

CROSSROADS

A Journal of English Studies

ISSUE 10

3/2015

An electronic journal published
by The University of Białystok



ISSUE 10

3/2015



An electronic journal published by The University of Białystok

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DOI: 10.15290/cr.2015.10.3.01

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Sensitivity to extralinguistic cues to identify generic and non-generic meaning

Abstract. Generic sentences convey generalizations about kinds. In contrast, non-generics express facts about specific individuals or groups of individuals. However, to identify generic meaning, we have to integrate multiple cues. This study tested whether the discrepancy between the noun phrase and the number of objects (extralinguistic cues) present should force a generic interpretation whereas the match between the noun phrase and the number of objects present would give rise to a non-generic interpretation. Results demonstrated that adults are sensitive to the match and the mismatch situations in three out of four conditions tested. The data also indicate the importance of world knowledge cues in construing sentences as generic.

Keywords: generics; non-generics; extralinguistic cues; adults; Russian.

1. Introduction

Statements which express generalizations about kinds rather than individuals – generic sentences – are frequent in everyday speech and we rely on them to pass on information to one another (Leslie 2007). An interesting feature of generics is that they admit exceptions, some more readily than others. For instance, the generic statement *Tigers are striped* is true of almost all tigers (apart from e.g., albino tigers), whereas the sentence *Mosquitoes carry the West Nile virus* is true of only two or three kinds of mosquitoes of the approximately 40 kinds that are said to be important transmitters of the West Nile Virus¹. These facts do not have any bearing on the truth value of the above generics. In contrast, non-generics such as e.g., *My cat has caught two mice* or *The birds are sitting in the tree* express facts about specific individuals or groups of individuals and do not admit exceptions.

Previous research suggests that there are at least three types of cues speakers of English use to interpret an utterance generically or non-generically: morphosyntactic features (Carlson 1980;

¹ According to <http://www.ext.colostate.edu/westnile/faq.html>

Lyons 1977; Krifka et al. 1995; Gelman & Raman 2003; Cimpian et al. 2011), contextual cues (Gelman & Raman 2003; Cimpian & Markman 2008), as well as world knowledge (Cimpian & Markman 2008; Brandone & Gelman 2009). Furthermore, we need to regularly attend to various cues in order to arrive at an adequate interpretation (Gelman, 2003).

Despite the range of previous studies that mostly focused on children's abilities to detect generic meaning (e.g., Gelman and Raman 2003; Cimpian and Markman 2008; Cimpian et al. 2011), little is known about adults' abilities, which are usually put to test to detect the end-point of development of generic and non-generic meaning. Research into adults' abilities, however, seems particularly interesting in the light of Dąbrowska's (2012) research, which claims that there are considerable differences in linguistic knowledge among monolingual first language learners; i.e. native speakers of a given language do not share the same grammar. Her claim is supported by a number of studies in which she examined different facets of linguistic knowledge such as, e.g., inflectional morphology, passives, quantifiers, etc. to confirm it.

Previous experimental work has focused mostly on generic meaning in English. In this study, we turn our attention to cues that listeners use to identify a sentence as generic in an article-less language. To our knowledge, contextual cues in Russian have not been studied so far and thus offer a good background for making certain predictions.

