

An information-theoretic approach to the typology of spatial demonstratives

Sihan Chen (MIT), Richard Futrell (UC Irvine), Kyle Mahowald (UT Austin)
email: sihanc@mit.edu

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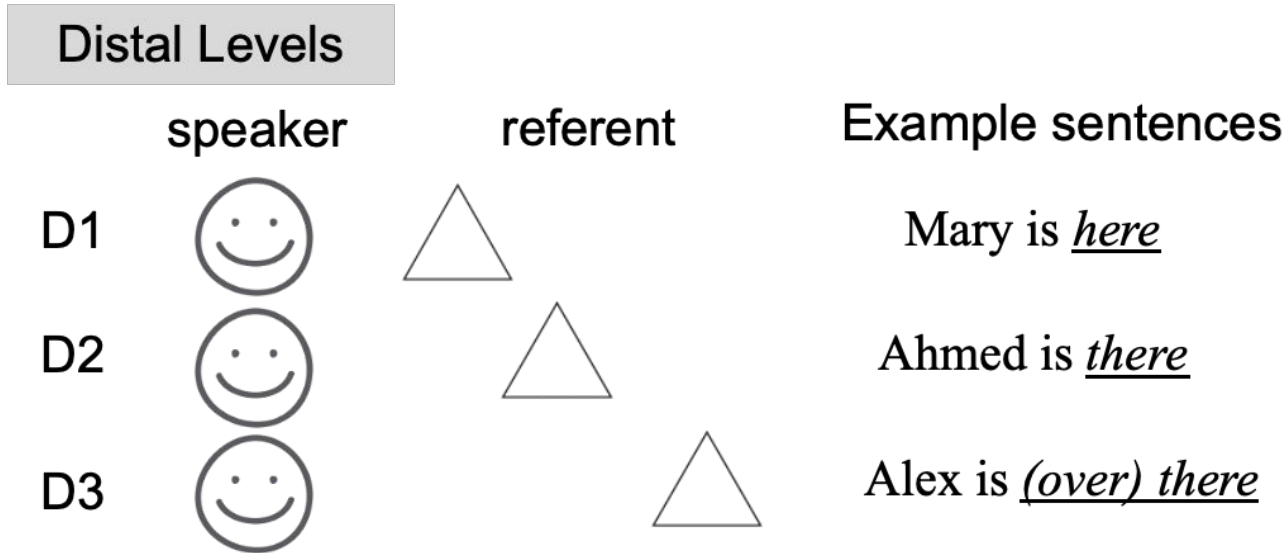
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Spatial deictic demonstratives

- Definition: words or phrases denoting spatial relation between speaker(s) and referent(s).
- Examples: “here”, “from there” (English), “tuolla”, “sieltä” (Finnish)

Spatial deictic demonstratives

- Meaning encoded: **distal level** (how far is the referent from the speaker)

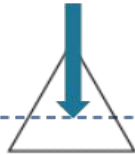


Spatial deictic demonstratives

- Meaning encoded: **orientation** (aka place / goal / source), the relative movement between the referent and the distal level.

Orientations

Mary is going (to) there



Goal (G)

Ahmed is there



Place (P)

Alex is from there



Source (S)

Spatial deictic demonstratives

- Example: spatial deictic demonstratives in English (top) and Finnish (bottom)

		Orientation		
		Goal (G)	Place (P)	Source (S)
Distal level	D3	(to over) there	(over) there	from (over) there
	D2	(to) there	there	from there
	D1	(to) here	here	from here
		Goal (G)	Place (P)	Source (S)
	D3	tuonne	tuolla	tuolta
	D2	sinne	siellä	sieltä
D1	tänne	täällä	täältä	

Research Question

- There are 21146 possible ways to partition the 3-by-3 meaning space with words

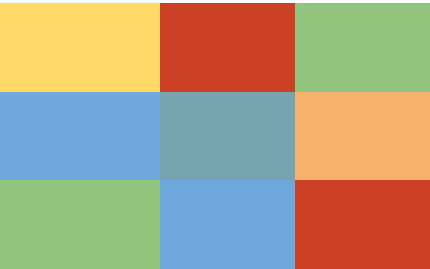


English



Finnish

+ 21141 more...



