

Motivating multiple exponents

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- **Choguita:** Sebastián Fuentes, Ma. del Rosario Cervantes, Guillermina Fuentes, Rosa Isela Chaparro, Bertha Fuentes, Teresa Guerrero, Rocío Fuentes, Jesusita Loya, Giltro Fuentes P., Roberto León, Reyes Fuentes, Luz Elena León, Miguel A. Fuentes, Francisco Moreno and Vicente Fuentes.
- **U Mass:** Alice Harris
- **UC Berkeley:** Sharon Inkelas
- **U of Oregon:** Volya Kapatsinski
- **UCSD:** Andrés Aguilar and Lucien Carroll; also: Patrick Mullen, Sean Stein (2012-2013).

- ME in German plural nouns

Matthews 1974:149 (cf. Wiese 1996, Müller 2006)

	<i>Singular</i>	<i>Plural</i>	<i>Gloss</i>	
a.	Arm	Arm-e	‘arm’	<i>Suffixation</i>
b.	Bild	Bild-er	‘picture’	
c.	Vater	Väter	‘father’	<i>Umlaut</i>
d.	Boden	Böden	‘earth’	
e.	Wurm	Würm-er	‘worm’	<i>Multiple Exponence</i>
f.	Hals	Häls-e	‘neck’	

The phenomenon

- Filomeno Mata Totonac (Totonaco-Tepehua; McFarland 2009:54)
 - a. š-k-qašmat-maa-čaa ‘PST-1SUBJ-hear-PROG-THERE’
 - b. š-qašpat-paa-pi-ti ‘PST-hear**2**-PROG**2**-THERE**2**-**2**SUBJ’

- Meskwaki (Fox) (Algonquian; Dahlstrom 2000:74)
 - a. ne-nowi: ‘1-go.out’
 - b. ke-nowi: ‘2-go.out’
 - c. ne-nowi:-pena ‘1-go.out-1.PL’
 - d. ke-nowi:-pwa ‘2-go.out-2.PL’

Other ME patterns

- Lower Jubba Maay (Cushitic; Paster 2007:86-87)

	<i>Singular</i>	<i>Plural</i>	
a.	šati	šati-yal	‘shirts’
b.	mateesa	mateesa-yal	‘peanuts’
c.	biŋ	bin-o ~ biñ-yal ~ bin- o-yal	‘pins’
d.	miis	miis-o ~ miis-yal ~ miis- o-yal	‘tables’
e.	hidik	hidiy-o ~ hidig-yal ~ hidiy- o-yal	‘stars’

Other ME patterns

- Crucially, it involves:
 - ✓ Independent morphological constructions/layers
 - ✓ Redundancy
- ME is NOT:
 - ✗ affix reduplication
 - ✗ morphologically conditioned phonology
 - ✗ distributed exponence (e.g. circumfixes)

plus other similar-looking phenomena (Caballero & Harris 2012)
- Today: ME at the *word* level
(see Sells (2004) for multi-word domains of ME)

Defining ME

- The morpheme as a Saussurean sign
 - ✓ (“[a] morphological rule introducing an affix ... discharge[s] features and positions-of-exponence... the affix so introduced is the principal exponent of the features discharged” (Noyer (1997:lv))
- Blocking-inducing principles (‘elsewhere’, structural complexity, economy, etc.)
 - ✓ “[a]mong equally expressive expressions, the simplest is optimal” (Kiparsky 2005:114)
- Economy in diachronic change
 - ✓ A more complex construction will be inhibited in analogical change (Haspelmath 2008:208)

The problem with ME

- Some diachronic sources of ME:
 - a. Paradigmatic analogy Harris & Faarlund 2006, Albright 2005, 2006
 - b. Affix trapping Harris & Faarlund 2006
 - c. Affix reordering Haspelmath 1993
 - d. Hypercharacterization Kurlowicz 1947, etc.

