# Hierachy-Effects in Karuk

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## Hierarchy-Based Competition

The verb agrees with the argument

which is highest on a prominence scale $S$

($\rightarrow$ "Hierarchical Agreement/Alignment")

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## Person-driven Hierarchy-Based Competition in Nocte

The verb agrees with the argument

which is highest on the prominence scale:

1st person > 2nd person > 3rd person

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## Person-driven Hierarchy-Based Competition in Nocte

|   | Sg | Pl |
|---|----|----|
| 1 | rang-ka-**ang** | rang-ka-**e** |
| 2 | rang-ka-**o** | rang-ka-**an** |
| 3 | rang-ka-**a** | |

('to go')

|                          | Direct | Inverse |                          |
|--------------------------|--------|---------|--------------------------|
| **1sg → 3sg** | hetho-**ang** | hetho-**h**-**ang** | **3sg → 1sg** |
|                          | teach-1sg | teach-**Inv**-1sg |                          |
| **2sg → 3pl** | hetho-**o** | hetho-**h**-**o** | **3sg → 2sg** |
|                          | teach-2sg | teach-**Inv**-2sg |                          |
| **1sg → 2sg** | hetho-**e** | hetho-**h**-**ang** | **2sg → 1sg** |
|                          | teach-1pl | teach-**Inv**-1sg |                          |

('to teach')

(Trommer, 2001; Gupta, 1971)

## Person-driven Inverse Marking in Nocte

The verb shows inverse marking

iff the object is higher than the subject

for the prominence scale:

1st person > 2nd person > 3rd person

(Trommer, 2001; Gupta, 1971)

## Person-driven Inverse Marking in Nocte

|  | | **Direct** | **Inverse** | |
|---|---|---|---|---|
| **1sg ➔ 2sg** | | hetho-e | hetho-**h**-ang | **2sg ➔ 1sg** |
| | | teach-1pl | teach-**Inv**-1sg | |
| **1sg ➔ 3sg** | | hetho-ang | hetho-**h**-ang | **3sg ➔ 1sg** |
| | | teach-1sg | teach-**Inv**-1sg | |
| **2sg ➔ 3pl** | | hetho-o | hetho-**h**-o | **3sg ➔ 2sg** |
| | | teach-2sg | teach-**Inv**-2sg | |

(Trommer, 2001; Gupta, 1971)

## Number-driven Hierarchy-Based Competition in Dumi

The verb agrees with the argument

which is highest on the prominence scale:

plural > dual > singular

(Trommer,2006)

## Number-driven HBC in Dumi: pl > du

| **Du** | phɨkh-**i** <br> get:up-[+du] | **'they (du.)** got up' (p. 97) |
|---|---|---|
| **Pl** | a-phɨkh-**ini** <br> MS-get:up-[+pl] | **'you (pl.)** got up' (p. 97) |
| **Du + Pl** | doːkhot-t-**ini** (*-**i**) <br> see-NPast-[-1 +pl] | **'they (pl.)** see them (du.)/ <br> 'they (du.) see **them (pl.)'** (p.108) |

(van Driem, 1993; Trommer,2006)

## Number-driven HBC in Dumi: du > sg

**Sg**  phɨkh-**a**        **'he** got up' (p. 97)
get:up-[-du]

**Du**  phɨkh-**i**        **'they (du.)** got up' (p. 97)
get:up-[+du]

**Sg + Du**  do:khos-t-**i** (\*-**a**)  'he sees **them (du.)**/
see-NPast-[+du]  **they (du.)** see him' (p.107)

(van Driem, 1993; Trommer,2006)

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## Number-driven HBC in Dumi: pl > sg

**Sg**  phɨkh-**a**        **'he** got up' (p. 97)
get:up-[-du]

**Pl**  a-phɨkh-**ini**        **'you (pl.)** got up' (p. 97)
MS-get:up-[+pl]

**Sg + Pl**  do:khot-t-**ini** (\*-**a**)  'he sees **them(pl.)**/
see-NPast-[-1 +pl]  **they (pl.)** see him' (p.108)

(van Driem, 1993; Trommer,2006)

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## Number-driven HBC in Dumi Inverse Marking: Dumi -si

**1sg - 2du**

dual    singular
 1      2

**1sg - 3du**

dual    singular
 1      3

**2sg - 3du**

dual    singular
 2      3
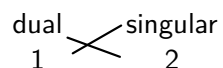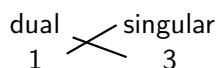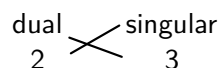
(van Driem, 2006; Trommer,2006)

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## How do Person and Number Hierarchies Interact?

