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Non-local morphological effects in the Kannada verb

by

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1 Introduction

Since the advent of syntax-centered theories of morphology, many arguments have been made for the nature and existence of post-syntactic morphological operations, often in an attempt to explain phenomena which violate the Mirror Principle (Baker (1985a)). This paper presents a previously unattested phenomenon involving the use of the causative morpheme in Spoken Kannada verbal constructions, which I will refer to as *variable causative exponence*, or VCE. VCE involves variations in the occurrence, position, and scope of the causative which are *prima facie* violations of the Mirror Principle, as seen in the following examples.¹

- (1) a. nānu aval -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i koṭṭ -e
I.nom she -dat self.gen child -instr coconut -acc break -caus -perf ben.past -1sg
- b. nānu aval -ige tanna magu -vinda tenginakāyi -yannu oḍe -du koḍ -is -id -e
I.nom she -dat self.gen child -instr coconut -acc break -perf ben -caus -past -1sg
- c. nānu aval -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i koḍ -is -id
I.nom she -dat self.gen child -instr coconut -acc break -caus -perf ben -caus -past
-e
-1sg
I made her child break the coconut for her. [caus > ben]
I made her child break the coconut for her. [ben > caus]

In these sentences, the causative morpheme *-is* can appear to the right of any verb root morpheme, regardless of the underlying position of the causative head. In addition, the morpheme can appear multiple times within the entire verb phrase, again, regardless of the underlying position of the causative head.

In this paper, I provide an analysis of VCE using the framework of Distributed Morphology, specifically following the insights of Myler (2013) that in certain syntactic configurations, specifically those involving phrasal movement, certain heads undergo Vocabulary Insertion simultaneously. I will show, following Myler's arguments for phrasal movement, that in syntactic configurations which involve multiple head movement chains, sets of heads also undergo Vocabulary Insertion simultaneously. Next, I will argue that sentences involving VCE involve multiple head movement chains, each chain being delimited by a verbal root. I will additionally argue that the following rule governs simultaneous Vocabulary Insertion.

¹Many thanks to the people that have helped me with this thesis. They include my adviser, Karlos Arregi, my informants, Charu, Anirudh, and Ashish, and my parents, Mohan and Mangala. Any mistakes are entirely my own.

(2) Simultaneous Vocabulary Insertion

When nodes X and Y undergo Vocabulary Insertion simultaneously, if they both have the same feature bundle, X can use any Vocabulary Insertion rules that Y can use, and vice versa.

I will show that this rule is capable of explaining the variation in ordering and scope of the causative morpheme in (1), and that, furthermore, it makes predictions about the occurrence of VCE in other Kannada verbal constructions, which are in fact borne out.

In section 2, I will provide background on the Kannada language, including relevant information about the structure of the Kannada verb. Then, I will provide a brief overview of Distributed Morphology, as well as the insights regarding Vocabulary Insertion provided by Myler (2013). In section 3, I will introduce examples of VCE, as well as information about the relevant constructions, including the Kannada synthetic causative and benefactive constructions. In section 4, I will provide an analysis of VCE, positing a syntactic structure for VCE constructions which involves multiple head movement chains, and which, in combination with (2), accounts for our data and makes further predictions, which are borne out. In section 5, I will go through some alternative analyses of the data, and ultimately determine that my main analysis accounts for the data more completely.

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2 Background

2.1 Kannada

Kannada is a South Dravidian language spoken in the Indian state of Karnataka. All of the data in this paper was collected through elicitations from three native Kannada speakers who were each raised in three different cities in Karnataka: Mysore, Dharwar, and Bangalore. Typologically, Kannada is a verb-final language, with a nominative-accusative alignment, and differential object marking, as shown in (3).

- (3) a. nānu oḍ -id -e
I.nom run -past -1sg
I ran.
- b. nānu pustaka (-vannu) oḍ -id -e
I.nom book (-acc) read -past -1sg
I read the book.

- c. nānu huḍuga -nannu nōḍ -id -e
 I.nom boy -acc see -past -1sg
 I saw the boy.

Indirect objects, such as goals, recipient, and benefactees, are marked with dative case.

- (4) a. nānu aṅgaḍi -ge oḍ -id -e
 I.nom store -dat run -past -1sg
 I ran to the store.
- b. nānu avaḷ -ige pustaka (-vannu) koṭṭ -e
 I.nom her -dat book (-acc) ben.past -1sg
 I gave her the book.

In affirmative indicative sentences, the Kannada verb carries agreement morphology which agrees with the highest nominative noun, including in so-called “dative subject” sentences (Sridhar (1979)).

- (5) nann -age jvara ban -tu
 I -dat fever.nom come.past -3sg
 I got a fever. (*lit. A fever came to me.*)

2.2 Distributed Morphology

Distributed Morphology is a theory of morphology first developed in Halle and Marantz (1993), in which the elements of word formation are distributed across different parts of the syntax. In DM, morphemes remain abstract feature bundles until the very end of the derivation, at which point they undergo a process known as Vocabulary Insertion, in which exponents which correspond to certain feature bundles are inserted, generating input to the phonology. For instance, Halle and Marantz give the following Vocabulary Insertion rules as an example analysis for the Tense node in the past tense paradigm of English.²

- (6) a. Tense[+past] ↔ ∅ / V[+strong] ____
 b. Tense[+past] ↔ /-t/ / V[-strong] ____
 c. Tense[+past] ↔ /-d/

During Vocabulary Insertion, the most highly specified Vocabulary Insertion rule, with the correct context, is chosen for insertion. For instance, for Tense nodes adjacent to weak verbs (i.e. those carrying the [-strong] feature), such as *send*, Vocabulary Insertion will choose rule (6b), resulting in *sent*.

²Halle and Marantz later discard this analysis, opting for one which does away with the \pm strong feature. I include this analysis here only as an example of the mechanics of Vocabulary Insertion.

