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Is the order of conflation in a conflated rule predictable?

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- *man-n-ik* (be-NONPST-3PL.FEM)
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A & \quad V \quad N \\
\textit{valid} & \quad \text{-at} \quad \text{-ion}
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```
V    N
collect -ion

A    V    N
valid  -at -ion

V    N
present -ation (N.B.: *presentate)
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[-ion rule © -ate rule]
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Given that adjective stems always begin with a consonant in Noon, there’s no way to see whether the $i$ is absent before a vowel. There seems not to be independent evidence for $i$-epenthesis, so Soukka’s analysis of the $i$ as a prefixal formative is at least consistent with the facts.
Nonmonotonic morphotactics
Nonmonotonic reasoning: reasoning by default inference.
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*Kiki is a bird.*
Nonmonotonic reasoning: reasoning by default inference.

*Kiki is a bird. Therefore Kiki can fly.*
Nonmonotonic reasoning: reasoning by default inference.

*Kiki is a bird. Therefore Kiki can fly.*
*Kiki is a kiwi.*
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Adding information changes an inference.
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Adding information changes an inference. Not all reasoning is by default inference.

\[1 + n = 2.\] Therefore \(n = 1.\)
Nonmonotonic morphotactics

A morphotactic rule’s properties change in the context of another rule.
An apparent example of nonmonotonic morphotactics:

Missing links in derivational paradigms
Derivational paradigms vs inflectional paradigms

A fundamental architectural difference between inflectional paradigms and derivational paradigms is one of hierarchy.
Derivational paradigms vs inflectional paradigms

The inflectional paradigm of a lexeme L may be seen as a set of cells, where each cell is the pairing $\langle w, \sigma \rangle$ of a word form $w$ with a morphosyntactic property set $\sigma$.

The synthetic inflectional paradigm of French INVENTER ‘invent’

<table>
<thead>
<tr>
<th></th>
<th>Indicative</th>
<th></th>
<th>Subjunctive</th>
<th></th>
<th>Imperative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Imperfect</td>
<td>Simple past</td>
<td>Future</td>
<td>Present</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1sg</td>
<td>invente</td>
<td>inventais</td>
<td>inventai</td>
<td>inventerai</td>
<td>inventerais</td>
</tr>
<tr>
<td>2sg</td>
<td>inventes</td>
<td>inventais</td>
<td>inventas</td>
<td>inventeras</td>
<td>inventerais</td>
</tr>
<tr>
<td>3sg</td>
<td>invente</td>
<td>inventait</td>
<td>inventa</td>
<td>inventera</td>
<td>inventerait</td>
</tr>
<tr>
<td>1pl</td>
<td>inventons</td>
<td>inventions</td>
<td>inventâmes</td>
<td>inverterons</td>
<td>inventerions</td>
</tr>
<tr>
<td>2pl</td>
<td>inventez</td>
<td>inventiez</td>
<td>inventâtes</td>
<td>inventerez</td>
<td>inventeriez</td>
</tr>
<tr>
<td>3pl</td>
<td>inventent</td>
<td>inventaient</td>
<td>inventèrent</td>
<td>inverteront</td>
<td>inventeraient</td>
</tr>
</tbody>
</table>

Infinitive: inventer

Participles

Present: inventant

Past: inventé
## Derivational paradigms vs inflectional paradigms

\[
\left\{ \text{inventons}, \{1\text{st plural present indicative}\} \right\}
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<td>inventiez</td>
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<tr>
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<td>inventent</td>
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**Infinitive:** inventor

**Participles**

- **Present:** inventant
- **Past:** inventé
Derivational paradigms vs inflectional paradigms

By contrast, the derivational paradigm of a lexeme L has a hierarchical structure dominated by L: each node in this structure is a lexeme that derives from the nodes that dominate it.

The derivational paradigm of French **INVENTER** ‘invent’
Derivational paradigms vs inflectional paradigms

In the canonical derivational paradigm, each mother-daughter relation is mediated by a single derivational rule.
Derivational paradigms vs inflectional paradigms

The canonical structure of the paradigm of French INVENTER ‘invent’
Derivational paradigms vs inflectional paradigms

But in some derivational paradigms, the mother-daughter relation between two lexemes is seemingly mediated by two rules rather than one.
That is, some derivational paradigms seem to have a “missing link” between base and derivative:

A missing link in the derivational paradigm of WHIMSY

```
HISTORY
HISTORIC
HISTORICAL
WHIMSICAL
-ic rule
-al rule
```

*WHIMSIC
A MISSING LINK is a nonactual lexeme whose stem seemingly participates in defining the morphology of an actual lexeme’s stem.

A missing link in the derivational paradigm of WHIMSY
Should missing links be seen as evidence that the lexicon of a language includes virtual as well as actual lexemes?
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This seems problematic. Do virtual words include all words that are nonactual but well-formed or only a subset those words?
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• The one approach would seem to entail that the lexicon contains more virtual words than actual words;

• the other requires that we invent criteria for deciding which nonactual but well-formed words are virtual and which are not.
A more concrete (and less ontologically suspect) assumption is that where a derivative seems to involve a missing link, that derivative is in fact defined by a conflated rule.
Rule conflation reconciles the mother-daughter pair \textsc{whimsy} – \textsc{whimsical} with the canonical property of rule-based hierarchy.

