

Secondary number agreement in Karuk*

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1 Introduction

- The primary agreement system of Karuk has received a fair amount of attention in the literature (Macaulay 1992, Béjar 2003:159–162, Bank 2010, Sappir 2010, Campbell 2012:135–147, White 2015, Gluckman 2017, Kumaran to appear)¹

(1) iim tá **nu**-mah
2SG PRF 1SG>2SG-see
I see you (SG).
Source: Vina Smith, October 25, 2010

- However, we show that there is also a secondary agreement system which tracks plural, animate arguments, marked by (morphophonologically-conditioned variants of) the suffix *-naa*.

(2) tá kun-ikyámiichvu-naa
PRF 3PL-play-PL
They are all playing around.
Source: Vina Smith, December 21, 2011

- At first glance, *-naa* looks like participant number marking, which tracks the number of internal arguments and does not appear to be instantiated by Agree (Bobaljik & Harley 2017).

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¹We follow the Leipzig Glossing Rules with the following additions: ANIM = animate, INAN = inanimate, INV = inverse, ITER = iterative.

- However, we show that Karuk *-naa* is unlike participant number in its distribution and is best described as secondary number agreement.

- We demonstrate that the properties of *-naa* can be best captured using an Interaction-Satisfaction model of Agree (Deal 2015), but poses problems for a standard Match-Value theory (e.g., Béjar 2003; Rezac 2003).

- Roadmap:

- §2: Relevant background
- §3: Data
- §4: Challenges for Match-Value
- §5: Analysis
- §6: Open questions

2 Background

- Setting

- Spoken along the middle course of the Klamath river in northwestern California
- Isolate within the disputed Hokan stock; see Golla (2011:82–127) for a recent assessment
- Neighbours: Yurok (Algic), Shasta (also Hokan), Tolowa (Athabaskan), Hupa (Athabaskan)
- Long-term pressure from colonialization and assimilation policies; first-language speakers all elderly

- Vigorous and sustained community language reclamation since 1970s; language teaching, documentation, revitalization in communities and local schools (head start through college), and social media.



Figure 1: Location of traditional Karuk territory (Sandy 2015)

- Documentation and data sources:

RESEARCHER	OUTPUT	PERIOD
Jeremiah Curtin	unpublished field notes	1889
Alfred Kroeber	unpublished field notes	1903
C. Hart Merriam	unpublished field notes	1910-21
John Peabody Harrington	Karok Texts (IJAL) Tobacco among the Karok Indians Unpublished fieldnotes	1920s and 30s
J. de Angulo & L. Freeland	Karok Texts (IJAL)	late 1920s
Hans Jørgen Uldall	unpublished field notes	1931-32
William Bright	The Karok Language (UC Press) published papers unpublished field notes	1949-57 1980s-2000s
Monica Macaulay	published papers (IJAL)	1989-present
Various community members	instructional material, incl. video	1970s-present
UC Berkeley linguists	unpublished field notes published papers senior thesis, dissertation on-line database (ararahih'urípih)	2010-present

- Salient grammatical features:

- Simple phonemic inventory, accent (a, á, âa), reduplication, complex morphophonology
- Moderately polysynthetic, highly agglutinating, strongly head-marking, and exhibits Hale's three surface characteristics for non-configurationality (Hale 1983) in that DP arguments may be
 - * freely ordered
 - * freely dropped
 - * freely split

2.1 Karuk agreement

- Primary agreement in Karuk is...

- Sensitive to person and number of both subject and object; compare (3) to (4) and (5)

(3) iim tá **nu**-mah
 2SG PRF 1SG>2SG-see
 I see you (SG). (1SG>2SG)
 Source: Vina Smith, October 25, 2010

(4) tá **ni**-mah
 PRF 1SG>3-see
 I see it. (1SG>3SG)
 Source: Lucille Albers, May 1, 2010

(5) chanáakat ìin t-**ee** pá-r-ap
 mosquito ERG PRF-2SG bite-INV
 The mosquito bit you (SG). (3SG>2SG)
 Source: Lucille Albers, October 24, 2010

- Insensitive to animacy and humanness

(6) yanava ikuk káan **u**-tháaniv
 visible log there 3SG-sit
 Then I saw the log lying there. [inanimate]
 Source: Benonie Harrie, "Coyote Pups" (DAF-KT-05a)

(7) chishíih ìikam **u**-tháaniv
 dog outdoors 3SG-sit
 There was a dog lying down outside. [animate]
 Source: Vina Smith, December 21, 2011