Recent revisions of DM (Embick and Noyer (2001), Harris and Halle (2005), Arregi and Nevins (2012), and many more) have expanded upon the nature of Vocabulary Insertion, as well as other post-syntactic operations which occur between syntax and Vocabulary Insertion, such as Fission, which separates a single feature bundle into multiple ones, and Metathesis and Doubling operations, which rearrange and reduplicate elements of the linearized tree. These operations do not figure into my main analysis of VCE in Kannada. However, later in this work I will attempt to provide an account for this phenomenon using solely these operations, and compare it to my main analysis.

Because DM is a syntax-centered framework, phenomena like VCE are problematic, due to the fact that they violate the Mirror Principle (Baker (1985a)), which states that morpheme ordering should mirror syntactic structure. However, we would expect that given the wide variety of options available to dislocate and rearrange morphemes within words, there cannot be one single explanation for all Mirror Principle violations.

2.3 Myler (2013)

A major feature of my analysis of VCE is the use of insights from Myler (2013) with respect to the ordering of Vocabulary Insertion. Myler argues that we can explain the connection between non-local morphophonological effects and Mirror Principle violations if we consider that a) Mirror Principle violations often are associated with word-internal phrasal movement and b) word-internal phrasal movement prevents us from generating a total ordering of nodes in a tree. Myler considers the ordering of reciprocal and causative morphemes in Nyakusa, a Bantu language, where we see non-local morphophonological effects in Mirror Principle violating orderings.

- (7) a. sob
 get.lost
 to get lost
- b. sof -i
 get.lost -caus
 to lose
- c. sob -an -i
 get.lost -recip -caus
 to get each other lost (causativized reciprocal)

- d. *sof -an -i*
 get.lost -recip -caus
 to lose each other (reciprocalized causative)

As we can see, spirantization is triggered in the verbal root when it is adjacent to the causative morpheme. However, we also see that it is triggered in the Mirror Principle-violating order in (7d), despite the fact that there is an intervening reciprocal morpheme. Following Buell and Sy 2005, Myler argues that the structure of these Mirror Principle-violating words involve word-internal phrasal movement, as in figure 1.

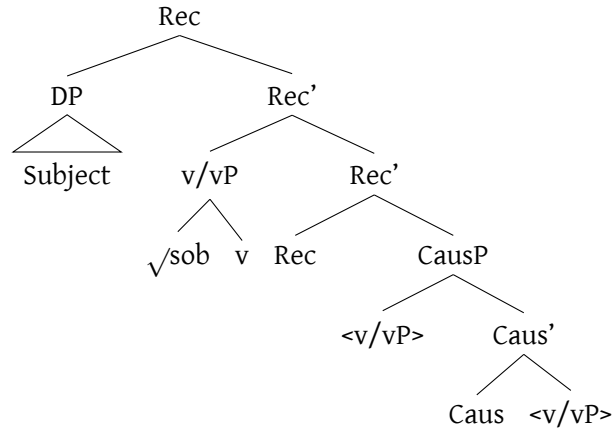


Figure 1: Structure posited for Mirror Principle-violating order (*sof-an-i*) in Nyakusa.

Myler notes that Vocabulary Insertion has been argued to proceed from the most deeply embedded nodes outward (Bobaljik (2000), Halle and Marantz (1993)). He formalizes this notion as described in (10).

(8) **Temporal Order of Vocabulary Insertion**

For a pair of terminal nodes x and y :

If x is the head of a maximal projection M such that M is categorially distinct from y and M dominates y , then $y \succ x$.

If $y \succ x$, then y undergoes Vocabulary Insertion prior to x .

Myler notes that this does not generate a total ordering for structures which involve phrasal movement. Instead, it generates partial orderings, such as the orderings listed in (9), for the tree in figure 1.

- (9) a. $\text{Caus} \succ \text{Rec}$
 b. $\sqrt{\text{sob}} \succ v \succ \text{Rec}$

Myler argues that in structures with multiple partial orderings, Vocabulary Insertion occurs simultaneously for the most deeply embedded heads in each ordering. Thus, in this case, $\sqrt{\text{sob}}$ and Caus undergo Vocabulary Insertion together *before* Rec is inserted; thus, there is no intervening material between the two morphemes and spirantization can occur.

In this paper, I adopt a slightly modified version of Myler's rule:

(10) **Temporal Order of Vocabulary Insertion**

For a pair of terminal nodes x and y :

If x is the head of a projection M such that M is categorially distinct from y and M dominates y , then $y \succ x$.

If $y \succ x$, then y undergoes Vocabulary Insertion prior to x .

2.3.1 Partial orderings derived from head movement

It is important to note that while Myler focuses on partial orderings which arise from phrasal movement, partial orderings can also arise from structures involving multiple head movement chains. For instance, consider the tree in figure 2, in which Z and X have adjoined to Y and W , respectively, by head movement.

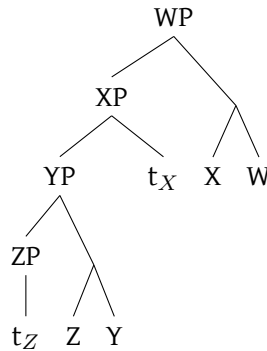


Figure 2: A tree with multiple head movement chains which admits partial orderings.

Following the rule in (10), we derive the following partial ordering for this tree:

- (11) a. $Z \succ Y \succ W$
 b. $X \succ W$

I will argue in section 4 that similar partial orderings can be derived from the structure of VCE sentences due to the fact that they also involve multiple head movement chains.

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3 The data

In this section, I will introduce the phenomenon of variable causative exponence (VCE) by first examining the causative morpheme, *-is*, followed by examining a class of auxiliaries which can induce VCE. Finally, I will introduce examples of VCE, as well as evidence for their various scopal readings.

3.1 The causative morpheme *-is*

VCE involves the Kannada synthetic causative construction. The synthetic causative construction marks the causee with accusative case in the case of causativized intransitive verbs, or instrumental case in the case of causativized transitive verbs.³ This construction is marked by the use of the morpheme *-is*, which *always* appears between the verb and any aspectual/agreement morphology. The Kannada synthetic causative is very productive, applying to almost every class of verbs, even dative subject verbs, where the causativized dative subject remains marked in dative case, and the embedded syntactic subject is marked with accusative case.

