Does the addressee matter when choosing referring expressions?

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Abstract

We report an experiment in which participants first heard a context sentence and saw a picture, and then had to produce a coherent discourse by describing the action of a previously introduced referent in a target picture. They described the picture either to an addressee or in the absence of an addressee. The results showed that participants produced more pronouns and fewer repeated noun phrases when the referent was mentioned as the subject than the object in the preceding sentence and when a competitor was not mentioned in the preceding sentence than it was. These linguistic saliency effects were not affected by the presence or absence of an addressee. In contrast, the effect of visual presence of a competitor did interact with addressee presence. In the presence of an addressee, speakers produced more pronouns when there was no visually present competitor than when there was, but no such visual saliency effect occurred in the absence of an addressee. We conclude that speakers take into account the referent's visual saliency for the addressee's benefit, but the linguistic saliency effect is independent of whether the addressee is present.

Keywords: Reference, referring expressions, pronouns, salience, discourse production, audience design, cooperativeness.

Introduction

A common assumption of many functional-linguistic theories of reference is that speakers choose particular referring expressions to signal to the addressee how salient or accessible the referent is (e.g., Ariel, 1990; Chafe, 1976; Givón, 1983, 1992; Gundel et al., 1993; Prince, 1985). These theories claim that speakers tend to produce reduced referring expressions such as pronouns to indicate to the addressee that the referent is highly salient in their discourse model, whereas they use more informative referring expressions such as names and full noun phrases to signal that the referent is less salient and to facilitate retrieval of the referent's representation to the addressee by providing more information. Corpus studies indeed show that people produce less explicit referring expressions when the referent was recently mentioned in the discourse and is therefore highly salient than when it was mentioned further back (e.g., Ariel, 1990; Givón, 1983). Furthermore, psycholinguistic studies show that speakers are more likely to produce pronouns (rather than names or full noun phrases) when the referent was mentioned as a subject (the first-mentioned

noun phrase) than an object (the second-mentioned noun phrase) in the preceding sentence (e.g., Brennan, 1995; Fletcher, 1984; Fukumura & Van Gompel, 2010), consistent with the idea that the subject/first-mentioned noun phrase is more salient than the object/second-mentioned noun phrase (Frederiksen, 1981; Gernsbacher & Hargreaves, 1988), and that therefore, speakers use less explicit expressions for the subject. They are also less likely to produce pronouns when a competitor is mentioned in the preceding context than when it is not (Arnold & Griffin, 2007; Fukumura, Van Gompel, & Pickering, 2010), consistent with the idea that the saliency of the referent in the linguistic context affects the choice of referring expression. Similarly, Fukumura et al. (2010) showed that the presence or absence of a competitor in the visual context also affected referential choice, suggesting that visual saliency has a similar effect. In sum, various saliency factors appear to affect the choice of referring expression.

What is less clear is to what extent saliency effects on the choice of referring expression are driven by the needs of the addressee, as is claimed by many functional-linguistic theories. That is, do speakers take into account various saliency factors to signal how salient the referent is in the addressee's discourse model, or do saliency factors have an effect regardless of the presence of an addressee? Although much research has investigated the question of whether speakers choose referring expressions to facilitate comprehension for their addressee, this research has generally not investigated different saliency factors. For example, Isaacs and Clark (1987) found that speakers adapted their reference to landmarks in New York depending on whether the addressee was a New-Yorker or not. But the choice of expression in such cases is presumably not due to the saliency of a particular landmark in the addressee's discourse model, but whether the addressee knows the name for it (e.g., *the Chrysler Building*). Similarly, several studies have found that after speakers had developed a referring expression in a dialogue with one addressee, they tend to avoid it during a subsequent dialogue with another addressee who may be unfamiliar with it (e.g., Brennan & Clark, 1996; Horton & Gerrig, 2002, 2005; Wilkes-Gibbs & Clark, 1992). Again, these effects are presumably due to the addressee's lack of familiarity with a specific expression. Finally, Horton and

Keysar (1996; Nadig and Sedivy, 2002) found that when speakers had no time pressure, they avoided ambiguous referring expressions such as *the circle* more often when the addressee could see another circle than when the addressee did not. In contrast, Horton and Keysar found no such evidence for audience design when speakers were under time pressure, so they suggested that speakers take into account the addressee during later stages of production. However, Horton and Keysar's and Nadig and Sedivy's studies involved initial reference to an object rather than anaphoric reference to an earlier introduced discourse entity, so again the observed audience design effects are not due to speakers signaling the referent's saliency to the addressee.

