The (de)composition of Words? Morphological Evidence from Aphasiology

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Based on:

processing of sentences versus processing of (complex) words

Sentences are composed during language processing. Hence, we don't know all the sentences we speak, read or hear!

But if we do so for sentences, what do we do with complex words?

› is the processing of complex words comparable to the processing of sentences?

Are complex words stored in long-term memory as whole-word units or are they ad hoc composed?

How are related complex words represented with respect to one another?

Are the meanings of words identified by taking apart independently stored morpheme representations (decomposition)?

What levels of representation (semantics, syntax, morphology etc.) are critically engaged in the representation and processing of complex words?

Psycholinguistic theories

› whole-word theories (e.g. Bybee, 1988)
  all lexical information is specified for each lexical entry, no share representation for morphologically related words at any level

› multi-level network theories (e.g. Drews & Zwitserlood, 1995)
  shared morphological representation may exists at a form-independent lexical level

› decompositional theorie (e.g. Allen & Badecker, 1999)
  shared representation may be expressed both at the form-level and at form-independent levels for some related complex words, shared representation may be expressed at the morpho-semantic/syntactic level

Psycholinguistic evidence

› all kind of paradigms and studies, problem:

› unimpaired people perform at or near ceiling in language processing tasks

› unimpaired langauge users are typically fast, accurate, and may use any number of cognitive processing mechanisms simultaneously

› differences between „normal“ performances are very small!

EVIDENCE FROM NEUROPSYCHOLOGY

What does the impaired language processing of neurological patients tell us about the „unimpaired“ linguistic system???
Aphasia

Aphasia is an acquired language problem caused by damage to the brain in the hemisphere responsible for communication (left).

Causes:
- stroke
- any disease or injury that affects the language areas of the brain
- accidents

Affects:
- Production
- Perception
  ▪ many different patterns

Two major distinctions

▪ Broca aphasia:
  non-fluent, telegramm-style, often omission/substitution of affixes, „asymptactical“
  ▪ agrammatic speech
e.g. One time long ago... Cinderella... Mother and one two sister... pants... shoes

▪ Wernicke aphasia:
  fluent, syntactical, „asemantical“
  ▪ paragrammatic speech
e.g. In ancient times we go through Cinderella upstairs in the attic and we have the mopping and the baking...

Agrammatism

▪ affixes often omitted or substituted
  e.g. want versus wants
  ▪ why?
  Problem:
  patients make many different errors, the exact cause is hard to detect
  ▪ is it phonology:
    the stemform is more frequent, i.e. earlier/easier accessed
  ▪ is it semantics:
    the uninflected form is semantically less complex
  ▪ is it morphology:
    deficit in the representation and(de)composition

Morphological paraphasia

▪ Case studies:
  Badecker & Caramazza (1991)
  S.
  ▪ acquired lexical output impairment on speech, reading and repetition
  ▪ Reading
    ▪ affixed words more difficult than monomorphic homophones; errors are morphological
e.g. bowed vs. bowd ▪ error = bowling
  ▪ Spontaneous speech:
    ▪ illegal combinations of morphemes
    e.g. poorless
  ▪ Elicited speech:
    ▪ Morphological neologisms
    e.g. He’s really knawling over me!

Acquired dysgraphic performance

Badecker, Rapp and Caramazza (1996)
T.
  difficulties to spell words

▪ difficulties retrieving stems, but not affixes, from the orthographic output lexicon
e.g. census ≠ sensis
▪ difficulties only on stems not on affixes:
e.g. surfed ≠ sourfed but not surf
  ▫ this pattern can only be explained when the affixes are stored as apart morphological items
  ▫ it cannot be part of a whole-word representation!
  ▪ DECOMPOSITION!

Complex words

▪ orthographic word forms are retrieved from the lexicon [...] in morpheme-sized units.
  Badecker, Hillis, & Caramazza (1990)
D.
  dysgraphic patient
  (affects the amount of orthographic material that can be kept in mind)

  ▪ Produced fewer errors on morphologically complex targets than on matched mono-morphemic controls.
  ▪ Probability of producing an error increased toward the end of a morphemic unit, and then dropped to baseline levels at the beginning of the second morpheme.
  ▪ complex word neologisms: non-existent bases with real affixes.
Inflection vs Derivation

Important factors for production by impaired language users:
- regularity, transparency, and productivity
  - inflection - derivation

however:
- inflection  
  create word variants conform functions in the sentence
- derivation  
  alter the lexical category or its basic meaning

Miceli & Caramazza (1988)

F. morphological paraphasia
- Less errors on derivations (3.7%) vs. inflections (96.3%)
- there must be some difference (semantical?)

Morphological Representation

- Morphologically regular complex words
  - (walk - walked | dark - darkness)
  - [WALK + past]

- Morphologically irregular complex words
  - (teach - taught | sane - sanity)

Irregularities on the semantic and morphosyntactic level has no phonological/orthographical representation
but also: [TEACH + past]

EVIDENCE

- S. disrupted walk + ed and left taught intact
- morphological decomposition
- morphological impairment

- F. disrupted both
  - [walk + past] and [teach + past]
  - semantical impairment

Summary and Conclusion

- Many different patterns
- No clear evidence for one or the other
- Highly modular system
- Highly interacting system
- Impairment might makes its own substitutes

References: