Complementizer-trace effects in Russian

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This paper presents and discusses the results from an acceptability judgment task conducted to test the complementizer-trace effect in Russian. In addition, in this study, I investigate (i) the differences in the transparency of the two types of finite embedded clause with two different complementizers for the argument extraction and (ii) the effect of a high adverb on the acceptability of subject extraction. While providing reliable data on the presence of the complementizer-trace effect in Russian, this paper also explores the significance of the results for the theory of complementizer-trace effects in general.

1. Introduction

Perlmutter (1968, 1971) observes that, in English, subject extraction out of the embedded clause is only available if the complementizer is null (1). In contrast, non-subject extraction is possible regardless of the type of complementizer (2).

(1) a. *Who do you think that __ met Sue?
b. Who do you think __ met Sue? (Pesetsky 2017:(1a))

(2) a. Who do you think that Sue met __?
b. Who do you think Sue met __? (Pesetsky 2017:(1b))

This phenomenon has come to be known as the complementizer-trace effect. Although several possible explanations have been suggested as to why such a constraint should exist, no consensus has been reached on that matter. Complementizer-trace effects were identified in other languages as well, which reinforced the assumptions about their universality (Pesetsky 2017).

For Russian, however, the data from different sources do not provide a clear picture about the existence of a similar constraint. Although, according to Pesetsky (1982), Russian is among the languages exhibiting the complementizer-trace effect, there is some conflicting data in other papers. Antonenko (2008, 2010) claims that there is a difference between indicative and subjunctive finite embedded clauses: only indicative clauses with the complementizer *čto* 'that' exhibit the complementizer-trace effect, while the same is not true for subjunctive clauses with the complementizer *čtoby* 'that.SUBJ'. Dyakonova (2009:216) reports that there is 'a massive

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speaker variation' on whether Russian exhibits subject/object asymmetries with regard to extraction out of embedded clauses.

The scarcity and the seeming variability of the data regarding the complementizer-trace effect in Russian calls for an experimental approach. The usage of experimental methods in the area of complementizer-trace effects has proven to be quite useful. First, such methods have previously been used to check the reliability of informal judgments. Cowart (1997) has reconfirmed the existence of the complementizer-trace effect in English. The claims about the lack of the complementizer-trace effect in German made in Haider (1983) were disputed experimentally by Featherston (2005). Experimental studies have also helped researchers in proposing new explanations for the phenomenon. The experiments of Salzmann et al. (2013) allowed the researchers to propose that the low ratings for subject extraction in German are due to a more general constraint on the adjacency of the complementizer and a finite verb. Ritchart et al. (2015) employ experimental methods to check the judgments that are used in Kandybowicz (2006) in support of the prosodic account of the complementizer-trace effect. The researchers show that these judgments are, in fact, incorrect, thus undermining the evidence for the said theory.

In this paper, I present the results of the acceptability judgment study conducted to test the complementizer-trace effect in Russian. They show that this phenomenon exists in Russian. In addition, I investigate the differences in the transparency of finite embedded clauses with different complementizers for argument extraction and the effect of a high adverb on the acceptability of subject extraction. I also discuss whether using context in an experimental study affects speakers' judgments.

2. Accounts of complementizer-trace effects

There have been numerous attempts to figure out the nature of the complementizer-trace effect. In this section, I briefly discuss some of the accounts proposed in the previous literature with a particular focus on the papers that will be relevant for the discussion of my study's results. For a fuller overview, see Pesetsky (2017).

Some accounts attribute the ungrammaticality of (1a) to the ban on the linear adjacency of a complementizer and a trace. The most famous proposal of this kind was given in Chomsky & Lasnik (1982); they suggest that the ungrammaticality of subject extraction over an overt complementizer is due to the complementizer-trace filter, that specifically rules out structures like this. A similar approach has also been used in some later works that connect the source of the phenomena to the syntax-prosody interface. For instance, Kandybowicz (2006) proposes a PF-filter that disallows certain prosodic mappings:

(3) Prosodic filter
*<C^{o}, t> iff:
(i) C^{o} and t are adjacent within a prosodic phrase, and
(ii) C^{o} is aligned with a prosodic phrase boundary (Kandybowicz 2006:(15))

Many other accounts, however, attribute the unacceptability of subject extraction to structural constraints. Some researchers connect the complementizer-trace effect with the Nominative Island Constraint (NIC, Chomsky 1980; Kayne 1980; Pesetsky 1982); this constraint, which

prohibits an anaphor to be free in S (=CP), rules out structures like (1a) since an overt complementizer prevents the extracted subject from binding its trace in the embedded clause. Empty Category Principle (ECP) accounts (Chomsky 1981; Lasnik & Saito 1984) explain the subject-object asymmetry in the same way that is used in ECP-based theories of island constraints. According to the ECP, a trace must be governed. Unlike object traces, subject traces are not head-governed by a lexical category, so they have to be governed by a governing antecedent, which is another way for a trace to be licensed. However, in sentences like (1a), the complementizer prevents the subject trace from being antecedent-governed, thereby ruling out the whole structure.

Some possible solutions to the puzzle in question have been proposed in the Minimalist framework as well. Pesetsky & Torrego (2001) argue that the complementizer-trace effect in English is due to economy considerations. In their framework, C has a *u*T feature. One way it can be deleted is by T-to-C movement. According to the researchers, this movement can actually be seen in embedded clauses, as the complementizer *that* represents an instance of T moved to C. Another way *u*T on C can be deleted is by the subject movement to Spec,CP. Nominative subjects are claimed to bear *u*T feature. Thus, they can be attracted by *u*T on C, satisfying the EPP property of C's *u*T feature. In principle, both of these options are equally available for deleting *u*T on C. That explains why the complementizer can be either present or not in regular embedded declaratives; in the former case *u*T on C is deleted by T-to-C movement, which is evident from the overt complementizer, while in the latter case, the absence of the complementizer shows that *u*T on C is rather deleted by the movement of the subject to Spec,CP. However, in the case of wh-subject extraction out of embedded clause, subject movement is a more economical way to satisfy the goals of the derivation. Unlike T-to-C movement, it can delete both *u*T, and *u*Wh on C. Due to this, it is preferred to T-to-C movement.

Several of the most recent proposals appeal to the notion of anti-locality. They state that in structures like (1a) certain constraints prevent the subject from being moved to Spec,CP, which is essential for it to be moved further up in the structure by successive-cyclic movement. In Erlewine (2020) the following variant of anti-locality is proposed:

(4) Spec-to-Spec Anti-Locality
Movement of a phrase from the Specifier of XP must cross a maximal projection other than XP. (Erlewine 2020:(2))

Movement from Spec,TP to the specifier of C, immediately dominating T, clearly violates this restriction. Since the subject is unable to reach the edge of a phase, it cannot move to the matrix clause. Erlewine further assumes that clauses with no overt complementizer are headed not by two distinct C and T layers, but rather by a head which bundles C and T. This allows subjects of embedded clauses with no overt complementizer to move to Spec,TP while also satisfying the need to be in the specifier of a phase head in order to be able to move into higher phases. Objects, on the other hand, are always able to move out of the embedded clause since movement out of a VP to Spec,CP of the embedded clause never violates the anti-locality both in the presence and in the absence of the complementizer.

A similar approach is taken in Pesetsky (2021), though his ideas about the source of the complementizer-trace effect are based on an independent concept of Exfoliation. In his paper, Pesetsky proposes a derivationalist hypothesis of clauses and posits that every embedded clause

starts out as a full finite CP and may be reduced to a clause of smaller size due to certain derivational processes. The operation of removing layers of the structure is called Exfoliation.

