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# Irregularization in the English Past Tense

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**Abstract**

This paper explores the workings of the past tense divide in English through the use of a word game. Speakers of English are capable of taking a word that usually takes the -ed ending but making it change the internal vowel instead: *mind/mound* instead of *mind/minded*. This word game can be used to show what rules are involved in the irregular past to better models made in the future whose goals are to generate the English past tense. I investigate different conjugation patters between different words to find a way to navigate the formation system. I design a survey with a multiple-choice section and a free response, both with four English words and four specially designed nonce words. The survey results show that the connectionist model of the English past tense is the better way to model it.

*Keywords*: Irregularization, Phonology, Past Tense, English, Connectionist

## 1. Introduction

The English past tense has two conjugations. There is the regular past tense which takes an allophonic ending displayed in example 1. The four sub examples show each of the allophones represented by the morphological past tense marking -ed: [{-əd, -ət, -d, -t}],

(1)

(a) grab/grabbed



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(b) crack/cracked

(c) sneeze/sneezed

(d) brush/brushed

This makes understanding the regular past a simple task. If a word needs to be put in the past tense, add *-ed*. If the word ends in a stop, keep the schwa, and if it ends in a voiced sound, the -ed will be voiced.

The irregular past tense is much more unpredictable. To a non-native speaker, it would be a hopeless quest to try and determine which words even take the irregular, let alone attempting to conjugate them in the correct irregular form. Example 2 below shows how there is no way to predict the conjugation of a word in the regular or irregular tense.

(2)

(a) I rake the leaves. I raked the leaves. *I rook the leaves.

(b) I take the leaves. *I taked the leaves. I took the leaves.

(c) The kid shows his pet rock. The kid showed his pet rock. *The kid shew his pet rock.

(d) The kid knows his pet rock. *The kid knowed his pet rock. The kid knew his pet rock.

If we examine 2 in a purely morphological sense, there does not seem to be an apparent reason as to why rake and take would be conjugated different, and the same goes for show and know. Adding the regular past tense ending to a word like *take* or *know* sounds like a mistake made by a child who is still learning the language.



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Now what exactly is at work here? What is it about the past tense that would still allow us to make a word like *take* > *taked* or *rake* > *rook* and still understand them? How is it that a word like *knowed* is still understood to be the past tense of *know* even though any English speaker could tell you that is not the correct form? Furthermore, there are many instances of English speakers who may either make a quick accidental error or (jokingly or not) get confused and genuinely not know the proper conjugation.

Lockwood's 2017 blog post *Slid, Slad, Slode* is an example of just this. It recounts a story of a reddit comment where someone mistakenly said that "25 people in my hometown fell/slided a few meters." Users flocked to correct the original commenter because Reddit will be Reddit. After they corrected *slided* to *slid*, they kept it going, providing forms like *slode, slad,* and *slud.*

This is interesting for two reasons. 1) What is at work here that lets us read a word we have never seen before like *slud* and know that this is the past tense conjugation of *slide*? 2) Lockwood sites McLellen's 1978 *More Figures of Speech* in which he quotes an excerpt from a 1400s manuscript: "The same morning there had fallen a great dew, so that the ground was somewhat moist, and so in his going forward he slode and fell around." *Slode* is real.

I provide two more examples below, 3 taken from twitter and 4 taken from Instagram. I italicize the irregularized forms.

(3) "Yesterday I *sprant* for the bus and the bus driver kept driving." user jjnwaogu

(4) "I spent $200 on a blender so everything getting *blent* idgaf…" user baabaing



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These two users surely could have sat down and planned this out to get extra laughs out of their post. It also could be the case that this was a genuine resolution to forming the past tense that their grammars supplied them. The mystery then is why is a word like *blent*, which most people have probably never seen or encountered, immediately and without question taken to be the past tense conjugation of *blend*? How does a word like *sprant* not leave speakers baffled but may even provoke a laugh?

Linguists have not come to a single consensus. Linguists have been debating this matter in an ongoing debate known simply as the Past Tense Debate. This has been going on for more than thirty years (Seidenberg, Plaut, 2014). While there is no definite consensus, the debate has at least settled on two major theories of formation: the lexicalist model and the connectionist model.

My way of discovering how the formation of the past tense works is to figure out how it does not work. If we knowingly break the rules of the past tense, then we can see what it will still allow and what it will not permit. In this paper I have fifty participants partake in my word game where they must conjugate words into the irregular past.

