The Basics of Morphology
Supplementary Readings

The following readings have been posted to the Moodle course site:

- Contemporary Linguistics: Chapter 4 (pp. 115-127)

The following reading (on Moodle) is not essential, but might be helpful:

- Language Instinct; Chapter 5 (119-152)
The System Thus Far

The Fundamental Question:
What are the **rules** and **mental representations** that underlie our ability to speak and understand a language?

The Answer Thus Far:

- **Mental Representations:**
  - A memorized representation of the *phonemes* making up the word.

- **The Rules:**
  - **Phonology:** Rules affecting how the word is pronounced.
    - The Syllabification Rule
    - The Aspiration Rule
    - The V-Lengthening Rule
    - (...and a whole bunch more...)
The System Thus Far

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▶ Mental Representations:
  ▶ A memorized representation of the phonemes making up the word.

▶ The Rules:
  ▶ Phonology: Rules affecting how the word is pronounced.
    ▶ The Syllabification Rule
    ▶ The Aspiration Rule
    ▶ The V-Lengthening Rule
    ▶ (...and a whole bunch more...)

Fact:
There are also rules for forming words of a language.

▶ Morphology = Rules for forming words.
The Mental Lexicon

Vocabulary:

**The (Mental) Lexicon** = the information about words that you store in memory.

- For each word, you memorize a ton of stuff:
  - its phonemic representation
  - its meaning
  - its ‘part of speech’ (noun, verb, adjective, etc.)
  - ... *etc.* ...

- Part of our knowledge of English is a huge database of words (a mental lexicon).
Dog:
- Sound: /daɡ/
- Part of Speech: Noun
- Meaning: *canis familiaris*

Cat:
- Sound: /kæt/
- Part of Speech: Noun
- Meaning: *felis domesticus*

Love:
- Sound: /lʌv/
- Part of Speech: Verb
- Meaning: To feel strong affection for
Words and Rules

Key Fact:

- The mental lexicon doesn’t store all the words that we know.
- Some words you know but haven’t ‘memorized’.
Words and Rules

Key Fact:

- The mental lexicon doesn’t store *all* the words that we know.
- Some words you know but haven’t ‘memorized’.

Illustration:

- Imagine I told you this was a technical term in linguistics:
  - ‘Blorking’ = to ask really long-winded questions at linguistics talks
Words and Rules

Key Fact:

- The mental lexicon doesn’t store all the words that we know.
- Some words you know but haven’t ‘memorized’.

Illustration:

- Imagine I told you this was a technical term in linguistics:
  - ‘Blorking’ = to ask really long-winded questions at linguistics talks
- Now suppose I said the following to you:
  - “Seth Cable is a notorious blorker.”
- You would understand the word blorker, even though you’d never actually heard it before...
Words and Rules

Key Fact:

- The mental lexicon doesn’t store *all* the words that we know.
- Some words you know but haven’t ‘memorized’.

Conclusion:
Since you’d never heard **blorker** before...

- It wasn’t memorized in your “mental lexicon”...
- So, your knowledge of its meaning came from *somewhere else*...
Words and Rules

Key Fact:

► The mental lexicon doesn’t store all the words that we know.
► Some words you know but haven’t ‘memorized’.

Conclusion:
Since you’d never heard blorker before...
► It wasn’t memorized in your “mental lexicon”...
► So, your knowledge of its meaning came from somewhere else...

The Rule:
For any verb V, adding “er” to the end of V makes a noun that means “one who Vs”
(“blorker” = one who ‘blorks’)

Major Conclusion:
English (and other languages) has rules for forming words.
► Morphology = Rules for forming words.
Vocabulary Time!

**Morpheme:**
A sequence of phonemes to which meaning is assigned.
- /blɔrk/ = to ask long-winded questions at linguistics talks
- /ɪᵽ/ = one who performs a given activity

**Free Morpheme:**
A morpheme that can ‘stand alone’ as a complete word.
- /blɔrk/ “Seth Cable loves to blork.”
- /plej/ “My cat loves to play.”

**Bound Morpheme:**
Morpheme that can’t ‘stand alone’ as a complete word.
- /ɪᵽ/ “Seth is a real blorker / player / *er.”

**Affix:**
A bound morpheme that can attach to a free morpheme
- /ɪᵽ/ “Seth is a real blorker / player / *er.”
Vocabulary Time!