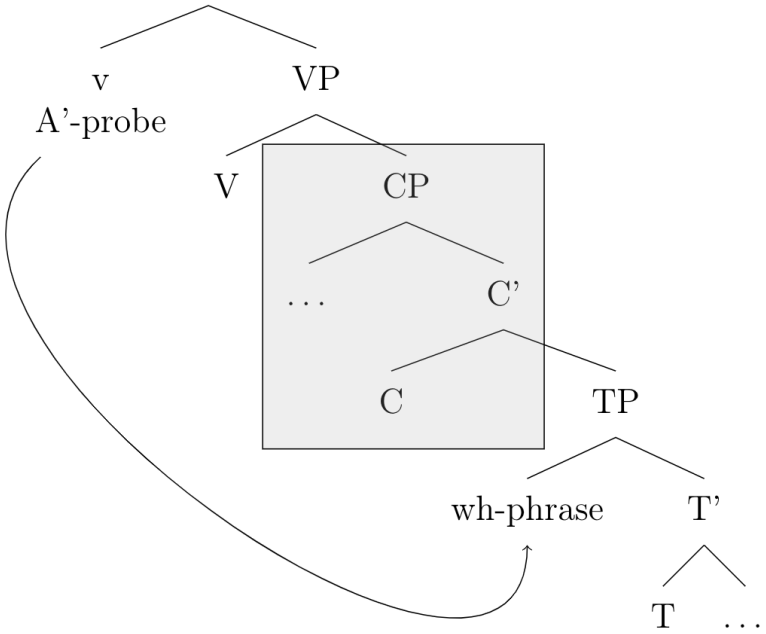
Next, Pesetsky assumes the following notion of anti-locality:[1]

(5) Antilocality constraint
Movement to the edge of CP must cross a phase boundary. (Pesetsky 2021:(31))

This constraint prevents the subject from making a move from Spec,TP to Spec,CP, since there is no phase boundary on its way. However, the Exfoliation of the CP layer bleeds the Antilocality constraint. If the CP layer is removed, the subject moves out to the matrix clause straight from the Spec,TP of the embedded clause. This explains why the subject can be moved out in the absence of the complementizer.

In (6), the part of the structure that has to be exfoliated is in a grey rectangle.

(6) Exfoliation of the CP layer of the embedded clause



(Pesetsky 2021:38)

In some cases, however, the complementizer-trace effect can disappear. One of the most discussed cases of this is adverb obviation. Bresnan (1977) and Culicover (1993) both note that in English the placement of a high adverbial between the complementizer and the extraction site noticeably ameliorates the complementizer-trace effect.

[1] Later in the same paper Pesetsky reexamines this notion of anti-locality and proposes to replace it with Lethal Ambiguity condition (McGinnis 2004). For the sake of brevity, I do not go into detail on why this change is needed and refer the reader to Pesetsky (2021).

(7) a. Robin met the man who Leslie said that **for all intents and purposes** __ was the mayor of the city. (Culicover 1993:(2a))
b. I asked what Leslie said that **in her opinion** __ had made Robin give a book to Lee. (Culicover 1993:(2c))

These data have since been discussed in many other papers. Culicover (1993) takes it as evidence against the ECP account of the phenomenon. Kandybowicz (2006) argues that sentences like (7) support the prosodic filter theory. Adverb obviation is expected under this account since an intervening adverb prevents the complementizer and the subject extraction site from occupying the same prosodic phrase.

Erlewine (2020) states that an intervening adverbial obviates the effect thanks to its own high AdvP projection (in the spirit of Cinque 1999). Extra functional material between the projections of T and C makes the subject movement from Spec,TP to Spec,CP no longer violate Spec-to-Spec Anti-Locality. Consequently, subjects can reach Spec,CP and be moved out to the higher clause.

Pesetsky (2021) attributes adverb obviation to the specifics of adverbial syntax. As McCloskey (2006) shows, English permits embedded clauses to have two instances of *that* are separated by an adverbial:

(8) Double *that* complements
a. We know **that** for all intents and purposes **that** the government created a rating agency oligopoly that prevented the market from enjoying more competition. (Pesetsky 2021:(78a))
b. But the simple analysis which suggests **that** because American investment takes place here **that** we should be a lapdog for their efforts in the war is one that I think is quite objectionable and quite offensive. (McCloskey 2006:(69a))
c. He thinks **that** if you are in a bilingual classroom **that** you will not be encouraged to learn English. (McCloskey 2006:(69b))

