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?

Irregular Inflection is Semi-systematic

- 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.

Reading:

*Steven Pinker’s, Words and Rules, Chapters 3 and 7*
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 strong 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?

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1 Verbs 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-clang*).

- 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 ir-
regular verb stems and pass the wug-test. (e.g., sing-
ed, bleed-ed; bing-binged).

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, powerfulllest, 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 snew!”
[After being told it was going to snow.]

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.

U-Shaped Learning

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

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!

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

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.
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”.

A Little Experiment

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

- 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!

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.
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.