- (8) yánava yítha âapun u-tháaniv u-kuhí-tih
 visible one on.the.ground 3SG-sit 3SG-be.sick-DUR
 He saw one (girl) lying down, she was sick. [human]
 Source: Nettie Ruben, "Coyote as Doctor" (WB-KL-11)

- Sensitive to mood and polarity; compare indicative (4) to imperative (9) and negative (10)

- (9) chimi **kan**-pakúriihv-i
 soon 1SG-sing.songs-IMP
 Let me sing. [imperative]
 Source: Fritz Hansen, "Coyote Falls through the Living-House Roof Hole" (JPH-KT-12)

- (10) purafáat vúra ná-'aapunmu-tih-ara
 nothing Intensive 1SG-know-DUR-NEG
 I don't know anything. [negative]
 Source: Charlie Thom, June 5, 2013

- Obligatory (Bright 1957:58)
 – Exclusively prefixal, except for suffixal *-ap* (see (5), which is either an inverse marker (Macaulay 1992) or a plural agreement morpheme (Béjar 2003:160)
 – Uniform across verbs with different selectional requirements (e.g., transpersonal vs. personal)

3 Properties of *-naa*

- *-naa* appears in the Karuk verbal complex to mark plurality of one of the arguments.
- Limited to animate arguments, particularly humans (Bright 1957:112)

- (11) tá kun-ikyámiichvu-naa
 PRF 3PL-play-PL
 They are all playing around. [subject]
 Source: Vina Smith, December 21, 2011

- (12) víri-va káan í-pmaah-vunaa-vish pa-mi-hrôoh-as
 so-so there 2SG>3-see.again-PL-FUT the-2SG.POSS-wife-PL
 There you will find your wives again. [direct object]
 Source: Chester Pepper, "Medicine for the Return of Wives" (WB-KL-52)

- (13) Naa koovúra pa-'ávans-as tá ni-kshúuph-ihí-naa.
 1SG all the-man-PL PRF 1SG>3-point-BEN-PL
 I'm teaching all the men. [applied object]
 Source: Vina Smith, March 25th, 2014.

- Primarily suffixal; 4 morphophonologically conditioned allomorphs: *iru-* (14), *-vanaa* (15), *-vunaa* (16), *-naa* (17).

- *iru-* if stem contains a directional suffix (or other Class 2 or 3 suffix; Bright 1957:113)

- (14) xas pa-pihních u-píip "chími
 then the-old.man 3SG-say soon
 kiik-p-iru-vôon-ishuk-i"
 2PL-ITER-PL-crawl-out-IMP
 Then the old man said to the girls, "Come out now!"
 Source: Margaret Harrie, "The Ten Young Men who Became the Pleiades" (DAF-KT-02)

- *-vanaa* or *-vunaa* after a consonant²

- (15) xás pa-'ávans-as kun-íshriim-vanaa-tih
 then the-man-PL 3PL-shoot.at.targets-PL-DUR
 And the men were target-shooting.
 Source: Emily Donahue, "The Pikiawish at Katimin" (WB-KL-82)

- (16) xás pa-'ávans-as kun-'arihíshriih-vunaa pa-pákurih
 then the-man-PL 3PL-sing-PL the-song
 And the men sang songs.
 Source: Julia Starritt, "Coyote's Journey" (WB-KL-04)

- *-naa* elsewhere

- (17) p-axfích-as tá kun-ikyámiichvu-naa
 the-child-PL PRF 3PL-play-PL
 The children are playing.
 Source: Vina Smith, June 2, 2011

²Bright(1957:112) describes these two allomorphs as ideolectal variants.

- Optional for plural arguments:

(18) nuu tá nu-xúrihi-naa káru tá nú-kviitha
 we PRF 1PL-be.hungry-PL also PRF 1PL-sleep
 ‘We’re hungry and we’re sleeping.’
 Source: Mamie Offield, “How Deer Meat Was Lost and Re-gained” (WB_KL-33)

- Ungrammatical with singular arguments:

(19) * páykuuk pa-’avansa vakaan u-’íríp-vunaa-tih âapun
 over.there the-man there 3SG-dig-PL-DUR ground
 Intended: The man is digging in the ground over there.
 Source: Vina Smith, March 25th, 2014.