Based on this data, Pesetsky proposes that sentences like (7) are, in fact, biclausal, with the bleached adverbial predication being the first CP and the embedded clause being the second one. These structures still involve the obligatory Exfoliation of the CP level of the embedded clause, which is needed for the subject to move out to the higher clause without violating anti-locality. The Exfoliation of the adverbial CP, on the other hand, is not required. The fact that the Exfoliation of the most inner CP is obligatory in the case of subject extraction is demonstrated by (9b) (compare to (9a), where object extraction over an adverbial is shown). Thus, sentences in (7) do not constitute an exception to the complementizer-trace effect in English.[2]

[2] An anonymous reviewer points out that the availability of double complementizer constructions in English may be a subject to dialectal variability. In particular, the reviewer, a native English speaker, reports that sentences like (8) are ungrammatical in their dialect.

Currently I do not have any additional data on double complementizer construction in English, so I cannot deliberate on this topic here. However, I would like to suggest that the acceptability of sentences in (7) may be degraded for some speakers because of their complex structure and their length. In future studies, these parameters should be checked alongside the dialectal variability.

(9) a. What kind of rating agency oligopoly did she claim that for all intents and purposes that the government had created __?
b. Which government did she claim that for all intents and purposes (*that) __ had created a rating agency oligopoly? (Pesetsky 2021:(82))

Overall, adverb obviation seems important to many of the existing accounts. I return to this matter in the discussion of the focal points of the experimental study.

3. Complementizer-trace effect in Russian

Russian has two kinds of embedded finite clause: indicative and subjunctive. Indicative clauses are introduced by the complementizer *čto* 'that' (10a), while subjunctive clauses are introduced by the complementizer *čtoby* 'that.SUBJ' (10b).

(10) a. ivan skazal čto maša prinesla šampanskoje
Ivan said that Masha brought champagne
'Ivan said that Masha has brought champagne.'
b. ivan xotel čtoby maša prinesla šampanskoje
Ivan wanted that.SUBJ Masha brought champagne
'Ivan wanted Masha to bring champagne.'

Pesetsky (1982) provides the following examples to demonstrate that subject extraction out of subjunctive clauses is less acceptable than object extraction, cf. (11a) and (11c) with (11b) and (11d). No examples with indicative embedded clauses are given.

(11) a. u menja est' kniga, kotoruju ja xoču, čtoby vy pročli __
by I.GEN is book which.ACC I wish, that.SUBJ you read
'I have a book which I wish you would read.'
b. * u menja est' kniga kotoraja ja xoču,
by I.GEN is book which.NOM I want
čtoby __ byla vo vsex bibliotekax
that.SUBJ was in all libraries
'I have a book which I wish would be in all libraries.'
c. paren', kotorogo ja xotel, čtoby maša ubila __
guy who.ACC I wished that.SUBJ Masha killed
'the guy, who I wanted Masha to kill'
d. * paren', kotoryj ja xotel, čtoby __ ubil mašu
guy who.NOM I wanted that.SUBJ killed Masha.ACC
'the guy, who I wanted to kill Masha' (Pesetsky 1982:(2))

However, in this paper, Pesetsky also observes that many speakers judge the sentences with object extraction as ungrammatical, albeit still more acceptable than the examples with subject extraction. Thus, there are certain concerns about the reliability of the data and their consistency across the speakers.

More recent papers open up even more questions about the Russian data. In particular, Antonenko (2008, 2010) argues that the complementizer-trace effect only arises in indicative clauses (12) and not in subjunctive clauses (13).

(12) a. * kto ty dumaeš' čto __ vypil vsë pivo?
who.NOM you think that drank all beer
'Who do you think drank all beer?'

b. ? kogo ty dumaeš' čto ivan narisoval __ na zabore?
who.ACC you think that Ivan drew on fence
'Who do you think Ivan drew on the fence?' (Antonenko 2008:(22))

(13) a. ? kto ty xočeš' čtoby __ napisal stat'ju?
who.NOM you want that.SUBJ wrote paper
'Who do you want to write a paper?'

b. ? čto ty xočeš' čtoby ivan kupil __?
what.ACC you want that.SUBJ Ivan bought
'What do you want Ivan to buy?' (Antonenko 2008:(23))

