NORTHERN JÊ VERB MORPHOLOGY AND THE RECONSTRUCTION OF FINITENESS ALTERNATIONS[1]

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This paper examines the morphology of verbs in the Northern branch of the Jê language family, paying particular attention to verbal finiteness, a pervasive category in the family that exhibits a number of morphological complexities. We argue that a number of Proto-Northern Jê verbs whose nonfinite forms have been traditionally regarded as suppletive can be shown to be derived through morphophonological processes that are plausible in comparative perspective. The proposal advanced here also illuminates a number of points regarding person inflection and other verbal morphology that have figured prominently in historical studies of Macro-Jê languages.

[KEYWORDS: Northern Jê, morphophonology, internal reconstruction, verbal finiteness]

1. Introduction. In the languages of the Cerrado branch (Central Brazil; Jê family, Macro-Jê stock), many verbs have in their paradigms distinct finite and nonfinite forms. Nonfinite forms are usually derived from the finite forms regularly through suffixation and/or prefix substitution.[2] However, some exceptions, typically regarded as instances of suppletion,

[1] Authors' names are in alphabetical order. We are grateful to two anonymous reviewers and the associate editor of this journal for comments and criticisms that helped improve this manuscript. We would also like to thank Jérémie Beauchamp, who provided us with Tapayúna data.

Salanova would like to thank the Mẽbêngôkre, especially the Xikrín from the village of Djudjêkô, for hosting him during several visits since 1996, and in particular Ikrô, Nhàkti, and Bepkamrêk Kayapó for answers to last-minute questions about lexicon. He also thanks Vanessa Lea for sharing a number of unpublished sources on Mẽbêngôkre that were, with support from FAPESP (Fundação de Amparo à Pesquisa do Estado de São Paulo), organized by Salanova and Maria Amélia Reis Silva into a searchable database in 1999–2000. Salanova would also like to thank SSHRC (the Social Sciences and Humanities Research Council of Canada) for financial support during the writing of this article through Insight grant 435–2018–1173.

Nikulin is grateful to Flávia de Castro Alves for fruitful discussions on Northern Jê morphosyntax and on syntactic reconstruction, as well as to Mário Coelho da Silva for his comments on Maxakalí and Krikatí. He also acknowledges the financial support of CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) during his doctoral studies.

Needless to say, we are responsible for any remaining shortcomings.

[2] Regularly, that is, if one considers the question at the proper level of abstraction. Various phenomena in the derivation of finite and nonfinite forms imply some morphophonological complexity; we describe them below. Our main concern in this paper, however, is one specific alternation that was previously considered to be irreducible to regular morphophonology.

[*IJAL*, vol. 85, no. 4, October 2019, pp. 533–67]

0020–7071/2019/8504–0001$10.00 DOI 10.1086/704565

have been attested in all Northern Jê languages (a subbranch of Cerrado). The examples in (1) are from the Kayapó variety of Mẽbêngôkre.[3]

(1) Finite/nonfinite pairs traditionally regarded as suppletive in Mẽbêngôkre[4]

	F	NF	
a.	*kate*	*kaʔêk*	'to break'
b.	*kuto*	*kuôñ*	'to light a fire.SG'
c.	*ga*	*ĵər*	'to roast.SG'
d.	*kaba*	*kaĵər*	'to take out.SG'
e.	*ŋõr*	*ñõt*	'to sleep'
f.	*ŋə̃*	*ñõr*	'to give'
g.	*ta*	*ʔyr*	'to cut off'

In the present article, we intend to show that the nonfinite forms in contemporary Northern Jê languages that have been previously analyzed as suppletive reconstruct as resulting from regular though nontrivial morphophonological processes. Recognizing this entails some important consequences for the understanding of the morphology of nonfiniteness, as well as for the reconstruction of Proto-Northern Jê consonantism.

2. Northern Jê languages. According to an influential classification scheme by Rodrigues (2012), Jê languages are divided into a Southern

[3] Mẽbêngôkre data are from Salanova's field notes, guided by previously existing unpublished lexical materials by other authors (Vanessa Lea, Earl Trapp, Terence Turner, among others). Tapayúna data are partly from Jérémie Beauchamp (personal communication, University of California at Santa Cruz, 2018). Data from other languages, as well as a part of the data on Tapayúna, come from published sources listed at the end of this paper (**8**).

[4] In this work, we adhere to a modified version of the International Phonetic Alphabet (IPA). The main differences between the transcription system used in this work and IPA are: *r* = any rhotic; *ñ* = IPA *ɲ*; *c* stands for any voiceless palatal, alveo-palatal or postalveolar stop or affricate; *ĵ* stands for any voiced palatal, alveo-palatal or postalveolar stop or affricate; *t̪ʰ* stands for an aspirated alveolar or retroflex stop; *ə*, *o*, *e*, *ɛ̃*, *õ*, *ẽ* are open-mid (for languages with 4 contrastive heights) or mid (for languages with 3 contrastive heights); *ə̂*, *ô*, *ê* are close-mid; *ə*, *ə̂*, *y* are central or back unrounded vowels (open-mid, close-mid, and close, respectively); *î*, *û*, *ŷ* are falling lowering diphthongs. A subscript diaeresis stands for breathy voice. Abbreviations used in the paper are as follows. **Person markers**: 1 = first person, 2 = second person, 3 = third person, 1+2 = first person inclusive. **Postpositions**: ERG = ergative, DAT = dative, GEN = genitive, LOC = locative, INS = instrumental, PURP = purposive. **Valency-changing operators**: ANTIC = anticausative, ANTP = antipassive, CAUS = lexical causative. **Verbal number**: PL = plural, SG = singular. **Finiteness**: F = finite form, NF = nonfinite form. **Tense, aspect, and mood**: IRR = irrealis mood, PROSP = prospective marker, RLS = realis mood. **Other glosses**: AUX = verbal auxiliary, CTG = contiguity relational prefix, NCTG = non-contiguity relational prefix, NEG = negation (verb), RP = relational prefix. **Language names**: MXK = Maxakalí, NJ = Northern Jê, PCerr = Proto-Cerrado, PCJ = Proto-Central Jê, PJ = Proto-Jê, PNJ = Proto-Northern Jê. **Other abbreviations**: C = consonant, N = nominal, P = postposition, V = vowel, oral vowel, *or* verb, Ṽ = nasal vowel. Abbreviations for individual Jê languages are presented in figure 1.

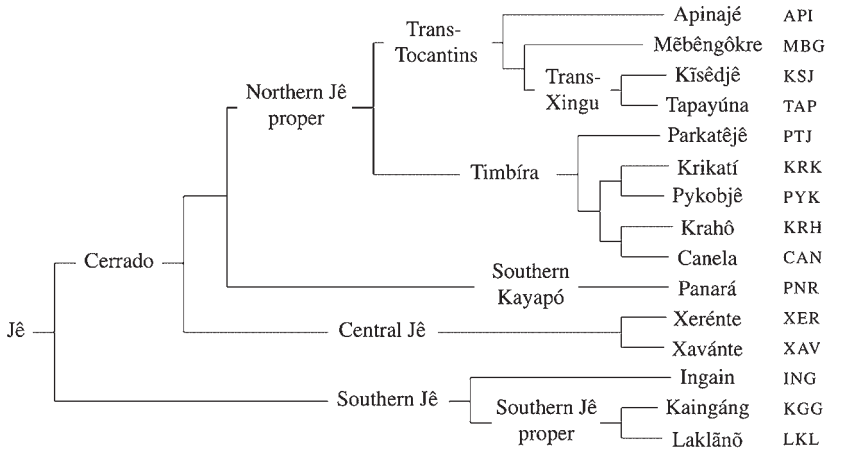

FIG. 1—Internal structure of the Jê family

branch that comprises Kaingáng (ISO 639–3 code [kgp]), Laklãnõ (Xokléng, [xok]), and the extinct Ingain (no ISO 639–3 code assigned), a Central branch with Xavánte ([xav]), Xerénte ([xer]), and the extinct poorly attested Akroá ([acs]) and Xakriabá ([xkr]), and a Northern branch that comprises Mẽbêngôkre ([txu]), Apinajé ([apn]), Kĩsêdjê (Suyá, [suy]), Tapayúna (no ISO 639–3 code assigned), Timbíra ([xri, xra, ram, gvp, xre]), and Panará ([kre]). Over the past decade, there has been an increasing consensus in the literature that Central and Northern Jê languages are more closely related to each other than to Southern Jê, constituting a branch we call Cerrado.[5] Even more importantly, we consider the internal structure of the Northern branch to have Panará as an early split-off node, alongside another daughter node that we call Northern Jê proper. It is the latter Northern Jê—without Panará—that we consider in this paper. In the remainder of this paper, unless specified otherwise, we will use the label "Northern Jê" to refer to Northern Jê proper. Our working model of the Jê phylogenetic tree (without Xakriabá and Akroá, whose position within Central Jê is unclear) is presented in figure 1 (see also Nikulin 2019).[6]

[5] Cerrado languages have been also called Amazonian Jê (Ribeiro and van der Voort 2010:549; Nikulin 2015) and Northern Jê (Ramirez et al. 2015:261) in earlier literature. We prefer the label "Cerrado" (used in Nikulin 2017, 2019) because we believe it to be more geographically appropriate: the only Jê peoples (besides those classified here as Northern Jê) that currently inhabit the Amazon region, Xavánte and Panará, are known to have entered the region after the European invasion.

[6] The internal classification of Timbíra proposed here is based on the distribution of shared phonological and lexical innovations. Innovations common to all Timbíra varieties except

In online appendices A and B we detail our proposal regarding the reconstruction of Proto-Northern Jê phonology, which differs in important respects from the previous proposals, and provide a sample of approximately 700 lexemes and grammatical morphemes reconstructible to Proto-Northern Jê.

3. Morphological categories of the verb in Northern Jê. The contrast between finite and nonfinite forms is one of the primary inflectional distinctions in Northern Jê verbs. We will discuss its morphosyntactic properties in detail in **4**. Before we do that, however, we briefly describe some of the other inflectional and derivational categories found on Northern Jê verbs.

3.1. Classes of predicates. Archetypal verbs in Northern Jê differ from other classes of predicates in two fundamental ways: they have a distinct finite and a nonfinite form in their paradigm and the clauses that they head display at least two distinct patterns of case marking according to whether the predicate is in a (finite) independent clause or in a (nonfinite) embedded clause.

Not all predicates participate in these alternations. A large number of predicates, both transitive and intransitive, are identical to nouns in having only a single form and inflecting for absolutive person (when they inflect at all: some of them behave like unpossessed nouns and don't inflect), with a second argument, if present, being expressed by means of an oblique noun phrase. All "inactive" intransitives[7] and all *verba sentiendi* with dative subjects and optional absolutive objects are like this, with the sole exception of **kato* 'to exit', which always inflects for absolutive person even though it has distinct finite/nonfinite forms (F **kato*, NF **kator*).[8] Some examples are given in (2).[9]

Parkatêjê include lexical replacements in basic vocabulary, such as PNJ **ndi* ~ **ndî* 'woman' → narrow Timbíra **kahɔ̃j* 'woman' (but Parkatêjê *ntî*), PNJ **mby* 'man' → narrow Timbíra **h-ũm-re* 'man' (but Parkatêjê *mpy*), PNJ **pyka* 'earth, soil' → narrow Timbíra **pjê* 'earth, soil' (but Parkatêjê *pyka*), as well as the extension of the meaning of **totok* 'heartbeat' to 'heartbeat, heart'. Pykobjê and Krikatí are grouped together because both share a nontrivial vowel height shift (raising of close-mid vowels and lowering of high vowels). Finally, even though Canela and Krahô are phonologically more conservative than Pykobjê and Krikatí, they can still be grouped together because they display several shared irregular developments, such as the loss of **-r-* in *kʰat* 'base, trunk, hip' (all other Northern Jê languages and varieties, including Pykobjê, Krikatí, and Parkatêjê, point to PNJ **krat*) and the accretion of *a-* in *ampo* 'something' (Pykobjê, Krikatí, and Parkatêjê point to Common Timbíra **mpo*).