A recent study that did investigate whether speakers take into account how salient the referent is to the addressee is Fukumura and Van Gompel (2009). In their study, speakers had to describe an action by a referent (e.g., an admiral getting up from a wheelchair) following a short discourse context. The addressee had to carry out the action using toy figures. The last sentence in the context either referred to the referent (the admiral) and therefore made it highly salient (1a) or referred to a competitor (the mermaid), making the referent less salient.

1a. The mermaid is waiting for a taxi with the admiral. He is sitting in a wheelchair.
1b. The mermaid is waiting for a taxi with the admiral. She is sitting on a bench.

Fukumura and Van Gompel found that speakers produced more pronouns and fewer full noun phrases when the referent was highly salient (1a) than when it was not (1b), but most important, this effect occurred (and was equally large) regardless of whether the addressee heard or did not hear the last context sentence. Thus, speakers appeared to use their own discourse model rather than signal how salient the referent was in the addressee's model.

Fukumura and Van Gompel's (2009) study shows that speakers do not take into account whether the linguistic context makes the referent or a competitor more salient to the addressee. However, Fukumura et al. (2010) showed that not only the linguistic context, but also the visual context affects saliency and the choice of referring expression. In this study, speakers described an action to an addressee, who had to carry it out. Speakers produced pronouns less often and full noun phrases more often to refer to a person when another person was mentioned in the previous sentence than when no other person was mentioned. This suggests that the linguistic mention of a competitor reduced the saliency of the referent, and therefore, speakers produced more explicit expressions. But in addition, Fukumura et al. found that speakers also used pronouns less often when the competitor person was visually present than absent, indicating that saliency due to the visual context also affected the choice of referring expression.

There is indirect evidence that speakers may take into account how the visual context affects the referent's saliency to the addressee. Arnold and Griffin (2007) conducted a similar experiment as Fukumura et al. (2010), but without an addressee. As in Fukumura and Van Gompel, they found that linguistic mention of a competitor affected the choice of referring expression. However, they found that the presence or absence of the competitor in the visual context had no effect. There are several differences in the method and materials between Arnold and Griffin (2007) and Fukumura et al. (2010), but one possible interpretation is that the effect of visual context on saliency is due to addressee presence and is therefore an audience design effect. In contrast, the effect of linguistic context may not be affected by addressee presence and may be an egocentric effect, consistent with Fukumura and Van Gompel (2009).

Most discourse theories assume that language users construct a discourse representation on the basis of linguistic information rather than using visual information (e.g., Kamp & Reyle, 1993; Kintsch & Van Dijk, 1978; Grosz, Joshi, & Weinstein, 1995). This may explain why the effect of linguistic mention of a competitor on referential choice occurs regardless of whether an addressee is present, whereas the effect of a competitor's visual presence only occurs in the presence of an addressee. When speakers determine the saliency of a referent in the linguistic context in order to choose a referring expression, they can straightforwardly use the linguistically-based discourse model. Because the linguistically-based model is automatically being updated while the discourse unfolds, it is readily available and may be used regardless of whether there was an addressee who may benefit from it or whether there was no addressee. In contrast, taking into account the visual saliency of the referent would be more complex, because it is not part of the linguistically-based discourse representation. Speakers need to consult information from outside the linguistic domain to choose a linguistic form. They may only do this when there is an addressee who could benefit from this extra effort.

Experiment

To test the account that we suggested above, we conducted an experiment in which we contrasted the effects of linguistic and visual saliency when speakers produced referring expressions either to an addressee or in the absence of an addressee. Specifically, we were interested in three questions: (1) Is the effect of grammatical role (or order or mention) influenced by the presence of an addressee? (2) Is the effect of presence/absence of a linguistic competitor influenced by the addressee? (3) Is the visual competitor effect influenced by it?

Participants first heard a context sentence (e.g., *A supporter kicks a footballer*) while they saw a context picture. We had four conditions, shown in Figure 1. Next, participants saw another picture (Figure 2), which showed an action of the referent, which the participant had to describe. One group of participants described the picture to

an addressee, whereas another group described it without addressee.

a. Object antecedent, competitor linguistically and visually present
Context sentence: *A supporter kicks a footballer.*

b. Subject antecedent, competitor linguistically and visually present
Context sentence: *A footballer kicks a supporter.*

c. Subject antecedent, competitor linguistically absent but visually present
Context sentence: *A footballer falls.*

d. Subject antecedent, competitor linguistically and visually absent
Context sentence: *A footballer falls.*

Figure 1: Context sentence and picture in the four item conditions.

