What can Ned Flanders tell us about linguistic knowledge?

Diddly-infixation and the poverty of the stimulus

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Roadmap

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- → Experiment 1: *Diddly*-infixation
- → Analysis
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- → Conclusion

Introduction

What does it mean to know a language?

→ Speakers have unconscious knowledge of the rules and structures (the grammar) of their language.

→ Speakers have strong intuitions about what words and sentences belong in their language (are grammatical) and what words and sentences don't (are ungrammatical).

→ These intuitions are *untaught*, and can be used to form generalizations about novel words and processes.

Untaught: Expletive Infixation

In most English dialects, there is a process which inserts an expletive like *fuckin* inside another word. (McCarthy, 1982)

Expletive Infixation

fantastic → fan-fuckin-tastic

Speakers are able to generalize to words they have not previously heard *fuckin* inserted into.

Where would you put *fuckin*?

Colorado Alabama Milwaukee

No one ever instructed you in this process, yet there is remarkable agreement about where in the word *fuckin* should be inserted.

Poverty of the Stimulus

Speakers are able to form very consistent generalizations based on extremely little data

→ How many examples of *fuckin* infixation have you seen?

The data speakers encounter are often ambiguous or incomplete; multiple generalizations are possible.

→ This is commonly known as "the poverty of the stimulus"

Given ambiguous data, what kinds of generalizations do speakers make? What does this tell us about what it means to know a language?

Diddly-infixation

Diddly-infixation is a form of expletive infixation popularized by the speech of Ned Flanders on the television show *The Simpsons*.

The nonsense word *diddly* infixes following an initial stressed syllable, and triggers reduplication (copying) of that syllable:[1]

Canonical Examples

wélcome	⟶	w**el**-diddly-**él**come
áction	⟶	**ac**-diddly-**ác**tion
múrder	⟶	m**ur**-diddly-**úr**der
órder	⟶	**or**-diddly-**ór**der

[1] Data are from The Simpsons Archive, http://www.snpp.com

For Example

Generalizing *Diddly*-infixation

It's easy to generalize *diddly*-infixation to other words with initial-syllable stress — like with *fuckin*-infixation, you have strong intuitions about where it should be inserted:

Where would you put *diddly*?

Boston Melbourne London

But what about words where the main stress is on a different syllable? Do you have intuitions about where *diddly* should be inserted?

Where would you put *diddly*?

Colorado Alabama Milwaukee

How are these stimuli impoverished?

Diddly-infixation presents a classic poverty of the stimulus problem.

There are two possible generalizations that speakers could make about the role of reduplication in the process:

1. Copying is built into the rule. In order to infix *diddly*, you must also copy.
2. Infixation is part of the rule, but copying is a response to the stress patterns of certain words.

If you've only ever heard it with initial-stress words, which generalization will you choose?

What kind of rule do speakers posit?

If speakers hypothesize that copying is a necessary part of *diddly*-infixation, they are building as much as possible into the novel process itself.

If speakers hypothesize that copying is a response to the stress patterns of initial-stress words, they are making use of their pre-existing grammatical knowledge.

- → English speakers have strong intuitions about how word-stress should be assigned in their language.
- → They know that inserting *diddly* without copying poses a problem for the rules governing stress assignment.
- → They use this knowledge in forming generalizations about novel processes.

Testing for Generalizations

How do we find out what generalizations speakers make?

The initial data speakers have is ambiguous: multiple generalizations are possible.

Asking them to use their generalizations in new ways can show us which of those generalizations they've created.

Hypothesis: if reduplication in *diddly*-infixation is a response to stress patterns, it will appear only in words that need it. If it's a necessary part of the process, it will appear everywhere.

Experiment 1: Diddly Infixation

Questionnaire study: performed on 113 undergraduate students, eliciting reduplicative preferences in *diddly*-infixation.

→ Subjects were trained on canonical examples, 5 initial-stress words with reduplication and 1 monosyllabic example.

→ They were then presented with initial-stress words, non-initial-stress words, and monosyllabic words.

Stimuli

Initial Stress	*Non-Initial Stress*		*Monosyllabic*
1 0	**2 1 0**	**2 0 1 0**	**1**
captain	artistic	anaconda	bite
maple	magnetic	application	cord
panther	October	California	dream
pilot	pandemic	information	jump
serpent	umbrella	intervention	march
winter	Wisconsin	Massachusetts	past

Experiment 1: Diddly Infixation

For initial and non-initial stress cases, subjects were asked to choose between infixation with and without reduplication:

Winter

A) win-diddly-inter

B) win-diddly-ter

C) A and B are equally acceptable

D) Neither A nor B is at all acceptable

For monosyllabic words, the choice was between reduplication of all or part of a coda cluster:

→ *jump-diddly–ump* vs. *jum-diddly-ump*

A and B responses were counterbalanced, and examples were presented in pseudo-random order.

Experiment 1: Hypothesis

Reduplication is predicted in initial-stress and monosyllabic words, regardless of what is motivating reduplication (these are the kinds of examples heard on *The Simpsons*):

Predictions

Stress Pattern	*Copying in Rule*	*Copying due to Stress*
1 0 (captain)	**Reduplication** (cap-diddly-aptain)	**Reduplication** (cap-diddly-aptain)
1 (bite)	**Reduplication** (bi-diddly-ite)	**Reduplication** (bi-diddly-ite)

Experiment 1: Hypothesis

In non-initial-stress words, reduplication is not predicted if it is due to stress, because it is unnecessary (examples of this sort don't appear on *The Simpsons*):

Predictions

Stress Pattern	*Copying in Rule*	*Copying due to Stress*
2 1 0 (artistic)	**Reduplication** (artis-diddly-istic)	**No Reduplication** (ar-diddly-tistic)
2 0 1 0 (anaconda)	**Reduplication** (anacon-diddly-onda)	**No Reduplication** (ana-diddly-conda)

Experiment 1: Results

In initial-stress words, subjects preferred reduplication:

Questionnaire Responses — Initial Stress

Reduplication	(cap-diddly-aptain)	**62%**
Non-reduplication	(cap-diddly-tain)	25%
Both		5%
Neither		8%

Binomial probability Redup vs. Non-Redup: $z = 3.68$, $SE = 0.10$, $p < 0.05$

In non-initial-stress words, subjects preferred non-reduplication:

Questionnaire Responses — Non-Initial Stress

Reduplication	(anacon-diddly-onda)	17%
Non-reduplication	(ana-diddly-conda)	**56%**
Both		7%
Neither		19%

Binomial probability Redup vs. Non-Redup: $z = -3.69$, $SE = 0.11$, $p < 0.05$

Experiment 1: Results

In monosyllabic words, subjects preferred minimal codas:

Questionnaire Responses: monosyllabic words

Simple coda	(jum-diddly-ump)	**47%**
Complex coda	(jump-diddly-ump)	19%
Both		10%
Neither		24%

Binomial probability Redup vs. Non-Redup: $z = 2.59$, $SE = 0.11$, $p < 0.05$

Summary: Speakers preferred reduplication where it improved stress assignment.

- → Subjects reduplicated with initial-stress and monosyllabic words, but not non-initial stress words.
- → If reduplication was part of the rule, non-initial stress words should have reduplicated as well.

Why do we copy?

In *diddly*-infixation, *diddly* must be inserted into the word (it cannot appear outside the word: **diddly*-welcome).

However, in words with main stress on the intial syllable, this poses a problem for the rules of stress assignment in English.

Copying occurs as a way to resolve that conflict.

How does that reflect speakers' grammatical knowledge?

Grammars as Ranked Constraints

In Optimality Theory (Prince and Smolensky, 1993/2004) (OT), grammar reflects a compromise between two opposing forces active in linguistic systems:

- → **Markedness**: Conditions on the sounds and structures in the surface forms of words. ("Don't Be Like This")
- → **Faithfulness**: Conditions on the similarity between words and their inputs, or between a word and the words derived from it. ("Don't Change")

Specific markedness and faithfulness constraints can be violated, but only to satisfy a more important (higher ranked) constraint.

In *diddly*-infixation, markedness constraints on where main stress should be are in conflict with a faithfulness constraint that wants words and their derived forms to have the same main stress.

The Precedents

In many contexts, main stress prefers to be assigned to the rightmost non-final syllable (Liberman and Prince, 1977):

Main Stress Assignment

cáptain fantástic anacónda

Adding suffixes changes what the rightmost non-final syllable is, but in many cases this doesn't shift where the stress falls:

No Stress Shift

lóvely → lóveliness (not lovelíness)

Note: this a severe simplification. English stress is full of exceptions and unresolved problems.

The Resolution

If infixed into an initial-syllable word with no copying, either the main stress will shift to a different syllable or it will fall too far to the left.

Two Possibilities

wélcome	$\longrightarrow$	a. wel-díddly-come	Stress Shifted
		b. wél-diddly-come	Too Far Left

Copying, however, allows us to satisfy both conditions: stress stays on the same syllable as in the original word, and is also on the rightmost non-final syllable.

Stress Conditions Satisfied

wélcome $\longrightarrow$ wel-diddly-élcome

Copying as a Repair

The plural marker in Hausa infixes between a consonant cluster. If no cluster is available, a single consonant reduplicates:

Hausa (Newman, 1972)

	Root	*Singular*	*Plural*	*gloss*
a.	gu**rb**	gu**rb**ìi	gu**r**àa**b**uu	'hollow place'
b.	ga**ɓ**	ga**ɓ**àa	ga**ɓ**àa**ɓ**uu	'joint, limb'

German children reduplicate a syllable to satisfy minimal word requirements:

German Child Speech (Dressler et al., 2005)

	Adult Form	*Jan, 1;3*		*Adult Form*	*Jan, 1;3*
a.	Bär 'bear'	bebe	b.	Bauch 'belly'	baubau

The Interpretation

Information about what kinds of processes are available for use in language is a part of *universal grammar*.

When English speakers see copying in *diddly*-infixation, they know that it's among the possible repairs that a grammar can use to fix marked structure.