“...the typological rarity of this structure [exhuberant exponence in Nakh-Dagestanian languages] is not explained as the result of its inability to function, the difficulty of its acquisition, the difficulty of processing it, our innate endowment, or by any universal rule specifically outlawing it. Rather... this structure results from a complex sequence of quite ordinary diachronic events.” Harris 2008:266

Diachrony and motivation

- *What leads to the synchronic stability of ME?*
- *Is this phenomenon shaped by usage-based (comprehension/production) pressures?*
- *If so, what aspects of these factors should be hardwired (if at all) into morphological theory?*

Some crucial questions

- Uto-Aztecan (Taracahitan)
- 1,000 CR speakers in Mexico [85,000 all varieties (INEGI 2010)]
- Data from field research
- Highly agglutinating, suffixing
- Small phonological inventory
- Restricted phonotactics
- Prosodically complex
- A lot of phonological reduction
- Complex morphophonology
- **Several ME patterns**



Choguita Rarámuri (Tarahumara)

1. ME may involve a functional advantage in morphological processing
2. This functional advantage is only at play in contexts where the relevant construction is *unexpected*
3. This effect is expected when two conditions hold:
 - (i) ME is optional, and
 - (ii) the optional redundant marker follows the other marker(s) in terms of processing



§1: CR within a simple typology of ME

§2: Perceptual functionality of ME

- Methods and results of field experiment

§3: Some implications

- Reconciling with previous cross-linguistic work: processing of ME in Batsbi (Harris & Samuel 2011)

§4: Conclusions

Roadmap



**§1: CR within a simple
typology of ME**

- Overlapping ME: each morphological construction contributes a feature that no other construction does.

e.g. Filomeno Mata Totonac person agreement

š-qašpat-paa-pi-ti ‘PST-hear₂-PROG₂-THERE₂-₂SUBJ.SG’

➤ *Secondary exponence of morphosyntactic features? (Noyer 1992)*

- Superfluous ME: a morphological construction makes no unique semantic or syntactic contributions given other construction(s) in the word in which it occurs.

e.g. Lower Jubba Maay plural marking in nouns

bin-o ~ biñ-yal ~ bin-o-yal ‘pins’

➤ *Resists this kind of reanalysis*

Two sub-types of ME (Caballero & Inkelas 2013)

- Basic pattern: words containing an inner marker of *limited productivity/phonologically reduced* may add a second, redundant outer exponent.
- ME is completely **superfluous**
- ME involves **derivation**
- ME is **optional**
 - ✓ The speaker has a choice to use the redundant cue or not
 - ✓ Allows us to examine whether the listener has expectations as to what drives this choice.

Why examine ME in CR?

Single Exponence

a. 'su-**n**-ma

b. wasa 'ra-**ni**-ma

c. 'pa-**si**-li

d. ri 'wi-**wi**-ma

e. ro 'n-**e**-ma

Multiple Exponence

'su-**n-ki**-ma 'sew-APPL(-APPL)-FUT.SG'

wasa 'ra-**n-ki**-ra 'plow-APPL(-APPL)-POT'
'(S/he) can plow it for X'

'pa-**s-ki**-li 'throw-APPL(-APPL)-PST'
'(S/he) threw it at X'

ri 'wi-**w-ki**-ma 'find-APPL(-APPL)-FUT.SG'
'(S/he) will find it for X'

ro 'n-**e-ki**-ma 'boil-APPL(-APPL)-FUT.SG'
'(S/he) boiled it for X'

Applicative ME in CR

- Recursive causativization

- a. biné-**ri**-ma ‘learn-CAUS-FUT.SG’

- [[learn] + CAUS = teach]

- b. biné-**r-ti**-ma ‘learn-CAUS-CAUS-FUT.SG’

- [[[learn] + CAUS = teach] + CAUS = make teach]

- Causative ME

- a. raʔi'tʃa-**ri**-ma ‘speak-CAUS-FUT.SG’

- b. raʔi'tʃa-**r-ti**-ma ‘speak-CAUS-CAUS-FUT.SG’

- [[speak] + CAUS = make speak]]

