The Role of Definiteness in Anaphora Resolution

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INTRODUCTION

• Anaphora resolution (AR) is the process of identifying the referent of an anaphoric expression into the context.

• When more than one possible compatible antecedents are available
  ✓ the anaphoric form becomes ambiguous
  ✓ its resolution is not driven by grammar constraints alone any more
INTRODUCTION

Factors affecting anaphora resolution

➢ Form of anaphoric expression (i.e. null vs. overt pronouns):

*Interpretive* effects in a great number of NSLs (e.g. Mayol, 2008; Colonna, Schimke & Hemforth, in press, for French; Gelormini-Lezama & Almor, 2008, 2009 for Spanish; Miltsakaki, 2003, 2007; Papadopoulou, Plemenou, Marinis, Tsimpli & Peristeri, in press for Greek; Sorace & Filiaci, 2006 for Italian)

-btn Default option, maintain topic
-btn Marked option, topic shift

➢ Syntactic position of the antecedents (subject vs. object)
INTRODUCTION

Factors affecting anaphora resolution (cnt’d)

Interaction btw form of anaphor & syntactic position of antecedents:

- The more reduced form (null) prefers a prominent antecedent
  Subject, first mentioned, topic (Carminati, 2002; Tsimpili et al., 2004)

- The strong form (overt) asks for a less prominent antecedent
  Object, non-topic (Grimhaw & Samek-Lodovici, 1998; Tsimpili et al., 2004)
INTRODUCTION

Factors affecting anaphora resolution (cnt’d)

- **Definiteness:**
  - **Definite NP**
    - Presupposed, given information, easy to identify, topic
      (Hawkins, 1978)
      -> usually takes subjects to be the topic;
      subject-topic relation well established across languages)
  - **Indefinite NP**
    - ambiguous between quantificational and referential interpretations;
    - introduces new referent (usually ‘new information focus’)
INTRODUCTION

• Definiteness of anaphora antecedents:
  • It can enhance or diminish antecedent prominence
  • Indefinite NP ➔ costly to refer back to IndefNP by a pronoun
    (e.g. Filiaci, 2010; Keller et al., 2008; Chiriacescu, 2012)
  • Indefinite antecedent in subject position ➔ harder to process
    (Gibson, 1998) ➔ weakens the topicality of the subject
  • Evidence from eye-tracking:
    • Adults more-likely to fixate the definite NP rather than the
      indefinite NP 1200ms after ambiguous pronoun onset
    (Heusinger, Chiriacescu, Brocher, & Graf ‘s, 2014)
INTRODUCTION

• The structures studied here:
  • Definite Subject – Definite Object ➔ baseline
  • Definite Subject – Indefinite Object ➔ unmarked (pragmatically)
  • Indefinite Subject – Definite Object ➔ marked

❖ When the Subj (topic of the sentence) is weakened due to the [-def] value, the Obj (structurally less prominent) is not expected to be [+def] ➔ rendering the structure IndS-DefO marked.
AIMS

• The present study aims to explore how null and overt pronouns interact with the definiteness of subject/object antecedents in the process of AR.

• Independent variables:
  • Definiteness: its effect explored in both Null and Overt Pronoun conditions.
  • Pronoun: its effect is explored indirectly

• Dependent variables:
  • Processing speed
  • Antecedent choice
METHODOLOGY: MATERIALS / PROCEDURE

- Online self-paced listening and picture-matching task (E-Prime)

- Participants heard a segmented sentence containing
  - either a null pronoun or the overt pronoun aftos, ‘he’, afti, ‘she’
  - with definite or indefinite possible antecedents
  - in the subject and object position

- while looking at three pictures: subject referent, the object referent and a distractor

- In the null pronoun condition, an adverb was placed in the position of the subject to maintain the same number of critical segments across conditions.
METHODOLOGY:
MATERIALS / PROCEDURE

Subj referent

Obj referent

Other referent
METHODOLOGY:
MATERIALS / PROCEDURE

• Examples:

  - I gramateas / voithuse / ti nosokoma /
    The secretary / was helping / the nurse
  - I gramateas / voithuse / mia nosokoma /
    The secretary / was helping / a nurse /
  - Mia gramateas / voithuse / ti nosokoma /
    A secretary / was helping / the nurse /

Who was writing the letter?
METHODOLOGY:
MATERIALS / PROCEDURE

• Two main conditions were formed:
  • the Overt Pronoun (OP) condition,
  • the Null Pronoun (NP) condition,

