

Regular and Irregular Verbs: Part 2

Informatics 1 CG: Lecture 4

Mirella Lapata

School of Informatics
University of Edinburgh
mlap@inf.ed.ac.uk

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Reading:

Steven Pinker's, Words and Rules, Chapters 3 and 7

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Recap: Words and Rules

- Theory of words and rules.
- Does it explain regular and irregular verbs?
- How can it be changed/refined to account for the fact that **irregular** verbs are also **semi-systematic**?
- What does evidence from **language development** tell us about regular and irregular verbs?
- What are possible **theories/models** of the linguistic data?
- Are they **cognitively plausible**?

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Irregular Inflection is Semi-systematic

blow-blew, grow-grew, know-knew, ...

bind-bound, find-found, grind-ground, ...

drink-drank, shrink-shrank, sink-sank, ...

bear-bore, wear-wore, swear-swore, ...

- Irregular verbs seems to display **some patterns!**
- Suppletion (e.g., *go* → *went*) is exception rather than rule.
- These patterns are the fossils of rules that lived in the minds of Old English speakers.
- But, evidence suggests that these patterns are represented, in some way, in the minds of modern-day English speakers.

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Irregular Verb Patterns

Stem-past similarity

Stems and their past tense alternants show non-random levels of sound similarity (e.g., *drink-drank* share [dr_nk]).

Change-change similarity

A few kinds of stem-past alternations are seen over and over again in the irregular verbs; e.g., the [i]-[a] alternation accounts for a large proportion of verbs (e.g., *drink, sing, begin*).

Stem-stem similarity

The stems in certain classes of strong¹ verbs show non-random levels of sound similarity ([i]-[a] verbs tend to end with either *-nk, -ng, or -n* (e.g., *drink, sink, shrink, sing, spring, begin*).

Why is the human mind so impressed by sound similarity?

¹Verbs in which a vowel inside the verb is changed to indicate different tenses.

The Sound Pattern of English (SPE)

- Theory of English sound system (Chomsky and Halle, 1968).
- Provides explanations for a range of phonological phenomena:

- Why are *blicket, dax* and *fep* possible English words, but *ftip, ptut* and *nganga* aren't?
- Why does the stressed vowel shorten when the *-ity* nominalizing suffix is added to the adjective *divine*?
- Why is *Canada* stressed on the first syllable, but *Canadian* on the second?

- Phenomena captured by just a **few dozen** phonological rules.
- Manages to account for the vast majority of English irregular verb inflections by adding just **three additional rules!**

SPE Rules for Irregular Verbs

Stem-past similarity, change-change similarity

If a verb has the sound *consonant-consonant-i-ng* change *i* to *u* (e.g., *cling-clung*).

- SPE rules **essentially replace consonants and vowels**.
- Several simple rules can account for one complex change.
- A few rules are shared by many verbs.
- Chomsky and Hale reject the words-and-rules dichotomy.

SPE is undeniably brilliant but is it true?

Problems with the SPE Theory of Irregular Verbs

Q₁: How could a child possibly **learn** these rules?

Q₂: Why would a child even **bother** to learn these rules?

Q₃: Is it not simpler to just **memorize** the past forms by rote?

- English speakers can produce irregular forms much more quickly than the regular forms; if they applied rules, it would take them longer (retrieval is faster than computation).
- SPE is not meant to be a theory of how children learn words or how adults represent words in their minds.
- Importantly, SPE fails to explain **stem-stem** similarity (*grow-grew, blow-blew* but *glow-glowed, show-showed*).

But how do children actually learn the past tense?

Stages of Language Acquisition

18 months children start to produce two-word microsentences

See baby!, More cereal!

Allgone sticky! (i.e., my hands are clean)

Circle toast (i.e. I want a bagel)

2 years children produce longer, more complicated sentences.

They start to use grammatical morphemes:

inflectional suffixes (e.g., *-ed*, *-s*, *-ing*)

auxiliary verbs (e.g., *have*, *be*, *do*, *will*)

3 years children start to make errors, by attaching *-ed* to irregular verb stems and pass the wug-test. (e.g., *sing-ed*,

bleed-ed; *bing-binged*).

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Overzealous Grammarians

Children don't just overgeneralize from regular past tense forms!

- they overuse the plural suffix *-s* (*mans*, *foots*, *tooths*, *mouses*)
- they overuse the third person sing suffix *-s* (*haves*, *do's*, *be's*)
- they overuse the comparative *-er* and superlative suffixes *-est* (*specialer*, *powerfullest*, *gooder*)
- they overuse the ordinal suffix *-th* on numerals (*oneth*, *twoth*)
- Children find regularity in the oddest places.

Parent: No booze in the house!

Child: What's a "boo"?

Child: "It did! It snow!"

[After being told it was going to snow.]

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U-Shaped Learning

Children's performance gets better as they get older. With inflectional morphology they get worse before getting better. This is what child psychologists call **U-shaped development**.

