Introduction

Redevelopment of a Morphological Class

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▲ Modeling variation at multiple levels → cleaner variation model.
▲ Interesting grammatical insights.

TD Deletion
Basic Facts

As is well known, syllable final coronal stops in clusters variably delete.

► $C[t d]_\sigma \rightarrow C[\emptyset]_\sigma$

Some well known factors which influence whether or not this deletion takes place are the left and right context.

► Preceding Segment
  Sibilants > Stops > Nasals > Fricatives > /l/
► Following Segment
  Consonant > Liquid, Glide > Vowel; Pause

Morphological Context
The morphological context also affects the rate of TD Deletion. The literature has traditionally divided the morphological contexts that TD deletion is sensitive to into four categories.

► Regular Verbal Morphology (e.g. packed)
► Semiweak Verbal Morphology (e.g. kept, swept)
► Monomorphemes (e.g. west)
  ▲ That is, anything that is not verbal morphology.
► not contraction (e.g. don’t)
One really interesting result in the sociolinguistic literature is that the rate of deletion in semiweak verbs is age graded. That is, older speakers tend to have a smaller difference between the semiweak and regular past tense verbs, and younger speakers tend to have a large difference (Guy and Boyd 1990).

Data from the Buckeye Corpus, Pitt et al. (2007)
Why this is probably not a language change

1. TD Deletion is stable variation, and the other morphological classes do display this age graded pattern.
2. Given the time when Guy and Boyd’s field work was done, if this were a change, it should now be completed.
3. The age profile of language changes in progress exhibit a late adolescent peak (Labov, 2001; Tagliamonte, 2009), which is not present here.

Adolescents’ high rate of deletion in semiweak verbs is surprising, because there is strong positive evidence in their input that they should delete less.
TD Variation

Clearly, accounting for this pattern requires

► a model of morphology/phonology interaction.
► a model of variation.

Morphological Model

Previous Models

► Phonological TD deletion is sensitive to morphological class.
  Classes = \{Monomorpheme, Semiweak, Regular\}
► For children, Semiweak = Monomorpheme

My proposal

► Phonological TD deletion is sensitive to morphological class.
  Classes = \{Not Verbal Morphology, Verbal Morphology\}
► There are competing hypotheses about what the exponent of $T_{past}$ is for semiweak verbs, leading to divergent behavior in children that persists into adult speech.

Morphological Model

I’m assuming that both the semiweak and regular past tense have a structure like this:

\[
\sqrt{\text{PACK}} \quad v \quad T_{past}
\]

► $\sqrt{\text{PACK}}$: Uncategorized root
► $v$: Category determining head
► $T_{past}$: Past tense head

Vocabulary Insertion

$T_{past} \leftrightarrow \emptyset / \{\sqrt{\text{Sing}}, \sqrt{\text{Give}}, \ldots\}$
$T_{past} \leftrightarrow t / \{\sqrt{\text{Keep}}, \sqrt{\text{Leave}}, \ldots\}$
$T_{past} \leftrightarrow d$
Morphological Model
Forming the past tense

Two morphological processes then contribute to forming the semiweak past tense:
1. Vocabulary Insertion of /-t/
2. Stem Readjustment

Only one morphological process forms the regular past tense:
1. Vocabulary Insertion of /-d/
Children have two competing hypotheses for the semiweak past tense:

**Hypothesis 1**

\[
T_{\text{past}} \leftrightarrow \emptyset / \{ \sqrt{\text{Sing}}, \sqrt{\text{Give}}, \sqrt{\text{Keep}}, \ldots \} \\
T_{\text{past}} \leftrightarrow t / \{ \ldots \} \\
T_{\text{past}} \leftrightarrow d
\]

**Hypothesis 2**

\[
T_{\text{past}} \leftrightarrow \emptyset / \{ \sqrt{\text{Sing}}, \sqrt{\text{Give}}, \ldots \} \\
T_{\text{past}} \leftrightarrow t / \{ \sqrt{\text{Keep}}, \ldots \} \\
T_{\text{past}} \leftrightarrow d
\]

As people get older, they are more likely to select this second hypothesis, creating the age graded pattern.

