English Past Tense Alternations

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Introduction History of Studies in Past Tense Production

English is spoken by over 1.8 people and is the language of science, business, and the media (Census Bureau 2000). All English speakers have common morphemes which can add additional meaning to other morpheme(s). However, depending where a morpheme is added to, the morpheme can be expressed differently and can also vary speaker from to speaker.

The past-tense morpheme is one morpheme that appears differently depending on which verb it is attached to. The most standard representation of past tense is the adding of the suffix [d] usually represented by -ed in English orthography. However, past tense can also appear as [t], [ʌ], [əd] , [ɛ], [o] and does not have to be a suffix or even appear at all.

Some phonologists argue that this morpheme appears as one underlying representation that is modified by phonological rules. Although, Pinker (1999) argues that since there are too many environments for some rules to apply (such as the rule ɪ -> ʌ which applies in both cling [klɪŋ] which clung [klʌŋ] and spin [spɪn] that turns into spun [spʌn]) that the chosen underlying representation of a morpheme is based on similarity. Hayes & Albright (2005) Wug tested participants while using a GCM model to find similarity between words and found that it could not correlate similarity to likelihood of expression. It is possible that their model inaccurately describes similarity or, as suggested by Hayes and Albright, that there is a complex set of rules that describe how the past tense morpheme appears on the surface.

Possible Explanation: Semantics and Rules

The semantics of the modified verb could be a factor in determining the correct surface representation of a word. For instance, give[gɪv] becomes gave [geɪv] and hand[hænd] becomes handed [hændəd] in the past tense. There are situations in which give could include something not given from hand to hand such as kicking a soccer ball while handed always describes an action that is passed literally from hand to hand. In cases where give[gɪv]is also meant as hand to hand it could be kept gave [geɪv] in order to retain simplicity. If meaning is a factor, then Wug Testing should provide different past-tense forms based on which “appropriate” context is said to have.

Of importance is that rules could also apply to prevent certain segments from appearing in English. Hand [hænd] cannot become [hænddd] so it becomes [hændəd]. Therefore, [d] could be the underlying representation of the past tense morpheme chosen that is later modified by phonological rules.

Experimental Design

Participants would be presented with english-like words and asked to change them into what they think would be the appropriate past tense forms. If they thought more than one form was possible they would put the forms in the order of most likely or note that they are equally likely. The context of the words would be provided and would be rotated based on the version of the quiz. The "context" would be based on whether or not a verb took a direct object, indirect object, or neither. Additionally, a set of known english verbs would also appear to test and see if the participant can correctly create the different surface forms of past tense.

Procedure

8 native english participants were provided with a quiz that asked them to change both 15(14 unique) english verbs and 20 english-like verbs into the past tense(with the possibility to list multiple answers for the english-like verbs and sort them based on likelihood). The english-like words were put into four groups of five with each group sharing example sentences to demonstrate their appropriate context. Four versions of the quiz were made so that the english verbs were in the same order but each english-like group appeared in each context exactly once. Participants took the quiz online and were assigned versions of the quiz to make sure that the amount of participants in each version was even. Their responses were in standard English orthography and I used my native English intuition to judge which phonetic representation they meant. The quiz is presented with links at the end of the paper.

Results

The results of the quiz are presented in the figure 1 presented on the next page:

