

# A typology of STAMP morphs in the Macro-Sudan Belt

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# What is STAMP?

Portmanteau morphemes consisting of subject features, tense, aspect, mood, and/or polarity (STAMP).

STAMP morphology in Gã (gaa, Kwa, Ghana) (primary data from work with native speaker)

- e=ba  
3SG=come  
'He came'
- ee=ba  
3SG.PROG=come  
'He is coming'
- é=ba  
3SG.PRF=come  
'He has come'
- Kofí ba  
Kofi come  
'Kofi came'

# Defining STAMP morphs

Sometimes STAMP morphs are easily decomposable into meaningful pieces (1).

1. Negative tone on subjects in Guébie (gie, Kru, Côte d'Ivoire) (primary work with a native speaker)
  - a. **guwə3.2** gba3 'the dogs barked'
  - b. **guwə3.24** gba3 'the dogs didn't bark'

However, other times they are not decomposable, and seem to be fused portmanteau morphs (2).

2. Guro (goa, Mande, Côte d'Ivoire) (Vydrine 2009:239)

|    |                          |           |                                |           |     |
|----|--------------------------|-----------|--------------------------------|-----------|-----|
| a. | <b>be</b>                | zuru-o    | b. <b>yaa</b>                  | zùrù-ò    | do  |
|    | <b>2SG&gt;3SG.IPFV</b>   | wash-IPFV | <b>2SG&gt;3SG.IPFV.NEG</b>     | wash-IPFV | NEG |
|    | '(you) wash him/her/it.' |           | '(you) don't wash him/her/it.' |           |     |

# Defining STAMP morphs

STAMP morphs can co-occur with overt subjects.

## 3. Ebira (igb, Nupoid, Nigeria) co-occurrence of STAMP with independent subjects (Adiva 1989)

- |    |   |    |  |
|----|---|----|--|
| a. | èṃī m̃â      rí ṽsá<br>I      STAMP eat food<br>'I ate the food.' | b. | èwū w̃â r      rí ṽsá<br>you STAMP eat food<br>'You ate the food.' |
|----|---|----|--|

Or they can be expounded together with the subject.

## 4. Negative tone on subjects in Guébie (gbi, Kru, Côte d'Ivoire) (primary work with a native speaker)

- |    |   |
|----|---|
| a. | <b>guwə3.2</b> gba3 'the dogs barked'       |
| b. | <b>guwə3.24</b> gba3 'the dogs didn't bark' |

Most commonly in our sample, STAMP morphs involve pronominal subjects that inflect for TAMP (52 of 61 languages). Though we consider all of the above types of cases to be STAMP morphs.

# Defining STAMP morphs

To encompass fused and decomposable STAMP morphs, Rolle (2021) defines STAMP based on “whether STAMP categories form a constituent *before* and to the *exclusion* of the verb root.”

- We adopt his definition here.
- Note: In none of the descriptions we looked at did STAMP morphemes appear *after* the verb, as suffixes or as separate words, so we do not comment on whether the criterion of appearing *before* the verb is a requirement for being a STAMP morph.
- Practically speaking, since authors use different sets of criteria for determining whether a morpheme is an affix or a separate word, we treat morphemes written as affixes and separate words equally here.

# Distribution

STAMP morphs are common in the Macro-Sudan Belt (Anderson 2011, 2016), which also forms a linguistic area with respect to a number of other features.

- Phonological inventory includes labio-velar stops, implosives, nasal vowels (Clements & Rialland 2008)
- ATR harmony (Clements & Rialland 2008, Güldemann 2008, Rolle et al. 2017)
- More than two tone levels (Clements & Rialland 2008, Hyman et al. 2020)
- Logophoricity marking (Güldemann 2008)
- SAuxOV(X) word order (Güldemann 2008, Sande et al. 2019)
- Many others! (Clements & Rialland 2008, Güldemann 2008, Creissels et al. 2008)

# Goals of this talk

We present results of a typological survey of STAMP morphology

- We expand on extant typological and historical work on STAMP morphs (Anderson 2016, Konoshenko 2020), with a focus on...
  - Which morphosyntactic categories are marked by STAMP morphs,
  - By what morphophonological means (tone, length, fusion, etc.),
  - And how to formally derive STAMP portmanteau morphs
- We consider possible explanations for which features are involved in STAMP, how STAMP is realized, and why it is an areal phenomenon in the Macro-Sudan Belt.