Morpheme: 
A sequence of phonemes to which meaning is assigned.
- /blərk/ = to ask long-winded questions at linguistics talks
- /ɪˈr/ = one who performs a given activity

Free Morpheme: 
A morpheme that can ‘stand alone’ as a complete word.
- /blərk/ “Seth Cable loves to blork.”
- /plej/ “My cat loves to play.”

Bound Morpheme: 
Morpheme that can’t ‘stand alone’ as a complete word.
- /ɪˈr/ “Seth is a real blorker/ player/ *er.”

Suffix: 
An affix that attaches to the end of a morpheme.
- /ɪˈr/ “Seth is a real blorker/ player/ *er.”
Towards Morphological Rules

Let’s work towards the rule for suffix “-er” in English...
Towards Morphological Rules

Let’s work towards the rule for suffix “-er” in English...

Observation 1:

- Suffix “-er” can attach to verbs.
  - blorker, player, baker, dancer, etc.
Towards Morphological Rules

Let’s work towards the rule for suffix “-er” in English...

Observation 1:

- Suffix “-er” can attach to verbs.
  - blorker, player, baker, dancer, etc.

- Suffix “-er” can’t attach to other kinds of words
  - It can’t attach to nouns:
    - piano *pianoer (one who is a piano?)
    - book *booker (one who is a book?)
  - It can’t attach to adjectives:
    - tall *taller (one who is tall?)
    - angry *angrier (one who is angry?)
Towards Morphological Rules

Let’s work towards the rule for suffix “-er” in English...

Observation 1:
- Suffix “-er” can attach to verbs.
  - blorker, player, baker, dancer, etc.
- Suffix “-er” can’t attach to other kinds of words
  - It can’t attach to nouns:
    - piano *pianoer (one who is a piano?)
    - book *booker (one who is a book?)
  - It can’t attach to adjectives:
    - tall *taller (one who is tall?)
    - angry *angrier (one who is angry?)

The Generalization, Part 1:
Suffix “-er” can only attach to verbs.
Towards Morphological Rules

Let’s work towards the rule for suffix “-er” in English...

Observation 2:
When “-er” attaches to a verb, the resulting word is a noun.

- blork the blorker (the one who blorks)
- play the player (the one who plays)
- dance the dancer (the one who dances)
- bake the baker (the one who bakes)
- shoot the shooter (the one who shoots)
Towards Morphological Rules

Let’s work towards the rule for suffix “-er” in English...

Observation 2:
When “-er” attaches to a verb, the resulting word is a noun.

- blork the blorker (the one who blorks)
- play the player (the one who plays)
- dance the dancer (the one who dances)
- bake the baker (the one who bakes)
- shoot the shooter (the one who shoots)

The Generalization, Part 2:
Suffix “-er” attaches to verbs, and thereby creates nouns.

Stated as Rule:
A noun (in English) can be created by affixing “er” to the end of a verb.
A Formal Notation for Rules

The Rule (Informally Stated):
A noun (in English) can be created by affixing “er” to the end of a verb.

A Formal Notation for Morphological Rules:

\[ N \rightarrow V + /\text{i}\text{u}/ \]

- \( N = “ a noun” \)
- \( \rightarrow = “ can be created from” \)
- \( V = “ a verb” \)
- \( + = “ combined with” \)
A Notation for Morphological Structure

The morphological composition of a word can be diagrammed by a “tree structure”.

The Morphological Structure of “Player”

```
/plej/  / thermometer
  V     
```

(“Player” is a noun formed from the V “play” and the suffix “er”)
The Suffix “-Ness”

Consider the following pairs of words...

happy  happiness
sad    sadness
blue   blueness
round  roundness

Key Observations:
I The words on the left are adjectives.
I The words on the right are nouns.
I The words on the right are just like the words on the left, except that they end with “-ness”.
I For each of these Adj/N pairs, the N means “state of being Adj”.

Hypothesis:
An noun can be formed from an adjective followed by the suffix “-ness”.
The Suffix “-Ness”

Consider the following pairs of words...

happy, happiness
sad, sadness
blue, blueness
round, roundness

Key Observations:

- The words on the left are adjectives.
- The words on the right are nouns.
- The words on the right are just like the words on the left, except that they end with “-ness”.
- For each of these Adj/N pairs, the N means “state of being Adj”

Hypothesis:

N = A + /nEs/  
A noun can be formed from an adjective followed by the suffix /nEs/
The Suffix “-Ness”

Consider the following pairs of words...