- *same allomorphy pattern suggests that individual exponents hold form-meaning connections at the synchronic level*

Causative ME in CR



§2: Perceptual functionality of ME

- Kuryłowicz (1947) first law of analogy: “a bipartite marker tends to replace an isofunctional morpheme consisting of only one of these elements” Hock 1991:211
- Hock's interpretation: more ‘clearly’ or ‘overtly’ marked elements tend to be preferred in analogical change (1991:212)
- Skou (New Guinea)verbal agreement Donohue 1999, 2003
 - a series of sound changes led to consonant cluster simplifications
 - led to loss of contrast in a large number of verb forms in paradigms
 - “[t]hese factors would appear to be sufficient to bring about a second process of cliticization onto the verb in order to preserve contrastive verbal agreement” Donohue 2003:493

Hypercharacterization

- Competition Model

Bates et al. 1982, Bates & MacWhinney 1989, MacWhinney et al. 1985

- Morphological exponents are a subtype of “cue”
- Morphological redundancy as ‘cue coalition’ = multiple cues aid in processing
- But an additional cue may not bring any advantages in the *absence* of cue competition
Kail 1989, Mimica et al. 1994
- Redundant cues may not speed up processing *if a single cue* is expected in the context
Bates & MacWhinney (1989: 55-56)

- ME should help the listener perceive the expressed meaning when help is needed
iff the meaning is not contextually predictable

- Measured perceptibility through a speech-in-noise gating task
Salasoo & Pisoni 1985
- Causative and applicative minimal pairs single exponence (SE)
vs. ME: 13 target pairs + 12 fillers
- Extracted from field recordings (same speaker, careful speech)
in pink noise
- Successively decreased noise in 2dB increments
- 14 adult native CR speaker participants with proficiency in
Spanish (18-60 years old)
- Identified the form? What does it mean? At what noise level?

Methods

- Two measures for each word for each participant:
 - 1) whether or not the participant recognized the causative or applicative meaning of the morphologically complex word, and
 - 2) what was the noise level when the word was recognized.

➤ *No evidence that ME enhances acoustic robustness of cues*

- Recognition accuracy data analyzed using logistic mixed-effects models with by-participant and by-stem random intercepts and slopes for all fixed effects using lme4
Bates et al. 2013
- Fixed effects: exponence (multiple vs. single) and average *stem accuracy*
- **Stem accuracy** = how easy or difficult meanings (CAUS, APPL) expressed by the single or multiple exponents were to guess in the context of each specific stem.