- (12) a. nānu huḍuga -nannu malag -is -id -e
 I.nom boy -acc sleep -caus -past -1sg
 I made the boy sleep.
- b. nānu huḍuga -ninda tenginakāyi -yannu oḍ -es -id -e
 I.nom boy -instr coconut -acc break -caus -past -1sg
 I made the boy break the coconut.
- c. nānu huḍuga -nige jvar -annu bar -is -id -e
 I.nom boy -dat fever -acc come -caus -past -1sg
 I made the boy get a fever. (*lit. I made fever come to the boy.*)

Another place that we see the *-is* morpheme is as a productive verbalizer of non-Kannada (often Sanskrit and English) words. In this use, it is often compared to the English verbalizer *-ify*, as noted in Den Dikken and Rao (2003).

- (13) a. nānu āgam -is -id -e (< Skt. *āgama* 'arrival')
 I.nom āgam -caus -past -1sg

³In some dialects, especially Dharwar Kannada, the transitive causee is marked with the animate locative *-kaiyalli*, literally *in the hand of*.

I arrived.

- b. nānu patra ṭaip -is -id -e (< Eng. type)
 I.nom letter ṭaip -caus -past -1sg
 I typed the letter.

3.2 The benefactive auxiliary *-koḍ*

Kannada has a closed class of functional heads which add aspectual meaning to main verbs. Because these functional heads appear verbal (that is, they are marked for aspect, and when they are the highest verbs, agreement), I will refer to them as aspectual auxiliaries, the name given to them in Sridhar (1990). The class of aspectual auxiliaries includes *koḍ*, used for the benefactive, *hāk*, used for an intensive meaning, and *biḍ*, which has a general perfective meaning. They all have main verb equivalents that have related meanings; for instance, when used as a main verb, *koḍ* means ‘give’. These auxiliaries inflect in the exact same way as their main verb counterparts:

- (14) a. nānu avaḷ -ige pustaka -vannu koṭṭ -e.
 I.nom she -dat book -acc give.past -1sg
 I gave her the book.
- b. nānu avaḷ -ige tenginakāyi -yannu oḍe -du koṭṭ -e.
 I.nom she -dat coconut -acc break -perf ben.past -1sg
 I broke the coconut for her.

The benefactive auxiliary only occurs in sentences with accusative noun phrases (including those noun phrases that are left unmarked due to differential object marking.) This means that it never occurs with intransitive verb. However, we can apply the benefactive to a unergative if either a) the unergative verb is first causativized or b) the resulting unergative + benefactive verb phrase is causativized.

- (15) * huḍuga vaidya -r -ige kemm -i koṭṭ -a
 boy.nom doctor -pl -dat cough -perf ben.past -3sgm
Intended: The boy coughed for the doctor.
- (16) avanu tanna magu -vannu vaidya -r -ige kemm -is -i koṭṭ -a
 he.nom self.gen child -acc doctor -pl -dat cough -caus -perf ben.past -3sgm.
 He made his child cough for the doctor. [caus > ben]
 He made his child cough for the doctor. [ben > caus]

In addition, the benefactive auxiliary seems to impose an animacy requirement on the subject of the sentence (i.e., the benefactor). In sentences which use the benefactive auxiliary with inanimate subject, an animating effect is present.

- (17) # k̄aru aval̄ -ige śabda māḍ -i koṭṭ -itu
 car she -dat noise do -perf ben.past -3sgn
 The car made a noise for her. (*Only felicitous if the car is 'alive' in some sense.*)

Auxiliary constructions appear similar to another construction which uses the perfective form of the verb: the conjunctive participle construction. Kannada does not have VP conjunction; instead, it uses non-finite verbs, including the perfective form, to describe actions normally described by VP conjunction, as in (18).

- (18) nānu mane -ge hōg -i malag -id -e
 I.nom house -dat go -perf sleep -past -1sg
 I went home and slept.

However, auxiliary constructions differ from conjunctive participle constructions in not allowing intervening material between the auxiliary verb and the main verb.

- (19) nānu dose tin -du mane -ge hōd -e
 I.nom crepe eat -perf house -dat go.past -1sg
 I ate a crepe and went home.
- (20) *avanu tanna magu -vannu kemm -is -i vaidya -r -ige koṭṭ -a
 he.nom self.gen child -acc cough -caus -perf doctor -pl -dat ben.past -3sgm
Intended: He made his child cough for the doctor.

3.3 Variable causative exponence

In some dialects of Spoken Kannada, including those spoken in Mysore, Bangalore, and Dharwar, when the synthetic causative is used in verb clusters, such as in the benefactive auxiliary construction, we see variation in the occurrence, position, and scope of the causative. The causative morpheme *-is* can appear in multiple locations. For brevity's sake, I will refer to this phenomenon as variable causative exponence, or VCE.

- (1) a. nānu aval̄ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i koṭṭ -e
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf ben.past -1sg

- b. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍe -du koḍ -is -id -e
 I.nom she -dat self.gen child -instr coconut -acc break -perf ben -caus -past -1sg
- c. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i koḍ -is -id
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf ben -caus -past
 -e
 -1sg
 I made her child break the coconut for her. [caus > ben]
 I made her child break the coconut for her. [ben > caus]

Note that in all of these sentences, there is only one causative event, even when there are two *-is* morphemes. This multiple exponence is not limited to a single auxiliary verb. As noted in section 3.1, *-is* only ever appears between the verb and aspect/agreement morphology, and the *-is* morpheme which appears in VCE sentences is no exception to this.

- (21) nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu (*-is) oḍ -es -i (*-is) koṭṭ
 I.nom she -dat self.gen child -instr coconut -acc (-caus) break -caus -perf (caus) ben.past
 (*-is) -e (*-is)
 (-caus) -1sg (caus)

When multiple auxiliary verbs, such as the benefactive and intensive auxiliary, are used together, *-is* can appear in any of these post-verbal positions.