This is similar to Guy and Boyd’s analysis, except they hypothesized a three stage developmental model.

1. \( k\text{ep} = \text{no TD} \)
2. \( k\text{ept} = \text{Monomorpheme} \)
3. \( k\text{ept}\#t = \text{Past Tense} \)

I am proposing that it is unnecessary to posit the second intermediate stage, since a mixture of the first and third produces the same quantitative result.
Plausibility

This proposal does not introduce any new mechanics to explain variation. Rather, it is a straightforward competing grammars analysis (Kroch, 1989, 1994). The developmental pattern is also compatible with parameter learning work done by Yang (2002). It also does not rely upon any novel morphological assumptions.

Regressive Devoicing

Some verbs undergo regressive devoicing when /t/ is affixed, specifically leave and lose. If the speaker chooses the /-VI grammar, then the only way to get the past tense of leave to be left is to posit an additional morphological devoicing of /v/.

\[ C# \rightarrow [-\text{voice}] / T_{\text{past}}\{\sqrt{\text{LEAVE}}, \sqrt{\text{LOSE}}, \ldots\} \]

Hypothesis

Children are more likely to choose the t-VI grammar rather than the /-Grammar for these verbs, so as to avoid positing this additional morphological process.

Evidence in Adult Speech

- Regressive Devoicing Data.
- Variance in Semiweak TD Rates.
These are the proportional rate of \(t\)-presence for the semiweak verbs grouped by the stem final consonant from Guy and Boyd (1990) from speakers under 14. Notice that \(/f/\) and \(/s/\) have the highest rate of \(t\)-presence, which is especially surprising for \(/s/\).

There is a lot more variation by speaker in the rate of TD deletion, which we would expect given variation at two different levels.

An Ansari-Bradley Test comparing e-logit transformed rates found a significant difference between the semiweak variance and the regular variance \((p = 0.0004)\).

Regular and monomorphemes were not significantly different in variance \((p = 0.07)\).

After accounting for segmental context, grammatical class, and frequency, \(left\) and \(lost\) have more unexplained \(/t/\) presence than \(crept, slept\) or \(kept\), where voicing assimilation is vacuous.

Data Source: The Buckeye Corpus (Pitt, et al. 2007)
**TD Deletion**

**Semiweak Variance**

<table>
<thead>
<tr>
<th>Probabilities Producing Semiweak Surface TD</th>
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<td>Phonological Retention</td>
</tr>
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<td>Rate of Observed TD</td>
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</tbody>
</table>

$$p = \frac{pq}{q} = 0.88$$

$$\sigma_{pq} = q^2\sigma_q + p^2\sigma_q + \sigma_p\sigma_q$$

$$\sigma_p = \frac{\sigma_{pq} - p^2\sigma_q}{q^2 + \sigma_q} = 0.098$$

**TD Deletion**

**Semiweak Variance**

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There is greater variability across individuals in their rate of t-VI than in their rate of phonological retention.

**Conclusions**

- Children diverge from their parental input on semiweak verbs because they have an initial $\emptyset$-VI hypothesis.
- This $\emptyset$-VI hypothesis remains active in adult speech, resulting in a difference between observed TD in semiweak and regular past.
- There is more individual level variation at the morphological level than at the phonological level.
- Phonological deletion is really only sensitive to whether or not the segment is an exponent of verbal morphology.

**TD Deletion**

**Further issues**

- Why is the time course for this age grading so long?
- What is the “target grammar”?

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![Graph showing the difference in probability of -td absence over age](image-url)

**Graph:**

- Difference in Prob. of -td absence
- (semiweak verb/irregular verb value)

**Age:**

- 10, 20, 30, 40, 50, 60
Conclusions

- Variation at different levels of the grammar can result in the same observable surface forms.
- It is possible to model the variation at these different levels, and doing so can produce interesting grammatical and variationist insights.

Thanks!

References I


References II