[7] The semantics of this class is predominantly stative, with some exceptions both in dynamicity/volitionality (**prõt* 'to run') and in Aktionsart (**kato*/**kator* 'to exit').

[8] The verb **kato*/**kator* is atypical also in that it has a transitivity prefix even though it is intransitive. It would not be unreasonable to suppose that it is etymologically transitive. An example of a similar mismatch between the morphology and the argumental structure is the Ukrainian verb *dɪv-ɪ-tɪ-sʲa* <дивитися> 'to look at', which is peculiar in being transitive despite containing the suffix *-sʲa* that is otherwise found only in reflexive (intransitive) verbs.

[9] The reconstructions in (2) are reliable since the constructions in question are preserved in all subbranches of Northern Jê (Mẽbêngokre, Apinajé, Trans-Xingu, and Timbíra). On applying

(2) Stative predicates in Proto-Northern Jê

a.	absolutive subject:	*ij–ŋgryk 1–angry 'I am angry'	
b.	dative subject:	*ij–mə̃ 1–DAT 'I am hungry	prə̃m hungry
c.	dative subject, absolutive theme:	*ij–mə̃ 1–DAT 'I like you'	a–kĩñ 2–nice

It has been argued (Oliveira 2003 for Apinajé; Castro Alves 2010 for Timbíra, among others) that such predicates differ from nouns in their syntactic behavior and constitute a special class of verbs—so-called *descriptive* or *unaccusative* verbs. However, morphologically they may be considered a subclass of the class of nouns (Salanova 2007, among others),[10] a decision we adopt here, and which is relatively innocuous given our focus on morphology rather than syntax in this paper.[11]

Among actual verbs (i.e., those that we called *archetypal* above), three subclasses should be recognized: intransitives, **ku-* transitives, and other transitives. The distinction between the transitive subclasses hinges on the way that they inflect for the third person in their finite forms (see next subsection). There are some reasons to consider the distinction to be deeper than a simple question of arbitrary morphological class.

As we will see in **4**, a number of transitive predicates that should be analyzed as verbs by the criterion of having two distinct patterns of argument marking lack an overt distinction between finite and nonfinite form, or have this distinction manifested only in voice prefixes but not at the right margin of the stem.

comparative method to constructions, see Gildea (1998) and Barðdal and Eyþórsson (2012), among others. There is vast literature on constructions such as those in (2a); Barros (2019: ch. 3) provides a survey of this type of predicates across Northern Jê, and Castro Alves (2010:454–56) argues that the respective constructions should be reconstructed to Proto-Northern Jê. For constructions with dative subjects in individual languages, see Oliveira (2005:233–37) for Apinajé, Nonato (2014:31–33) for Kĩsêdjê, and Castro Alves (2018) for Canela, among others. Some reconstructible predicates whose reflexes in individual languages may receive a dative subject include **prə̃m* 'to be hungry', **kôr* 'to be thirsty', **kĩñ* 'to like', **ĵəñ* 'to find tasty', **pymba* 'to be afraid', **kry* 'to feel cold', **jabê* 'to trust, to love, to be melancholy'.

[10] The only morphological facts that speak against this idea are the existence of the aforementioned predicate **kato/*kator* 'to exit' as well as the fact that a few such predicates encode *number* (see below).

[11] Many pseudo-transitive verbs (i.e., verbs taking oblique objects) are also in this class (examples are from Mẽbêngôkre): *ʔə̃ jê* 'to close', *bê jê* 'to lock up', *kum okaʔê* 'to build a wall around', *kum kikre* 'to build a house for', *o ĵuwamec* 'to take care of', *o kê* 'to wrestle', as well as ideophones and loans.

3.2. Person inflection. Person inflection is straightforward in verbs: finite verb forms inflect for the accusative argument (i.e., are uninflected if intransitive) while nonfinite verb forms inflect for the absolutive argument. Absolutive and accusative person markers are identical except for the third person, and then in only a relatively restricted set of verbs that have **ku-* as their third-person accusative marker. In other verbs, the third-person marker is the same in both the accusative and absolutive case, **c-*, triggering morphophonology in stems that begin with **py-*/**pu-* or a palatal consonant (underlying **/ʃ/*). A few sample paradigms in (3) show how this works.

(3) Finite transitive verbs in Proto-Northern Jê

	'to hear'	'to hit'	'to see'	'to make'	'to look after, to wait'
1	**ij-mba*	**ij-kura*	**ij-pumbu*	**i-ñĩ̃pêc*	**i-jamə̃*
1+2	**ba-mba*	**ba-kura*	**ba-pumbu*	**ba-ñĩ̃pêc*	**ba-jamə̃*
2	**a-mba*	**a-kura*	**a-pumbu*	**ŋ-ĩ̃pêc*	**ŋg-amə̃*
3	**ku-mba*	**c-kura*[12]	**c-ombu*	**c-ĩ̃pêc*	**c-amə̃*

The opposition between **ku-* and other third-person indices is considered by Wiesemann (1986) to be a simple allomorphy determined by verb class; Oliveira (2005:181, 219) further specifies that the verb stems taking **ku-* are only the monosyllabic ones, and Nonato (2014:13, 133) adds that only verbs with distinct finite and nonfinite forms may belong to this class. Though Oliveira's and Nonato's observations are correct, two facts militate against the idea that **ku-* is a minimality satisfying allomorph of **c-*: on the one hand, **ku-* disappears in the nonfinite forms, despite them being monosyllabic;[13] on the other hand, verbs with **ku-* display a limited person hierarchy effect that is not found in any other verb: when a second-person subject acts on

[12] The reconstruction of the third person prefix **c-* in consonant-initial stems is still uncertain. Only Timbíra and Apinajé have non-zero reflexes. In Timbíra, the allomorph **i?-* is found preceding voiceless consonants **p*, **t*, **h*, **k*, **kʰ* (< PNJ **p*, **t*, **c*, **k*); the allomorph **i-* is found preceding prenasalized consonants **mp*, **nt*, **nc*, **ŋk* (< PNJ **mb*, **nd*, **nĵ*, **ŋg*); the allomorph **ij-* is found preceding **p*, **r* (< PNJ **b*, **r*); the zero allomorph is found preceding nasal consonants **m*, **n*, **ŋ* (< PNJ **m*, **n*, **ŋ*) and in some polysyllabic stems. The distribution of these allomorphs points to an early manner assimilation of a palatal segment distinct from **j* to the initial segment of the stem. This is suggested by the fact that the first-person prefix in Timbíra is **ij-* (< PNJ **ij-*) before any segment; hence the palatal segment in the third-person prefix could not have been **j*. In Apinajé, the third-person prefix before consonants is reported to be *ʔ-* (utterance-medially) or *iʔ-* (utterance-initially) by some authors (Ham 1961:25).

[13] One could object that nonfinite forms are heavy because they contain a coda segment. At least one transitive **ku-* verb stem does contain a coda in its finite form, however: **kwȳr* 'break'. Alternatively, the minimality constraint that induces **ku-* to appear could be specific to finite verbs, a generalization that does account for the surface facts. The second reason for considering the **ku-*/**c-* distinction to be morphosyntactically relevant would still stand, however.

a third-person object, **ku*-verbs are inflected with the second-person index **a-*.[14] For these reasons, we associate the prefix **ku-* with a distinct morphosyntactic category (third person accusative) from the other (absolutive) third-person inflection. Further discussion of this for Mẽbêngôkre may be found in Reis Silva and Salanova (2000).

3.3. Transitivity prefixes. "Transitivity prefixes" is the label we give to the obligatory prefixes, which are found in all transitive verbs that have distinct finite and nonfinite forms (and in a few that do not) and that do not receive accusative **ku-* third-person inflection. They have been described by Oliveira (2005:117–28) for Apinajé and by Salanova (2014) for Mẽbêngôkre. Verbs whose finite and nonfinite forms are identical may lack transitivity prefixes despite not receiving **ku-* (e.g., **kre* 'to plant', **côk* 'to paint', **ĵũn* 'to insult', **mrõ* 'to submerge', and **pro* 'to cover') and could constitute a distinct class of denominal predicates (e.g., **côk* 'to paint' and **côk* 'sap').

Transitivity prefixes are integrated with the root to such an extent that it is impossible to determine their semantic load in most cases, though some derivational families are clearly identifiable, as illustrated in (4). In (4a–b), underived transitive verbs of the **ku-* class are attested. In the pairs (4c–d), no underived verbs can be reconstructed. In (4e), the first verb in the pair is intransitive; the prefix **ij-* is not a transitive prefix but rather a finiteness prefix found in four verbs with physiological semantics (**ij-kõ* 'to drink', **ij-pê* 'to fart', **ij-tu* 'to urinate', and **ij-kû* 'to defecate').

(4) PNJ transitive prefixes

a.	**cô*	'to eat (soft food)'
	**ka-cô*	'to suck'
b.	**nĵa*	'to bite'
	**ju-p-nĵa*	'to gnaw'
	**ka-p-nĵa*	'to chew'
c.	**ka-cõ*	'to wash (soft objects)'
	**ku-cõ*	'to wash (hard objects)'
d.	**ka-ĵô*	'to tear'
	**ku-ĵô*	'to peel'
e.	**ij-kû*	'to defecate (intr.)'
	**ka-kû*	'to defecate on'

The etymology of the prefixes is anyone's guess, with Oliveira (2005:117) advocating various origins, including incorporated nouns, and Salanova (2014)

[14] This phenomenon can be securely reconstructed to Proto-Northern Jê, since it has been attested in Mẽbêngôkre (Reis Silva 2001:55–56), Apinajé (Callow 1962:178; Ham et al. 1979:4–5), and Canela (Castro Alves 2004:104–5), though some degree of variation between accusative (*ku-*) and nominative (*a-*) person marking pattern in $2_A>3_O$ constructions has been reported for the latter variety (Castro Alves 2011).

advocating primarily incorporated adpositions. An adpositional etymology is most transparent in the case of **ka-*, discussed in both sources as well as in Pache (2018:622). The association of these prefixes with transitivity[15] suggests that they combined with roots to introduce objects. As with most adpositions, the resulting stems would govern absolutive. True transitive roots would be monosyllabic and take accusative objects. An alternative description that would still account for the facts would be that the preferred template for transitive verbs (other than **ku-* verbs) is "sesquisyllabic" (Salanova 2014), with the (unstressed) initial syllable of these verbs chosen from a very small set (**ja-*, **ñĩ-*, **ka-*, **ku-*, **py-*/**pu-*, and a few less commonly occurring ones).

Intransitive verbs don't usually have transitivity prefixes, though in some causative/inchoative pairs the prefix **a-*/**jə-* replaces a transitive prefix in the inchoative form. **a-*/**jə-* is primarily used as an antipassive prefix in nonfinite verb forms, in which case it occurs outside of a transitivity prefix, rather than instead of it, and is found in some denominal intransitive verbs (e.g., MBG *ĵə-ki* 'to make earth ovens' ← *ki* 'earth oven') as well as in other intransitives that have no obvious transitive or nominal etymon. Nouns are not subject to these restrictions, and one finds many nominal (i.e., descriptive) predicates with two or more syllables.

3.4. Verbal number. Verbal number is a rather diffuse category, both morphologically and semantically. Archetypally, certain verbs have distinct forms according to the number of the absolutive argument (if the argument in question is not human, number is not marked independently on it but rather only on the verb).[16] In addition, verbal number can indicate repeated action, even if all participants are singular. Further nuances of the plural include a more prolonged or sluggish carrying out of an action, incomplete or ineffective carrying out of the action, and perhaps even indirect evidence for the action. Morphologically, verbal number is most often indicated via root or stem suppletion (5a–d), with a handful of cases in which it is encoded by the transitivity prefix **ja-* (5e–f), occasionally substituting another transitivity prefix (5g–h).

[15] Oliveira (2005:119) notes that *ka-* appears in descriptive verbs in Apinajé, which are nouns in our analysis. In fact, many bisyllabic nouns exist in all Northern Jê languages whose first syllable has the form of one of these prefixes. It is not clear whether those syllables should be related to the transitivity prefixes found in verbs. Among archetypal verbs, transitivity prefixes are never found with intransitive verbs, save for the case of **kato*/**kator* discussed in fn. 8.