- (22) a. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i hāk -i
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf intsv -perf
 koṭṭ -e
 ben.past -1sg
- b. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i hāk -is -i
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf intsv -caus -perf
 koṭṭ -e
 ben.past -1sg
- c. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i hāk -is -i
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf intsv -caus -perf
 koḍ -is -id -e
 ben -caus -past -1sg
- d. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍe -du hāk -is -i
 I.nom she -dat self.gen child -instr coconut -acc break -perf intsv -caus -perf
 koṭṭ -e
 ben.past -1sg

e. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍe -du hāk -is -i koḍ
 I.nom she -dat self,gen child -instr coconut -acc break -perf intsv -caus -perf ben
 -is -id -e
 -caus -past -1sg

f. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍe -du hāk -i koḍ -is
 I.nom she -dat self,gen child -instr coconut -acc break -perf intsv -perf ben -caus
 -id -e
 -past -1sg

I made her child break the hell out of the coconut for her. [caus > ben]

I made her child break the hell out of the coconut for her. [ben > caus]

In addition to variable exponence, in these sentences, the causative has scopal ambiguity; it can either scope over the event introduced by the main verb, or it can scope over the benefactive.

(23) a. nānu avaḷ -ige kār -inda śabda māḍ -is -i koṭṭ -e
 I.nom she -dat car -instr sound do -caus -perf ben.past -1sg

b. nānu avaḷ -ige kār -inda śabda māḍ -is -i koḍ -is -id -e
 I.nom she -dat car -instr sound do -caus -perf ben -caus -past -1sg

c. nānu avaḷ -ige kār -inda śabda māḍ -i koḍ -is -id -e
 I.nom she -dat car -instr sound do -perf ben -caus -past -1sg

I made the car make a noise for her.

Recall that the benefactive auxiliary imposes an animacy requirement on its subject. Because we do not have an animating effect on the car in this sentence, we know that the causative is able to scope over the event introduced by the main verb, regardless of surface order. Now, consider a sentence with an inanimate causer argument.

(24) a. pustaka -dalli oḍ -i -da -ddu avan -inda avaḷ -ige bar -es -i koṭṭ -itu
 book -loc read -perf -rel -it he -instr she -dat write -caus -perf ben.past -3sgn

b. pustaka -dalli oḍ -i -da -ddu avan -inda avaḷ -ige bar -es -i koḍ -is -i -tu
 book -loc read -perf -rel -it he -instr she -dat write -caus -perf ben -caus -past -3sgn

c. pustaka -dalli oḍ -i -da -ddu avan -inda avaḷ -ige bare -du koḍ -is -i -tu
 book -loc read -perf -rel -it he -instr she -dat write -perf ben -caus -past -3sgn

What he read in the book made him write her a letter.

As this sentence is also felicitous, we see that both scopal readings are available, regardless of surface order.

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4 Analysis

In this section, I will first make explicit the syntactic assumptions present in my analysis of VCE. Next, I will posit a structure for VCE sentences which involves multiple head movement chains and thus admits a partial ordering and simultaneous Vocabulary Insertion. Finally, I will show how the Simultaneous Vocabulary Insertion rule I previously described in (2) accounts for the variable exponence and scopal ambiguity of VCE, as well as the ways in which the predictions it makes are borne out by other Kannada verbal constructions.

4.1 Assumptions

4.1.1 Auxiliaries

I assume in this analysis that Kannada auxiliary verbs, or at least those auxiliary verbs which we have shown to exhibit VCE, have a very similar structure to other verbs; that is, they have roots and v heads. The idea that functional heads also have roots was argued for in Lowenstamm (2010), who noted that often, derivational affixes often have multiple categorial interpretations, something which would be unexpected if we assumed that these affixes were categorial exponents. Indeed, as we have seen in section 3.2, these auxiliary verbs have multiple interpretations, including as main verbs, where they morphologically act in exactly the same way.

4.1.2 Head movement

Analyzing Kannada auxiliaries as having roots allows us to make a generalization about head movement in the Kannada verb phrase: every syntactic head, save for the verbal root, head-moves its complement. I argue that in Kannada, word-formation in Kannada is fed by head movement, as argued by Baker (1985b), Julien (2002), and many others. The effect of this recursive head-movement is that when we have multiple rooted verb phrases in a derivation, we construct multiple head movement chains, each delimited by the verb root.

4.1.3 Causatives

I follow Pylkkänen (2002) in assuming that causation involves a verbal head, Caus, ‘which combines with noncausative predicates and introduces a causing event to their semantics.’ Caus, in this case, selects for the *v* head of the predicate which it is modifying (and subsequently head-moves it, as described in the previous section). In addition, I assume that *-is* is not in fact an exponent of Caus, but instead an exponent of *v* in the context of Caus. Recall that *-is* has a secondary use as a verbalizer, and that are not interpreted as involving a causation event. Thus, we know that *v* does have *-is* as an exponent.

4.2 Structure

Our goal for an adequate analysis is to be able to account for both the scopal variation and the variable exponence of variable causative exponence. As described in section 2.3.1, partial orderings, and thus, simultaneous Vocabulary Insertion, can arise from structures which involve multiple head movement chains. I posit that sentences which exhibit VCE in Kannada are of this form, and the structure of these sentences admit partial orderings, and that furthermore, simultaneous Vocabulary Insertion occurs on syntactic heads which have the same feature bundle, the condition for rule (2). I reproduce here sentences 1a-c, which display VCE.

- (1) a. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i koṭṭ -e
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf ben.past -1sg
- b. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍe -du koḍ -is -id -e
 I.nom she -dat self.gen child -instr coconut -acc break -perf ben -caus -past -1sg
- c. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i koḍ -is -id
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf ben -caus -past
 -e
 -1sg
 I made her child break the coconut for her. [caus > ben]
 I made her child break the coconut for her. [ben > caus]

I posit that at Vocabulary Insertion, the structure of the verb cluster for the low causative (benefactive of the causative), and for the high causative (causative of the benefactive), are the trees in figures 3 and 4, respectively. For readability, I will reproduce these structures here, with traces, labels, and arguments removed.