Unlike English, Russian has no articles – probably the most direct formal cue in English – and thus relies on other linguistic devices to signal generic interpretation (see e.g., Leshkova 1984; She-lyakin 1985; Ermolenko 1987; Jespersen 2002; Dayal 2011; Alda et al. 2012). The subject NP of a generic sentence can be a bare plural (“Тигры – хищные животные” / ‘Tigers are predators’) or a bare singular (“Тигр – хищник” / ‘A tiger is a predator’). However, number is not sufficient for the kind-referring interpretation of a sentence. Note that sentences with identical noun phrases (“Тигры сбежали из зоопарка” / ‘Tigers escaped from the zoo’ or “Тигр греется на солнце” / ‘A tiger is sunbathing’) can lead to non-generic interpretations. In Russian, most generic sentences have verbs in the present tense. Sentences in other tenses and aspects, however, are also possible (“Собаку приручили много лет назад” / ‘The dog was domesticated a long time ago’ or “Дети пойдут в школу осенью” / ‘Children will go to school in autumn’) and will receive generic interpretation. Although tense and aspect are important cues, they are not entirely reliable indicators of generic meaning. It is important to observe that the presence of a demonstrative pronoun such as “тот” (that) and “этот” (this) does not preclude a generic interpretation (“Что за чудо эти небоскребы!” / ‘What a miracle these skyscrapers are’). Again, note that none of these morpho-syntactic cues – taken alone or together – can guarantee generic interpretation.

Even when formal cues are kept constant, world knowledge strongly influences generic interpretations. This seems to be due to our extensive knowledge of properties, events, and states concerning individuals, as well as kinds. For instance, ‘having’ is a state that indicates that one owns something. It appears not to be possible for an individual to have or own an entire kind. The sentence (“У меня есть паста” / ‘I have pasta’) refers to an indefinite sample of the kind, which is equivalent to ‘some pasta’. The sentence (“Мне нравится паста” / ‘I like pasta’), on the other hand,

implies a generic interpretation. Finally, contextual cues are also fundamental to the identification of generics. Let us consider a contextual cue which involves the resolution of anaphoric references involving ‘they’. In the sentence (“Собаки – хорошие друзья. Они преданные и добрые” / ‘Dogs are good friends. They are loyal and friendly’) ‘they’ implies a generic reading which refers to the whole category of dogs. By way of contrast, in a similar sentence (“Эти собаки – хорошие друзья. Они преданные и добрые” / ‘These dogs are good friends. They are loyal and friendly’) ‘they’ implies a particular reading (i.e., my dogs). Another type of contextual cue – which is of direct importance to this study – is the physical setting of the utterance (an extralinguistic cue).

For the purpose of the present paper, the pioneering study by Gelman and her colleague, which partly focused on children’s sensitivity to extralinguistic cues, will be discussed. Gelman and Raman (2003) assumed that the mismatch between a plural NP in the presence of a single object would signal generic meaning. By contrast, the match between an NP and the number of objects should signal non-generic meaning. To test this claim, 2-, 3- and 4-year-olds saw a picture of an atypical animal (e.g., a tailless horse) and then were asked a question about it in the plural (e.g., “Do they have tails?”). If children are sensitive to this mismatch situation, they would infer “they” in the question as referring to horses in general and the answer would be “yes”. However, in the match situation, children could infer that “they” refers to the tailless horses in the picture and the answer would be “no”. The results demonstrated that two groups of children: the 3- and 4-year-olds (not 2-year-olds) were sensitive to both the mismatch and the match situation. As a result, they gave generic answers in the former and non-generic answers in the latter situation.

Building upon previous experimental work by Gelman and Raman (2003) in particular, the aim of the present study was two-fold. Firstly, it attempted to investigate whether mismatch situations (e.g., using a singular NP in the presence of two exemplars of a category) and match situations (e.g., using a plural NP in the presence of two exemplars of a category) would signal different interpretations to native speakers of Russian. However, instead of capitalizing on the ambiguity of the plural pronoun “they”, we relied on bare singular and bare plural NPs. Note that a specific reference of pronouns constrained the use of “they” in some of our conditions (e.g., * “Это лев. У них три глаза?”). Note also that in the absence of the pictorial stimuli, the NPs in the questions used in the study would receive generic interpretations (see Table 2). Secondly, it served as a norming study for an experiment whose purpose was to test the aforementioned ability in individuals with semantic aphasia². In accordance with the second aim of this study, we introduced a method that placed minimal demands on the participants’ verbal production.

