surface representation of N-bonding and is consistent with the post-syntactic licensing approach outlined here.[11]

[11] I remain agnostic regarding the framework governing features within segments. This needs more careful examination to fully understand whether there exists variation in N-bonding representations and how this variation is derived.

In summary, N-bonding can be analyzed as a reflection of a particular configuration: head-head adjunction, which, in Malagasy, can be derived through Local Dislocation, an operation that is implemented in the language due to structural licensing constraints. For example, non-trigger agents are unable to be licensed in their merged position (Spec, *v*/VoiceP) and therefore must undergo Local Dislocation, which results in a head-head adjunction configuration. This creates the right conditions for N-feature sprouting which results in the realization of the N-bonding element between the verb and non-trigger agent. The same pattern is found between possessees and possessors, and between certain prepositions and adjectives and their complements, showing that the N-bonding process is the same across both the verbal and nominal domains.

5. Discussion and Conclusion

In this paper, I argued that N-bonding in Malagasy signals the presence of a particular construction, namely one in which a nominal cannot be structurally licensed. I proposed that the only licensors available in Malagasy are CT^0 and *v*/$Voice^0$, which assign nominative and accusative case, respectively. Maintaining a licensing perspective, I argued that the patterns in the nominal domain mirror those in the verbal domain; all the environments in which N-bonding occurs, which are traditionally labelled as 'genitive' constructions, in fact reflect constructions in which the bonded nominal cannot be structurally licensed. Following Levin 2015, I assume that Malagasy makes use of Local Dislocation as an alternative licensing strategy, which results in a head-head adjunction configuration. Additionally, I provided an account of the insertion of the N-bonding element as a morphophonological ornament. Since the result of Local Dislocation leads to N-bonding and Local Dislocation itself is post-syntactic, I proposed that the insertion of the N-bonding element is also post-syntactic. I argued that N-bonding functions as a language-specific morpho-phonological operation. More specifically, I proposed that the N-bonding element is made up of the features [cor] and [nas] which sprout specifically in head-head configurations.

This account of Malagasy N-bonding is in line with several existing theoretical accounts with a focus on nominal licensing (e.g. Aldridge 2017, Erlewine 2018, among others) and morphological operations (e.g. Embick & Noyer 2001, Levin 2015). Furthermore, if on the right track, the present analysis offers an alternative view of underlying clausal structure in Malagasy.

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