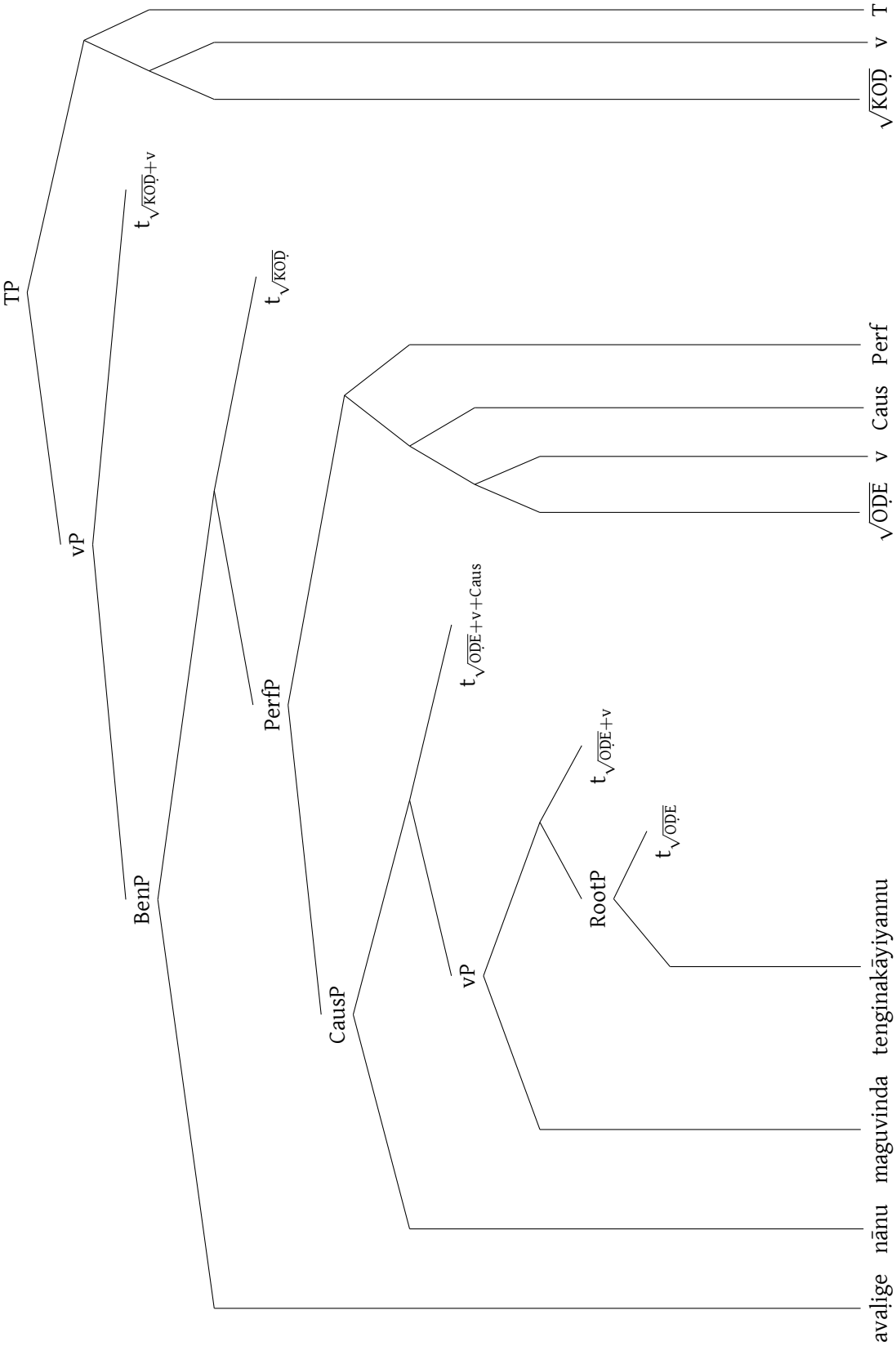


Figure 3: Proposed structure for the low causative reading of (1).