[16] In light of what we say in this paragraph, it might be more accurate to say that pairs of lexical verbs exist whose semantics differs primarily in number (much as English *come* and *go* and *depart* and *arrive* are pairs of verbs that differ primarily in direction), rather than to claim that there is an actual inflectional or derivational category of number at play. A further element to argue for considering number a lexical rather than a morphological feature is the fact that the plural counterparts of positional verbs, which are archetypal intransitive verbs (such as **ĵa* 'to stand.SG', **ñỹ* 'to sit.SG'), are nominal predicates (**kucê* 'to stand.PL', **krĩ* 'to sit.PL').

(5) PNJ verbal number

	SG	PL	
a.	**ga*	**bô*	‘to roast’
b.	**krẽ*	**ku*	‘to eat’
c.	**mẽ*	**rẽ*	‘to throw’
d.	**tẽ*	**mõ*	‘to go’
e.	**nĵô*	**ja-nĵô*	‘to hang’
f.	**mbô*	**ja-mbô*	‘to grab, to carry’
g.	**ku-to*	**ja-to*	‘to ignite’
h.	**ñõ-pôk*	**ja-pôk*	‘to pierce’

3.5. Valency-reducing prefixes. Valency-reducing prefixes apply outside of transitivity prefixes. At least two notional classes of valency-reducing morphology exist: anticausatives and antipassives. Anticausatives suppress the agent or causer of a transitive verb, whereas antipassives suppress the theme or patient. Both anticausative (6a–c) and antipassive (6d–e) prefixes have distinct allomorphs depending on the finiteness of the stem to which they attach. Furthermore, there is some morphophonology involved: anticausatives may take **aj-* or **a-* in the finite form without a transparent phonological motivation (but always **bi*(*t*)- in the nonfinite form); some antipassives take **aw-* in the finite form and **ju-* in the nonfinite form, others take **a-* in the finite form and **jə-* in the nonfinite form.

(6) Proto-Northern Jê anticausatives and antipassives[17]

	Transitive (F/NF)	gloss	Intransitivized (F/NF)	gloss
a.	**kate/*kacê-k*	‘to break’	**aj-kate/ *bi-kacê-k*	‘to break (intr.)’
b.	**kamẽ/*kamẽ-ñ*	‘to push out’	**aj-kamẽ/ *bi-kamẽ-ñ*	‘to move out’
c.	**kundo/*kundo-r*	‘to chase’	**a-kndo/ *bi-kndo-r*	‘to disappear’
d.	**jarẽ/*jarẽ-ñ*	‘to tell’	**aw-jarẽ/ *ju-jarẽ-ñ*	‘to tell stories’
e.	**cû/*cwô-r*	‘to ask for’	**a-cû/ *jə-cwô-r*	‘to beg’

Some further morphophonological complexities occur in anticausatives whose stems contain the transitivity prefix **ja-*; discussing these is beyond the scope of this paper.

[17] The reflexes of the underived verbs in (6) in modern Northern Jê languages may be found in online appendix B. For reasons of space, we cannot include the reflexes of derived (intransitivized) verbs in all modern languages. Mêbêngôkrê and Canela reflexes of the intransitivized verbs in (6) are as follows: MBG *aj-kate/bi-kaʔê-k*, *aj-kamẽ/bi-kamẽ-ñ*, *a-kuno ~ a-ŋno/biŋno-r*, *a-jarẽ/ĵu-jarẽ-ñ*, *aʔû/ĵəʔwâr*; CAN *aj-kaʔte/pi-kaʔhê-k*, *aj-kamẽ/pi-kamẽ-n*, *a-kto/pi-kto-r*, *aw-jarẽ/jũ-jarẽ-n*, *a-ʔwô/jə-ʔwô-r*.

4. Finiteness. Returning to finiteness, we characterize first its morphosyntactic function and then move on to the peculiarities of the category's morphological expression. The contrast between finite and nonfinite forms corresponds to what in various sources on Jê languages is considered an opposition between verbal and nominal or adjectival forms of verbs, between active and stative forms (Urban 1985), between unmarked forms and forms with a specific aspectual value (Dourado 2001; Estevam 2011), or simply between short and long forms (Wiesemann 1972, 1986; Santos 1997) of the verb, among other characterizations. Finite forms are the forms of verbs normally used in independent clauses. Nonfinite forms are the only forms used in syntactically embedded environments, but their distribution extends also to various constructions which seem prima facie to be unembedded, including negated clauses, clauses in the prospective or progressive aspect, clauses with a manner modifier, and so on. Furthermore, in individual Northern Jê languages the nonfinite form can be used without any modification to convey a specific aspectual or temporal interpretation, typically a perfect or a recent past. We exemplify this range of uses for Mẽbêngôkre in (7).

(7) Usage of finite and nonfinite forms in Mẽbêngôkre

	Transitive			Intransitive		
matrix	*ba*	*ku–ma*		*ba*	*ŋõr*	
	I.NOM	3ACC–hear.F		I.NOM	sleep.F	
	'I('ll) hear it'			'I('ll) sleep'		
embedded	[*i–je*	*∅–ma–r*]	V/P/N	[*i–ñõt*]	V/P/N	
	1–ERG	3–hear–NF		1–sleep.NF		
	'. . . that I hear'			'. . . that I sleep'		
prospective	*i–je*	*∅–ma–r*	*mə̃*	*i–ñõt*	*mə̃*	
	1–ERG	3–hear–NF	PROSP	1–sleep.NF	PROSP	
	'I am going to hear'			'I am going to sleep'		
negated	*i–je*	*∅–ma–r*	*kêt*	*i–ñõt*	*kêt*	
	1–ERG	3–hear–NF	NEG	1–sleep.NF	NEG	
	'I do not hear'			'I do not sleep'		
progressive	*ba*	*∅–ma–r*	*o=nõ*	*(ba)*	*i–ñõt*	*o=nõ*
	I.NOM	3–hear–NF	INS=AUX	(I.NOM)	1–sleep.NF	INS=AUX
	'I am hearing'			'I am sleeping'		
perfect aspect	*i–je*	*∅–ma–r*		*i–ñõt*		
	1–ERG	3–hear–NF		1–sleep.NF		
	'I have heard/can hear'			'I have slept/can sleep'		

We do not delve into the structure of these constructions here. For more discussion, see Castro Alves (2010) and Salanova (2017).

In archetypal verbs, the nonfinite form is derived from the finite form via suffixation (for stems that end in a vowel and for one stem that ends in *-*r*, in which case the *-*r* is dropped) or via consonantal alternation at the right edge of the stem (for stems that end in approximants); note that no underived verb

with distinct finite and nonfinite forms ends in a stop in its finite form. The consonantal suffix that is added to create the nonfinite form from the finite form is chosen arbitrarily from the set *-*r* (8a–e), *-*ñ* (8f–j), *-*k* (8k–l), *-*m* (8m–o), *-*c* (8p), in order of decreasing frequency.[18]

(8) Proto-Northern Jê nonfinite forms formed through suffixation

	F	NF	
a.	**mõ*	**mõ-r*	'to go.PL'
b.	**bĩ*	**bĩ-r*	'to kill.SG'
c.	**krẽ*	**krẽ-r*	'to eat.SG'
d.	**karê*	**karê-r*	'to weed'
e.	**japrô*	**japrô-r*	'to take away'
f.	**põ*	**põ-ñ*	'to rub'
g.	**kê*	**kê-ñ*	'to grate'
h.	**kwỹr*	**kwỹ-ñ*	'to break'
i.	**kumbə*	**kumbə-ñ*	'to gnaw'
j.	**kaĵô*	**kaĵô-ñ*	'to tear'
k.	**ty*	**ty-k*	'to die'
l.	**rû*	**rwə̂-k*	'to descend'
m.	**tẽ*	**tẽ-m*	'to go.SG'
n.	**ij-kõ*	**kõ-m*	'to drink'
o.	**ĵa*	**ĵã-m*	'to stand.SG'
p.	**a-ŋgî*	**ŋgjê-c*	'to enter.PL'

Verbs whose finite forms end in falling diphthongs (*-*î*, *-*û*) replace them with rising diphthongs (*-*jê*-, *-*wə̂*-) upon the accretion of a nonfinite consonantal suffix since falling diphthongs do not occur in closed syllables (see online appendix A). Examples of this in (8) include **a-ŋgî*/**ŋgjê-c* and **rû*/**rwə̂-k*. This alternation provides us with evidence to make an important point, which we sketch briefly in the following two paragraphs before returning to our description.

The arbitrariness in the allomorphy of the consonantal suffix of nonfiniteness might lead one to wonder whether proposing that the finite form is derived from the nonfinite form through truncation of the last segment, as put forward, e.g., in Salanova (2007), is not a more elegant analysis since it eliminates the need for morphological classes. In addition to the diachronic motivations for the directionality that we choose here, there is a synchronic argument from several NJ languages that suggests that nonfinite forms are in fact derived through suffixation.

There are phonotactic restrictions that apply between onset consonants and rising diphthongs in contemporary NJ languages. The generalization may be stated as follows, based on Salanova's (2001) discussion of Mẽbêngôkre: all nonsyllabic segments in the onset and in the rising part of the nucleus

[18] It is noteworthy that the allomorph *-*ñ* appears to combine only with transitive verbs, whereas the allomorphs *-*k*, *-*m*, and *-*c* are only found with intransitive verbs.

have to be produced with distinct articulators, chosen among *labial*, *coronal*, and *velar*. This rules out such sequences as *mwV*, *tjV*, and *rjV* on the surface (even though there is some evidence for PNJ **tjV*, a phonotactic possibility not preserved in any modern language). Given this, one would expect to see interactions between the diphthong and the onset consonants in some of the finite/nonfinite pairs which contain alternations between rising and falling diphthongs. In fact, one finds such interactions in pairs such as **mbû*/**mbə̂-r* 'to cry' and **krî*/**kjê-r* 'to raise (pets)', where, rather than expected **mbû*/**mbwə̂-r* and **krî*/**krjê-r*, one has a nonfinite form with the loss of a segment in order to satisfy the phonotactics.[19] Since that consonant is not recoverable from the nonfinite form, we conclude that the direction of derivation is from finite to nonfinite.[20]

In addition to verbs where the nonfinite form is derived through a simple accretion of a suffix, in some intransitive verbs the finiteness distinction is achieved through the lenition of a stem-final stop (**-t*, **-c*, **-k* → **-r*, **-j*, **-r*) in the **finite** form, as shown in (9). No overt suffix is added.[21]

(9) Proto-Northern Jê finite forms formed through coda lenition

	F	NF	
a.	**tjêr*	**tjêt*	'to burn'
b.	**bôj*	**bôc*	'to arrive'
c.	**to=pôj*	**to=pôc*	'to extract.PL' (CAUS of unattested ***pôj*/***pôc* 'to exit.PL')
d.	**kar*	**kak*	'to cough'
e.	**pôr*	**pôk*	'to burn, to ignite'
f.	**jar-kjêr*	**jar-kjêk*	'to yawn'

[19] It is demonstrable not only that the phonotactic restrictions in question are reconstructible for the PNJ level, but also that they continued to be active throughout the history of the individual languages: for example, PNJ **bôj* 'to arrive.F' was expected to undergo diphthongization in Trans-Xingu languages in accordance with a sound law PNJ **-ôj* > Proto-Trans-Xingu **-wə̂j*. However, the Proto-Trans-Xingu reflex is **pə̂j*, not ***pwə̂j*.

[20] The argument of recoverability can be extended to the diphthong itself, since a nonfinite form such as **kjê-r* could correspond to a finite form with a rising diphthong, in addition to one with a falling diphthong. In fact, one does find another verb **kjê* 'to pull' with identical nonfinite form, but without the alternation in the diphthong in the finite form.