These data, along with some other asymmetries between the two types of embedded clause noted by Antonenko, lead him to claim that there are certain structural differences between the two complementizers. Namely, he proposes that the complementizer *čto* 'that' appears in Spec,CP, while the complementizer *čtoby* 'that.SUBJ' consists of two parts — *čto* in Spec,CP and the subjunctive particle *by* in C.[3] The judgments in (12)-(13) can be explained in the following way. Object extraction is assumed to proceed successive-cyclically in both types of the embedded clause with nothing preventing it from moving out to the matrix clause. However, when it comes to subject extraction, the difference in complementizers' structure plays a crucial role. Antonenko follows Rizzi (2006) and Rizzi & Shlonsky (2007) and postulates that after moving to the Spec,TP position subjects get frozen due to them satisfying the EPP feature on T. In the case of the indicative clause that entails the unavailability of the subject DP to move any further. In the subjunctive clause, however, there is another way of satisfying the EPP feature on T — by the particle *by* in C via head-head configuration (Rizzi & Shlonsky 2007). In this case, the subject of the subjunctive clause is not required to stay in Spec,TP and can be moved out to the matrix clause.

[3] The assumption about the complementizer *čto* 'that' being located in Spec,CP rather than in C is linked to the properties of T-to-C movement in Russian. Antonenko notes, that, unlike in English, Russian embedded clauses with an overt complementizer cannot occupy subject position.

(i) *(That) Sue will buy the book was expected by everyone.

(ii) * (to,) **čto** Petju posadili v tur'mu nikogo ne udivilo
it that Petja.ACC was.put into jail nobody.ACC not surprised
'Nobody was surprised by the fact that Petja was put into jail.'

This indicates that *čto* does not have the properties similar to those of the English complementizer *that*, which allows English clauses to be subjects. Antonenko states that this might serve as evidence that the complementizer *čto* is not an instantiation of T-features moved to C (Pesetsky & Torrego 2001). Building on the proposal in Landau (2007) that says that only the categories with phonologically overt heads can be selected as subjects, Antonenko concludes that in indicative embedded clauses in Russian C is empty, while the complementizer itself is located in Spec,CP.

The asymmetry between indicative and subjunctive clauses is also addressed in Dyakonova (2009). Although she only considers object extraction, her notes might be relevant to the discussion of the complementizer-trace effect in Russian. Unlike Antonenko, she claims that sentences with an object moved out of the indicative clause (14a) are, in fact, less acceptable than sentences with object extraction out of subjunctive clause (14b).

(14) a. * kogo olga skazala čto oni videli __?
who.ACC Olga say that they saw
'Who did Olga say that they saw?' (Dyakonova 2009:(63a))

b. kogo ty xočeš' čtoby ja priglasila __?
who.ACC you want that.SUBJ I invited
'Who do you want me to invite?' (Dyakonova 2009:(72a))

According to Dyakonova, this asymmetry arises due to the properties of the embedded T. In the indicative clause, T has its own valued Tense feature, while T of the subjunctive clause does not. This is evident from the fact that subjunctive clauses, unlike indicative ones, exhibit sequence of tense (Khomitsevich 2007). The sentence in (15) is most likely to be interpreted as though the event of the embedded clause precedes the event of the matrix clause. In (16), on the other hand, the events in the matrix and the embedded clauses are probably happening at the same time. That indicates that the tense of the subjunctive embedded clause is dependent on the tense of the matrix one.

(15) ivan skazal čto olga gotovila
Ivan said that Olga cooked
'Ivan said that Olga was cooking.'

(16) ja treboval čtoby galya ušla
I demanded that.SUBJ Galya went.away
'I demanded Galya to go away.'

This difference is argued to affect the Spell-Out of embedded structures. Dyakonova assumes that the uppermost projection of the clause, ForceP, is a phase. In the case of the indicative clause, object extraction is blocked since it cannot cross the phase boundary. However, in subjunctive clauses, the phase can be extended for the purpose of evaluating the features on the embedded T. This results in the availability of movement to the higher clause.