² There are two major approaches to classify aphasia: the Boston tradition and Luria’s classification. Semantic aphasia – a type of aphasia not included in the Boston classification – results from a lesion in the area of the left temporal-parietal-occipital junction (Akhutina 2015; Dragoy et al. 2015). Two specific deficits underlying semantic aphasia are difficulties in: (i) finding words and (ii) understanding logical-grammatical constructions such as genitive, passive, double negation or embedded clause. Although patients with semantic aphasia are able to grasp the meaning of simple sentences, little is known regarding their sensitivity to the generic/non-generic distinction.

Thus, instead of answering open-ended questions, the participants answered closed-ended “yes” or “no” questions.

Method

Participants

We recruited 162 native speakers of Russian (113 females; mean age 26; (range 16-60)) using virtualex.ru. Figure 1 in the Appendix shows the participants’ educational backgrounds, which ranged from secondary to master’s degree level.

Materials and Design

Altogether we used thirty-six items (pictorial stimuli showing animals with an atypical feature, e.g., a camel with a green hump) in our Study³. Figure 2 shows some of the pictorial stimuli used. We designed the items to reflect one of the three property types (marked in Table 1 as “extra”, “lacking”, or “changed”). The first group comprised twelve items depicting animals which have some extra feature (e.g., a lion with three eyes). Another group of pictures shows animals which lack some feature (e.g., an elephant without a trunk). Finally, the last group depicts animals with some changed feature (e.g., a cow which has claws instead of hooves). We tested each item in four conditions. Table 2 shows one item in four conditions.

| Condition | Sample example |
|-------------------|--|
| singular-singular | <i>Это верблюд. У верблюд-а зелен-ый горб?</i> DEM camel (SG.NOM) at camel-SG.GEN green-SG.NOM hump (SG.NOM) ‘Here is a camel. Does the camel have a green hump?’ |
| singular-plural | <i>Это верблюд. У верблюд-ов зелен-ый горб?</i> DEM camel (SG.NOM) at camel-PL.GEN green-SG.NOM hump (SG.NOM) ‘Here is a camel. Do camels have green humps?’ |
| plural-singular | <i>Это дв-а верблюд-а. У верблюд-а зелен-ый горб?</i> DEM two-NOM camel-SG.GEN at camel-SG.GEN green-SG.NOM hump (SG.NOM) ‘Here are 2 camels. Does the camel have a green hump?’ |
| plural-plural | <i>Это дв-а верблюд-а. У верблюд-ов зелен-ый горб?</i> DEM two-NOM camel-SG.GEN at camel-PL.GEN green-SG.NOM hump (SG.NOM) ‘Here are 2 camels. Do the camels have green humps?’ |

Table 2: Four conditions used in the Study.

³ The ideas for four items taken from studies by Gelman and Raman (2003), and Cimpian, Meltzer and Markman (2011) are marked in Table 1 as either GR (2003) or CMM (2011). The abbreviations stand for the initial letters of the authors’ surnames.

Thus, thirty-six items in four conditions generated 144 unique trials, which we divided into four lists. Each participant in our study answered questions from one of the four lists and always saw each item in only one of the four conditions. In addition, test materials included 36 fillers of other grammatical construction types.

Taking into account the results obtained by Gelman and Raman (2003), we sought to confirm that the singular-plural condition would tend to generate generic answers, whilst the singular-singular condition would tend to elicit non-generic ones. It was also our aim to verify whether the plural-singular condition would prompt native speakers of Russian to give non-generic replies. Following Gelman et al.'s studies, we also assumed that the plural-plural condition would elicit non-generic answers. We were, however, unsure whether the results from our study would straightforwardly replicate this prediction.

Note that we used the same questions with the singular NP (e.g., верблюд / 'camel') in the singular-singular condition as well as in the singular-plural condition. The questions with the plural NP (e.g., верблюдов / 'camels') were used in the plural-plural condition and the singular-plural condition. The only difference was the number of instances of a category shown (one instance in the case of the singular-singular and singular-plural conditions; two instances in the remaining conditions).