(20) * pa-’ávansa ni-pshavriik-vunaa-tih.
 the-man 1SG>3-hellp-PL-DUR
 Intended: I’m helping the man.
 Source: Vina Smith, March 25th, 2014.

- For some speakers, Vina Smith in particular, PL marks cardinality of 3 or more. Other speakers (e.g. Julia Starritt and Phoebe Maddux) allow PL for 2 and more (cf. archaic dual, Bright 1957:114)

- Appears alongside primary agreement and operates independently

(21) tá **kun**-ikyámiichvu-naa
 PRF 3PL-play-PL
 They are all playing around.
 Source: Vina Smith, December 21, 2011

(22) pa-’óokukam uum ú-ksuupku-naa pa-’áxak
 the-on.this.side 3.SG 3SG>3-point.at-PL the-two
 The one on this side is pointing at the two of them.
 Source: Julia Starritt, “Responses to Pictures” (WB-KL-92)

- Insensitive to mood and polarity

(23) xas pa-pihníich u-pííp ”chími kiik-p-iru-vôon-ishuk-i”
 then the-old.man 3SG-say ”soon 2PL-ITER-PL-crawl-out-IMP
 Then the old man said to the girls, “Come out now!” [imperative]
 Source: Margaret Harrie, “The Ten Young Men who Became the Pleiades” (DAF-KT-02)

(24) xas kun-p-iru-vôon-ishuk
 then 3PL-ITER-PL-crawl-out
 And they came out. [indicative]
 Source: Margaret Harrie, “The Ten Young Men who Became the Pleiades” (DAF-KT-02)

(25) xáyfaat ku-chuuphí-naa-tih
 don’t! 2PL-speak-PL-DUR
 Don’t talk! [imperative]
 Source: Vina Smith, October 20, 2012

3.1 Which argument controls *-naa*

- To understand which argument controls *-naa*, we need to introduce a distinction drawn by Bright (1957:33) between PERSONAL and TRANSPERSONAL verb stems.

– “PERSONAL themes [= stems] are those which occur only with those ten personal morphemes [= agreement prefixes] which indicate third person singular object. These themes designate actions which may be performed by animate beings, but which do not have other animate beings as objects of the action, as in ní-krav ‘I grind,’ nu-iina ‘we live,’ u-uuma ‘he arrives.’”

– “TRANSPERSONAL themes are those which occur with the full total of sixteen personal morphemes, indicating subjects and objects in all persons and numbers. They designate actions which may be performed by animate beings with other animate beings as objects, as in ná-mah ‘he sees me,’ nu-íimnih ‘I love you.’”

- Transpersonal stems are necessarily transitive (mono or ditransitive); personal stems may be transitive or intransitive.

- *-naa* marks the subject of a personal verb, independent of transitivity and theta-role ...

(26) púyava yáanchiip vúra uum koovúra tá kun-kúhi-naa
 you.see next.year Intensive 3.SG all PRF 3PL-be.sick-PL
 Then the next year everybody was sick. [unaccusative]
 Source: Nettie Ruben, “The Origin of the Pikiawish” (WB-KL-48)

(27) tá kun-ikyámiichvu-naa
 PRF 3PL-play-PL
 They are all playing around. [unergative]
 Source: Vina Smith, December 21, 2011

- (28) *xás pa-’ávans-as kun-’arihíshriih-vunaa pa-pákurih*
 then the-man-PL 3PL-sing-PL the-song
 And the men sang songs. [transitive]
 Source: Julia Starritt, “Coyote’s Journey” (WB-KL-04)
- (29) *xás pihnêefich u-píip chími aan nu-paríshriihvu-naa*
 then coyote 3SG-say soon string 1PL>3-twine-PL
 Then Coyote said, “Let’s twine string!” [transitive]
 Source: Julia Starritt, “Coyote Goes to the Sky” (WB-KL-08)
- ...while *-naa* may only mark the object of a transpersonal verb (Bright 1957:112).
- (30) *xás u-muustihi-naa*
 then 3SG>3-look.at-PL
 He’s looking at them.
 Source: Vina Smith, September 13, 2010
- (31) *kári xás u-píip ’hári t-i-’áhachaku-naa*
 then then 3SG-say sometime PRF-2SG>3-withhold.from-PL
pa-mi-túnviiv
 the-2SG.POSS-children
 Then (his wife) said, “You held out on your children at various times.
 Source: Mamie Offield, “The Greedy Father” (WB-KL-24)
- (32) **koovúra pa-’ávans-as ñin tá kan-eekshúupi-naa*
 all the-man-PL ERG PRF 3PL>1SG-point-PL
 Intended: All the men point at me.
 Source: Vina Smith, March 25th, 2014