Hypothetically possible system



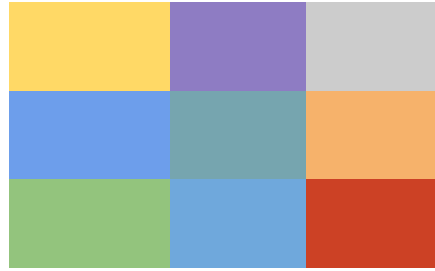
Another hypothetical system

Research Question

- 34 of them are attested in 221 languages in work by Nintemann et al. (2020)



English



Finnish

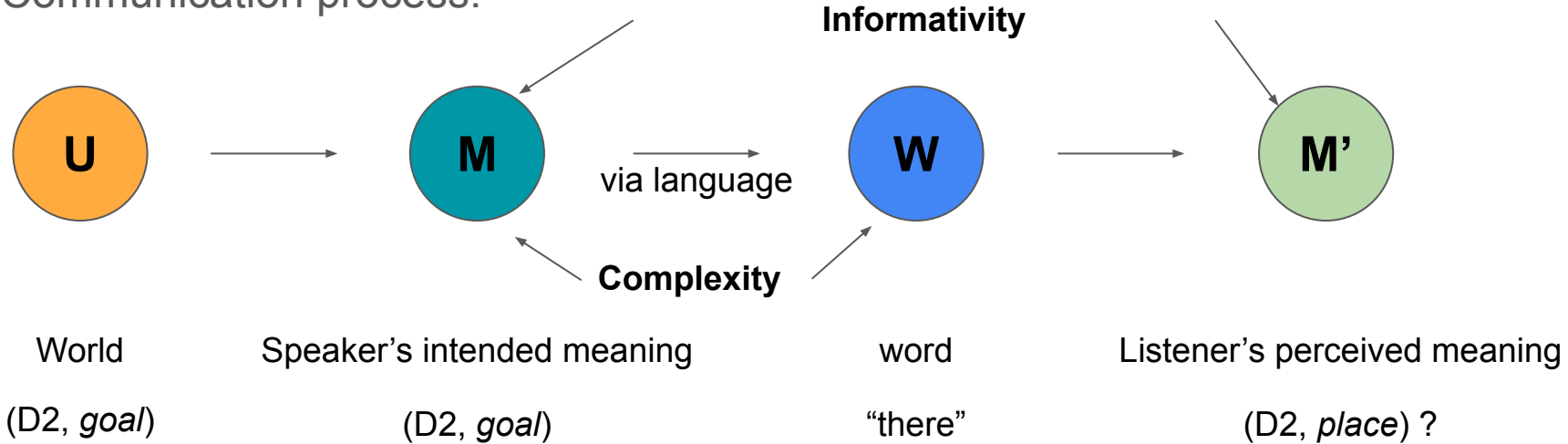
+ 32 more

- Question we are interested in:

How efficient are the spatial deictic demonstrative systems in real languages, compared with other unattested ones?

Information-theoretic model

- Communication process:



Components of efficiency:

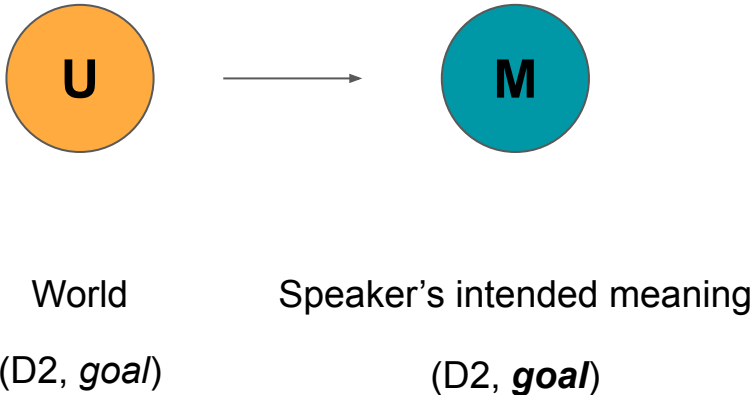
- **Informativity:** how similar is the perceived meaning to the intended meaning? (high -> good)
 - **Complexity:** how much can we infer the intended meaning given the word? (low -> good)
- (Shannon, 1948, 1959; Tishby et al., 2000; Zaslavsky et al., 2018)

