Prefix order and interpretation in Crow

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Abstract: In transitive verbs, Crow person prefixes generally line up in left-to-right order as nonactive prefix, active prefix, transitive verb. Some transitive verbs, however, call for two nonactive prefixes, and these can come in either order before the verb with either prefix indicating subject or object. Although the flexibility in order and interpretation could simply reflect a lexical oddity of the few verbs that behave like this, this article proposes that the phenomena can be easily handled under standard minimalist principles of lexical subcategorization, Merge, Agree and feature checking. The claim is that certain verbs subcategorize for two nonactive arguments and that nothing prevents the appearance of either nonactive prefix from appearing in either of two structural positions. Further, the precise semantic roles of both are open to interpretation as long as they are nonactive.

Keywords: Crow, prefix order, variable affix order, syntax-semantics interface

1. A puzzle

As described by Graczyk (2007) Crow verbs are prefixed with person markers in an active-stative pattern. Transitive verbs typically have an active prefix adjacent to the verb indicating the subject (the so-called A-set prefix) and a nonactive prefix (the B-set prefix) that precedes the active prefix, resulting in B-A-verb. There are a few transitive verbs, however, that call for two B-set prefixes, as in (1). Note that *dii-* and *lii-* are allomorphs, as are *bii-* and *wii-*.

(1) 'I resemble you' / 'You resemble me' (Graczyk 2007:199)
   a. *dii-wii-chichée-k*
      2B-1B-resemble-DECL
   b. *bii-lii-chichée-k*
      1B-2B-resemble-DECL

Besides the verb using two B-set prefixes, the sentences in (1) are curious in that the person prefixes are order-reversible, as 2B-1B or 1B-2B, and that in both orders the semantic interpretation is ambiguous as to who is resembling who. It is unclear whether the markers are agreement prefixes or pronominal clitics, but in either case neither the order reversibility nor semantic ambiguity is expected.

In this paper, I argue that both the variable order of the prefixes and the semantic ambiguity follow from standard assumptions of syntax involving subcategorization of verbs, the operation Merge, Agree and feature checking. In short, for a small set of verbs, the verb subcategorizes for two nonactive prefixes which assign theta roles to the nominal arguments. However, while the verb specifies for two B prefixes there is nothing in the syntax that forces one to precede the other. This is in contrast to ordinary transitive sentences where the nonactive prefix

must precede the active prefix. As for interpreting which nonactive prefix corresponds to the subject and which to the object, this is left open because verb subcategorization only specifies as far as the active/nonactive contrast and has no effect on finer-grained semantic distinctions. Thus ambiguity follows.

Section 2 outlines details about Crow verbal person markers. In section 3 I lay out syntactic assumptions. Section 4 contains detailed derivations of Crow sentences with regard to verbal prefixes, with a goal of showing the derivation of the sentences in (1) in particular so as to explain the two B-prefix orders and the variable interpretation. Section 5 concludes and establishes topics for further research.

2. Crow person markers

Verbs in Crow, a head-last polysynthetic Siouan language, access two sets of person prefixes in an active-stative pattern. One set corresponds to arguments that are subjects of active verbs, whether transitive or intransitive. Graczyk (2007:121-122) calls these A-set prefixes (set I, per Wallace 1993). The other set, comprising the B-set prefixes (set II in Wallace), is for subjects of stative verbs, direct objects of verbs and postpositional objects. Transitive verbs usually call for active subjects and nonactive objects while intransitive verbs are for the most part predictably active or stative based on semantics.[1] If the subject of an intransitive is intentional, causal, etc., the intransitive verb is active, calling for an A-set prefix; at least some experiencer verbs have A-set prefixes as well. B-prefixes are used when referring to an object or a subject that is less agentlike. Thus, A-prefixes are for active subjects and B prefixes occur in all other environments. Active verbs typically have agentive subjects, in the sense of Dowty (1991), although in Crow experiencers line up in the active class with causal subjects. The division between active and nonactive is not completely consistent as some verbs with seemingly nonagentive subjects behave like active verbs with A-set subjects. For example, *sáaxi* 'snore', takes an active prefix, while both 'remain voluntarily' and 'remain involuntarily' are both active verbs, as are *ilí* 'be alive' and *shée* 'die' (Graczyk 2007:133, 139). On the other hand, *biíshi* 'tell a lie' seems to indicate an intentional subject, yet it is a stative verb. Thus, the class of active verbs must be understood as a grammatical class which includes some verbs that are not necessarily semantically active or agentive. Likewise for the B-prefixes: the class as a whole contains some verbs that call for subjects tending toward the intentional and agentive.