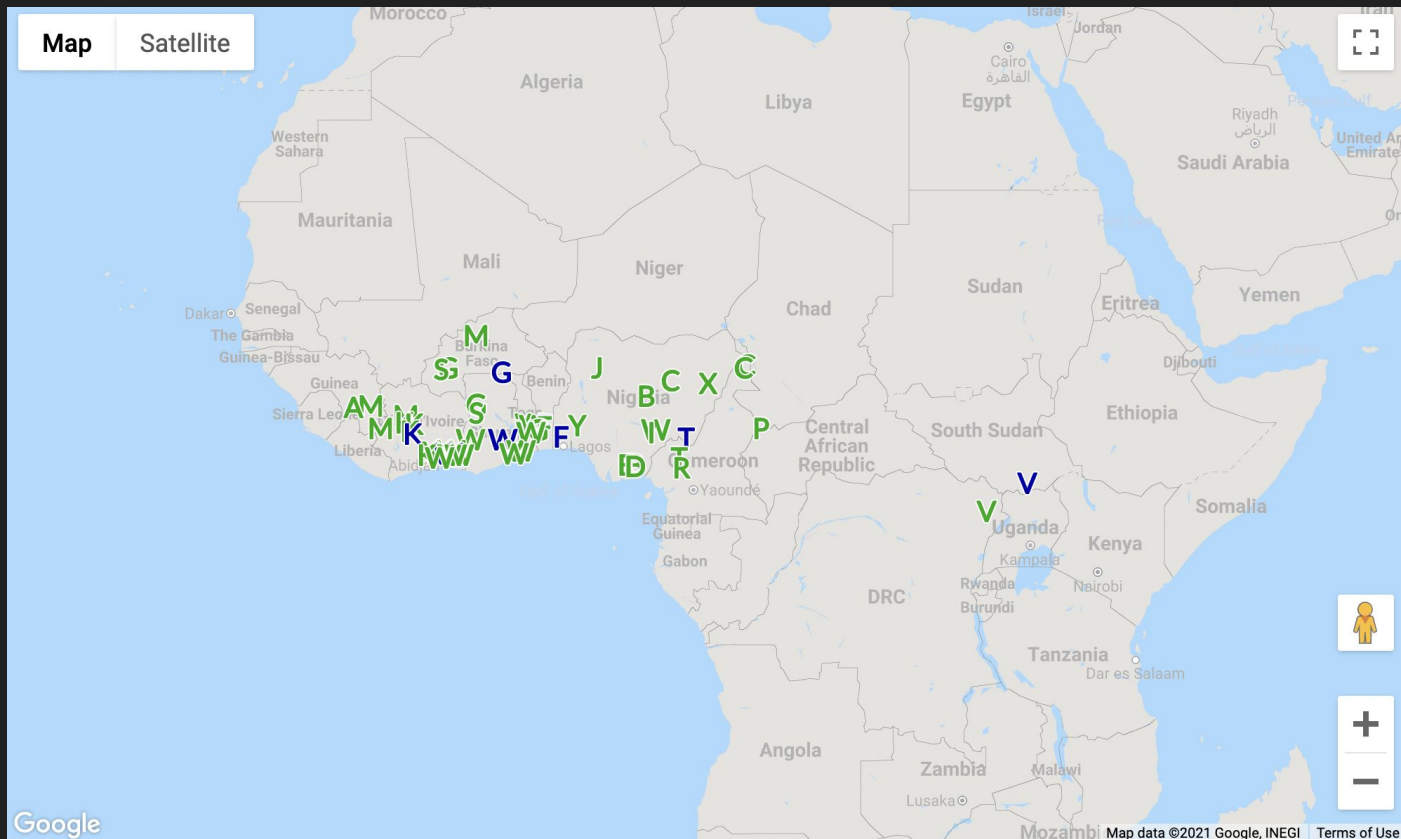
# Methodology

We investigated STAMP patterns in a typological survey of 60+ languages across 20 language families in the Macro-Sudan Belt.

- The data was entered into a Google form, which asked for metadata on the language and source of data, as well as data questions about how various combinations of subject, tense, aspect, mood, and negation are marked.
- The data came from a combination of descriptive grammars and language experts.
- We tried to include wide coverage of language families in the Macro-Sudan Belt, but concentrated on West Africa where STAMP morphs are more common, since there was simply more relevant data available there.



# Map of STAMP vs. non-STAMP languages in our sample



Green: STAMP

Blue: No STAMP

Letters: Language family:

- A: Atlantic-Congo
- B: Benue-Congo
- C: Chadic
- D: Igboid
- E: Edoid
- F: Gbe
- G: Gur
- H: Cushitic
- I: Idomoid
- J: Kainji
- K: Kru
- M: Mande
- N: Nupoid
- O: Omotic
- P: Mbum
- R: Grassfields Bantu
- S: Senoufo
- T: Bantoid
- U: Ubangian
- V: Sudanic
- W: Kwa
- X: Adamawa
- Y: Yoruboid

# Categories marked by STAMP

- STAMP Categories:
  - Person and Number (typically subject, occasionally object)
  - Tense
  - Aspect
  - Mood
  - Negation/Polarity
  - Combinations thereof
- Languages vary in which categories are marked by STAMP
- However, looking across languages, patterns emerge in the categories most likely to show STAMP marking

# Categories marked by STAMP: Person and Number

## Number:

- Singular more likely to be marked than plural,
  - None of the languages in our sample mark plural without marking singular
  - 4 languages mark 1, 2, 3 in singular but only 1 and/or 3 in plural
  - Five languages only mark singular:
    - E.g. Tíéfo (tiq, Gur, Burkina Faso) and Ebrié (ebr, Kwa, Côte d'Ivoire) (Dido, 2015)

### Tíéfo (tiq, Gur, Burkina Faso)

#### Imperfective

|   | sg | pl |
|---|----|----|
| 1 | ɲí | é  |
| 2 | mì | nā |
| 3 | kā | ō  |

#### Perfective

|   | sg | pl |
|---|----|----|
| 1 | ān | é  |
| 2 | m  | nā |
| 3 | n  | ō  |

# Categories marked by STAMP: Person and Number

49 of the languages in our survey mark 1, 2, 3 person pronouns

## Person Hierarchy: 1>2>3

- 3rd person is often exceptional, where STAMP is either:
  - only marked on 3rd person
    - E.g. Merey (meq, Chadic, Cameroon) (Gravina 2007)
  - the only person where STAMP is not marked
    - E.g. 3PL in Tem (kdh, Gur, Togo) (De Craene 1986), Avikam (avi, Kwa, Côte d'Ivoire) (Schang 1995)
- This is consistent with 3rd person being default marking
  - Which outcome (marked or not), likely dependent on how STAMP is marked in the language
- Corresponding with person hierarchy and default marking, in some languages both 1st and 3rd person have STAMP marking
  - E.g. Eleme (elm, Benue-Congo, Nigeria) (Bond 2006)

# Categories marked by STAMP: Tense

- Many languages in this region do not have explicit tense marking,
  - Time related distinctions are instead marked through aspect (e.g. imperfective)
- Grammars vary in how these patterns are described
- Thus, implications for STAMP marking can not be clearly defined
- Clearest example of a tense category marked by STAMP is future
  - 19 languages in our sample mark future tense

