

Introduction

- Accessibility Theory (Ariel, 1990): **more accessible entities** are referred to with **less explicit** anaphoric expressions
 - In null subject languages (e.g., Carminati, 2002, among many others): **null** subject pronoun \Rightarrow **subject** (Spec-IP position) while **overt** subject pronoun \Rightarrow **object** (non-Spec-IP position)
- The impact of syntactic function has been widely studied, but other factors like antecedents lexical properties, such as **animacy**, have not: Studies usually only test **human** or, at least, **animate** antecedents (*John, the doctor, Mickey*)
- Kaiser & Trueswell (2008) propose the *form-specific multiple constraints account*: Saliency is not a monolithic concept, and not only different pronominal forms are sensitive to different factors, but also different factors are unequally weighed
 - What is the impact, on different anaphoric expressions, of antecedents animacy?
- Previous studies have shown that animacy:
 - Might be organised on a scale or hierarchy (Human > Animate > Inanimate) (Yamamoto, 1999) and this hierarchy has an impact on accessibility in memory: Animate entities are more accessible in the discourse representation (e.g., Bock & Warren, 1985)
 - Has an impact on relative pronoun interpretation (and production) with complex NPs: Attachment site depends on the lexical properties (animacy and concreteness) of the available NPs (Desmet, Baecke, Drieghe, Brysbaert, & Vonk, 2006)

Research questions

- Does animacy have an impact on pronoun resolution in European Portuguese (EP)?
- Is animacy hierarchy reflected in the Accessibility Theory so that more explicit anaphoric forms (such as overt pronouns) are preferably associated with less accessible (inanimate) antecedents?

Previous studies

- Fukumura & van Gompel (2011) (production study, in English): animate antecedents are more frequently chosen to be the subject of the following sentence and they are more frequently referred to by a pronoun than inanimate ones
- Vogels, Maes, & Krahmer (2014) (production study, in Dutch): pronouns (more than other anaphoric expressions) are used to refer to animate antecedents, but:
 - Reduced pronouns are used to refer to (less accessible) inanimate antecedents
 - Full pronouns are used to refer to (more accessible) animate antecedents
- Costa, Faria, & Matos (1998) (interpretation study, in EP): null pronouns are preferably interpreted (compared to overt pronouns) as referring back to inanimate (compared to animate) antecedents in object position
- Barbosa, Duarte, & Kato (2005) (corpora study, in EP and BP): in EP, unlike Brazilian Portuguese, overt pronouns tend to refer back only to animate antecedents

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Methods

- Participants:** 26 native speakers of European Portuguese attending undergraduate courses at Universidade NOVA de Lisboa
- Materials:** 24 experimental sentences in two conditions: animate vs. inanimate antecedent in object position (pronoun interpretation was forced by gender agreement) + 48 fillers
 - Depois de a instrutora pintar o **recruta**/**capacete** no exercício militar, **ele** ficou camuflado no meio da vegetação.*
After the instructor_{fem} painted the **recruit**_{masc}/**helmet**_{masc} in the military training, **he**_{masc} was concealed among the vegetation.
- Procedure:** Self-paced moving window paradigm (using *PsychoPy* software) with a final *yes/no* comprehension question
- Analysis:** accuracy of answer and reaction time on: pronoun region (critical region), auxiliary verb region (post-critical region), and on question answering

Additional information

- Only overt pronouns were tested in this study
 - Antecedents were all in object position
 - EP has no special form to refer to non-human or inanimate entities
 - There is no neutral gender in EP: all entities are gender marked and preceded by an article that gender marks it (*pen* is feminine (*a caneta*) while *pencil* is masculine (*o lápis*))
- * In this study, the term *animate* is used to refer to any human entity, and *inanimate* to refer to entities that are neither human nor animate

Results

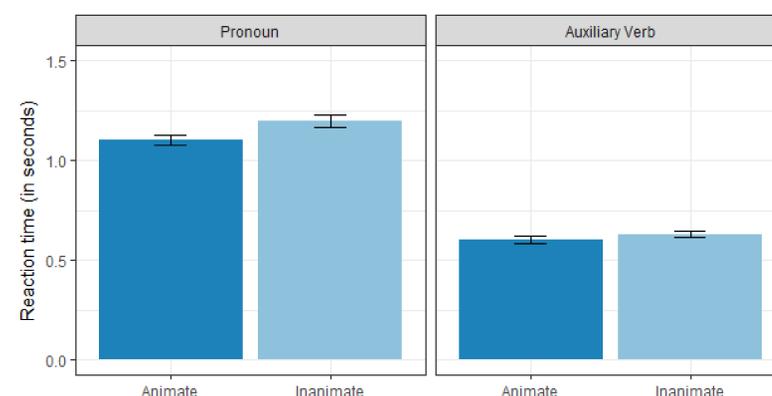


Figure 1: Reading times on *pronoun* and *auxiliary verb* regions on both animate and inanimate conditions.

- Significant effect of animacy at the pronoun region ($\beta = 0.92$; $SE = 0.37$; $t = 2.46$; $p < 0.01$): **faster reading times** when the **overt pronoun** is forced to be interpreted as referring back to an **animate antecedent** (1.09ms) than when it is forced to be interpreted as referring back to an inanimate one (1.17ms)
- Non-significant effect of animacy at the auxiliary verb region, on accuracy or on time of answer

Discussion

- Answer to research question ①: YES**
 - Animacy does seem to have an impact on pronoun resolution in EP: Reading times for pronouns referring back to animate and inanimate antecedents are different
 - This result is in line with previous research (e.g., Fukumura & van Gompel, 2011; Vogels et al., 2014)
- Answer to research question ②: (to be answered in future research)**
 - Overt pronouns in EP are preferably interpreted as referring back to the semantic most prominent antecedent
 - Possible explanations for the present results (not mutually exclusive):
 - There is no inverse relation between animacy prominence and anaphoric forms explicitness in pronoun interpretation in EP, in line with the production results from Vogels et al. (2014)
 - Overt pronouns are **not** preferably interpreted as referring back to the semantic less prominent antecedent
 - There is an inverse relation between animacy hierarchy and anaphoric forms explicitness, although only to some degree since animacy is one among other factors that contribute to saliency ascription: The overt pronoun is preferably interpreted as referring back to the semantic most prominent antecedent among the syntactic less salient antecedent (Object animate > Object inanimate)
 - As Kaiser & Trueswell (2008) propose, different factors are differently weighed and animacy, although having some impact, might have a weaker impact than syntactic function or just work in interaction with it
 - Strong (overt) pronouns are semantically restrained to animate antecedents, as proposed by Cardinaletti & Starke (1999) and so are not suitable to refer back to inanimate antecedents
 - Inanimate antecedents are overall less acceptable as (anaphoric expression) antecedents: Pronouns in EP are encoded for natural gender and inanimate entities only have grammatical gender, therefore, pronouns are not easily assigned to inanimate entities

Future research

- Contrast the interpretation of **null** and **overt** pronominal forms (ambiguously) referring back to animate and inanimate antecedents in an off-line questionnaire and in a Visual World Paradigm experiment

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