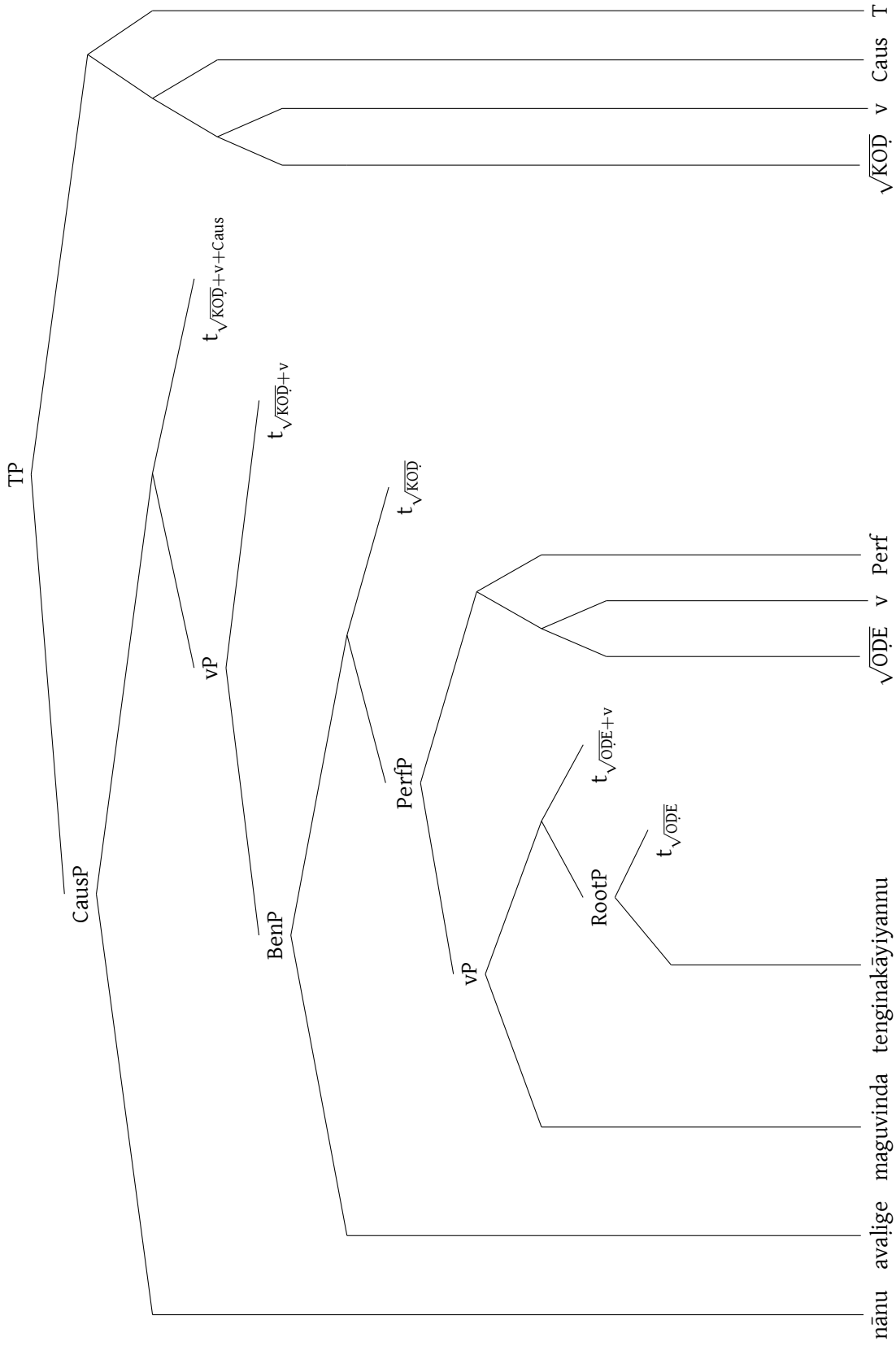


Figure 4: Proposed structure for the high causative reading of (1).

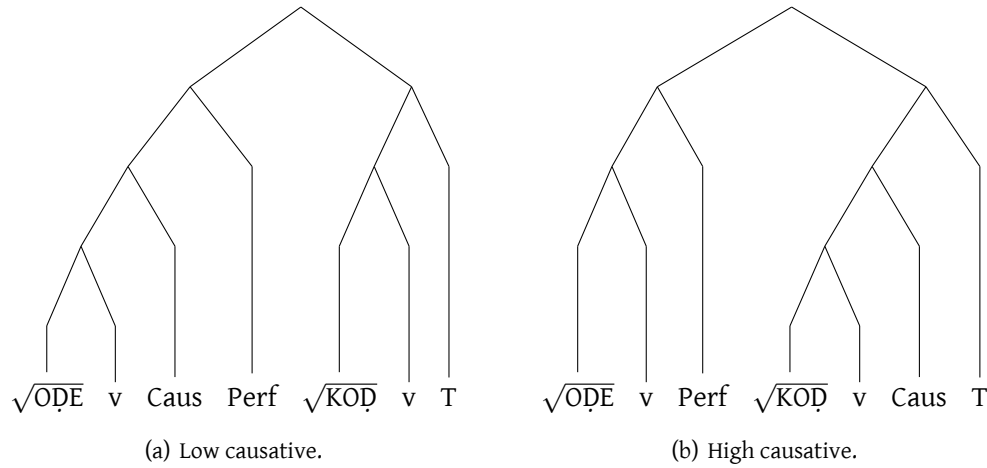


Figure 5: Simplified structures for (3) and (4) which preserve partial orderings.

These structures generate the following partial ordering:

(25) Low causative

a. $\sqrt{\text{ODE}} \succ v \succ \text{Caus} \succ \text{Perf} \succ T$

b. $\sqrt{\text{KOD}} \succ v \succ \text{Perf} \succ T$

(26) High causative

a. $\sqrt{\text{ODE}} \succ v \succ \text{Perf} \succ T$

b. $\sqrt{\text{KOD}} \succ v \succ \text{Caus} \succ T$

According to this ordering, the verbal roots and v heads undergo Vocabulary Insertion at the same time.

I argue that rule (2), restated here, applies to simultaneous Vocabulary Insertion.

(2) Simultaneous Vocabulary Insertion

When nodes X and Y undergo Vocabulary Insertion simultaneously, if they both have the same feature bundle, X can use any Vocabulary Insertion rules that Y can use, and vice versa.

Furthermore, I posit the following Vocabulary Insertion rules for v :

(27) a. $v \leftrightarrow /-\emptyset/$

b. $v \leftrightarrow /-is/ / _ \text{Caus}$

Because these two Vocabulary Insertion rules are both specified for the same feature bundle, they can be applied at all v nodes which undergo Vocabulary Insertion simultaneously, which, in this case, is all v nodes in the derivation.

This analysis is readily extendable to examples with two auxiliary verbs, such as those in (28), reproduced here:

- (28) a. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i hāk -i
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf intsv -perf
 koṭṭ -e
 ben.past -1sg
- b. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i hāk -is -i
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf intsv -caus -perf
 koṭṭ -e
 ben.past -1sg
- c. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍ -es -i hāk -is -i
 I.nom she -dat self.gen child -instr coconut -acc break -caus -perf intsv -caus -perf
 koḍ -is -id -e
 ben -caus -past -1sg
- d. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍe -du hāk -is -i
 I.nom she -dat self.gen child -instr coconut -acc break -perf intsv -caus -perf
 koṭṭ -e
 ben.past -1sg
- e. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍe -du hāk -is -i koḍ
 I.nom she -dat self.gen child -instr coconut -acc break -perf intsv -caus -perf ben
 -is -id -e
 -caus -past -1sg
- f. nānu avaḷ -ige tanna magu -vinda tenginakāyi -yannu oḍe -du hāk -i koḍ -is
 I.nom she -dat self.gen child -instr coconut -acc break -perf intsv -perf ben -caus
 -id -e
 -past -1sg
- I made her child break the hell out of the coconut for her. [caus > ben]
- I made her child break the hell out of the coconut for her. [ben > caus]

The trees for these sentences have the following partial ordering:

- (29) a. $\sqrt{\text{OḍE}} \succ v \succ \text{Caus} \succ \text{Perf} \succ \text{Perf} \succ \text{T}$
 b. $\sqrt{\text{HĀK}} \succ v \succ \text{Perf} \succ \text{T}$
 c. $\sqrt{\text{KOḍ}} \succ v \succ \text{T}$

Again, in this ordering, the v heads undergo Vocabulary Insertion simultaneously, and therefore all Vocabulary Insertion rules are available to them.