Usually argument number appears as a suffix on verbs, not on nouns. However, for simplicity the data analyzed here considers singular subjects and objects. And since third person active and inactive are not marked with an overt prefix, the article focuses on first and second person. The A-set prefixes, which must be adjacent to the verb root, are more variable in form than the B-set prefixes and are "often somewhat fused with the stem" (Graczyk 2007:121). The paradigms appear in Table 1 (based on Graczyk 2007:121).[2]

[1]Note that I will use the term "active" in referring to the verb or the subject and prefix. Similarly, "nonactive" will describe the verb or the argument/prefix.

[2]The surface forms of the person markers, argued to be underlyingly /m/ and /n/ by Graczyk, are more varied than suggested in the table, but the distribution indicated in Table 1 is sufficient for present purposes. Also, while it appears the prefixes are further decomposable, with, for example, *b-/w-* by itself indicating first person and the vowel alone marking the active/nonactive distinction, I follow Graczyk in treating the prefixes as single units.

Table 1: Singular person verbal prefixes

Person	A-set (active)	B-set (nonactive)
1	*baa-*, *waa-*	*bii-*, *wii-*
2	*dá(a)-*, *lá(a)-*	*dii-*, *lii-*
3	∅-	∅-

In most transitive verbs an A-set prefix is immediately left-adjacent to the verb but right of the B-set prefix if present, as in (2a). Active intransitive verbs use an A-set prefix for the single argument, as in (2b), while stative verbs use a B-set prefix for the single argument in (2c). Example (2d) shows that third person is unmarked.[3]

(2) a. *dii-waa-lichí-k*
2B-1A-hate-DECL
'I hate you' (based on Graczyk 2007:122, Table 6.2)

b. *baa-lisshí-k*
1A-dance-DECL
'I dance' (based on Graczyk 2007:134, Table 6.18)

c. *dii-háchka-k*
2B-tall-DECL
'You are tall' (based on Graczyk 2007:124, Table 6.4)

d. *Joe-sh Peter-sh ∅-∅-dúupia-k*
Joe-DET Peter-DET 3-3-hate-DECL
'Joe hates Peter' (adapted from Graczyk 2007:123)

Transitive verbs, therefore, usually have B-A-verb morphology, while intransitive verbs can be B-verb or A-verb, depending on whether the subject is of an active or stative verb. I also remind that while the A-prefix immediately precedes the verb root, the B-prefix need not be adjacent to the A-prefix, as adverbial and other material can intervene. To focus on the issues of prefix order and interpretation I put aside cases of, for example, B-X-A-verb for further research.

The goal of this paper is describe the syntax of verbs like *chichée* 'resemble' that take two B-set prefixes. A few other verbs that take two B-set prefixes are 'be touching' and 'be equal to' (Graczyk 1991:83), which suggests these verbs have a common feature of being somewhat reciprocal: if I resemble you then you must resemble me, for example. But other verbs with two B-set prefixes include 'belong to', 'be proud of', 'be there' and have no such reciprocal semantics. What all the B-B verbs do seem to share is the property of lacking a clear active subject.

3. Syntactic assumptions

I assume basic morphosyntactic principles common to researchers working within the Minimalist Program (See Chomsky 1995, 2001, 2008; Hornstein et al. 2005; among many others). A concise formalization appears in Collins & Stabler (2016). Thus, among many things, I assume the

[3]For (2a) and (2b) I've added the *-k* declarative suffix to Gracyzk's examples, since these sentences will be used in section 4 where the full sentences are derived.

existence of a numeration of feature bundles (morphemes) to be used in a derivation, a single operation of Merge where Move is a kind of Merge, Agree and feature checking. Though not crucial so the main point of the paper, I also assume some version of Distributed Morphology whereby morphology and syntax are essentially the same operation (Halle & Marantz 1993, 1994; Harley & Noyer 1999; among many others).

