Paradigmatic Levelling in English: The Influence of Phonological Neighbours

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\textit{International Cognitive Linguistics Conference}

23–28 June 2013
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Morphological Levelling in English

- A simplification in the English strong verb paradigm
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- Levelling can occur in two possible directions in English
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  - Participipal Shift
    - Levelling from the past participle to the preterite
      e.g. *I drunk it* or *We seen him there*
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- Levelling can occur in two possible directions in English
  - Participial Shift
    - Levelling from the past participle to the preterite
      e.g. *I drunk it* or *We seen him there*
  - Preterite Shift
    - Levelling from the preterite to the past participle
      e.g. *I have drank it* or *We should have have went too*
Previous Studies

- Bybee & Slobin 1982
  - Elicited the preterite from adults, third-graders, & children
  - Adults & third-graders sometimes produced the past participle verb form as the preterite (e.g. *drunk, swum, rung*)
  - Also produced novel verb forms (e.g. *brung, thunk, shuck*)
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- Geeraert 2010
  - Elicited the past participle in two production experiments
    - Spoken version: participants under pressure for time
    - Written version: opportunity to reflect on answer
  - High percentages of Preterite Shift with same verbs (e.g. have swam >80% on written experiment)
Phonological Neighbours

- Defined as a one-phoneme difference
  - *drink* is neighbours with *drank* and *rink*, but not with *slink* or *ring*
- Extracted from the English Lexicon Project (Balota et al. 2007)
Graph Theory

- A method of measuring the network structure of the lexicon (Vitevitch 2008; Steyvers & Tenenbaum 2005)
- Graph Theory quantifies the interconnectedness of the phonological neighbours
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- Graph Theory quantifies the interconnectedness of the phonological neighbours
- We utilized three measures:
  - Degree: number of neighbours
  - Clustering Coefficient: whether the neighbours are neighbours
  - Closeness: measure of the average paths of a verb to all other nodes in the network
Eye-Tracking Study
Data

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- Sentences adapted from COCA:
  - Two conditions:
    - Preterite (e.g. *I drank an entire bottle of wine*)
    - Participle (e.g. *I have drunk an entire bottle of wine*)
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- Sentences adapted from COCA:
  - Two conditions:
    - Preterite (e.g. *I drank an entire bottle of wine*)
    - Participle (e.g. *I have drunk an entire bottle of wine*)
  - Standard or Non-Standard Form:
    - Standard: *I drank it* or *I have drunk it*
    - Non-Standard:
      - *I drunk an entire bottle of wine* = Participial Shift
      - *I have drank an entire bottle of wine* = Preterite Shift
Design

- Head-mounted, video-based eye-tracking device
- Self-paced reading task
- Utilized a Latin-square design
  - Participants saw each verb once in one of the four conditions
- 54 native speakers of English
  - First-year linguistics students from UofA
Variables

- **Response Variable**
  - Total Fixation Duration (Mean = 379.4, SD = 233.2)
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- **Predictor Variables**
  - Bybee Verbs: *drink, ring, sing, cling* class of verbs
  - Condition: preterite or participle
  - Usage: standard or non-standard form
  - Degree: number of neighbours
  - Clustering Coefficient: whether neighbours are neighbours
  - Closeness: average measure of neighbour distances
  - log Frequency: log frequency of the lemma verb form
  - Trial: where in the experiment the item occurred
Model and Results – Total Fixation Duration

Preterite vs Participial Shift

![Graph showing total fixation duration for preterite and participial forms.](image)
Size of the Neighbourhood

Preterite

Participle

Total Fixation Duration

Degree

Usage

NonStandard

Standard

NonStandard

Standard

Total Fixation Duration

Usage

Degree
Model and Results – Total Fixation Duration

Clustering within the Neighbourhood

-1 0 1 2 3 4

Total Fixation Duration

5.66 5.68 5.70 5.72 5.74 5.76 5.78

Clustering Coefficient
Model and Results – Total Fixation Duration

Bybee vs Other Irregular Verbs

Preterite

Participle

Total Fixation Duration

Standard NonStandard

Total Fixation Duration

Standard NonStandard
Model and Results – Total Fixation Duration

Distances in the Lexicon

Preterite

Participle
Conclusions

- **Levelling in English**
  - Non-standard forms are processed faster in the past participle than in the past tense
  - Preterite Shift is the preferred levelling pattern in English
  - Bybee Verbs are processed significantly faster, even in the non-standard (especially in the past participle)
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- **Structure of the Lexicon**
  - Larger neighbourhoods facilitates the processing of non-standard forms
  - Greater neighbourhood connectivity show inhibitory processing effects regardless of usage
  - The distances between the nodes in the lexicon greatly affect processing of Bybee verbs
  - Phonological neighbours significantly facilitate levelling in the direction of Preterite Shift
Thank You!

Acknowledgements
Harald Baayen
John Newman
References