## Nafaanra (nfr, Senufo, Ghana) (Garvin, 2017)

Default person marking

|   | sg | pl |
|---|----|----|
| 1 | ni | o  |
| 2 | mu | e  |
| 3 | u  | pe |

Future+person marking

|   | sg  | pl  |
|---|-----|-----|
| 1 | mbe | oo  |
| 2 | mú  | ee  |
| 3 | we  | pie |

# Categories marked by STAMP: Mood

- Overall, mood appears to be less frequently marked on STAMP morphemes
  - 19 languages are described as marking any mood category
  - May not be a property of STAMP marking, but rather of descriptions of mood, which is often described in less detail or omitted
- Where mood is marked, subjunctive (9), conditional (4), irrealis (4), and imperative (3) mood are most likely to be marked

**Kulango (nku, Gur, Côte d'Ivoire)** (Elders 2007)

## Habitual:

má            dólì  
 1.SG:HAB    sell:HAB  
 'I sell'

## Subjunctive:

mí            dólì  
 1.SG:SBJV    sell:SBJV  
 'May I sell'

|             |  |
|-------------|--|
| <b>Sbjv</b> | <b>Tem</b> (kdh, Gur, Togo)<br><b>Mano</b> (mev, SE Mande, Liberia)<br><b>Baoulé</b> (bci, Kwa, Côte d'Ivoire)<br><b>Merey</b> (meq, Chadic, Cameroon)                   |
| <b>Cond</b> | <b>Mano</b> (mev, SE Mande, Liberia)<br><b>Zialo</b> (zil, Mande, Guinea)<br><b>Nyankpa</b> (yes, Benue-Congo, Nigeria)<br><b>Degema</b> (deg, Edoïd, Nigeria)           |
| <b>Irr</b>  | <b>Mano</b> (mev, SE Mande, Liberia)<br><b>Zialo</b> (zil, Mande, Guinea)<br><b>Eleme</b> (elm, Benue-Congo, Nigeria)<br><b>Ajagbe</b> (ajg, Gbe, Benin)                 |
| <b>Imp</b>  | <b>Zialo</b> (zil, Mande, Guinea)<br><b>San</b> (sbd, E Mande, Burkina Faso)<br><b>Dan</b> (ndj, SE Mande, Côte d'Ivoire)<br><b>Toura</b> (neb, SE Mande, Côte d'Ivoire) |

# Categories marked by STAMP: Aspect

- Aspect marking is particularly common across languages in our survey
  - Imperfective (20), perfective (18), progressive (23), and habitual (20) particularly common
- Greater number of languages mark progressive
  - However, few languages mark progressive and not imperfective, whereas several languages mark imperfective but not progressive
    - Implication hierarchy: imperfective > progressive
  - Implicational hierarchy may depend on clausal spine, or clausal spine may be emergent from other factors (e.g. frequency, scope, phonological content)

**Dukawa** (dud, Kainji, Nigeria): +m suffix on pronoun in progressive aspect (Heath 2002)

## Default Pronouns

|   | sg | pl |
|---|----|----|
| 1 | me | te |
| 2 | wo | no |
| 3 | wu | e  |

## Progressive Pronouns

|   | sg  | pl  |
|---|-----|-----|
| 1 | mem | tem |
| 2 | wom | nom |
| 3 | wum | em  |

# Categories marked by STAMP: Polarity

- Negation/Polarity (23 languages) mark negation on the pronoun

## Dan (ndj, SE Mande, Côte d'Ivoire) (Doneux 1968)

| Perfective |    |     | Negative Perfective |     |       | Negative Habitual |     |       |
|------------|----|-----|---------------------|-----|-------|-------------------|-----|-------|
|            | sg | pl  |                     | sg  | pl    |                   | sg  | pl    |
| 1          | má | yóé | 1                   | māá | yōéóé | 1                 | máá | yóéóé |
| 2          | bá | ká  | 2                   | bāá | kāá   | 2                 | báá | káá   |
| 3          | yà | wà  | 3                   | yāá | wāá   | 3                 | yáá | wáá   |

- Often marked on full NP
  - 8 out of 11 languages where STAMP on NP, negation marked on NP