\textbf{No missing link in the derivational paradigm of \textsc{whimsy}}

\begin{center}
\begin{tikzpicture}
  \node (ic) at (0,0) {\textit{(i)} -\textit{ic} rule};
  \node (al) at (0,-2) {\textit{(ii)} -\textit{al} rule};
  \node (history) at (-3,0) {\textsc{history}};
  \node (historic) at (-3,-2) {\textsc{historic}};
  \node (historical) at (-3,-4) {\textsc{historical}};
  \node (whimsy) at (3,0) {\textsc{whimsy}};
  \node (whimsical) at (3,-2) {\textsc{whimsical}};
  \draw[->] (ic) -- (history);
  \draw[->] (al) -- (historic);
  \draw[->] (whimsy) -- (whimsical);
  \draw[->] (whimsy) -- ([xshift=1cm]ic.north east);\end{tikzpicture}
\end{center}

\texttt{[(ii) © (i)]}
Two important points:
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• The existence of a complex rule conflating rule B with rule A does not, in itself, exclude the possibility that these rules might apply independently, in their unconflated forms. Thus, while the derivational relation between the lexemes WHIMSY and WHIMSICAL is mediated by a conflation of the -al rule with the -ic rule, these two rules nevertheless apply independently in licensing the derivatives HISTORIC and HISTORICAL.
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• The properties of a conflated rule are, in the default case, deducible from the properties of the individual rules that it comprises; nevertheless, a conflated rule does take on the status of an independent rule, and its properties may therefore deviate from the default properties inferrable from its component rules.
Nonmonotonic morphotactics: A rule’s morphotactic properties change in the context of another rule.

- Rule A’s domain of application in the context of rule B
- Rule A’s productivity in the context of rule B
- The content expressed by rule A in the context of rule B
- Rule A’s usefulness in the context of rule B
- The processing of rule A in the context of rule B
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The principle of rule conflation is independently motivated by a variety of phenomena

a. The domain of rule A may depend on whether it applies in combination with rule B.

b. The productivity of rules A and B may depend on whether they apply in combination.

c. The content expressed by the combination of rules A and B may differ from the content of A combined with the content of B.

d. Rule A may be more useful in combination with rule B than it is alone.

e. Words involving the combination of rule A with rule B may be processed faster than words with other rule combinations.

f. Rule A may have two different functions in the context of rule B.
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f. Rule A may have two different functions in the context of rule B.
The domain of rule A may depend on whether it applies in combination with rule B.
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It is reasonable to assume that a derivational rule A maintains the same domain of application no matter what rule applies after it.

Yet, this assumption is widely disconfirmed.
The domain of rule A may depend on whether it applies in combination with rule B.

Some adjectives are defined by the successive application of the two rules, first the -ic rule, then the -al rule.

<table>
<thead>
<tr>
<th>Stem</th>
<th>Adjective in-ic</th>
<th>Adjective in-ic-al</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>history</td>
<td>historic</td>
</tr>
<tr>
<td></td>
<td>cycle</td>
<td>cyclic</td>
</tr>
</tbody>
</table>
The domain of rule A may depend on whether it applies in combination with rule B.

There are also adjectives derived by means of the -ic rule that do not serve as stems for the -al rule.

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<th>Adjective in-ic-al</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>history</td>
<td>historic</td>
<td>historical</td>
</tr>
<tr>
<td>cycle</td>
<td>cyclic</td>
<td>cyclical</td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ion</td>
<td>ionic</td>
<td>*ionical</td>
</tr>
<tr>
<td>base</td>
<td>basic</td>
<td>*basical</td>
</tr>
</tbody>
</table>
The domain of rule A may depend on whether it applies in combination with rule B.

But in the definition of still other words, the application of the -ic rule requires the subsequent application of the -al rule. This third group seems to involve missing links, i.e. a sort of inward conditioning.

**Derivatives in -ic and -ical**

<table>
<thead>
<tr>
<th>Stem</th>
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<th>Adjective in-ic-al</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>history</td>
<td>historic</td>
<td>historical</td>
</tr>
<tr>
<td>cycle</td>
<td>cyclic</td>
<td>cyclical</td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ion</td>
<td>ionic</td>
<td>*ionical</td>
</tr>
<tr>
<td>base</td>
<td>basic</td>
<td>*basical</td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>whimsy</td>
<td>*whimsic (missing link)</td>
<td>whimsical</td>
</tr>
<tr>
<td>nonsense</td>
<td>*nonsensic (missing link)</td>
<td>nonsensical</td>
</tr>
</tbody>
</table>
The domain of rule A may depend on whether it applies in combination with rule B.

This third group is not small:

Some adjective types in -ical with more than 50 tokens in COCA which lack any corresponding adjective in -ic

<table>
<thead>
<tr>
<th>physical</th>
<th>70068</th>
<th>eschatological</th>
<th>489</th>
<th>narratological</th>
<th>236</th>
<th>philological</th>
<th>111</th>
</tr>
</thead>
<tbody>
<tr>
<td>radical</td>
<td>14186</td>
<td>nonsensical</td>
<td>468</td>
<td>farcical</td>
<td>207</td>
<td>pneumatological</td>
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<td>teleological</td>
<td>195</td>
<td>soteriological</td>
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<td>7699</td>
<td>cylindrical</td>
<td>865</td>
<td>etymological</td>
<td>190</td>
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<td>surgical</td>
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<td>nautical</td>
<td>856</td>
<td>ecclesiological</td>
<td>184</td>
<td>ornithological</td>
<td>93</td>
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<td>catechetical</td>
<td>111</td>
<td>ototopical</td>
<td>54</td>
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</table>
The domain of rule A may depend on whether it applies in combination with rule B.

The principle of rule conflation provides an alternative to postulating missing links or inward conditioning in the derivational paradigms of all these words.

This alternative is to say that the domain of the conflated -ical rule includes forms that aren’t in the domain of the simple -ic rule.
The productivity of rules A and B may depend on whether they apply in combination.
The productivity of rules A and B may depend on whether they apply in combination.

