1. Introduction

Common ground about anaphoric processing
• The choice of an antecedent for a pronoun is based on the prominence of the available entities in the discourse: the more salient an antecedent is in the discourse the less marked and informative (more reduced) will be the anaphoric expression referring to it (Almi, 1996).
• Matter of debate:
  • Some theories propose that only one factor is responsible for prominence ascription
  • Other theories adopt a multi-factor perspective
• Current stage:
  • Many studies have demonstrated the importance of different types of linguistic information such as Syntax (Subjacency, Order of mention/Topicity/Information), Semantics (Implicit causality, Aperiodicity) or Pragmatics
  • However few studies have combined and contrasted those types of information against one another. For instance, many authors defend that:
    • Syntactic function or Subjacency is the most important factor for salience ascription
    • Anaphoric expressions like null Pronouns are preferred to retrieve a salient SUBJECT as antecedent over Overt Pronouns are preferred to retrieve null SUBJECT constituents (Costa, Faria, & Mato, 1998, and Clifton, Faria, & Kall, 2004, for European Portuguese; Correa, 1998, and Melo, & Maia, 2005, for Brazilian Portuguese; Carminatti, 2002, for Italian; Mano-Oliveira, Clifton, Frater, & Silveri, 2002, for Spanish)
  • Others claim that Order of mention is the factor that defines the saliency of an anaphor:
    • First mentioned entities are very prominent, regardless of their syntactic status (Görkemli-Basar, & Hargreaves, 1999, for English; Carminatti, & Miliţo, 1995, for Spanish)
    • While in the former studies the SUBJECT was always the first mentioned entity, in the latter studies the alleged preference for null mentioned entities was not tested with pronouns
    • Some factors that have been contrasted in different languages:
      • Gender information and Accessibility (Arnold, Eisenberg, Brown-Schmidt, & Trueswell, 2000, in English)
      • First Mention and Subject Preference (Bakkie, Dompier, Holyk, & Betham, 2005, and Kaiser, & Trueswell, 2006, in Flemish; Kaiser, & Virman, 2006, in Estonian)
    • Topic and Focus (Kaiser, 2006, in English)
• In general, these studies have shown that many factors contribute to salience ascription. However, some aspects may have not been deeply explored due to the characteristics of the tested languages. For instance, English is neither a free word order language nor a pronominal one (null pronouns are always replaced by finite forms). In Spanish, free word order languages, only overt pronouns and demonstratives were tested to look at pronoun salience preferences.

2. Experiment

Participants: 24 adult native speakers of European Portuguese from the University of Lisbon
Stimuli: 20 experimental items in 4 conditions (1:4) = 40 items
1. (Max clause OVS + null pronoun: OVS+null)
O nauceio teotendal con e angleison na o o histo quan 4 ouroman o de como teplantad. The subject noun he worked with the subject in the same for when he had the competition car.
2. (Max clause OVS + null pronoun: OVS+null)
Con o enaemteclal na o eangleison na o histo quan 4 ouroman o de como teplantad. The subject noun he worked with the subject in the same for when he had the competition car.
3. (Max clause OVS + overt pronoun: OVS+Ov)
O nauceio teotendal con e angleison na o o histo quan 4 ouroman o de como teplantad. The subject noun he worked with the subject in the same for when he had the competition car.
4. (Max clause OVS + overt pronoun: OVS+Ov)
Con o enaemteclal na o eangleison na o histo quan 4 ouroman o de como teplantad. The subject noun he worked with the subject in the same for when he had the competition car.

Procedure: Visual World Paradigm: participants listened to sentences while viewing pictures representing the content of the two mentioned characters and with the location of the action described in the main clause (eye movements were registered, at a 500Hz rate, with an eyetracker Hi-Speed) Questionnaire: final interview question

Analysis:
Visual World Paradigm (on-line task): percentage of looks to each entity (SUBJECT, OBJECT, or NULL) over a 400 ms window, and for a 1400 ms window. Only percentage of looks to SUBJECT and to OBJECT are contrasted.