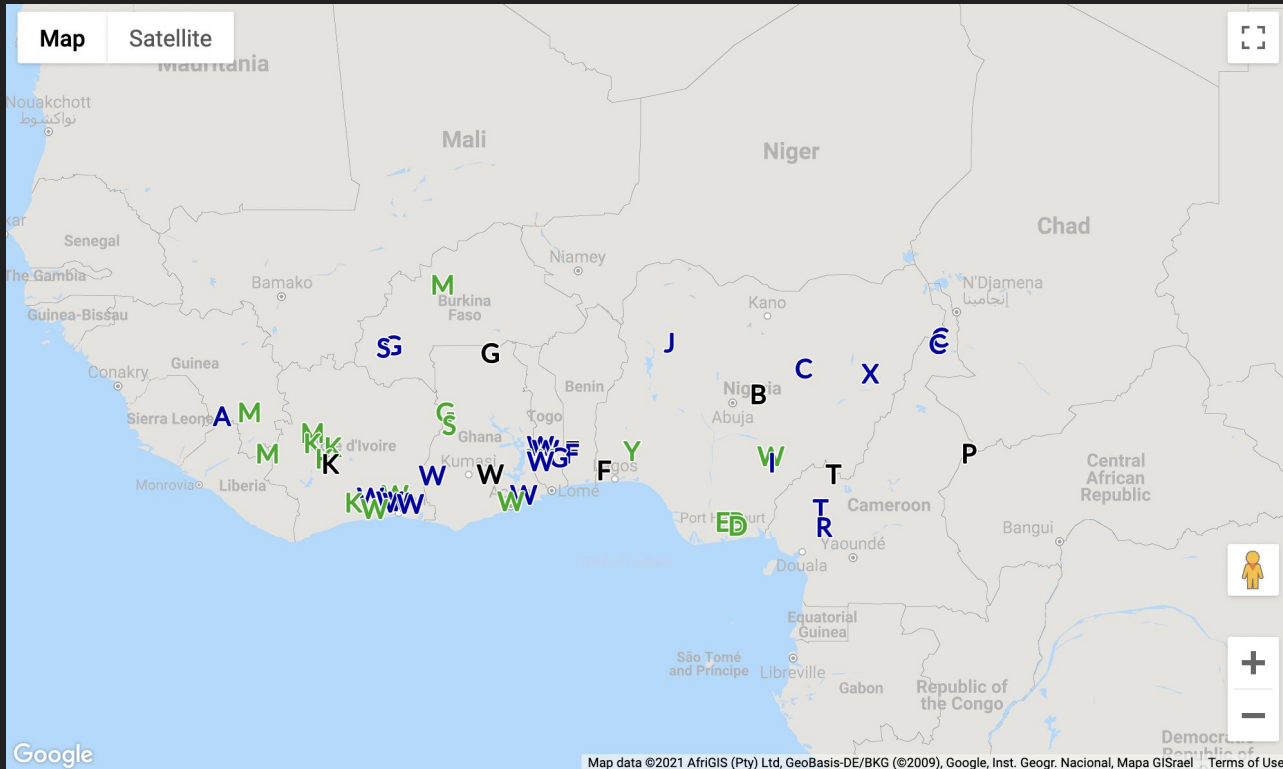
## Godié (god, Kru, Côte d'Ivoire)

(Marchese 1986)

| Default      |      |            |    | Negation            |      |                  |    |
|--------------|------|------------|----|---------------------|------|------------------|----|
| laago        | blá  | o          | mu | laagoó              | blá  | óó               | mu |
| God          | kill | 3SG        | go | God.NEG             | kill | 3SG.NEG          | go |
| 'God kills.' |      | 'He goes.' |    | 'God doesn't kill.' |      | 'He doesn't go.' |    |

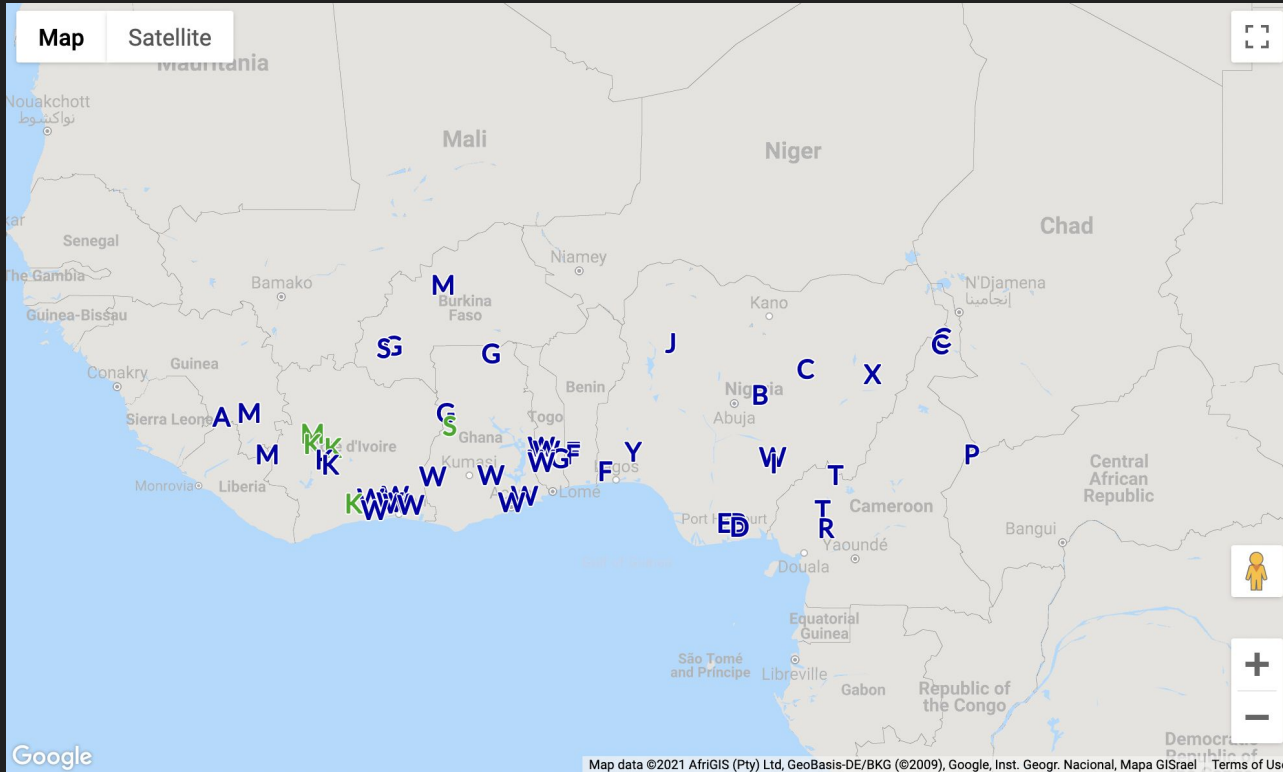


# Negation maps



...on non-pronominal subjects

# Negation maps



STAMP marking negation Green = Yes

# Categories marked by STAMP: Putting it together

- Multiple STAMP categories can combine or be marked simultaneously on the subject
  - Additionally, some TAMP categories can **only be marked in the presence of other TAMP** categories and/or may **block** TAMP processes that surface elsewhere:

## Nafaanra (nfr, Senufo, Ghana) (Garvin 2017)

|   | IPFV | PFV | PFV+PROG | IPFV+PROG | IPFV+NEG | NEG.PFV | PFV+PROG+NEG |
|---|------|-----|----------|-----------|----------|---------|--------------|
| 1 | ni   | nda | ndaa     | ni        | ni-n     | ni nsra | ni nsraa     |
| 2 | mu   | mna | mnaa     | mu        | mu-n     | mu nsra | mu nsraa     |
| 3 | u    | wra | wraa     | u         | u-n      | u nsra  | u nsraa      |

# Interim Conclusion

- **Why might TAMP be marked with subject features rather than on verb stems or as separate auxiliaries?**
  - The functional load of (tones on) verbs is high. Neutralizing any verbal contrast is not worth it (cf. Rolle 2021), so TAMP is marked on the subject, or as a separate morpheme with subject morphology.
    - But not all STAMP morphology neutralizes contrasts.
  - Subject pronouns and TAMP-marking auxiliaries co-occur frequently, and are likely to fuse during grammaticalization over time.
    - But not all STAMP involves pronouns, some involves full DP subjects. Presumably a frequency argument cannot be made about a full DP subject (with modifiers and/or + a relative clause). Though perhaps STAMP on DP subjects may arise through analogy with other, more frequent subjects, such as pronouns.

# Interim Conclusion

- **Why might STAMP involve the features it does?**
  - Frequency of co-occurrence may play a role in which features are realized through STAMP morphs
    - This would suggest that negation, progressives, habituais, and imperfectives, which are more commonly marked by STAMP morphs in our database, are more frequent in corpora, or more common with pronominal subjects, than other TAMP morphology.
  - The order of elements in the (hierarchical syntactic) clausal spine may influence which features are realized by STAMP morphs.
    - Hierarchically higher TAMP morphemes are more likely to be co-realized with the subject.
    - Or perhaps the order of elements in the clausal spine is emergent from frequency effects.

# Morphophonological realizations of STAMP

STAMP can be realized in a wide variety of ways across languages. The morphophonological means of marking STAMP can be sorted into two general categories. All the languages in our sample make use of at least one of the following:

- **Suprasegmental realization** - 39 languages
  - Tone - 36 languages
  - Length - 7 languages
- **Segmental fusion** - 31 languages
  - Fused pronoun + auxiliary complex

# Suprasegmental realization: Tone

- The suprasegmental realization of STAMP is found in 39 languages. Of those, 36 languages mark TAMP via subject tone.
  - Ndemli (nml, Grassfields, Cameroon) paradigmatic tone (Lenaka 1999):
    - Pronouns surface with Mid tone in present, compared to HL tone in future.
    - The segmental content of the pronouns is identical; the distinction is solely tonal.

## Present

|   | sg | pl    |
|---|----|-------|
| 1 | mī | hábē  |
| 2 | wō | hínbē |
| 3 | bē | bī    |

## Future

|   | sg | pl    |
|---|----|-------|
| 1 | mî | hábê  |
| 2 | wô | hínbê |
| 3 | bê | bî    |

# Suprasegmental realization: Length

- The suprasegmental realization of STAMP is found in 39 languages. Of those, 7 languages mark TAMP via a change in vowel length of the subject.
  - Ìkàré Yoruba (yor, Yuroboid, Nigeria) vowel lengthening (Oyebade & Agoyi 2018):
    - The vowel of the pronoun is short in habitual contexts, and long in future contexts.
    - The tone of the pronouns is identical in both: the distinction is made solely by length.

## Habitual

|   | sg | pl |
|---|----|----|
| 1 | mi | a  |
| 2 | wɛ | ɛ  |
| 3 | e  | ɔ  |

## Future

|   | sg  | pl |
|---|-----|----|
| 1 | mii | aa |
| 2 | wɛɛ | ɛɛ |
| 3 | ee  | ɔɔ |



# Suprasegmental realization: Non-pronominals

- Of the 11 languages in our sample in which TAMP is realized on a full NP subject, it is expounded suprasegmentally in 9.
  - **Tone:** Yala (yba, Idomoid, Nigeria) (Oko 1986)

|                        |       |      |                       |       |      |
|------------------------|-------|------|-----------------------|-------|------|
| ògbudú                 | hèhè  | gbáá | ògbudú                | hèhè  | gbáá |
| Ogbudu                 | laugh | hard | Ogbudu.HAB            | laugh | hard |
| 'Ogbudu laughed hard.' |       |      | 'Ogbudu laughs hard.' |       |      |

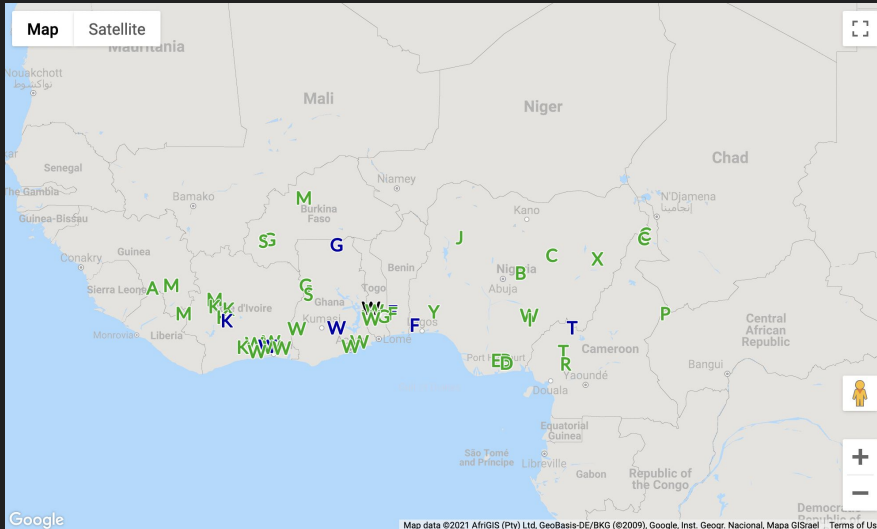
- **Length:** Baoulé (bci, Kwa, Côte d'Ivoire) (Creissels 1977)

|               |     |                      |     |
|---------------|-----|----------------------|-----|
| nyisan        | dī  | nyisaan              | dī  |
| Nyisan        | eat | Nyisan.SBJV          | eat |
| 'Nyisan ate.' |     | 'Nyisan has to eat.' |     |