It reasonable to assume that the productivity of words involving the joint application of rule A and rule B is in general calculable from the productivity of rule A and that of rule B.

Yet, one can easily find cases in which the joint application of rules A and B has significantly greater productivity than the application of either A or B individually.
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78

*by Gaeta & Ricca’s 2006 variable-corpus approach to the measure of productivity (= the ratio \( x / y \) such that for some fixed number \( y \) and some subcorpus \( S \), \( S \) contains \( y \) tokens exhibiting morphology \( m \) and \( x \) hapax legomena exhibiting \( m \)), here multiplied by 100
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78
Productivity* of the -ation rule in COCA: 1.23

*by Gaeta & Ricca’s 2006 variable-corpus approach to the measure of productivity (= the ratio \(x\) / \(y\) such that for some fixed number \(y\) and some subcorpus \(S\), \(S\) contains \(y\) tokens exhibiting morphology \(m\) and \(x\) hapax legomena exhibiting \(m\)), here multiplied by 100
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78
Productivity* of the -ation rule in COCA: 1.23
Productivity* of -ize and -ation rules applying together: 4.59

*by Gaeta & Ricca’s 2006 variable-corpus approach to the measure of productivity (= the ratio $x/y$ such that for some fixed number $y$ and some subcorpus $S$, $S$ contains $y$ tokens exhibiting morphology $m$ and $x$ hapax legomena exhibiting $m$), here multiplied by 100
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78
Productivity* of the -ation rule in COCA: 1.23
Productivity* of -ize and -ation rules applying together: 4.59

A rule may enhance the applicability of a subsequent rule; in the terminology of Williams (1981), the first rule “potentiates” the second one.
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78
Productivity* of the -ation rule in COCA: 1.23
Productivity* of -ize and -ation rules applying together: 4.59

A rule may enhance the applicability of a subsequent rule; in the terminology of Williams (1981), the first rule “potentiates” the second one.

Here, the -ize rule might be seen as potentiating the -ation rule, since verbs in -ize generally belong to the -ation rule’s domain of application.
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78
Productivity* of the -ation rule in COCA: 1.23
Productivity* of -ize and -ation rules applying together: 4.59

Aronoff (1976) proposes to account for potentiation in the formulation of the potentiated rule, by means of a “positive constraint” stipulating that its domain of application generally includes stems derived by means of the potentiating rule.
In particular, he argues that a word-formation rule has at least two parts:

First, there is a part which specifies the syntactic and semantic characteristics. There will be no disjunction in the specification of these characteristics, and no negation. The semantics of the output of the [word-formation rule] is specified here as a compositional function of the base. Second, there is a series of positive conditions on the morphology of the base. These conditions are associated with productivity and semantic coherence (which are, in a sense, the same thing). (pp. 62f)
The productivity of rules A and B may depend on whether they apply in combination.

Rule of negative un# (Aronoff 1976: 63)

a. \([X]_{\text{Adj}} \rightarrow [\text{un#}[X]_{\text{Adj}}]_{\text{Adj}}\)
   
   *semantics (roughly) un#X = not X*

b. Forms of the base
   1. \(X_v\text{en}\) (where *en* is the marker for past participle)
   2. \(X_v\text{#ing}\)
   3. \(X_v\text{#able}\)
   4. \(X+y\)  
      (worthy)
   5. \(X+ly\)  
      (seemly)
   6. \(X\text{#ful}\)  
      (mindful)
   7. \(X\text{-al}\)  
      (conditional)
   8. \(X\text{#like}\)  
      (warlike)
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78
Productivity* of the -ation rule in COCA: 1.23
Productivity* of -ize and -ation rules applying together: 4.59

On this approach, the formulation of the -ation rule stipulates that verbs in -ize are in general in its domain of application.
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78
Productivity* of the -ation rule in COCA: 1.23
Productivity* of -ize and -ation rules applying together: 4.59

But this same approach can’t account for the fact that the productivity of the -ize rule is also apparently enhanced by the subsequent application of the -ation rule.
The productivity of rules A and B may depend on whether they apply in combination.

Productivity* of the -ize rule in COCA: 3.78
Productivity* of the -ation rule in COCA: 1.23
Productivity* of -ize and -ation rules applying together: 4.59

But this same approach can’t account for the fact that the productivity of the -ize rule is also apparently enhanced by the subsequent application of the -ation rule.

In COCA, this fact is reflected in the existence of nouns in -ization whose corresponding verb in -ize is absent—
The productivity of rules A and B may depend on whether they apply in combination.

Tokens of nouns in -ization in COCA for which forms of the corresponding verb in -ize are absent from the corpus

<table>
<thead>
<tr>
<th>Adjectivalization</th>
<th>1</th>
<th>Bavarianization</th>
<th>7</th>
<th>Cantonization</th>
<th>8</th>
<th>Condo-ization</th>
<th>1</th>
<th>Cyclization</th>
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<td>Capillarization</td>
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<td>Condomization</td>
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<td>2</td>
<td>Zuckerization</td>
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</tbody>
</table>
The productivity of rules A and B may depend on whether they apply in combination.

The -ize rule seems to be subject to a kind of inward conditioning such that in some cases, it is only applicable if the -ation rule applies subsequently.

The enhancement of the -ize rule’s productivity by the -ation rule cannot be portrayed as a positive constraint on the stems to which the -ize rule applies.
The productivity of rules A and B may depend on whether they apply in combination.