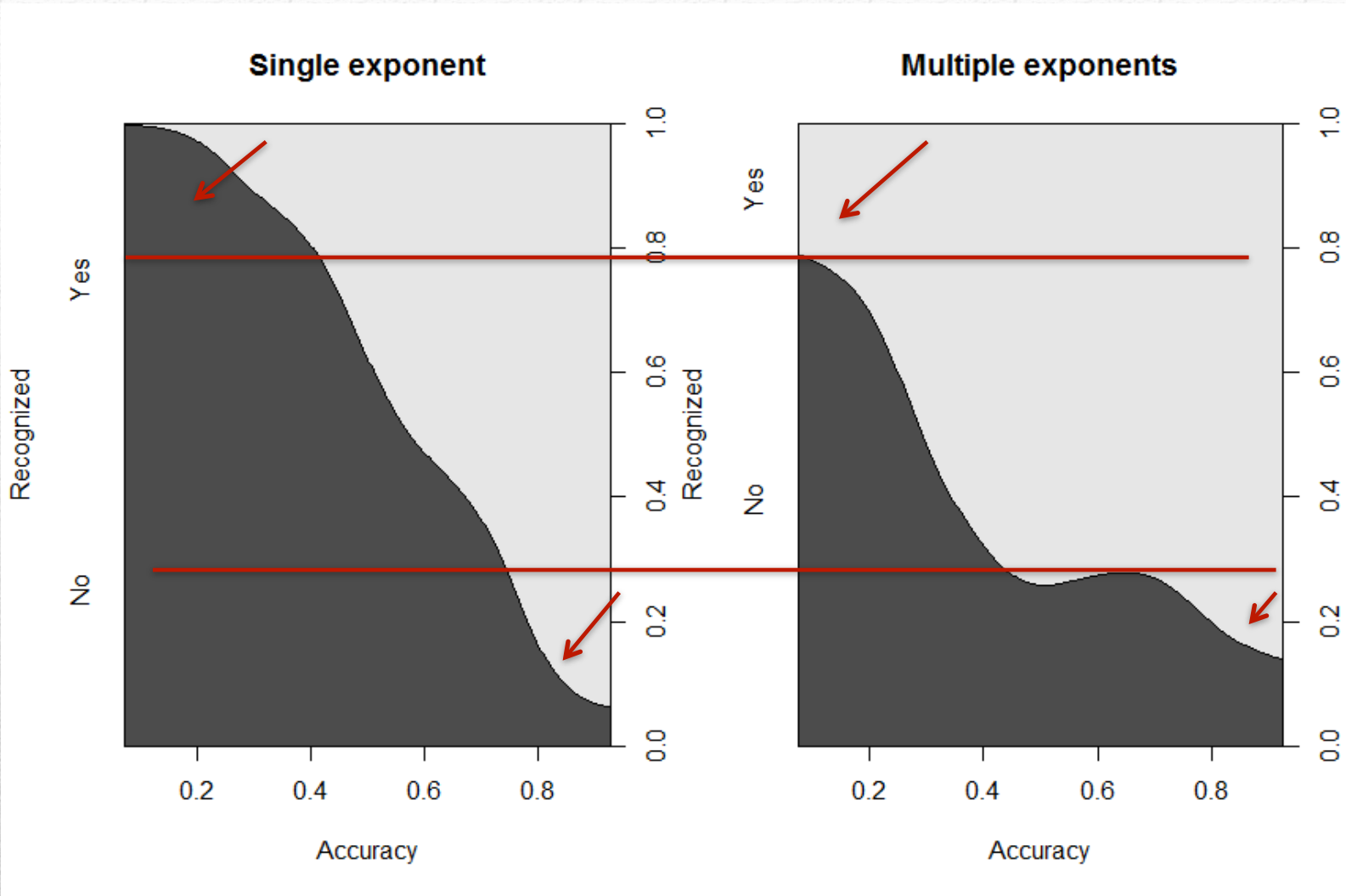
- A significant main effect of exponence, with ME leading to slightly higher accuracy.
- A significant interaction between effect of exponence and stem accuracy

ME helps recognizing the meaning when recognition rates are low (= when help is needed) and may hurt recognition when they are high (= word-internal context is sufficiently predictive).

Results

Table 1. Recognition accuracies as a function of stem context and exponence, ordered by overall probability of recognition. The higher-accuracy cell in each row is highlighted.

Stimulus pair	Recognition with single exponence	Recognition with redundant exponence	Probability of recognition per stem
ki 'p-e-ba/ki 'p-e-ki-pa	0/7	1/7	7%
'po-nu-ma/'po-n-ki-ma	0/7	2/7	14%
si 'ru-ni-ri/si 'ru-n-ki-ri	1/7	4/7	36%
ko 'ʔi-ri-ma/ko 'ʔi-r-ti-ma	1/7	6/7	50%
'pa-si-ri/'pa-s-ki-ri	3/7	6/7	64%
'me-ti-ma/'me-r-ti-ma	4/7	5/7	64%
u 'k-e-ri/u 'k-e-ki-ma	5/8	4/6	64%
wika 'ra-ri-ma/wika 'ra-r-ti-ri	5/7	4/7	64%
su 'we-ri/su 'we-ki-ri	6/7	6/7	86%
wika 'ra-ni-ma/wika 'ra-ni-ki-ma	6/7	7/7	93%
ri 'me-ni-ma/ri 'me-ni-ki-ma	7/7	5/7	86%
ri 'ku-tu-ma/ri 'ku-r-ti-ma	7/7	6/7	93%
'ub-ti-ri/u 'ba-r-ti-pa	7/7	6/7	93%