They use their grammatical knowledge of English to make decisions about what the marked structure is that is being repaired by copying.

This solution still violates a faithfulness constraint (material from the original word appears twice) but seeing the reduplicated forms gives speakers quick evidence that that constraint is less important.

If it's not broken...

For initial-stress words, we need to use copying to repair the stress assignment problems created by infixing *diddly*.

However, for non-initial stress words, infixing doesn't create a problem: it doesn't change what the rightmost non-final syllable is:

No Repair Necessary

fantástic → fan-diddly-tástic

The constraint on stress assignment is satisfied, and so is the constraint against moving the stress to a different syllable. Words like this don't need to be repaired.

These are the kinds of words that will easily participate in *fuckin*-infixation, which doesn't usually occur with reduplication.

Experiment 2: Fuckin' Infixation

Subjects were willing to infix *diddly* without reduplication where it was unnecessary. Are speakers willing to reduplicate with *fuckin*-infixation where it would be necessary?

→ *Fuckin*-infixation typically operates on non-initial stress words.

→ We conducted a second experiment to find out how *fuckin* behaves in initial-stress words.

Hypothesis: If reduplication is a phonological repair, it should be a possible repair for *fuckin*-infixation as well.

Second Questionnaire Study: performed on 119 undergraduate students (who had not participated in the previous experiment), eliciting reduplicative preferences in *fuckin*-infixation.

→ Subjects were trained on 4 canonical examples (e.g. fan-fuckin-tastic), infixation with non-initial stress.

Experiment 2: Fuckin' Infixation

The task was the same as the previous experiment: subjects were presented with initial-stress words, non-initial-stress words, and monosyllabic words (the same word list).

→ For initial-stress and non-initial-stress words, the choice was between infixation with reduplication and infixation without reduplication.

→ For monosyllabic words, the choice was between reduplicating a simple coda or a complex coda.

Winter

A) win-fuckin-inter

B) win-fuckin-ter

C) A and B are equally acceptable

D) Neither A nor B is at all acceptable

Experiment 2: Results

In non-initial stress words, subjects preferred non-reduplication:

Questionnaire Responses — Non-Initial Stress

Reduplication	(anacon-fuckin-onda)	$< 1\%$
Non-reduplication	(ana-fuckin-conda)	**89%**
Both		$< 1\%$
Neither		10%

Binomial probability Non-Redup vs Neither: $z = 8.58$, $SE = 0.10$, $p < 0.05$

In initial-stress words, subjects preferred neither option for infixation:

Questionnaire Responses — Initial Stress

Reduplication	(cap-fuckin-aptain)	7%
Non-reduplication	(cap-fuckin-tain)	39%
Both		2%
Neither		**51%**

Binomial probability Non-Redup vs Neither: $z = -.29$, $SE = 0.10$, $p < 0.05$

Experiment 2: Results

In monosyllabic words, subjects preferred neither option for infixation:

Questionnaire Responses: monosyllabic words

Simple coda	(jum-fuckin-ump)	9%
Complex coda	(jump-fuckin-ump)	2%
Both		$< 1\%$
Neither		**89%**

Binomial probability Non-Redup vs Neither: $z = 5.43$, $SE = 0.13$, $p < 0.05$

Summary

- → Subjects preferred non-reduplication in non-initial-stress words, as predicted.
- → In initial-stress and monosyllabic words, speakers chose neither infixation option.

Why are *diddly* and *fuckin'* different?

Diddly-infixation and *fuckin*-infixation differ with respect to subjects' willingness to reduplicate: reduplication is dispreferred in *fuckin*-infixation, but preferred with *diddly*-infixation.

At first, this seems surprising — if reduplication is a phonological repair, it should be available with *fuckin* as well.

However, there is clear difference between *diddly* and *fuckin*: While speakers have never seen a non-infixed use of diddly[2], they have encountered plenty of examples of non-infixed *fuckin*.

Roughly Equivalent in Meaning

fan-*fuckin*-tastic / fuckin' fantastic

[2] The diddly in e.g. *diddly-squat* carries an entirely different meaning.

To Infix or Not?

What part of the process can't be derived from grammar?

- → The grammar doesn't tell us whether or not we need to infix a particular word or nonsense word.
- → Speakers need to learn whether or not it's a necessary part of the meaning of the process.

English speakers know that fuckin' doesn't require infixation. They will therefore avoid infixing it where it would create problems with stress assignment.

Since speakers have not seen non-infixed *diddly*, they posit that it must necessarily be infixed, and that the resulting stress assignment problems must be repaired.

Conclusion

In *diddly*-infixation, there is ambiguity about whether reduplication is part of the novel rule or a repair for problematic stress assignment.

When faced with ambiguous data, what generalizations to we create? What can this tell us about linguistic knowledge?

When asked to generalize to words where *diddly* did not create stress assignment problems, speakers did not reduplicate. This shows us that they are using the grammar of English to make decisions about how to generalize from ambiguous data.

In novel processes, speakers get as much mileage as possible out of their existing grammars, and the process-specific rule is what is left over.

Thank You!

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