Each "yes" and "no" answer was coded as either generic or non-generic. This is to say that depending on the trial, the reply "no" (or "yes") could be coded generically or non-generically. For instance, in the singular-singular condition ("Это верблюд. У верблюда зеленый горб?" / 'Here's a camel. Does the camel have a green hump?'), the reply "no" would be coded generically (i.e., we assumed that by answering "no", the participant interprets the NP in the question as referring to the entire kind of camels). The reply "yes", on the other hand, would be included in the non-generic answers (i.e., we assumed that by answering "yes", the participant interprets the NP in the question as referring to the camel in the picture). However, the answer "no" in a different trial in the same condition ("Это крыса. У крысы 2 глаза?" / 'Here's a rat. Does the rat have 2 eyes?') would be coded non-generically. The answer "yes" would therefore be included in the generic answers.

2. Results

The results bore out the predictions outlined above (see Figure 3). We obtained 85% of generic answers in the singular-plural condition. Furthermore, the singular-singular condition generated more non-generic (69.7%) than generic replies (30.3%). Contrary to Gelman et al.'s claim, the plural-singular condition, however, generated more generic than non-generic answers: 68.5% and 31.5% respectively.

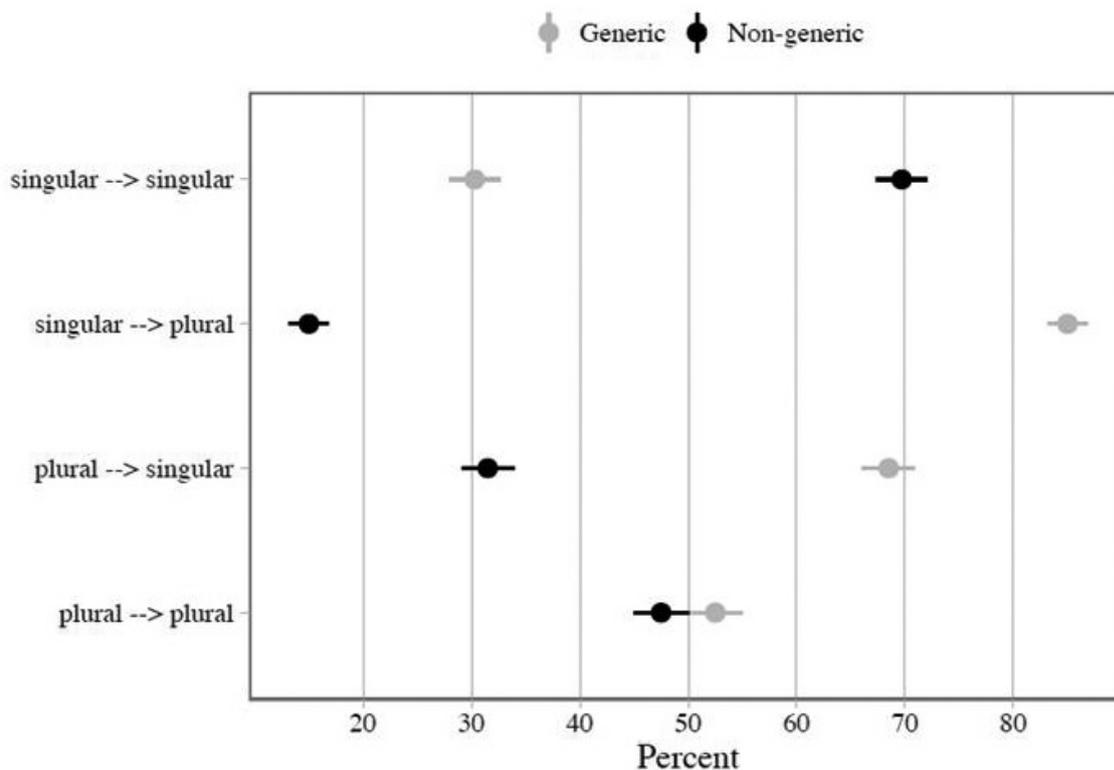


Figure 3: Percentage of generic and non-generic answers.