The principle of rule conflation allows the conflation of the -ation rule with the -ize rule to have the status of an independent rule whose productivity is in principle independent of that of its component rules taken individually.
The content expressed by the combination of rules A and B may differ from the content of A combined with the content of B.
The content expressed by the combination of rules A and B may differ from the content of A combined with the content of B.

Ordinarily, the content expressed by the application of rules A and B is, in some sense, a function of the content realized by A together with that realized by B.

Yet there are clear cases in which this is not so.
The content expressed by the combination of rules A and B may differ from the content of A combined with the content of B.

Derived adjectives in -istic ← nouns in -ist

Nouns in -ist generally have human reference, denoting specialists in or devotees of X or Xism. Yet, the interpretation of an adjective in -ist-ic generally isn't a function of the class of people denoted by the corresponding noun in -ist.

- a linguistic phenomenon
- a futuristic landscape
- etc.
The content expressed by the combination of rules A and B may differ from the content of A combined with the content of B.

Moreover, there are adjectives in -ist-ic for which there is no corresponding noun in -ist.

**Adjectives in -istic with 8 or more tokens in COCA lacking any corresponding noun in -ist**

<table>
<thead>
<tr>
<th>Adjective</th>
<th>Tokens</th>
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<td>anachronistic</td>
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<td>animalistic</td>
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<td>wholistic</td>
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</table>
The content expressed by the combination of rules A and B may differ from the content of A combined with the content of B.

The principle of rule conflation makes it possible to avoid assuming that these adjectives belong to derivational paradigms that include some missing nominal links.

As an independent rule, the conflation of the -ic rule with the -ist rule deviates from a conflated rule’s default semantics, deriving adjectives whose interpretation is not a function of the interpretation of the corresponding -ist noun (if one even exists).
The content expressed by the combination of rules A and B may differ from the content of A combined with the content of B.

In many cases, the interpretation of adjectives in -istic is very much like that of adjectives in -ic, as though -ist has been bleached of any content.

Cf. the near-synonyms

- cabalistic
- cannibalistic
- narcissistic
- realistic
- synergistic

- esoteric
- anthropophagic
- egocentric
- pragmatic
- synergic
Rule A may be more useful in combination with rule B than it is alone.
Rule A may be more useful in combination with rule B than it is alone.

It's reasonable to assume that a particular class of derivational bases is just as useful as any class of derivatives to which it gives rise.

Yet, evidence abounds of derivatives that fail to conform to this assumption. Recall—
**Rule A may be more useful in combination with rule B than it is alone.**

**Tokens of nouns in -ization in COCA for which forms of the corresponding verb in -ize are absent from the corpus**

<table>
<thead>
<tr>
<th>adjectivalization</th>
<th>amateurization</th>
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</table>
Rule A may be more useful in combination with rule B than it is alone.

Nouns in -ization with 10 or more tokens in COCA which outnumber the corresponding verb in -ize by at least 10 to 1

(N = -ization noun tokens; V = -ize verb tokens)

<table>
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<table>
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</table>
Rule A may be more useful in combination with rule B than it is alone.

The disparity of these token frequencies suggests that the nouns in these tables are, in some sense, more useful than the corresponding verbs.

Usefulness is a multifaceted concept. First, word X may be more useful than word Y with respect to its semantic content—that is, the denotation of X may be more important than that of Y.
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The noun Cajunization appears ten times in COCA, the verb Cajunize not at all; by contrast, the noun pasteurization appears 123 times, and forms of the verb pasteurize appear 122 times.
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The noun *Cajunization* appears ten times in COCA, the verb *Cajunize* not at all; by contrast, the noun *pasteurization* appears 123 times, and forms of the verb *pasteurize* appear 122 times. This difference likely has a semantic explanation: the meaning of *pasteurization* is based a well-defined process, but the meaning of *Cajunization* is based on the well-defined outcome of a vague and heterogenous set of factors.
Rule A may be more useful in combination with rule B than it is alone.

Second, word X may be more useful than word Y with respect to the lexicon, since word Y might be blocked by an existing lexical item while word X is not.

For instance, nominalizations in -ic-ity generally correspond to adjectives in -ic (authenticity, elasticity, specificity, toxicity, etc.) but multiplicity and simplicity are exceptions; this is presumably because *multiplic and *simplic are lexically blocked by the existence of multiple and simple.
Rule A may be more useful in combination with rule B than it is alone.

Third, word X may be more useful than word Y because it better satisfies an output condition.

For instance, *Hermanator* (a blend of *Herman*—media personality Herman Cain—and *Terminator*) has six tokens in COCA, but no token of any form of the putative verb *Hermanate*. *Hermanator* works well as a blend of *Terminator*, but *Hermanate* does not.
Rule A may be more useful in combination with rule B than it is alone.

The principle of rule conflation makes it possible to avoid assuming that nouns like *Cajunization, *simplicity, and *Hermanator occupy derivational paradigms in which *Cajunize, *simplic and *Hermanate appear as missing links.

In each case, this principle makes it possible to assume that a conflated rule [B © A] defines derivatives that are more useful than those defined by rule A.
Words involving the combination of rule A with rule B may be processed faster than words with other rule combinations.
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Experimental evidence shows that formulaic combinations of words are stored and accessed as wholes and are therefore processed more quickly than nonformulaic word combinations that are otherwise comparable (Wray 2002; Underwood et al. 2004; Conklin & Schmitt 2012).
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Various factors contribute to formulaicity: formulaic word combinations
• are very frequent (down the street, just what I wanted),
• are idiomatic (over the hill, sure as shooting) or
• are simply the conventionally accepted way of expressing something (please accept our condolences, take a walk).
Words involving the combination of rule A with rule B may be processed faster than words with other rule combinations.