I will assume that theta roles are visible on the prefixes, as part of the prefixes' feature bundles. The nominal subjects and objects are assigned theta roles via the prefixes. Theta roles are thus assigned under Merge (Hornstein et al. 2005:54). However, since Crow is a *pro*-drop language the arguments are often *pro*s. The overt or nonovert nominals, then, act as probes seeking an interpretable theta feature.[4]

Generally I take no firm position on whether the prefixes are inflectional agreement markers or pronominal elements. Graczyk (1991, 2007) considers them argument clitics, but there is some evidence that the B-prefixes are not the same category as the A-prefixes. As mentioned above, the A-prefixes must be adjacent to the verb itself and are phonologically malleable while the B prefixes need not be adjacent to the bare verb or the A-prefix and are much more phonologically stable and uniform. Further, while both attach to verbal stems, the B prefixes may attach to elaborated verbal stems with adverbial and other material intervening between them and the A-verb complex. verb. That is, with regard to some properties of distinguishing clitics from affixes per Zwicky & Pullum (1983), the B-prefixes have at least some clitic properties where A-prefixes have affixal inflectional properties. In one instance, however, the distinction may be important. Since the A-prefix must be adjacent to the verb and the B-prefix occurs outside (left of) the A-prefix, there must be some property to determine the order nonstipulatively. If the nonactive B-prefixes are clitics and the active A-prefixes agreement markers, then the order of B-prefix outside the A-prefix would follow since clitics typically occur outside inflectional material.

In the Crow syntax to be proposed, the simplest way to get the prefixes in the right order requires a position for the B-prefix to be higher than the position for the A-prefix. This is counter to typical treatments where AgrSP is higher than AgrOP.[5] While the proposed relationship is thus somewhat stipulative, the stipulation is tempered by the fact that Crow is an active-stative language, at least with regard to its verbal person markers. In contrast to nominative-accusative and ergative-absolutive languages, where the distribution of case marking and agreement is based on the number of arguments, as mentioned above verbs in Crow as an active-stative language select prefixes based on semantics. The fact that languages with active-stative verbal morphology are rather rare, comprising about 7% of a sample in the World Atlas of Language Structures Online (Siewierska 2014), may be relevant as well. I assume these facts allow for some parametric variation in the hierarchical structure.

Thus, I assume the prefixes project phrases. An A-prefix projects at Active Prefix Phrase (APP) while a B-prefix projects a Nonactive Prefix Phrase (NPP). These must be separate phrases and not binary forms of the same phrase, since in the transitive structures under discussion they co-occur.

[4]Whether the missing or deleted object in particular is *pro* is much debated. See Ruda (2017) for some background and the suggestion that missing objects, at least, are silent nominal heads *n*, possibly with higher functional material. I leave for further research determining the status of unexpressed nominal arguments in Crow.

[5]Agr phrases have generally been abandoned since Chomsky (1995) (also see Hornstein et al. 2005:161-169 for discussion). Positions to replace Agr heads and phrases are still, however, in the same structural relationship.

4. The syntax and semantics of Crow person prefixes

In this section I work through derivations for transitive and intransitive sentences to demonstrate the syntax. First will be shown the derivations for an active intransitive, a nonactive intransitive, and an active transitive; these are followed by the derivations for a nonactive intransitive, which is the goal of the paper. These four kinds of sentences have have verbal morphology, respectively, of A-verb, B-verb, B-A-verb, B-B-verb. The last of the derivations is that of sentences of the type in example (1), containing a verb with two B-set prefixes. It will be demonstrated that not only does the syntax allow the above discussed variable prefix order and interpretation but, if the syntax is on the right track, variable order and semantics necessarily follow for these types of sentences.

The derivations are somewhat informal in order to make the main points clear.

4.1. Active intransitive

First is presented the derivation of the active intransitive sentence in (2a), repeated here as (3).

(3) *baa-lisshí-k*
1A-dance-DECL
'I dance'

The verb subcategorizes for a single active argument. Hence the numeration is {*baa-*, *lisshí*, *-k*, *proS*, [Tense: nonfuture]}.[6] Tense is listed in feature format but of course all the items in the numeration represent feature bundles that are spelled out phonetically late. In particular baa- is a surface form listed as such for convenience. The feature bundle for the prefix includes include [1.A], as in the gloss, showing it is for first person and semantically active. The verb merges with the prefix and I assume that the verb raises to adjoin to the prefix. Recalling that Crow is a head-last language, the movement is necessary for getting the verb to the other side of the head.