- A mechanism of *pragmatic inference*: the listener expects the speaker to produce the second exponent *only* when the meaning would be unlikely to come across without it
Maxim of Clarity – Grice 1975
- Will generalize *only* to situations where two conditions hold:
 1. redundant marking is optional - the speaker has a choice in production and the listener can therefore form expectations as to what the choice entails
 2. recognition of the optional exponent *follows* recognition of another exponent - can be anticipated by the listener as s/he is incrementally processing the speech signal Allopenna et al. 1998; Marslen-Wilson & Tyler 1980

Discussion



§3: Some implications

- Batsbi (Nakh-Dagestanian; Georgia) “exhuberant” exponence.
- Three or more redundant exponents of gender-number agreement (“class markers” (CM)).
- CMs are lexically determined in preradical or postradical position:

	WITH POSTRADICAL CM	WITHOUT POSTRADICAL CM
WITH PRERADICAL CM	d-ag-d-alar ‘show oneself, be seen’	d-a:ar ‘give; appear’
WITHOUT PRERADICAL CM	tag-d-alar ‘be done, be made’	ol:ar ‘thread (e.g. needle); put on (e.g. clothing); ladle out’

TABLE 2. Distribution of CMs in Batsbi.

- CM distribution is partially governed by phonological factors, but conditioned mainly by lexical factors

Single Exponence

WITH 1 CM

tag-d-alar	‘be done, made’
teps-d-alar	‘fall (down)’
xerc-d-alar	‘change’
kot:-d-alar	‘get upset’
qot:-d-alar	‘open (leaves)’
kak’-d-ar	‘stir; dirty; chop’
zor-d-ar	‘make brave/bold’
tat:-d-ar	‘move (something) toward’
kot:-d-ar	‘taper; oppress’
teq-d-ar	‘drag, trail’
lax-d-ar	‘lower’
lak-d-ar	‘throw, toss’
teš-d-ar	‘convince; confide’
tepl-d-ar	‘avert; send off’
qol:-d-ar	‘prop up, support’
lac’-d-ar	‘hurt’
tec’-d-ar	‘teach, show, edify’

Multiple Exponence

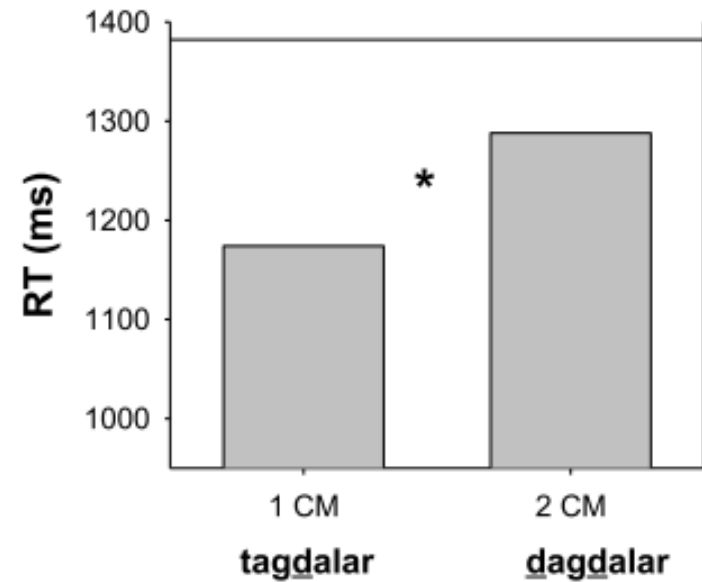
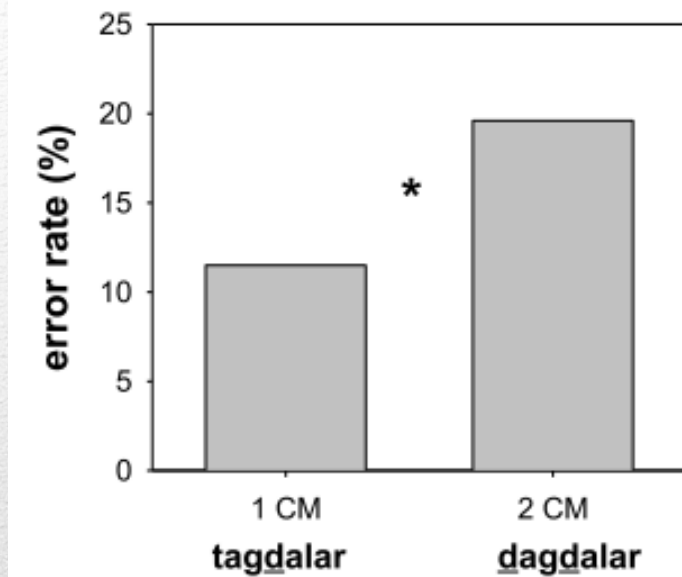
WITH 2 CMs