[21] This lenition process might be ultimately accounted for by the fact that finite forms tend to occur in the utterance-final position, where the consonants in coda were obligatorily accompanied by so-called *echo vowels* (Nikulin 2016:169) in PNJ, whereas nonfinite forms typically occur in the utterance-medial position and thus have their echo vowels suppressed. Echo vowel suppression has been attested synchronically in Apinajé (Oliveira 2003:268, 2005:191), even though there may be a phonological explanation for it. Suppression of the echo vowels in PNJ nonfinite forms ending in **-ər* and **-or* may have left a trace in Mẽbêngôkre, Kĩsêdjê, and Tapayúna: although the data from these languages clearly indicate that a dissimilating echo vowel **[i]* occurred in PNJ nouns with these rhymes (MBG *-ər[i]*, *-or[i]*; KSJ, TAP *-əj*, *-oj*), in nonfinite verb forms these languages display a likely secondary echo vowel that copies the syllable nucleus (MBG *-ər[ə]*, *-or[o]*; KSJ, TAP *-ər[ə]*, *-or[o]*).

In addition to the suffixes and stem alternations just discussed, in a number of PNJ verbs prefixes found in the finite form are either lost or substituted in the nonfinite form, leading to the possibility of some denominal verbs having distinct finite/nonfinite forms. While the substitution of valency-reducing prefixes (see **3**), exemplified in (11a–c), might be explained as an independent morphosyntactic alternation (i.e., specific allomorphs for antipassive and anticausative depending on whether the verb form is finite or nonfinite), alternations affecting physiological verbs, exemplified in (10d–g), are idiosyncratic, without any reasonable grounds to consider them to be related to valency. A third class is constituted by a number of intransitive verbs that may or may not have transitive counterparts, which lose an initial string that resembles a valency-reducing prefix in their nonfinite form (10h–j).

(10) Proto-Northern Jê nonfinite forms formed through prefix substitution

	F	NF	
a.	**aj-kamẽ*	**bi-kamẽ-ñ*	‘to push out.ANTIC = to move out’
b.	**aj-côk*	**bi-côk*	‘to paint.ANTIC’
c.	**aw-jarẽ*	**ju-jarẽ-ñ*	‘to tell.ANTP = to narrate’
d.	**ij-tu*	**tu-r*	‘to urinate’
e.	**ij-pê*	**pê-k*	‘to fart’
f.	**ij-kõ*	**kõ-m*	‘to drink’
g.	**ij-kû*	**kwə̂-r*	‘to defecate’
h.	**a-jêt*	**jêt*	‘to hang.SG’
i.	**a-ĵə*	**ĵə-r*	‘to enter.SG’ (CAUS **ĵə*, NF **ĵə-r*)
j.	**a-ŋgî*	**ŋgjê-c*	‘to enter.PL’ (CAUS **ŋgî*, NF **ŋgjê-ñ*)

The consonantal suffixes discussed above and the prefix changes just described constitute all the affixal processes involved in deriving nonfinite forms detected so far.

5. The data and the analysis. Central to our discussion are the following verbal roots reconstructible to Proto-Northern Jê: **-ba*; **ga*; **-to*; **(-)twə̂*, **-te*; **ŋõ*; **ŋõr*; **-tĩ* (two homonymous roots); **ta*; **-nẽ*. What they have in common is that in descriptions of individual Northern Jê languages their reflexes have been invariably treated as having suppletive nonfinite forms.

5.1. Data. The data are exposed in detail in (11–21) (information on anticausatives and antipassives is provided only if the corresponding transitives are not attested or if their semantics differs in an unpredictable way from that of the corresponding transitives).

(11) ****kaba***, NF ****kaĵər*** ‘to extract.SG’

Trans-Tocantins	MBG *kaba/kaĵər*, API *kapa/kacər*, KSJ *kapa/kapaj*, TAP *kawa/kawaj*
Timbíra	**kapa/*kacər*

In Trans-Xingu languages, the original "suppletive" nonfinite form was evidently replaced with an analogical formation (< pseudo-PNJ **kabar*; note that in PNJ **-r* is the most frequent NF allomorph, which is regularly reflected as KSJ and TAP *-j* after **-a-*). Mẽbêngôkre, Apinajé, and Timbíra data clearly show that the nonfinite form of **kaba* was **kaĵər*. The expected reflex in both KSJ and TAP would be **katər*, which is not attested.

(12) ****ga***, NF ****ĵər*** 'to roast.SG'
Trans-Tocantins MBG *ga/ĵər*, API *ka/cər*, KSJ *ka/kaj*, TAP *ka/tər*
Timbíra **ka/*cər*

This time, only Kĩsêdjê—but not Tapayúna—underwent an analogical development, substituting the expected **tər* with *kaj* (< pseudo-PNJ **gar*; note that in PNJ **-r* is the most frequent NF allomorph, which is regularly reflected as KSJ *-j* after **-a-*).

(13a) ****kuto***, NF ****kucôñ*** 'to ignite.SG'
Trans-Tocantins MBG *kuto/kuôñ*, API *kuto* (NF not attested), KSJ *kuṭʰo/kusôn*, TAP *kuṭʰo* (NF not attested)
Timbíra **kuto/*kuhô-n* 'to ignite'

(13b) ****jato***, NF ****jacôñ*** 'to ignite.PL'
Trans-Tocantins MBG *jato/jaôñ*, KSJ *jaṭʰo/jasôn*

(13c) ****kato***, NF ****kacôñ*** 'to cook (?)'
Trans-Tocantins API *kaʔto/kaʔôñ* 'to treat (with the help of a shaman)'
Timbíra **kato/*kahôn* 'to cook'

These three verbs clearly belong to the same derivational family, even though there is no evidence that would allow us to reconstruct the underived verb (would-be ***to*, NF ***cô-ñ*). The semantics that unites them is that of thermal manipulation. The number opposition between **ku-to* and **ja-to* is not found in Timbíra and Apinajé and is thus technically only reconstructible to the protolanguage of Mẽbêngôkre and Trans-Xingu; however, it is quite possible that it did exist in PNJ and was later lost in Timbíra and Apinajé given that the verbal plurality is expressed by the prefix **ja-* in multiple verbs reconstructible to PNJ. The exact semantics of PNJ **ka-to* is unclear due to significant differences between Timbíra and Apinajé.

(14a) ****twâ***, NF ****cuk*** 'to grind, to pound'
Timbíra **twâ/*huk* (ANTP **aʔtwâ/*jəʔhuk* 'to hit the ground, to land, to reach')

(14b) ****katwâ***, NF ****kacuk*** 'to grind, to pound' (ANTIC **ajkatwâ/*bikahuk* 'to be tied together')
Trans-Tocantins MBG *katwâ/kaʔuk* (ANTIC *ajkatwâ/bikahuk* 'to be tied in a bun (hair)'), API *kaʔtvâ/kaʔuk*
Timbíra **katwâ/*kahuk* 'to reach' (ANTIC **ajkatwâ/*pikahuk* 'to be tied')

The underived verb is preserved only in Timbíra, but the fact that a derivative is also found in two Trans-Tocantins languages makes it possible to project the underived verb to the Proto-Northern Jê level. The semantic diversity of the derivatives with valency-reducing prefixes can be understood if the meaning of the underived verb is presented as 'to cause to collide (with the ground or with a similar object)' or 'to press against a surface (or each other)'. It is possible that MBG *kuretû/kureʔuk* 'to repel an attack, to take revenge' is also related to this derivational family.

(15a) ***kate***, NF ***kacêk*** 'to break into pieces'
Trans-Tocantins MBG *kate/kaʔêk*, API *ka(ʔ)te/ka(ʔ)êk*
Timbíra **kaʔte/*kaʔhêk*

(15b) ***kujate***, NF ***kujacêk*** 'to push, to move away'
Trans-Tocantins MBG *kujate/kujaêk*, API *kujate* (NF not attested), KSJ *kujaṭʰe/kujasêk*, TAP *kujaṭʰe* (NF not attested)
Timbíra **kujate/*kujahêk* (→ 'to order' in Canela and Krahô)

(15c) ***to=ñĩte***, NF ***to=ñĩcêk*** 'to nail' (?)
Trans-Tocantins MBG *o=ite/o=iʔêk*

(15d) ***ate***, NF ***jəcêk*** 'to shake.ANTP, to nod' (?)
Timbíra **aʔte/*jəʔhêk*

(15e) ***kute***, NF ***kucêk*** 'to nail' (?)
Timbíra **kuʔte/*kuʔhêk*

The first two verbs are easily reconstructible to Proto-Northern Jê. The third one is only found in Mẽbêngôkre (always with a third-person internal argument, pointing to PNJ **to=c-ĩte/*to=c-ĩcêk*),[22] whereas the reflexes of the latter two are only attested in Timbíra. However, the existence of Timbíra **aʔte/*jəʔhêk* (without any transitivity prefixes) suggests that either underived **te/*cêk* or antipassive **ate/*jəcêk* (or maybe both) did exist in PNJ. The semantics of the aforementioned derivatives is quite diverse, but all the verbs in question have to do with physical manipulation (moving and/or destroying an object).

(16) ***ŋõr***, NF ***ñõt*** 'to sleep'
Trans-Tocantins MBG *ŋõr/ñõt*, API *ŋõr/ñõt*, KSJ *ŋõr/ñõn*, TAP *ŋõr/ñõn*
Timbíra **ŋõr/*jõt*

The reconstruction of both forms of this verbs is trivial; it is preserved in all daughter languages without any irregularities or semantic changes. Note

[22] Certain pseudo-transitive verbs that take their objects with an adposition are formed from transitive verbs, and in these cases the actual accusative object inflection is occupied by an "expletive" third person. This is distinct but similar to the phenomenon whereby a dislocated object, but not an object in situ, is "agreed with" by a referential third-person index. We cannot discuss these phenomena here for reasons of space (for some examples and discussion, see Salanova 2011).

that the finite form is *hõr* in the Timbíra varieties that lack /ŋ/ (Parkatêjê and Krikatí).

(17) ***ŋõ***, NF ***ñõr*** 'to give'
Trans-Tocantins MBG *ŋə̃/ñõr* (Kayapó) ~ *ñə̃r* (Xikrin), API *ŋõ/ñõr*, KSJ *ŋõ/ñõr*, TAP *ŋõ* (NF not attested)
Timbíra **ŋõ/*jõr*

Here Mẽbẽngôkre has an irregular reflex of the vowel (*ə̃* instead of the expected **õ*; in the Kayapó variety the regular outcome is preserved in the nonfinite form). Once again, the finite form is *hõ* in the Timbíra varieties that lack /ŋ/ (Parkatêjê and Krikatí).

(18) ***-tĩ***, NF ***-cĩk*** 'to plait'
Trans-Tocantins MBG *ñiʔĩk* 'ornaments'
Timbíra **aʔtĩ/*jəʔhĩk* 'to interweave.ANTP, to make a rope'; **h-əʔhĩk* 'rope'

The reflexes of this root are only very scarcely attested. Timbíra reflexes include an antipassive verb KRK *aʔtẽ/jəʔhẽk*, PYK *aʔtẽ̩/jəʔhẽ̩k*, whose nonfinite form inflected for third person is attested in the meaning 'rope' (PTJ *h-əhik-ti*, KRK *h-əʔhẽk*, PYK *h-əʔhẽ̩k*). Mẽbêngôkre apparently preserves a nonfinite form of a derived verb with a transitivity prefix (would-be **ñĩtĩ/*ñĩcĩk*), whose verbal reflexes have not been attested. No reflexes of the underived verb (would-be **tĩ/*cĩk*) have been identified in any modern language.

(19) ***atĩ***, NF ***jəcĩk*** 'to sneeze'
Trans-Tocantins API *aʔcĩ/cəʔĩk*
Timbíra **aʔtĩ ~ *aʔcĩ/*jəʔhĩk*

The reflexes of this verb (morphologically an antipassive) are attested only in Apinajé and Timbíra (PTJ *t-atĩ*, NF unknown, CAN *atĩ ~ aʔcĩ/jəʔhĩk*). PNJ **t* is irregularly palatalized before a high front vowel in Apinajé and optionally in Canela, though a regular, non-palatalized reflex is also attested in this latter variety (Grupp 2015:8–9). Such palatalization was plausibly driven by onomatopoeic reasons.

