

The Acquisition of the Russian *Or** **

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1 Introduction

Cross-linguistically, languages fall into two categories in terms of what reading a sentence has when a disjunction operator is used with clausemate negation. In languages such as English and German, the disjunction operator has a Boolean inclusive interpretation in negative contexts, which results in the reading in (1) that I will refer to as the “neither” reading in this paper.

$$(1) \neg P \wedge \neg Q$$

In English, *or* corresponds to Boolean inclusive disjunction, as in (2).

$$(2) \neg(P \vee Q) \Leftrightarrow \neg P \wedge \neg Q$$

(3) John didn't go to the movies or the concert

“Neither” reading: John didn't go to the movies and John didn't go to the concert.

In contrast, in Russian, Hungarian and a number of other languages, the sentence where the disjunction operator is used in a negative context has an “I don't know which” interpretation, which corresponds to the reading in (4) (Szabolcsi, 2002).

$$(4) \neg P \vee \neg Q$$

Consequently, the use of the Russian “or,” *ili*, in negative contexts does not give rise to the “neither” interpretation of the sentence. In the Russian counterpart of (3) in (5), only the “I don't know which” reading is possible.

(5) Ivan ne xodil v kino ili na koncert

Ivan not _{OPAST} in movies or on concert

‘Ivan did not go to the movies or did not go to the concert.’

“I don't know which” reading: Ivan didn't go to the movies or Ivan didn't go to

the concert.

To convey the reading where both disjuncts are negated, the “neither... nor” form is used in Russian, as in (6).

- (6) Ivan ne xodil ni v kino ni na koncert
Ivan not go_{PAST} neither in movies nor on concert
'Ivan went neither to the movies nor the concert.'

Two accounts of the behavior of *ili* are possible. The first possibility is that *ili* is not a Boolean operator and has a semantics that is different from that of the English *or*. The second possibility is that *ili* is a Boolean operator that is interpreted outside of the scope of negation in negative contexts like the one in (5). On this account, the only difference between *or* and *ili* is that *or* is interpreted within the scope of sentential negation and *ili* is interpreted outside of the scope of negation.

To test between these two accounts, it will be useful to examine the behavior of *or* and *ili* under matrix negation in embedded contexts. As expected, the sentence containing the English *or* in an embedded context receives a “neither” interpretation (7).

- (7) Mary did not say that John went to the movies or the concert.
“Neither” reading: Mary did not say that John went to the movies, and Mary did not say that John went to the concert.

The sentence containing the Russian *ili* under matrix negation in an embedded context receives a “neither” interpretation as well (8).

- (8) Maša ne skazala, što Ivan xodil v kino ili na koncert
Masha not say_{PAST} that Ivan go_{PAST} in movies or on concert
'Masha did not say that Ivan went to the movies or the concert.'
“Neither” reading: Mary did not say that John went to the movies, and Mary did not say that John went to the concert.

The use of both *or* and *ili* gives rise to the “neither” reading of the sentence when the disjunction operators in question are used inside a restrictive relative clause as well, as (9) and (10) illustrate.

- (9) Mary did not see the professor who can run a marathon or do semantics.
“Neither” reading: Mary did not see the professor who can run a marathon and do semantics.

(10) Maša ne videla profesora kotoryj mozet probežat' marafon ili
Mary not see_{PAST} professor who can run marathon or
zanimat'sja semantikoj
do semantics

'Mary did not see the professor who can run a marathon or do semantics.'

'Neither' reading: Mary did not see the professor who can run a marathon and do semantics.

As evidenced by (8) and (10), the Russian *ili* behaves as a Boolean operator in embedded contexts. These data support the account on which *ili* is, in fact, a Boolean operator. While *ili* has the inclusive semantics, when it is used with clausemate negation, as in (5), the sentence receives an "I don't know which" reading for the following reason. As was argued by Szabolcsi (2002), the disjunction operators in Hungarian, Russian and Italian have the status of PPIs; when the disjunction operator is used with clausemate negation, the disjunction operator takes wide scope and the sentence receives an "I don't know which" interpretation.

2 Acquisition Predictions

In the previous studies on the acquisition of disjunction, it was found that at the age of 4 children were able to interpret the English *or* as having a Boolean inclusive interpretation under the scope of negation (Gualmini et al. 2000, Chierchia et al. 2001, Crain et al. 2002). At the same time, in the experiments described in Chierchia et al. (2001), it was found that when *or* was used in a non-downward-entailing environment, 50% of the time children erroneously accepted the inclusive reading instead of the target "I don't know which" reading of the sentence. These experiments are evidence to the effect that children acquiring English start out by interpreting the disjunction as logical, i.e., *inclusive*, and learn to compute the exclusivity implicature at a later point.