(4) [*lisshí* [*baa-*]] ⇒ [~~*lisshí*~~ [*baa-lisshí*]]

The result in (4) merges with *proS*, resulting in APP, the equivalent of VoiceP.

(5) [$_{\text{APP}}$ *proS* [~~*lisshí*~~ [*baa-lisshí*]]

In (5), *proS* probes for the first person active features in c-commanded *baa-*. Then, I assume, the verb raises to T, as in (6).

(6) [$_{\text{TP}}$ [$_{\text{APP}}$ *proS* [~~*lisshí*~~ [~~*baa-lisshí*~~]] *baa-lisshí*]

The *pro* subject, or an overt nominal, perhaps moves to SpecTP in (6) but I leave that issue open for now. Finally, the structure in (6) merges with the declarative marker, which I assume is in C.[7]

(7) [$_{\text{CP}}$ [$_{\text{TP}}$ [$_{\text{APP}}$ proS [~~*lisshí*~~ [~~*baa-lisshí*~~]] *baa-lisshí*] *-k*]

The important thing in the above derivation is how the A-prefix ends up on the verb.

[6] Crow does not distinguish past/present, neither with overt morphology, but does have future with a suffixed verbal form.

[7] Interrogative and imperative markers also occur in this verb-final position.

4.2. Nonactive intransitive

Here I show the derivation for the nonactive intransitive sentence (2c), here repeated as (8).[8]

(8) *dii-háchka-k*
2B-tall-DECL
'You are tall'

We start with the numeration {*dii-*, *háchka*, *-k*, *proS*, [Tense: nonfuture]}. The verb merges with the prefix and the moves to right-adjoin to it.

(9) [*háchka* [*dii-*]] ⇒ [~~*háchka*~~ [*dii-háchka*]]

The result of (9) merges with *pro* and *pro* probes *dii-* for its [1.B] features.

(10) [$_{\text{APP}}$ *proS* [~~*háchka*~~ [*dii-háchka*]]]

The verb raises to T and the result merges with *-k*. It's possible that the subject moves to SpecTP.

(11) [$_{\text{CP}}$ [$_{\text{TP}}$ [$_{\text{APP}}$ *proS* [~~*háchka*~~ [~~*dii-háchka*~~]]] *dii-háchka*] *-k*]

4.3. Active transitive

In transitives there are two arguments and two prefixes, one for object and one for subject. As mentioned in section 3, it is possible that the two sets of prefixes may differ in category, in that the A-prefixes may be inflectional and B-prefixes clitics. So these prefixes' feature makeup will include the fact that A is an inflectional prefix and B a clitic. So the A-prefix must attach directly to the verb, inside the B-prefix. The derivation here is for the sentence in (2a), repeated here as (12).

(12) *dii-waa-lichí-k*
2B-1A-hate-DECL
'I hate you'

We begin with the numeration {*dii-*, *waa-*, *lichí*, *proS*, *proO*, [Tense: nonfuture], *-k*}. Assuming that the object is inside VP, the first instance of merge involves the verb with the object *pro*.

(13) [$_{\text{VP}}$ *proO lichí*]

The VP in (13) then merges with the active prefix *waa-* and the verb raises to right-adjoin to the prefix, as in (14).

(14) [[$_{\text{VP}}$ *proO lichí*] *waa-*] ⇒ [[$_{\text{VP}}$ *proO* ~~*lichí*~~] *waa-lichí*]

ProO does not c-command an appropriate prefix so cannot yet get assigned its theta role. The result in (14) merges with *proS*. Since *proS* in SpecAPP c-commands the A-prefix it can be assigned the appropriate theta role.

(15) [$_{\text{APP}}$ *proS* [$_{\text{VP}}$ *proO* ~~*lichí*~~ [*waa-lichí*]]]

[8] Graczyk (2007:5) considers adjectives to be stative verbs in Crow.

The syntactic object in (15) merges with the B-prefix, *dii-* (16) and the verb moves with the A-prefix to adjoin to *dii-*, resulting in (17). *ProO* then internally merges in SpecNPP, as in (18).