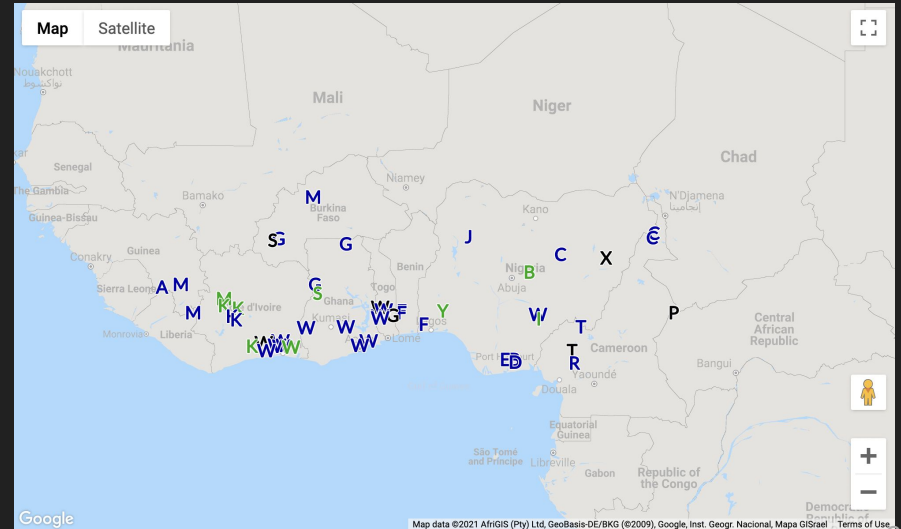
# STAMP on pronouns vs. full subjects

Implicational hierarchy: If we see TAMP marked on full noun phrase (NP) subjects, we also see it on pronouns in that language.

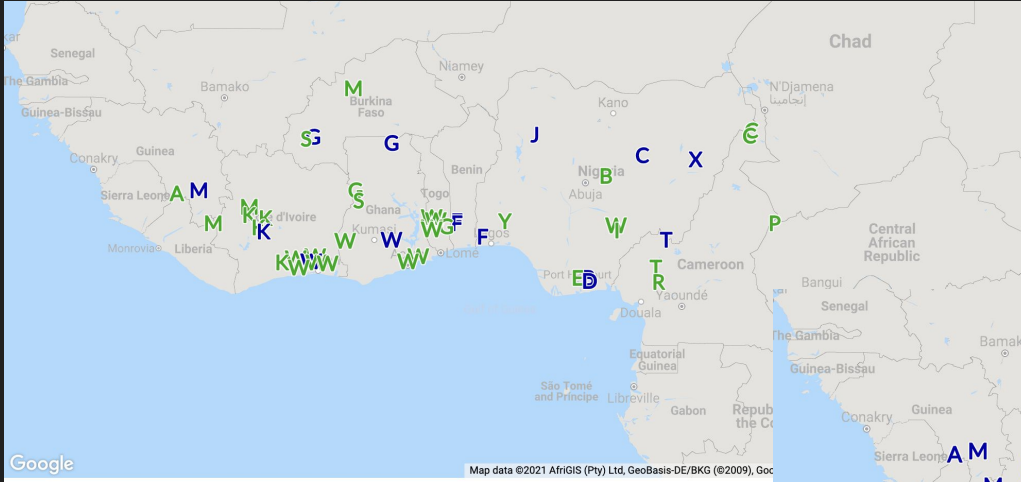
TAMP on Pronouns (Green = Yes)



TAMP on full NP subjects (Green = Yes)



# Where is STAMP marked suprasegmentally?

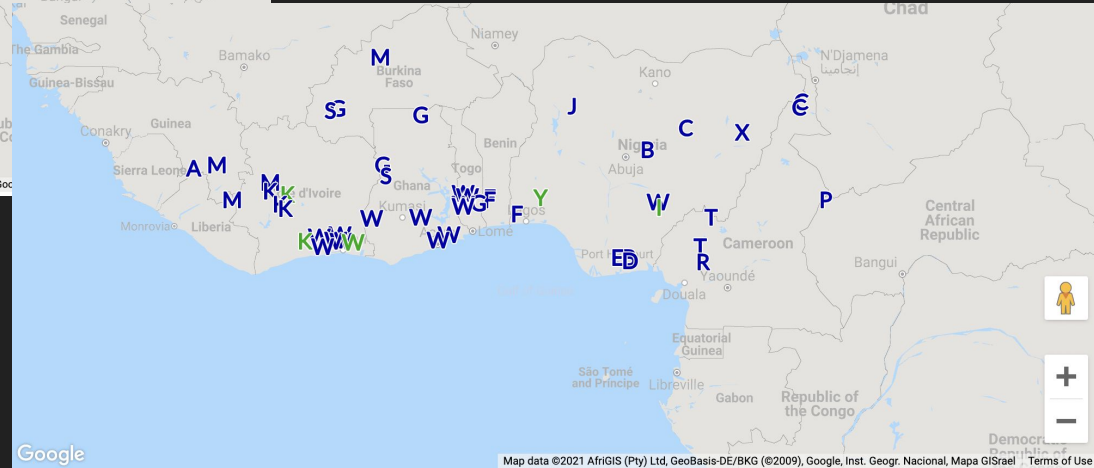


Green: At least one STAMP morph is suprasegmental

Blue: No suprasegmental STAMP

Above: STAMP marked suprasegmentally

Right: STAMP marked suprasegmentally on full noun phrase subject



Terms of Use

# Segmental fusion

- The realization of STAMP as segmental fusion between a pronoun and auxiliary is found in 31 languages. The fusion of the pronominal with an auxiliary results in a single form with aspects of both elements.
  - Subject pronouns in Avikam (avi, Kwa, Côte d'Ivoire) fuse with the imperfective auxiliary *á* (Schang 1995):