If VCE does in arise from this syntactic configuration, we might expect to see it arise in other verbal forms, and in fact, this prediction is borne out. In sentences with restructuring predicates, such as those described in Agbayani and Shekar (2007), we also see VCE, along with scopal ambiguity.

- (30) a. nānu avan -inda hosa mane -yannu kaṭṭ -is -alu śurumāḍ -id -e
 I.nom him -instr new house -acc build -caus -inf begin -past -1sg
- b. nānu avan -inda hosa mane -yannu kaṭṭ -alu śurumāḍ -is -id -e
 I.nom him -instr new house -acc build -inf begin -caus -past -1sg
- c. nānu avan -inda hosa mane -yannu kaṭṭ -is -alu śurumāḍ -is -id -e
 I.nom him -instr new house -acc build -caus -inf begin -caus -past -1sg
 I made him begin building the new house.
- I began making him build the new house.

A further phenomenon which may also be relevant to this analysis involves aspectual auxiliaries being used with verbs which have *-is* as their verbalizer. For some speakers of Kannada, when these verbs are used with aspectual auxiliaries, we also see *-is* optionally being pronounced on the higher head. However, in these cases, *-is* must also be pronounced on the verb for which *-is* is used as a verbalizer.

- (31) a. nānu avaḷ -ige hoov -annu aghrāṇ -is -i koṭṭ -e (< Skt. *aghrāṇa* ‘smelling’)
 I.nom she -dat flower -acc aghrāṇa -caus -perf ben.past -1sg
- b. nānu avaḷ -ige hoov -annu aghrāṇ -is -i koḍ -is -i -de
 I.nom she -dat flower -acc aghrāṇa -caus -perf ben -caus -past -1sg
 I smelled the flower for her.
- c. * nānu avaḷ -ige hoov -annu aghrāṇ -(i/u/du)? koḍ -is -id -e
 I.nom she -dat flower -acc aghrāṇa -perf ben -caus -past -1sg

Whether we can explain these sentences using the Simultaneous Vocabulary Insertion rule is not quite clear. It is possible that for some speakers, the Vocabulary Insertion rule which generates the verbalizing *-is* is specified for a set of features which does not intersect with the set of features of the higher v head, which prevents this rule from undergoing insertion, or that perhaps some phonological constraint prevents the verbalized head from being spelled out without the *-is* morpheme.

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5 Alternate explanations

5.1 Phonological approaches

Caballero (2008) argues that several examples of multiple exponence in Choguita Rarámuri are the result of interactions between phonological and morphological rules. In Choguita Rarámuri, causatives which are modifying stress-final verbal bases can optionally undergo causative duplication, in which multiple causative exponences are pronounced despite the presence of only one causative event, as seen in (32).

- (32) á=mi tamí mé -r -ti -ma?
 Aff=2sgN 1sgA win -Caus -Caus -Fut:sg
 Will you make me win?

However, such an argument cannot possibly work for the case of Kannada causatives. Note that in the case of Choguita Rarámuri, the multiple causative exponences are adjacent, as well as in the same “prosodic environment” as the element which determines the occurrence of causative duplication. In Kannada, the multiple causative heads are *not* in the same prosodic environment.

Furthermore, it is unlikely that *any* phonological explanation would be able to account for causative doubling in Kannada. In addition to occurring along with the benefactive auxiliary, causative doubling also occurs along with the intensive auxiliary, and even in sentences with both the benefactive and intensive auxiliaries, as in (28).

A phonological explanation for this data would require phonological operations which had effects across several syllables, something which is highly unlikely, if not impossible. In addition, as we have seen, VCE occurs in a wide variety of contexts, with heterogeneous morphemes.

5.2 Generalized Reduplication

Generalized Reduplication, as described in Harris and Halle (2005), is a post-syntactic operation which allows the displacement and reduplication of abstract morphemes from their linear ordering. I argue that while we could develop an analysis of VCE which used Generalized Reduplication, the end result would be much too wild, and that in fact, it would make predictions that were too broad. For instance, consider the following linearization of the two trees we described in our analysis.

- (33) $\sqrt{\text{ODE}} \vee \text{Caus Asp} \sqrt{\text{KOD}} \vee \text{T}$

$$(34) \quad \sqrt{ODE} v \text{ Asp } \sqrt{KOD} v \text{ Caus } T$$

From these linearizations, we could the following Generalized Reduplication rules:

- (35) a. Structural description: Caus Asp Root v
 b. Structural change:
 i. Insert \llbracket to the left of Caus and \rrbracket to the right of v.
 ii. Insert \langle immediately to the right of Caus.
- (36) a. Structural description: Asp Root v Caus
 b. Structural change:
 i. Insert \llbracket to the left of Asp and \rrbracket to the right of Caus.
 ii. Insert \rangle immediately to the right of v.