3.2 Indirect objects

- In ditransitives it is the applied object that controls primary (33) as well as secondary (34) agreement.
- (33) *tá ni-’aachíhha pa-tá na-’êe*
 PRF 1SG-be.happy NMZL-PRF 2SG>1SG-give
pa-mi-pákurih
 the-2SG.POSS-song
 I’m glad that you gave me your song.
 Source: Nettie Ruben, “Coyote Trades Songs” (WB-KL-07)
- (34) *xás ú-peen-vunaa p-eekvípaan-sa pay’ôok ikríish*
 then 3SG>3-say.to-PL the-runner-PL right.here sit.down
 And he told the runners, “Sit here.”
 Source: Julia Starritt, “Coyote Steals Fire” (WB-KL-10)

3.3 Participant number

- On the surface, *-naa* may look like participant number, a phenomenon by which the semantic number of internal arguments is marked on the verb.
 - Participant number is...
 - Often suppletive, but can also be marked by reduplication or a segmental affix (Corbett 2000).
 - Typically the only instance of “agreement” in the language, or orthogonal to the primary agreement system.
 - Restricted to internal arguments (i.e., unaccusative subjects and transitive objects).³ No documented instance of participant number tracks transitive subjects.
- (35) Niuean (Seiter 1980: 62–64):
- a. **Mate** tuai a ia.
 die PERF ABS 3SG
 ‘She is dead.’ (SG)
- b. **Ma-mate** tuai a laua.
 RED.PL-die PERF ABS 3DU
 ‘They are dead.’ (PL)
- c. Kua **hala** e ia e lā akau.
 PERF cut ERG 3SG ABS branch tree
 ‘He cut down the branch.’ (SG>SG)
- d. Kua **ha-hala** e ia e tau lā akau.
 PERF RED.PL-cut ERG 3SG ABS PL branch tree
 ‘He cut down the branches.’ (SG>PL)

- Why *-naa* is not participant number:
 - It can index transitive subjects (of personal verbs)
 - Its alignment varies depending on the verb
 - Restricted to animate arguments
 - Optional

³This generalization is cross-linguistically robust, though Toosarvandani (2016) argues that participant number indexes unergative subjects in Northern Paiute.

3.4 Interim summary

- Plural *-naa* is distinct from the primary agreement system in its morphology, alignment, and feature sensitivity.
- Important features: optional, sensitive to animacy, distribution depends on selectional restrictions of the verb

Verb type	Object type	<i>-naa</i> controller
Personal	None or Inanimate	Subject
Transpersonal	Animate or Inanimate	Object

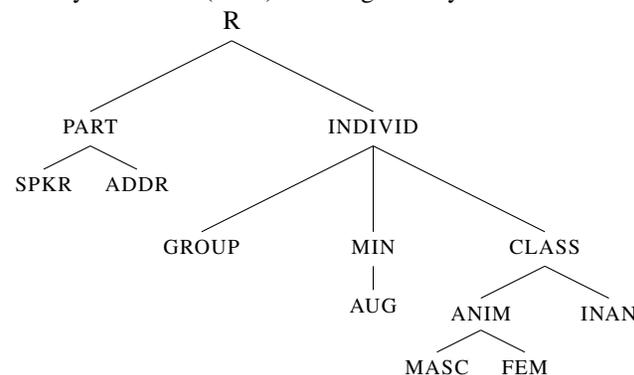
Table 1: Distribution of *-naa*

- The empirical generalization:
 - The closest argument to the verb that could potentially be animate (according to the verb’s selectional restrictions) controls *-naa*, regardless of the features of the arguments themselves.

4 Challenges for Match-Value

- A popular model of Agree is built upon a two-step process of Match and Value (e.g., Rezac 2003; Béjar 2003).
 - Probes are articulated for the feature they seek, as well as those features which are entailed by the target feature.
 - Match occurs when the probe finds a goal in its domain with an identical feature (segment).
 - Value occurs when the features of the goal entail the features of the probe; the probe’s uninterpretable features are then marked for deletion.
 - Crucially, for Béjar, the probe will only pull back the features of the goal that entail the matched feature(s).