• each including 3 versions of 10 different sentences:
  • definite subject – definite object (DefS_DefO), which served as the baseline,
  • definite subject – indefinite object (DefS_IndO) (unmarked)
  • indefinite subject – definite object (IndS-DefO) (marked structure)

• 20 filler sentences (per version of each condition)
• 5 practice items prior to the task

Duration: 10-20 min approx.
• Examples: Fillers
  • The girl / was crying / because / the dog / tore / the shoes / in the room. **What did the dog tear?**
METHODOLOGY: MEASUREMENTS / ANALYSES

• The following were recorded:
  • Participants’ listening times (RTs) in each segment of the sentence,
  • Response latencies in the final question,
  • Response to final question, denoting preference for an antecedent.

• Comparisons:
  • RTs across definiteness conditions.
  • Antecedent preferences across definiteness conditions.
  • RTs and antecedent preferences across pronoun conditions (indirect comparison).
METHODOLOGY:
PARTICIPANTS

• 80 university students at the Aristotle University of Thessaloniki and the University of Ioannina.
• All participants were Greek monolingual speakers.
• Age range 20-28, mean age 22.3
RESULTS
LISTENING TIMES

- Overt Pro Condition
- Significant effect of definiteness in segments 2, 3 and 4.
  - IndS-DefO condition marked the slowest reaction times
  - DefS-DefO condition was the fastest one
RESULTS
LISTENING TIMES

- **Overt Pro Condition**
- **Significant differences:**

\[ S2: \]
- defS-defO vs. indS-defO
- defS-indO vs. indS-defO

\[ S3: \]
- defS-defO vs. indS-defO
- defS-indO vs. indS-defO

\[ S4: \]
- defS-defO vs. indS-defO
RESULTS
LISTENING TIMES

- **Null Pro Condition**
- Significant effect of definiteness in segments 1, 2 and 5.
RESULTS
LISTENING TIMES

- Null Pro Condition
- Significant differences:

S1: defS-defO vs. indS-defO
S2: defS-defO vs. indS-defO
S3: defS-defO vs. indS-defO
S5: defS-defO vs. defS-indO
defS-defO vs. indS-defO
ON THE 5TH SEGMENT

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RESULTS

FINAL RESPONSE LATENCIES

- There was a significant effect of Definiteness.
- DefS-DefO slower responses than both DefS-IndO and IndS-DefO.
- Significant diffs: defS_defO vs. indS_defO in both Overt S and Null S conditions.
RESULTS

FINAL RESPONSE LATENCIES

- Responses where the object antecedent was selected were faster in both conditions.
- No differences with respect to definiteness when the Subj was selected.
- Sig differences btw. DefS_DefO and IndS_DefO when the Obj was selected → DefS_DefO significantly slower.
RESULTS
ANTECEDENT PREFERENCES

• Object antecedent was significantly preferred in the overt pronoun conditions.
• No significant preference in the DefS-IndO and DefS-DefO versions of the NullS condition.
• Significant preference for Obj antecedent in the IndS_DefO version of the NullS condition.
SUMMARY OF RESULTS

• Participants needed more time to process an indefinite first-mentioned character in the subject position than a definite one.

• A definite object following the indefinite subject seemed to cause greater delay (vs. DefO following a DefS).

• Indefinite NPs in the antecedent positions interacted with null pronoun condition, causing significant delay in the processing

• Definiteness manipulations also affected antecedent preferences only in the NullS condition → preference for the Obj antecedent was intensified in the IndS-DefO version of the NullS condition.
The findings indicate that definiteness affects the way a NP is processed, confirming previous findings that argue for increased processing difficulty of indefinite NPs in the subject position (Gibson 1998).

The manipulation of definiteness in the antecedents affected participants’ interpretation of the pronoun only in Null S sentences:

- A non-topic (i.e. indefinite) subject generates preference for an object antecedent in otherwise ambiguous sentences, i.e. null subject sentences.
CONCLUSION

• Definiteness seems to affect anaphora resolution only in cases of higher ambiguity:
  • Null subject sentences, where no preference is attested.
• In sentences of low ambiguity (i.e. with overt pronouns) definiteness manipulation does not affect listening times on the pronoun segment nor resolution.
• Markedness of pronoun (Overt in a NSL) is stronger than definiteness of potential antecedents
SELECTED REFERENCES


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