Yet, it was the plural-plural condition that brought the most surprising results. Although we assumed that the plural-plural condition might yield results which could differ from Gelman et al.'s study, we did not expect to get 52.5% of generic and 47.5% of non-generic answers. This shows that the participants were almost unanimously divided in their interpretations. Note that in some trials, (e.g., “Это 2 свиньи. У свиней хвост крючком?” / ‘Here are 2 pigs. Do pigs have curly tails?’), the participants’ replies divided equally into generic and non-generic ones.

3. Discussion

In this study we specifically wanted to determine how the presence of an extralinguistic cue (one or two atypical exemplars of the category) might affect adults’ interpretation of a generic NP. We assumed that when an extralinguistic cue is at odds with the NP (e.g., one exemplar + plural NP or two exemplars + singular NP), a generic interpretation would be reached. We would get specific replies, however, when the form of the NP is the same as the number of exemplars of the category. The prediction that one exemplar and the plural NP should give rise to generic interpretation was based on Gelman et al.’s (1998) study in which the experimenters analyzed conversations between mothers and children in the context of picture-book reading. It was determined that despite the fact that each picture in the book only represented a single example of its kind (e.g., an animal), mothers would at times use plural generics to talk about it (e.g., “That’s a chipmunk. And *they* eat

acorns”). Such findings are also interesting in the light of data obtained from the magazine for children *Miś* (Karczewski 2016). Some pages from the magazine depict single pictures of animals, while on others we may find fragments of generic texts concerning a given kind (e.g., the beaver, the mole, the sheep, etc). There are numerous instances of pages on which generic texts in the plural are accompanied by a picture representing one exemplar of the category. The examples from the magazine sample seem to provide additional evidence for Gelman’s claim that there is a tendency to use plural generics in the presence of a picture representing one exemplar of the category. Overall, it seems that the transition from a single exemplar to generalizing about a kind using the plural form would seem to be implying that this single instance is so representative that it may be used to stand for the whole kind.

The data we obtained from the singular-plural condition is consistent with the prediction that it should lead participants to give non-generic answers. It is, however, surprising that some participants in our study failed to reach the ceiling effect in this condition.

This study tested one condition (plural-singular) which according to Gelman and Raman should lead to non-generic answers because the singular NP in the presence of two exemplars of a category could be interpreted as referring to one of the instances displayed. This prediction was further supported by the finding that parents seldom produced generics by using the singular NP in the context of plural instances (Pappas & Gelman 1998). Our findings, however, did not confirm this prediction. The plural-singular condition yielded more generic than specific answers. Note, however, that 30% of the non-generic answers we obtained in this condition might reflect this assumption (cf. Table 3).

The fact that adults gave more non-generic replies when provided with a singular generic NP cue in the presence of one atypical exemplar of a category (singular-singular condition) accords well with our prediction. Nevertheless, it seems interesting that this construal prompted 30% of our participants to give generic replies. One explanation for this might reside in different sources of information that adults have to take into account and resolve before reaching generic/specific interpretation. It would seem that world knowledge was a prime candidate for this situation, which means that some of our participants must have relied primarily on their knowledge of the world in making their decision or that their previous knowledge concerning the animal kingdom might have overridden the extralinguistic cue available.

Our most unexpected result was that adults produced almost the same number of generic and specific replies in the plural-plural condition. What is more, this finding seems particularly interesting in the light of Gelman and Raman’s research which shows that specific answers dominated over generic answers in the plural-plural condition. The fact that the plural construal is the most natural expression of generalized meaning in Russian (Golovan 2013), must have had some bearing on the results we obtained from this study. The results might also suggest that coordinating multiple sources of information (linguistic + extralinguistic + prior knowledge) proved difficult for the participants in the plural-plural condition.

