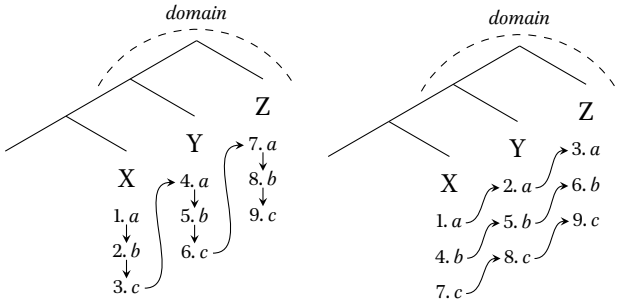
Ordering postsyntactic operations within domains

In Distributed Morphology (Halle and Marantz 1993, et seq.), a number of postsyntactic morphological operations are proposed, such as Impoverishment, Fission, and Vocabulary Insertion (henceforth VI), among others (e.g. Embick 2015), raising the question of how these operations are ordered (Arregi and Nevins 2012, Kalin 2022, Hewett 2023, a.o.). One underexplored aspect of this question (though see Kalin 2022) involves the distinction between what we can call HYPERCYCLIC VS. NON-HYPERCYCLIC ordering: Given a set of postsyntactic operations *a*, *b*, and *c* ordered $a \prec b \prec c$ (where $\prec$ is read 'precedes'), under the hypercyclic derivation you apply operations *a*, *b*, and *c* in that order at each node, from bottom up (1a), while under the non-hypercyclic derivation you first apply operation *a* from bottom up (within the domain), and then *b*, and then *c* (1b). Here, we argue **(*i*) for the order of operations given in (2)**, and **(*ii*) that this order is non-hypercyclic (1b)**, examining data from verb agreement in Algonquian languages which evidence crucial interactions between Impoverishment, Fission, Displacement, and VI (e.g. contextual allomorphy).

(1) a. *Hypercyclic* b. *Non-hypercyclic*



(2) Impoverishment $\prec$ Fission $\prec$ Displacement $\prec$ Vocabulary Insertion (VI)

Background assumptions: We focus on the INDEPENDENT ORDER, the verbal inflectional paradigm characteristic of matrix declaratives (in the majority of Algonquian languages), which displays the relevant kinds of interactions. Following previous work (Oxford 2019ab, Hammerly 2020, Grishin 2023, a.o.), we assume the following descriptive template and mapping to the clausal spine (example from Odawa, a dialect of Ojibwe):

(3) a. *nwaabmaasiimnaadgenag* 'maybe we don't see them' (Odawa; Valentine 2001:293)

b.

Prefix	Stem	Theme sign	NEG	Central suffix	MOD	Peripheral suffix
n-	*waabm*	*-aa*	*-sii*	*-mnaa*	*-dgen*	*-ag*
1-	see	-3OBJ	-NEG	-1PL	-DUB	-AN.PL
Infl	$\sqrt{+v}$	Voice	Neg	Infl	Mod	C

Voice Agrees with the (highest) object (Brittain 1999, a.m.o.); Infl Agrees with all accessible [+PART] arguments, else (if all arguments are [−PART]) the argument in the highest A position (Oxford 2019b, a.o.); and C Agrees with some third person (which one exactly varies across the family; Xu 2022, Grishin 2024). Note that we follow Oxford (2019ab), Hammerly (2020), Grishin (2023) in treating the prefix (*n-* '1' above) and central suffix (*-mnaa* '1PL' above) as arising via Fission of Infl; see the works cited for more discussion, as well as below. We assume Voice–C forms a single domain for morphological processes, and discuss in the full paper how this falls out from phase theory (either *v* and C are phrase heads, or Voice and a higher C head are phase heads).

Downward Haplological Impoverishment and Fission of Infl: Given the agreement behavior described above, there will be situations where Voice, Infl, and/or C Agree with the same goal. As Oxford (2017, 2019b) notes, Voice and Infl are subject to HAPLOLOGICAL DISSIMILATION (Nevins 2012): they get an exceptional realization when the next-highest φ-probe hosting head indexes the same argument (C for Infl; Infl for Voice). Here we focus on the Infl-C relationship (see Oxford 2019b, 2024 for the Voice-Infl relationship and the analysis of the Algonquian inverse). This relationship is very clearly seen in languages like Wampanoag (4) where C shows specificity-sensitive agreement, preferring to index the lowest specific third person argument (Goddard and Bragdon 1988, Bruening and Rackowski 2001, Xu 2021)—the object if it's a specific third person (4a), the subject otherwise (4b). In these forms, Infl (bolded) will uniformly Agree with the subject. In (4a), Infl and C (underlined) index distinct arguments (subject and specific object, respectively), but in (4b) both are expected to index the subject (as the object is nonspecific). But here, *both* prefix and central suffix are replaced by the default exponent of Infl, *-w* (also found when

(4) Wampanoag (fermino 2000:49–50)

a. **wu-** nâm **-unâwôw** -<u>ash</u>
3- see **-PL** -<u>IN.PL</u>
'**they** see <u>them</u> (IN)'

b. nâm **-w** -<u>ak</u>
see **-DFLT** -<u>AN.PL</u>
'<u>**they**</u> see something, some things'

Infl fails to Agree; Oxford 2017, Xu 2022). The uniform replacement of the prefix and central suffix with *-w* suggests that these two slots represent the discontinuous exponence of a single head (Infl), derived by Fission (Noyer 1992). In the full paper we discuss other contexts where C and Infl target the same goal across the family, as well as what happens when C is absent or lacks a probe, further illustrating Haplological Impoverishment.

