

Gender agreement attraction and grammatical illusion in Standard Arabic sentence comprehension

Souad Kheder (University of Florida)

skheder@ufl.edu

The relationship between words in a sentence is guided by grammatical constraints that impose some agreement requirements on several linguistic structures and features. Studies that examined how these requirements are implemented in real-time processing during language comprehension have reported difficulty in the implementation of some agreement constraints due to interference from some linguistic information that were previously encoded and stored in memory. The retrieval of certain linguistic cues can lead to a failure in detecting an agreement error such as in the sentence (*The **key** to the **cabinets are** on the table.*) causing grammatical illusion/attraction effects that reflect reduced behavioral sensitivity to ungrammaticalities. We report an eye-tracking study on gender agreement in Standard Arabic, focusing particularly on whether attraction effects apply to (a) a morphologically rich language (which may provide more cues for disambiguation), (b) more dependency structures such as gender (dis)agreement between a relative pronoun (RP) and a noun, and (c) whether attraction effects are drawn by the grammatical notion of “Markedness”.

Participant read sentences and responded to yes/no comprehension questions while their eyes were tracked. Sentences were either grammatical where the RP and the object noun preceding it match in gender or ungrammatical where the RP and the object noun don't match. Additionally, the subject noun was either an “attractor” when it matches the gender of the RP or not (see sample stimuli Table1).

Data analysis was based on 21 native speakers of Arabic. Analysis of total duration of fixations to the interest area of the RP (word 5) revealed a significant main effect of grammaticality. Participants looked at the RP in the ungrammatical conditions ($M = 404.71$; $SD = 289.06$) more than they did in the grammatical condition ($M = 306.39$; $SD = 180.98$). In addition, a main effect of attractor shows that participants looked at the RP less when there was an attractor [$M = 334.28$, $SD = 203.14$] than when there was no attractor [$M = 383.04$; $SD = 286.15$]. These effects resulted in an interaction between grammaticality and attractor showing that in the ungrammatical condition participants looked less at the RP in the presence of an attractor, while in the grammatical conditions looks at the RP did not depend on the status of the attractor (Figure 1). Finally, there was also an interaction between gender and attractor. In the presence of an attractor, participants looked less to the feminine RP than to masculine RP (Figure 2), suggesting that attraction effects occur with marked features. These results suggest that grammatical illusion and attraction effects can occur even with a morphologically rich language and even when the attractor noun is retrieved earlier in the sentence and is further from the RP than the noun it refers to. Additionally, these results support a relationship between attraction effects and the notion of “Markedness”. Results will be used to evaluate models of agreement resolution and attraction effects.

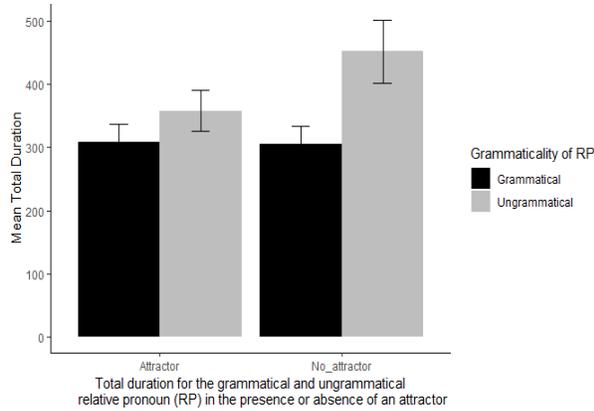


Figure 1

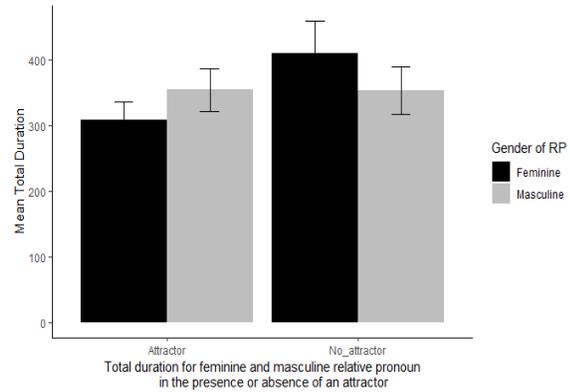


Figure 2

Table 1: Sample sentence stimuli and conditions

Grammatical conditions:

- | | | | | | | | |
|------------------------|-------------------------------------|-------------------------------------|-----------------------|--------------------------------|-----------------------------|----------------|-----------------------|
| (1) ishtara
bought | <u>al-waladu</u> [masc.]
the boy | al-qalam [masc.]
the pen | al-aswad
the black | alladhi [masc.]
that | raahu
(he)saw-it | fi-l
in the | maktaba.
bookstore |
| (2) ishtarat
bought | <u>al-bintu</u> [fem.]
the girl | al-qalam [masc.]
the pen | al-aswad
the black | alladhi [masc.]
that | raathu
(he)saw-it | fi-l
in the | maktaba.
bookstore |
| (3) Ahabbat
Loved | <u>uxti</u> [fem.]
my sister | al-uynija [fem.]
the song | al-haziina
the sad | allati [fem.]
that | samiṣat-ha
(she)heard-it | haḏə
this | al-Sabaaf
morning |
| (4) Ahabba
Loved | <u>axi</u> [masc.]
my brother | al-uynija [fem.]
the song | al-haziina
the sad | allati [fem.]
that | samiṣa-ha
(she)heard-it | haḏə
this | al-Sabaaf
morning |

Ungrammatical conditions:

- | | | | | | | | |
|------------------------|-------------------------------------|-------------------------------------|-----------------------|--------------------------------|-----------------------------|----------------|-----------------------|
| (5) ishtara
bought | <u>al-waladu</u> [masc.]
the boy | al-qalam [masc.]
the pen | al-aswad
the black | allati [fem.]
that | raahu
(he)saw-it | fi-l
in the | maktaba.
bookstore |
| (6) ishtarat
bought | <u>al-bintu</u> [fem.]
the girl | al-qalam [masc.]
the pen | al-aswad
the black | allati [fem.]
that | raathu
(she)saw-it | fi-l
in the | maktaba.
bookstore |
| (7) Ahabbat
Loved | <u>uxti</u> [fem.]
my sister | al-uynija [fem.]
the song | al-haziina
the sad | alladhi [masc.]
that | samiṣat-ha
(she)heard-it | haḏə
this | al-Sabaaf
morning |
| (8) Ahabba
Loved | <u>axi</u> [masc.]
my brother | al-uynija [fem.]
the song | al-haziina
the sad | alladhi [masc.]
that | samiṣa-ha
(she)heard-it | haḏə
this | al-Sabaaf
morning |