Words/ Participants	Participant A Condition 1	Participant C Condition 2	Participant B Condition 3	Participant D Condition 4	Participant E Condition 1	Participant F Condition 2	Participant G Condition 3	Participant H Condition 4
Sleep	Slept	Slept	Slept	Slept	Slept	Slept	Slept	Slept
Spring	Sprung	Sprung	Sprung	Sprung	Sprung	Sprung	Sprung	Sprung
Jump	Jumped	Jumped	Jumped	Jumped	Jumped	Jumped	Jumped	Jumped
Vote	Voted	Voted	Voted	Voted	Voted	Voted	Voted	Voted
Turn	Turned	Turned	Turned	Turned	Turned	Turned	Turned	Turned
Spring	Sprung	Sprung	Sprung	Sprung	Sprung	Sprung	Sprung	Sprung
Plan	Planed	Planned	Planned	Planned	Planned	Planned	Planned	Planned
Run	Ran	Ran	**Runned**	Ran	Ran	Ran	Ran	Ran
Leap	**Leaped**	Lept	Leapt	Lept	**Leaped**	Lept	Leapt	Lept
Speak	Spoke	Spoke	Spoke	Spoke	Spoke	Spoke	Spoke	Spoke
Leak	Leaked	Leaked	Leaked	Leaked	Leaked	Leaked	Leaked	Leaked
Ring	**Rang**	Rung	Rung	**Rang**	**Rang**	Rung	Rung	**Rang**
Stop	Stoped	Stopped	Stopped	Stopped	Stopped	Stopped	Stopped	Stopped
Meet	Met	Met	Met	Met	Met	Met	Met	Met
Learn	Learned	Learned	Learned	Learned	Learned	Learned	Learned	Learned
Sloke	Sloked	Sloked	Sloked	Sloked	Sloked	Sloked	Sloked	Sloked
Chlore	Chlored	**Chlore**	Chlored	Chlored	Chlored	Chored	Chlored	Chlored
Ting	Tinged	Tinged	**Tung**	Tinged	**Tang**	Tingged	Tinged	Tinged
Geet	Geeted	Geeted	**Get**	Geeted	**Get**	Geeted	Geeted	Geeted
Rool	Rooled	Rooled	Rooled	Rooled	Rooled	Rooted	Rooled	Rooled
Zleek	Zleeked	Zleeked	**Zloke**	Zleeked	Zleeked	Zleeked	Zleeked	Zlkeeked
Ling	Linged	Linged	**Lung**	Linged	**Lang**	Linged	Linged	Linged
Rog	Rogged	Rogged	Rogged	Roged	Rogged	Rogged	Rogged	Rogged
Reaplog	Reaplogged	Reaplogged	Reaplogged	Reaploged	Reaplogged	Reaplogged	Reaplogged	Reaplogged
Po	**Poded**	Poed	**Poed, Pod, Pot**	Poed	**Pod**	Poed	Poed	Poed
Ging	Ginged	Ginged	**Gung**	Ginged	**Gang**	Gingged	Ginged	Ginged
Kreen	Kreened	Kreened	Kreened	Kreened	Kreened	Kreened	Kreened	Kreened
Qweek	Qweeked	**Qweek**	**Qwoke**	Qweeked	Qweeked	Qweeked	Qweeked	Qweeked
Zo	Zoded	Zoed	Zoed	Zoed	**Zod**	**Zo**	Zoed	Zoed
Splink	Splinked	Splinked	**Splunk**	**Splunk**	Splinked	Spinked	Splinked	**Splunk**
Feek	Feeked	Feeked	Feeked	Feeked	Feeked	Feeked	Feeked	Feeked
Moar	Moared	Moared	Moared	Moared	Moared	Moared	Moared	Moared
Tink	Tinked	Tinked	**Tunk**	Tinked	**Tanked**	Tinked	Tinked	Tinked
Slog	Slogged	Slogged	Slogged	Sloged	Slogged	Slogged	Slogged	Slogged
Mun	Munned	Munned	Munned	Muned	**Man**	Munned	Munned	Munned

Figure 1: Words categories are bolded and italicized. Words that are irregular are bolded. Some differences are not bolded because they are just treated as orthographically different.

Analysis

Participants had differences in how they produced some of the past tenses of run [rʌn], leap [lip], and ring [rɪŋ]. Most of these were due to an attempt to normalize past tense endings. For example, Run [rʌn] had one case with the unique production, runned [rund] and in some cases Leap [lip] became leaped [lipt] instead of leapt [lɛpt] but leaped [lipt] was much less frequent. In the case of ring [rɪŋ] an equal amount of people created rang [ræŋ] and rung [rʌŋ]. This could mean that both forms are equally acceptable.

All the english-like words many words had the option of adding the regular affixes [d], [t], [əd] but some transformations were made to follow similar english words. Chlore [klɔr] could stay chlore [klɔr], zo [zoʊ] could stay [zoʊ], ting [tɪŋ] could vary between tang [tæŋ] or tung [tʌŋ], get [git] could change to [gɛt], zleek [zlik] to zloke [zloʊk], po [poʊ] to pod [pɒd], poded [poʊdəd], or pot [pɒt], tink [tɪŋk]could change to tunk [tʌŋk] or tanked [tæŋkt], and mun [mʌn] to man [mæn].