If object extraction is also affected by the complementizer, as suggested by the data in Dyakonova (2009), a question arises whether the same considerations lie beneath the differences in subject extraction reported in Antonenko (2008, 2010). In addition to that, any other possible restrictions on extraction out of embedded clauses should certainly be investigated prior to studying the complementizer-trace effect.

4. Experimental study
4.1. Focal points of the study

Given the variety of factors that might affect the judgments on the complementizer-trace effect in Russian, the task of choosing the factors to be looked at in an experimental study becomes quite challenging while still being incremental to the success of the experiment. Here I would like to elaborate on the choices I made in this study.

4.1.1. Type of embedded clause

In this study, I chose to compare embedded clauses with two different overt complementizers rather than clauses with and without an overt complementizer. There are several considerations behind this choice. First, the differences between indicative and subjunctive clauses remain an important issue in the study of Russian syntax, especially given the inconsistencies in the data which were discussed above. Second, the possibility of the complementizer omission is itself questionable. The conditions under which the complementizer *čto* 'that' might be phonologically null are not clear and are in need of a careful examination (17). The complementizer *čtoby* 'that.SUBJ' can never be omitted (18).

(17) a. petja skazal **??(čto)** ty ne pridëš'
Petja said that you not come
'Petja said that you will not come.'
b. ja znaju **??(čto)** ty vrëš'
I know that you lie
'I know that you are lying.'

(18) a. ja xoču ***(čtoby)** ty ušël
I want that.SUBJ you went.away
'I want you to go away.'
b. ona trebovala ***(čtoby)** vasja prinës piva
she demanded that.SUBJ Vasja brought beer
'She demanded Vasja to bring beer.'

4.1.2. The effect of high adverbs

While simply studying the difference in subject and object extraction is undoubtfully important, it would not be enough to make some additional inferences about the nature of the complementizer-trace effect. Therefore, I decided to add another level to the type of the argument factor[4] and check the acceptability of subject extraction in the presence of a high adverbial in the embedded clause. As noted above, several approaches, including the prosodic account and the anti-locality accounts, predict that the complementizer-trace effect should be obviated by the presence of an item like this. If the experiment shows that it is indeed the case,

[4] I did not use the presence of a high adverb as a separate factor since it is expected to affect only the subject extraction. Apart from that, a 2x3x2 experiment would probably be too complex, which in turn might have had affected the results.

it would make a good support to the theories of that kind. Apart from that, it is also interesting to see whether adverb obviation holds across different languages.

4.1.3. Use of context

Aside from the main goals of the study, I also wanted to check the effect of sentences' context on the acceptability judgments. When one tests out question sentences in an experiment without audio stimuli, there is a possibility that the participants will read the sentences as echo-questions. Echo-questions are known to differ in their properties from the regular questions (see Artstein 2002, a.o.). Using context in the experiment might point the participants to the needed interpretation of the sentences. In addition to this, the usage of context might make the sentences sound more natural overall, thus increasing the external validity of the study.

To test out these two premises, I conducted two versions of the experiment presented to two random groups of respondents. The first group took the regular version of the experiment, while for the second group, each sentence, including the filler sentences, was presented preceded by its context on a separate screen. Contexts each consisted of one or two sentences briefly describing the situation in which the test sentence might have been said. (19)-(21) illustrate some of the contexts used alongside the experimental items.

(19) Experimental item, subject extraction, indicative clause, no adverb

a. Context:

kažetsja	tol'ko	odin	naš	kollega	ne	zabyl	pro	sašin	jubilej
seems	only	one	our	colleague	not	forgot	about	Sasha's	jubilee
i	pozdravil	ego							
and	congratulated	him							

'It seems that only one of our colleagues didn't forget about Sasha's birthday and congratulated him.'

b. Test sentence:

kto	ty	dumaeš'	čto	pozdravil	sašu	s	jubileem?
who.NOM	you	think	that	congratulated	Sasha.ACC	with	jubilee

'Who do you think that congratulated Sasha on his jubilee?'