Cross-linguistically, disjunction has the status of a PPI in some languages, such as Hungarian and Russian, and does not have the status of a PPI in languages such as English and German. Whether or not disjunction is a PPI in a given language is language-specific lexical information that children learn from being exposed to sentences where disjunction appears with clausemate negation and sentences where disjunction appears with extracausal negation. Disjunction is subject to a lexical parameter with values {+PPI, -PPI}. Next, I will discuss what the default setting of the parameter in question provided by UG must be.

There is some evidence that seems to suggest that the default setting of the PPI parameter must be "-PPI"; the "-PPI" setting of the parameter gives rise to a smaller grammar than the "+PPI" setting thereof in the case of (11) and (12) below.

(11) Mary does not speak Russian or German.

“Neither” reading: Mary does not speak Russian and Mary does not speak German.

(12) Maša ne govori po-ruski ili po-nemecki

Masha not speak Russian or German

‘Mary does not speak Russian or German.’

“I don’t know which” reading: Mary does not speak Russian or Mary does not speak German.

In every situation in which the “neither” reading of (11) is true, the “I don’t know which” reading of (12) will be true. Every situation where Mary speaks neither Russian nor German is also a situation where she does not speak one of the languages in question. However, if (12) is true in a given situation, it does not follow that (11) is true in this situation. If Mary does not speak one of the languages, it does not follow that she speaks neither of the languages. Therefore, (11) is true in a subset of situations of the set of situations where (12) is true. In accordance with the Subset Principle, the default setting of the PPI parameter must correspond to the smaller grammar which, in this instance, is the grammar of English. On the basis of this evidence, it appears that the default setting of the PPI parameter must be “-PPI.” If the default setting of the PPI parameter were “+PPI,” this state of affairs would have given rise to a learnability problem. All of the input that the child was exposed to would have been compatible with his grammar, and he would not have been able to arrive at a smaller grammar on the basis of positive input.

However, there is also evidence according to which the English grammar is, in fact, in the superset relation to the Russian grammar, which is provided below.

(13) Mary does not speak Russian or German.

Preferred “neither” reading: Mary does not speak Russian and Mary does not speak German.

Possible “I don’t know which” reading: Mary does not speak Russian or Mary does not speak German.

The English sentence in (13) has not only the preferred “neither” reading but also may be construed as having an “I don’t know which” reading in a very limited range of contexts, for example, if it is uttered in the context in (14).

(14) A: I know that Mary does not speak one of the languages that were in the job description. Do you remember what language she doesn’t speak?

B: Mary does not speak Russian or German (I don’t remember which).

In contrast, the Russian counterpart of (13) in (15) can only have the “I don’t know which” reading.

(15) Maša ne govorit po-russki ili po-nemecki

Masha not speak Russian or German

‘Mary does not speak Russian or German.’

“I don’t know which” reading: Mary does not speak Russian or Mary does not speak German.

While the English sentence in (13) has both the preferred “neither” reading and the less common “I don’t know which” reading, its Russian counterpart in (15) has only the “I don’t know which” reading. In this instance, the Russian grammar appears to be “smaller” than the English one.

To summarize, the Russian and English grammars are not in a subset / superset relationship; rather, there is a partial overlap between the two grammars – both grammars allow the “I don’t know which” reading. Thus the Subset Principle does not enable us to determine what the default setting of the PPI parameter must be. It is more economical to interpret the disjunction operator in its syntactic position. While the “-PPI” setting makes the isomorphic interpretation available, the “+PPI” setting makes the non-isomorphic interpretation available. In view of economy considerations, I hypothesize that the child should start out with the default “-PPI” setting.

If a child is acquiring an English-type language where the default setting corresponds to that of the target language, the “-PPI” setting is retained. If a child is acquiring a Russian-type language where “-PPI” is not the parameter setting of the target language, the child is liable to go through an “English” stage during which he will retain the default “-PPI” setting of the parameter. Since the Russian and English grammars are in the partial overlap relationship, in principle, the child may start out with either setting of the parameter and reset it as a result of experience. The resetting of the parameter will not create a Subset Problem. However, the child may not start out with a grammar that generates sentences that are licit both on the “+PPI” and “-PPI” settings of the parameter, and then arrive at a grammar where the parameter setting is “+PPI” or “-PPI.” In view of this, I will propose a trigger that may change the initial “-PPI” setting of the PPI parameter for the Russian-acquiring child as well as a trigger that may change the initial “+PPI” setting of the parameter for a child acquiring English. In the remainder of the paper, I will discuss the experiment on the acquisition of *ili*, and how a child arrives at the correct setting of the PPI parameter in the grammar of the target language.

