PREDICTING A NOUN BASED ON ADJECTIVE MEANING: AN EYE-TRACKING STUDY

Abstract

There is abundant evidence in the literature demonstrating that online language processing in adults is fast and incremental. Indeed, adults process words as they hear them and they integrate their meaning with world knowledge and information provided by the visual scene (e.g., Tanenhaus et al., 1995, Rayner & Clifton, 2009). In addition, adults are also able to predict how a sentence will unfold on the basis of the semantic meaning of the words they are processing (e.g., Altmann & Kamide, 1999; Sedivy et al., 1999; Mak et al., 2013). However, studies investigating children’s online processing seem to show contradictory results concerning the interpretation of noun-adjective combinations. Ninio (2004) found that Hebrew-learners have difficulties in integrating noun and adjective meanings and suggested that these findings reflect the two-step process young children have to go through, interpreting the noun first and the adjective after, independently of their relative order. Similar results were found in Spanish (Weisleder & Fernald, 2009) and English (Fernald et al., 2010). Contrarily, in an eye-tracking study conducted with Dutch-learners, Tribushinina and Mak (2016) found that young children are able to interpret prenominal adjectives without the need to wait for the noun and concluded that, like adults, toddlers interpret language incrementally.

In light of the contradictory results in this respect, the aim of the present study is to investigate whether young children are able to process language incrementally, i.e., if they are able to process adjectives as they are being heard and to predict the following noun on the basis of the adjective meaning. We target this issue in an eye-tracking experiment on Italian. We tested thirty-nine Italian monolingual children (2;4-5;3, mean age = 3;6) and twenty-four Italian-speaking adults (19;1-29;9, mean age = 25;4) and we compared eye-movement behaviors of children and adults while looking at two pictures on the screen (e.g., a pillow and a bone, in Figure 1), as a linguistic stimulus asked a question about one of the two, e.g., È morbido il cuscino? (lit. Is soft the pillow? ‘Is the pillow soft?’).

As illustrated in Table 1, three conditions were tested, based on the informativity of the adjective (i.e., whether the adjective labeled a property attributable to only one of the two pictures): the Informative-true condition, the Uninformative-true condition and the Informative-false condition.

<table>
<thead>
<tr>
<th>Informative-True</th>
<th>Uninformative-True</th>
<th>Informative-False</th>
</tr>
</thead>
<tbody>
<tr>
<td>È morbido il cuscino?</td>
<td>È bianco il cuscino?</td>
<td>È morbido l’osso?</td>
</tr>
<tr>
<td>‘Is the pillow soft?’</td>
<td>‘Is the bone white?’</td>
<td>‘Is the bone soft?’</td>
</tr>
</tbody>
</table>

Comparing the first two conditions allowed us to investigate how children and adults make use of the informativeness of the adjective to predict the following noun. We found that, in the
Informative-true condition, both groups looked at the target object after hearing the adjective, but clearly waited until the noun in the Uninformative-true condition. However, comparing the two informative conditions led to interesting results. Indeed, while both adjectives were informative about the following noun, the Informative-false condition led to attraction errors at the semantic level (Laurinavichyute & von der Malsburg, 2020) in the sense that the adjective referred to the property of the distractor object. We found that, upon hearing ‘Is soft the bone?’, children make attraction errors by shifting to the pillow after hearing soft, and then zoom to the target around 100ms after the offset of the noun. Adults, on the other hand, are less subject to the attraction error and look at the distractor above chance after hearing the property term, but not significantly. Furthermore, they shift to the target object around 100ms before the offset of the noun.

In conclusion, results from eye-movements show that young children are able to predict the noun on the basis of the adjective meaning, further confirmed by children’s semantic attraction errors. The analysis of adults’ data showed that they are overall faster in target identification in all condition but are not subject to attraction errors to the same extent. We argue that presenting adjectives in predicative constructions may facilitate the incremental interpretation of nouns and adjectives in combination and that the adults’ findings may reflect a possible task effect.

Main references