Research on formulaic language has mostly focused on formulaic combinations of words. But logically, combinations of affixes could also become formulaic (Frauenfelder & Schreuder 1992: 180).
Words involving the combination of rule A with rule B may be processed faster than words with other rule combinations.

Durrant (2013) shows that in Turkish, certain affixes appear adjacently with very high frequency, and are therefore good candidates for formulaicity. For example, 99.74% of the tokens of the 3rd-person singular possessive suffix -sIn in his sample appeared in one of three combinations:

- dIk- sIn  [subordinator – 3sg possessive]
- mA sIn  [subordinator – 3sg possessive]
- yAcAK sIn  [subordinator – 3sg possessive]
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- dİk- sİn [subordinator – 3sg possessive]
- mA sİn [subordinator – 3sg possessive]
- yAcaK sİn [subordinator – 3sg possessive]

Moreover, one or another of these three combinations appeared in 20.51% of all of the verb-form tokens in the sample.

If frequency contributes to formulaicity, combinations of these sorts should become formulaic.
Words involving the combination of rule A with rule B may be processed faster than words with other rule combinations.

Bilgin (2016) confirmed this experimentally.

In a word recognition task, Bilgin presented subjects with inflected nouns, some with high-frequency suffix sequences, e.g.

\[ \text{gergedan-laş-tur-dı} \]
\[ \text{rhino-BECOME-CAUS-PAST} \]
\[ \text{caused to become a rhino} \]

—and others with low-frequency suffix sequences, e.g.

\[ \text{antilop-laş-tur-ip} \]
\[ \text{antelope-BECOME-CAUS-GERUND} \]
\[ \text{having caused to become an antelope,} \]

controlling for the relative frequency of noun stems, of stem+suffix sequence combinations, and of the individual suffixes.
Words involving the combination of rule A with rule B may be processed faster than words with other rule combinations.

Subjects’ response times were faster for high-frequency suffix sequences than for low-frequency sequences.

This suggests that the high-frequency sequences are processed as stored units rather than by the successive retrieval of individual suffixes.
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Subjects’ response times were faster for high-frequency suffix sequences than for low-frequency sequences.

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Rule conflation is precisely the principle that allows high-frequency affix combinations to be stored and accessed as units.
Rule A may have two different functions in the context of rule B.
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English derivational morphology exhibits a striking pattern of polyfunctionality involving the rules that introduce the suffixes -ion, -ation and -ate.
The history of *-ion* and *-ation*

Latin nominalization:
perfect passive participial stem + *-iō(n) = third-declension noun

<table>
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<tr>
<th></th>
<th>Declension of Latin <em>incīsiō</em></th>
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<th>Declension of Latin <em>aliēnātiō</em></th>
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<tr>
<td></td>
<td>‘incision’</td>
<td>‘separation’</td>
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<td><em>aliēnātiōnēs</em></td>
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</table>
Rule A may have two different functions in the context of rule B.

The history of -ate

Many Latin verbs were first borrowed into English in the perfect passive participial form.

This subsequently served as the basis for their integration into the system of English verb morphology (Marchand 1966: 199ff). Every form in the paradigms of English *incise* and *alienate* reflect this participial origin:

- *incīs-*: perfect passive participial stem of *incīdere* ‘to cut open’
- *aliēnāt-*: perfect passive participial stem of *aliēnāre* ‘to transfer’
Rule A may have two different functions in the context of rule B.

The history of -ate

Verbs from the Latin first conjugation therefore turn up in English with a final -ate. This was subsequently reanalyzed as a verb-deriving suffix.
Rule A may have two different functions in the context of rule B.

Some -ation nouns have parallel -ate verbs

<table>
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<th>Noun or Adjective</th>
<th>-ate verb</th>
<th>-ion noun</th>
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<td>vaccine</td>
<td>vaccin-ate</td>
<td>vaccin-at-ion</td>
</tr>
<tr>
<td>valid</td>
<td>valid-ate</td>
<td>valid-at-ion</td>
</tr>
</tbody>
</table>

Because verbs in -ate often existed alongside nouns in -ation —originally the nominalizations of first-conjugation verbs—the suffix -ation in these nouns was in turn reanalyzed as involving the verb-forming suffix -ate followed by the nominalizing suffix -ion.
Rule A may have two different functions in the context of rule B.

But there were nouns in *-ation that did not have parallel verbs in *-ate. Many were nominalizations whose verbal counterparts were borrowed from Latin (or Old French) in their root form rather than in their perfect passive participial form.

E.g. the noun *accusation* (Latin accusātiō, acc. accusātiōnem) corresponds to the verb *accuse* (Latin accusāre) rather than to *accusate.*

<table>
<thead>
<tr>
<th>Verb</th>
<th>*-ate verb</th>
<th>-ation noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>accuse</td>
<td>*accus-ate</td>
<td>accus-ation</td>
</tr>
<tr>
<td>cease</td>
<td>*cess-ate</td>
<td>cess-ation</td>
</tr>
<tr>
<td>consult</td>
<td>*consult-ate</td>
<td>consult-ation</td>
</tr>
<tr>
<td>declare</td>
<td>*declar-ate</td>
<td>declar-ation</td>
</tr>
<tr>
<td>deport</td>
<td>*deport-ate</td>
<td>deport-ation</td>
</tr>
<tr>
<td>evoke</td>
<td>*evoc-ate</td>
<td>evoc-ation</td>
</tr>
<tr>
<td>examine</td>
<td>*examin-ate</td>
<td>examin-ation</td>
</tr>
<tr>
<td>expect</td>
<td>*expect-ate</td>
<td>expect-ation</td>
</tr>
<tr>
<td>form</td>
<td>*form-ate</td>
<td>form-ation</td>
</tr>
<tr>
<td>manifest</td>
<td>*manifest-ate</td>
<td>manifest-ation</td>
</tr>
<tr>
<td>represent</td>
<td>*represent-ate</td>
<td>represent-ation</td>
</tr>
<tr>
<td>reveal</td>
<td>*revel-ate</td>
<td>revel-ation</td>
</tr>
<tr>
<td>usurp</td>
<td>*usurp-ate</td>
<td>usurp-ation</td>
</tr>
<tr>
<td>visit</td>
<td>*visit-ate</td>
<td>visit-ation</td>
</tr>
</tbody>
</table>
Rule A may have two different functions in the context of rule B.