In section two I further explain the concept of irregularization and how I go about designing my survey. In section three I introduce the lexicalist and connectionist perspectives and how they play into the past tense debate. In section four I provide my methodology. In section five I present my conclusions.

**2. Irregularization**



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When I use the term irregularization, I use it in this context to describe the act of conjugating a regular (-ed) past tense verb in the paradigm of the irregular past tense. The words that in examples 3 and 4 like *sprant* and *blent* I refer to as irregular forms or IFs. Before understanding the formation of these words, it will help to understand how a speaker can understand and produce these various irregular forms.

The English irregular past tense may seem like a nightmare of random choices of random words and vowels. This is not the case if we ignore the few exceptions like *to be* and *to go*. The conjugations of *be* and *go* are so common in English speech that people who speak the language have no trouble remembering the correct forms, so a change like *go* > *went* will have little impact on this study.

English conjugates verbs in the irregular past tense in eight different ways. Bybee and Slobin lay these out in their 1986 publication *Rules and schemas in the development and use of the English Past Tense.* Example 5 below shows their findings:

(5)

1. Verbs that experience no change of form: *hit/hit, cut/cut*
2. Verbs where a final [d] is changed to a [t] in the past tense: *send/sent, bend/bent*
3. Verbs that undergo a vowel change and /{d, t}/ is inserted word final: *kneel/knelt, sell/sold*
4. Verbs that undergo a vowel change, the final phonetic consonant is deleted, and a [t] is added: *bring/brought, catch/caught*
5. Verbs that undergo a vowel change and whose stems end in an alveolar: *find/found, light/lit, write/wrote*



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6. Verbs where [ɪ] changes to {æ, ʌ}: *sing/sang, sting/stung*
7. Verbs that undergo a vowel change and nothing else: *ride/rode*
8. Verbs that undergo a vowel change that end in a diphthong: *fly/flew, know/knew*

Now we know that there are only eight different patterns that a word will classify into as it undergoes irregularization. These classes are determined by the phonetic makeup of the words in question and are not entirely unpredictable. This makes sense for our examples of *blent* and *sprant* again. *Blend* is changing to *blent* which is a type two verb. *Sprint* is changing to *sprant* which is a type six verb. Bybee and Slobin's classification system is not just a handy tool for showing how children acquire the past tense, but it also becomes useful for determining IFs.

The next step then is determining how English speakers are able to understand IFs as they encounter them. Again, there is no question as to IFs being incorrect or grammatical. This is no more than a word game, but it is certainly interesting how saying *I slode on the ice* will not have people staring blankly at you but only jumping at the opportunity to correct a speech error. There are two parts that speakers use to recognize the irregular past tense: syntax and phonology.

The syntax acts here to give speakers context clues as to what the IF in that position of a tree would be doing. Especially if we take example 3 again (Yesterday I sprant for the bus…) we know that *sprant* must be a verb for two reasons. The phrase starts with the word *yesterday* which places the reference in the past. *Sprant* is also nestled between the DP *I* and the PP *for the bus*. Because of its placement and the context of the phrase, it makes the most sense for it to be a verb in the past tense.