(20a) ***ta***, NF ***cyr*** 'to cut off.SG'
Trans-Tocantins MBG *ta/ʔyr*, API *ta/yr*, KSJ *ṭʰa/syr*, TAP *ṭʰa* (NF not attested)
Timbíra **ta/*hyr*

(20b) ***krə̃ta***, NF ***krə̃cyr*** 'to chop off'
Trans-Tocantins MBG *krə̃ta/krə̃ʔyr*, API *krə̃ʔta/krə̃ʔyr*, KSJ *kʰrə̃ṭʰa/kʰrə̃syr*, TAP *kʰrə̃ṭʰa* (NF not attested)

The difference in the semantics of the underived verb and of **krə̃ta* is not readily identifiable (the reflexes of the latter verb are not attested in Timbíra,

which means that it is only reconstructible to the Proto-Trans-Tocantins level). Note that **krə̃-* is not a known transitivity prefix. Oliveira (2005:127–28) is probably right in hypothesizing that **krə̃-* emerged diachronically as an incorporated object (**krə̃* 'head; spherical object');[23] however, in modern languages the reflexes of **krə̃ta* do not include the element of sphericality. In Mẽbêngôkre, it can refer to cutting parts of the body or branches; in Apinajé, all available usage examples refer to cutting one's hair, while the cognate verbs in the Trans-Xingu languages prototypically refer to chopping wood.

(21a) ***nẽ***, NF ***ñỹr*** 'to say so, to do so'
Trans-Tocantins KSJ *nẽ/ñỹr*

(21b) ***canẽ***, NF ***cañỹr*** 'to say so, to do so'
Trans-Tocantins MBG *anẽ/añỹr*, API *anẽ/añỹr*
Timbíra **hãnẽ/*hãjn̥r*

The reflexes of PNJ **nẽ/*ñỹr ~ *canẽ/*cañỹr* are used as a quotative verb in all branches of the NJ group. It is likely that the variant **canẽ/*cañỹr* is in fact a transitive verb with third person inflection, i.e., **c-anẽ/*c-añỹr*. The uninflected form (a putative **janẽ/*jañỹr*) would be unattested given the peculiar characteristics of the direct object of this verb: it is the only Northern Jê verb that may take a finite complement clause, normally produced as a direct quotation with its own intonation, and not forming a prosodic constituent with the verb. An "agreeing" third person prefix would thus be expected (see fn. 22). The nasalization of the first vowel in Timbíra is somewhat mysterious and is not consistently transcribed in the available sources (e.g., Pries 2008:59).

5.2. Analysis. It can be readily seen that all the verbs listed in **5.1** have a palatal consonant in the onset of the last (root) syllable of their reconstructed nonfinite forms. We claim that these nonfinite forms can, instead of being treated as suppletive, be derived from the respective finite forms through two concomitant processes (consonant palatalization and vowel raising), in addition to the accretion of a consonantal nonfiniteness suffix or the lenition of the stem-final stop in the finite form, morphological devices that are regular in all archetypal verbs.

The consonant to be palatalized is always the onset of the last (root) syllable, and the result of the palatalization is a palatal consonant of the same manner of articulation and phonation: **b/*g → *ĵ*, **t → *c*, **ŋ/*n → *ñ*. The nucleus of the last syllable is raised: **a → *ə* (in one instance **a → *y*), **o → *ô*, **e*

[23] In fact, according to Oliveira, the forms *krə̃ʔta* and *krə̃ʔyr* are independent lexemes, derived from *ta* and *yr*, respectively. She provides the following glosses: *krə̃ʔta* 'to cut off, to chop off', *krə̃ʔyr* 'to cut, to trim (hair)'. However, the usage examples given by Oliveira (2005:392, 411, 420) comply with the hypothesis that, synchronically, *krə̃ʔyr* and *yr* are the nonfinite forms of *krə̃ʔta* and *ta*.

TABLE 1
DERIVATION OF PSEUDO-SUPPLETIVE NON-FINITE FORMS

F	NF	Consonantal Alternation	Vocalic Alternation	Suffix
**ka-ba*	**ka-ĵə-r*	**b* → **ĵ*	**a* → **ə*	**-r*
**ga*	**ĵə-r*	**g* → **ĵ*	**a* → **ə*	**-r*
**ku-to*	**ku-cô-ñ*	**t* → **c*	**o* → **ô*	**-ñ*
**ja-to*	**ja-cô-ñ*			
**ka-to*	**ka-cô-ñ*			
**twə̂*	**cu-k*	**t* → **c*	**wə̂* → **u*	**-k*
**ka-twə̂*	**ka-cu-k*			
**ka-te*	**ka-cê-k*	**t* → **c*	**e* → **ê*	**-k*
**ku-ja-te*	**ku-ja-cê-k*			
(?) **to=c-ĩ-te*	(?) **to=c-ĩ-cê-k*			
(?) **a-te*	(?) **jə-cê-k*			
(?) **ku-te*	(?) **ku-cê-k*			
**ŋõr*	**ñõt*	**ŋ* → **ñ*	**õ* remains	lenition
**ŋõ*	**ñõ-r*	**ŋ* → **ñ*	**õ* remains	**-r*
**-tĩ*	**-cĩ-k*	**t* → **c*	**ĩ* remains	**-k*
**a-tĩ*	**jə-cĩ-k*	**t* → **c*	**ĩ* remains	**-k*
**ta*	**cy-r*	**t* → **c*	**a* → **y*	**-r*
**krə̃-ta*	**krə̃-cy-r*			
**c-anẽ*	**-c-añỹ-r*	**n* → **ñ*	**ẽ* → **ỹ*	**-r*

→ **ê*, **wə̂* → **u*, **ẽ* → **ỹ*. The vowels **õ* and **ĩ* remain intact, apparently because they have no higher equivalents in the vocalic system of PNJ. The data are summarized in table 1.

The co-occurrence of the two processes (consonant palatalization and vowel raising) is not entirely surprising: allophonic raising of vocalic segments following allophonically palatalized consonants has been attested, among other cases, in Iyojwa'ja' Chorote (Matacoan, Argentina; Carol 2014).[24] For concreteness, we suggest that the nonfinite forms of these verbs contain an underlying palatalizing prefix absent from the respective finite forms, as exemplified in (22).

(22) PNJ underlying palatalizing prefix
  a. */ga/, NF */ʲ-ga-r/ → */ga/, NF */g[-ʲ-]a-r/ → **ga*, NF **ĵər*
  b. */twə̂/, NF */ʲ-twə̂-k/ → */twə̂/, NF */t[-ʲ-]wə̂-k/ → **twə̂*, NF **cuk*

[24] This process contrasts with the cases of palatalization being correlated with vowel frontness rather than height, which are more cross-linguistically common (e.g., Marshallese, Tundra Nenets).

A compelling piece of evidence for the palatalizing prefix can be seen in the alternations affecting antipassive prefixes (see **2**), which are here hypothesized to have arisen in exactly the same way, as shown in (23).[25]

(23) PNJ underlying palatalizing prefix in antipassives
a. */ap-jarẽ/, NF */ʲ-ap-jarẽ-ñ/ → */ap-jarẽ/, NF */j-əp-jarẽ-ñ/ → **awjarẽ*, NF **jujarẽñ*
b. */a-cû/, NF */ʲ-a-cû-r/ → */a-cû/, NF */j-ə-cû-r/ → **acû*, NF **jəcwə̂r*

The palatalizing prefix is added to all antipassive verbs when they are in the nonfinite form. In verbs that take the **a-* allomorph of the antipassive prefix, this results in raising of the vowel of the prefix to **ə*; in all NJ languages other than Timbira, the palatal prefix fortitions to an affricate or stop in a way that is consistent with the established sound correspondences. In verbs that take the **aw-* allomorph of the antipassive prefix (underlying */ap-/), the **w* vocalizes to **u* and the **a* is syncopated; the palatal prefix fortitions in all NJ languages (including Timbira), in a way that is consistent with the established sound correspondences.

Although there are other instances of prefix alternation patterns conditioned by finiteness (**a(j)-/*bi-* in anticausatives, **ij-/*∅-* in "physiological" verbs, **a-/*∅-* in some positional verbs), in the case of the verbs considered in this section there appears to be no semantic or morphosyntactic basis from which to independently motivate a natural class of predicates. An alternative explanation on why these verbs and not others would receive a palatalizing prefix in their nonfinite form becomes necessary.

We suggest that the allocation of archetypal verbs to the "palatalizing" class was historically conditioned by nothing other than the onset of the root. This is suggested by the fact that the set of the possible onsets of the verbs under consideration is extremely small: it contains only **b*, **t*, **n*, **g*, and **ŋ* (which can be a surface realization of */g/ in nasal environments).[26] The onsets **p*, **mb*, **m*, **pr*, **mbr*, **mr*, **nd*, **r*, **k*, **ŋg*, **kr*, **ŋgr*, **ŋr* never

[25] One could object that in the other cases of palatalization discussed in this paper the palatalizing prefix attaches to the verb root before prefixation of the unproductive transitivity prefixes, while here it prefixes to a relatively more productive intransitivizing prefix which is external to the former. There is no reason to suppose that the palatalizing prefix doesn't attach at all levels, however. The transitivity prefixes have the peculiarity that they don't begin with any of the segments that undergo palatalization, and therefore the effect of a palatalizing prefix is not seen. The intransitivizer discussed here has a shape such that palatalization would be manifested as an onset consonant, and the vowel change would apply in exactly the way we observe it happening.

[26] Note that not all instances of **ŋ* in onsets are plausibly surface realizations of */g/: in nasal environments, underlying */g/ and */ŋ/ are not expected to contrast (see **2**). Examples of surface **ŋ* that is demonstrably a realization of an underlying */ŋ/ include verbs such as **ŋə̃* 'to grind' (NF **ŋə̃ñ*) and **kaŋõ* 'to crumble, to push against' (NF **kaŋõñ*), given that these do not undergo the palatalization process despite being archetypal, as well as all instances of **ŋr* (**ŋrə̃*

undergo palatalization. Moreover, at least in the case of */g/, the rule applies to the totality of archetypal verbs whose roots start with this segment—**ga*, **ŋõ*, **ŋõr*. Note, however, that this is not the case for either **b*, **n*, or **t*: more often than not, verbal roots that start with these segments do not undergo palatalization. For example, the nonfinite forms of **bə̃* 'to sniff', **by* 'to take.SG', **bô* 'to roast.PL', **bô* 'to untie', **bôj* 'to arrive', **bĩ* 'to kill.SG', **ty* 'to die', **to* 'to fly', **tu* 'to carry' and **tẽ* 'to go.SG' are, respectively, **bə̃r*, **byr*, **bôr*, **bôñ*, **bôc*, **bĩr*, **tyk*, **tor*, **tur*, and **tẽm*. The quotative **canẽ/*cañỹr ~ *nẽ/ñỹr* is peculiar in being the only one in which **n* palatalizes.[27] A number of other verbs with **n* exist, and none of them palatalizes. The vowel change in this verb is also unique.

At the present stage of our knowledge it is impossible to describe the class of verbs that undergo palatalization in PNJ without a diacritic; furthermore, the inventory of segments that are subject to palatalization in PNJ does not form a natural class. Nevertheless, we hypothesize somewhat speculatively that PNJ **t* in palatalizing verb stems (and possibly the unique case of palatalizing **n*) goes back to an earlier ***d*: recall that PNJ has no **d*, a notable gap in the reconstructed phonemic inventory of the language.[28] This hypothesis would allow us to restrict the palatalizing class to the verbs whose roots started with a voiced stop in Pre-Proto-Northern Jê.[29]

'dirty', **ŋrõ* 'toucan', **kuŋrĩ* 'to gather in a bundle', **ñĩŋrõt* 'to sprout from ground'), since only underlying voiceless stops and nasals can be combined with an **-r-* to form a complex onset.