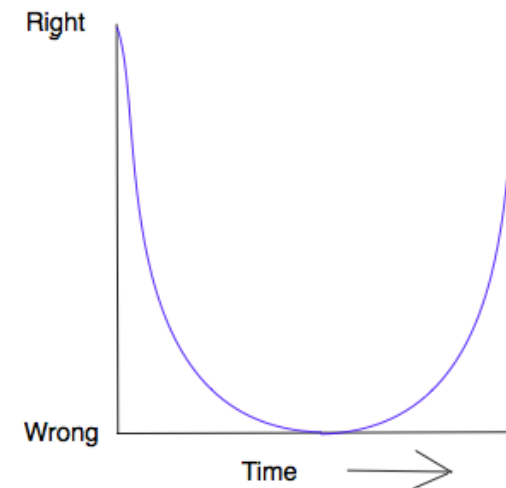
Stage 1 children produce both regular and irregular past tense forms with very few errors.

Stage 2 after a certain amount of time, the error rate appears to increase significantly; children add regular past tense suffix *-ed* to irregular verb stems even with verbs whose past tense forms they had previously mastered.

Stage 3 the error rate slowly decreases, as the child gets older, until almost no errors are made.

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U-Shaped Learning



- U-shaped learning in early childhood cognitive development.
- Child uses *spoke*, then *spoked*, and later again *spoke*.

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Children versus Adults

- The sudden deterioration in performance appears to be evidence for **mental reorganization**.
- The child has inferred a new generalization involving previously unrelated concepts.
- The rule which says “add *-ed* to form the past tense”.

Why is it that only children generate overregularization errors like *bleeded* and *singed*?

Guess 1

Adults communicate their thoughts more clearly than children by slowly learning to do that.

Guess 2

Adults don't say *bleeded* and *singed* because they don't hear other adults saying these words.

Guess 3

Adults have learned the **blocking principle**: *sang* blocks the past-tense rule from applying to *sing*.

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Learning how to Block

Q₁: How could a child learn the blocking principle from scratch?

A₁: They would need to learn **explicitly** that overregularized forms like *bleeded* and *singed* are **ungrammatical**, i.e., they need to have **negative evidence** to solve the problem.

Q₂: What would this negative feedback be?

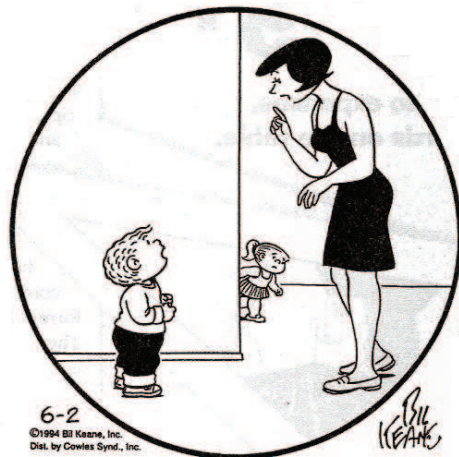
A₂: An explicit correction, an indirect signal of disapproval (a frown, a puzzled look, a slap) or a failure to achieve some non-linguistic goal.

Q₃: Is there evidence that negative feedback has any effect on children's language acquisition?

A₃: The answer is no!

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Negative Feedback



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“Mommy Dolly hitted me,”
“Dolly HIT me.”
“You too?! Boy, she’s in trouble!”

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Karin Stromswold and Subject AS



- The child could not talk but understood complex sentences.
- Gave dog a **bone** when it spoke correctly and a **rock** otherwise.
- Bones: *heated, baked, showed, sewed*. Rocks: *eated, taked, knowed*.
- Child recognized that forms were ungrammatical without making an error and noting parents' response.

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Blocking as Innate Knowledge

Hypothesis

Blocking principle is part of **innate linguistic knowledge**; children don't **learn** it from evidence that *singed* is not in English. They **deduce** that *singed* is not in English from the blocking principle.

Why do adults use blocking more effectively than children?

- Because they have more experience than children. They have heard irregular past tense verb forms being used more often.
- And memory retrieval improves through repetition.
- Adults retrieve the irregular verb forms from memory more quickly, and hence blocking is more likely to happen.
- Children are "little adults with bad memories".

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A Little Experiment

What is the past-tense form of the verb *shend*?

[*shend* means to shame]

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A Little Experiment

What is the past-tense form of the verb *shend*?

[*shend* means to shame]

shended

shent

- If you have answered *shended*, you have **overgeneralized**.
- The error is to be expected! Irregular forms are not predictable. The only way you could have produced *shent* is if you had previously **heard** and **remembered** it.
- Many verbs will be like *shent* for the child; she hasn't heard them enough times to recall them on demand!

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Theories of Regular and Irregular Verbs

Hypothesis A

Regular past tense forms are formed by a rule. Irregular past tense forms are stored and retrieved as words.

Hypothesis B

Irregular past tense forms are also generated by rules. SPE captures irregular verbs with just three rules!

Hypothesis C

Regular past tense forms are formed by a rule which is blocked for irregular verbs. Blocking principle is innate.

Hypothesis D

There are no rules, only a general associative mechanism for recognizing patterns; reason by analogy.

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Can the study of regular and irregular English verbs shed light on how language works?

- Irregular verbs display some patterns, which sheds doubt on the words and rules theory.
- SPE proposes rules for irregular verbs too, but they are too rigid; there's always exceptions, rule membership fuzzy.
- Perhaps words and rules theory can be salvaged, through innate blocking principle.
- Or, there are no rules at, all we need is a mechanism for recognizing patterns.

Next lecture: connectionism and neural networks.