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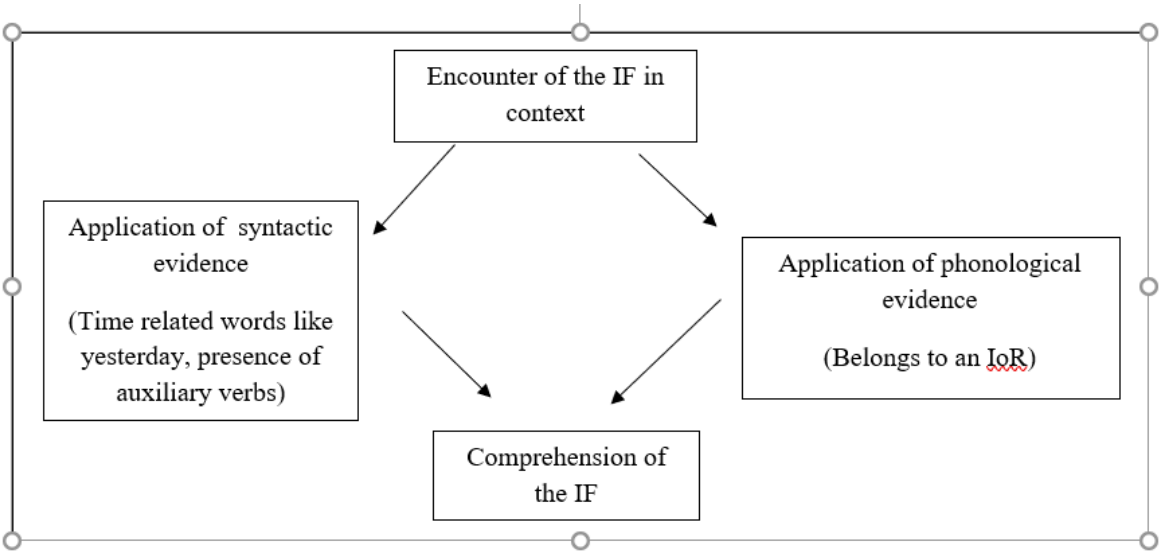
The phonology is the step that takes a word that English speakers may have never seen before and making it something comprehensible, if still descriptively incorrect for English rules. *Sprant* is a type six verb as seen earlier and belongs to a phonological rule that changes the internal vowel as patterned in other verbs (see *sink > sank*). This is not just a random application of vowels and hoping for the best. If I stayed in the type six schema and said "Yesterday I sprunt for the bus" it would not have the same effect. English speakers have intuitions on what is the correct IF. This means there must be a specific vowel choice when irregularizing a verb.

Furthermore, this suggests that the English grammar does in fact have ways of determining the formation of the irregular past. These islands of regularity are what help speakers carry the semantic information from the present tense to the past tense. In example 6 below, I provide a flowchart to demonstrate the steps the grammar takes to parse an IF.

(6)



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At this point we know that it is a fact that speakers can and will provide IFs either by mistake, on accident, or because they may momentarily forget the proper form. Twitch Streamer Ryukhar often says during his gameplay that he knew he should have “spun-jump” instead of “spin-jumped”. Liberman (2007) points out that there are cases of words getting grammaticalized such as *greenlighted* getting changed to *greenlit* or some confusion with baseball announcers saying, “flied out” or “flown out”. Or words like *dive/dove dive/dived* are patterns that often get confused. The mission now is to find a way to represent these changes in the grammar.

There are two main theories on the irregular past as stated in section one. Scalise and Guevera (2005) show how a system of lexical analogy would work to check against other words and other word formation rules. Moore-Cantwelle and Staubs (MC&S 2014) provide a computational approach to handle the irregular past as well as the regular to show how a weighted system of nodes is able to handle these past tense conjugations.

As the past tense debate has gone on, different statements have been made at many parts of the progression. When Prasada and Pinkner were working on their dual route theory (see section three) they stated how having a system based solely off of making errors would be of little use (1988). I say that they made an oversight. I can say “I boke along the whole trail today” and have no doubt that I will be understood. There needs to be attention focused on figuring out why that is. And as Yang adds, “A model that banks on analogy, which can only explain weird past tense errors, misses the major target of the [past tense formation] study.” (2002). To that I say that we have much to learn from these “weird past tense errors” and what they reveal about the grammar.



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In section three I will present the lexicalist perspective and the connectionist perspective. I will provide a brief history of where they came from and how they will be used to derive the irregular past tense. I will also briefly introduce Dual Route Theory because of the impact is has had in the past tense debate although it is not a part of the study.

**3. Introducing the Theories**

Linguists have already done plenty of studies to determine how the past tense system plays a role in producing the past tense. The consensus is that there is much more at play than memorizing different irregular forms and regular rules, as evidenced by the IFs seen so far. Studies conducted by Bonami and Stump (2006) on Icelandic case systems show that the system at work is the set of lexical analogy. Work by linguists MC&S (2014) and McClellend (2002) demonstrate that the connectionist model holds up just as well. Additionally, Albright (2010) and McClellend (2002) show that both of these systems hold up just as well, outperforming the model proposed my Prasada and Pinkner in 1993: Dual Route Theory.

Their idea was to find a way to account for the weaknesses presented by the two theories at the same time. They note in their work that “rule-only theories have trouble explaining patterns of irregular generalizations, whereas single-network theories have trouble explaining regular ones…” (1993). The way to combat this then was to have a system that had two fully functional paths. If a word took the regular -ed ending it went down the rule based path. The rule was applied, allophonic -ed was accounted for, and the past tense was supplied. If a word was irregular, it went down the lexical path. The word was applied to the lexicon, the site “looked up”



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the pattern of the word, and it produced the irregular form. They were satisfied with the results of their study and were happy to present their dual route theory.

