

Regular and Irregular Verbs: Part 1

Informatics 1 CG: Lecture 3

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January 15, 2016

Reading:

Steven Pinker's, Words and Rules, Chapter 2

Recap: Words and Rules

Human language involves two different kinds of “mental tissue”:

- a **finite lexicon of words**, stored in and retrieved from memory;
- a **finite grammar of rules** (productive, abstract, combinatorial);
- these two mechanisms produce an **infinite set of sentences**;

What is the evidence for dichotomy between words and rules?

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What is the evidence for dichotomy between words and rules?

The existence of regular and irregular verbs.

Regular Verbs

- Past tense: just add *-ed* to the end of present tense form.
- Set of regular verbs is open-ended (probably tens of thousands in the mental lexicon of an educated adult).
- New regular verbs enter English every year.

jog →

walk →

play →

kiss →

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(*snarf*: to download a file, *mung*: to damage something, *mosh*: to dance in a roughhouse fashion; https://www.youtube.com/watch?v=_d8MnxrEqY8)

Berko Gleason's wugs (1958)



This is a wug.

Berko Gleason's wugs (1958)



This is a wug.



Now there is another one.
There are two of them.
These are two _____.

Berko Gleason's wugs (1958)



This is a wug.



Now there is another one.
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These are two _____.

- 4–7 year old kids were shown a hand-drawn picture of a bird.
- The kids generally replied: “These are two wugs”.
- 75% of the 4–5 year olds, 99% of the 6–7 year-olds
- So, kids don't just repeat words they have heard. They are capable of forming **regular** plural forms **creatively**.

Berko Gleason's wugs (1958)



<http://www.youtube.com/watch?v=ElabA5YICsA>

What about Verbs?



This is a man who knows how to BING. He is BINGING. He did the same thing yesterday. What did he do yesterday? Yesterday he _____.

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This is a man who knows how to BING. He is BINGING. He did the same thing yesterday. What did he do yesterday? Yesterday he _____.

- Almost all kids replied *binged* (or *ricked*, *glinged*).
- So children form regular past tense forms creatively as well.
- **Even when they have never heard the verb used before!**

Irregular Verbs

buy	→
hold	→
steal	→
go	→

- Some past tense forms don't just add *-ed* to the end of the present tense form.
- Irregular past tense inflection is chaotic and idiosyncratic.
- Irregular verbs are a closed list, of 150–180 members.
- There have been no recent additions (not since *sneak–snuck* arrived during the 19th century).
- Kids rarely produce irregular past forms in the *wug*-test.

Linguists use an asterisk (*) to mark things which are not part of the language, or, at least, which make native speakers uncomfortable, or are meaningless.

Irregular Verbs

buy → *buyed → bought
hold → *holded → held
steal → *stealed → stole
go → *goed → went

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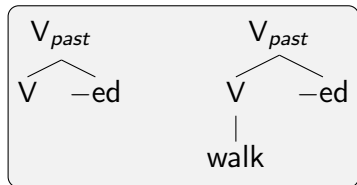
sing → sang
think → *thank → thought
ring → rang
cling → *clang → clung

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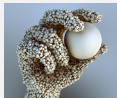
A Simple Theory of Regular and Irregular Verbs

Regular past tense forms are created by a **rule**.



Irregular past tense forms are stored and retrieved as **words**.

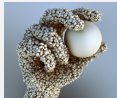
sound: *hold*



meaning:

part of speech: V

sound: *held*

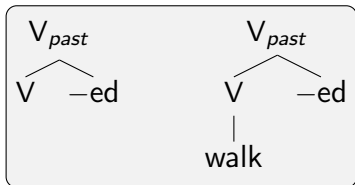


meaning:

part of speech: V_{past}

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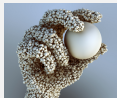
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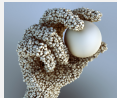
meaning:

part of speech:

V

sound:

held



meaning:

part of speech:

V_{past}

We have two independent mechanisms for past tense formation:

- **irregular** past tense forms stored as **words**;
- a productive **rule** for **regular** past tense forms;
- **Why don't they get in each other's way?**
held vs. *holded, stole vs. *stealed

Simple Answer

If a past tense verb form is stored in memory as a word, the rule is **blocked**. If no past tense form is stored, then the rule may be applied (e.g., *sarfed*, *mashed*, *ricked*).