**Bejar (2003):**  Effects of person and number hierarchies are in principle independent

**Our Hypothesis:**  Person and number categories may form complex hierarchies in specific languages

# Hierachy-Effects in Karuk

1 Introduction

2 The Karuk Language

3 Person Agreement in Karuk
   Paradigms of Pronominal Affixes
   Measuring Hierarchy Mismatches
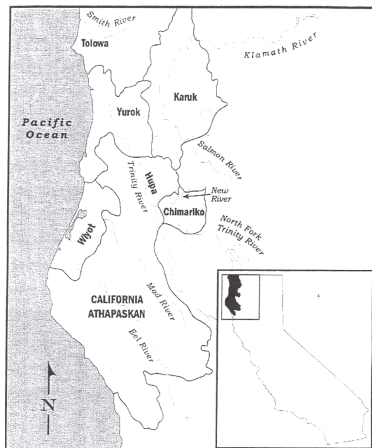   OT-Analysis
   Inverse Marking

4 Bejar (2003)

# The Karuk Language

- Nearly extinct Amerindian language of Northwestern California

- Part of the (controversial) Hokan Language family
  and forming a sprachbund with other languages
  of the area (Yurok, Hupa, Chimariko)

- Agreement morphology akin to similar systems
  in Algonqian and Algic (e.g. Cree and Yurok)

# The Karuk Language

# Person Agreement in Karuk

(1) a. *ʔu-ʔáák-tih*
       **3sg**>**3sg**-hit-DUR
       'He´s hitting him.'

   b. *ʔiim-pú=**kín**–ʔááku-tih-**ap***
       you(sg)-NEG=**2sg**>**1pl**-hit-DUR-**ap**
       'You´re not hitting us.'

(Macaulay 1992: 185)

| *ʔu-* *kín-* | *ʔááku* | — *-ap* |
|---|---|---|
| pron. prefix | verbal stem | suffix |

## Paradigms of Pronominal Affixes

- Categories:
  - ‣ Person: 1, 2, 3
  - ‣ Number: sg, pl
  - ‣ A>P
  - ‣ 'Orders': opt(ative), pos(itive), neg(ative)

- Obligatory reflexivaton for transitive 1>1 and 2>2

- Intransitive forms x>3sg

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| opt | 1sg | 1pl | 2sg | 2pl | 3sg | 3pl |
|---|---|---|---|---|---|---|
| **1sg** | — | — | nú | kiik-ap | kán | kán |
| **1pl** | — | — | nú | kiik-ap | nú | nú |
| **2sg** | ná | kín | — | — | ø | ø |
| **2pl** | kaná | kín | — | — | kiik | kiik |
| **3sg** | ná | kín | ʔi-ap | kiik-ap | kám | kám |
| **3pl** | kaná | kín | ʔi-ap | kiik-ap | kun | kín |

| pos | 1sg | 1pl | 2sg | 2pl | 3sg | 3pl |
|---|---|---|---|---|---|---|
| **1sg** | — | — | nú | kiik-ap | ni | ni |
| **1pl** | — | — | nú | kiik-ap | nú | nú |
| **2sg** | ná | kín | — | — | ʔi | ʔi |
| **2pl** | kaná | kín | — | — | ku | ku |
| **3sg** | ná | kín | ʔi-ap | kiik-ap | ʔu | ʔu |
| **3pl** | kaná | kín | ʔi-ap | kiik-ap | kun | kín |

| neg | 1sg | 1pl | 2sg | 2pl | 3sg | 3pl |
|---|---|---|---|---|---|---|
| **1sg** | — | — | kín | kiik-ap | ná | ná |
| **1pl** | — | — | kín | kiik-ap | kín | kín |
| **2sg** | ná | kín-ap | — | — | ø | ø |
| **2pl** | kaná-ap | kín-ap | — | — | -ap | -ap |
| **3sg** | ná | kín-ap | -ap | kiik-ap | ø | -ap |
| **3pl** | kaná-ap | kín-ap | -ap | kiik-ap | -ap | kín-ap |