Unfortunately for them, later studies have shown that this is not the case. The problem with having two routes is that this can only be accounted for by speakers already knowing everything about their language. In other words, this system falls apart when tasked with tracking language learning. That leaves us with two working theories that have been deemed to have their strengths and weaknesses by the earlier mentioned studies McClellend (2002) and Albright (2010): the lexicalist perspective and the connectionist perspective.

When I use the term lexicalist, I refer to the branch of linguistics championed by some of the most famous linguists out there: Chomsky (*Remarks on Nominalisation* 1970), Jackendoff (*Semantic Interpretation in Generative Grammar* 1972), and Halle (*Prolegomena to a Theory of Word Formation* 1973). Linguists were quick to get their ideas out in this period of the Linguistics Wars, and lexicalist perspectives were all around in literature. Now classic examples like "John criticized the book/John's criticizing the book" (Chomsy 1970) were being seen for the first time. The lexicon being a storehouse of unpredictable information assigning theta roles were being used to combat other types of semantics (Jackendoff 1972). Ideas of hierarchical constructions in words like *in-spire-ation-al* were gaining popularity (Halle 1973). These were being published in an exciting and tumultuous time in the field and to this day the theory still holds some traction.

To model the acquisition of the irregular past in the lexicalist perspective I propose figure 7 below. It is composed of the Word Formation Rules (WFR), the Phonological Generation Site (PGS), and the Lexical Lookup Site (LLS). All of these sites work together at once to produce these



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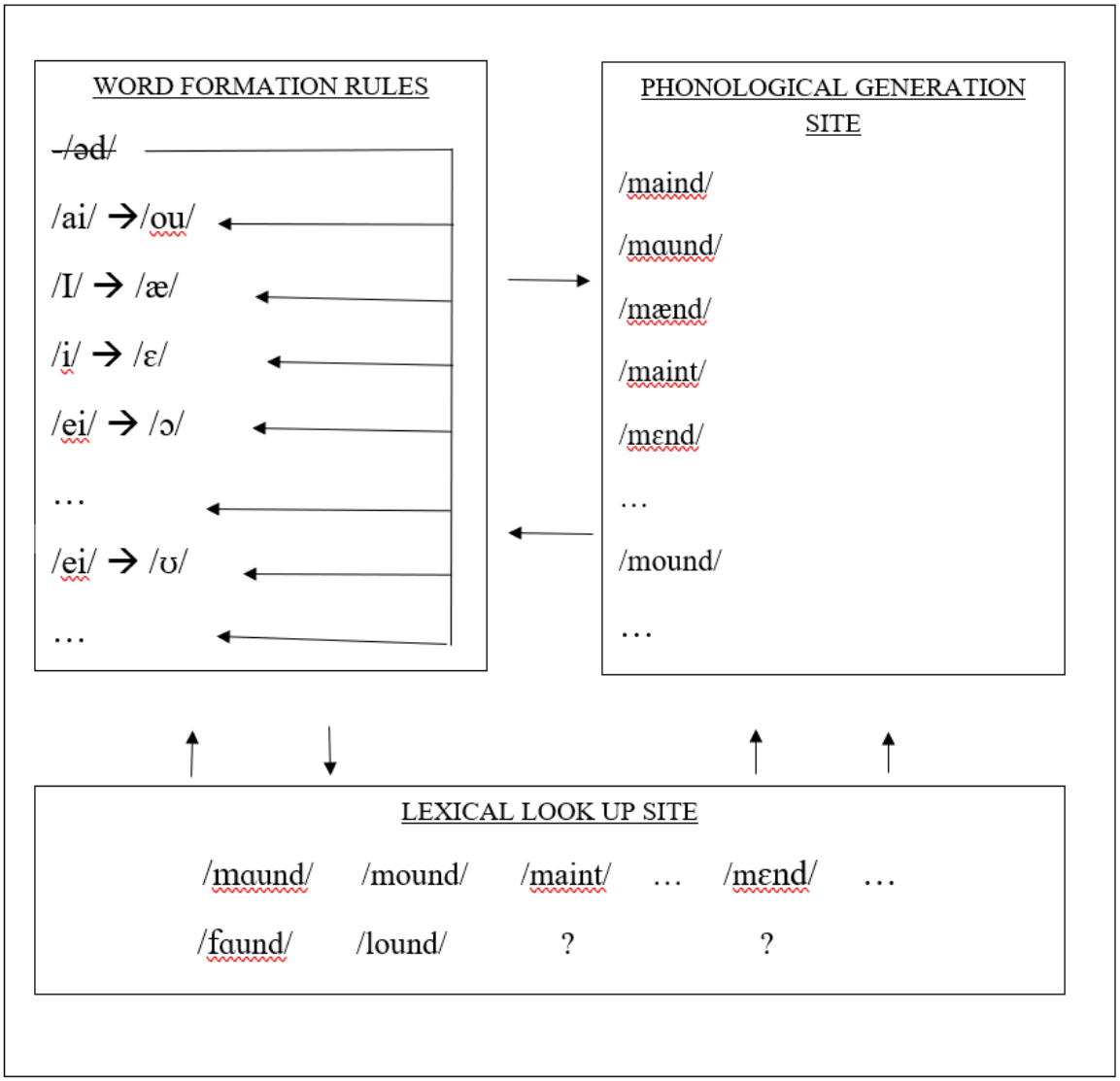
different forms. Notice in the WFR that the -ed has been crossed off. In this word game we are not looking for the regular word formation, we need an internal vowel change. In WFR, all of the possible vowel changes are listed to infinity. These are applied to the PGS where the vowel changes (or final consonant devoicing) are applied to the word. The LLS is what checks these words against other past generated words to verify their pseudo-grammaticality.