Overall, it would seem that some of our participants followed one of two strategies while completing the questionnaire. Some of them relied on their general knowledge and thus ignored the extralinguistic cue, while others decided to follow the extralinguistic cue but ignored the remaining cues available. This assumption is further supported by the comments made by some of the participants. This issue, however, requires further study and analysis and will be examined in greater detail in the experiment with individuals with semantic aphasia.

On a final note, the data obtained from the study helped us select thirty-two (out of thirty-six) pictorial stimuli which we will use in the study with individuals with semantic aphasia. We have based our selection choices on a number of factors, some of which include: (i) the overall agreement with the standard coding, (ii) the balance between “yes” and “no” answers, (iii) the balance between features (i.e., “lacking”, “extra”, and “changed”). Each item will be presented in two different conditions, thus generating 64 unique trials. The experiment will be conducted using PsychoPy (Peirce).

Acknowledgment

The authors are thankful to Anna Bakłażec who designed pictorial stimuli for the study.

Funding

The study was supported by the Erasmus Mundus Action 2 project Aurora II (2013-2521) grant to Karczewski.

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Appendix

| No. | Item | Property type |
|-----|--------------------------------|---------------|
| 1 | three-eyed lion | Extra |
| 2 | five-pawed dog | Extra |
| 3 | three-winged ladybird | Extra |
| 4 | four-eared sheep | Extra |
| 5 | two-tailed fox | Extra |
| 6 | two-nosed hedgehog | Extra |
| 7 | winged donkey | Extra |
| 8 | tailed frog | Extra |
| 9 | webbed-footed wolf | Extra |
| 10 | antlered tiger | Extra |
| 11 | tusked zebra | Extra |
| 12 | spiked snake | Extra |
| 13 | trunkless elephant CMM (2011) | Lack |
| 14 | whiskerless mouse | Lack |
| 15 | tailless horse GR (2003) | Lack |
| 16 | combless rooster | Lack |
| 17 | toothless crocodile | Lack |
| 18 | shellless turtle | Lack |
| 19 | one-winged bird CMM (2011) | Lack |
| 20 | one-eared rabbit | Lack |
| 21 | three-pawed bear | Lack |
| 22 | one-eyed hippo | Lack |
| 23 | three-legged stork | Lack |
| 24 | one-eared rat | Lack |
| 25 | clawed cow | Changed |
| 26 | straight-tailed pig | Changed |
| 27 | yellow crow | Changed |
| 28 | furry fish | Changed |
| 29 | hoofed eagle | Changed |
| 30 | short-necked giraffe GR (2003) | Changed |
| 31 | purple-legged deer | Changed |
| 32 | red-finned shark | Changed |
| 33 | stiped swan | Changed |
| 34 | green-humped camel | Changed |
| 35 | polka dotted tail-finned whale | Changed |
| 36. | pink-footed squirrel | Changed |

Table 1: Items used in the Study.