However, the affixes were the dominant form in every production while the transformations that followed the pattern of other english words were the minority. This could mean that there are several past tense morphemes and these morphemes change based on rules, that there are optional rules, or that a rule could apply based "islands of reliability" (Albright, 2002).

If there was a past tense morpheme it would be the affix [d] because it appears in the greatest amount of words. One could argue that a rule exists that transforms [d] into other past tense affixes. These rules are provided below:

Stop Final Devoicing

$$\begin{bmatrix}\text{+ anterior}\\ \text{-delayed release}\end{bmatrix} \rightarrow \text{[-voice]} \;\; \backslash \big[\, \text{[-voice]} \_ \,\big]\text{word}$$

Schwa Insertion

$$\varnothing \rightarrow [\text{ə}] \;\; \backslash \left[\begin{matrix}[\text{+anterior}] \_\_\_\_\_ [\text{+ anterior}]\\ [\text{-delayed release}] \_\_\_\_\_ [\text{-delayed release}]\end{matrix}\right]\text{word}$$

There is also the possibility of the following rule in case of sing [sɪŋ] and sung [sʌŋ]:

I Lowering

$$[\text{I}] \rightarrow [\text{-high}] \;\; \backslash \big[[\_\text{ŋ}]\big]\text{word}$$

Also in the case of read [rid] to read [rɛd] we would have this rule:

i Detensing

[i] → [-high] / [-tense] \ [____ [+anterior]] [[+delayed release]] word

For cases like speak [spik] to spoke [spoʊk] we would need this:

i Backening and Rounding

[i] → [+back] / [-high] [+round] \ [[-syllabic] ____ [-syllabic]] [ ] word

D Deletion

[+ anterior]
[-delayed release] → ∅ \ [___]word
[+voice]

ʊ Insertion

∅ → [+high] [+back] [+tense] / [[+back] ____] [[-high]]

t Insertion

∅ → [+anterior] [+delayed release] [-voice] \ [[+tense] [[+back] ____] [[-high]]] word

i Lowering

$$[i] \rightarrow \begin{matrix}[\text{-high}] \\ [\text{+low}]\end{matrix} \backslash \left[\ [\_ŋ]\right] \text{ word}$$

However, these rules provide some problems. According to our english-like words it would seem like all of these rules are optional except for schwa insertion. However, in the case of spring [sprɪŋ], spinged [sprɪŋd] cannot be created, thus I Lowering must occur. Additionally, the data shows that I lowering can be ignored with a word like ling [lɪŋ] and even preferred. If this were the case then it could mean that there is another set of rules that bleed it. The figure below could explain a possible ordering of these rules.