Why do Irregular Verbs Exist?

- There aren't really that many of them.
- Adding 180 words to a lexicon of tens of thousands of words is not such a big deal in terms of memory capacity.
- Rules cut our mental storage needs!
- Retrieving a word from memory is faster than applying a rule.
- Especially for words we hear often (e.g., *be*, *have*, *do*, *go*, *say*).

Simple Conclusion

The existence of both words and rules, somewhat counterintuitively, makes human language more **efficient**.

Two Kinds of Words

Linguistics:	word-as-morphological object , as opposed to phrases and sentences
Psychology:	word-as-lexical entry , stretch of sound which has been memorized and cannot be produced by a rule
Pinker:	calls this a listeme

- Some memorized chunks are smaller than a word in 1st sense.
- Others are larger than a word in the 1st sense.
- The second sense of word covers things which appear only as parts of words in the 1st sense.

Suffixes

-able (*cap-able*)
-ed (*wak-ed*)
-al (*refus-al*)
-ship (*fellow-ship*)

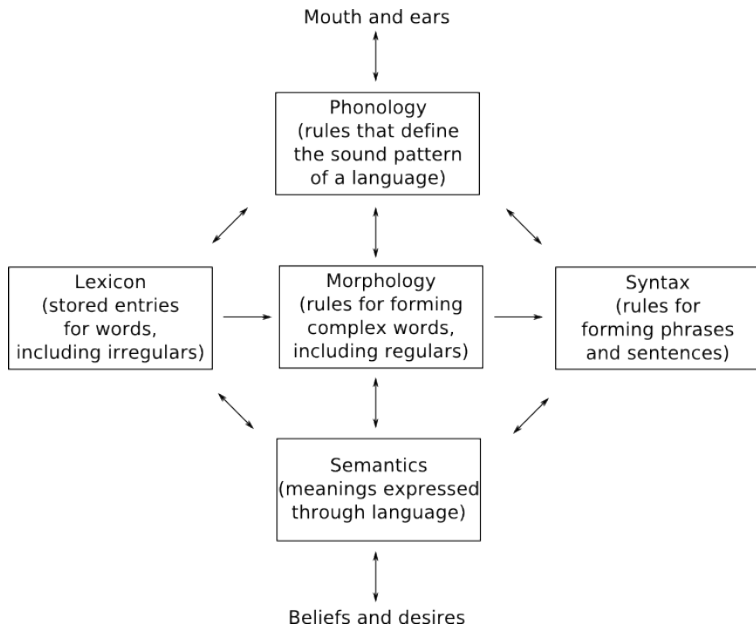
Prefixes

un- (*un-finished*)
ante- (*ante-cedent*)
co- (*co-pilot*)
re- (*re-claim*)

Idioms

piece of cake
when pigs fly
like two peas in a pod
beat around the bush
see eye to eye
once in a blue moon
the last straw
the best of both worlds
costs an arm and a leg
add insult to injury

The Anatomy of Language



- English inflection is very simple.
- Only suffixes; no prefixes
- At most one inflection per verb

Examples

walk
walk-s
walk-ing
walk-ed

One Rule for English Verb Inflection

A verb is composed of a stem and an optional suffix. The stems and suffixes themselves are stored in, and retrieved from, the mental lexicon.

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Irregular Verbs and Broken Telephones

- All irregular past tense verb forms used to be regular!
- They were formed by productive rules (e.g., *sing* → *sang*).
- Language acquisition has slightly **imperfect fidelity**.
- Your language is slightly different from your parents' language, a little bit more different from your grandparents', etc.
- The “broken telephone” metaphor (a.k.a. Chinese Whispers)

Hypothesis

For any irregular past tense form in Modern English, some past generation of English speakers must have **failed to grasp the relevant rule**; they memorized the forms as separate words, then passed the new version of the language on to their children; Once a past tense form has been stored as a word, it can **become more and more irregular** down the generations!

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**.

Errors preschool children make in their spontaneous speech!