3 The Experiment

In the present experiment, I tested Russian-speaking children on sentences where *ili* was used with clausemate negation. Since my hypothesis is that the initial setting of the PPI parameter is “-PPI,” my experimental hypothesis is that there is a stage where children interpret sentences where *ili* is used with clausemate negation on the “neither” reading.

H₁: Children acquiring Russian go through a stage where they interpret sentences where *ili* is used with clausemate negation on the “neither” reading.

3.1 METHODS

21 3;11-6;10-year-old Russian-speaking children who attended Shaloh House school in Brighton, Massachusetts, “School is Cool” day care center and Brookline Dance studio in Brookline, Massachusetts participated in the experiment. Children’s mean age was 5;4. All of the children were native speakers of Russian. The entire experiment was conducted in Russian. The standard picture-matching task was used, where the child is shown two pictures, one that corresponds to the test sentence and one that doesn’t, and is asked to choose the “right” picture.

The storyline was as follows. Lion hid a key and a mirror in two identical boxes and promised to give a basket with strawberries to animals who found both the key and mirror. Subsequently, different animals took turns looking for the boxes. In the “or” condition, the child was shown a picture where an animal found one box and a picture where an animal found nothing. Consider an “or” condition test sentence and a pair of pictures that were used with this sentence.

(16) Lion did not give Cat a basket with strawberries because Cat did not find the key or the mirror.

Experimenter: show me a picture where this is shown.



Picture one.



Picture two.

Each child was told ten short stories individually. Of the ten stories, there were 6 items where *ili* was used with clausemate negation; the child's task was to choose between a picture that corresponds to the reading on which *ili* takes wide scope with respect to negation (the target response) and a picture that corresponds to the reading where the negation scopes over *ili*. Two stories tested the children on the *ni... ni* or "neither... nor" construction which is in complimentary distribution with constructions where *ili* scopes over negation. In the case of the *ni... ni* construction, the child's task was to choose between a picture where negation applied to both DPs in question vs. the one where it applied only to one DP. The fact that I used the *ni... ni* construction may have served as an additional clue to the effect that the construction where *ili* was used with clausemate negation was to be interpreted with *ili* scoping over negation. If *ili* is interpreted as scoping below negation, the two constructions have the same interpretation – the "neither" reading. Two stories with the *i... i* or "and" construction were used as controls in order to ensure that individual children were paying attention to the experimental task. I did not expect even the younger children to experience difficulties with this construction. (See Appendix for the detailed description of the experimental materials).

3.2 RESULTS

16 out of 21 children consistently provided the incorrect "neither" interpretation of sentences where *ili* was used with clausemate negation. H_1 according to which children acquiring Russian go through a stage where they interpret sentences where *ili* is used with clausemate negation on the "neither" reading was supported. The Chi-Square = 696.24, $df=6$, $N=21$, $p < .001$.

Also, 6 adult controls who were native speakers of Russian were tested. In the "or" condition, they provided 100% of the target "I don't know which" reading responses. In the "neither... nor" and "and" conditions, 100% of the target responses were provided as well.

3.3 DISCUSSION

I found that 16 children computed the incorrect "neither" interpretation of sentences where *ili* was used with clausemate negation 98.9% of the time. These 16 children also provided 93.7 % of correct responses in the *ni... ni* or "neither... nor" condition, and they provided 100% of correct responses in the "and" condition. These children are at a stage where they have not learned that *ili* is a PPI and interpret it under the scope of negation. These children's results are summarized in Table 1 below.

Subject #	Age	Or	Neither... nor	And
1	4;5	0	2	2
3	5;4	0	2	2
4	5;3	0	2	2
5	5;5	0	1	2
6	4;5	0	2	2
7	5;2	0	2	2
8	6;10	0	2	2
11	3;11	0	2	2
13	5;9	0	2	2
14	5;4	0	2	2
15	4;5	1	1	2
16	5;5	0	2	2
17	5;2	0	2	2
18	5;5	0	2	2
19	6;3	0	2	2
20	6;5	0	2	2

Table 1. The Key: the number of correct responses in each condition is given.

Interestingly, it was found that four children who consistently computed the correct “I don’t know which” interpretation of sentences where *ili* was used with clausemate negation also consistently provided erroneous responses in the *ni... ni* “neither... nor” condition. Thus the four children in question computed the correct “neither” interpretation of sentences where *ili* was used with clausemate negation present 91.7% of the time. However, the four children also provided no correct responses in the “neither... nor” condition and 87.7% of correct responses in the “and” condition. These children’s results are provided in Table 2 below.