(36) Harley & Ritter’s (2002) feature geometry:



Probe	Goal	Match	Value
$[\pi[\text{PART}]]$	$[\pi]$	Yes	No
$[\pi[\text{PART}]]$	$[\pi[\text{PART}]]$	Yes	Yes
$[\pi[\text{PART}]]$	$[\pi[\text{PART}[\text{ADDR}]]]$	Yes	Yes

Table 2: Illustration of Match and Value (Béjar 2003:66)

- Under this model, it’s difficult to capture the pattern while copying both animacy and plural features back to the probe.
- Scenario 1: Probe on little *v*, relativized to [ANIM]
 - PERSONAL verbs (*-naa* tracks subjects):
 - * The probe will never be valued by the object because by definition, personal verbs don’t take animate objects.
 - * The probe will reproject and match and value with an animate subject.
 - * The probe will not be valued with the [GROUP] feature because it doesn’t entail [ANIM]
- Scenario 2: Probe on little *v*, relativized to [GROUP]
 - PERSONAL verbs:
 - * The probe will match and value with a plural inanimate object, resulting in no Agree with the subject.
 - * This predicts that plural objects will intervene for *-naa* agreement, which is not the case.

- Scenario 3: Probe on little *v*, relativized to both [GROUP] and [ANIM] (perhaps as a conjoined probe in the sense of Coon & Bale 2014)
 - PERSONAL verbs:
 - * The [GROUP] segment of the probe will match and value with a plural inanimate object, but the [ANIM] feature will remain untouched.
 - * The probe will reproject and its [ANIM] segment will match and value with an animate subject.
 - * This system falsely predicts that an inanimate plural object and an animate singular subject will yield *naa*, since it has been valued with both features but from different arguments.
- Takeaway: In Béjar’s system, there is no way to pull back both [GROUP] and [ANIM] features without predicting object intervention since neither entails the other.
 - If we use a composite probe to remedy this issue, we overpredict.
- Our only recourse is to put the probe above the subject (i.e., on T) for personal verbs but below the subject for transpersonal verbs.

5 An Interaction-Satisfaction analysis

- Under an Interaction-Satisfaction model of Agree (Deal 2015), a probe’s interaction condition specifies which features get copied back to the probe, while the satisfaction condition specifies which features cause the probe to halt.
 - Probes copy back all features that entail the interaction feature, effectively getting more than they bargain for.
- To capture Karuk *-naa*, we can pin the difference between the two patterns on satisfaction conditions.
 - The probe for personal verbs interacts with φ and is insatiable, while the probe for transpersonal verbs interacts with and is satisfied by φ (what we could call an “indiscriminate” probe).
 - In other words, personal verb probes will copy back phi-features for all arguments, while transpersonal verb probes will only ever copy back the phi-features of the object.

Verb type	Interaction	Satisfaction
Personal	φ	\emptyset
Transpersonal	φ	φ

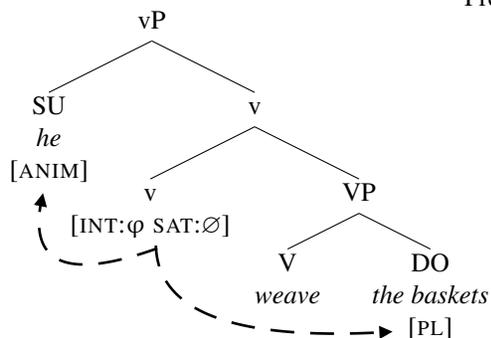
Table 3: Karuk probe conditions

- In Karuk, the phi-feature geometry must include animacy in addition to person and number (e.g., Harley & Ritter 2002:486).
- Two nice generalizations:
 - By hypothesis, the locus of the probe is little *v*, which we know to be sensitive to selectional requirements of the verb. This essentially encodes the personal/transpersonal distinction in the grammar.
 - What it is to posit a probe in this framework is to specify its interaction and satisfaction conditions—no new machinery.
- Vocabulary:
 - *iru-* \leftrightarrow [ANIM, PL] / Root-C₋
 - *-vunaa* \leftrightarrow [ANIM, PL] / Root+class2/3₋
 - *-vanaa* \leftrightarrow [ANIM, PL] / Root+class2/3₋
 - *-naa* \leftrightarrow [ANIM, PL]
- [ANIM] and [PL] must come from the same argument (i.e., no smashing, in Deal’s (2015) terms)
- By shifting the animacy sensitivity to the vocab items, we can keep the probes general (so the transpersonal probe doesn’t search too far).
 - This is only possible in an Agree framework that gets more features than it seeks.
- We can capture optionality by positing an additional lexical item for little *v* that has no *-naa* probe.
 - The derivation will converge whether little *v* merges with or without the relevant probe, yielding an “optional” pattern.