External cognates corroborate the alleged contrast between underlying */g/ and */ŋ/ since the external correspondences are also different. For example, in Maxakalí PNJ */g/ corresponds to /h ~ ∅/ both in nasal and oral environments, e.g., MXK /mũ=hap/ 'to roast' ~ PNJ **ga*, MXK /hũp/ 'to give' ~ PNJ **ŋõ*, MXK /mũ=(h)ũt/ 'to sleep.IRR' ~ PNJ **ŋõr* 'to sleep.F', MXK /ũk/ 'your = 2.GEN' ~ PNJ **ŋõ*. In comparison, PNJ */ŋ/ corresponds to Maxakalí /k/ both in nasal and oral environments, e.g., MXK /knãt/ 'toucan' ~ PNJ **ŋrõ*, MXK /KYT/ 'louse' ~ PNJ **ŋgô*.

[27] **canẽ/*cañỹr* is also peculiar from a morphosyntactic point of view since it is the only verb that can take a finite complement clause (actually a quoted expression).

[28] It is possible that PNJ **d* should have to be reconstructed in order to account for the cognate set Mẽbêngôkre *jaduj* 'truncated, without tip' ~ Apinajé *o-ʔatuj* 'soon' ~ Timbíra **jatuj* 'to shortcut', **jatuj-re* 'short' (< PNJ **jaduj* 'short'?). The Mẽbêngôkre reflex is the only word in the language (other than borrowings and clearly onomatopoeic words) that contains the voiced stop *d*; Apinajé and Timbíra data could equally reflect PNJ **jatuj*. We refrain from attributing phonemic status to PNJ **d* until more positive evidence is identified because alternative explanations (such as a borrowing from a substrate language, see Nikulin and Carvalho 2018:557 for such a possibility) could account for the data in question.

[29] Note that the external correspondences of stops */b, g/ are approximants rather than stops: PNJ */b/ corresponds to *w* in all Central and Southern Jê languages and Krenák (in Maxakalí, it corresponds to /p/ or /m/, but this language has no /w/ at all), whereas PNJ */g/ corresponds to *h* or zero in Maxakalí and Krenák (Nikulin and Silva 2019). Ribeiro and van der Voort (2010:549–50, 562), as well as Nikulin (2017:158–59), have also previously suggested that **w* and **j* have been historically fortitioned in the history of PNJ. Hence PNJ */b, t, ĵ, g/ < Pre-PNJ **/b, d, ĵ, g/ probably arose as a result of a fortition of an earlier approximant series (**/w, ð, j, ɰ/), though the external evidence for the dental point of articulation is still lacking at present.

In any case, since only four (*/b, t, n, g/) of 13 underlying non-palatal onsets that occur in archetypal verbs (*/p, pr, m, mr, b, t, n, r, k, kr, ŋ, ŋr, g/) occur in verbs whose nonfinite form undergoes palatalization leaves little doubt as to the relevance of the phonological structure of the verbal root to the occurrence vs. nonoccurrence of an underlying palatalizing prefix. Note furthermore that the class of sounds subject to palatalization consists precisely of those (other than **r*) that disallow complex onsets and includes some of the rarest possible onsets in PNJ (**n*, **g*). Even without these further observations about the inventory of palatalizing consonants, the probability that the root onsets of palatalizing verbs only accidentally fall into this limited inventory is extremely low, something which is easy to show.

Two problems remain unresolved even after accepting our speculative hypothesis that **n* and **t* in palatalizing stems derive from ***d*, and hence that palatalization targets stems with voiced stops:

- Why do some PNJ verbs whose roots start with **b* (such as **bə̃* 'to sniff', **by* 'to take.SG', **bô* 'to roast.PL', **bô* 'to untie', **bôj* 'to arrive', **bĩ* 'to kill.SG', etc.) not undergo palatalization, while **kaba* 'to extract.PL' does?
- Why is the low vowel in **ta* 'to cut off.SG' raised to **y* instead of the expected ***ə* in the nonfinite form?

Although we have no answer to the first question at present, the case of the verb **ta* 'to cut off.SG' deserves to be discussed in greater detail. As shown in (24), the Central Jê cognates of PNJ pseudo-suppletive verbs usually have their finite form back-derived from the respective nonfinite form (see also discussion in **5.3**).

(24) Proto-Central Jê finite forms back-derived from nonfinite forms[30]

		PCJ F	←	PCJ NF	~	PNJ NF
a.	'to extract'	**waĵê*		**waĵêrê*		**kaĵər* (PL)
b.	'to roast'	**ĵêbrê*		**ĵêbrê*		**ĵər* (SG)
c.	'to sleep'	**ñõtõ // *ñõːnõ*		**ñõtõ // *ñõːnõ*		**ñõt*
d.	'to give'	**cõ*		**cõmrĩ*		**ñõr*

PNJ finite forms of these verbs (**kaba*, **ga*, **ŋõr*, **ŋõ*) do not correspond to any known form in Central Jê (would-be ***wawa*, ***ka*, ***kõrõ // **kõːrõ*, ***kõ*). It is possible that, throughout the history of Proto-Central Jê, inherited finite forms were perceived as too dissimilar to their nonfinite counterparts and were replaced with analogical formations (compare that to Kĩsêdjê *kapa/kapaj*

[30] These PCJ forms are reflected as XAV *waĵê/waĵêrê*, *ĵêbrê*, *ñõtõ // ñõːnõ*, *cõ/cõmrĩ*, XER *wazê/wazêr(ê) ~ wazrê*, *dêbr(ê) ~ zbrê*, *nõt(õ) ~ ntõ*, *sõ/sõmr(ĩ)*. The PCJ reconstructions here and elsewhere in the manuscript follow the proposal by Nikulin (2017). The notation "A // B" means that the allomorph A occurs utterance-internally whereas the allomorph B occurs utterance-finally.

'to extract.PL', *ka/kaj* 'to roast.SG', whose nonfinite forms were not inherited from PNJ, but rather formed from the respective finite forms by analogy).

On the other hand, the apparent cognate of Proto-Northern Jê **ta/*cyr* 'to cut off.SG' in Proto-Central Jê is **ta/*tari* (XAV, XER *ta/tari*). It can be easily seen that this time PCJ and PNJ present a perfect match between the respective finite (rather than nonfinite) forms. If Proto-Northern Jê reflects the original Proto-Cerrado situation, Proto-Central Jê must have innovated by analogically replacing the inherited nonfinite form with a secondary formation derived from the finite form **ta*, as in the Kĩsêdjê examples above but unlike the situation in (24). Although analogy, being a subregular process, plausibly operated in different directions in different verbs, it is also possible that PNJ **ta/*cyr* is, after all, a truly suppletive verb, eliminating the need to account for the unexpected raising of **a* to **y*. We leave this question open for future research.

5.3. Age of the phenomenon. It is important to emphasize that the putative palatalizing prefix does not constitute an exclusively Proto-Northern Jê innovation. For instance, the cognates in the closely related Central Jê languages of most of the verbs considered in this section reflect what appear to be Proto-Cerrado nonfinite forms—with the palatalization of the stem-initial consonant and the raising of the nucleus, as shown in (25a–f); (25g) is an exception in that it preserves the original finite form and constructs the nonfinite form via a regular model. Note that Central Jê finite forms in (25a–f) appear to be back-derived from the inherited nonfinite forms.

(25) Central Jê cognates of PNJ pseudo-suppletive verbs[31]
- a. PNJ **kaba/*kaĵər* ~ PCJ **waĵê/*waĵêrê* 'to extract'
- b. PNJ **ga/*ĵər* ~ PCJ **ĵêbrê* 'to roast'
- c. PNJ **-to/*-côñ* ~ PCJ **cu* 'to burn grass'
- d. PNJ **twâ/*cuk* ~ PCJ **cuku* // **cu* 'to plain, to smooth'[32]
- e. PNJ **ŋõr/*ñõt* ~ PCJ **ñõtõ* // **ñõːnõ* 'to sleep'
- f. PNJ **ŋõ/*ñõr* ~ PCJ **cõ/*cõmrĩ* 'to give'
- g. PNJ **ta/*cyr* ~ PCJ **ta/*tari* 'to cut off.SG'

A more distantly related language, Maxakalí, provides important evidence for an even greater antiquity of the palatalization process affecting some nonfinite forms. In the history of Maxakalí, the function of the verbal forms that

[31] All the correspondences are regular except for the fact that Proto-Northern Jê nonderived **ə* is expected to correspond to Proto-Central Jê **e* (Ribeiro and van der Voort 2010:554; Nikulin 2017:164), whereas Proto-Northern Jê **ə* derived from **a* via palatalization corresponds to Proto-Central Jê **ê*. We leave the question of how exactly the palatalization process affected the nuclei in Proto-Cerrado open.

[32] It would be tempting to draw PCJ verb **cum* // **cu* 'to grind' to this etymology (semantically, it would be an ideal match), but the coda consonants make this comparison implausible. Instead, PCJ **cum* // **cu* should be compared with PNJ **ĵôm* (Nikulin 2017:176).

used to contrast in finiteness in Proto-Macro-Jê (and still do so in Northern Jê) was altered, giving rise to the category of mood (Nikulin and Silva n.d.). What used to be finite forms in Proto-Macro-Jê had their usage restricted to imperative constructions and to subordinate clauses with purposive semantics, a form associated with the irrealis mood by Nikulin and Silva. On the other hand, former nonfinite forms are now used in most types of matrix and dependent clauses in Maxakalí (Nikulin and Silva's realis mood). Realis and irrealis forms are identical for most Maxakalí verbs, but several dozen verbs do make this distinction overtly—including a cognate of PNJ **ŋõr/*ñõt* 'to sleep', Maxakalí IRR /mũ=(h)ũT/, RLS /mũ=ñũT/ (Nikulin and Silva 2019, n.d.). The alternation at the left margin of the stem in Maxakalí matches precisely the analogous alternation in Northern Jê: Maxakalí /h/ corresponds to PNJ */g/ (as in /mũ=haP/ 'to roast' ~ **ga*, /hũP/ 'to give' ~ **ŋõ*), whereas Maxakalí /ñ/ corresponds to PNJ */ʃ/ in nasal environments (as in /ñĩT/ 'meat' ~ **ñĩ*, /ñũK/ 'GEN' ~ **ñõ*, /ñỹP/ 'to sit.SG' ~ **ñỹ*). This means that the phenomenon under consideration can be probably reconstructed all the way back to Proto-Macro-Jê, though its reconstruction would have hardly been possible without the Northern Jê data.

6. Consequences for other hypotheses. In this section, we discuss the relevance of the analysis proposed in **5** to two other issues. In **6.1**, we provide additional evidence for a hypothesis by Salanova (2011), according to which a morpheme that had been labeled "contiguity relational prefix" or just "relational prefix" does not exist in Northern Jê languages. In **6.2**, we argue that reconstruction of Proto-Northern Jê **c* (< Proto-Cerrado **c* < Proto-Jê **c*) as a voiceless stop or affricate is a more plausible solution than the alternative reconstructions proposed by Davis (**z*, 1966) and Ribeiro (**s*, 2005).[33]

6.1. The contiguity prefix controversy. Here we present additional evidence against the existence of the so-called contiguity relational prefix (or simply "relational prefix") in Northern Jê languages.

The concept of *relational prefixes*, a set of prefixes that would mark contiguity of a theme with its internal argument, was first proposed by Rodrigues (1953) for Tupinambá, a Tupian language of eastern Brazil. This framework was subsequently transferred by the author to non-Tupian languages, including Macro-Jê (Rodrigues 1999, 2009, 2012), and has been widely adopted in most synchronic descriptions of Macro-Jê languages in two variants.

[33] Unfortunately, we have had no access to the materials of Ribeiro's talk, which is cited in numerous subsequent works by the same author either as a talk or as a manuscript (Ribeiro 2009, 2011, 2012; Ribeiro and van der Voort 2010, among others), and is explicitly indicated as the ultimate source for the reconstruction of Proto-Jê **s* for the correspondence set in question.