<table>
<thead>
<tr>
<th>Adjective</th>
<th>Noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>happy</td>
<td>happiness</td>
</tr>
<tr>
<td>sad</td>
<td>sadness</td>
</tr>
<tr>
<td>blue</td>
<td>blueness</td>
</tr>
<tr>
<td>round</td>
<td>roundness</td>
</tr>
</tbody>
</table>

Key Observations:

- The words on the left are adjectives.
- The words on the right are nouns.
- The words on the right are just like the words on the left, except that they end with “-ness”.
- For each of these Adj/N pairs, the N means “state of being Adj”

Hypothesis: \( N \rightarrow A + /n\varepsilon s/ \)

(A noun can be formed from an adjective followed by the suffix /n\varepsilon s/)
The Suffix “-Ness”

Consider the following pairs of words...

happy    happiness
sad      sadness
blue     blueness
round    roundness

Hypothesis: \[ N \rightarrow A + /n\varepsilon s/ \]
The Suffix “-Ness”

Consider the following pairs of words...

<table>
<thead>
<tr>
<th>Word 1</th>
<th>Word 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>happy</td>
<td>happiness</td>
</tr>
<tr>
<td>sad</td>
<td>sadness</td>
</tr>
<tr>
<td>blue</td>
<td>blueness</td>
</tr>
<tr>
<td>round</td>
<td>roundness</td>
</tr>
</tbody>
</table>

Hypothesis: \( \text{N} \rightarrow \text{A} + /\text{nɛs}/ \)

Confirmation, Part 1:

- Suppose I said that in linguistics, “grug” means *lame*.
The Suffix “-Ness”

Consider the following pairs of words...

- happy  happiness
- sad    sadness
- blue   blueness
- round  roundness

**Hypothesis:** \[ N \rightarrow A + /n\varepsilon s/ \]

**Confirmation, Part 1:**

- Suppose I said that in linguistics, “grug” means *lame*.
- You could probably understand this:
  “The **grugness** of this talk is undeniable.”
The Suffix “-Ness”

Consider the following pairs of words...

happy  happiness
sad    sadness
blue   blueness
round  roundness

Hypothesis: \( N \rightarrow A + /n\varepsilon s/ \)

Confirmation, Part 1:

- Suppose I said that in linguistics, “grug” means \( \textit{lame} \).
- You could probably understand this:
  “The \textit{grugness} of this talk is undeniable.”
- You could only understand “grugness” if you had the rule above.
The Suffix “-Ness”

Consider the following pairs of words...

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Nouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>happy</td>
<td>happiness</td>
</tr>
<tr>
<td>sad</td>
<td>sadness</td>
</tr>
<tr>
<td>blue</td>
<td>blueness</td>
</tr>
<tr>
<td>round</td>
<td>roundness</td>
</tr>
</tbody>
</table>

Hypothesis: \[ \text{N} \rightarrow \text{A} + /n\varepsilon s/ \]

Confirmation, Part 2:
If we put “-ness” after something that’s \textit{not} an adjective, it doesn’t sound right.

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Nouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>*walkness</td>
<td>*chairness</td>
</tr>
<tr>
<td>*stealness</td>
<td>*treeness</td>
</tr>
<tr>
<td>*scrapeness</td>
<td>*hatness</td>
</tr>
</tbody>
</table>
The Suffix “-Able”

Consider the following pairs of words...

ride    rideable
do      doable
see    seeable
like    likeable
The Suffix “-Able”

Consider the following pairs of words...

ride  rideable
do   doable
see  seeable
like  likeable

Key Observations:

- The words on the left are verbs.
- The words on the right are adjectives.
- The ones on the right are just like the ones on the left, except they end with “-able”.
- For each of these V/Adj pairs, the Adj means “able to be V-ed”
The Suffix “-Able”

Consider the following pairs of words...

ride  rideable
do   doable
see  seeable
like likeable

Key Observations:

- The words on the left are verbs.
- The words on the right are adjectives.
- The ones on the right are just like the ones on the left, except they end with “-able”.
- For each of these V/Adj pairs, the Adj means “able to be V-ed”

Hypothesis:  A → V + /əbl/  
(An adjective can be formed from a verb followed by the suffix /əbl/)
The Suffix “-Able”