Figure 2: Target picture.

We investigated the effect of grammatical role on the choice of referring expression by comparing condition (1a) with (1b). In (1a), participants have to refer to the object in the context sentence, whereas they have to refer to the subject in (1b) (*the footballer* in both cases). On the basis of previous results (e.g., Brennan, 1995; Fletcher, 1984; Fukumura & Van Gompel, 2010), we expect more pronouns (and fewer full noun phrases) for the subject than object. Note that the subject is also the first-mentioned person in the sentence, whereas the object is mentioned later, so we did not attempt to distinguish between the effects of grammatical role and word order. It is unclear whether this grammatical role/first mention effect is affected by addressee presence, but we hypothesize that linguistic saliency effects are unaffected by this, as discussed above.

The effect of linguistic mention was investigated by comparing (1b) and (1c). In both conditions, the antecedent is the subject, but a competitor (*the supporter*) is mentioned in (1b) but not (1c). Based on the results by Arnold and Griffin (2007) and Fukumura et al. (2010), we expect fewer pronouns in (1b) than (1c) and we predict that the effect of linguistic mention is unaffected by the presence or absence of an addressee.

Finally, we manipulated the visual saliency of the referent by either presenting a picture in which the competitor (the supporter) was present (1c) or absent (1d). Given the results of Fukumura et al. (2010), we expect fewer pronouns in (1c) than (1d) when an addressee is present, but no visual competitor effect when there is no addressee, as in Arnold and Griffin (2007).

Method

Participants One-hundred native speakers of English took part in the experiment.

Materials An example of the materials can be found in Figures 1-2. The sentences in conditions (1a) and (1b) were always monotransitive constructions, whereas those in (1c) and (1d) were intransitives. The pictures in conditions (1a), (1b) and (1c) always showed both the referent and competitor, whereas (1d) only showed the referent.

Design Forty-eight participants described the target pictures to an addressee (addressee group) and 52 different participants described it in the absence of an addressee (no addressee group). We had 32 experimental items in four item conditions and 40 fillers. We constructed four experimental lists with eight items presented in each item condition. Each item occurred once in each list. We randomly assigned 12 participants in the addressee group to each list and 13 participants to each list in the no-addressee group.

Procedure Participants were asked to produce coherent discourses by describing a target picture (Figure 2) following a context sentence that described a picture (Figure 1).

Participants in the addressee group had to describe the picture to another participant. They were unaware that this was an experimental confederate. First, the confederate read out the context sentence while the participant saw the context picture. Participants were told that the confederate saw the same picture. Next, the participant saw the target picture, and they continued the story by describing it to the addressee. Participants were told that the addressee saw two pictures (one was the same as the participant's and the other was different) and had to choose which of them best matched the participant's description. On 12 pre-determined trials, participants received feedback indicating that the addressee chose the wrong picture. This was done to encourage participants to produce descriptions that were easy to understand.

In the no-addressee group, participants heard the context sentence via loudspeakers in the absence of an addressee. Otherwise, their task was the same as in the addressee group, except that they received no feedback.

Results

We scored whether participants used either a pronoun or full noun phrase to refer to the referent (e.g., *the footballer*) and excluded all other cases. The mean percentages of pronouns and noun phrases are presented in Figure 3 (addressee group) and Figure 4 (no-addressee group). We analyzed the data by fitting a logit mixed effect model. Addressee presence/absence and item condition (1a-d) were included as fixed variables, and participants and items as crossed random variables. The addressee variable was centered so that the effect of addressee presence corresponds to a main effect in a standard analysis of variance. For item condition, forward difference coding was used, resulting in a comparison of conditions (1a) vs. (1b), (1b) vs. (1c), and (1c) vs. (1d).
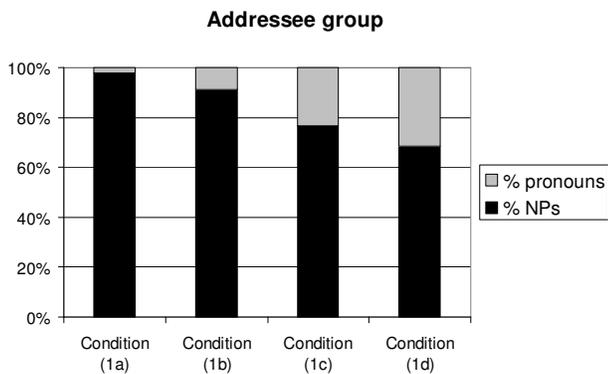
Addressee group