This difference has led some to assume that the morphology of nouns like *validation* is different from that of nouns like *accusation*—that *validation* is derived by means of two rules while *accusation* is derived by means of a single rule.

a. -ate rule -ion rule
   
   *valid* $\rightarrow$ *validate* $\rightarrow$ *validation*

b. -ation rule

   *accuse* $\rightarrow$ *accusation*
Rule A may have two different functions in the context of rule B.

Moreover, some have argued that the suffixes -ion and -ation are allomorphs.

Aronoff (1976: 104), for example, proposes the following rule to derive one from the other.

\[ +\text{Ation} \to \{ +\text{ion} \} /X \{ +\text{cor} \} = , \]

where \( X \alpha \text{cor} \) is one of a set of specified latinate roots.
Rule A may have two different functions in the context of rule B.

But could validation and accusation actually be alike in their morphology?

From a purely etymological point of view, they are.

And although modern English -at- serves a function in validation that it doesn’t serve in accusation, the same can be said of -ist in futurist and futuristic.

Moreover, there are at least three considerations that suggest that -at- is the same formative in accusation as in validation.
Rule A may have two different functions in the context of rule B.

First, some English nominalizations in -ation for which verbal counterparts in -ate were never borrowed acquired them subsequently by back-formation.
Rule A may have two different functions in the context of rule B.

Verbs in *-ate* likely derived from nouns in *-ation* by back-formation

<table>
<thead>
<tr>
<th>Noun in <em>-ation</em></th>
<th>1st attestation</th>
<th>Verb in <em>-ate</em></th>
<th>1st attestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>constipation</td>
<td>c1400</td>
<td>constipate</td>
<td>1541</td>
</tr>
<tr>
<td>cremation</td>
<td>1623</td>
<td>cremate</td>
<td>1874</td>
</tr>
<tr>
<td>dedication</td>
<td>1382</td>
<td>dedicate</td>
<td>1530</td>
</tr>
<tr>
<td>equation</td>
<td>1393</td>
<td>equate</td>
<td>1530</td>
</tr>
<tr>
<td>granulation</td>
<td>1617</td>
<td>granulate</td>
<td>1666</td>
</tr>
<tr>
<td>incarnation</td>
<td>1297</td>
<td>incarnate</td>
<td>1533</td>
</tr>
<tr>
<td>mitigation</td>
<td>1382</td>
<td>mitigate</td>
<td>1425</td>
</tr>
<tr>
<td>mutation</td>
<td>1398</td>
<td>mutate</td>
<td>1796</td>
</tr>
<tr>
<td>oration</td>
<td>c1440</td>
<td>orate</td>
<td>c1600</td>
</tr>
<tr>
<td>pagination</td>
<td>1794</td>
<td>paginate</td>
<td>1858</td>
</tr>
<tr>
<td>termination</td>
<td>1395</td>
<td>terminate</td>
<td>1425</td>
</tr>
</tbody>
</table>
Rule A may have two different functions in the context of rule B.

Second, the -at- in -ate and the -at- in -ation are mutually exclusive. That is, we don’t find nominalizations such as the following, which result from applying the -ation rule to a verb in -ate.

*alienatation
*salivatation
*validatation
**Rule A may have two different functions in the context of rule B.**

Third, *-at-* appears with suffixes other than *-ion*. The pattern in Row (a) below is paralleled by those in Rows (b)–(d).

The parallel morphology of *-ion, -ive, -or and -ory*

<table>
<thead>
<tr>
<th></th>
<th>without <em>-at-</em></th>
<th>with <em>-at-</em></th>
<th>corresponding verb in <em>-ate?</em></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>(a) Nouns in <em>-ion</em></td>
<td>rebellion</td>
<td>hyphenation</td>
<td>hyphenate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>explanation</td>
<td></td>
</tr>
<tr>
<td>(b) Adjectives in <em>-ive</em></td>
<td>explosive</td>
<td>operative</td>
<td>operate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>conservative</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*conservate</td>
</tr>
<tr>
<td>(c) Nouns in <em>-or</em></td>
<td>governor</td>
<td>activator</td>
<td>activate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>commentator</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*commentate</td>
</tr>
<tr>
<td>(d) Adjectives in <em>-ory</em></td>
<td>sensory</td>
<td>obligatory</td>
<td>obligate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>explanatory</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*explanate</td>
</tr>
</tbody>
</table>
Rule A may have two different functions in the context of rule B.

The identification of -at- as the same suffix in all four of these classes is independently motivated in at least two ways.
Rule A may have two different functions in the context of rule B.

(i) Many verbs ending in -(i)fy have an alternate stem ending in -(i)fic whose use is conditioned by certain suffixes.

Vowel-initial suffixes don’t always condition this alternation (signifier, pacifist, classifiable), but it is invariably conditioned by the suffixes -ation, -ative, -ator and -atory:

\[
\begin{align*}
\text{simplify} & \rightarrow \text{simplific-at-ion} \\
\text{signify} & \rightarrow \text{signific-at-ive} \\
\text{purify} & \rightarrow \text{purific-at-or} \\
\text{classify} & \rightarrow \text{classific-at-ory}
\end{align*}
\]

This fact seems coincidental unless one assumes that the alternation is conditioned by the suffix -at- and that this is a shared component of each of -ation, -ative, -ator and -atory.
Rule A may have two different functions in the context of rule B.

(ii) Some derivatives in -ation, -ative, -ator and -atory derive from a verb in -ate, while others do not. Whether or not they do, they exhibit the same accentual patterns:

### Accentuation of -ation, -ative, -ator and -atory

<table>
<thead>
<tr>
<th>suffix-initial</th>
<th>stem-final</th>
<th>stem-penultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>-ation valid-átion (válidate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>explan-átion (*explanate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-ative</td>
<td>interróg-ative (interrogate)</td>
<td>óper-ative (óperate)</td>
</tr>
<tr>
<td>consér-v-ative (*conservate)</td>
<td>signífic-ative (*significate)</td>
<td></td>
</tr>
<tr>
<td>-ator cre-átor (créáte)</td>
<td>cúr-ator (cúrate)</td>
<td>áctiv-ator (áctivate)</td>
</tr>
<tr>
<td>lev-átor¹ (*levate)</td>
<td>idól-ator (*idolate)</td>
<td>cómment-ator (*commentate)</td>
</tr>
<tr>
<td>-atory</td>
<td>compéns-atory (cómpensate)</td>
<td>discrímín-atory (discrímírate)</td>
</tr>
<tr>
<td>explán-atory (*explanate)</td>
<td>impróvis-atory (*improvisate)</td>
<td></td>
</tr>
</tbody>
</table>

1. a muscle that raises a body part (med.)
Rule A may have two different functions in the context of rule B.

This suggests that they are alike in their morphology:

(a)  hyphen-at-ion
     accus-at-ion
(b)  ulcer-at-ive
     conserv-at-ive
(c)  activ-at-or
     comment-at-or
(d)  respir-at-ory
     accus-at-ory
Rule A may have two different functions in the context of rule B.

This suggests that they are alike in their morphology:

(a) \textit{hyphen-at-ion}  \hspace{2cm}  (b) \textit{ulcer-at-ive}  \\
\textit{accus-at-ion} \hspace{2cm} \textit{conserv-at-ive}  \\
(c) \textit{activ-at-or}  \hspace{2cm}  (d) \textit{respir-at-ory}  \\
\textit{comment-at-or} \hspace{2cm} \textit{accus-at-ory}

Despite this likeness of morphological form, the -\textit{at}- rule is clearly performing two functions here:
Rule A may have two different functions in the context of rule B.

This suggests that they are alike in their morphology:

(a) hyphen-at-ion
    accus-at-ion
(b) ulcer-at-ive
    conserv-at-ive
(c) activ-at-or
    comment-at-or
(d) respir-at-ory
    accus-at-ory

Despite this likeness of morphological form, the -at- rule is clearly performing two functions here:
• in the derivation of *hyphenation*, *ulcerative*, *activator* and *respiratory*, it serves as a verb-deriving rule whose output is nominalized by the -ion and -or rules and adjectivalized by the -ive and -ory rules;
Rule A may have two different functions in the context of rule B.

This suggests that they are alike in their morphology:

(a) hyphen-at-ion  (b) ulcer-at-ive
    accus-at-ion       conserv-at-ive
(c) activ-at-or     (d) respir-at-ory
    comment-at-or  accus-at-ory

Despite this likeness of morphological form, the -at- rule is clearly performing two functions here:
• in the derivation of hyphenation, ulcerative, activator and respiratory, it serves as a verb-deriving rule whose output is nominalized by the -ion and -or rules and adjectivalized by the -ive and -ory rules;
• in the derivation of accusation, conservative, commentator and accusatory, by contrast, it joins with the -ion and -or rules to form rules of deverbal nominalization and with the -ive and -ory rules to form rules of deverbal adjectivalization.
Rule A may have two different functions in the context of rule B.

Rule conflation affords a simple account of the dual function of -at- in English nominalizations in -ation. This account has three main characteristics.

First, it distinguishes two subclasses of verbs:

**Class I:** Verbs that nominalize by means of -ion, including verbs in -ate

(Examples: rebel, repulse, collect, hyphenate, validate)

**Class II:** Verbs that nominalize by means of -ation and lack any corresponding verb in -ate

(Examples: accuse, examine, expect, explain, conserve)
Rule A may have two different functions in the context of rule B.

Second, it has simple rules that introduce the basic derivational affixes. Each rule includes the specification of a stem operation, a domain of application, and the category of the resulting derivative. The verbs defined by rule (ate) belong to Class I, and rules (ion)–(ory) have verbs of Class I as their domain of application.

### Basic rules of derivation for a fragment of English

<table>
<thead>
<tr>
<th>Rule name</th>
<th>Stem operation</th>
<th>Domain</th>
<th>Range</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ate)</td>
<td>$X \to Xate$</td>
<td>N or A</td>
<td>V, Class I</td>
<td>hyphen $\to$ hyphenate, valid $\to$ validate</td>
</tr>
<tr>
<td>(ion)</td>
<td>$X \to Xion$</td>
<td>V, Class I</td>
<td>N</td>
<td>rebel $\to$ rebellion</td>
</tr>
<tr>
<td>(ive)</td>
<td>$X \to Xive$</td>
<td>V, Class I</td>
<td>A</td>
<td>repulse $\to$ repulsive</td>
</tr>
<tr>
<td>(or)</td>
<td>$X \to Xor$</td>
<td>V, Class I</td>
<td>N</td>
<td>govern $\to$ governor</td>
</tr>
<tr>
<td>(ory)</td>
<td>$X \to Xory$</td>
<td>V, Class I</td>
<td>A</td>
<td>sense $\to$ sensory</td>
</tr>
</tbody>
</table>
Rule A may have two different functions in the context of rule B.