(16) [[$_{APP}$ *proS* [$_{VP}$ *proO* ~~*lichí*~~ [*waa-lichí*]]] *dii-*]

(17) [[$_{APP}$ *proS* [$_{VP}$ *proO* ~~*lichí*~~ [~~*waa-lichí*~~]]] *dii-waa-lichí*]

(18) [$_{NPP}$ *proO* [[$_{APP}$ *proS* [$_{VP}$ ~~*proO*~~ ~~*lichí*~~ [~~*waa-lichí*~~]]] *dii-waa-lichí*]]

Following movement, *ProO* now c-commands the B-prefix and can get its theta role via Spec-head agreement. The verb, with its prefixes, internally merges in T (19), and TP merges with the declarative marker (20).

(19) [$_{TP}$ [$_{NPP}$ *proO* [[$_{APP}$ *proS* [$_{VP}$ ~~*proO*~~ ~~*lichí*~~ [~~*waa-lichí*~~]]] ~~*dii-waa-lichí*~~]] *dii-waa-lichí*]

(20) [$_{CP}$ [$_{TP}$ [$_{NPP}$ *proO* [[$_{APP}$ *proS* [$_{VP}$ ~~*proO*~~ ~~*lichí*~~ [~~*waa-lichí*~~]]] ~~*dii-waa-lichí*~~]] *dii-waa-lichí*] *-k*]

4.4. Nonactive transitive

The derivations for active and nonactive intransitives and active transitives present no surprises. Following is the goal of showing the derivation for nonactive transitives with two B-prefixes. Recall that the interesting facts about such verbs include the fact that the B-prefixes can occur in either order and that both orders are ambiguous as to which correlates with the subject and which with the object. The derivation shows how to achieve these results and, further, makes the prediction that such results, in fact, follow.

The derivation is for sentence (1), here repeated as (21).

(21) 'I resemble you' / 'You resemble me' (Graczyk 2007:199)

a. *dii-wii-chichée-k*
2B-1B-resemble-DECL

b. *bii-lii-chichée-k*
1B-2B-resemble-DECL

The verb *chichée* is one of those verbs that subcategorize for two B-prefixes and hence for two nonactive arguments. Again, we start with the numeration of elements to enter the derivation. Since the first person and second person prefixes show up as alternate forms depending on whether they are in word-initial or intervocalic position, for convenience they are listed here as dii-/lii- and bii-/wii-. The numeration is {*dii-/lii-*, *bii-/wii-*, *proS*, *proO*, *chichée*, [Tense: nonfuture], *-k*}.

The first Merge operation involves the verb and its *pro* object to form the VP. Either *pro* can serve as the "object" since whatever the object is will not get its theta role checked until it raises to c-command the prefix. Meanwhile, the VP merges with a B-prefix, but since both *dii-/lii-* and *bii-/wii-* are of the B set the VP can merge with either. The result so far, equivalent to the bar-level of the Nonactive Person Phrase, has four possible forms before the verb raises to adjoin to the prefix:

(22) [[$_{VP}$ *proS chichée*] *dii-/lii-*]

(23) [[$_{VP}$ *proO chichée*] *dii-/lii-*]

(24) [[$_{VP}$ *proS chichée*] *bii-/wii-*]

(25) [[$_{VP}$ *proO chichée*] *bii-/wii-*]

In each case the verb will raise to the prefix and the *pro* element will raise to SpecNPP. In SpecNPP, *pro* c-commands the prefix and can be assigned its theta role and agree in person, either first or second. Thus, either *pro* can be the subject, the resembler, or the object, the resemblee. In (26) B_i is a variable for either *dii-/lii-* or *bii-/wii-*. *Pro-x* is a variable indicating either of the pros from the numeration.

(26) [$_{NPP}$ *pro-x* [$_{VP}$ ~~*proS/O chichée*~~] B_i-*chichée*]

The syntactic object in (26) then merges with the unused prefix in the numeration, followed by merging with the unused pro from the numeration. The verb raises. The result, before final V-raising to T and the Merge with *-k*, is as in (27).