It was neat – you should have sawn it!

Doggie bat me [bit].

The cheerios got aten by the Marky.

I know how to do that. I truck myself [tricked].

This is the best place I ever sot [sat].

- 8 out of 9 children make at least one error of this kind.
- Such errors persist well into their school-age years.
- Children have never heard adults using past tense forms like *swang* or *shuck*. Must be constructing these forms creatively, by analogy with other verbs they already know.

The Moral

- Irregular verbs cannot simply be memorized by rote.
- They show evidence of **patterning** even in minds of **modern-day** English speakers!
- Thus, the distinction between regular and irregular verbs, and hence between **words** and **rules**, is not so clear anymore.

Hypothesis A

Irregular past tense forms are also generated by rules.

Hypothesis B

There are no rules, only a general associative mechanism for recognising patterns.

500 year old debate about the nature of the human mind.

The Knowledge Acquisition Problem

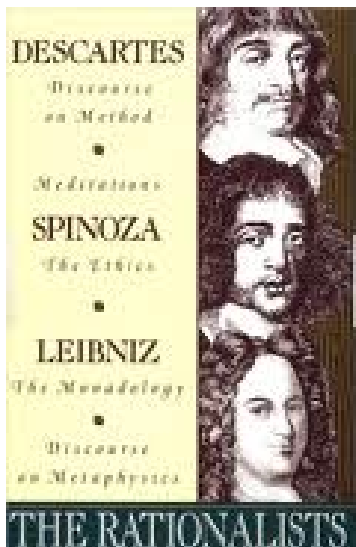
Q₁: How do we acquire knowledge? Clearly, we are not born knowing everything! Else we wouldn't have to go to school!

Q₂: But are we born knowing anything at all?

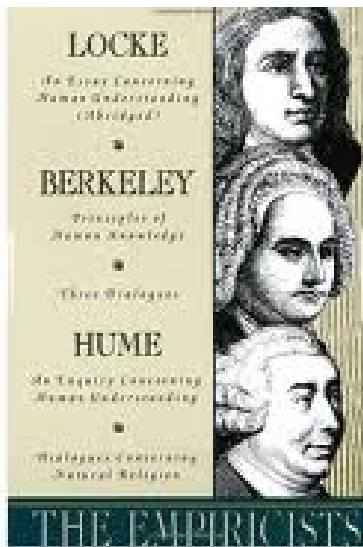
Q₃: Is the mind completely blank or do we start with some rudimentary understanding of the world?

- Questions examples of **nature-nurture** debate.
- Debate centers on relative contributions of biology and experience in determining any particular capacity.
- Nature: traits that are **genetically** or **biologically** determined.
- Nurture: traits that are **learned through experience** and interaction with the environment.

Rationalism versus Empiricism



Versus



Rationalism versus Empiricism

Rationalism

- Intelligence arises from the **manipulation of symbols** by **rules**.
- Associated with Leibniz and Descartes, Noam Chomsky.
- The human mind has lots of **innate structure**.
- Knowledge comes from logical deduction (i.e., “calculation”).

Empiricism

- Intelligence arises from the mind **connecting together things** that were experienced together or that look alike.
- Associated with John Locke and David Hume.
- More recently with behaviourism (Ivan Pavlov, B.F. Skinner) and even more recently with connectionism.
- The human mind starts out as a **“blank slate”**.
- Knowledge comes by **generalising from observations**.

Evaluating the Knowledge Acquisition Debate



Grasping reflex



Sucking reflex



Step reflex

- Some forms of procedural knowledge are innate.
- Newborn infants come into the world with a variety of different skills; **reflexes** are important for survival.
- Innate abilities are **domain-specific**, i.e., attuned to perform special operations only on a certain type of information.
- Nature constrains or limits on environmental influence.

Can the study of regular and irregular English verbs address one of the most important controversies in philosophy?

- Irregular verbs display some patterns, which sheds doubt on the words and rules theory.
- Perhaps **there exist rules for irregular verbs too**, we just haven't thought of them yet.
- Or, **there are no rules**, all we need is a mechanism for recognising patterns.
- Rationalism vs empiricism.

Next lecture: more on words & rules and language development.