(7)



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I use the word *mind* here as an example. I am supposed to say, "I wouldn't have minded if he showed up late." If I am playing this word game, I must say "I wouldn't have mound if he shew up late" (Ignore the *shew* for now). In WFR, the internal vowel change of [ai] to [u] is supplied (among countless others). The PGS applied this rule and supplies the form *mound*. LLS shows that this checks out because of the word pair *find/found*. Through analogy and word changes, *mind/mound* is deemed grammatical in this word game. Just like that, there is a system that can explain the formation of IFs to explain how they creep up in errors or how people can purposely say them to play this game.

Connectionist is being used here to denote the progression of thinking after the landmark publication *Parallel Distributed Processing* in 1986 (Rumulhardt & McClelland). The duo worked to show how a computer would be able to use a set of weighted nodes to learn and produce different vowel sounds. These nodes used something called *wickelfeatures* as a nod to the linguist *Wickelgren* whose publication in 1969 introduced *wickelphones*. These *wickelphones* were groupings of three phonemes that represented the mind's short term memory of words. This was transformed into a way to map how the Language Acquisition Device learned rules and was able to produce them over time.

Gary Marcus' *The Algebraic Mind* (2001) is a case study of 21 different styles of systems inspired by the work done by R&MC (including their system as well). As theirs was one of the first connectionist models ever made, it was a huge addition to the field but had some serious downfalls. It had to be fed with an unrealistically high volume of verbs before it finally began learning, and it would confuse reduplicated words in other languages like *algal* (straight) and

*algalgal* (ramrod straight). Other methods proposed in Marcus' case study include some dual route methods, feedforward methods, and classifier systems.

R&M specifically say that their model will add higher weights between nodes that are either grammatical forms or between nodes with "some other possible response of interest" (1986). These other responses of interest are exactly what I am looking at with regards to irregularization and connectionism. The model used to describe the past tense applications in this project is one published in 2014 by Moore-Cantwelle and Staubs (MC&S). They created a connectionist model reined in by optimality theory to generate regulars and irregulars. It should not come as a surprise at this point that the challenging part for them was representing the irregulars. They present the following formula to stand in for their system:

(8) (M-C&S 2014)

> Φ(BASE)i: X → Y: (Where Φ stands in to represent a morphosyntactic feature, i represents an arbitrarily labeled array, and X → is the mapping of the change occurring)
>
> PAST(PRESENT)2: I → æ "≈ 'The past tense of bundle 2 words should be formed from the present tense by changing I to æ."

Next, they provide this graph to see how the mapping constraints effect the outcomes:

(9) (MC&S 2014)



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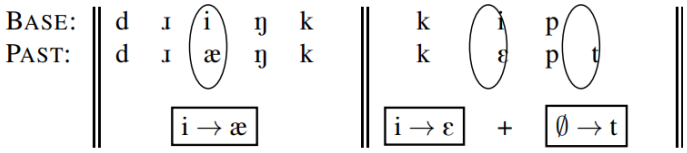
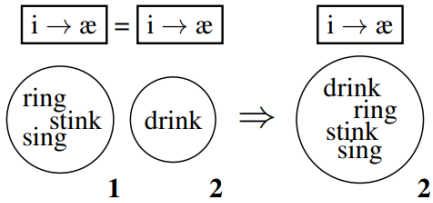



**(a)** A lexical item in BASE is aligned with one in PAST. The operations transforming one into the other are used in the corresponding operational constraint.




