Paul's proportional model: Is it really so hard?

- "The problem with any proportional theory of analogy is that it is both too weak and too strong. On the one hand, it allows many kinds of analogical change which we do not find in the actual history of languages. [...] [I]n syntax, we do not expect to hear *Mary, who John knows Bill and, though this is the solution to the proportion John knows Mary : Mary, who John knows = John knows Bill and Mary : x. (Kiparsky 1974:259)

Paul's narrow definition of analogy

- "Horizontal" exclusions:
- "Vertical" exclusions

- “A further type arises from syntactic associations. This type is distinguished from those discussed above in that the connection between the terms that make up the individual proportions is already presented to the mind from the outside. [...] Sentences such as the following become associated: *spricht Karl*, *schreibt Fritz* etc. [...] or combinations such as *pater mortuus*, *filia pulchra*, *caput magnum* [...], and the following equations are thus constructed: *spricht* : *Karl* = *schreibt* : *Fritz* and *pater* : *mortuus* = *filia* : *pulchra* = *caput* : *magnum*.” (§76)

Compare:

- “In natural first-language acquisition, the rule is not given as such, but rather merely a number of model sentences. Over time, we hear a number of sentences that are constructed in the same way and that therefore band together into a group. [...] [T]he common element is reinforced again and again through repetition, and thus the rule is abstracted unconsciously from the model sentences. [...] For only in this way does a recognition of the general validity of the model develop. This gives the individual speakers the feeling that their own sentence constructions are justified.” (§79)
- "[W]e adopt a usage-based theoretical perspective on the process of language acquisition. We thus assume that what children are learning initially is concrete pieces of language, of many different shapes and sizes, across which they then generalize to construct more abstract linguistic constructions - which underlie their ability to generate creative new utterances." (Tomasello 2006)

- "The [proportional] notation ["A:B :: X:Y"] itself does not provide any way to indicate ["that the examples A and B should be construed as representative members of a larger analogical set"] [...] and thus has no formal means of excluding or disfavoring analogies supported by just one or a few pairs. (Albright 2008, part 1)

- But Paul is very explicit that every "group" includes **all** of the items that meet its defining criteria:
- “What I am calling “formal groups” include, for example, the totality of all nomina actionis, all comparatives, all nominatives, all first-person forms of the verb, etc.” (§75)

- Thus, in a solvable proportional group (= proportional equation) such as
- *stone* : *stones* :: *shoe* : X

  the left side of the proportion (*stone* : *stones*) is to be understood as standing ultimately for the set of **all** singular-plural noun pairs in English (or the subset of all such pairs known to a particular speaker).

Size matters:

- “Above all, however, one group is easily in a position to extend its pattern over the domain of another, related group, when the former significantly outweighs the latter in terms of frequency of occurrence.” (§79)
- “Which of the various applicable proportions wins out depends only on the dominance relationships among them.” (§81)

- “Furthermore, the notation does not impose any restrictions on what properties particular A_i:B_i pairs can have in common with one another. In fact the pattern itself--i.e., the relation between *A* and *B*, and the equation for *Y*--is left entirely implicit." Albright 2008, part 2)

- “Our model employs a bottom-up approach to learning, iteratively comparing pairs of surface forms to yield ever more general rules. It takes as its input ordered pairs of forms which stand in a particular morphological relation – e.g., (present, past) – and compares the members of each pair to construct rules that derive one from the other. As an example, consider the pairs of forms in (1).

(1) ([mɪs]$_{pres.}$, [mɪst]$_{past}$) ‘miss(ed)’
([prɛs]$_{pres.}$, [prɛst]$_{past}$) ‘press(ed)’
([læf]$_{pres.}$, [læft]$_{past}$) ‘laugh(ed)’
([hʌg]$_{pres.}$, [hʌgd]$_{past}$) ‘hug(ged)’
([rʌb]$_{pres.}$, [rʌbd]$_{past}$) ‘rub(bed)’
([nid]$_{pres.}$, [nidəd]$_{past}$) ‘need(ed)’
([dʒʌmp]$_{pres.}$, [dʒʌmpt]$_{past}$) ‘jump(ed)’
([plæn]$_{pres.}$, [plænd]$_{past}$) ‘plan(ned)’” (Albright & Hayes 2002)

wordforms perceived by learner >

categorization/organization

proportional groups >

????(abstraction/forgetting

abstract rules >)????

computation

production/comprehension of unlearned forms

- The Albright and Hayes model, like so many others, is a function that takes proportional groups as input and yields unlearned wordforms as output.
- This is exactly what speakers do in Paul's theory.
- The (only?) question: Is this computation divided between an abstraction/forgetting step that belongs to acquisition and a deductive step that belongs to processing or are proportional groups the end product of acquisition and the whole computation belongs to processing?

“Most, but not all, of this work has assumed that some “oracle”—some outside source of information—provides the phonology learner with the information that two words are morphologically related: the two words may be explicitly marked as being part of the same morphological paradigm, for example.” (Goldsmith 2006)