Questionnaire (off-line task): percentage of SUBJECT/OBJECT choice

Note: The Two Object condition was used in a general sense, referring to obligatory pronominalization. In our conditions, when the patient is not the one beginning the sentence, the perspective will work as the one that is the most motivated in the information, not in the Subject. But in the following, presenting the verb, it is sufficient for an object.

3. Results

3.1. Questionnaire

Preferences for SUBJECT:
• OVS+null (p=0.001)
• OVS+Ov (p=0.047)
• OVS+null (although statistically significant)

Preferences for OBJECT:
• OVS+null (p=0.003)

Only in the SVO-null condition there is a clear preference to retrieve the SUBJECT with the null pronoun. When the SUBJECT is also the first-mentioned entity there is a straightforward preference to retrieve it with the null pronoun

In the OVS-null condition there is a preference to choose the SUBJECT as the antecedent of the null pronoun in the off-line task (albeit not statistically significant) but the preference goes for the OBJECT during the on-line task. This result seems to indicate that the order of mention of the SUBJECT influences its saliency and that an OBJECT that is in topic position may become more salient than a post-verbal SUBJECT, making it a good antecedent for the null form of the pronoun

The former hypothesis may also explain the results of OVS+Ov condition (preference for SUBJECT) that is, if the SUBJECT is not post-verbal position as salient as an OBJECT in topic position a fuller expression is preferred to refer to it, for instance, the overt form

The results for the SVO-over condition are in line with results obtained by Costa and colleagues (1998, 2004) and Carminatti (2002), for instance, that found that the overt form of the pronoun is more aggressive than the covert one. Although preference chosen to retrieve the OBJECT, it is also sometimes chosen to refer to the SUBJECT, even in conditions were the SUBJECT was also the first-mentioned entity

Our results also suggest that the identification of the null and overt pronoun occurs at different moments, being the identification of the overt pronoun sooner than its null counterpart. On the null pronoun conditions we only find differences between looks to Subject and looks to Object 800ms after the onset of the pronoun/verb, contrary to what we find in the overt conditions, where differences emerge at the first period, between 200ms and 400ms after the onset of the pronoun/verb

A splitter effect due to recovery cannot be excluded, although not present in all conditions. Also, as it may be observed even at the 200s-400s interval it may be the case (OVS+null or SVO-Ov), at 400ms-600ms there is little or no difference between looks to SUBJECT and looks to OBJECT in SVO+null, OVS+Ov and SVO-Object, while there are, clearly, more looks to the SUBJECT in the SVO-OV condition.

HYPOTHESES & PREDICTIONS
H1: Prominence depends only on Syntactic-function information, hence the null pronoun will retrieve always the Subject and the overt pronoun will be retrieved to the Object.
H2: Prominence depends on the Order of mention, and so the null pronoun will prefer the entity that is mentioned first and the overt pronoun will prefer the second mentioned entity.
H3: Prominence is the result of the combination of various factors, namely Syntactic function and Order of mention. Therefore there will be different results depending on this combination.

4. Discussion

Results are summarized in the following table:

<table>
<thead>
<tr>
<th>OVS+null</th>
<th>SVO-OV</th>
<th>SVO-Object</th>
<th>SVO-null</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>Subject</td>
<td>Object</td>
<td>Subject</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>60%</td>
<td>50%</td>
<td>40%</td>
</tr>
<tr>
<td>Visual World Paradigm</td>
<td>20%</td>
<td>25%</td>
<td>45%</td>
</tr>
</tbody>
</table>

5. Conclusions

Our results suggest that different types of syntactic information like Subjacency and Topicality, contribute to salience acquisition differently, depending on if they are combined or placed against each other. An antecedent is both the subject and the of the reference (null or overt pronoun) will be clearly preferred to co-occur with a null sentence, regardless during sentence processing and at a later stage of the comprehension. However, if these factors of information are identified among different entities, results from on-line and off-line tasks, can be different depending on the factors of information considered (if the sentences are found to be free or fixed, we will find different results from conditions with different combination of factors). In the SVO+null condition, when the two factors are combined the results are stronger when there is a conflict between them.

As predicted, our Third Hypothesis is confirmed by the results. Our procedure is the result of the combination of different factors, namely Syntactic Function and Order of mention. That is, as proposed by Kaiser (2006), salience is not a monolithic concept.