- PERSONAL verbs: *naa* tracks subjects

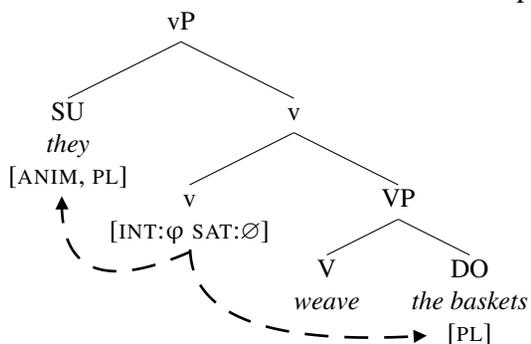
– “He wove the baskets.”

[SG ANIM > PL INAN]
Predicts: no *naa*



– “They wove the baskets.”

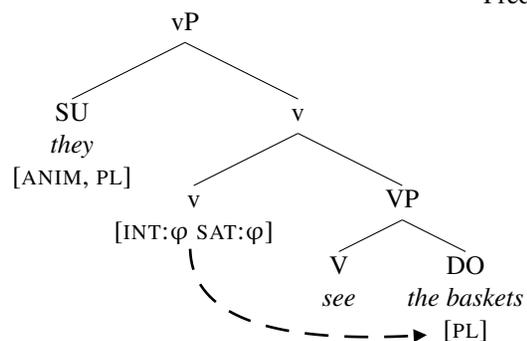
[PL ANIM > PL INAN]
Predicts: *naa*



- TRANSPERSONAL verbs: *-naa* tracks objects

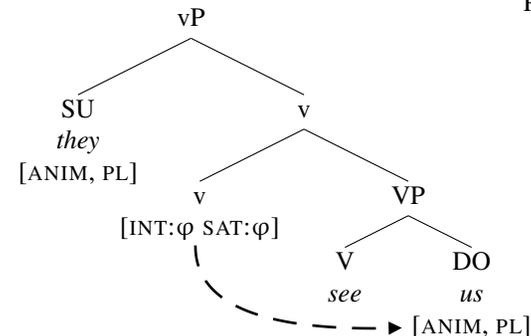
– “They saw the baskets.”

[PL ANIM > PL INAN]
Predicts: no *naa*



- “They saw us.”

[PL ANIM > PL ANIM]
Predicts: *naa*



6 Open questions

- In the corpus, *-naa* can track inanimate subjects of so-called ACTIVE verbs, which “designate actions of inanimate objects” (Bright 1957:59)

(37) ú-mkuufhi-*naa*-tih u-’iinvú-*naa*-tih
 3SG-give.off.smoke-PL-DUR 3SG-be.forest.fire-PL-DUR
 There was lots of smoke, there were forest fires.
 Source: Julia Starritt, “Coyote Steals Fire” (WB-KL-10)

– Anthropomorphism?

- If secondary agreement is on little v, where is primary agreement?
 - To account for the difference in morphological position (primary agreement is prefixal, *-naa* is suffixal), maybe primary agreement is on T, with verb movement stopping before T.
 - However, *-naa* (along with other Karuk morphemes) has both suffixal and prefixal allomorphs, which is not predicted by the Mirror Principle (Baker 1985)
 - Bright provides a verbal morphological template—if this intuition is correct, then this could be an entirely morphological problem

7 Conclusions

- We have described the distribution of *-naa*, which is distinct from primary agreement, does not instantiate participant number, and relies on the selectional requirements of the verb.

- *-naa* demonstrates that the same feature can be referenced (i.e., copied back) by multiple probes which show very different distributions.
- In a Match-Value framework, the entailment requirement on the Value operation is too narrow to account for the distribution of *-naa*, given that [ANIM] and [GROUP] do not entail each other.
- Our analysis provides further support for an Interaction-Satisfaction model of Agree:
 - What seems like a very strange distribution can be captured by a very simple satisfaction distinction, which allows the probe to always be on the same head.
 - The merit of this framework is that probes can pull back more features than they're satisfied by with little to no restrictions.
- Our analysis also follows a theory of “invisible agreement”—probes copy back a large number of phi features, very few of which may be expounded in the morphology.

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