Third, the model specifies how the basic rules conflate. The rule below licenses the conflation of each of rules (ion)–(ory) with rule (ate).

In the default case, a conflated rule [B © A] has the same domain of application as A; but the conflated rules defined here deviate from this default pattern, since their domain of application consists of verbs belonging to Class II (rather than nouns and adjectives).

For each rule \( R \in \{ (\text{ion}), (\text{ive}), (\text{or}), (\text{ory}) \} \), \([R \odot (\text{ate})]\) is a rule whose domain is \([V, \text{Class II}]\).

Examples:  
\[
\begin{align*}
[(\text{ion}) \odot (\text{ate})] & : \quad \text{accuse} \rightarrow \text{accus-at-ion}
\end{align*}
\]
\[
\begin{align*}
[(\text{ive}) \odot (\text{ate})] & : \quad \text{conserve} \rightarrow \text{conserv-at-ive}
\end{align*}
\]
\[
\begin{align*}
[(\text{or}) \odot (\text{ate})] & : \quad \text{comment} \rightarrow \text{comment-at-or}
\end{align*}
\]
\[
\begin{align*}
[(\text{ory}) \odot (\text{ate})] & : \quad \text{accuse} \rightarrow \text{accus-at-ory}
\end{align*}
\]
Rule A may have two different functions in the context of rule B.

Derivational paradigms defined by means of these rules do not have missing links such as *ACCUSATE and are, to that extent, canonical with respect to the property of rule-based hierarchy.

Branches in the derivational paradigms of REBEL, VALID, and ACCUSE

\[
\begin{align*}
\text{REBEL} & \quad \text{VALIDATE} \\
(\text{ion}) & \quad (\text{ate}) & \quad [(\text{ion}) \, \&\, (\text{ate})] \\
\text{REBELLION} & \quad \text{VALIDATION} & \quad \text{ACCUSE} & \quad \text{ACCUSATION}
\end{align*}
\]
Rule A may have two different functions in the context of rule B.

Here, I have focused on the dual function of the -\textit{ate} rule in the context of the -\textit{ion} rule. But other rules also seem to exhibit this sort of dual function.
Rule A may have two different functions in the context of rule B.

Here, I have focused on the dual function of the -ate rule in the context of the -ion rule. But other rules also seem to exhibit this sort of dual function.

**Action nominalizations of eight English verbs**

<table>
<thead>
<tr>
<th>Verb</th>
<th>-ion</th>
<th>-ation</th>
<th>-tion</th>
<th>-ition</th>
</tr>
</thead>
<tbody>
<tr>
<td>commune</td>
<td>commun-ion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>educate</td>
<td>educat-ion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>present</td>
<td></td>
<td>present-ation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>realize</td>
<td></td>
<td>realiz-ation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>intervene</td>
<td></td>
<td></td>
<td>interven-tion</td>
<td></td>
</tr>
<tr>
<td>resume</td>
<td></td>
<td></td>
<td>resump-tion</td>
<td></td>
</tr>
<tr>
<td>repeat</td>
<td></td>
<td></td>
<td></td>
<td>repet-ition</td>
</tr>
<tr>
<td>expose</td>
<td></td>
<td></td>
<td></td>
<td>expos-ition</td>
</tr>
</tbody>
</table>
**Rule A may have two different functions in the context of rule B.**

Here, I have focused on the dual function of the *-ate* rule in the context of the *-ion* rule. But other rules also seem to exhibit this sort of dual function.

### Three parallel patterns of rule conflation in English nominalizations

<table>
<thead>
<tr>
<th>Rules</th>
<th>Derivations</th>
<th>Example</th>
<th>Missing link?</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. -<em>ate</em> rule, -<em>ion</em> rule conflated -<em>at-ion</em> rule</td>
<td>$A \rightarrow V \rightarrow \text{action N}$</td>
<td><em>valid</em> → <em>validate</em> → <em>validation</em></td>
<td><em>accusate</em></td>
</tr>
<tr>
<td>b. -<em>t</em> rule, -<em>ion</em> rule conflated -<em>t-ion</em> rule</td>
<td>$V \rightarrow \text{action N}$</td>
<td><em>accuse</em> → <em>accusation</em></td>
<td><em>seduct</em></td>
</tr>
<tr>
<td>c. -<em>ite</em> rule, -<em>ion</em> rule conflated -<em>it-ion</em> rule</td>
<td>$V \rightarrow A \rightarrow \text{action N}$</td>
<td><em>define</em> → <em>definite</em> → <em>definition</em></td>
<td><em>addite</em></td>
</tr>
</tbody>
</table>
A great deal of work in morphology has been dedicated to explaining form/content mismatches, including such mismatches as

- syncretism
- deponency
- morphomic categories
- overabundance
- underdetermination

etc.
Conclusion

The evidence discussed here reveals another domain of form/content mismatch, that of morphological rules that take on unpredicted properties when they apply together.

The principle of rule conflation affords a formal model of this sort of mismatch, one in which the conflation \([B \odot A]\)
- has a domain different from that of A
- is more productive than A or B
- expresses content that is not directly deducible from that of rules A and B
- is more useful than rule A on its own
- is processed more quickly than other rule combinations
- allows rule A to function in more than one way in the context of rule B.