By applying rule (35) to (33) and (36) to (34), we get the following output:

$$(37) \quad \begin{aligned} &\sqrt{ODE} v \text{ Caus Asp } \sqrt{KOD} v T \rightarrow \\ &\sqrt{ODE} v \llbracket \text{Caus } \langle \text{Asp } \sqrt{KOD} v \rrbracket T \rightarrow \\ &\sqrt{ODE} v \text{-Caus Asp } \sqrt{KOD} v \text{-Caus Asp } \sqrt{KOD} v \text{-T } \rightarrow \\ &\sqrt{ODE} v \text{ Caus Asp } \sqrt{KOD} v \text{ Caus } T \end{aligned}$$

$$(38) \quad \begin{aligned} &\sqrt{ODE} v \text{ Asp } \sqrt{KOD} v \text{ Caus } T \rightarrow \\ &\sqrt{ODE} v \llbracket \text{Asp } \sqrt{KOD} v \rangle \text{Caus } \rrbracket T \rightarrow \\ &\sqrt{ODE} v \text{-Asp } \sqrt{KOD} v \text{-Caus-Asp } \sqrt{KOD} v \text{ Caus-T } \rightarrow \\ &\sqrt{ODE} v \text{ Caus Asp } \sqrt{KOD} v \text{ Caus } T \end{aligned}$$

However, these rules are only capable of deriving inverted order with respect to scope; in order to derive a reduplicated ordering, we would need to posit two more rules. In addition, the structural descriptions of these rules are necessarily broad in order to ensure that the *-is* morpheme cannot appear anywhere besides the immediate right of the verb root. However, with this broadness, we also risk overspecifying the environment which VCE occurs in. It is unclear what kind of structural description would be required to account for the VCE described in restructuring predicates in example (30).

We also risk underspecifying the environment that VCE occurs in. For instance, recall that the benefactive auxiliary construction can have the same linear ordering as the conjunctive participle construction.

- (39) a. nānu avan -annu neg -es -i oḍ -is -id -e
 I.nom he -acc jump -caus -perf run -caus -past -1sg
 I made him jump and I made him run. (*not* I made him jump and I ran.)
- b. nānu avan -annu neg -es -i oḍ -id -e
 I.nom he -acc jump -caus -perf run -past -1sg
 I made him jump and I ran. (*not* I made him jump and run.)

As we see, in this construction, we cannot receive variable causative scope; that is, the position of the *-is* morpheme corresponds to the syntactic position of the causative head, unlike in auxiliary constructions.

Another set of sentences which have similar linearized forms to the auxiliary constructions are those which involve the complementizer *endu*, which, formally, is the verb *ennu*, ‘say’, in its past participle form. Consider the following sentences:

- (40) a. nānu avan -inda pustaka -vannu oḍ -i -da en -du hēḷ -is -id -e
 I.nom he -instr book -acc read -perf -3sg comp -perf say -caus -past -1sg
 I made him say that he read the book.
- b. * nānu avan -inda pustaka -vannu oḍ -i -da enn -is -i hēḷ -is -id -e
 I.nom he -instr book -acc read -perf -3sg comp -caus -perf tell -caus -past -1sg
- c. * nānu avan -inda pustaka -vannu oḍ -i -da enn -is -i hēḷ -id -e
 I.nom he -instr book -acc read -perf -3sg comp -caus -perf tell -past -1sg

If we had a Generalized Reduplication rule which was underspecified enough to be able to account for sentences which involve such heterogeneous syntactic heads as restructuring predicates and aspectual auxiliaries, it would predict that VCE would occur in the previous examples. This is where an analysis of VCE which takes into account simultaneous Vocabulary Insertion is advantageous: we can formulate an explanation for why VCE does not occur in these sentences, perhaps by positing a mismatch in features which prevents the *-is* Vocabulary Insertion rule from being used. However, in a Generalized Reduplication analysis, we seemingly do not have this option, given that our GR rules occur without consideration of the features of nearby heads.

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6 Conclusion

In this section, I will describe possible future research directions for VCE and Simultaneous Vocabulary Insertion, and I will summarize my analysis and conclusions regarding morphology in the Kannada verb.

6.1 Further research directions

As we have seen, there is some variation within Kannada itself as to the occurrence of VCE; indeed, some dialects of Kannada, including the Coastal Kannada dialect spoken in Hassan, do not exhibit VCE. This is somewhat expected, given my analysis of VCE, as it relies not only on the correct alignment of syntactic heads, but also on the features of those syntactic heads, as well as the specific Vocabulary Insertion rules used. Further examination of dialectal differences may unveil systematic differences that may lead to further insights on the nature of Vocabulary Insertion.

As Simultaneous Vocabulary Insertion is a rule which governs Vocabulary Insertion, we would also expect its effects to appear in other languages. I argue that ‘verb clustering’ phenomena are a good place to look for these effects, given that they often involve the parallel structures required to induce SVI effects. Indeed, copying phenomena are common in verb clusters, the most well known of which being ‘infinitivus pro participio’ (IPP) effects in West Germanic auxiliary constructions, in which participles in verb clusters are replaced with infinitives whenever they take infinitives as their complement. (Hinterhölzl (2009), Kiss and Riemsdijk (2004)).

- (41) Hans hat das Buch lesen wollen (*gewollt) (*German*, from Hinterhölzl (2009))
 Hans has the book read.inf want.inf (wanted.pp)
 Hans has wanted to read the book.

Others include TMA-copying phenomena in pseudocoordination in many language, including Swedish, Danish, and the Sicilian dialect Marsalese (Wiklund (2007), Kjeldahl (2010)). Many of these phenomena are more similar to VCE in that they also allow optionality in copying TMA morphology.

- (42) a. Han börjar o skriva dikter. (*Swedish*, from Wiklund (2007))
 He start.pres and write.inf poem.pl
 b. Han börjar o skriver dikter.
 He start.pres and write.pres poem.pl
 He starts writing poems.

These phenomena all share with VCE the fact that they copy phonological exponents to positions where the corresponding syntactic heads do not seem to be syntactically present.

6.2 Summary

In this paper, I have pursued an analysis of variable causative exponence in Kannada, ultimately arguing that the phenomenon can be explained through Simultaneous Vocabulary Insertion which arises from a partial ordering due to multiple head movement chains. I first showed that multiple head movement chains can in fact derive partial orderings as defined by Myler (2013), then I argued that cases of VCE involve multiple head movement chains, and finally, I showed that Simultaneous Vocabulary Insertion could explain variations in the exponence of the causative morpheme, as well as scopal ambiguity. I also showed that other analyses of this data, including phonological and other morphological explanations, were inadequate to describe the behavior of VCE. My analysis of VCE not only provides the best analysis of the non-local morphological effects and scopal ambiguity present in VCE, but it is readily applicable to similar issues in other languages, and may provide further insight into the nature of Vocabulary Insertion and morphology as a whole.

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