Consider the following pairs of words...

ride  rideable
do    doable
see   seeable
like  likeable

Hypothesis: $A \rightarrow V + /əbəl/$
The Suffix “-Able”

Consider the following pairs of words...

ride  rideable
do   doable
see  seeable
like  likeable

Hypothesis: \[ A \rightarrow V + /əbl/ \]

Confirmation, Part 1:

- Suppose I said that in linguistics “croob” means ‘analyze’. 
The Suffix “-Able”

Consider the following pairs of words...

ride rideable
do doable
see seeable
like likeable

Hypothesis: A → V + /əbəl/

Confirmation, Part 1:

- Suppose I said that in linguistics “croob” means ‘analyze’.
- You could probably understand this: “This language’s phonology is totally croobable.”
The Suffix “-Able”

Consider the following pairs of words...

ride  rideable
do   doable
see  seeable
like likeable

Hypothesis:  A → V + /əbl/

Confirmation, Part 1:

► Suppose I said that in linguistics “croob” means ‘analyze’.
► You could probably understand this: “This language’s phonology is totally croobable.”
► You could only understand “croobable” if you had the rule above.
The Suffix “-Able”

Consider the following pairs of words...

ride rideable
do doable
see seeable
like likeable

Hypothesis: \( A \rightarrow V + \emptyset /\emptyset /\emptyset \)

Confirmation, Part 2:
If we put “-able” after something that’s not a verb, it doesn’t sound right.

<table>
<thead>
<tr>
<th>Adjectives</th>
<th>Nouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>*happyable</td>
<td>*chairable</td>
</tr>
<tr>
<td>*sadable</td>
<td>*treeable</td>
</tr>
<tr>
<td>*blueable</td>
<td>*hatable</td>
</tr>
</tbody>
</table>
The Suffix "-Ing"

Consider the following pairs of words...

bore    boring

tire    tiring

excite  exciting

annoy   annoying

Observations:
- The words on the left are verbs.
- The words on the right are adjectives.
- The ones on the right are just like the ones on the left, except they end with "-ing".

Hypothesis:
- An adjective can be formed from a verb followed by the suffix "-ing".
The Suffix “-Ing”

Consider the following pairs of words...

- bore  boring
- tire  tiring
- excite exciting
- annoy annoying

Observations:

- The words on the left are verbs.
- The words on the right are adjectives.
- The ones on the right are just like the ones on the left, except they end with “-ing”.
- For each of these V/Adj pairs, the Adj means “tends to V people”
The Suffix “-Ing”

Consider the following pairs of words...

- bore  boring
- tire  tiring
- excite exciting
- annoy annoying

Observations:
- The words on the left are verbs.
- The words on the right are adjectives.
- The ones on the right are just like the ones on the left, except they end with “-ing”.
- For each of these V/Adj pairs, the Adj means “tends to V people”

Hypothesis: \[ A \rightarrow V + /iŋ/ \]
(An adjective can be formed from a verb followed by the suffix /iŋ/)
The Suffix “-Ing”

Consider the following pairs of words...

<table>
<thead>
<tr>
<th>bore</th>
<th>boring</th>
</tr>
</thead>
<tbody>
<tr>
<td>tire</td>
<td>tiring</td>
</tr>
<tr>
<td>excite</td>
<td>exciting</td>
</tr>
<tr>
<td>annoy</td>
<td>annoying</td>
</tr>
</tbody>
</table>

Hypothesis: \[ A \rightarrow V + /ɪŋ/ \]
The Suffix “-Ing”

Consider the following pairs of words...

bore       boring

tire       tiring

excite     exciting

annoy      annoying

Hypothesis: $A \rightarrow V + /\text{iŋ}/$

Confirmation, Part 1:

- Suppose I said that in linguistics “drass” means *to make angry.*
The Suffix “-Ing”

Consider the following pairs of words...

bore   boring
   tire   tiring
   excite exciting
   annoy annoying

Hypothesis: $A \rightarrow V + /iŋ/$

Confirmation, Part 1:

- Suppose I said that in linguistics “drass” means *to make angry*.
- You could probably understand this: “That comment on my paper was really drassing.”
The Suffix “-Ing”

Consider the following pairs of words...