**(b)** Two bundles with identical operational constraints can be merged into one.

Thus, when a word is taken from Base PRESENT and changed to Φ PAST, the vowel/word change is considered and placed into a group that holds all of those similar changes. This model will only have to be changed slightly for this study. We would only have to feed it irregulars and make it think it functions in a world that has no -ed ending so that everything must be grouped in an irregular bundle.

## 4. Method

In order to test my theory of irregularization, I designed a survey in two parts. Part one is a multiple-choice section. I selected four English words and designed four nonce words to fit in with the eight styles of irregular verbs denoted in Bybee & Slobin (1986). I provide the answer I am looking for, an answer that is not necessarily "correct", but since none of this is descriptively correct it will help to see what speakers say, and one that is purposefully wrong. The multiple-choice word list is given in table 9 down below.

(9)



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| Presented Word | Predicted Form | Plausible Form | Unlikely Form |
|---|---|---|---|
| *Hud* | *Hud* | *Hod* | *Heed* |
| *Blend* | *Blent* | *Bland* | *Blant* |
| *Spell* | *Spold* | *Spall* | *Spoold* |
| *Letch* | *Lought* | *Latch* | *Letch* |
| *Plite* | *Plote* | *Plit* | *Plat* |
| *Tring* | *Trang* | *Trung* | *Tronge* |
| *Hike* | *Hoke* | *Hack* | *Heek* |
| *Show* | *Shew* | *Shaw* | *Shee* |

The free response is the same idea. I selected four English words and designed four nonce words to see how English speakers would choose to conjugate the verbs in the irregular form. Table 10 lists them and their expected forms below.

(10)

| Presented Form | Predicted Form | Plausible Form |
|---|---|---|
| *Edit* | *Edit* | *Edat* |



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| | | |
|---|---|---|
| *Pind* | *Pint* | *Pand* |
| *Spell* | *Spelt* | *Spold* |
| *Tatch* | *Taught* | *Tutch* |
| *Chite* | *Chote* | *Chit* |
| *Vit* | *Vat* | *Vut* |
| *Rake* | *Rook* | *Roke* |
| *Snow* | *Snew* | *Snaw* |

The goal between free response and multiple-choice is to guage whether or not IFs are able to be predicted. If they can, this will give us an insight into the past tense formation and show us that there are rules that we must follow during generation. Past studies have already shown that the lexicalist and the connectionist perspectives are the most reliable ways to portray the irregular past. Purposefully breaking the distinction of regular/irregular will help determine the rules that go into forming irregulars as these are often the parts that systems have the most trouble with.

There will also be takeaways from what speakers do not provide/select. Using the word *show* as an example, we learn as much about the irregular system from seeing what speakers provide as much as we do from seeing what they do not provide. If we use *blow/blew* as our base, *show/shew* is expected. Because this is a word game and there is no correct answer, the

response *shaw* is also expected if not preferred. What we have no reason to expect is *show/shee*. The vowel becomes so far from the original form that there is no reason for the language faculty to produce it. My goal with the data is to account for the vowel changes (and consonant voicing strategies) to see how the past tense is mapped in English.

My two part survey was posted online using Google Forms. I gathered fifty participants who were over the age of 18 and whose first language was English. Participants were either friends, class mates, people from Facebook, or people from Reddit. Not every free response got 50 responses, but the multiple-choice had 50 responses for every question.

**5. Results**

Following are the results of the survey. I begin with the results for the multiple-choice section. I list the chosen word first, then the predicted response, the plausible response, and the unexpected response.

(11)

| | | | |
|---|---|---|---|
| Hud | Hud 32% | Hod 46% | Heed 22% |
| Blend | Blent 80% | Bland 18% | Blant 2% |
| Spell | Spold 74% | Spall 20% | Spoold 6% |
| Letch | Lought 64% | Letch 20% | Latch 16% |
| Plite | Plote 46% | Plit 30% | Plat 24% |
| Tring | Trang 50% | Trung 44% | Tronge 6% |
| Hike | Hoke 82% | Hack 12% | Heek 6% |



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| Show | Shew 80% | Shaw 18% | Shee 2% |
|---|---|---|---|

The predicted response was selected first 7/8 times. The one time that it was not was in the type one verb *hud* where *hod* was chosen as the top response. Speakers favored lowering the vowel instead of having no change. Below are the tables for the top responses chosen by speakers.