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## Observations: ʔi

| pos | 1sg | 1pl | 2sg | 2pl | 3sg | 3pl |
|---|---|---|---|---|---|---|
| **1sg** | — | — | nú | kiik-ap | ni | ni |
| **1pl** | — | — | nú | kiik-ap | nú | nú |
| **2sg** | ná | kín | — | — | ʔi | ʔi |
| **2pl** | kaná | kín | — | — | ku | ku |
| **3sg** | ná | kín | ʔi-ap | kiik-ap | ʔu | ʔu |
| **3pl** | kaná | kín | ʔi-ap | kiik-ap | kun | kín |

**2sg vs. 3**

|  | **A** |  | **O** |
|---|---|---|---|
| 2sg | > | 3sg | ʔi |
| 2sg | > | 3pl | ʔi |
| 3sg | > | 2sg | ʔi-ap |
| 3pl | > | 2sg | ʔi-ap |

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## Observations: kiik

| opt | 1sg | 1pl | 2sg | 2pl | 3sg | 3pl |
|---|---|---|---|---|---|---|
| **1sg** | — | — | nú | kiik-ap | kán | kán |
| **1pl** | — | — | nú | kiik-ap | nú | nú |
| **2sg** | ná | kín | — | — | ø | ø |
| **2pl** | kaná | kín | — | — | kiik | kiik |
| **3sg** | ná | kín | ʔi-ap | kiik-ap | kám | kám |
| **3pl** | kaná | kín | ʔi-ap | kiik-ap | kun | kín |

**2pl vs. 3   P vs. A**

|  | **A** |  | **P** |
|---|---|---|---|
| 2pl | > | 3sg | kiik |
| 2pl | > | 3pl | kiik |
| 3sg | > | 2pl | kiik-ap |
| 3pl | > | 2pl | kiik-ap |
| 1sg | > | 2pl | kiik-ap |
| 1pl | > | 2pl | kiik-ap |

## Observations: *ná* and *kín*

| neg | 1sg | 1pl | 2sg | 2pl | 3sg | 3pl |
|-----|-----|-----|-----|-----|-----|-----|
| **1sg** | — | — | *kín* | *kiik-ap* | *ná* | *ná* |
| **1pl** | — | — | *kín* | *kiik-ap* | *kín* | *kín* |
| **2sg** | *ná* | *kín-ap* | — | — | ø | ø |
| **2pl** | *kaná-ap* | *kín-ap* | — | — | *-ap* | *-ap* |
| **3sg** | *ná* | *kín-ap* | *-ap* | *kiik-ap* | ø | *-ap* |
| **3pl** | *kaná-ap* | *kín-ap* | *-ap* | *kiik-ap* | *-ap* | *kín-ap* |

**1 vs. 3**    **P vs. A**

|  | **A** |  | **P** |  |  | **A** |  | **P** |  |
|--|-------|--|-------|--|--|-------|--|-------|--|
|  | 1sg | > | 3sg | *ná* |  | 1pl | > | 3sg | *kín* |
|  | 1sg | > | 3pl | *ná* |  | 1pl | > | 3pl | *kín* |
|  | 3sg | > | 1sg | *ná* |  | 3sg | > | 1pl | *kín-ap* |
|  | 3pl | > | 1sg | *(ka)ná-ap* |  | 3pl | > | 1pl | *kín-ap* |
|  | 2sg | > | 1sg | *ná* |  | 2sg | > | 1pl | *kín-ap* |
|  | 2pl | > | 1sg | *(ka)ná-ap* |  | 2pl | > | 1pl | *kín-ap* |

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## Featural Analysis

|  | 1sg | 1pl | 2sg | 2pl | 3sg | 3pl |
|--|-----|-----|-----|-----|-----|-----|
| **1sg** | — | — | **1sg>** | >2pl | **1sg>** | **1sg>** |
| **1pl** | — | — | **1pl>** | >2pl | **1pl>** | **1pl>** |
| **2sg** | >1sg | >1pl | — | — | **2sg>** | **2sg>** |
| **2pl** | pl>1sg | >1pl | — | — | **2pl>** | **2pl>** |
| **3sg** | >1sg | >1pl | >2sg | >2pl | >3sg | >3pl |
| **3pl** | pl>1sg | >1pl | >2sg | >2pl | **3pl>** | 3pl>3pl |

