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The role of potential referential conflict in the choice of a referring expression

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Abstract

The present survey focuses on the phenomenon of referential ambiguity, or referential conflict, i.e., the discourse situation in which two or more referents are activated high enough to be chosen the antecedent of a reduced referring expression. While permanent ambiguity occurs occasionally and is quite uncommon, potential ambiguity is pervasive in language and, thus, should be thoroughly studied. In addition to proposing the typology of referential conflicts, this study seeks to give an explanation of the effects related to the potential referential conflicts that are described in the literature. It proposes a model of the referential conflict that accounts for the choice of the referential strategy made by the speaker depending on whether she or he precludes referential conflicts or not. Finally, from examining the past work on the topic as well as analyzing the results of the current experiment on Russian material, a general model of referential choice is presented which should place the mechanism responsible for the preclusion of referential conflict as a separate module rather than reckoning referential ambiguity among the factors which lower the activation of a referent, as it has been proposed by some researchers.

Keywords: discourse, referential choice, ambiguity, potential referential conflict, preclusion of referential conflict, reference

Introduction. Reference and ambiguity: The tension between explicitness and efficiency

One of the central aspects of language use is the process of refere nce — speakers or writers refer to a particular entity that they have in mind, i.e., the referent. When they subsequently refer back to the same referent to provide new information about it, this phenomenon of repeated mention of a referent is known as anaphora. In order for communication to be successful, the listener or the reader must recognize what the speaker or the writer is referring to. Meanwhile, human beings have limited resources of time, and a general desire to make their communication as economical as possible. One way to make communication more efficient is to use a shorter and a simpler linguistic element, i.e., a referring expression, such as a pronoun or an anaphoric zero. In this case, however, a reduced referring expression can refer to more than one referent, establishing corefer ence — deciding that two different referring expressions refer to the same referent.

If it is unclear to a listener or reader what a reduced referring expression is refers to, then the expression is referentially ambiguous. Generally, ambiguity is a pervasive phenomenon in language which occurs at all levels of linguistic analysis — in phonetics, morphology, syntax and discourse. Some linguists argue that the key structures of language have not evolved for purposes of communication precisely because of ambiguity. “The natural approach has always been: Is [language] well designed for use, understood typically as use for communication? I think that’s the wrong question.... If you want to make sure that we never misunderstand one another, for that purpose language
is not well designed, because you have such properties as ambiguity. If we want to have the property that the things that we usually would like to say come out short and simple, well, it probably doesn’t have that property.” (Chomsky, 2002:107).

As pointed out by Piantadosi and colleagues (2012), however, contrary to the Chomskyan view, “Ambiguity is in fact a desirable property of communication systems, precisely because it allows for a communication system which is short and simple” (Piantadosi, Tily, & Gibson 2012: 281). The authors proposed two beneficial properties of ambiguity: “First, where context is informative about meaning, unambiguous language is partly redundant with the context and therefore inefficient; and second, ambiguity allows the re-use of words and sounds which are more easily produced or understood” (Piantadosi et al., 2012: 281). Ambiguity is therefore a functional

property of language, and the investigation of this phenomenon contributes to the knowledge about how people use language in communication.

This survey focuses on referential ambiguity, or referential conflict (The term ‘referential conflict’ was introduced in Kibrik, 1987.) , namely, the issue ofhow speakers choose a particular referring expression amongst alternatives in a situation of potential referential conflict. The structure of the paper is as follows. Section 1 focuses on the choice of a particular referring expression for a referent, or the referential choice (In the paper the term ‘referential choice’ is used that was first mentioned in the Pear Stories (Chafe, 1980); it is not common, but see Arnold& Griffin, 2007 or Kibrik, 2011) that is made by the speaker on the basis of a number of various factors. Section 2 addresses the typology of referential conflicts. In Section 3, I consider the case of the potential referential conflict when there are two highly activated referents of the same or different conceptual genders. The Section 4 summarizes and discusses the major findings and proposes the model that underlies the speakers choice of referring expressions in a situation of referential conflict.

1.Referential choice: Factors and models

When a speaker mentions a referent, she or he chooses from a multitude of different kinds of referring expressions — various full noun phrases (NPs), pronouns, and anaphoric zeroes. Which factors determine the preference for a particular referring expression over the alternatives? Is there a model which best describes the referential choice? This section considers early accounts of referential choice (Subsection 1.1) as well as the cognitive multi-factorial model of referential choice proposed in Kibrik (2011) (see Subsection 1.2).

1.1. Past accounts of referential choice

It is widely believed that a speaker does not choose referring expressions randomly. Almost all researchers explain the choice of a particular referring expression by its appeal to the cognitive status of the referent in the speakers and the addressees minds. There seems to be a general assumption that when the referent is highly

active or available in palette of ideas and cognitive notions is employed to identify the processes and mechanisms of the choice of referring expressions. Some of the terms that are used to describe the referential choice are: focusing, memory, activation, consciousness, salience, prominence, accessibility, and topicality.

There are traditionally two different views on the phenomenon of referential choice, adopted in theoretical linguistics and psycholinguistics respectively. The former concentrates on identifying different factors that determine the referential choice and their relation to different types of referring expressions. The latter focuses on how these factors are used during language production and comprehension. Note that the majority of psycholinguists deal with interpretations of referring expressions by the addressee, i.e., r eference resolution. See linguistic and psycholinguistic surveys in Gamham (2001).

Among the landmark studies in functional linguistics relevant to the present study are the Topic Continuity Hypothesis by Givon (1983), the Accessibility Hierarchy by Ariel (1988, 1990), and the Givenness Hierarchy by Gundel et al. (1993) which elaborated on Chafe's (1976) discussion of givenness. Researchers recognize different linguistic properties affecting the referential choice, including: (1) referential distance between the antecedent and the anaphor; (2) potential interference, i.e., how many potential antecedents of the referring expression are present in the discourse; (3) persistence, i.e., how long the referent remains in the discourse; (4) saliency of the antecedent, which is determined by whether it is a topic or not; (5) unity, i.e., whether the antecedent is within the same episode or not (Givon, 1983; Ariel, 1988 and 1990); and (6) rhetorical structure of the discourse (Fox, 1987).

Some psycholinguistic research has shown that speakers use more reduced referential forms when the referent is the subject in sentence-initial position (subjecthood) rather than a second-mentioned object (e. g., Arnold, 2001). The results are consistent with theoretical accounts which claim that the referent's accessibility is affected by the antecedent's grammatical role (Centering Theory by Grosz, Weinstein, & Joshi, 1995) or the antecedent's sentence position (Gernsbacher & Hargreaves, 1988). The research based on Finnish data suggests that both the antecedent's grammatical role and its sentence position influence the accessibility of the referent (Järvikivi, van Gompel, Hyönä, & Bertram). Another factor is parallelism. First proposed by Sheldon (1974), this hypothesis refers to the increased accessibility of

antecedents in the same grammatical position — subject, object, or other — as in the preceding clause (see Arnold, 2008 for a review). Implicit causality is a phenomenon associated with certain verbs that are biased either towards the subject or towards the object. Several researchers argued that this is because certain semantic roles are more likely to be seen as the cause of the event denoted by the verb. Some psycholinguists identify ambiguity as another factor affecting the activation in the speakers mind (e.g., McDonald & MacWhinney, 1990), but the present study put the phenomenon within another component of the Model of Referential Conflict.

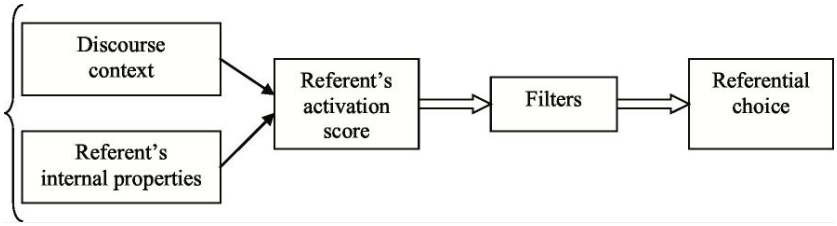

Figure 1. The Cognitive multi-factorial model of referential choice (reproduced from Kibrik 2011: 394, with the permission of the author)

Past accounts of referential choice — linguistic and psycholinguistic — have generally focused on the roles of one or a few factors in establishing reference. In contrast with previous work, the purpose of the cognitive account by Kibrik (2011) is to pull together many different factors into one general framework, namely, the Cognitive Multifactorial Model of referential choice.

1.2. Cognitive multi-factorial model of referential choice by Kibrik (2011)

Many theories of reference and referential choice suggest that cognitive concepts of attention and memory are the critical constraints in speakers' calculations about which referential forms to use (Chafe, 1994; Gundel et al., 1993; Givon, 1993; Rosa & Arnold, 2011). According to Kibrik, the notions of reference and referential choice are not synonymous: Reference is a process referring to a speakers decision to mention a certain referent at a certain moment in discourse, while referential choice denotes the process of choosing a certain referring expression amongst others. In Kibriks (2011) model, the attention to a referent determines its reference

while the activation in the speakers working memory determines referential choice.

According to this model the referential choice is made by the speaker on the basis of different factors that are hereby called activation factors, falling into two categories: discourse context and referents internal properties, see Fig. 1. The first category of activation factors includes rhetorical, linear, and paragraph distances to the antecedent, syntactic and semantic roles of the antecedent, the antecedents referential , the referential, syntactic and semantic roles of the current mention, sloppy identity of referents, supercontiguity, temporal or spatial shift, predictability, and introductory antecedent. The second category includes animacy and protagonisthood.

In Kibrik (2011) an approach is adopted that allows the description of the integration of activation factors, hereby called the activation score, in each moment of the discourse stream. Each factor of activation is ascribed a certain value; in sum, the activation score can range from Oto 1. The scale has some thresholds; for example, if an activation score is below a certain threshold, a full NP is used; otherwise, a reduced form is possible. Note that some values allow for a free choice between the two alternatives.

Finally, a separate component of the model — 'Filters' — consists of the world boundary filter that blocks a reduced form of a referent activated in an alternative 'world', and the referential conflict filter that allows to revise a reduced referring expression if it can create the ambiguity effect for the addressee.

In Section 4, a new model of the referential choice is proposed, which is a modification of the model described here.

2. Typology of referential conflicts

From the addressee's perspective, a more general definition of referential conflict says that a referential conflict arises whenever the addressee is unable to select a unique referent for a referring expression out of multiple alternatives. From the speaker's perspective, according to the Cognitive Multi-factorial Model, a referential conflict can take place whenever two or more referents are activated, and activation scores of all of them allow using a reduced form. (Referential conflict is more probable with reduced referring expression, but it can related to the full NPs as well.) This

section examines different types of referential conflicts from the addressee's (Subsection 2.1) and the speaker's (Subsection 2.2) perspectives.

2.1. Referential conflict

from the addressee's perspective

Two distinctions are used in discussing this topic. The first distinction is between precluded and actual referential conflicts. A precluded referential conflict occurs when in the presence of all above-mentioned prerequisites (high activation scores for two or more referents) there are some linguistic devices that help the addressee to tease apart two or more alternatives; see examples below:

1. My sister, was very fond of her new schoolmaster. She/He. always arrived in the classroom ten minutes early. (In all examples the following conventions are used. An anaphoric referring expression and its antecedent have the same index; the first-mentioned referent is underlined, the second-mentioned referent is double-underlined; referential aids are boldface; ambiguous fragments are italicized.)
2. At a quarter to nine the laboratory assistant Petrov., all out of breath from running, rushed into the room, but it turned out that the department chair, still wasn't there. Of course, the **secretarial/executive** position obliged him/him, to come on time. In addition, an appointment was scheduled for half past eight, and the visitor was already waiting in the hall.
3. For over a year Katya, has been extremely worried for her niece. Except for **the niece/Katya,** /she, had no other close relatives.
4. My sister, was very fond of her new schoolmistress., **so/because** /she, always arrived in the classroom ten minutes early.

These linguistic devices that help the addressee to preclude referential conflicts are hereby called deconflicters (Kibrik, 2011: 287ff.) (Studying reference production, Kibrik (2011) uses terms 'deconflicters' and 'referential aids' as synonyms. Here, I use the term 'deconflicters' describing reference resolution, and 'referential aids' describing reference production.). Kibrik distinguishes two classes of deconflicters: conventional and ad hoc. Conventional

deconflicters refer to lexico-grammatical categories, such as gender (Ex. 1), number, etc. Ad hoc deconflicters are based on semantic compatibility with the context and the encyclopedic information (Ex. 2) and the engagement factor (The term 'engagement factor' was introduced in Kibrik, 1987.) (Ex. 3). For the same notion Givon (1983) used the term 'potential interference', and Foley and Van Valin (1984) used the terms 'inference system' or 'pragmatic system'. It is possible to discriminate the third class — implicit causality (Ex. 4) — that differs from the two others because the phenomenon of implicit causality relates to attention (and therefore to reference), but not to activation in working memory (and therefore to referential choice). Moreover, experiments by Fukumura and van Gompel (2010) showed no evidence that semantic biases affect the choice of anaphor: participants produced more reduced referring expressions when referring to the first-mentioned subjects than to the second-mentioned objects. So, the factor 'implicit causality' is not among activation factors. This factor is excluded from the list of referential aids influencing preclusion of referential conflict as well (see below). However, implicit causality likely helps the addressee to preclude referential conflicts. Implicit causality thus is a factor related to which deconflicters and referential aids are distinguished.

The second distinction is the one within actual referential conflict, namely, between temporarily and permanently ambiguous referential situations. The first situation — a temporary referential conflict — is actually quite common in everyday language use. Consider some examples:

5. The schoolmistress, told my sister that she/she certainly could **conduct/take** an exam next Thursday.

6. My sister, was very fond of her new schoolmistress. She/She, al ways arrived in the classroom ten minutes early to $Ø_i$/$Ø_j$ **be able to sit in the front row/chat with her students.**

7. The cat, smelled the dog, only when it/it ran out in the road. Then, having stopped in the middle of the road, it/ It suddenly **meowed/barked.**

8. My sister, was very fond of her new schoolmistress. /She always arrived in the classroom ten minutes early to 070 better prepare for the class.

But today **my sister/the schoolmistress** was forced to be late.

In all these examples, the addressee is unable to determine the antecedent® during some discourse fragment: within a clause (Ex. 5), a sentence (Ex. 6), a paragraph (Ex. 7), and a whole discourse

fragment (Ex. 8). The temporary referential conflict is resolved with the help of the deconflicters as well. The most common deconflicters in such cases are ad hoc ones.

The second situation within actual referential conflict — a permanent referential conflict — is not as common as the previous one. For example:

9. The cat, smelled the dog, only when it/jt ran out in the road.

10. My sister was very fond of her new schoolmistress.. always arrived in die classroom ten minutes early to **Øi/Øj** better prepare for the class.

11. Ata quarter to nine the laboratory assistant Petrov, all out of breath from running, rushed into the room, but it turned out that the department chair, still wasn't there. Of course, the position obliged / him. to come on time. In addition, an appointment was scheduled for half past eight, and the visitor was already waiting in the hall.

In these examples the addressee is unable to determine the antecedent of the reduced referring expression from start to finish. There is no resolution to the referential conflict.

2.2. Referential conflict from the speaker's perspective

There is one explicit distinction, between a discourse situation where only one referent with a high activation score exists and a situation where two or more referents are highly activated. In the first situation, the probability of the referential conflict is close to zero. This type of situation is excluded from further consideration.

This study concentrates on the second situation, namely a potential referential conflict, which is created due to the concurrent activation of two or more referents. One might argue that this situation is represented as a sort of continuum between two poles: at one pole of this continuum are cases in which there is a high (close to 100%), probability of referential conflict. At the other pole are those cases which have a low probability of referential conflict, regardless of the concurrent activation of two or more referents. What factors influence the probability of the referential conflict? Does the speaker always take the addressee factor into account, or are there various speakers' strategies? These questions are addressed in the next section.

3. Potential referential conflict: Ambiguity avoidance or semantic competition?

The section is structured as follows. Subsection 3.1 describes the so-called gender effect' on referential conflict resolution while Subsection 3.2 considers 'two-character effect' introduced in Arnold and Griffin (2007). Next, a review of the_literature_is_presented_whic h_provides_evidence_for_two [3] The term 'antecedent' refers to the linguistic form with which the referent was last mentioned.

alternative hypotheses — the ambiguity avoidance hypothesis and the semantic competition hypothesis — that are proposed for accounting for a situation of potential referential conflict (Subsection 3.3). Finally, Subsection 3.4 addresses the experiment in Russian.

3.1. Gender effect

Usually, the gender effect on referential conflict resolution is described as evidence for ambiguity avoidance. The gender effect account predicts that a speaker uses fewer reduced referring expressions (mostly, third-person pronouns) when there is more than one highly activated referent that matches the gender of the referring expression (Fletcher, 1984; Karmiloff-Smith, 1985; Arnold et al., 2000; Arnold & Griffin, 2007; Fukumura et al., 2010). Two studies are of particular relevance, first relating to pronoun resolution, and the second — to reference production.

In the two eyetracking experiments of Arnold et al. (2000) participants were presented with pictures of two familiar Disney cartoon characters of either the same (Ex. 12) or a different (Ex. 13) gender. They listened to texts describing the pictures, in which a pronoun referred to either the first character that was more accessible, or the second.

12. Donald, is bringing some mail to Mickey, while a violent storm is beginning. He./He. is carrying an umbrella, and it looks like they're both going to need it.

13. Donald, is bringing some mail to while a violent storm is beginning. He./She, is carrying an umbrella, and it looks like they're both going to need it.

The results of the experiment demonstrated a gender effect and the fact that gender (as well as accessibility) affects the initial processes (approximately 200 ms after the pronoun offset) of pronoun resolution.

In Arnold and Griffins (2007) experiments, participants were also shown pictures with two familiar Disney cartoon characters of either the same or a different gender. The participants task was to listen to a sentence describing the first picture, repeat it, and then continue the story by making up a sentence that would describe the second picture. (See Ex. 14 for the same-gender context and Ex. 15 for the different-gender context.)

14. Mickey, went for a walk with Donald, in the hills one day.

15. Mickey, went for a walk with Daisy, in the hills one day.

Arnold and Griffin (2007) provided evidence that participants produced fewer pronouns in the same-gender than in the different-gender condition; i.e., the presence of another character of the same gender reduced pronoun use.

Usually, the gender effect is described as evidence for ambiguity avoidance. Another possibility is that this effect is driven by increased semantic competition between referents in the same-gender condition, which reduces the referents activation in the speakers memory. This dilemma is discussed below.

3.2. Two-character effect

Arnold and Griffin (2007) showed that the presence of a second character influences the referential choice between a pronoun and a proper name. This is true, however, even if the characters differ in gender, so that a proper name does not disambiguate any more than a pronoun. Arnold and Griffins (2007) study demonstrated that speakers were less likely to use a pronoun in the two-character context (29% pronouns) than in the single-character context (67% pronouns).

16. Mickey, went for a walk with Daisy, in the hills one day.

17. Mickey, went for a walk in the hills one day.

Whereas the gender effect could be the result of an ambiguity avoidance strategy, the two-character effect cannot. Arnold and Griffin (2007) argued that the reasons for the two-character effect lie in the speakers' cognitive load when they generate referring expressions.

3.3. Ambiguity avoidance or semantic competition?

The experiments described in the previous sections demonstrated two effects on speakers' decisions to use full or reduced referential expressions. Speakers produced reduced referential expressions more often when there was no other character present in the discourse context than when there was another character of a different (two-character effect) or the same (gender effect) gender.

There are two alternative hypotheses that are proposed to account for the two phenomena. The first hypothesis — ambiguity avoidance — is the most common explanation for the gender effect: speakers use fewer reduced referential expressions when the linguistic context includes a competitor that has the same gender as the referent to facilitate identification of the referent for the addressee. This addressee-oriented' view (see Arnold, 2008 for a review) of referential choice is in accordance with evidence about the role of common ground and audience design in language use (Clark, 1996; Brown-Schmidt, 2009 and in press).

The addressee-oriented view, however, does not fit with the two-character effect, according to Arnold and Griffin (2007). The authors argue that this effect is not affected by the addressee's factor; on the contrary, it is of an egocentric nature. Consider the speaker-oriented view in more detail. Arnold and Griffin (2007) explained the two-character effect in terms of competition between two characters that were present in discourse context. They argued that "the reduction in pronoun use for situations with more than one character is likely to result from competition between entities in the speaker's mental model, which results in a lower level of activation for each entity" (Arnold & Griffin, 2007: 528). Further support for the semantic competition hypothesis came from Arnold and Griffin's (2007) findings that reduced forms declined when utterances were disfluent, reflecting the stage of planning.

Is it possible that the gender effect described above is also due not to ambiguity avoidance, but to semantic competition? In English, pronouns are ambiguous in the same-gender condition, but not in the different-gender condition. That is, the gender effect is specific to gendermarking languages. Fukumura (2010) tested this effect in Finnish, where pronouns are not gender marked.

The Finnish pronoun hän does not encode gender distinction; i.e., it is ambiguous in the same-gender condition (Ex. 18), as well as in the different-gender condition (Ex. 19):

18. Kuningasi vieraili linnassa lentäjänj kanssa.
‘The king visited the castle with the pilot.’
19. Kuningasi vieraili linnassa lentoemännänj kanssa.
‘The king visited the castle with the stewardess.

According to the ambiguity avoidance hypothesis, the referential choice is not affected by the competitor’s gender in Finnish. The semantic competition hypothesis, however, predicts that the competitor’s gender affects referential choice in Finnish, because semantic similarity between referents of the same gender influences the referent’s activation score. The results showed that Finnish speakers produced significantly fewer pronouns when the competitor had the same gender (lentäjän ‘pilot’) than a different gender (lento emännän stewardess’), supporting the semantic competition hypothesis.

Fukumura and Hyönä (2011) tested Finnish native speakers in an English version of the same experiment. If this effect, referred to as gender congruence, is not due to ambiguity avoidance, it should remain the same with English stimuli. However, it is significantly larger in English than in Finnish, suggesting that gender congruence affects both semantic competition and ambiguity avoidance.

3.4. Experiment in Russian

This section describes the experiment on the Russian material which replicates Exp. 2 of Arnold and Griffin (2007).

Method. Participants. Twenty-four students participated in the study. All of them were naive with respect to the purpose of the experiment, they were native speakers of Russian and had normal or corrected-to-normal vision.

Materials and procedure. Participants were presented with a set of visual stimuli. Each stimulus item consisted of two pictures which together formed a short story involving one or two referents. All pictures used in the experiment represented the characters from popular Soviet cartoons which are familiar to most Russian speakers and thus could be easily identified and named by the participants.

The condition of interest was the number of characters displayed in the pictures. Each of the 15 stimulus items appeared in three versions, so that: (1) only one character was displayed in each of the two pictures (1/1 context); (2) two characters of different genders were displayed in both pictures (2/2 context); (3) two characters of different genders were present in the first picture, but only one of them remained in the second picture (2/1 context). See Fig. 2. Three

stimulus lists were constructed by rotating the 15 stimulus items through the three conditions in a Latin Square design. Additionally, two practice items were placed at the beginning of each list.

In each trial, the participant was first shown both pictures, placed one under another on the computer screen, for two seconds. Then the second picture disappeared and the participant heard the pre-recorded voice that described the first picture in one sentence. The first character was always mentioned in the subject position, and the second character was mentioned in the combative prepositional phrase (PP) (see Ex. 20).

20. Freken Bok. s Karlsonom. byli na kuxne.

‘Freken Bok with Karlsson was in the kitchen.’

The participant was asked to repeat the sentence that he or she had just heard word-for-word. Right after that, the experimenter pressed a key and the second picture reappeared on the screen. The participant’s task was to continue the story by making up a sentence that would describe the second picture. In order to stimulate participants to produce coherent and simple discourses, they were asked to imagine that they were telling a story to a five-year-old child.

Results and discussion. The character that was present in both pictures was made somewhat visually more prominent so the participants were encouraged to mention it first and to make it the grammatical subject of the second sentence. As can be seen from the table below, canonical sentences prevailed among the responses. Non-canonical sentences (those having both characters as a subject) as well as those containing errors were excluded.

Figure 2. An example of a stimulus Item. From left to right: 1/1,2/2 and 2/1 contexts

The number of characters displayed in the first/ second picture	Canonical sentences, %	Type of the referring expression, %		
Anaphoric zero	Pronoun	Full NP		
1/1	90	34	37	29
2/2	72	1	2	97
2/1	78	0	1	99

Table 1. Percentage of the chosen referring expressions

In the present study the phenomenon of interest is the choice of the referring expressions in one- and two-character contexts. The

percentage of anaphoric zeroes, pronouns and full NPs was measured. Table 1 shows that while in 1/1 contexts the distribution of referential choices is almost equal, in 2/1 and 2/2 contexts participants overwhelmingly chose full NPs, despite the fact that the use of a pronoun would not cause any referential conflict and thus be sufficient.

The statistical reliability of the obtained results was evaluated using the R software environment. Specifically, the functions binom.test and prop.test were run in order to calculate p-values. The statistical testing showed that the three types of referring expressions were identically distributed in 1/1 contexts ($p = .42$), while in two-character contexts the difference between the amount of full and reduced referring expressions was statistically significant ($p = .01$) proving that the preference for full NPs was not accidental. In addition, the similarity in the distribution of referring expressions in 2/1 and 2/2 contexts (p-values ranging from .24 to .73) supports the idea that the referential choices made by participants were based on the activation of referents rather than being conditioned by the type of the presented visual stimulus.

Recall that Exptriment 2 of Arnold and Griffin (2007) demonstrated the use of full NPs 33 % of the time in the singlecharacter context, compared to 71 % in the two-character contexts. In this experiment full NPs were used 29% of the time in the single-character context, but almost 100% of the time in the two-character context. This suggests that the PPs used in the Russian experiment, ‘Freken Bok with Karlsson were in the kitchen, significantly differed from stimuli used in Arnold and Griffin (2007), Mickey went for a walk with Daisy. In the Russian experiment, all PPs are continuous, so participants perceived them as a whole referent. In order to explain this effect I introduce a novel activation factor, called ‘multiple antecedent’. It is possible that this factor decreases the activation score nearly twice so the current activation of ‘Freken Bok’ becomes too low to use a reduced referring expression, thus suggesting that there is no situation of potential referential conflict at all.

4. Potential referential conflict from the speaker’s perspective

The above-mentioned studies revealed two novel effects: the gender effect and the two-character effect; two novel hypotheses: the ambiguity avoidance hypothesis and the semantic competition

hypothesis; two views on referential choice: the speaker-oriented view and the addressee-oriented view, and a number of novel questions. In particular, these findings raised four important and controversial questions. The first question addresses a possible locus for the gender effect and the two-character effect; the second evaluates the role of the addressee in referential choice; the third relates to the speaker's referential strategies; the last focuses on linguistic devices used to preclude referential conflict. This section examines the major findings of the related research reported in the literature.

Let us begin with the question about a possible locus for the gender effect and the two-character effect. There are two possibilities. One possibility was stated by Arnold and Griffin: "When two characters are present in the discourse, they share the attentional resources available, and each receives less activation in the speaker's internal representation" (Arnold & Griffin, 2007: 528). That is, the locus for these effects is the activation system in the speaker's working memory. Contrary to this hypothesis, Kibrik (2011) suggested that the locus was separate from the activation system. He proposed a distinct component of referential choice, namely, the referential conflict filter (see Fig. 1 above). He argued that "the speaker's caring about precluding referential conflicts is a part of his/her efforts in establishing the common ground (Clark & Brennan, 1991; Clark & Bangerter, 2004; Hanna et al., 2003) with the addressee", and that "by using this filter, a speaker may revise a projected reduced referential device if it creates a threat of ambiguity for the addressee" (Kibrik, 2011:67ff.). Kibrik drew an analogy between the separate component of referential conflict in his model and the idea that the common ground is used as a second-stage filter in reference processing (Keysar et al., 2000).

The second question relates to the addressee's role. Whereas early studies of the addressee's factor supported the addressee-oriented view on the referential processes (see, e.g., Clark & Wilkes-Gibbs, 1986; Brennan & Clark, 1996; Clark & Krych, 2004), more recently the focus has shifted to the speaker-oriented view. The reason for this shift primarily came from Ferreira et al.'s 2005 study. They distinguish between nonlinguistic ambiguity (conceptual ambiguity, in terms of Arnold, 2008) and linguistic ambiguity. Nonlinguistic ambiguity arises, for example, in the context of two flying mammals, one larger and one smaller. Linguistic ambiguity arises because of segmentation ambiguity (a back vs. aback), syntactic ambiguity, and

homophony (e.g., the word bat means a flying mammal or an instrument for hitting baseballs).

Ferreira et al.'s (2005) central claim is that the similarity that relates to nonlinguistic ambiguity is represented at the level of meaning, whereas the similarity that relates to linguistic ambiguity is represented at the level of linguistic form. They presented three experiments that have demonstrated that speakers consistently avoid saying the bat when two bats of different sizes are visible: they say, for example, the small bat instead. But speakers very often say simply the bat when pictures of both a baseball bat and a flying mammal are visible. Ferreira et al's (2005) suggested that people are much less likely to avoid linguistic ambiguities, because this type of similarity does not become available until after the production process has begun. Before producing an ambiguous expression, they proposed, speakers have available only a comprehensionbased ambiguity-detection strategy. This strategy, however, is not especially effective, because it involves monitoring one's inner speech, which has been argued to pose a high processing demand (see Levelt, 1989).

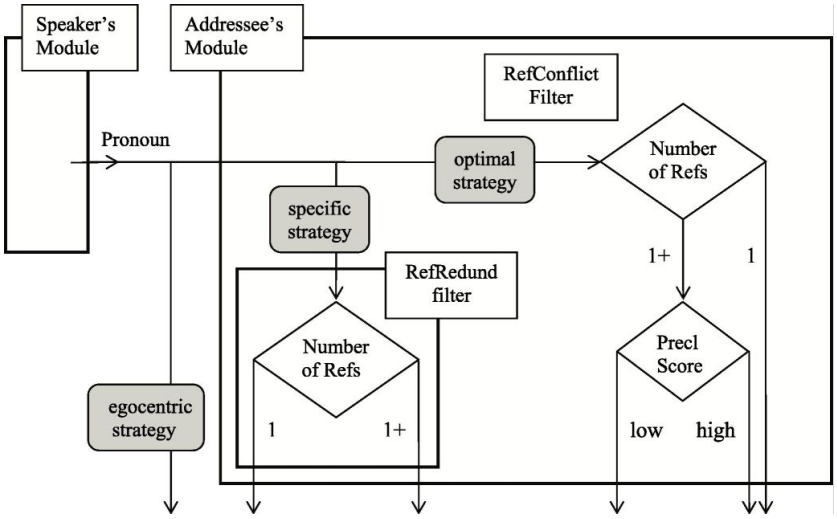

Figure 3. Referential strategies in situation of potential referential conflict

A production-based ambiguity-detection strategy is more effective than one based on comprehension, but it detects ambiguous expressions after they are produced. However, such an after-the-fact ambiguity avoidance strategy helps speakers to clarify already

articulated ambiguous expressions (antitopics in terms of Lambrecht, 2004). Ferreira et al. (2005) concluded that “at least as for as online production is concerned, linguistic-ambiguity may not powerfully influence speakers’ utterances, at least not until after they have been articulated” (Ferreira et al., 2005:280).

The third question concentrates on the speaker’s referential strategies. Arnold (2008) suggested that a referential choice in discourse deals with both speaker- and addressee-oriented processes. She proposed that speakers suppose that addressees have a similar current mental model as themselves, so they could simply calculate the referent’s activation score referring to their own mental model. At the same time, Arnold (2008) noted that speakers sometimes provide information that is redundant from the addressee’s perspective. Describing speakerinternal and addressee-oriented processes engaged in referential choice, Kibrik (2011) proposed three speakers’ strategies: egocentric, optimal, and overprotective. Using an egocentric strategy, speakers overestimate the addressees’ ability to identify processes in their own minds. Using an overprotective strategy, they allow linguistic redundancy. The optimal strategy allows speakers to efficiently model their addressees’ minds.

Finally, the fourth question focuses on linguistic devices of the preclusion of referential conflict. In his cross- linguistic study, Kibrik (2011) described a wide range of linguistic resources that help to preclude referential conflict. He considered the classification of the so-called referential aids that include ad hoc and conventional referential aids. The latter type is divided into two classes: stable (e.g., gender, number, animacy or honorificity) and current (e.g., logophoricity). Showing the importance of referential aids for the purpose of referential conflict preclusion, Kibrik suggested, however, that they evolve in language for others reasons and are used here in their subsidiary functions.

The final subsections of this study are devoted to a further exploration of all above-mentioned questions. There are several important issues regarding the implications of the presented results and opinions, including a model of referential conflict from the speaker’s perspective (Subsection 4.1), preclusion factors (Subsection 4.2), and referential strategies (Subsection 4.3).

4.1. A model of referential conflict from the speaker's perspective

The detailed investigation begins at the moment when a speaker projects a reduced referring expression (a pronoun in our case) of a highly activated referent. That is, he or she
exits the first module of the two-module model of referential choice (see Fig. 3). In this moment, a speaker is at his/her first fork: he or she can choose the egocentric strategy, avoiding the addressee's module. If a speaker prefers consider the addressee, he or she runs into the addressees module and finds himself/ herself at the second fork. This time, he or she can choose between the specific and the optimal strategies. The specific strategy is, on the one hand, egocentric or speaker-internal oriented (according to Arnold & Griffin, 2007), because it does not evaluate the addressees mind. On the other hand, it is in a certain sense overprotective (Kibrik, 2011:56ff.), because a speaker prefers to use a more explicit referring expression to avoid a mistake. When a speaker decides to use the specific strategy, he or she must first check the number of highly activated referents. If there is only one highly activated referent, a speaker does not make any change. If there are two or more highly activated referents, he or she changes a projected referential form from a pronoun to a full NP. I call this component of the model the referential redundancy filter (see Fig. 3). I hypothesize that checking the number of highly activated referents is not a resource-demanding process; on the contrary, highly activated discourse referents would be automatically numbered in the speakers working memory.

Using the third (optimal) strategy speakers model their addressee' minds. When a speaker decides to use this strategy as in the case of specific strategy, he or she must first check the number of highly activated referents. If there is only one highly activated referent, a speaker does not make any change. If there are two or more highly activated referents, he or she must calculate the current preclusion score. If this score is high, a speaker does not make any change. If this score is low, he or she must change a projected referential form from a pronoun to a full NP.

The current preclusion score depends on several factors, which are described in the next subsection. It is hereby proposed that so-called optimal strategy is the best strategy, but it is too resource-demanding for speakers to engage in all the time. So, there are two

others strategies that are available to speakers. Predictions about the distribution of the mentioned strategies are discussed later.

4.2. Preclusion factors

The final choice between reduced forms and full NPs is influenced by the current degree of preclusion, i.e., the preclusion score. The different variables are taken into consideration when precluding referential conflict; the current evidence suggests that both linguistic and nonlinguistic context can affect the preclusion score. Some factors increase the probability of using reduced referring expressions, while some factors decrease it. Let us consider these factors in turn.

First, each language has its own list of potential conventional referential aids. For example, there are two Senegalese languages, Pulaar and Sereer; both of them have a noun class system. Kibrik (2011) showed, however, that only the former uses noun classes to preclude referential conflict, because the third person pronouns in Sereer are not distinguished for noun class (Kibrik, 2011:347ff.). Some conventional referential aids, such as gender or number, are cross-linguistically quite common; in contrast, some others, such as honorificity or logophoricity, are quite rare. In any case, the use of a certain conventional referential aid is not obligatory: a speaker has a choice to use it or not.

Second, each language user routinely uses ad hoc referential aids. It may be argued that ad hoc referential aids are the most common linguistic devices for precluding referential conflict. However, there is one peculiarity in using this type of referential aids — they sometimes allow temporary referential conflict, as shown in Ex. 5-8 above. It can be argued, however, that speakers do not take care of avoiding temporary referential conflict, so these situations are common in everyday language use.

So, a speaker can employ a referential aid — conventional or ad hoc — that is, a linguistic device distinguishing the target referent from the competing one. Attention is now turned to the third group of factors influencing the preclusion score, namely, nonlinguistic context. After over a decade of research on the role of nonlinguistic factors, the literature is largely equivocal. For example, Arnold and Griffin (2007) demonstrated that visual context does not affect the choice of referring expression. In this authors experiment on the Russian material, this effect is replicated (see above): the proportion of pronoun responses was unaffected by the visual presence

(condition 2/2) or absence (condition 2/1) of the competitor in the second picture.

However, Fukumura et al. (2010) found that visual presence of a competitor in both the same- and the different-gender conditions does affect the choice of referring expression. There are several differences in the method and materials between Arnold and Griffins (2007) and Fukumura et al's. (2010) experiments: Fukumura et al. (2010) used the referential communication task where the speaker instructed the addressee to pick up the referent in the visual context, and the second character was mentioned in a passive by-phrase, as in Ex. (21) and (22):

- The pirate.'s carpet had been cleaned by a prince..
- The pirate.'s carpet had been cleaned by a princess..

Note that Fukumura et al.'s (2010) results also provided evidence that the effect of visual context was smaller when the competitor was not linguistically introduced.

Specifying the role of visual context, Fukuruma et al. (2011) found an effect of the competitor's similarity': speakers produced fewer pronouns when the competitor was in the same situation as the target referent (both on a horse) rather than in a different situation (only the target referent on a horse). This effect was larger when it was relevant to the to-be-described action (getting off a horse) than otherwise (taking off a hat). Moreover, Fukuruma et al. (2011) found the same effect in the different-gender context. All these findings support the semantic competition hypothesis (Arnold & Griffin 2007) based on the speakerinternal view of referential choice.

Vogels et al. (2011) presented the results from a story completion experiment in Dutch. They showed that the visual context affects referential choice only when the impact of linguistic factors is moderated, i.e., when referents are linguistically non-salient. The authors argued that in other situations the factor of visual context can be overruled by linguistic factors.

The next question pertains to how the above- mentioned factors influence the preclusion score. It is apparent that all these factors can have pervasive effects on probabilities of the referential conflict. Four groups of preclusion factors are singled out:

- Conventional referential aids used in discourse context increase the preclusion score.

- Ad hoc referential aids used in discourse context increase the preclusion score, but sometimes they create temporary referential conflicts.
- Conceptual overlap between the target referent and the competitor in discourse context decreases the preclusion score.
- Conceptual overlap between the target referent and the competitor in visual context decreases the preclusion score.

The hypothesis here is that in everyday communication, the current preclusion score depends on more than one factor, demonstrated in Ex. 23. Each factor contributes to the aggregate preclusion score, but not much is known about how these factors interact. So, this paper restricts consideration to the intuitive notions of high and low degrees of the preclusion score. It is noted, however, that the question of speaker sensitivity to avoiding referential conflict is not answered with 'yes' or nd. Instead, the current degree of the preclusion score varies across speakers and emerges through a complicated balancing of multiple factors.

- My sister, was very fond of her new schoolmaster.. **/He.** always arrived in the classroom ten minutes early to **070. be able to sit in the front row/chat with his students.**

Intuition suggests that the conceptual factors (all but the first groups) play a more significant role in how people preclude referential conflicts than grammatical ones. The key difference between the conceptual and the grammatical factors, then, is similar to the difference between the linguistic and nonlinguistic contexts outlined by Ferreira et al. (2005): a comprehension-based ambiguity detection strategy is not especially effective, because it involves monitoring one's inner speech.

4.3. Referential strategies

In this section I describe the three strategies used by speakers in situations of potential referential conflict. These alternative strategies can be distinguished by comparing relations between the main components of the referential choice model described above.

One possible way to avoid referential ambiguity is to evaluate whether the to-be-produced reduced referring expression rules out reference to the competitor; this is the optimal strategy. As one can see in Table 2, it uses addressee-oriented and resource-demanding

mechanisms that are too resource-intensive for speakers to routinely engage in. So, there must be alternative strategies that are available for speakers to use. The specific strategy also uses the addressee-oriented mechanism of avoiding referential redundancy, but it is likely automatic and fast (see also Table 3). The egocentric strategy uses none of the mentioned mechanisms, so the speaker makes a choice with a minimal effort.

The suggested hypothesis is that there are three different strategies. What factors affect the choice of a particular strategy? An important factor influencing the speaker's choice relates to audience design. Horton and Keysar (1996) found that when speakers had no time pressure, they avoided ambiguous referring expressions more often when the addressee was present. However, they found no such evidence for situations when speakers were under time pressure. The authors suggested that speakers take into account the addressee's needs during later stages of production process. Kantola and van Compel (2011) demonstrated that activation factors were not affected by the presence or absence of the addressee, but the effect of visual context did interact with addressee presence. It may be speculated that the speaker takes into account the addressee using a more "user-friendly" strategy when an addressee is present in the discourse situation. Of course, confirming this prediction is an agenda for future studies.

Strategy	Resource-demanding mechanism	Addressee-oriented mechanism
egocentric	-	-
specific	-	+
optimal	+	4-

Fable 2. Referential strategies and associated mechanisms

Strategy	Speaker's module	Addressee's module	
		Referential conflict filter	Referential redundancy filter
	+	-	-

egocentric			
specific	+	-	4-
optimal	4-	4-	-

Fable 3. Referential strategies and modules

Conclusion. Agendas for future research

The aim of this paper was not to provide a comprehensive model of the preclusion of the referential conflict. Rather the goal was only to propose the typology of referential conflicts and to emphasize the two-stage nature of the referential choice; that is the independence of the processes responsible for the preclusion of the referential conflict from activation factors. Processes that take place in the first module of the model — the speaker's module — are automatic and apparently not effortful, because speakers do not take into account the perspective of their addressees. This module works only when a choice must be made between several referential options.

The second module — the addressee's module — works only when speakers need to evaluate and change their projected reduced referring expressions if there is potential ambiguity for the addressee. If the activation score is too low, this module does not work. This experiment with Russian data supports the view that the first module is more accurate and categorical while the second module allows a number of possibilities.

Suppose that the referential choice is a one-stage process. In this case, speakers must evaluate all activation factors together — both resource-demanding and not. This would suggest that this process is necessarily resource-demanding.

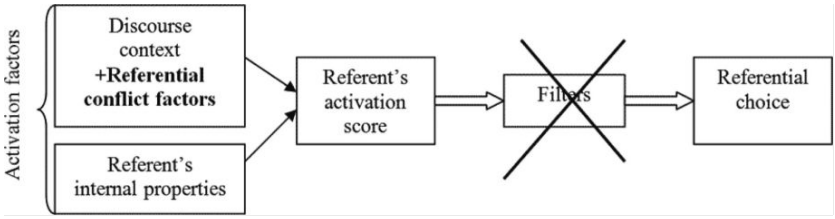

Figure 4. The Cognitive multi-factorial model of referential choice as a one-stage model

In any case, the question of whether the referential choice is a two-stage process or not is a topic for further research. Consider Kibriks model of referential choice remade into a one-stage model, as shown in Fig. 4.

Suppose that we conduct a study on reference production in which participants describe pictures. We design an experiment with two variables: context and time pressure manipulation. In general, in situations of potential referential conflict speakers prefer full NPs, but in situations with only one highly activated character they prefer pronouns.

The prediction is that if speakers use the one-stage model, their results under time pressure will not differ from the results without time constraints, see Table 4. If speakers use the two-stage model, however, under time pressure in the condition 'two-character context' they will use pronouns instead of full NPs because the time pressure should force them to skip the process of precluding the referential conflict, as shown in Table 5.

Referential context	Time pressure	
	yes	no
single-character context	pronoun	pronoun
two-character context	full NP	full NP

"Fable 4. Predictions for the one-stage model

Referential context	Time pressure	
	yes	no

single-character context	pronoun	pronoun
two-character context	pronoun	full NP

"Fable 5. Predictions for the two-stage model

* * *

Let us conclude with three final comments. First, ambiguity is not routinely noted when people communicate in their everyday speech. In contrast, psycholinguists who study language use notice ambiguity everywhere, cf. the famous quote by Chafe: “Ambiguities may be more salient to the exocultural linguist than to the endocultural narrator or audience, for whom familiarity and context are likely to remove most problems of keeping third-person referents straight” (Chafe, 1990: 315).

Second, indeed, language is rarely ambiguous within context, as noted by Miller (1951) who considered the polysemy of the word tak e: “Why do people tolerate such ambiguity? The answer is that they do not. There is nothing ambiguous about ‘take’ as it is used in everyday speech. The ambiguity appears only when we, quite arbitrarily, call isolated words the unit of meaning” (Miller, 1951 as quoted in Piantadosi et al., 2012:289).

Third, the consideration of context is not cost-free. However, the cost is moderate, and addressees are able to quickly use discourse context to disambiguate the speakers’ utterances (see Kaiser & Trueswell, 2004). So, it is hereby suggested that the temporary referential conflict is a regular phenomenon while the permanent referential conflict should be considered as an occasional aberration.

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Footnotes

1. The term ‘referential conflict’ was introduced in Kibrik, 1987.

2. In the paper the term ‘referential choice’ is used that was first mentioned in the Pear Stories (Chafe, 1980); it is not common, but see Arnold& Griffin, 2007 or Kibrik, 2011

3. Referential conflict is more probable with reduced referring expression, but it can related to the full NPs as well.

4. In all examples the following conventions are used. An anaphoric referring expression and its antecedent have the same index; the first-mentioned referent is underlined, the second-mentioned referent is double-underlined; referential aids are boldface; ambiguous fragments are italicized.

5. Studying reference production, Kibrik (2011) uses terms ‘deconflicters’ and ‘referential aids’ as synonyms. Here, I use the term ‘deconflicters’ describing reference resolution, and ‘referential aids’ describing reference production.

6. The term ‘engagement factor’ was introduced in Kibrik, 1987.