(27) [$_{NPP}$ *pro-y* [$_{NPP}$ *pro-x* [$_{VP}$ ~~*pro-x/y chichée*~~] B_i-*chichée*] B_j]
where *pro-x* $\neq$ *pro-y* and $B_i \neq B_j$

What (27) is showing is that the two B-prefixes appear sequentially in either order and that the two pros can be selected for Merge in either order. In short, as the verb goes through successive instances of Merge, it can merge first with 1B or with 2B. If it merges with 1B first, then it merges with 2B second, and if it merges with 2B first, then it merges with 1B second. This accounts for the variant orders of the prefixes. Similarly with the pro elements, since either can merge in the lower SpecNPP, the remaining one will merge in the higher SpecNPP. This accounts for the subject/object ambiguity.

The proposed syntax not only allows for order variability and semantic interpretation, it in fact predicts both should occur.

5. Conclusions

The preceding presented a morphosyntax for Crow simplex verbs consistent with basic common to the Minimalist Program. The syntax for intransitives and active transitives follows into non-active transitives to account for both B-prefix orders being grammatical and both interpretations predictable from checking in an active-stative language.

Stipulations were kept to a minimum. Nonetheless, further research should clarify whether unexpressed Crow subjects and objects are pro and whether or to what degree the prefixes are inflections of clitics, since the assumption of pros and how they receive theta roles was crucial to the ordering of steps of Merge. Also, while leaving open a determination about the status of the prefixes, it was convenient to assume that B-prefixes are more cliticlike and A-prefixes are more inflectionlike in that this allows the derivation the desired result of getting the B-prefixes outside the A-prefixes. Further research should integrate causative structures. As some simplex verbs take two B-prefixes, causatives end up with two B-prefixes as well, including one for the subject of the embedded (caused) event. Finally, this paper worked with verbs that only have agreement/clitic person markers. Crow verbs can become quite complex with a number of incorporated elements and a fuller account will place the additional elements in the right orders vis-a-vis the active and nonactive prefixes.

References

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.

Chomsky, Noam. 2001. Derivation by phase. In Michael Kenstowicz (ed.), *Ken Hale: A life in language*, 1–52. Cambridge, MA: MIT Press.

Chomsky, Noam. 2008. On phases. In Robert Friedin, Carlos P. Otero & Maria Luisa Zubizarreta (eds.), *Foundational issues in linguistic theory: Essays in honor of Jean-Roger Vergnaud*, 133–166. Cambridge, MA: MIT Press.

Collins, Chris & Edward Stabler. 2016. A formalization of minimalist syntax. *Syntax* 19(1). 43–78.

Dowty, David R. 1991. Thematic proto-roles and argument selection. *Language* 67(3). 574–619.

Graczyk, Randolph. 1991. *Incorporation and cliticization in Crow morphosyntax*. Chicago, IL: University of Chicago dissertation.

Graczyk, Randolph. 2007. *A grammar of Crow*. Lincoln, NE: University of Nebraska Press.

Halle, Morris & Alec Marantz. 1993. Distributed Morphology and the pice of inflection. In Kenneth Hale & Samuel Keyser (eds.), *The View from Building 20: Essays in linguistics in honor of Sylvain Brombeger*, 111–176. Cambridge, MA: MIT Press.

Halle, Morris & Alec Marantz. 1994. Some key features of Distributed Morphology. *MIT Working Papers in Linguistics* 21. 275–288.

Harley, Heidi & Rolf Noyer. 1999. Distributed Morphology. *Glot International* 4(4). 3–9.

Hornstein, Norbert, Jairo Nunes & Kleanthes K. Grohmann. 2005. *Understanding Minimalism*. Cambridge, UK: Cambridge University Press.

Ruda, Marta. 2017. *On the syntax of missing objects*. Amsterdam, Netherlands: John Benjamins.

Siewierska, Anna. 2014. Alignment of verbal person marking. In Matthew S. Dryer & Martin Haspelmath (eds.), *The world atlas of language structures online*, Leipzig, Germany: Max Planck Institute for Evolutionary Anthropology. (Available online at http://wals.info/chapter/100, accessed on August 14, 2018).

Wallace, Karen Kay. 1993. *Verb incorporation and agreement in Crow*. Los Angeles, CA: UCLA dissertation.

Zwicky, Arnold M. & Geoffrey K. Pullum. 1983. Cliticization vs. inflection: English *n't*. *Language* 59(3). 502–513.