Subject #	Age	Or	Neither... nor	And
2	4;11	6	0	2
9	6;3	6	0	1
10	6;2	6	0	2
12	6;6	4	0	2

Table 2. The Key: the number of correct responses in each condition is given.

The four children’s unexpectedly poor performance on the “neither... nor” condition makes it dubious that they performed well on the “or” condition because they have correctly classified *ili* as a PPI and interpreted it outside the

scope of negation. It may be the case that the four children in question had trouble interpreting the scope of negation both in the “or” and “neither... nor” conditions. In the “neither... nor” condition, the child was shown a picture where an animal found one box, which corresponded to the erroneous reading on which negation applied only to one DP, and a picture where an animal found nothing, which corresponded to the target reading on which negation applied to both DPs. An example of a test sentence that a child was given in the “neither... nor” condition is provided in (17).

(17) Cat found neither the key nor the mirror.

Experimenter: Show me a picture where this is shown.

The four children in question consistently picked the picture where an animal found one box, i.e., computed the reading where negation applied only to one DP. This is evidence to the effect that these children consistently assigned the wrong scope to the negation operator in the “neither... nor” condition. Importantly, it was precisely these four children who provided responses that appeared to have the “I don’t know which” interpretation in the “or” condition. Thus it is plausible that these children interpreted only one of the DPs in the scope of negation in the “or” condition as well. In the “or” condition, the child was asked to choose between a picture where an animal found one box and a picture where it found nothing. The four children picked the picture where an animal found one box and rejected the picture where the animal found nothing; these children interpreted only the DP in the first disjunct under the scope of negation. Thus my hypothesis is that these children provided what appeared to be the target responses in the “or” condition not because they correctly interpreted *ili* as a PPI but because they misinterpreted negation as applying to the DP in the first disjunct instead of as applying to both DPs. In (18), I illustrate what interpretation these children must have arrived at if they interpreted negation as applying to the DP in the first disjunct and not to both DPs.

(18) Koška ne našla klučik ili zerkal’ce

cat not find_{PAST} key or mirror

‘Cat did not find the key or the mirror.’

Child’s erroneous “one DP” interpretation: Cat either did not find the key or found the mirror.

If the child misinterprets (18) in this manner, given a choice between a picture where Cat found one box and a picture where Cat found nothing, the child will pick a picture where Cat found one box. Only this picture matches the child’s interpretation of (18). Picking a picture where Cat found one box happens to be the target response because the Russian “or” takes scope over the clausemate negation¹.

Next, consider why the four children in question provided the wrong responses in the “neither... nor” condition. An example of a test sentence is given in (19).

(19) Medved' ne našël ni klučik ni zerkal'ce
 bear not find_{PAST} neither key nor mirror
 'Bear found neither the key nor the mirror.'

Child's erroneous “one DP” interpretation: Bear either did not find the key or found the mirror.

If the child misinterprets (19) in this manner, given the choice between a picture where Bear found nothing and a picture where he found one box, the child will pick a picture where Bear found one box. It is this picture that matches the child's construal of (19). In contrast to the “or” condition, in the “neither... nor” condition, picking a picture where Bear found one box is not the target response.

To summarize, the four children's responses cannot be taken as evidence to the effect that these children correctly interpret the Russian *ili* as a PPI. While these children did end up interpreting *ili* as being outside of the scope of negation in the “or” condition, they did so because they erroneously applied negation only to the DP in the first conjunct.

Finally, one 3;5-year-old child, who was the youngest subject, provided 50% of correct responses in the “or” condition. This child's responses are provided in the table below.

Subject #	Age	Or	Neither... nor	And
21	3;5	3	2	1

Table 3. The Key: the number of correct responses in each condition is given.

In the “or” condition, the child was guessing between the “I don't know which” and “neither” readings of sentences; this may have been due to the fact that the child very young and the kind of inferential reasoning she had to go through in order to pick out a picture that matched her reading of the *ili* sentence was too challenging.

4 Conclusion

It was found that Russian-speaking children go through an “English” stage in interpreting *ili* in contexts where clausemate negation is present. At this stage, Russian-speaking children interpret sentences where “or” is used with clausemate negation on the “neither” reading. Thus my hypothesis that Russian-speaking children go through a stage where they interpret sentences where *ili* is

used with clausemate negation on the “neither” reading was supported. I hypothesized this stage based on the view that the default setting of the PPI parameter is “-PPI.” 16 children were precisely in a stage where they interpreted the sentences in question on the “neither” reading because they have not changed the default setting of the PPI parameter to that of the target language.

