

How “systematic” is native-speaker knowledge of verb inflection?

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Language is the cognitive product of both storage and computation. The stored bits are the “lexicon,” and computation is guided by the rules of “grammar.” To which does verb inflection belong? Linguists have generally treated verb inflection as rule-governed and systematic, excepting only those irregular verbs which cannot be well characterized by rules and are thus considered to be memorized.

This paper reports a series of psycholinguistic experiments using Japanese nonce verbs in which native speakers’ production of inflected forms seemed to draw only partially on systematic knowledge of paradigmatic relationships. In order to explain these results, I present a more radical model of regular verb inflection than has been proposed previously:

All current models assume **systematic generation** of inflected forms, using rules or regularities. Given a source form, the speaker applies certain operations to it in order to produce the appropriate target form. The operations are defined on a class of source forms, so the result hinges on a correct analysis of which class this particular source form belongs to. In the various models, class assignment may be by rule or by analogy, and may use probabilistic or featural information.

In contrast, I suggest that nonce forms are produced by a process of **unsystematic generation**, which is invoked only for novel, nonlexicalized verbs. The target form is constructed to match one of a defined set of possible forms. The particular target form is selected not by rules but by biases of various sorts, either principles (“default”) or statistical tendencies, and the selection may also have an idiosyncratic or random component. The basis on which a particular individual selects a target may in fact be mysterious, as was found in several previous experiments (Bybee & Elly Pardo (1981), Schnitzer (1996), Vance (1991)). In unsystematic generation, the membership of the created form to some class of target forms is defined by a rule or analogy (and thus it is identifiable as a particular form), but the manner in which the source form is to be transformed into the selected target form is not specified. Unsystematic generation is by definition not used for “known” verbs, all the forms of which in Japanese are drawn from memory.

These experiments had the additional goal of teasing apart several influences and sources of information which affect performance on such a nonce verb inflection task.

Methodology: Each of three experiments used sixteen nonce verbs, modeled on two or three different Japanese verb paradigms. Subjects heard these verbs in short recorded conversations which included two forms of each verb, and then answered a question orally either by repeating a form which had been heard in the conversation, or by generating a third, unheard form. In a second “round” for each subject, the same questions were asked again at a time lag of 3–17 minutes. On this round, subjects might remember what they had heard and/or said on the first round, or for some verbs the base form information in the question would be sufficient. The design was thus within subject, with independent variables of a) verb paradigm, b) heard vs. unheard, c) first vs. second round.

Japanese verbs, which have not been much studied in psycholinguistics, are an interesting contrast to European verb systems. For instance, there are more paradigms

and subparadigms (11 subparadigms in 2 main groups), but only two irregular verbs. Each paradigm has about 20 different forms. The verb paradigms used in these experiments varied along three dimensions:

- a. Productivity: Across the three experiments, I used various combinations of three subparadigms: one irregular verb (the “empty” verb *suru* ‘do’) which is highly productive in creating new verbs from “verbal nominals,” a productive paradigm from the 5-dan group, and one of limited productivity and one unproductive one from the 1-dan group.
- b. Transparency of the relation between various forms in the same paradigm: *suru* involves suppletion, 5-dan verbs inflect with stem changes, and 1-dan verbs simply add affixes to the unchanged stem.
- c. How many forms are needed to determine the paradigm: *suru* and some 5-dan verbs are identifiable from the base form alone, while 1-dan and other 5-dan verbs require at least one additional form.

Results: Subjects gave answers that matched the modeled paradigm in 35% to 97% of the instances, depending on the combination of conditions. Productive verb paradigms received more matching answers than unproductive ones, even though the productive paradigms were generally the less transparent ones.

The results showed that native speakers of Japanese do not reliably use systematic knowledge of regular verb paradigms when inflecting novel verbs. However, it is noteworthy that subjects did not invent “wild” forms, but used only a small number of paradigmatic Japanese forms. Virtually all answers matched some paradigm, but not always the one modeled. The degree of variability in responses observed is not compatible with a source-oriented, rule-based account of inflection.

I also use the contrast between different conditions to estimate the contribution of five possible influences on verb inflection performance:

- hearing/repeating (short-term memory)
- systematic generation strategies (computation using rules or analogies)
- learning/remembering from previous experience of the same verb (long-term memory)
- *a priori* bias toward a particular paradigm
- random or idiosyncratic choice (unsystematic = otherwise unexplained)

Discussion: The performance results in this experiment were sufficiently unsystematic that previous models of regular verb inflection will find them difficult to explain, since all these models assume that systematic knowledge of verb paradigms underlies the generation of forms. Instead, I suggest that performance on novel but paradigmatically predictable verbs calls forth a variety of unsystematic strategies centering around a product-oriented goal. By contrast, the smooth performance observed with known verbs in everyday speech must thus result from storage rather than calculation, suggesting that the various inflected forms of existing verbs in Japanese must all be memorized, no matter how “regular” they appear to be.

References

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