Impoverishment ≺ Fission: Infl thus is subject to both Impoverishment and Fission—and they seem to be crucially ordered such that Impoverishment precedes (and can potentially bleed) Fission (see also Arregi and Nevins 2018, Hewett 2020). Under an alternative where Fission precedes Impoverishment, we'd need two distinct Impoverishment rules, one for the prefix and one for the central suffix, which would predict the possibility of some language only having one of these processes, Impoverishing only the prefix or only the central suffix. This is robustly *un*attested across Algonquian—under Haplological Impoverishment, both prefix and central suffix *always disappear together*, providing support for the ordering Impoverishment ≺ Fission.

More evidence for Fission ≺ Displacement ≺ VI: Semitic non-first-person subject agreement exhibits a discontinuous pattern similar to Algonquian Infl agreement, argued to result from fission (Noyer 1992). Hewett (2023) notes that only the suffixal part of this agreement can undergo allomorphy triggered by object enclitics, never the prefixal part, arguing for the postsyntactic ordering Fission ≺ Displacement ≺ VI: the displaced prefixal part is linearly too distant from the allomorphy trigger, bleeding any possibility of allomorphy. Moose Cree displays a similar phenomenon. There are two main allomorphs of 2PL central suffixes, *-nâwâw* and *-wâw* '2PL'. The shorter suffix *-wâw* appears when C (underlined) has φ features (5), even if C is null (recall that C agrees with third persons only), and the longer suffix *-nâwâw* appears elsewhere (6) (e.g. in scenarios without a third person). While similar allomorphy of the central suffix is found across Algonquian (Xu 2022), we never see equivalent allomorphy of the person prefix, the same asymmetry found in Semitic. Algonquian thus provides further evidence for VI following Fission and Displacement. In the full paper we discuss further examples of this constraint across Algonquian, illustrating its prevalence. Note also that prefix and central suffix can doubly expone (certain) person features, e.g. *ki-…-(nâ)wâw* '2-…-2PL' in (5–6), where at least [+ADDR] is doubly exponed, an IMPURE DISCONTINUITY, providing additional support for a modular analysis of discontinuous agreement along the lines of Hewett (2023). In the full paper we provide a formal implementation of Fission using morphotactic constraints against coexponence of marked feature combinations (Arregi and Nevins 2012).

(5) Moose Cree (Ellis 1971:88)

a. ki- wâpam -â **-wâw** -<u>Ø</u>
2- see -3OBJ **-2PL** -<u>AN.SG</u>
'**y'all** see <u>him</u>/<u>her</u>'

b. ki- wâpam -â **-wâw** -<u>ak</u>
2- see -3OBJ **-2PL** -<u>AN.PL</u>
'**y'all** see <u>them</u>'

(6) Moose Cree (Ellis 1971:87–88)

a. ki- nipâ **-nâwâw**
2- sleep **-2PL**
'**y'all** sleep'

b. ki- wâpam -i **-nâwâw**
2- see -1OBJ **-2PL**
'**y'all** see me/us'

Against hypercyclicity: Hypercyclic ordering predicts that information created by operation on a higher node Y cannot condition any operation on a lower node X, since all operations related to Y happen after those targeting X. In contrast, non-hypercyclic ordering predicts that information created by an earlier operation on Y *can* condition a later operation on lower X. This prediction is verified in Moose Cree in contexts where C gets Impoverished (or Obliterated). First, observe that C can agree with inanimate (in)transitive subjects (7ab). But when Infl indexes an animate, this is no longer possible, even if the inanimate is the only third person (7c). We conclude that φ features on C are Impoverished (or Obliterated) in the context of [+AN] on Infl. Note that this Impoverishment of C feeds contextual allomorphy on Infl, yielding the elsewhere long allomorph *-nâwâw* '2PL' rather than the more specific *-wâw* conditioned by [φ] on C. This indicates that Impoverishment of C has to precede VI of Infl, an interaction which isn't predicted by hypercyclic ordering, but is successfully derived under non-hypercyclic ordering: all instances of Impoverishment precede all instances of VI within a domain.

(7) Moose Cree (Ellis 1971:86–88)

a. wâpâ-w-**a**
be.white-DFLT-**IN.PL**
'**they (IN)** are white'

b. wâpaht-amô-makan-w-**a**
see-IN.OBJ-IN.SBJ-DFLT-**IN.PL**
'**they (IN)** see it'

c. ki-wâpam-iko-nâwâw☐
2-see-INV-2PL
'<u>it</u>/<u>they</u> see(s) y'all'

Conclusion: Data from Algonquian helps re-examine whether the ordering in (2) (Arregi and Nevins 2012, a.o.) is hypercyclic (Kalin 2022): it is not. We end by discussing how (2) is compatible with Kalin's hypercyclic ordering, as the operations she investigates derivationally follow the ones in (2).

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