# Complex Scales: Modelling the Interaction of Person and Number Hierarchies in Karuk Verbal Agreement

Sebastian Bank & Jochen Trommer, University of Leipzig

Virtually all formal approaches to hierarchy effects of pronominal features in inflectional morphology (e.g. Aissen 1999, Béjar 2003) assume that they are triggered by mismatches of atomic scales for specific categories such as person, number, and grammatical function as in (1):

(1)     a.   $\{1, 2\} \succ 3$          b.   $sg \succ du \succ pl$          c.   A(gent) $\succ$ P(atient)

In this talk, we provide evidence that hierarchical agreement and inverse marking in the Hokan language Karuk (also Karok, cf. Bright 1957, Macaulay 1992) departs from this simple picture in two ways: *First,* it requires reference to the complex scale in (2) which conflates person, number, and grammatical role:

(2)     1 > 2pl > 2sg > 3plA > 3plP > 3sgA > 3sgP

*Second*, we show that this hierarchy gets only effective if two arguments differ by at least two positions on this scale (thus the distance between 2pl and 2sg would not trigger a hierarchy effect, but the distance of 2pl and 3plA would). In our talk, we develop a principle-based theory for the construction of complex scales, and show that the Karuk data can be captured straightforwardly as two-step-effects.

**Data:** Karuk agreement markers comprise pronominal prefixes marking person (1st, 2nd, and 3rd) and number (singular and plural) plus the inverse marker *-ap*. The pronominal prefixes agree with the object by default, turning to subject-agreement if a) the subject is a (speech-act) participant and the object is a non-participant (1→3, 2→3); b) the subject is 1st person and the object is 2nd person singular (1→2sg); c) the object is 3rd person singular and the subject is anything different (3pl→3sg).

For local (1st, 2nd) vs. non-local (3rd) person(s), this means there is always agreement with the local argument – independently of its grammatical function:

(3)   a.

| **2→3** | 3sg | 3pl |
|---|---|---|
| 2sg | *ʔi-* | *ʔi-* |
| 2pl | *ku-* | *ku-* |

| **3→2** | 2sg | 2pl |
|---|---|---|
| 3sg | *ʔi-* | *ki·k-* |
| 3pl | *ʔi-* | *ki·k-* |

(positive)

   b.

| **1→3** | 3sg | 3pl |
|---|---|---|
| 1sg | *ná-* | *ná-* |
| 1pl | *kín-* | *kín-* |

| **3→1** | 1sg | 1pl |
|---|---|---|
| 3sg | *ná-* | *kín-* |
| 3pl | *ka-ná-* | *kín-* |

(negative)

With *ʔi-* expressing 2nd person singular, *ku/ki·k-* as 2nd person plural, (3a) forms a typical example of hierarchical agreement where the verb agrees with the argument that is higher on the person scale *{1st, 2nd} ≻ 3rd* (Siewierska 1996). However, the agreement patterns in contexts with local persons only ('you and me forms') is more complex. In transitive sentences with a 1st person and a 2nd person singular argument (4a-d), there is always (hierarchical) agreement with the 1st person argument, while in contexts with a 1st person and a 2nd person **plural** argument (4e-h) we are faced with object agreement:

(4)     *Person/number agreement for local A→P forms (agreed-with argument in bold)*
        a)  **1sg**→2sg     c)  **1pl**→2sg     e)  1sg→**2pl**     g)  1pl→**2pl**
        b)  2sg→**1sg**     d)  2sg→**1pl**     f)  2pl→**1sg**     h)  2pl→**1pl**

By comparison of (4a) and (4g), it becomes clear, that any analysis utilizing simple (person, number, etc.) scales could not avoid to falsely predict agreement with the same argument for both contexts (which is the case in (4b) and (4h)). In fact, Béjar (2003) admits that her analysis does not extend to these cases.

**Analysis:** Departing from approaches where particular instantiations of universal hierarchies are captured by the language-specific parametrization of feature structure (Béjar and Rezac 2009), or the construction of optimality-theoretic constraints (Aissen 1999), we shift the burden of explanation to the licensing of (language-specific) scales by (universal) simplex scales, where licensing follows the Scale Composition Principle in (5):

(5) **Scale Composition**
A complex scale $CS = C_m, C_{m-1}, \ldots, C_1$ is licensed
by the ranking of scales $SS = S_n, S_{n-1}, \ldots, S_1$ **iff:**
for every pair of categories $C_i, C_j, i > j$:
   If    $C_j > C_i$ for scale $S_p$
   then $C_i \geq C_j$ for scale $S_o, o > p$

Crucially, *Scale Composition* allows to derive the complex scale in (2) from the simplex scales in (1) under the ranking in (6).

(6)     PERSON $\succ$ NUMBER $\succ$ GRAMMATICAL FUNCTION.

This operation only allows for sub-differentiation of atomic points on a higher scale through the categories of a lower scale. It is thus restricted to only yield possibilities for more fine-grained complex scales that inherit all the restrictions of the base scales. The distribution of Karuk prefixes is then captured by the requirement that they switch from object agreement to agreement with the subject, if this outranks the object by at least two steps on (2). Further evidence for an analysis that measures hierarchy mismatches in form of steps over positions for complex scales comes from the distribution of the suffix *-ap*: Macaulay (1992) treats it as an inverse marker – an affix which indicates, that the object is hierarchically higher than the subject (Comrie 1980) – but has to admit that it has a defective distribution as it doesn't occur in typical inverse cases like 3→1.

(7)     -ap *in the x→2 forms of the positive and optative order (occurrences in bold)*
       a)    1sg→2sg   1pl→2sg    b)   **1sg→2pl**   **1pl→2pl**
       c)    **3sg→2sg**   **3pl→2sg**    d)   **3sg→2pl**   **3pl→2pl**

In our analysis, the distribution follows from a complex scale. Since 1st and 2nd person are not strictly ordered under (1a), (5) licences (8) by the ranking PERSON $\succ$ NUMBER.

(8)     2pl $\succ$ 2sg $\succ$ 1 $\succ$ 3

Hence *-ap* exactly occurs, if the subject is not only lower, but also two steps lower on this scale than the object.

**References**

Aissen, J. (1999). Markedness and subject choice in Optimality Theory. *Natural Language and Linguistic Theory*, 17(4):673–711.

Béjar, Susana (2003). *Phi-Syntax: A Theory of Agreement*. PhD thesis, University of Toronto.

Béjar, S. and Rezac, M. (2009). Cyclic agree. *Linguistic Inquiry*, 40(1):35–73.

Bright, William (1957). *The Karok Language*. Berkeley: University of California Press.

Comrie, B. (1980). Inverse verb forms in Siberia. *Folia Linguistica Historica* 1:61–74.

Macaulay, Monica (1992). Inverse Marking in Karuk: the Function of the Suffix *-ap*. *International Journal of American Linguistics* 58:182–201.

Siewierska, A. (1996). Word order type and alignment type. *Sprachtypologie und Universalienforschung* 49:149–176.