Information-theoretic model

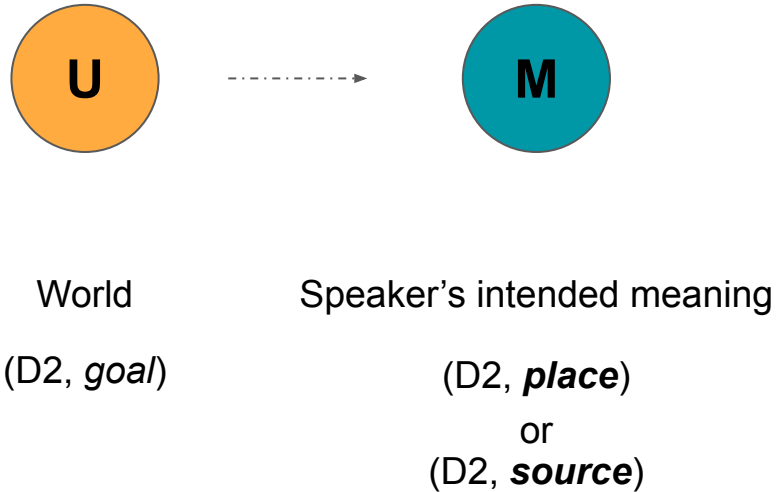
- Parameters in the model:

1) *place - goal* confusion cost

2) *place - source* confusion cost

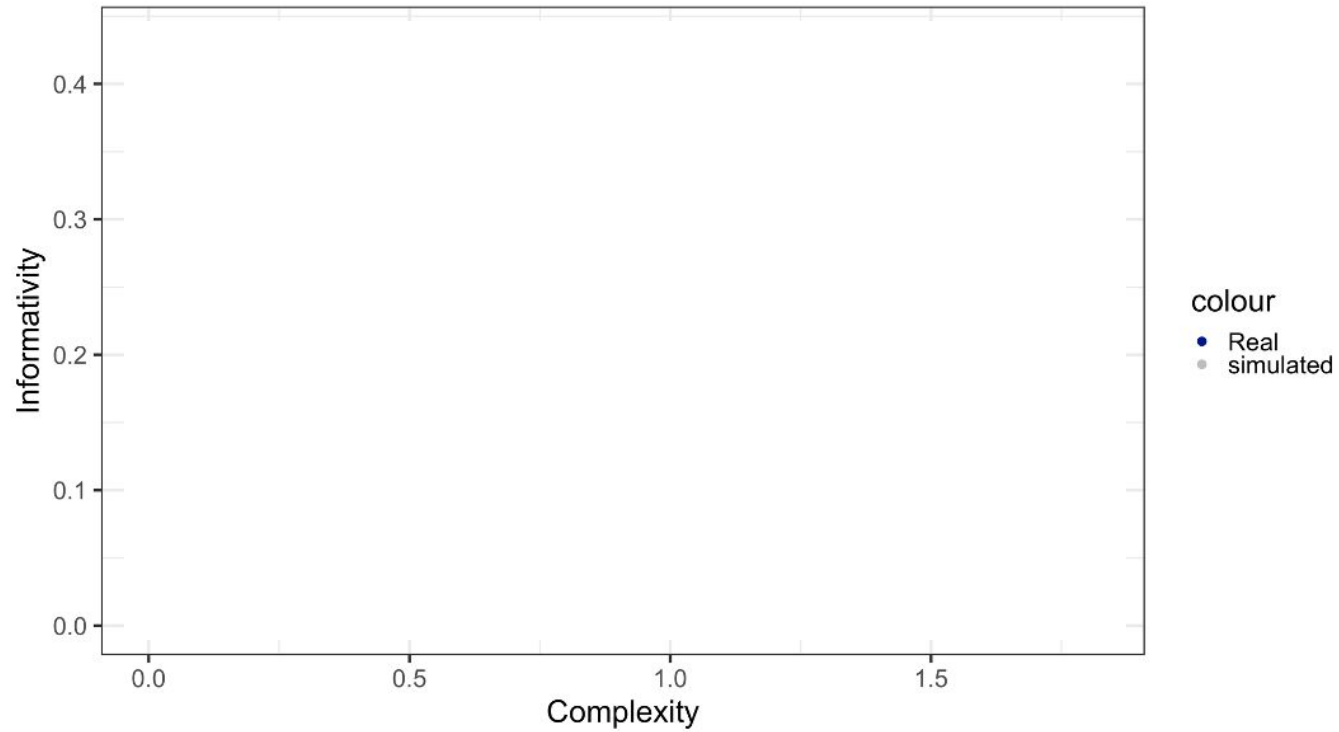


No confusion

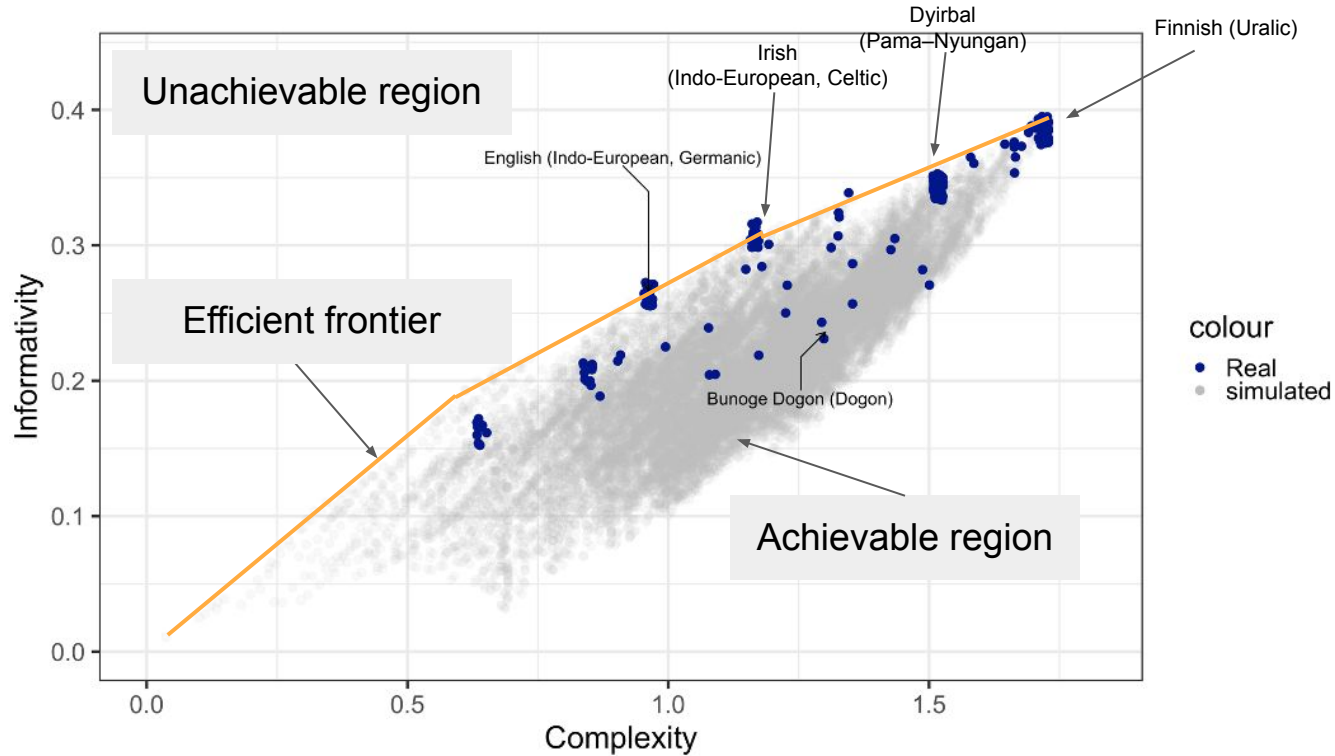


Confusion

Results

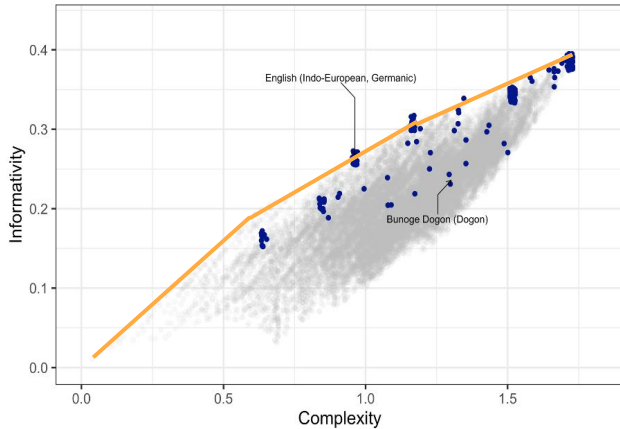


Results

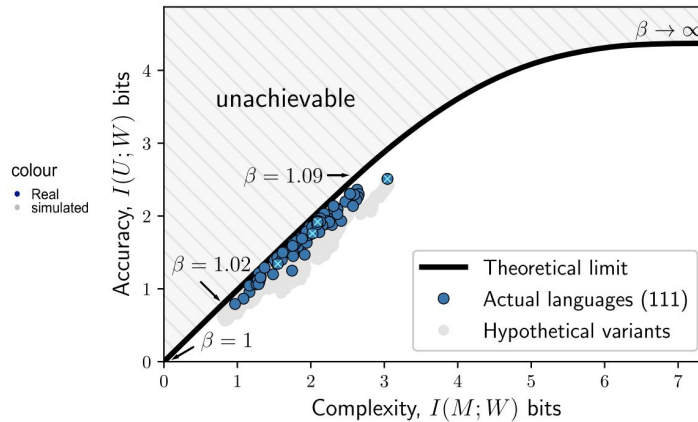


Results

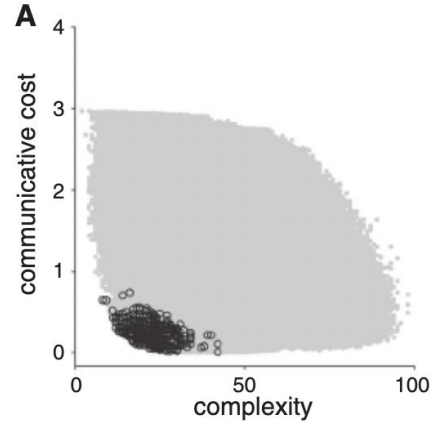
Our results add deictic demonstratives to the growing list of lexical semantic domains whose form can be explained in terms of information-theoretic efficiency, such as color terms and kinship terms.



Our results



Color terms
(Zaslavsky et al., 2018)
(Regier et al., 2015)



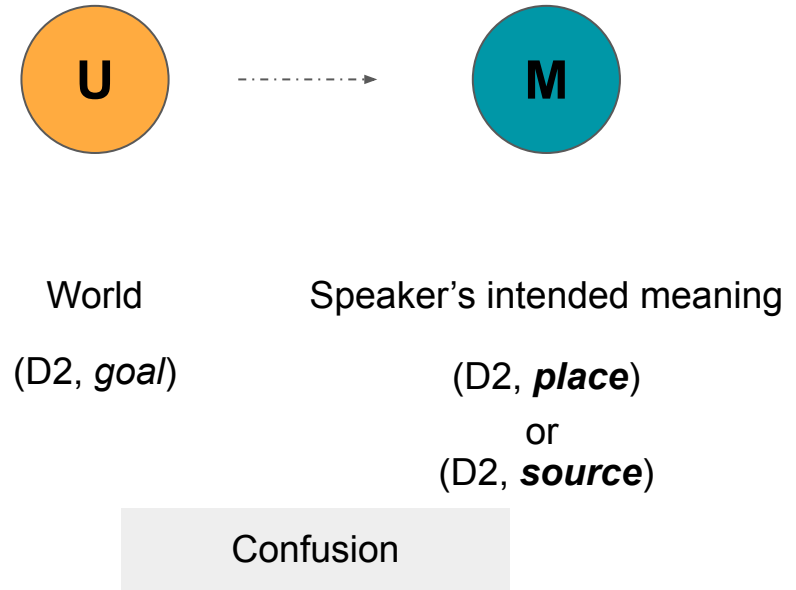
Kinship terms
(Kemp & Regier, 2012)

Results

- Our finding:

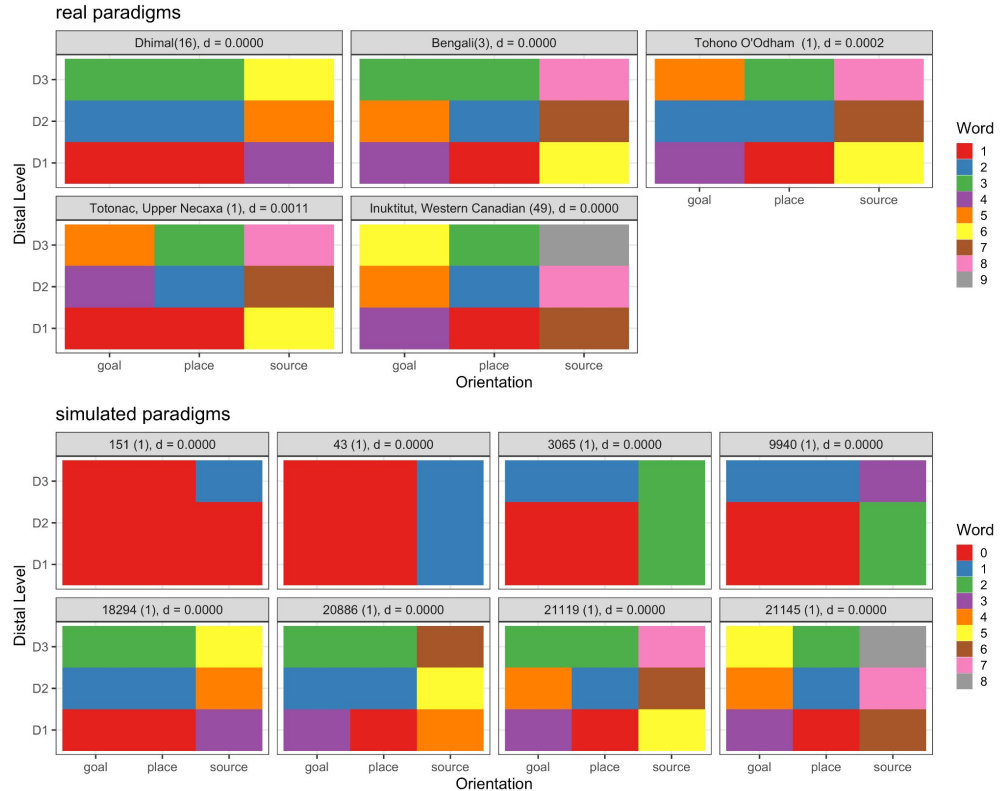
Place-source confusion cost should be greater than the *place-goal* confusion cost; consistent with the line of work regarding the asymmetry between *goal* and *source*.

e.g. Jackendoff, 1983; Lakusta & Landau, 2005; Nikitina, 2009; Lakusta & Landau, 2010; Lakusta & Landau, 2012; Do et al., 2020



Additional constraint: systematicity

- Observations
 - Many of the optional lexicons are not attested in real languages
 - Even if they are attested, they are not widely adopted;



Additional constraint: systematicity

- Systematicity - syncretism of patterns at different levels
- Real lexicons tend to be systematic in addition to being communicatively efficient.

English (systematic, score = 2)

	Goal (G)	Place (P)	Source (S)
D3	there	there	from there
D2	there	there	from there
D1	here	here	from here

1 distal level pattern
1 orientation pattern

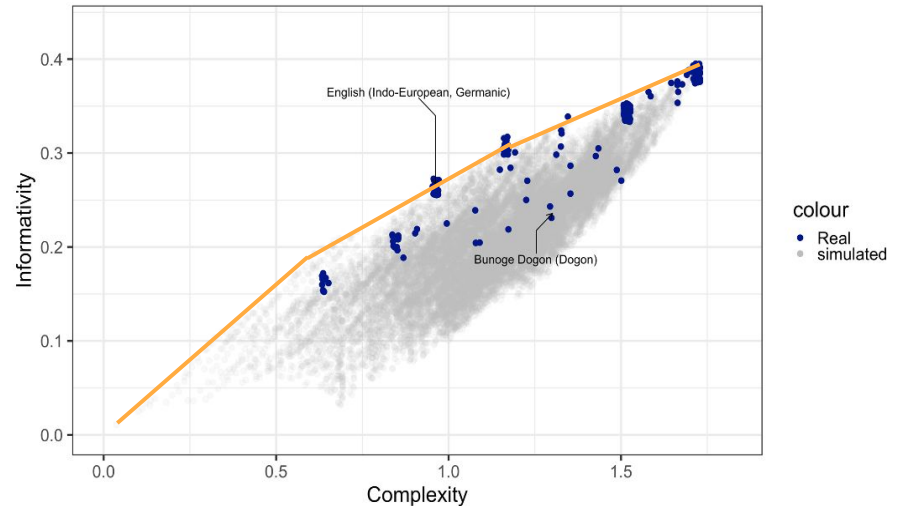
Fake English (not really systematic, score = 4)

	Goal (G)	Place (P)	Source (S)
D3	there	there	from there
D2	there	here	from there
D1	here	here	from here

2 distal level patterns
2 orientation patterns

Summary

- Spatial deictic demonstratives describe spatial relations between speakers and referents, with meanings varying in distal levels and orientations;
- Spatial deictic systems in real languages are near optimal in communicative efficiency, if we impose a higher penalty for confusing *place* and *source* than confusing *place* and *goal*
- Additionally, spatial deictic systems in real languages tend to also be systematic.





Thank you!