The impact of animacy on coreference processing: A self-paced reading and a questionnaire study

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Picking brains, crossing ideas
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Accessibility Theory (Ariel, 1990)

- Entities that are more accessible in the discourse are retrieved by less explicit anaphoric expressions
- Inverse relation between accessibility and referential form
## Accessibility theory

### Antecedent’s accessibility
- + accessible
- - accessible

### Referential form
- - explicit (null pronoun)
- + explicit (overt pronoun)
Position of Antecedent Hypothesis (Carminati, 2002)

- The salience of an antecedent is dictated by structural issues.
- In null subject languages, the null pronoun preferably retrieves an antecedent in the Spec IP position, whereas the overt pronoun preferably retrieves an antecedent elsewhere.
When Leonor saw Inês in the garden, Ø /she was eating an ice cream.
Form-specific multiple constraints account (Kaiser & Trueswell, 2008)

- The salience of an antecedent is not a monolithic concept:
  - Different pronominal forms are sensitive to different factors
  - Different factors have a different weight in referential processing (ex. contrast, structural position, among others)
The animacy factor

The relevance of syntactic function on referential processing has been widely studied, but in most of the cases, the antecedents are humane or at least animate:

- Peter
- The architect
- The horse
The animacy factor

It is assumed that animacy:
- is organised on a scale or hierarchy (Yamamoto, 1999):
  - (+ humane) > (+ animate) > (inanimate)
- has an impact on accessibility in memory:
  - animate entities are more accessible in the discourse (Bock & Warren, 1985)
Investigation questions

1. Does the antecedent animacy have an impact on referential processing in European Portuguese (EP)?
   - Different pronominal forms associated with [+/-] animate antecedents?

2. Is there an inverse relation between the animacy of an antecedent and the pronominal form used to retrieve it?
   - Does the animacy scale overlap with the accessibility scale?
Investigation questions

Animacy of the antecedent
- animate
- inanimate

Referential form
- explicit (null pronoun)
- + explicit (overt pronoun)
Production

- in Dutch: full pronouns retrieve animate antecedents; reduced pronouns retrieve inanimate antecedents (Vogels, Maes & Krahmer)
- contrary to the Accessibility Scale:
  - (+ accessible) $\Rightarrow$ (- explicit)
in EP: object retrieval with a null pronoun increases when that antecedent is inanimate (Costa, Faria & Matos)

could eventually indicate a restriction of the overt pronoun to retrieve inanimate entities

contrary to the Accessibility Scale
Corpora: EP vs. BP

- in EP the null pronoun tends to retrieve inanimate antecedents (Barbosa, Duarte & Kato)
- the overt pronoun does not retrieve inanimate antecedents unlike BP
Syntax

- strong pronouns, such as the overt pronoun, have animacy restrictions (Cardinaletti & Starke, 1999)
- they cannot retrieve inanimate antecedents unlike weak pronouns, such as the null pronoun
Experiment 1

- self-paced reading with moving window technique (*PsychoPy*)
- 24 experimental sentences
- 48 filler sentences
- 2 conditions (animacy of the object antecedent)
- pronominal retrieval (overt pronoun) in subject position
- retrieval of the object forced through gender marking
Depois de a instrutora pintar o **recruta** no exercício militar, ele ficou camuflado no meio da vegetação.
Depois de a instrutora pintar o **capacete** no exercício militar, ele ficou camuflado no meio da vegetação.

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2. After the instructor feminine painted **the recruit**/ **the helmet** masculine in the military exercise, he was camouflaged among the vegetation.
Experiment 1: methodology

- 26 participants, undergraduate and graduate students at NOVA FCSH
- Analysis of reading time at the onset of the pronoun and of the following verb, as well as time and accuracy of response
- Analysis: linear mixed-effects model using the lmer function from the lme4 package in R
Why self-paced reading?

- reading time is linked to easiness of reading
- faster reading times for sentences or words that are seen as more natural, more correct and more predictable
After the instructor ________ ___ __________ __ ___ __________. ___ ____________.
Experimental work

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Experimental work

the helmet

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Experimental work in the military exercise.
Experimental work

he...
Experimental work was...
Experimental work
among the vegetation.
The helmet was camouflaged among the vegetation.

The instructor was camouflaged among the vegetation.
Results

animacy effect ($\beta = 0.92; \ SE = 0.37; \ t = 2.46; \ p < 0.01$)
Experiment 2

- Off-line questionnaire
- 24 experimental sentences
- 48 filler sentences
- 4 conditions (animacy of the object antecedent vs. pronominal form in the retrieval)
- ambiguous retrieval: two antecedents of the same gender
- 40 participants, undergraduate students at NOVA FCSH
Experimental work

Experimental sentences

a) Depois de o instrutor pintar o *recruta* no exercício militar, *ele* ficou camuflado no meio da vegetação.

b) Depois de o instrutor pintar o *capacete* no exercício militar, *ele* ficou camuflado no meio da vegetação.

c) Depois de o instrutor pintar o *recruta* no exercício militar, *∅* ficou camuflado no meio da vegetação.

d) Depois de o instrutor pintar o *capacete* no exercício militar, *∅* ficou camuflado no meio da vegetação.
Results

Animacy effect ($\beta = 0.83; SE = 0.33; t = 2.51; p < 0.01$)
Question 1: Impact of animacy

- Animacy of the antecedents does have an impact on referential processing in EP, at least, in the overt pronoun:
  - slower reading times with an inanimate antecedent
  - significant decrease of object retrieval when this antecedent is inanimate
Question 2: Animacy and accessibility

- No overlap between the accessibility scale and the animacy scale;
- No inverse relation between the animacy of an antecedent and the pronominal form used to retrieve it.
Animacy restrictions

- The results indicate that there are animacy restrictions of the overt pronoun.
- These restrictions may not be of a syntactic order since the overt pronoun was effectively used to retrieve inanimate antecedents, although in a significantly low percentage.
References


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Thank you