# LIN333 Morphological Patterns in Language

Productivity

## Week 3
## Decomposition

# What is decomposition?

Another way of thinking about productivity is to ask, to what extent do speakers recognize a word as being morphologically complex? I.e. to what extent do they **decompose** a (ostensibly) morphologically complex form into subparts?

Compare:

SUCCESS-FUL (relatively **transparent**, compositional)
SUCCESS-OR (relatively **opaque**, non-compositional)

An important body of work in **psycholinguistics** has addressed these questions.

We'll review a few findings, with the goal of giving you a sense of some considerations that have not yet come up in our discussions of morphological decomposition.

# Discussion in Haspelmath and Sims

In 6.4.1 Haspelmath and Sims have a general discussion of processing restrictions on productivity. Key points are:

- All simple words, but also many complex words, are stored in the lexicon. In addition, some complex words are decomposed "and only their component morphemes are stored" (p.123).
- The difference between decomposed and non-decomposed forms affects **memory strength**. Memory is strengthened by accessing the form in the lexicon. If a form mostly (or only ever) occurs as part of a stored word, it will have poor memory strength. This will inhibit speaker capacity to decompose (novel) complex words containing that form.

# Frequency

An important factor determining whether words are decomposed or stored whole that is noted by H&S is **frequency**.

- If a complex form is less frequent than its base then the complex form is likely to be decomposed.

  (1) *modernity* is less frequent than *modern* and therefore likely to be decomposed (high frequency of *modern* makes this efficient)

- If a complex form is more frequent than its base then it is likely to be stored whole.

  (2) *security* has higher frequency than *secure* and therefore is likely to be stored whole.

H&S note we can ask about **parsing ratio** for particular affixes. Note that *-ity* is more likely to be stored than decomposed on this approach.

(6.10)

| affix | parsing ratio | productivity ($100 \times \mathcal{P}$) |
|---|---|---|
| *-ence* | 0.1 | 0.0 |
| *-ity* | 0.17 | 0.1 |
| *-ate* | 0.31 | 0.3 |
| *-dom* | 0.5 | 0.2 |
| *-ness* | 0.51 | 0.8 |
| *-ish* | 0.58 | 0.5 |
| *-like* | 0.68 | 38.1 |
| *-proof* | 0.8 | 5.5 |
| *-less* | 0.86 | 1.7 |

(Hay and Baayen 2002: 233–5)

# How do we find independent evidence for decomposition?

# Lexical decision tasks

Much of what is known about morphological processing comes from experiments where participants perform **lexical decision tasks**.

- Participants judge the lexical status of a string presented as the **target** from (i.e., they make a “lexical decision” )
- what gets measured and analyzed is the correctness of the lexical decision, and also the response time (how long it takes to make a decision). Response time is usually interpreted as proxy for how long it takes to access a form (or related forms) in the lexicon.

# Priming

Response times can be facilitated through **priming effects** where, before being presented with the target word, participants shown a different word, known as a **prime**, that may or may not be related to the target word in some way (meaning, form, etc).

Psycholinguists use priming effects to probe relatedness between lexical elements.

# Masked priming

Priming effects can be obtained even if the participant is unaware that they have been presented with the prime. In a **masked priming** design, the prime is presented so quickly that the participant is not consciously processed. This can eliminate certain confounds, and is also thought to enable a window into early processing.

# Processing form vs meaning

One body of work suggests that lexical processing occurs in two stages (here assume visual word recognition):

1. Form based (orthographic) decomposition occurs early during visual word recognition
2. semantic interpretation of the decomposed constituents at a later stage

This suggests that when we ask about decomposition of productive vs unproductive (i.e. transparent vs non-transparent) forms, we have to differentiate between morphological decomposition (meaning decomposition of form only) and semantic decomposition.

Evidence:

primes: UNCOVER and RECOVER (morphologically well structured and decomposable)

target: COVER

both primes facilitate the recognition of the target comparably, regardless of whether they share both meaning and form with it, or form but little meaning.

Note that this predicts there should be no difference (at early stage) between truly morphologically related primes vs. morphologically unrelated primes. Consider the following target-prime pairs:

CORN-CORNER

BROTH-BROTHEL

Indeed, many studies have found no difference between these and morphologically-related prime-target pairs (though there are some conflicting results).

Note:

- CORNER can be exhaustively decomposed (both CORN and -er) are attested, but CORNER is not derived from CORN
- BROTHEL can only partially decompose (BROTH is attested, but -el is not) and BROTHEL is not derived from BROTH

# Neighbourhood density

**Neighbourhood density** is a measure of similarity of forms. Neighbours are formed by changing one letter, e.g. CORN, BORN

The number of "neighbors" a form has can influence priming: the bigger the neighbourhood, the slower response times.

- The more neighbours a prime has, the smaller the facilitation effect.
- The fewer neighbours a target has, the greater the facilitation effect.
  - e.g. FORM with many neighbors (e.g., FORK, FOAM, FIRM, DORM) will show less responsiveness to primes than DRESS with fewer neighbours (e.g., PRESS, CRESS)

Effects of neighbourhood density may help explain discrepancies between processing finds across languages.

For example, priming effects for both morphological form and semantics have been easier to document for English than for Hebrew, a language with rich morphology (and hence greater target neighbourhood density).

# References

Haspelmath, Martin, & Andrea D. Sims. 2010. Understanding Morphology 2nd ed. London: Hodder Education. Chapters 1-2, 6, 11, [pp 1-30, 114-132, 234-263].

Milin, P., Smolka, E., & Feldman, L. B. (2017). Models of lexical access and morphological processing. The handbook of psycholinguistics, 240-268.