(20) Grammatical filler

a. Context:

ja	uže	zabyla	sdelal	li	petja	vsju	domašnjuju	rabotu	na	zavtra
I	already	forgot	did	Q	Petja	all	home	work	for	tomorrow

'I have already forgot if Petja has done all the homework for tomorrow.'

b. Test sentence:

ty	pomniš'	sdelal	li	petja	zadanie	po	matematike?
you	remember	did	Q	Petja	homework	in	math

'Do you remember if Petja has done the math homework?'

(21) Ungrammatical filler

a. Context:

ty	rasskazyval	čto	nedavno	videl	na	rynke	odnu	očen'
you	told	that	recently	seen	at	market	one	very

krasivuju prodavščicu
beautiful saleswoman
'You told me recently that you have seen a very beautiful saleswoman at the market.'

b. Test sentence:
čto ty vstretil devušku kotoraja pytalas' prodat'?
what.ACC you met girl which.NOM was.trying sell
'You met a girl that was trying to sell what?'

4.2. Experimental design

The study was an acceptability judgment experiment with a 2x3 factorial design. The first factor was the type of the embedded clause (CL) and had 2 levels: (i) finite indicative embedded clause with the complementizer *čto* 'that' (ii) finite subjunctive embedded clause with the complementizer *čtoby* 'that.SUBJ'. The second factor was the type of the extracted argument (ARG). The factor had 3 levels: (i) extraction of the object, (ii) extraction of the subject and (iii) extraction of the subject in the presence of a high adverb in the embedded clause. I used the adverb *odnaždy* 'once' as an intervening item. This choice was motivated by several considerations. First, it is a high enough adverbial, according to the hierarchy in Cinque (1999). The usual linear position of this adverb also allows us to assume that the subject extraction site follows this adverb rather than precedes it.

(22) a. ja xotel čtoby **odnaždy** petja priglasil mašu v gosti
I wanted that.SUBJ **once** Petja invited Masha.ACC in guest
'I wanted Petja to once invite Masha to visit.' {a=b}

b. ?? ja xotel čtoby petja **odnaždy** priglasil mašu v gosti
I wanted that.SUBJ Petja **once** invited Masha.ACC in guest

Second, the adverb had to sound natural in both types of the embedded clause. Thirdly, while it was possible to use a range of high PP-adjuncts, they would lengthen the sentences significantly, which would distinguish the sentences with this factor from the others. That could have led to the ratings being affected by the length of the sentence. Finally, a number of other Russian adverbials higher up in Cinque's (1999) hierarchy, such as *navernoe* 'probably', *vozmožno* 'possibly', *očevidno* 'obvious' etc. are often used as parentheticals. Using an item that can be interpreted both as an adverbial and as parenthetical would make the results of the experiment hard to interpret unambiguously.

In the experimental sentences, only 6 matrix verbs were used, 3 of which (*dumat'* 'think', *predpolagat'* 'assume', *sčitat'* 'consider') had an indicative clause as their complement while the other 3 had a subjunctive clause as their argument (*xotet'* 'want', *trebovat'* 'demand', *prosit'* 'ask'). The reason for using two different sets of matrix predicates was the following: verbs that can take both types of the embedded clause as their argument are not that common and are not that frequently used (Dobrushina 2012). Note that all the predicates were non-factive, so the factivity could not affect the acceptability of extraction. All the sentences had a similar structure: all of the embedded verbs were transitive and had a PP-adjunct at the end of the sentence. One set of experimental items is shown in (23).

(23) a. Subject extraction, indicative clause, no adverb
kto ty dumaeš' čto pozval svetu na progulku?
who.NOM you think that asked Sveta.ACC for walk
'Who do you think asked Sveta out for a walk?'

b. Subject extraction, indicative clause, adverb present
kto ty dumaeš' čto odnaždy pozval svetu
who.NOM you think that once asked Sveta.ACC
na progulku?
for walk
'Who do you think once asked Sveta out for a walk?'

c. Object extraction, indicative clause
kogo ty dumaeš' čto sveta pozvala na progulku?
who.ACC you think that Sveta.NOM asked for walk
'Who do you think that Sveta asked out for a walk?'