- Object-agreement as default

- Subject-agreement with:
  ‣ 1>3 and 2>3
  ‣ 1>2sg
  ‣ other>3sg

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## Agreement Pattern

- Object-agreement as default

- Subject-agreement with:
  ‣ 1>3 and 2>3
  ‣ 1>2sg
  ‣ other>3sg

### Hypothesis

Subject-agreement only, if the subject outranks the object in prominence for a significant amount – two steps downward on the scale:

$$1 > 2pl > 2sg > 3plA > 3plP > 3sgA > 3sgP$$

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## Measuring Hierarchy Mismatches

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

How is this scale constructed?

- Combination of basic scales:    $1 > 2 > 3$        $pl > sg$        $A > P$
- Hierarchy of scales:    person > number > gram. function
- Sub-differentiation of non-distinguished points on higher scale with a complete lower scale, gaining specifity

## Licensing of Complex Scales

Atomic scales rank features (e.g. 1, 2, A, P, sg, pl, etc.)

Complex scales rank categories (bundles of features, e.g. 1pl, 2Asg)

A category $C_1$ is higher than a category $C_2$
for a simplex scale $S = F_n, F_{n-1}, \ldots, F_1$ **iff:**

there is a feature $F_i \in C_1$ and a feature $F_j \in C_2$ such that $F_i > F_j$

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   $C_j$ is higher than $C_i$ for scale $S_p$
then $C_i$ is higher than $C_j$ for scale $S_o, o > p$

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## OT-Analysis

(3)  a.  $\mathrm{AGR}(\pi)_{\mathrm{OBJ}}$
Agree with the person feature of the object.
b.  $\mathrm{AGR}(\pi)\text{-X}\searrow\text{x}$
Agree with the person feature of the argument, that outranks
the object by two (or more) steps on the scale
$1 > 2\mathrm{pl} > 2\mathrm{sg} > 3\mathrm{plA} > 3\mathrm{plP} > 3\mathrm{sgA} > 3\mathrm{sgP}$.

(4)  $\mathrm{COHERENCE}(\text{X})$
Allow only one vocabulary item of type X in the output.

(5)  $\mathrm{COH}(\pi) \gg \mathrm{AGR}(\pi)\text{-X}\searrow\text{x} \gg \mathrm{AGR}(\pi)_{\mathrm{OBJ}}$

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(6)  Input: $[\text{1sg}]_{\mathrm{SUB}}\ [\text{3sg}]_{\mathrm{OBJ}}$ ('I see him')

| | $\mathrm{COH}(\pi)$ | $\mathrm{AGR}(\pi)\text{-}$X$\searrow$x | $\mathrm{AGR}(\pi)_{\mathrm{OBJ}}$ |
|---|---|---|---|
| $ná_{[\text{1sg}]}ʔu_{[\text{3}]}$ | *! | | |
| ☞ $ná_{[\text{1sg}]}$ | | | * |
| $ʔu_{[\text{3}]}$ | | *! | |
| | | *! | * |

(7)  Input: $[\text{2sg}]_{\mathrm{SUB}}\ [\text{1sg}]_{\mathrm{OBJ}}$ ('You(sg.) see me')

| | $\mathrm{COH}(\pi)$ | $\mathrm{AGR}(\pi)\text{-}$X$\searrow$x | $\mathrm{AGR}(\pi)_{\mathrm{OBJ}}$ |
|---|---|---|---|
| $ʔi_{[\text{2sg}]}ná_{[\text{1sg}]}$ | *! | | |
| $ʔi_{[\text{2sg}]}$ | | *! | * |
| ☞ $ná_{[\text{1sg}]}$ | | | |
| | | *! | * |

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(8)  Input: $[\text{1pl}]_{\mathrm{SUB}}\ [\text{2sg}]_{\mathrm{OBJ}}$ ('We see you(sg.)')