The fact that the initial setting of the PPI parameter is “-PPI” gives rise to the following learnability problem that is illustrated on the example of (20) and (21).

(20) Cat did not find the key or the mirror.

Preferred “neither” reading: Cat did not find the key and Cat did not find the mirror.

Possible “I don’t know which” reading: Cat did not find the key or Cat did not find the mirror.

(21) Koška ne našla klučik ili zerkal’ce

cat not find key or mirror

‘Cat did not find the key or Cat did not find the mirror.’

“I don’t know which” reading: Cat did not find the key or Cat did not find the mirror.

While the English sentence in (20) has both the preferred “neither” reading and the less common “I don’t know which” reading, its Russian counterpart in (21) has only the “I don’t know which” reading. If a child acquiring Russian goes through an “English” stage where (21) is interpreted as having the “neither” and “I don’t know which” readings, her task is to arrive at a grammar where (21) is interpreted as having just the “I don’t know which” reading. The child will hear sentences such as (21) in contexts where the “I don’t know which” reading is relevant, and she will be able to interpret them on this reading without changing the setting of the PPI parameter because this reading is licit in languages where the setting of the PPI parameter is “-PPI,” such as English. The child acquiring Russian will first hypothesize that the “I don’t know which” reading is licit only in contexts that force it, as in (14). Upon having received sufficient exposure to a broad range of contexts where this reading is licensed in Russian, the child will eventually realize that the “I don’t know which” reading is licensed in any context.

Next, I will discuss the type of input that may serve as a trigger for changing the default setting of the PPI parameter to “+PPI.” In the positive input, children acquiring Russian are exposed to sentences as in (22).

(22) Ona ne budet tancevat’ ili pet’

she not will dance or sing

‘She will not dance or she will not sing’

“I don’t know which” reading: She will not dance or she will not sing.

For adults, (22) has only the “I don’t know which” reading. The English counterpart of (22), which is in (23), has only the “neither” reading.

(23) She will not dance or sing.

“Neither” reading: she will neither dance nor sing.

For the child acquiring Russian, hearing sentences like (22) that are uttered in contexts where the “I don’t know which” reading is the relevant one serves as the crucial piece of evidence needed to change the setting of the PPI parameter to “+PPI.” This is because the English sentence in (23) lacks the “I don’t know which” reading. To arrive at the “I don’t know which” reading, the child needs to reset the disjunction parameter to “+PPI.”

Finally, I will discuss what type of evidence may serve as a trigger for changing the setting of the PPI parameter from “+PPI” to “-PPI.” (Although the present experiment has provided evidence to the effect that Russian children start out with a “-PPI” setting of the parameter, as was previously mentioned, another theoretical possibility is that a child might start out with a “+PPI” setting). If a child acquiring an English-type grammar starts out with a “Russian” “+PPI” setting, the trigger for resetting the parameter will be sentences as in (20) used in contexts where the “neither” reading is intended. Because this reading is licit only on the “-PPI” setting of the parameter in question, these sentences serve as a trigger for resetting the value of the PPI parameter.

5 Appendix

Test sentences:

- (1) Lion did not give Cat a basket with strawberries because Cat did not find the key or the mirror.
- (2) Lion did not give Duck a basket with strawberries because Duck did not find the key or the mirror.
- (3) Lion did not give Deer a basket with strawberries because Deer did not find the key or the mirror.
- (4) Lion did not give Goat a basket with strawberries because Goat did not find the key or the mirror.
- (5) Lion did not give Frog a basket with strawberries because Frog did not find the key or the mirror.
- (6) Lion did not give Bird a basket with strawberries because Bird did not find the key or the mirror.
- (7) Lion did not give Bear a basket with strawberries because Bear found neither

the key nor the mirror.

- (8) Lion did not give Buffalo a basket with strawberries because Buffalo found neither the key nor the mirror.
- (9) Lion gave Camel a basket with strawberries because Camel found the key and the mirror.
- (10) Lion gave Elephant a basket with strawberries because Elephant found the key and the mirror.

Endnotes

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ⁱ It is true that the picture where Cat found one box is not a perfect match for the child's reading of the test sentence, "Cat either did not find the key or found the mirror," because the two disjuncts describe the same situation, namely, the one where Cat found the mirror but not the key. However, this is precisely the situation where Cat found one box. Given the choice between a picture where Cat found one box and one where it found nothing, children choose the picture that best matches their reading.

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