## Perfective

|   | sg | pl |
|---|----|----|
| 1 | m̀ | ò  |
| 2 | à  | õ  |
| 3 | è  | ɲõ |

## Imperfective

|   | sg | pl   |
|---|----|------|
| 1 | mǎ | wǎ   |
| 2 | àá | ɲwǎǎ |
| 3 | jǎ | ɲwǎǎ |

# Morphophonological realization: Combinations

- Languages can make use of both categories (suprasegmental realization, segmental fusion), or a combination of the two.
  - **Tone and fusion, together:** Degema (deg, Edoid, Nigeria) (Kari 2004)

me=tá    mú    éki

1SG=go    to    market

‘I am going to the market.’

mî=tá    mú    éki

1SG.NEG=go    to    market

‘I am not going to the market.’

- **Tone and length, separately:** Gã (gaa, Kwa, Ghana) (primary data)

o=ba

2SG=come

‘You came.’

ó=ba

2SG.PRF=come

‘You have come.’

oo=ba

2SG.PROG=come

‘You are coming.’

# Interim Conclusion

- Why might suprasegmental STAMP be more common than segmental STAMP?
  - Tones and other suprasegmental features are more likely to spread and have long-distance effects than segmental features.
  - Tones tend to be stable, such that when segmental material is lost over time, tones stick around and can “float” onto other nearby morphemes.
  - Regular, frequent co-occurrence of specific subjects (pronouns) and specific TAMP morphology over time can result in segmental reduction and tonal overrides.

# Formal analyses of STAMP realization

In recent work (Garvin et al. 2021), we have shown that at least two distinct formal mechanisms are needed to derive STAMP surface forms:

- Concatenation of underlying forms associated with each morphosyntactic feature, plus regular phonological alternations (cf. Russell 2021 on Gã and Rolle 2021 on Ebira)
- Morphological suppletion (cf. Felice 2021 on Gã)

Whether a given STAMP morpheme or paradigm is best analyzed as concatenative or suppletive is independent of whether the cells of the paradigm differ in suprasegmental or segmental content.

# Diagnosing phonological versus suppletive STAMP morphs

- Likely concatenation + phonology:
  - Phonologically derivable with independently motivated constraints
  - The same exponent of a morpheme across a full paradigm
- Likely morphological fusion + suppletion:
  - Unpredictable exponence across the paradigm
  - Non-regular phonological alternations
  - Distinct (suppletive) portmanteau morphs for each set of features



# Phonologically predictable STAMP

- In many languages, the presence of STAMP is predictable based solely on phonological factors.
  - In the Sanvi variant of Agni (any, Kwa, Côte d'Ivoire), monosyllabic pronouns fuse with the progressive auxiliary *lé*; the one disyllabic pronoun in the paradigm does not (Ahua 2004):
- Additionally, the realization of a given feature is consistent across the paradigm (LH tone in all STAMP morphs in the progressive).

|     | Default           | Progressive          |
|-----|-------------------|----------------------|
| 1sg | mĩ                | mĩĩ                  |
| 2sg | e                 | èé                   |
| 3sg | o                 | òó                   |
| 1pl | je                | jèé                  |
| 2pl | é <sup>↓</sup> mó | é <sup>↓</sup> mó lé |
| 3pl | be                | bèé                  |

# Suppletive STAMP

- In other languages, STAMP morphs are not clearly decomposable into distinct morphemes, and instead look like portmanteau forms.
  - In Tiefo (tiq, Gur, Burkina Faso), there are two paradigms of pronouns, and no obvious phonological change that derives one set of singular pronouns from the other (Hantgan 2014)

|            | Imperfective | Perfective |
|------------|--------------|------------|
| <b>1sg</b> | <b>ɲí</b>    | <b>an</b>  |
| <b>2sg</b> | <b>mì</b>    | <b>m</b>   |
| <b>3sg</b> | <b>ka</b>    | <b>n</b>   |
| <b>1pl</b> | <b>é</b>     | <b>é</b>   |
| <b>2pl</b> | <b>na</b>    | <b>na</b>  |
| <b>3pl</b> | <b>o</b>     | <b>o</b>   |

# Summary of typological results: Kru

| Language | Phonological | Suppletive | Other |
|----------|--------------|------------|-------|
| Guébie   | X            |            | X     |
| Nyabwa   | X            |            |       |
| Kouya    | X            |            |       |
| Godié    | X            |            | X     |
| Wobe     | X            | X          |       |
| Vata     | X            |            |       |

# Summary of typological results: Senoufo + Gur

| Language | Phonological | Suppletive | Other |
|----------|--------------|------------|-------|
| Nafaanra | X            | X          |       |
| Kulango  | X            |            |       |
| Syer     | X            |            |       |
| Tiefo    |              | X          |       |
| Tem      | X            | X          |       |

