A Bathtub by Any Other Name:
the Reduction of German Compounds in Predictive Contexts

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Shorter vs. longer referring gexpressions

- **He** sold me some strawberries yesterday
- **Tom** sold me some strawberries yesterday
- **The grocer / greengrocer** sold me some strawberries yesterday

What drives the choice of referring expression?
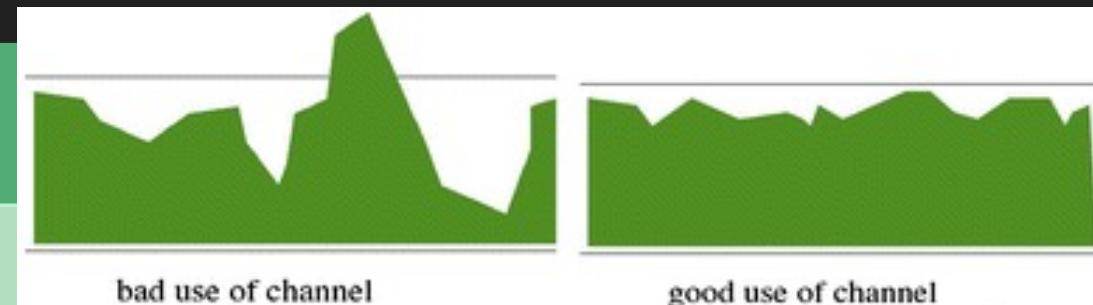

referent

Referent predictability and length of referring expression

○ The **grocer / greengrocer** sold me some strawberries yesterday

shorter encodings are favored in more predictable contexts

Uniform Information Density Hypothesis (UID, Levy & Jaeger 2007):

- tendency to **distribute information** over a message in a **uniform way** for optimal information transmission
- given two **equivalent encodings** which can be used interchangeably, speakers would choose the **shorter one** in contexts where the referent is **more predictable**

bad use of channel   good use of channel

Shorter vs. longer word forms in English

[Supportive context]
Susan was very bad at algebra, so she hated…

[Neutral context]
Susan introduced herself to me as someone who loved…

67% short forms

math / mathematics

56% short forms

- forced-choice sentence completion task
- e.g. *A/C, ID, UK, limousine, rhinoceros, chemotherapy*
  - phenomenon not very pervasive in the lexicon in English
  - shorter and longer forms differ in register or style

"chimp" or "chimpanzee"?
(Mahowald et al., 2013)

German compounds and their base forms

determinative bimorphemic compound

Weinglas / Glas

Badewanne / Wanne

Fingernagel / Nagel

base form

- no register difference, but difference in **length** and **lexical specification**

  - same-category distractor → more specialized compound preferred

- very productive

  - **ideal test bed for the UID hypothesis…**

  - …as long as no other referent sharing the same base can be used in the same context

Weinglas vs. Sektglas

German compounds and their base forms

[Supportive context]

Jeden zweiten Samstag ging Carola zur Maniküre

Carola went for a manicure every second Saturday

[Neutral context]

Carola war ihr Aussehen sehr wichtig.

Carola cared a lot about her looks.

Sie liebte es, wenn ihre _____ farblich auf ihr Outfit abgestimmt waren. Diesmal hatte sie sich für einen grellgrünen Lack entschieden.

She loved it, when her _____ matched her outfit.
This time she had picked a bright green polish.

Fingernägel / Nägel

○ 80 German speakers on Prolific, 36 items (each in a supportive and neutral version)

○ Sentence completion with left- and right- context (simulating production)

German compounds and their base forms

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Fingernägel / Nägel

1. How do we know that the referent is more predictable in the supportive-context condition?

2. Are same-category distractors also predictable?

Norming study

[Supportive context]

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[Neutral context]

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Sie liebte es, wenn ihre _____

She loved it, when her _____

Fingernägel / Nägel

- ○ 40 German speakers on Prolific, 36 items (each in a supportive and neutral version)
- ○ Sentence completion with left-context only (simulating comprehension)

Norming study: Results

74% target completions

[Supportive context]

Jeden zweiten Samstag ging Carola zur Maniküre

Carola went for a manicure every second Saturday

22% target completions

[Neutral context]

Carola war ihr Aussehen sehr wichtig.

Carola cared a lot about her looks.

(1.6% in Mahowald et al., 2013)

Sie liebte es, wenn ihre _____

She loved it, when her _____

Fingernägel / Nägel

1. How do we know that the referent is more predictable in the supportive-context condition? **they are**

2. Are same-category distractors also predictable? **not really < 1% same-category distractors (e.g. Untertopf / Blumentopf)**

Main Study: Results

[Supportive context]

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Carola went for a manicure every second Saturday

[Neutral context]

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Compound and base are meaning-equivalent

○ Target reference elicited 89% of the time (93% in supportive contexts, 85% in neutral ones)

○ Non-target referents excluded from analysis, none was a same-category distractor

Main Study: Results

- Independent of context, baseline preference for base form (used **66%** of the time)
- Context (supportive vs. neutral) had a **significant effect** over what form was chosen
- Base form chosen more often in **supportive contexts**

supportive contexts: 72% completions base form

neutral contexts: 61% completions base form

Discussion

Previous work (Mahowald et al. 2013)

- English abbreviations (short vs. long forms)
  - register differences
- forced-choice sentence completion task
- referent predictability (incremental norming)
  - 52.4% target completions in supportive contexts
  - 1.6% target completions in neutral contexts
- overall preference for short forms
- significant effect of context on encoding
  - 67% short forms in supportive contexts
  - 56% short forms in neutral contexts

Our study:

- German compounds vs. base forms (pervasive)
  - no register differences, controlled for specificity
- sentence completion with left and right context
- referent predictability(incremental norming)
  - 74% target completions in supportive contexts
  - 22% target completions in neutral contexts
- overall preference for base forms
- significant effect of context on encoding
  - 72% base forms in supportive contexts
  - 61% base forms in neutral contexts

Specificity vs. Predictability

Rational Speech Act framework (**RSA,** Frank & Goodman, 2012; Goodman & Stuhlmüller, 2013):

- language production and interpretation as a **rational communicative process**
- driven by the **utility** of alternative utterances
  (**communicative success** vs. **effort**)

○ **communicative success** at risk (e.g. same-category distractor)
  → choices helping communicative success (longer forms)

○ **communicative success** ensured
  → choices requiring **less effort** (shorter forms)

"dog" or "German shepherd"?

(Graf et al., 2016)

Specificity vs. Predictability

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- language production and interpretation as a **rational communicative process**
- driven by the **utility** of alternative utterances (**communicative success** vs. **effort**)

Our study:

○ no same-category distractor

○ communicative success ensured

bad use of channel   good use of channel

Why do speakers still choose longer forms and not the short ones (less effort)?

○ **Predictability** is the determining factor

○ **Cost** can also be determined by information density / predictability (peaks and troughs are costly, Levy 2018)

Shorter vs. longer forms to optimize information transmission

UID: information distributed over message in a uniform way (optimized)

- low informativity leads to reductions in length (syntactic structure, diachronic change)
- **active use** of language:
  - referent predictability → surface form chosen to refer to it
  - shorter form when the referent is more predictable (less informative)

Efficient communicative design by information density control

Thank you!

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