| | $\mathrm{COH}(\pi)$ | $\mathrm{AGR}(\pi)\text{-}$X$\searrow$x | $\mathrm{AGR}(\pi)_{\mathrm{OBJ}}$ |
|---|---|---|---|
| $nú_{[\text{1pl}]}ʔi_{[\text{2sg}]}$ | *! | | |
| ☞ $nú_{[\text{1pl}]}$ | | | * |
| $ʔi_{[\text{2sg}]}$ | | *! | |
| | | *! | * |

(9)  Input: $[\text{3sg}]_{\mathrm{SUB}}\ [\text{3sg}]_{\mathrm{OBJ}}$ ('He sees him')

| | $\mathrm{COH}(\pi)$ | $\mathrm{AGR}(\pi)\text{-}$X$\searrow$x | $\mathrm{AGR}(\pi)_{\mathrm{OBJ}}$ |
|---|---|---|---|
| ☞ $ʔu_{[\text{3}]}$ | | | |
| | | | *! |

## Inverse Marking in Karuk

| pos | 1sg | 1pl | 2sg | 2pl | 3sg | 3pl |
|-----|-----|-----|-----|-----|-----|-----|
| **1sg** | — | — | *nú* | *kiik-**ap*** | *ni* | *ni* |
| **1pl** | — | — | *nú* | *kiik-**ap*** | *nú* | *nú* |
| **2sg** | *ná* | *kín* | — | — | *ʔi* | *ʔi* |
| **2pl** | *kaná* | *kín* | — | — | *ku* | *ku* |
| **3sg** | *ná* | *kín* | *ʔi-**ap*** | *kiik-**ap*** | *ʔu* | *ʔu* |
| **3pl** | *kaná* | *kín* | *ʔi-**ap*** | *kiik-**ap*** | *kun* | *kín* |

- Macaulay (1992): non-negative *-ap* as defective inverse marker (object higher than subject), reflecting the scale:

  $$2pl > 1 > 2sg > 3$$

  ‣ *-ap* expected for:     x>2pl     3>2sg     2sg>1     3>1

- 'Step analysis': inverse marking, if the object outranks the subject by two (or more) steps on the scale:

  $$2pl > 2sg > 1 > 3$$

  ‣ *-ap* expected for:     1>2pl     3>2pl     3>2sg

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## *-ap* as Inverse Marker

(10)    a.    $*\text{STRUCT}_{\text{INV}}$: No inverse marker.

b.    $\text{INV!-S} \not\nearrow \text{O}$: Inverse marking if the object outranks the subject by two (or more) steps on the scale 2pl > 2sg > 1 > 3.

c.    $\text{INV!-S} \not\nearrow \text{O} \gg *\text{STRUCT}_{\text{INV}}$

(11)    a.    Input: $[1sg]_{\text{SUB}}\ [2sg]_{\text{OBJ}}$ ('I see you(sg.)')

|  | $\text{INV!-}$ $\text{S} \not\nearrow \text{O}$ | $*\text{STRUCT}_{\text{INV}}$ |
|-----|-----|-----|
| *-ap*$_{[inv]}$ |  | *! |
| ☞ |  |  |

b.    Input: $[3sg]_{\text{SUB}}\ [2pl]_{\text{OBJ}}$ ('He sees you(pl.)')

|  | $\text{INV!-}$ $\text{S} \not\nearrow \text{O}$ | $*\text{STRUCT}_{\text{INV}}$ |
|-----|-----|-----|
| ☞    *-ap*$_{[inv]}$ |  | * |
|  | *! |  |

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Bejar (2003)

## The Analysis of Bejar (2003)

- Person and number are different syntactic probes which trigger independent agreement processes

- The resulting agreement features are fused postsyntactically into single heads
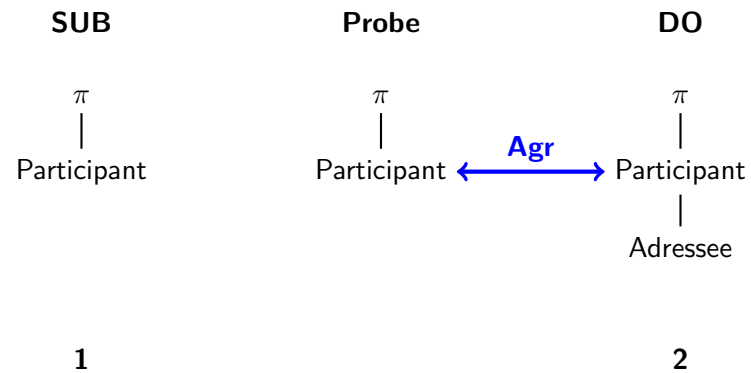
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Bejar (2003)