One variant, followed by the proponent of the concept of relational prefixes himself as well as by his students (Miranda 2014; Costa 2015, among others), proposes that all inflectable stems are obligatorily marked for *contiguity with their internal argument*. If their internal argument is expressed in its canonical position—that is, directly to the left of the head—they would receive a *contiguity relational prefix*, whose allomorphs in Northern Jê languages are **zero** before consonants and **reflexes of PNJ */j̊/** before vowels. The authors who follow this argumentation line also propose that if the internal non-SAP argument is omitted or dislocated to a noncanonical position, inflectable themes necessarily receive a so-called *noncontiguity relational prefix*. For convenience, we refer to this type of analysis as "Rodrigues-style analysis." Note that, under these premises, zero allomorphs of the contiguity relational prefixes occur with a strikingly high frequency in discourse, as illustrated in (26) with an example from Miranda's (2014) thesis on Krahô.

(26) Occurrence of the zero allomorph of the contiguity relational prefix (CTG) in Krahô (Rodrigues-style analysis)

a	*Ø–te*	*kop*	*Ø–kʰə̃m*	*kô*	*j–acwô–r*
2SG	CTG–ERG	glass	CTG–LOC	water	CTG–pour–NF
Ø–to	*i*	*Ø–kʰõ–m*	*Ø–kacû*		
CTG–INS	1SG	CTG–drink–NF	CTG–PURP		

'You poured water into the glass in order [*sic*][34] to drink it.'

(Miranda 2014:230)

In another variant of the analysis (Castro Alves 2004; Sá Amado 2004; Oliveira 2005; Nonato 2014; Camargo 2015), consonant-initial inflectable stems do not receive any special marker if their internal argument is adjacent to them and forms a constituent with them. However, the instances of the reflexes of PNJ */j̊/ before vowels that appear in this morphosyntactic context are still analyzed as prefixes, variably labeled as "relational prefixes" or "linking consonants." The authors who favor this analysis also tend to identify the morpheme that emerges in case of an omitted or dislocated argument with the third-person prefix. One of the most active proponents of this analysis for Macro-Jê languages is Ribeiro (2011, 2012, among others); for convenience, we refer to this analysis as "Ribeiro-style analysis."

[34] Miranda (2014:230) glosses *i* (in his analysis, not a prefix but rather a pronoun of so-called *series II*) as 1SG, which implies that one would expect a first-person agent for "drink" in the subordinate clause. It is also possible that the morpheme in question is in fact *i?* 3. The translation given by the author ('Houve de ti o derramar a água no copo para beber (isto) = Você derramou a água no copo para bebê-la'), however, suggests an interpretation wherein the subordinate subject is coreferential with the main clause subject, possibly as a result of mistranslation. These discrepancies are irrelevant for our purposes.

Salanova (2011) has argued explicitly against both of these possibilities of analysis. According to his proposal, the reflexes of PNJ **/ʃ/ that occur at the left margin of some inflectable stems would be an integral part of these stems, and contiguity of stems to their internal arguments would not receive overt morphological marking in any type of stem (however, Northern Jê morphosyntax would require an agreeing third-person prefix in case of a dislocated argument). Salanova's argumentation, built primarily on data from Mẽbêngôkre, includes the following facts.

- Intransitive verbs (or S_A verbs in terms of those who view Northern Jê alignment as *split-S*) in their finite forms do not have an internal argument; hence they are not expected to be marked for contiguity. Nevertheless, the **/ʃ/ that would mark contiguity in their nonfinite forms, where they do have internal arguments (i.e., **i-ñỹr* 'my sitting' vs. **c-ỹr* 'his sitting'), is fixed in their finite forms: **ba ñỹ* 'I sit', **ga ʃa* 'you stand'.
- Many proper names that are built from inflectable **/ʃ/-initial words keep the initial consonant even in the absence of a contiguous internal argument. This would be impossible in the normal use of these words as common nouns, where they would obligatorily mark their internal argument (or "lack of contiguity") with the prefix **c-*. Mẽbêngôkre examples include *Ñĩjakre-kam-pĩ* 'wood in the nose' (cf. *ñĩjakre* 'nose', third person Ø-*ĩjakre*), *Ʃê-tire* 'large ornament' (cf. *ʃê* 'knot, ornament', third person Ø-*ê*), *Jamy-biŋrĩ* 'tangled tail' (cf. *jamy* 'tail', third person Ø-*amy*).
- If a valency-reducing prefix is attached to a stem that has a movable **/ʃ/, the **/ʃ/ stays, as in *ʃu-jarẽ-ñ* 'to narrate.NF' (< *jarẽ-ñ* 'to tell.NF'). In Mẽbêngôkre, this consonant is fortitioned to *c* [t͡ʃ] after the anticausative prefix: *bi-caʃwə̂-r* 'to descend.NF' (< *jaʃwə̂-r* 'to put down.NF'), reflecting Proto-Northern Jê **bit-jaʃwə̂-r*.
- Transitivity prefixes are attached before **/ʃ/. Given the low productivity of transitivity prefixes, the force of this argument depends on the possibility of identifying **/ʃ/-initial roots that can occur without transitivity prefixes, and show that an alternating **/ʃ/ in the root is stable when the prefix is attached. This clearly happens in the case of Mẽbêngôkre *ʃə̂-r* 'go in.NF' (Ø-*ə̂-r* 'he has gone in'), which becomes *ja-ʃə̂-r* 'put in.NF', with stable /ʃ/, when a transitivity prefix is added. In other examples the semantic connection between the transitive and intransitive stem is not as clear.
- A small number of nouns can be both inalienably and alienably possessed—in other words, can both inflect for their possessor or express it by means of a genitive adpositional phrase. When such nouns begin by one of the alternating consonants, the consonant will be stable in the alienably possessed variant. This is the case of Mẽbêngôkre *ʃuʃê* 'bow, weapon': inalienable *i-ʃuʃê* 'my weapon', Ø-*uʃê* 'his weapon', but alienable *i-ñõ ʃuʃê* 'my weapon', Ø-*õ ʃuʃê* 'his weapon'.

TABLE 2
DIFFERENT ANALYSES OF WHAT HAS BEEN CALLED RELATIONAL PREFIXES APPLIED TO PROTO-NORTHERN JÊ

	following Rodrigues		following Ribeiro		following Salanova	
**kukryt ĵwa*	**kukryt*	*ĵ-wa*	**kukryt*	*ĵ-wa*	**kukryt*	*ĵwa*
'tapir's tooth'	tapir	CTG-tooth	tapir	RP-tooth	tapir	tooth
**kukryt ndo*	**kukryt*	*∅-ndo*	**kukryt*	*ndo*	**kukryt*	*ndo*
'tapir's eye'	tapir	CTG-eye	tapir	eye	tapir	eye
**c-wa*	**c-wa*		**c-wa*		**c-ĵwa* →	**c-wa*
'(its) tooth'	NCTG-tooth		3-tooth		3-tooth	
**c-ndo*	**c-ndo*		**c-ndo*		**c-ndo*	
'(its) eye'	NCTG-eye		3-eye		3-eye	

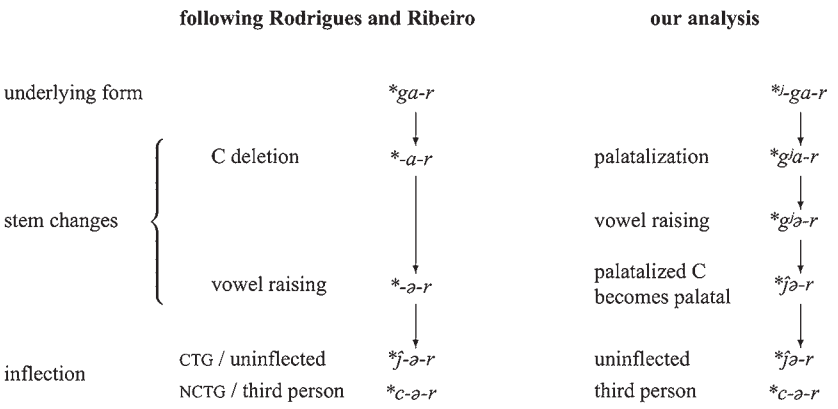

FIG. 2—Pseudo-suppletive forms in Rodrigues's, Ribeiro's, and our analyses

The three analyses are summarized in table 2.

It is now possible to enrich Salanova's (2011) argumentation with a new observation. It consists in the fact that a */ĵ/ that is derived through palatalization of a root-initial */g/ behaves in exactly the same way as any other stem-initial */j/: it appears under the same morphosyntactic conditions, being replaced with */c/ in the third-person forms. If one were to maintain an analysis with contiguity-marking prefixes, one would have to say that the process that we describe as palatalization here consists of dropping of an initial consonant of the root and effecting an unmotivated vowel change, which under the analysis that we propose here is a rather natural concomitant of the palatalization rule. Figure 2 contrasts how this would be done in an analysis that follows Rodrigues or Ribeiro with how it is done in our analysis.

TABLE 3
PALATALIZATION OF CONSONANTS IN
PROTO-NORTHERN JÊ

Input		Output	
Phonemic	Phonetic	Phonemic	Phonetic
*/b/	**b*	*/ʃ/	**ĵ*
*/g/	**g*		
	**ŋ*		**ñ*
*/t/ (< **/d/)	**t*	*/c/	**c*
*/n/ (< **/d/)	**n*	*/ʃ/	**ñ*

As seen in the chart, although our analysis involves only natural morphophonological processes, it is much more difficult to account for the processes required by the "relational prefix" framework: the insertion of relational prefixes would only be possible after the deletion of the stem-initial consonant and the raising of the nucleus. However, there appears to be no obvious motivation whatsoever for such stem-changing phenomena. Furthermore, the "relational prefix" framework would fail to capture the similarity of what happens to stems like **ga/*ĵə-r* 'to roast.SG' with what happens to stems that contain transitivity prefixes, such as **kaba/*kaĵə-r* 'to extract.PL': if the initial segment of the nonfinite form of **ĵə-r* actually were a prefix, the intervocalic palatal consonant found in **kaĵə-r* would require some other explanation.

6.2. The reconstruction of PNJ *c. In **5.2** we showed that, under our analysis, the palatalization process, as reconstructible to PNJ, transforms a non-palatal consonant into a palatal consonant of the same manner of articulation and phonation. This is reproduced in table 3 (for data, see **5**).

Obviously, this minimal analysis, involving only one contrastive feature, relies heavily on the very reconstruction of the segments that participate in the process—namely, */b, g, t, n, ĵ, c/ (**b*, **g*, **ŋ*, **t*, **n*, **ĵ*, **ñ*, **c*)—and on the reconstructed systemic oppositions between them. This reconstruction was proposed by Nikulin (2016) based on the reflexes in daughter languages rather than on the details of operation of the palatalization process, whose existence the author fails to mention. The rationale behind the reconstruction of a voice contrast for oral stops (**b*, **ĵ*, **g* vs. **p*, **t*, **c*, **k*) includes the following facts.

- All these phonemes, except **c*, are preserved in Mẽbêngôkre (but PNJ **c* yields MBG *ʔ*/∅).
- In Trans-Xingu languages, the voice contrast was transformed into an aspiration contrast. In Kĩsêdjê, PNJ voiced stops (in Nikulin's reconstruction) became voiceless unaspirated (PNJ **b*, **ĵ*, **g* > KSJ *p*, *t*, *k*), whereas PNJ voiceless stops either became aspirated (PNJ

**t*, **k* > KSJ *ṭʰ*, *kʰ*) or have continuant reflexes (PNJ **p*, **c* > KSJ *h(w)*, *s*), which can have gone through an aspirate stage in the past. In Tapayúna, the reflexes are similar to Kĩsêdjê except that PNJ **b* yielded TAP *w* (there is no *p* in Tapayúna) and PNJ **c* > TAP *t*. This allows us to reconstruct the evolution of PNJ oral stops in Trans-Xingu languages positing a minimal number of sound changes, as shown in (27) (from PNJ to pre-Proto-Trans-Xingu: voiced contrast > aspiration contrast, palatals > dentals, retraction of **t*; from pre-Proto-Trans-Xingu to Proto-Trans-Xingu: **pʰ* > **h(w)*; from Proto-Trans-Xingu to Kĩsêdjê: **tʰ* > *s*; from Proto-Trans-Xingu to Tapayúna: **tʰ* > *t*, **p* > *w*).