d-ag-d-alar	‘show oneself, be seen’
d-opx-d-alar	‘heat up; dress’
d-arž-d-alar	‘dissolve’
d-os:-d-alar	‘come down’
d-it:-d-alar	‘bathe’
d-ak’-d-ar	‘burn, burn down/up’
d-el-d-ar	‘make laugh’
d-os:-d-ar	‘seat, set down’
d-ax:-d-ar	‘drown; lengthen’
d-aq-d-ar	‘raise; exaggerate’
d-ex-d-ar	‘demolish; wear out’
d-aš-d-ar	‘melt; soak’
d-ek-d-ar	‘cause to cry, plead’
d-eb1-d-ar	‘begin, start’
d-ol-d-ar	‘begin, start’
d-ac’-d-ar	‘burden, add weight’
d-ec’-d-ar	‘cause to love’

ME in Batsbi (Harris & Samuel 2011:465)

- Lexical decision task and grammaticality judgment task.
- ME conveys **NO** functional advantage in Batsbi
 - “[W]ords with two agreement markers are recognized more slowly and with more errors relative to verbs with a single marker”
 - “For grammaticality judgments, subjects were generally slower to respond when the verb carried more markers”
 - With ME “the extra processing time did not produce much improvement in accuracy”

ME in Batsbi (Harris & Samuel 2011:449)



ME hurts processing
(Harris & Samuel 2011: 456)

- Some methodological issues [V. Kapatsinski pc]:
 - The kind of ME in Batsbi makes words have higher cohort density
 - makes word recognition harder Marslen-Wilson & Welsh 1978
 - In a lexical decision or grammaticality judgment task, *mismatch in any one segment or illegal combination of any two morphemes* should cause a “no” judgment
 - more morphemes → slower, more room for error
- In addition, ME in Batsbi does not display the critical properties that make ME advantageous in CR
 - Not optional
 - Redundant markers do not follow other markers in processing

Why would it hurt?



§4: Conclusions

- Our results have bearing on the questions of listeners' expectations, but not on what drives *speakers'* choice.
- Are speakers choosing to implement redundancy in less predictive (word-internal) contexts?
- *Perhaps*
- “[S]peakers are indeed more likely to produce optional morphology when the meaning encoded by the morphology is unexpected in context” Norcliffe 2009
Also: Kurumada & Jaeger 2013; Mahowald et al. 2013, for related evidence
- But choice may also depend on other factors
 - Phonological properties of stems in CR?
 - Association of ME with individual stems through common discourse contexts?
 - Other?

Production?

- Get production data in the field
- Develop the CR corpus to assess the role of distributional factors (word and affix frequency) and assess contextual predictability, informativity
- Refine developing tools in formal models of morphology that seek to compel ME
(e.g., Optimal Construction Morphology – Caballero & Inkelas 2013)

Some future directions

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Matétara ba!