(12)

| Starting Vowel | Resulting Vowel |
|---|---|
| ə͡i x2 | o͡u x2 |
| o͡u | u: |
| ɛ: | ɔ: |
| ɛ: | o͡u |
| I: | æ |

| Type | Number |
|---|---|
| X͡X → Y͡Y | 2 |
| X͡X → Y: | 1 |
| X: → Y͡Y | 2 |
| X → Y: | 1 |

| Type | Number |
|---|---|
| Raise | 3 |
| Lower | 1 |
| Back | 2 |
| Forward | 0 |

Next are the same three tables for the second answer chosen by participants.

(12)

| Starting Vowel | Resulting Vowel |
|---|---|
| ə͡i | I: |
| ə͡i | æ: |
| o͡u | ɔ: |
| I: | ʌ: |
| ɛ: | æ: |
| ɛ: | ɔ: |
| ʌ: | ɑ: |

| Type | Number |
|---|---|
| X͡X → Y͡Y | 0 |
| X͡X → Y: | 3 |
| X: → Y͡Y | 4 |
| X → Y: | 0 |

| Type | Number |
|---|---|
| Raise | 1 |
| Lower | 5 |
| Back | 0 |
| Forward | 0 |

In comparing the first and second choices that speakers have chosen, we can see specific differences in the distribution of changes that occur. The ones that have been judged as the most acceptable by speakers favor raising the vowel over the other directions. The second highest



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accepted responses much preferred lowering the vowel and always changed from either monophthong or diphthong. Both groupings never had any fronting of the vowels.

The free response predictably has a much wider variance in words supplied. It also relied on my predicting the top responses and the second most popular responses. In the table below I include the percentages for those answers and will include one notable mention per word.

(13)

| | | | |
|---|---|---|---|
| *Edit:* 6 words 50 responses | *Edit* 36.9%<br>1st place | *Edat* 17.4%<br>3rd place | *Edeet* 6.6%<br>5th place |
| *Pind* 8 words<br>48 responses | *Pint* <7%<br>4th place | *Pand/pound/pond* 25%<br>1st place | *Punt* <5%<br>8th place |
| *Spell* 7 words<br>50 responses | *Spelt* 42.5%<br>1st place | *Spold* 19.9%<br>3rd place | *Spunttesh* 2%<br>7th place |
| *Tatch* 6 words<br>48 responses | *Taught* 28%<br>1st place | *Tutch* 16.6%<br>3rd place | *Tatch* 5.5%<br>6th place |
| *Chite* 7 words<br>48 responses | *Chote* 60.3%<br>1st place | *Chit* 22.3%<br>2nd place | *Chillt* <5%<br>7th place |
| *Vit* 7 words<br>47 responses | *Vat* 44.7%<br>1st place | *Vut* n/a<br>n/a | *Vought* 5.5%<br>5th place |



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| Type | Number |
|---|---|
| $\widehat{XX} \rightarrow \widehat{YY}$ | 1 |
| $\widehat{XX} \rightarrow$ Y: | 3 |
| X: $\rightarrow \widehat{YY}$ | 2 |
| X $\rightarrow$ Y: | 0 |

| | | | |
|---|---|---|---|
| *Rake* 6 words<br>48 responses | *Rook* 5.2%<br>4th place | *Roke* 71.7%<br>1st place | *Rade* <5%<br>6th place |
| *Snow* 4 words<br>48 responses | *Snew* 81.9%<br>1st place | *Snaw* 12.9%<br>2nd place | *Snount* 2.6%<br>4th place |

The level of unpredictability was much higher in the free response than the multiple-choice. The predicted form was still chosen 6/8 times, and the plausible form was supplied in the proper order 2/8 times. It was supplied first 2/8, third 3/8 times, and not supplied ever once. Below are the vowel changes for the top responses.