(27)

PNJ	pre-Proto-Trans-Xingu	Proto-Trans-Xingu	KSJ	TAP
**b*	**p*	**p*	*p*	*w*
**ĵ*	**t*	**t*	*t*	*t*
**g*	**k*	**k*	*k*	*k*
**p*	**pʰ*	**h(w)*	*h(w)*	*h(w)*
**t*	**ṭʰ*	**ṭʰ*	*ṭʰ*	*ṭʰ*
**c*	**tʰ*	**tʰ*	*s*	*t*
**k*	**kʰ*	**kʰ*	*kʰ*	*kʰ*

- In Timbíra and Apinajé, as in Trans-Xingu, PNJ voiced stops (in Nikulin's reconstruction) became voiceless (*p*, *c*, *k*), partially merging with PNJ voiceless stops. The merger did not occur in the palatal point of articulation because of an early weakening PNJ **c* > Timbíra **h*, Mẽbêngôkre, Apinajé **ʔ*/**∅; in Timbíra the merger was also prevented in the velar point of articulation because of a sound change **k* > **kʰ* in stressed syllables. In the labial point of articulation the merger was complete in both Apinajé and Timbíra, but the ancient distinction between PNJ **p* and **b* is still manifested in the allophony of the third-person prefix in Timbíra (see fn. 12).
- At first sight, it might seem that Trans-Xingu and Timbíra are conservative in having an aspiration contrast, but no voice contrast among their oral stops, since Trans-Xingu and Timbíra are not especially close to each other within Northern Jê. However, there is both internal and external evidence clearly shows that these languages—and not Mẽbêngôkre—have undergone a major innovation. Internal evidence consists of two observations. The first is the fact that not only PNJ voiced stops, but also the pre-oralized allophones of PNJ nasal stops underwent devoicing in Timbíra. The latter development has been argued to be an example of an unnatural sound change (Lapierre 2017); however, as argued by Nikulin (2017:148), it can be easily explained if viewed within a more general devoicing trend (see also the discussion in Beguš 2018:25). Another piece of internal evidence is the fact that PNJ */g/ and */ĵ/ surface as **ŋ* and **ñ* in nasal environments, something that would have been

difficult to account for if these consonants were to be reconstructed as voiceless. External data, in its turn, show that PNJ **b* and **ĵ* correspond to approximants in languages that have them (Proto-Central Jê **w*; Proto-Southern Jê **w*, **j*; Krenák *w*, *j*), whereas PNJ voiceless stops tend to correspond to voiceless unaspirated segments in Macro-Jê languages where the [voice] contrast has historically been robust (Proto-Southern Jê **p*, **t*, **θ*, **k*; Proto-Jabutí **p*, **t*, **t̪s*, **k*).

Strictly speaking, reconstructive proposals by Davis (1966) and Ribeiro (2005) refer to Proto-Jê—a deeper level than Proto-Northern Jê. However, any attempt at a reconstruction of Proto-Jê phonology should also be able to account for Proto-Northern Jê data. Below we show that Davis's (1966) reconstruction of Proto-Jê stop series is deeply flawed in this regard and should definitely be rejected. On the other hand, Ribeiro's (2005) reconstruction of Proto-Jê onsets—as is known to us from the fragments published—is almost entirely compatible with the reconstruction adopted here except for Ribeiro's **s*.

As pointed out by Ribeiro and van der Voort (2010:549–50), one of the major shortcomings of Davis's (1966) reconstruction is the author's overreliance on Apinajé data. Data from Mẽbêngôkre (labeled "Northern Kayapó" by Davis) were not considered by Davis because of the proximity of this language to Apinajé, and the very existence of oral voiced stops in Mẽbêngôkre is deemed irrelevant for the reconstruction as they would have "apparently developed in restricted environments" (Davis 1966:11). This leads the author to reconstruct only voiceless oral stops (**p*, **k*) in the labial and velar points of articulation (compare this with our **p*, **b*, **k*, **g*). In the dental point of articulation, no complications arise, as only **t* is to be reconstructed. The reflexes of what we reconstruct as PNJ **ĵ* and **c* are different enough to make it impossible to conflate them into one reconstructed phoneme, and Davis reconstructs **c* and **z* in lieu of them.

Among languages examined by Davis, reflexes of PNJ **p* and **b* are distinct in Kĩsêdjê, while their external correspondences are distinct in Xavánte and Kaingáng. As for Kĩsêdjê, the author correctly identifies the reflexes of PNJ **p*/**b* (Proto-Jê **p* in his reconstruction) as *h(w)*, *w*, *p*, stating that the "[t]he conditions for the latter developments are not known, nor is it certain that these sounds are all phonemically distinct" (Davis 1966:13). Something similar concerns Xavánte, a language for which Davis (1966:13) lists three possible reflexes of his **p* (our **p* and **b*): /p/, /m/, /w/. For the most part he correctly identifies the environments that conditioned the split of **p* into /p/ and /m/ (corresponding to our PCerr **p* > PNJ **p*, see also Nikulin 2017), but some occurrences of /m/ as well as "the appearance of *w* in at least two items remain unexplained" (Davis 1966:13). Davis did not identify any Kaingáng

TABLE 4
OUR RECONSTRUCTION OF PNJ STOPS COMPARED WITH PJ RECONSTRUCTION BY DAVIS (1966)

proposal (PNJ)	proposal (PCerr)	Davis (1966)
**p*	**p*	**p*
**b*	**w*	
**t*	**t* (maybe merged earlier **t* and **ð̩*)	**t*
**c*	**c*	**z*
**ĵ*	**j*	**c*
**k*	**k*	**k*
**g*	**g* (< earlier **uɻ*)	

cognate of any PNJ stem that, according to our reconstruction, contains a **b*. As suggested by Ribeiro and van der Voort (2010:549–50), the unexplained splits noted by Davis are easily accounted for if one posits two distinct reconstructed labial phonemes (PJ/PCerr **p*, **w* > PNJ **p*, **b*).

In the velar point of articulation, reflexes of PNJ **k* and **g* are also distinct in Kĩsêdjê and Timbíra: the former yielded an aspirated stop (at least in stressed syllables), whereas the latter yielded an unaspirated stop. However, the aspiration was not consistently transcribed in Davis's sources, and the generalizations he formulates concerning the distribution of the reflexes of his **k* in these two languages are not exceptionless (Davis 1966:13–14), preventing him from detecting the contrast between **k* and **g* we reconstruct for PNJ.

In the palatal point of articulation, Davis (1966:13, 15) does reconstruct two distinct phonemes for Proto-Jê: **c* (~ our PNJ **ĵ*) and **z* (~ our PNJ **c*). The reconstruction of **c* as a voiceless stop/affricate was clearly suggested by the fact that Davis's sample of Northern Jê languages did not include Mẽbêngôkre, the only NJ language without devoicing. Conversely, **z* is placed by Davis (1966:13) into the approximant series, though the author acknowledges that this reconstructed segment "exhibits a great variety of reflexes and its original phonetic characteristics are not known" (Davis 1966:15).

The palatalization process, described in **4**, suggests strongly that what Davis reconstructs as **z* was related to **t* in the same way as Davis's **c* was related to what we reconstruct as **b*, **g* (phonemes conflated with **p*, **k* in Davis's reconstruction because of his overreliance on Apinajé data). The easiest way to account for these asymmetries is reinterpreting Davis's **z* as a voiceless segment (on par with **t*, a segment whose reconstruction does not create any obstacles), while Davis's **c* would be reinterpreted as a voiced segment (on par with **b*, **g*, whose reconstruction was argued for above). Relations between our reconstruction of PNJ stops and Davis's PJ reconstruction are exhibited in table 4.

Concerning the segments under discussion, Ribeiro's (2005) reconstruction of Proto-Jê does not differ much from our reconstruction of Proto-Cerrado: despite the difference between the levels of reconstruction, there is an identity relation between Ribeiro's and our **p*, **w*, **t*, **j*, **k*, though it is unclear from the published fragments (e.g., Ribeiro and van der Voort 2010:555) how Ribeiro's reconstruction accounts for the occurrences of PNJ **g*. Apart from PNJ **g*, there is one other minor difference between our current proposal and Ribeiro's reconstruction—namely, the reconstruction of Proto-Jê **s*. Ribeiro and van der Voort (2010:555, fn. 35) justify it as follows:

> The symbol **s* . . . is used to represent a phoneme whose regular reflexes are /s/ in Panará, /s/ in Suyá, /h/ in Timbira, /s/ in Central Jê (/h/, before PJê **i*; /z/ before PJê **ɨ*), zero (or a glottal stop) in Apinajé and Kayapó, /ɸ/ in Kaingáng, and /ð/ in Xokléng. Davis (1966) reconstructs it as **z*, but when one considers the reflexes listed above, **s* seems to be a better approximation to its likely pronunciation.

We believe that the reconstruction of this segment has to be amended to **c* for all reconstruction levels involved (Proto-Jê, Proto-Cerrado, and Proto-Northern Jê). Crucially, Davis does not take into account Jê varieties that have non-continuant reflexes of this segment, such as Tapayúna *t* and Xavánte *c* [ts ~ tʃ] (elder speakers).[35] Although it is technically possible to derive these reflexes from a reconstructed **s*, it is well-known that it is easier for an affricate (or a palatal stop) to become a fricative than for a fricative to develop a stop phase. At least for the Proto-Northern Jê stage, the reconstruction of */c/ as a member of the stop series is definitely confirmed by the fact that */t/ becomes */c/ when it undergoes palatalization. We deem this to be a sufficient reason to project the reconstruction of */c/ further onto Proto-Jê level in order to avoid typologically less common sound changes.

7. Conclusions. We have proposed an analysis according to which the expression of (non)finiteness in Northern Jê languages would historically not involve any suppletion. Instead, the very different finite and nonfinite forms of some verbs could be accounted for by positing a morphophonological process that palatalizes the initial segment of the stem and causes a raising of the nucleus (when applicable). A closer examination of the class of verbs affected by this process and of the details of its operation lends support to a number of collateral hypotheses, such as Salanova's (2011) claim regarding the unsegmentability of the reflexes of Proto-Northern Jê **ʃ/ and Nikulin's (2016) reconstruction of PNJ stops, and gives rise to some new hypotheses, such as the potential double origin of PNJ **t*.

[35] We thank Juliana Pereira dos Santos (personal communication, Universidade Federal de Goiás, 2018) for pointing out that the affricate realization of this phoneme is associated with the elder speakers' speech. It has also been described as a regional or free variant (see Nikulin 2017:153 and references).

Two rough spots remain in the account proposed in this paper. On the one hand, two verbs, **ta/cyr* and **(ca)nẽ/*(ca)ñỹr*, do not apply the vowel changes in a way that is perfectly consistent with our rule. The verb **(ca)nẽ/*(ca)ñỹr* is futhermore the only one in which **n* gets palatalized, raising questions about the extent to which it should affect our reconstruction. What happens with these two verbs has to remain as a subregular phenomenon in our analysis.

On the other hand, representing the palatalization process as the effect of a **j-* prefix is at this point somewhat speculative. Though the existence of this prefix has some support in the alternations of the antipassive prefix **a-/*aw-*, better evidence for it is still lacking.

8. A note on the sources for individual languages. Main sources on individual languages are as follows:

Apinajé	Callow 1962; Ham et al. 1979; Oliveira 2005; Albuquerque 2012
Canela	Popjes and Popjes 1971, 1986; Castro Alves 2004; Grupp 2015
Kĩsêdjê	Santos 1997; Suyá et al. 1999, 2012; Nonato et al. 2012; Nonato 2014
Krahô	Miranda 2014
Krikatí	Pries 2008
Mẽbêngôkre	(our field data)
Parkatêjê	Araújo 2016
Pykobjê	Sá Amado 2004; Pries 2008
Tapayúna	Camargo 2010, 2015; Jérémie Beauchamp, UC Santa Cruz, personal communication 2018
Xavánte	Hall et al. 1987; Lachnitt 1987; Estevam 2011
Xerénte	Krieger and Krieger 1994

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