Figure 3: Results from the four conditions when an addressee was present.
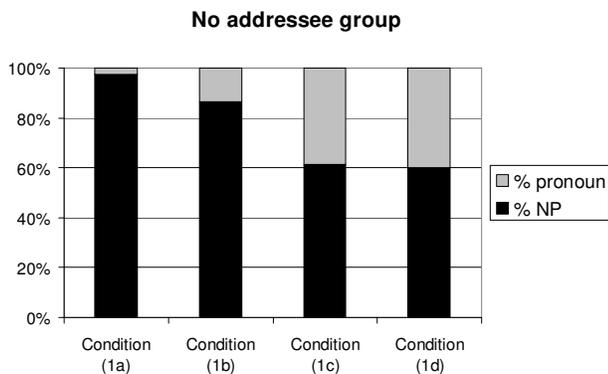
No addressee group

Figure 4: Results from the four conditions when no addressee was present.

The effect of addressee presence approached significance ($\beta = .58$, $z = 1.83$, $p = .07$), suggesting that overall, speakers produced somewhat fewer pronouns (and more noun phrases) when there was an addressee than when there was not. The effect of grammatical role/order of mention (comparing (1a) and (1b)) was significant ($\beta = -2.47$, $z = -7.53$, $p < .01$) and did not interact with addressee presence ($\beta = -.38$, $z = -1.17$, $p = .24$). Speakers produced

fewer pronouns when referring to the object than subject. The effect of linguistic mention of the competitor ((1b) vs. (1c)) was also significant ($\beta = -2.39$, $z = -11.18$, $p < .01$) and did not interact with addressee presence ($\beta = -0.23$, $z = -1.10$, $p = .27$). Pronouns were less frequent when a competitor was mentioned than when it was not. Finally, speakers produced fewer pronouns when a competitor was visually present (1c) than absent (1d): $\beta = -0.58$, $z = -3.58$, $p < .01$. However, this effect was qualified by an interaction with addressee presence ($\beta = .38$, $z = 2.33$ $p = .02$). The visual competitor effect was significant when there was an addressee ($\beta = -.96$, $z = -3.77$ $p < .01$), but not when there was no addressee ($\beta = -0.19$, $z = -.89$ $p = .38$).

Discussion

The results showed effects of grammatical role/order of mention and linguistic mention of a competitor on the choice of referring expressions. Participants produced more pronouns and fewer noun phrases when the referent was mentioned as the subject rather than object in the preceding sentence and they also produced more pronouns when no competitor was mentioned than otherwise. Thus, in line with previous studies (e.g., Arnold & Griffin, 2007; Brennan, 1995; Fukumura & Van Gompel, 2010), participants tended to produce less explicit referring expressions when the prior linguistic context made the referent more salient. Most interesting, these linguistic saliency effects were unaffected by whether speakers produced reference for an addressee or not. Thus, they appear to take into account the referent's saliency in the linguistic context regardless of whether an addressee could benefit from this or not.

It seems unlikely that we failed to find an interaction between addressee presence and linguistic saliency effects because the addressee manipulation was too weak, because we observed that the visual competitor effect *was* affected by addressee presence. When speakers produced reference for an addressee, we observed an effect of visual context, that is, participants produced more pronouns and fewer noun phrases when there was no competitor in the visual context than when there was a visual competitor, but there was no such effect in the absence of an addressee. This suggests that speakers take into account how salient the referent is in the visual context for the benefit of the addressee. Thus, the visual competitor effect is allocentric; when there is no addressee, speakers do not appear to take into account the referent's visual saliency, but instead choose their referring expression purely on the basis of its saliency in the linguistic context.

These results are consistent with the idea that in the first place, speakers construct a discourse representation on the basis of the linguistic input, as suggested by many discourse theories (e.g., Kamp & Reyle, 1993; Kintsch & Van Dijk, 1978; Grosz, Joshi, & Weinstein, 1995). When they choose the form of reference, they use this linguistically-based discourse representation to determine the referent's saliency,

regardless of whether this may help the addressee or whether there is no addressee. Our results indicate that when there is no addressee, their choice of referring expression is entirely based on this linguistically-based discourse representation. But when they produce reference for an addressee, they go further by also consulting extra-linguistic information that is not part of their linguistically-based discourse model, so they produce more explicit referring expressions when a competitor is visually present than absent.

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