<table>
<thead>
<tr>
<th>bore</th>
<th>boring</th>
</tr>
</thead>
<tbody>
<tr>
<td>tire</td>
<td>tiring</td>
</tr>
<tr>
<td>excite</td>
<td>exciting</td>
</tr>
<tr>
<td>annoy</td>
<td>annoying</td>
</tr>
</tbody>
</table>

Hypothesis: \[ A \rightarrow V + /iŋ/ \]

Confirmation, Part 1:

- Suppose I said that in linguistics “drass” means *to make angry*.
- You could probably understand this: “That comment on my paper was really *drassing*.”
- You could only understand “drassing” if you had the rule above.
The Suffix “-Ing”

Consider the following pairs of words...

bore    boring

tire    tiring

excite  exciting

annoy   annoying

Hypothesis: \( A \rightarrow V + /\text{iŋ}/ \)

Confirmation, Part 2:
If we put “-ing” after something that’s \textit{not} an verb, it doesn’t sound right.

<table>
<thead>
<tr>
<th>Adjectives</th>
<th>Nouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>*happying</td>
<td>*chairing</td>
</tr>
<tr>
<td>*sadding</td>
<td>*treeing</td>
</tr>
<tr>
<td>*blueing</td>
<td>*hatting</td>
</tr>
</tbody>
</table>
Another Suffix “-Er”

Consider the following pairs of words...

happy happier
sad sadder
blue bluer
bad badder

Key Observations:
1. The words on the left are adjectives.
2. The words on the right are also adjectives.
3. The ones on the right are just like the ones on the left, except they end with “-er”.
4. For each of these pairs, ‘Adj+er’ means “more Adj”.

Hypothesis:
A ! A +/1ô/ (An adjective can be formed from an adjective followed by suffix /1ô/)

The Suffix “-Ness”
The Suffix “-Able”
The Suffix “-Ing”
Another Suffix “-Er”
Prefixes
Morphological Structure and Ambiguity
Another Suffix “-Er”

Consider the following pairs of words...

happy   happier
sad     sadder
blue   bluer
bad   badder

Key Observations:

- The words on the left are adjectives.
- The words on the right are also adjectives.
- The ones on the right are just like the ones on the left, except they end with “-er”.
- For each of these pairs, ‘Adj+er’ means “more Adj”
Another Suffix “-Er”

Consider the following pairs of words...

happy  happier
sad    sadder
blue  bluer
bad    badder

Key Observations:

- The words on the left are adjectives.
- The words on the right are also adjectives.
- The ones on the right are just like the ones on the left, except they end with “-er”.
- For each of these pairs, ‘Adj+er’ means “more Adj”

Hypothesis: \( A \rightarrow A + /\text{i}r/ \)
(An adjective can be formed from an adjective followed by suffix /\text{i}r/)
Another Suffix “-Er”

Consider the following pairs of words...

happy  happier
sad    sadder
blue  bluer
bad  badder

But Wait!:
Didn’t we already see that “-er” is a suffix that (i) combines with Vs, (ii) produces Ns, and (iii) means “one who Vs”?

play  player
dance dancer
bake  baker
shoot shooter
call  caller
Another Suffix “-Er”

Consider the following pairs of words...

happy happier
sad sadder
blue bluer
bad badder

Homophonous Morphemes

- There are many pairs of words that (i) sound exactly the same, but (ii) have totally different meanings:
  
  red read
  blue blew
  shed (hair) shed (a building)
  bank (river) bank (financial institution)

- Such pairs of words are called homophones.
Another Suffix “-Er”

Consider the following pairs of words...

- happy happier
- sad sadder
- blue bluer
- bad badder

The Conclusion:
Just as with words (free morphemes), affixes (bound morphemes) can be homophones.

- One “-er” suffix combines with Vs to make Ns.
  \[ N \rightarrow V + /i\mu/ \]

- Another, **homophonous** “-er” suffix combines with As to make As.
  \[ A \rightarrow A + /i\mu/ \]
The Prefix “Re-”

Prefix:
An affix that attaches to the *beginning* of a morpheme.

Consider the following pairs of words...

do redo

type retypE

zip rezip

print reprint

Key Observations:
I The words on the left are verbs.
I The words on the right are verbs.
I The ones on the right are just like the ones on the left, except they begin with “re-”.
I For each of these pairs, ‘re+V’ means “to V again”
The Prefix “Re-”

Prefix:
An affix that attaches to the *beginning* of a morpheme.

Consider the following pairs of words...

