

Entrenchment vs. Transparency

Modelling the Dutch strong-weak past tense competition in an agent-based simulation

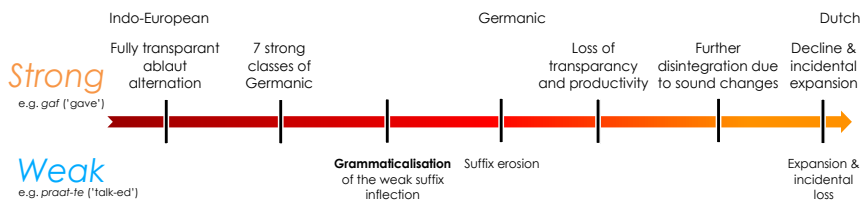
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Historical Competition



Is the Dutch strong verb inflection bound to disappear?

Model Design

Set-up

- Population: 10 agents
- World: 200 events which occur with a frequency taken from the **Corpus of Spoken Dutch**
- Game: After each event, a hearer and speaker agent are randomly selected to play a language game!

Language game

- Task: communicate the event taken place
- How: use the strong or weak past tense
- Lexicon with strong form, weak form and score
- Score indicates chance of strong form being chosen

Entrenchment vs. Transparency

Alignment: hearer increases/decreases score of used verb greatly (+/- 0.01)

Strong entrenchment
all verbs start with a bias pro strong inflection (initial score 0.7)

Weak transparency
if a weak form in used, the scores of all verbs are decreased slightly (- 0.0005)

World

Event	Chance of occurrence
gaan	0.105168148
...	
kijken	0.027508912
krijgen	0.020419438
...	
schijten	0.000028571

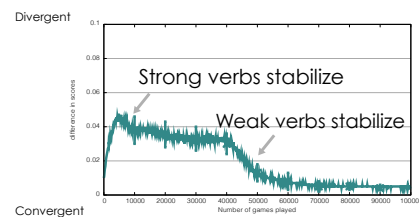
Initial lexicon

Event	Strong	Weak	Score
gaan	"ging"	"gade"	0.7
...			
kijken	"keek"	"kijkte"	0.7
krijgen	"kreeg"	"krijgde"	0.7
...			
schijten	"scheet"	"schijtte"	0.7

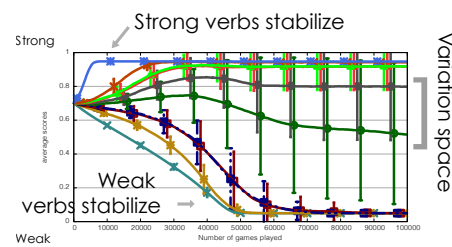
Basic model

40 series of 100,000 interactions

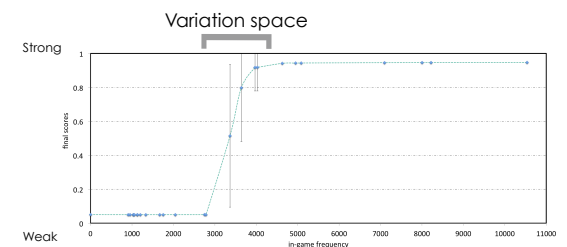
Hearer-speaker convergence



Preference development



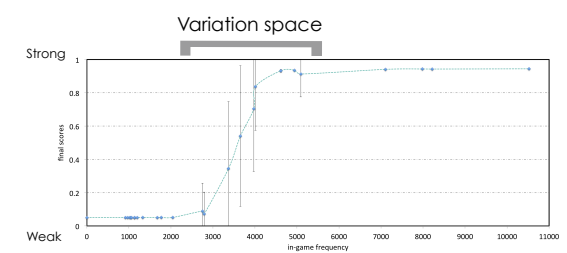
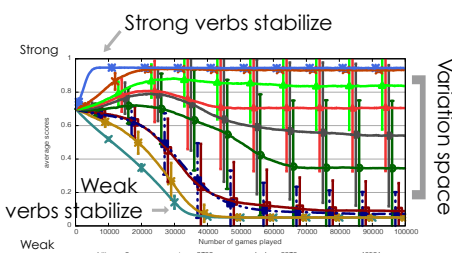
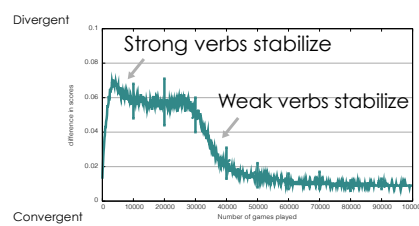
Influence of frequency on final preference



Sociolectal Extension

When speaking, a prestigious agent has 5x the normal verb-specific and general effect on the hearer

+ 1 prestigious agent / 10 agents



References

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Conclusions

- Strong and weak inflection systems may coexist** with each its own habitat in the lexicon
- Between the strong inflection's habitat, i.e. the high frequency verbs, and weak inflection's habitat, there is room for variation
- High frequent strong verbs may resist regularization pressure indefinitely
- Prestigious agents**
 - speed up convergence
 - enlarge the variation space**
 - may turn more frequent verbs weak and less frequent verbs strong according to 'personal taste'

Future goals

- From **lexicon-based** to **construction-based**
 - Competition between constructions instead of lexical forms using **Fluid Construction Grammar**
 - Making the weak inflection truly productive: new events
 - Internally competing strong verb classes
- Comparing different theories about **the emergence of the weak suffix inflection**
 - Verb + past tense of *to do*
 - Verb + past participle ending
 - Verb + second person singular ending
 - ...