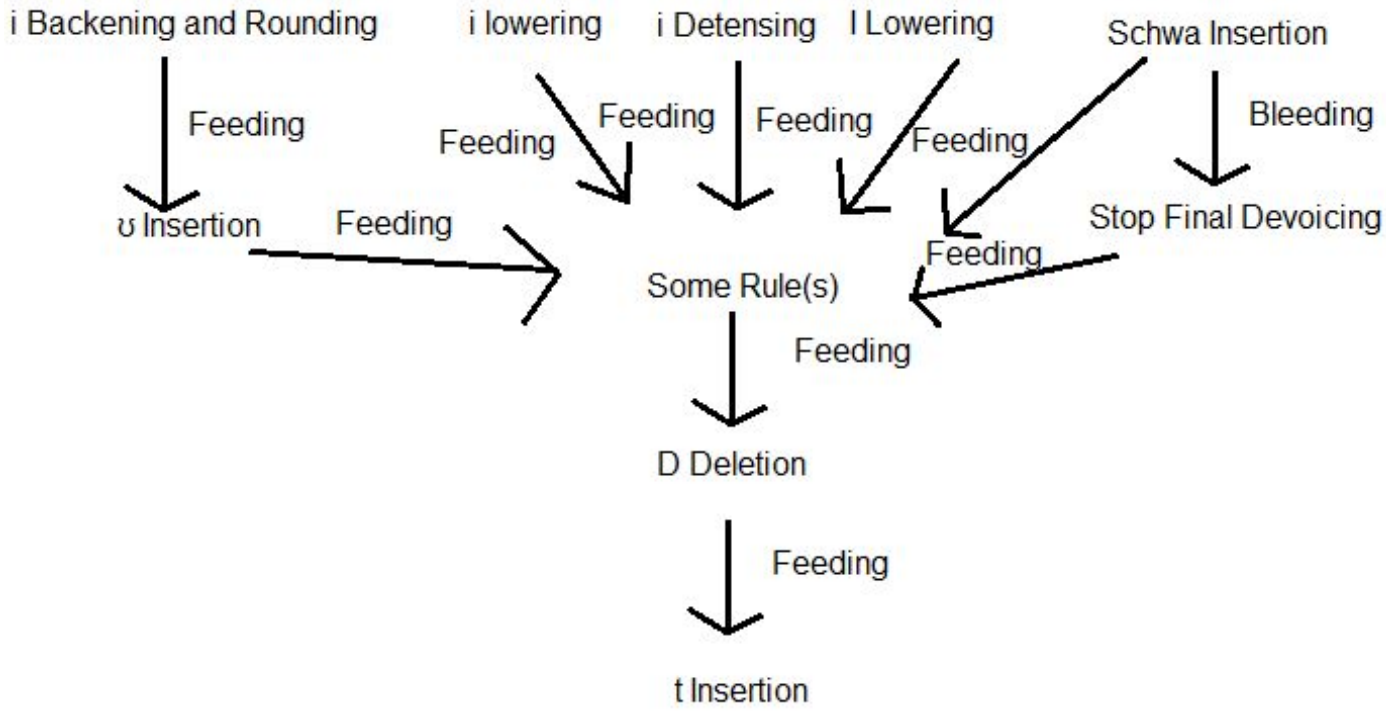

Figure 2 : Hasse Diagram Representing theoretical rule ordering.

The problem with generating these unknown rules is that they either affect more sounds than they should, affect sounds too far away, or they don't affect enough sounds. In order to be more accurate we need more specific environments. Theoretically, environments could be affected by how a verb acts, such as if it receives a direct object, indirect object, or not. According to my experiment, however, this did not have an affect on the word produced. Although, there could be more environments which change the likelihood of certain productions. Take certain words like sing [sɪŋ] which never have a surface form singed [sɪŋd] although it is possible to say without it sounding too strange.

Additionally, suppose there is a person named Sing, who likes to jump around a lot after eating ice cream. When one jumps around a lot after eating ice cream they can be said to have singed [sɪŋd]. There just might be a constraint in the lexicon that prevents singed [sɪŋd] from being the past tense of the traditional meaning of singing. Alternatively, it could be possible that instead of these being environments for rules, that there are environments to select the proper morpheme, so that rules can happen in purely phonological environments rather than including semantic ones.

Further Discussion

Different speakers have different preferences to which they make a new word into the past tense. Dive [daɪv]can become dived [daɪvd] or dove [doʊv] or like in the experiment leap [lip] can become leaped [lipt] or leapt [lɛpt]. Likewise, speakers can choose several productions for the formation of past tense from a novel word. It would be important to find out why certain productions equally likely or plausible. This may help shed light on how past tense is formed. Furthermore, although there are environments already listed for phonological rules maybe there is a field of morphological environments(based on semantics) that in addition to rules, form the surface forms of the many words we see today. Constraints are also useful idea to consider as some words seem like they should be possible phonologically even though they are not. Furthermore, the example I used of singed[sɪŋd] could show it useful to make nonce verbs out of nouns and see how they are made into past tense.

Links to Quizzes

Quiz 1:
https://docs.google.com/document/pub?id=1Hs742HrMNygmRAb3WmaFy6QV0Uj-D8jY84D5zrLYzoA
Quiz 2:
https://docs.google.com/document/pub?id=1kgC82B5lO6s1tMnwAwfb3t3E4UQJFPZha350Xj61eXc
Quiz 3:
https://docs.google.com/document/pub?id=1szFOltwL-P2xA3Jlu5H43UewQMsS8VkJgRQhFoh2vIw
Quiz 4:
https://docs.google.com/document/pub?id=1wKabkJH25-gPK_jqBJNjMTR07ssKJQjQ2nGv_IxkDZc

References

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