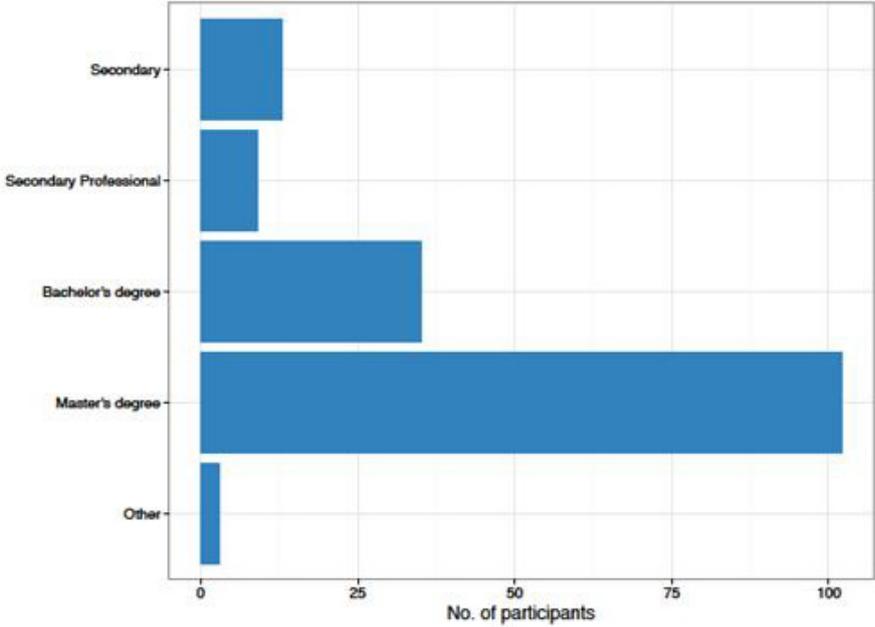


Figure 1: Participants' educational backgrounds.

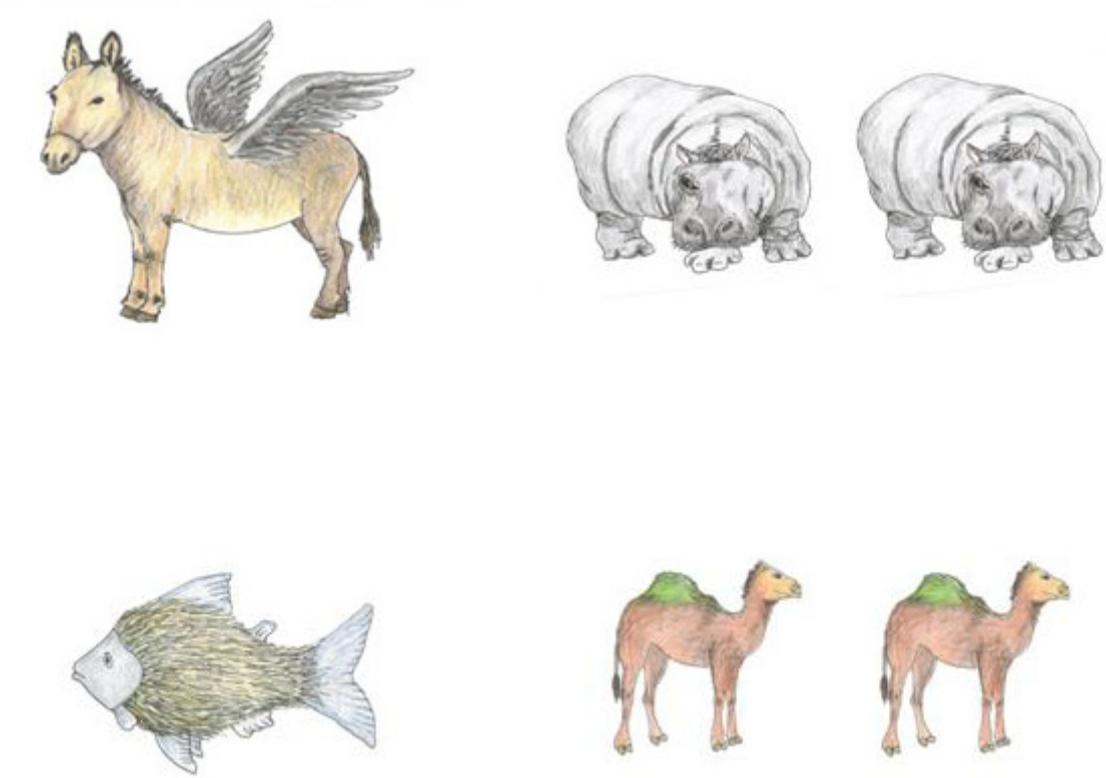


Figure 2: Sample of the pictorial stimuli used in the Study.