- do       redo
- type     retype
- zip      rezip
- print    reprint
The Prefix “Re-”

Prefix:
An affix that attaches to the *beginning* of a morpheme.

Consider the following pairs of words...
- do redo
- type retype
- zip rezip
- print reprint

Key Observations:
- The words on the left are verbs.
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An affix that attaches to the beginning of a morpheme.

Consider the following pairs of words...

- do    redo
- type  retype
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- print reprint

Key Observations:
- The words on the left are verbs.
- The words on the right are verbs.
- The ones on the right are just like the ones on the left, except they begin with “re-”.
- For each of these pairs, ‘re+V’ means “to V again”

Hypothesis: $V \rightarrow /\mu i/ + V$
(A verb can be formed from a verb, preceded by the prefix /\mu i/)
The Prefix “Re-”

Consider the following pairs of words...

<table>
<thead>
<tr>
<th>do</th>
<th>redo</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>retype</td>
</tr>
<tr>
<td>zip</td>
<td>rezip</td>
</tr>
<tr>
<td>print</td>
<td>reprint</td>
</tr>
</tbody>
</table>

Hypothesis: \( V \rightarrow /\text{ɪ}/ + V \)

**Confirmation, Part 1:**

Suppose I said that in linguistics “croob” means to analyze. You could probably understand this: “We need to recroob this language’s phonology.” You could only understand “recroob” if you had the rule like above.
The Prefix “Re-”

Consider the following pairs of words...

do    redo
type  retype
zip    rezip
print reprint

Hypothesis: \( V \rightarrow /\mu i/ + V \)

Confirmation, Part 1:

- Suppose I said that in linguistics “croob” means to analyze.
The Prefix "Re-"

Consider the following pairs of words...

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>do</td>
<td>redo</td>
</tr>
<tr>
<td>type</td>
<td>retype</td>
</tr>
<tr>
<td>zip</td>
<td>rezip</td>
</tr>
<tr>
<td>print</td>
<td>reprint</td>
</tr>
</tbody>
</table>

Hypothesis: \( V \rightarrow /\iota/ + V \)

Confirmation, Part 1:

- Suppose I said that in linguistics “croob” means to analyze.
- You could probably understand this: “We need to recroob this language’s phonology.”
The Prefix “Re-”

Consider the following pairs of words...

- do     redo
- type   retype
- zip    rezip
- print  reprint

Hypothesis: \[ V \rightarrow /\text{i}/ + V \]

Confirmation, Part 1:

1. Suppose I said that in linguistics “croob” means *to analyze*.
2. You could probably understand this: “We need to **recroob** this language’s phonology.”
3. You could only understand “recroob” if you had the rule like above.
The Prefix “Re-”

Consider the following pairs of words...

- do  redo
- type  retype
- zip  rezip
- print  reprint

Hypothesis: \( V \rightarrow /\text{\textmu i}/ + V \)

Confirmation, Part 2:
If we put “re-” before something that’s *not* a verb, it doesn’t sound right.

<table>
<thead>
<tr>
<th>Adjectives</th>
<th>Nouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>*rehappy</td>
<td>*rechair</td>
</tr>
<tr>
<td>*resad</td>
<td>*retree</td>
</tr>
<tr>
<td>*reblue</td>
<td>*rehat</td>
</tr>
</tbody>
</table>
The Prefix “Un-”

Consider the following pairs of words...

- happy  unhappy
- sound  unsound
- cool  uncool

Key Observations:
- The words on the left are adjectives.
- The words on the right are adjectives.
- The ones on the right are just like the ones on the left, except they begin with “un-”.
- For each of these pairs, ‘un+Adj’ means “not Adj”

Hypothesis:  \[ A \rightarrow /\!\!\!\!n/ + A \]
(An adjective can be formed from an adjective, preceded by \(/\!\!\!\!n/\))
Another Prefix “Un-”

Important Fact:
As with “-er”, there is another, homophonous prefix “un-”:

- do undo
- zip unzip
- dress undress

Key Observations:
- The words on the left are verbs.
- The words on the right are verbs.
- The ones on the right are just like the ones on the left, except they begin with “un-”.
- For each of these pairs, ‘un+V’ means “to reverse V-ing”

Hypothesis: \( V \rightarrow /\wedge n/ + V \)
(A verb can be formed from a verb, preceded by the prefix /\wedge n/)
# Summary of Our Morphological Rules