## Person in Bejar (2003)

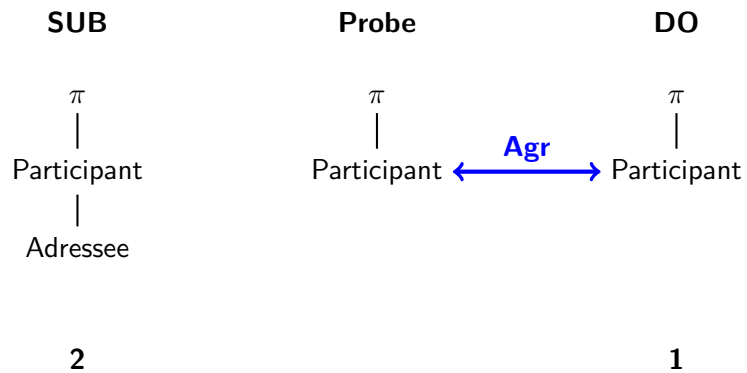| 3rd Person | 1st Person | 2nd Person |
|-----|-----|-----|
| π | π | π |
|  | \| | \| |
|  | Participant | Participant |
|  |  | \| |
|  |  | Adressee |
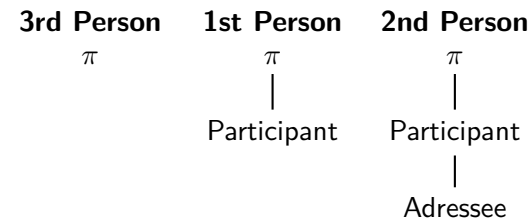
# Person Agreement in Bejar (2003)

- A probe agrees with a goal which is identical or more specific than the probe

- The person probe tries to establish an Agr relation with the direct object

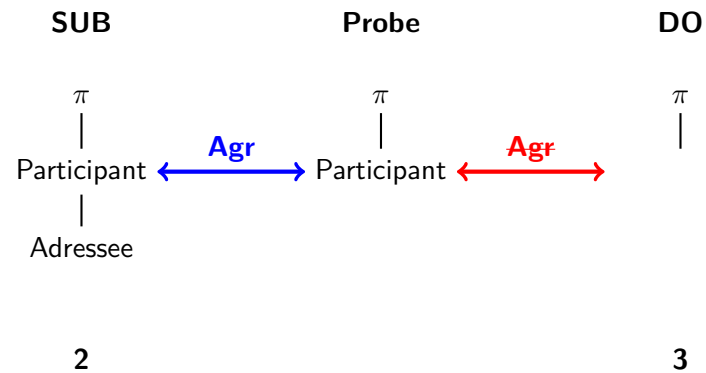- Only if this fails, the probe initiates Agr with the subject

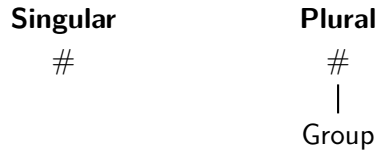# Person Agreement in Bejar (2003)

**SUB**          **Probe**          **DO**
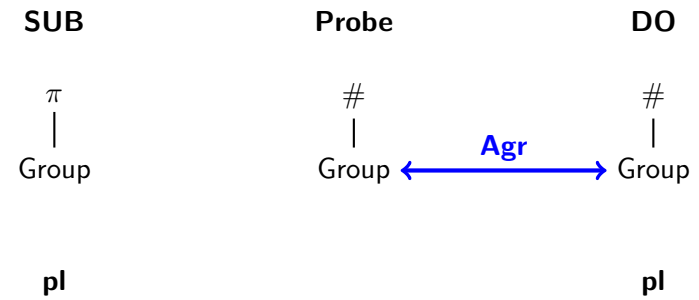
$\pi$             $\pi$              $\pi$

Participant     Participant $\xleftrightarrow{\text{Agr}}$ Participant

                                    Adressee

**1**                              **2**

# Person Agreement in Bejar (2003)

**SUB**          **Probe**          **DO**

$\pi$             $\pi$              $\pi$

Participant     Participant $\xleftrightarrow{\text{Agr}}$ Participant

Adressee

**2**                              **1**

# Person Agreement in Bejar (2003)

**SUB**          **Probe**          **DO**

$\pi$             $\pi$              $\pi$

Participant $\xleftrightarrow{\text{Agr}}$ Participant $\xleftrightarrow{\text{Agr}}$

Adressee

**2**                              **3**

## Number in Bejar (2003)

**Singular**　　　　**Plural**

$\#$　　　　　　　　$\#$
　　　　　　　　　　$|$
　　　　　　　　　Group

## Number Agreement in Bejar (2003)

**SUB**　　　　　　**Probe**　　　　　　**DO**

$\pi$　　　　　　　　$\#$　　　　　　　　$\#$
$|$　　　　　　　　$|$　　　　　　　　$|$
Group　　　　　Group $\longleftarrow$ **Agr** $\longrightarrow$ Group

**pl**　　　　　　　　　　　　　　　　　　**pl**

## Number Agreement in Bejar (2003)

**SUB**　　　　　　**Probe**　　　　　　**DO**

$\pi$　　　　　　　　$\#$　　　　　　　　$\#$
$|$　　　　　　　　$|$
Group $\longleftarrow$ **Agr** $\longrightarrow$ Group $\longleftarrow$ **Agr** $\longrightarrow$

**pl**　　　　　　　　　　　　　　　　　　**sg**
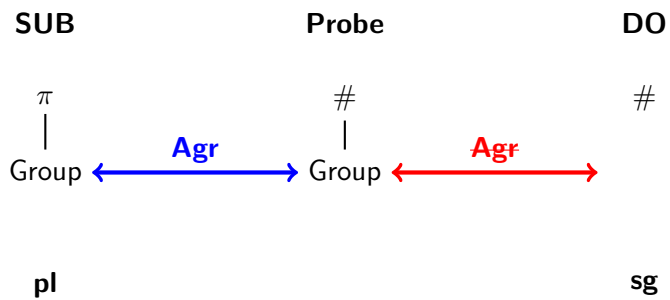
## Bejar (2003) on HBC in Karuk

|  |  | **Sg DO** | | | **Pl DO** | | |
|---|---|---|---|---|---|---|---|
|  |  | **1** | **2** | **3** | **1** | **2** | **3** |
| **Sg Sub** | **1** | — | *nú* | *ni* | — | *kiik-ap* | *ni* |
|  | **2** | *ná* | — | *ʔi* | *kín* | — | *ʔi* |
|  | **3** | *ná* | *ʔi-ap* | *ʔu* | *kín* | *kiik-ap* | *ʔu* |
| **Pl Sub** | **1** | — | *nú* | *nú* | — | *kiik-ap* | *nú* |
|  | **2** | *kaná* | — | *ku* | *kín* | — | *ku* |
|  | **3** | *kaná* | *ʔi-ap* | *kun* | *kín* | *kiik-ap* | *kín* |

- $\pi$-agreement is with the object if this is 1st/2nd person

- $\#$-agreement is with the object if this is plural

## Empirical Problems with Bejar's Analysis

| | | Sg DO | | | Pl DO | | |
|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **1** | **2** | **3** |
| **Sg Sub** | **1** | — | *nú* | *ni* | — | *kiik-ap* | *ni* |
| | **2** | *ná* | — | *ʔi* | *kín* | — | *ʔi* |
| | **3** | *ná* | *ʔi-ap* | *ʔu* | *kín* | *kiik-ap* | *ʔu* |
| **Pl Sub** | **1** | — | *nú* | *nú* | — | *kiik-ap* | *nú* |
| | **2** | *kaná* | — | *ku* | *kín* | — | *ku* |
| | **3** | *kaná* | *ʔi-ap* | *kun* | *kín* | *kiik-ap* | *kín* |

- 2nd person objects should not allow subject $\pi$–agreement

- 3pl objects should not allow subject #-agreement

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## Conclusions

- Hierarchy effects in Karok employ complex prominence scales composed of simpler atomic scales

- Hierarchy mismatches become relevant only if they cross two scale positions

- The same effects cannot be captured in a theory with harmonic scales only

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