(14)

| Starting Vowel | Resulting Vowel |
|---|---|
| $\widehat{ai}$ | æ: |
| æ: | ɔ: |
| $\widehat{ei}$ | $\widehat{ou}$ |
| $\widehat{əi}$ | I: |
| I: | æ: |
| $\widehat{ou}$ | u: |

| Type | Number |
|---|---|
| Raise | 4 |
| Lower | 1 |
| Back | 1 |
| Forward | 0 |

Following are the vowel changes for the second most popular responses.

| Starting Vowel | Resulting Vowel |
|---|---|
| $\widehat{ai}$ | ɑ: |
| $\widehat{ai}$ | $\widehat{ou}$ |
| $\widehat{əi}$ | I: |



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| | |
|---|---|
| e͡i | æ: |
| æ: | ɑ: |
| o͡u | æ: |
| I: | o͡u |

(15)

| Type | Number |
|---|---|
| X͡X → Y͡Y | 1 |
| X͡X → Y: | 4 |
| X: → Y͡Y | 1 |
| X → Y: | 1 |

| Type | Number |
|---|---|
| Raise | 1 |
| Lower | 3 |
| Back | 3 |
| Forward | 0 |

The vowel changes in free response behaved similarly to those in the multiple-choice, despite a different selection of vowels to work with.

In the most popular supplied answers, there was a fairly distributed amount of vowel changes between diphthongs and long vowels. The changes present also favored raising in a great majority, as did the multiple-choice. The second most popular supplied answers were unique because of a tie with the supplied word *pind* (speakers provided *pond* and *pound* with the same frequency). The types of vowel changes heavily favored a diphthong to a long vowel over any other change, and there was a tie between lowering and backing the vowels.

The final bit of data is a mapping of the irregular past. The resulting vowels are listed below to show how the past tense derivations are mapped into the English vowel space.

(16)



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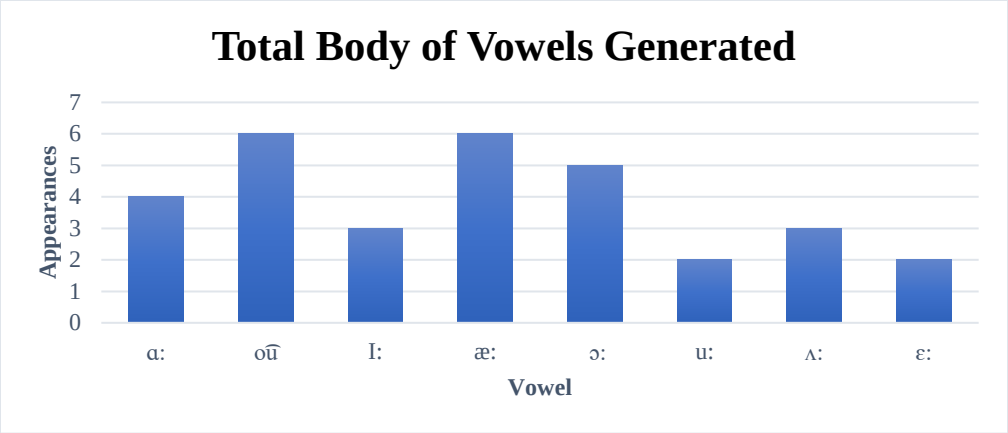


There is a strong correlation between back vowels and the irregular past from the given data. Between the back vowels and [æ], 83% of the data is accounted for. There must be some inherent connection between back vowels and the past tense for English. Perhaps this points to a phonological-semantic interface.

Finally, I am led by these data to believe that the connectionist perspective is the more successful way to present the changes at hand. I take this stance based on the instances when I was unable to predict the top response. These were times when I expected a whole word change like *latch/lought* or a lack of a change like *hud/hud*. The features of the consonants at the start and at the end were what determined the vowel change, not the word itself.

**6.Conclusion**

In this paper I presented an irregularization study where I received 50 responses over the course of one month. I asked speakers to irregularize regular verbs and nonce verbs and to judge three presented forms. The presented forms were carefully chosen and predicted based on conclusions drawn from lexicalist methods or connectionist methods. From these results, I took inventory of the vowels to show what the greater tendencies are and to map a large IoR of the



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past tense. I additionally use these results to show that the connectionist model has the most efficacy in predicting and comprehending the irregularization process.

I hope that this paper leads to more studies in irregularization and more perspectives on research that has been done in the past. From such exercises we are able to gain a deeper insight to past research. Just like how we can learn about a language's phonology from looking at loan words, we can learn a lot about morphosyntactic processes and the systems that run them through word games such as irregularization.

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