# Summary of typological results: Kwa

| Language  | Phonological | Suppletive | Other |
|-----------|--------------|------------|-------|
| Gã        | X            | X          |       |
| Ebrié     | X            |            |       |
| Abidji    | X            |            |       |
| Sekpele   | X            | X          |       |
| Tafi      | X            | X          |       |
| Tuwuli    | X            |            |       |
| Baoulé    | X            |            |       |
| Avatime   | X            |            |       |
| Avikam    | X            |            |       |
| Adioukrou | X            |            |       |
| Efutu     | X            | X          |       |
| Agni      | X            |            |       |
| Ega       | X            |            |       |

# Summary of typological results: Mande

| Language     | Phonological | Suppletive | Other |
|--------------|--------------|------------|-------|
| <b>Mano</b>  | X            | X          |       |
| <b>San</b>   | X            | X          |       |
| <b>Toura</b> | X            | X          |       |
| <b>Zialo</b> | X            | X          |       |
| <b>Dan</b>   | X            | X          |       |
| <b>Zodi</b>  | X            | X          |       |

# Summary of typological results: Other

| Language     | Phonological | Suppletive |
|--------------|--------------|------------|
| Longuda      | X            | X          |
| Dukawa       | X            | X          |
| Nyankpa      | X            |            |
| Ikare Yoruba | X            |            |
| Kare         | X            |            |
| Fe'fe'       | X            |            |
| Degema       | X            | X          |
| Ajagbe       | X            |            |
| Us-Saare     | X            |            |

| Language | Phonological | Suppletive |
|----------|--------------|------------|
| Ebira    | X            |            |
| Ndemli   | X            | X          |
| Yala     | X            |            |
| Igede    | X            | X          |
| Merey    | X            | X          |
| Lese     | X            |            |
| Igbo     | X            |            |
| Vamé     | X            | X          |

# Typological summary of formal categorization

- With a single exception (Tiefo, Gur, Burkina Faso), all languages with STAMP have at least some phonologically derivable STAMP morphs.
- Most language families show mixed STAMP patterns, where some languages have only phonologically derivable STAMP. No language family shows only suppletive STAMP.
- All Mande languages in the sample have both phonologically derivable and suppletive STAMP.
- Most languages without any STAMP are part of language families with only phonologically derivable STAMP.



# Historical and areal implications

- The typological results suggest a historical path from transparently concatenative to morphologically fused suppletive STAMP morphs, with Mande languages being the most advanced in the grammaticalization path.
- Historical path:
  - Step 1: Subject precedes Auxiliary as separate words.
  - Step 2: Transparent concatenation of Subject with auxiliary (perhaps along with phonological reduction of one or both Subj and Aux).
  - Step 3: Subject and auxiliary are non-transparently fused into a single suppletive portmanteau morph
- These findings support Anderson's (2016) conclusions about the historical path of STAMP morphs across families, and Konoshenko's (2020) on the historical path of STAMP morphs in Mande.

# Phonologically predictable STAMP within a family

- With a close look at a single language family, we can see the historical path from Subj Aux sequences to STAMP morphs in progress.
  - In the Gbe languages, spoken in Benin and Togo, we see STAMP only in the languages in which the future auxiliary is a single vowel (Hazoume 1990):

|                 |                           |
|-----------------|---------------------------|
|                 | 'He will kill the animal' |
| <b>Tɔfingbe</b> | <u>à</u> ná hù kànnì ló   |
| <b>Xwedagbe</b> | <u>ǫ</u> lá hù hlàn ló    |
| <b>Xlwagbe</b>  | à hù kànlin ó             |

|                 | Future AUX | STAMP? |
|-----------------|------------|--------|
| <b>Gungbe</b>   | ná         | no     |
| <b>Fongbe</b>   | ná         | no     |
| <b>Tɔfingbe</b> | ná         | no     |
| <b>Gɛngbe</b>   | lá         | no     |
| <b>Xwedagbe</b> | lá         | no     |
| <b>Ajagbe</b>   | ā          | yes    |
| <b>Xlwagbe</b>  | á          | yes    |

# Overall areal patterns

- Languages spoken in and around Côte d'Ivoire are more likely to:
  - include negation among STAMP morphs
  - show TAMP morphology marked on full noun phrase subjects than elsewhere
  - have (only) suprasegmental STAMP marking
- These generalizations hold across Kru, Kwa, and Mande languages in the area, but not outside the relevant area.
- This areal pattern is stronger than many of the STAMP patterns within specific language families.
- A Mande-specific pattern comes from the best formal analysis of each STAMP paradigm, where Mande languages show more suppletive STAMP morphs than other language families.

# Implications and conclusions

- STAMP morphs are an areal phenomenon across Macro-Sudan belt.
- They are manifested in a variety of ways (tone, length, segmental fusion).
- They involve a variety of grammatical features including tense, aspect, mood, person, number, and negation. Some TAMP features are more likely to be expounded through STAMP morphs than others (negation and imperfective/progressive/habitual).
  - Future work will examine whether this correlates with frequency, syntactic position, etc.
  - Future work will also examine the interaction between a) morphophonological realization and TAMP features and b) clausal word order and STAMP patterns
- They can be categorized as derived via suppletion or concatenation and regular phonological processes.
  - This categorization illuminates the historical pathways that lead to synchronic STAMP morphs, with Mande languages being the furthest advanced along the grammaticalization path..

# Why the Macro-Sudan Belt?

Languages in the Macro-Sudan Belt, and especially in the sub-area identified near Côte d'Ivoire, tend to have the following properties:

- Analyticity
- Short words (often CV)
- Contrastive tone
- Contrastive length
- S Aux or S V word order

This set of properties makes these languages particularly prone to developing STAMP morphology, not to mention that it is an areal phenomenon, so contact likely also plays an important role.

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If you'd like to contribute data to our typological sample about a language with which you're familiar, please get in touch with us

([katherine.russell@berkeley.edu](mailto:katherine.russell@berkeley.edu)) or visit

<https://tinyurl.com/STAMPWestermann> to enter the data!

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