A psycholinguistic view on definites

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The Structure of Representations in Language, Cognition and Science
Project C3: Psycholinguistic Evidence for Concept Types

Semantic and typological perspectives on definites

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Outline

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1. Theoretical Background: CTD
(modif. version of Löbner 2011:307)

<table>
<thead>
<tr>
<th>[-U]</th>
<th>conceptually unique [+U]</th>
</tr>
</thead>
</table>
| **SORTAL – SC**
apple stone moment human
✓ indefinite
⇒ definite
⇒ possessive |
| **INDIVIDUAL – IC**
pope earth weather Police
⇒ indefinite
✓ definite
⇒ possessive |

<table>
<thead>
<tr>
<th>[-R]</th>
<th></th>
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</thead>
</table>
| **RELATIONAL – RC**
colleague arm page idea
✓ indefinite
⇒ definite
✓ possessive |
| **FUNCTIONAL – FC**
mother body age birth
⇒ indefinite
✓ definite
✓ possessive |

✓ congruent determination
⇒ incongruent determination

A Psycholinguistic View on Definites
1.1 Assumptions: 1) Underlying CT

• Concept Types (CT)
  – Concept type information of nouns is lexically stored
  – Most nouns have only one lexically stored concept type and corresponding frame specification

→ underlying concept type
1.1 Assumptions: 2) Type shifts

• CTs & Determination
  – Each of the four concept types has a preferred contextual profile (c.f. Lübner 2011), i.e. it is used with specific “congruent” determination type (DT)

• CTs & Incongruent Determination
  – The interpretation of a noun used with an incongruent DT leads to a reanalysis process, so that its referential properties then match the ones required by the DT.

→ conceptual type shift (CT-shift)
1.1 Assumptions: Example

a) Der Papst wohnt in Italien.
   *(The Pope lives in Italy.)*

b) Johannes Paul II. war ein freundlicher Papst.
   *(John Paul II. was a friendly pope.)*

- ’Papst‘ *(pope)* is an IC [+U,+R]
- In a) it is used with congruent determination
- the indefinite article ’ein‘ in b) requires a [–U]-concept.
  \[\Rightarrow\text{incongruency between CT and DT}\]
- the interpretation of b) requires a **reanalysis process**: the referential properties of the IC ’Papst‘ have to be changed, to match the values required by the DT ’ein‘
  \[\Rightarrow\text{incongruency coerces a CT-shift}\]
1.2 Research Questions & Hypotheses

• Empirical Research Questions:
  – Do CTs and CT-shifts have a measurable cognitive reality?
  – Can we find empirically measurable time differences in the processing of nouns used with congruent vs. incongruent DT?

• Hypotheses & Prediction:
  – *Congruent determination* should *facilitate* the processing of the respective noun
  – *Incongruent determination* leads to CT-shifts, which should be time-consuming and thus *slow down* responses.
2.1 Experiment: Paradigm

• *On-line reaction time experiment* with German NPs containing a combination of *determiner+noun*

• *Lexical decision task:*
  – Task: „Is the presented stimulus a word or a non-word?“
  – triggers lexical and (flat) semantic processing

• *Presentation mode*: auditory

• *Measured variable*: reaction time (RT) via response pad
2.2 Experiment: Stimuli & Method

• *Participants*: 96 German native speakers

• *Stimuli*:

  – *target nouns*: 80 German nouns – 20 nouns of each CT (matched by frequency and number of letters and phonemes)

  – *pseudo words*: 80 non-words satisfying the phonotactic rules of German

  – each item was combined with each of the four determiner types *indefinite, definite, possessive, none*
2.2.1 Experiment: Stimuli

- **Four combinations of CT and DT:**

<table>
<thead>
<tr>
<th>Det. type</th>
<th>Concept type</th>
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<tbody>
<tr>
<td></td>
<td>SORTAL</td>
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<td>INDIVIDUAL</td>
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<td>RELATIONAL</td>
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<td>FUNKTIONAL</td>
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<td>[-U, -R]</td>
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<td>[+U, -R]</td>
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<td>[-U, +R]</td>
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<td></td>
<td>[+U, +R]</td>
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<tr>
<td>indefinite</td>
<td>ein Apfel</td>
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<td>ein Papst</td>
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<td>ein Arm</td>
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<td>eine Mutter</td>
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<td>an apple</td>
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<td>a pope</td>
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<td>an arm</td>
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<td>a mother</td>
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<td>definite</td>
<td>der Apfel</td>
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<td>der Papst</td>
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<td>der Arm</td>
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<td>die Mutter</td>
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<td>the apple</td>
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<td>the pope</td>
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<td>the arm</td>
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<td></td>
<td>the mother</td>
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<tr>
<td>possessive</td>
<td>sein Apfel</td>
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<td>sein Papst</td>
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<td>sein Arm</td>
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<td>seine Mutter</td>
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<td>his apple</td>
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<td>his pope</td>
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<td>his arm</td>
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<td>his mother</td>
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<td>none</td>
<td>xxxx Apfel</td>
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<td>xxxx Papst</td>
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<td>xxxx Arm</td>
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<td>xxxx Mutter</td>
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</table>

congruent determination
incongruent determination
2.2.2 Experiment: Method

Each of the 160 trials consisted of 3 subsequent parts:

+ a fixation stimulus: „beep“

+ one of the three determiners or the neutral determiner stimulus (realized as 400ms white noise)

+ one of the 80 target words or one of the 80 pseudo words
2.3.1 Experiment: Results [±U]

- Mean reaction time for [±U]-concepts

**Significant Effects:**

- statistically significant interaction effect between determination & uniqueness (F(93)=8.09, p=.00)
- post-hoc comparisons show:
  - significant facilitation of [+U]-nouns by definite DT
  - significant facilitation of [-U]-nouns by indefinite DT
2.3.2 Experiment: Results $[\pm R]$

- Mean reaction time for $[\pm R]$-concepts

**Significant Effects:**

- Statistically significant interaction effect between determination & relationality
  \[(F(93)=6.76, \ p=.00)\]

- Post-hoc comparisons show:
  - Significant facilitation of $[+R]$-nouns by possessive DT
  - Inhibition of $[-R]$-nouns by possessive DT
  - Unexpected significant facilitation effect of $[-R]$-nouns by definite DT
2.3.3 Experiment: Results Congruency

- Mean reaction times for congruent, incongruent and neutral DT

**Significant Effects:**

- highly significant difference between congruent, incongruent & no determination ($F(94)=12.85; p=.00$)
- Post-hoc comparison shows:
  - significant difference between congruent vs. incongruent determination
  - no significant difference between incongruent vs. no determination

→ results cannot be explained by mere gender effect of determination
3. Summary & Further Questions

• Results show evidence for
  – the cognitive reality of the distinction of the four concept types within the CTD
  – the interaction of determiner type and concept type

• Further research objectives:
  – Differences in the data for visual mode of speech perception?
  – Processing stage (lexical or post-lexical)?
  – Mechanisms & time course of processing conceptual information?
References


