Generating the Conserving Effect without Language Acquisition
An agent-based model

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Conserving Effect

Do we need **language acquisition**[1-4] to explain that high frequency forms better resist regularization, or does **language use**[5-7] suffice?

Assumptions

- Single generation of agents, **no acquisition**
- For regular language forms, a construction is stored alongside the specific form
- Both representations are susceptible to frequency[5]

Evaluation

- Co-existence at the type-level
- Fixation at the token-level
- Differentiation according to frequency

Dutch past tense

- Only finite forms
- Regular vs. irregular, no ablaut classes
- No influence of phonetic resemblance

Model

World

Event	Chance of occurrence
gaan	11%
…	
lopen	1%
…	
schijten	0.003%

lopen →

Speaker

Event	Irregular	Regular	Irregularity score
gaan	"ging"	"gade"	0.7
…			
lopen	"liep"	"loopte"	0.7
…			
schijten	"scheet"	"schijtte"	0.7

"liep" / "loopte"

Hearer

- Form becomes more entrenched: Irregularity score ↑
- Form becomes more entrenched: Irregularity score ↓
- **[+de/te] Construction** becomes more entrenched: Irregularity score for all verbs slightly ↓

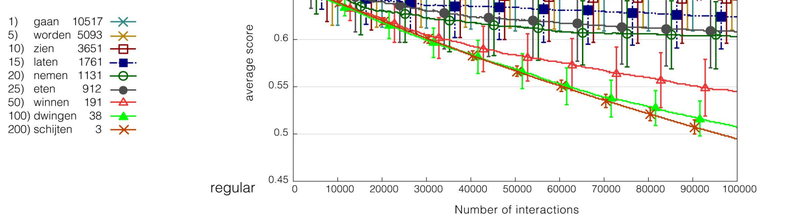
200 events, corresponding to 200 irregular verbs, may occur with a frequency taken from the **Corpus of Spoken Dutch**[8]

Entrenchment

10 agents in 40 series of 100.000 interactions

❶ Frequency counts

$$score_v = \frac{\#\ irreg_v}{\#\ irreg_v + \#\ reg_v + total\ \#\ reg * 0.001}$$



- Co-existence
- Differentiation according to frequency
- No fixation

❷ Familiarity-driven entrenchment

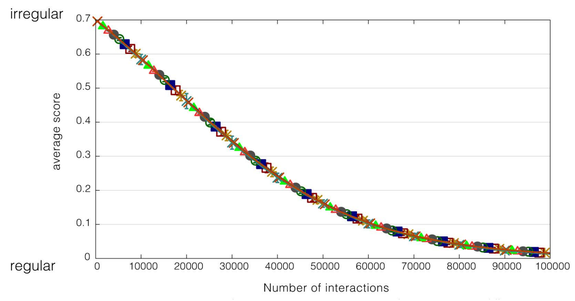
Irregular form

$score_v = score_v * (1 - 0.01) + 0.01$

Regular form

$score_v = score_v * (1 - 0.01)$

$score = score * (1 - 0.0005)$



- Fixation
- No co-existence
- No differentiation according to frequency

❸ Linear entrenchment

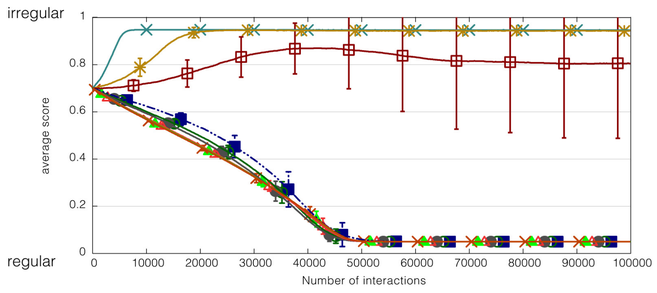
Irregular form

$score_v = score_v + 0.01$

Regular form

$score_v = score_v - 0.01$

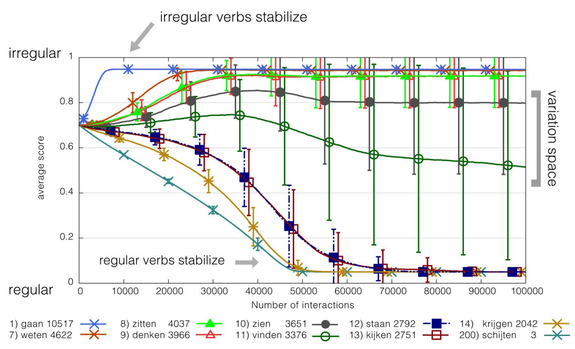
$score = score - 0.0005$



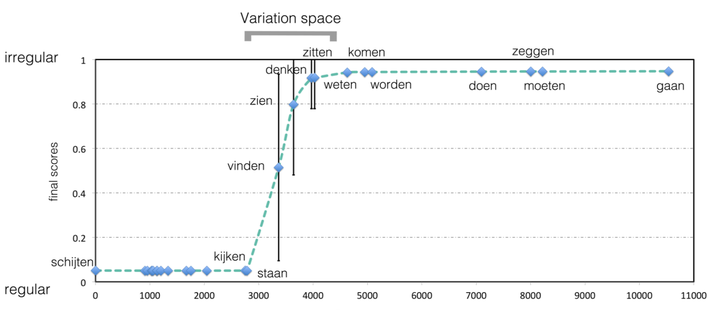
- Co-existence
- Fixation
- Differentiation according to frequency

❸ Linear entrenchment

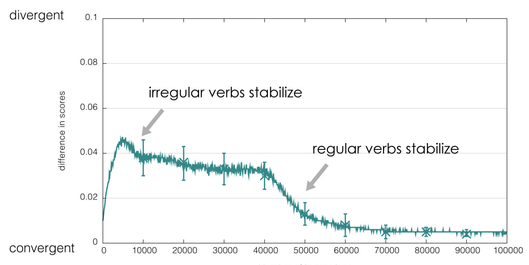
Preference development



Final preference[9]



Convergence



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Conclusions

- The model with an implementation of linear alignment complies with the evaluation criteria
- The initial entrenchment of the irregular inflection and the constructional effect of the regular inflection can balance each other out
- Each inflection takes up its own habitat, i.e. respectively the high-frequency verbs and low-frequency verbs[10]
- **Both language use and language acquisition[3,4] can independently generate a Conserving Effect**

Extensions & future goals

- Social structure: prestige
  - Stronger initial disagreement
  - Faster convergence
  - Larger variation space
- How could the weak inflection gain supremacy against the dominant strong inflection in Germanic?[11,12]
  - General applicability of the weak inflection
  - Irregularization of the strong inflection

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