<table>
<thead>
<tr>
<th>Morphological Rule</th>
<th>Illustrative Word:</th>
</tr>
</thead>
<tbody>
<tr>
<td>N → V + /iː/</td>
<td>player</td>
</tr>
<tr>
<td>N → A + /nɛs/</td>
<td>happiness</td>
</tr>
<tr>
<td>A → V + /əbl̥/</td>
<td>doable</td>
</tr>
<tr>
<td>A → V + /iŋ/</td>
<td>sickening</td>
</tr>
<tr>
<td>A → A + /iː/</td>
<td>taller</td>
</tr>
<tr>
<td>V → /əi/ + V</td>
<td>reinvest</td>
</tr>
<tr>
<td>A → /ʌn/ + A</td>
<td>uninteresting</td>
</tr>
<tr>
<td>V → /ʌn/ + V</td>
<td>unlock</td>
</tr>
</tbody>
</table>
Complex Morphological Structures

Key Fact: These morphological rules can iterate!

- The word output by one rule can be the input to another rule.

<table>
<thead>
<tr>
<th>Input</th>
<th>Rule</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>do</td>
<td>A → V + /əbl/</td>
<td>doable (able to be done)</td>
</tr>
<tr>
<td>doable</td>
<td>A → /ʌn/ + A</td>
<td>undoable (not doable)</td>
</tr>
<tr>
<td>dress</td>
<td>V → /ʌn/ + V</td>
<td>undress (to reverse dressing)</td>
</tr>
<tr>
<td>undress</td>
<td>V → /əi/ + V</td>
<td>reundress (to undress again)</td>
</tr>
</tbody>
</table>

- By iterating the rules this way, we can make some really complex words:
  - Antidisestablishmentarianism
    (anti-dis-**establish**-ment-arian-ism)
Morphological Ambiguity

Another Key Fact:
Some words can be created in multiple ways, and this affects their meaning.

Illustration: ‘Unlockable’
- able to be unlocked
  (the door is unlockable; I can open it with my keys)
- not able to be locked
  (the door is unlockable; the lock is broken)

Observation:
Our morphological rules predict this ambiguity!
- There are two ways our rules make ‘unlockable’
- Each way of making the word will give a different meaning.
Two Ways of Creating ‘Unlockable’

<table>
<thead>
<tr>
<th>Derivation One:</th>
<th>Derivation Two:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td><strong>Rule</strong></td>
</tr>
<tr>
<td>lock</td>
<td>V → /\n/ + V</td>
</tr>
<tr>
<td>unlock</td>
<td>A → V + /əb]/</td>
</tr>
<tr>
<td>lock</td>
<td>A → V + /əb]/</td>
</tr>
<tr>
<td>lockable</td>
<td>A → /\n/ + A</td>
</tr>
</tbody>
</table>

We can represent these two different methods for making ‘unlockable’ by using two different ‘tree structures’. 
Two Different Structures for ‘Unlockable’

Derivation One:

\[A\]

\[\text{V} /\text{əbl}/\]

\[/\text{n}/ \text{V} /\text{lak}/\]

\[/\text{lak}/\]

- The V /lak/ combines with the prefix /n/, making the V /nlak/ (to reverse locking)
- The V /nlak/ combines with the suffix /əbl/, making the A /nlakəbl/ (able to be unlocked)
Two Different Structures for ‘Unlockable’

**Derivation Two:**

```
/\nA

  /\n A
  |
 V/ άβ]/
  |
 /lak/
```

- The V /lak/ combines with the suffix /άβ]/, making the A /lakάβ]/ (able to be locked)
- The A /lakάβ]/ combines with the prefix /\n, making the A /\nlakάβ]/ (not able to be locked)
Rules Determine Structure

Sometimes, our rules only allow a word to have one structure.

Example: The word ‘redoable’.

**Possible Structure**

- A
  - V
    - /əbl/  
      - /ɪə/  
        - /dʊ/  

**Not a Possible Structure**

- A
  - /ɪə/  
    - V
      - /əbl/  
        - /dʊ/    

- Our rules only allow /ɪə/ to combine with Vs (not As)
- So, in ‘redoable’, /ɪə/ *can’t* be combining with the A ‘doable’
- Instead, /ɪə/ must be combining with the V ‘do’...
- And then ‘redo’ combines with ‘able’ (= able to be done again)