d. Subject extraction, subjunctive clause, no adverb
kto ty xočeš' čtoby pozval svetu na progulku?
who.NOM you want that.SUBJ asked Sveta.ACC for walk
'Who do you want to ask Sveta out for a walk?'

e. Subject extraction, subjunctive clause, adverb present
kto ty xočeš' čtoby odnaždy pozval svetu
who.NOM you want that.SUBJ once asked Sveta.ACC
na progulku?
for walk
'Who do you want to once ask Sveta out for a walk?'

f. Object extraction, subjunctive clause
kogo ty xočeš' čtoby sveta pozvala na progulku?
who.ACC you want that.SUBJ Sveta.NOM asked for walk
'Who do you want Sveta to ask out for a walk?'

24 lexicalizations of each sentence type were created and distributed among six lists using a Latin Square procedure. In each list, the stimuli were intermixed with 36 fillers in a pseudo-random order, such that no two experimental items appeared adjacent to each other. Half of the fillers were grammatical, and half were not. I used regular sentences with embedded questions as grammatical fillers (24) and sentences with *wh*-extraction out of a complex NP island as ungrammatical ones (25).

(24) Grammatical fillers
a. ty znaeš' prinesët li maša vina k užinu?
you know bring Q Masha wine for dinner
'Do you know whether Masha will bring wine for dinner?'

b. ty vyjasnil kogda lena prigotovit pirog dlja babuški?
you found.out when Lena cook pie for grandma
'Did you find out when Lena is going to cook a pie for grandma?'

(25) Ungrammatical fillers

a. * čto ty polučila otčët o tom
what you got report about it
čto nikita pročël za leto __?
that Nikita read during summer
'You got a report that Nikita has read what during summer?'

b. * pro čto tebe ponravilsja mal'čik kotoryj pokazal fil'm __ na festivale?
about what you like boy which showed film at festival
'You liked a boy that has shown a film about what at the festival?'

4.3. Procedure

The respondents were recruited through the crowd-sourcing platform Yandex.Toloka and online forums. 241 self-reported speakers of Russian took part in the experiment without the context, and 181 — in the experiment with the context. The participants were asked to rate sentences on a 7-point Likert scale (Likert 1932). Items were presented using the IbexFarm platform (Drummond 2013).

4.4. Results

Before the statistical analysis, I detected the outliers using the gold-standard method (Sprouse 2018). Under this method, the fillers are supposed to be pre-evaluated. In his experiments, Sprouse uses a set of fillers that all have varying mean ratings from English speakers on average (i.e., there are sentences, which are most likely to get 1, 2, … 7 on a 1-7 Likert scale). Using these sentences as the gold standard, one can identify the participants who give substantially different judgments than all the other participants and eliminate them from the analysis. One way to do it is to use the sum of squares measure of error. The participants whose sum of squares metric differs from the mean by more than a certain number of standard deviations could be identified as the outliers.

The fillers used in this experiment were not pre-tested. However, it is quite safe to assume that grammatical sentences like the ones in (24) are most likely to get high ratings, while the ones featuring a strong island violation, as in (25), are probably going to get low ratings. Relying on this premise, I decided to use the fillers as golden standards and postulated 6 as the expected value for the grammatical fillers and 2 as the expected value for the ungrammatical ones. Then the same statistical procedure as the one described above was performed. The number of standard deviations used was 2. Overall, there were 7 outliers in the experiment without the context and 14 in the experiment with the context. After omitting their judgments, the raw ratings were then transformed into z-scores.[5]

The mean ratings for the sentences in both versions of the experiment are shown below in Figure 1 and Figure 2. In both figures, we can see that the ratings for subject extraction from the different types of clause look very similar. In the case of object extraction, however, there is a noticeable difference between the z-scores for the sentences with the indicative clause and

[5] z-scores indicate how many standard deviations an observation is above or below the mean.

the sentences with the subjunctive clause. Another thing worth mentioning is that the scores for subject extraction look almost as low as the scores for the ungrammatical fillers, which suggests that the constraint on the complementizer-trace sequence is quite strong in Russian.

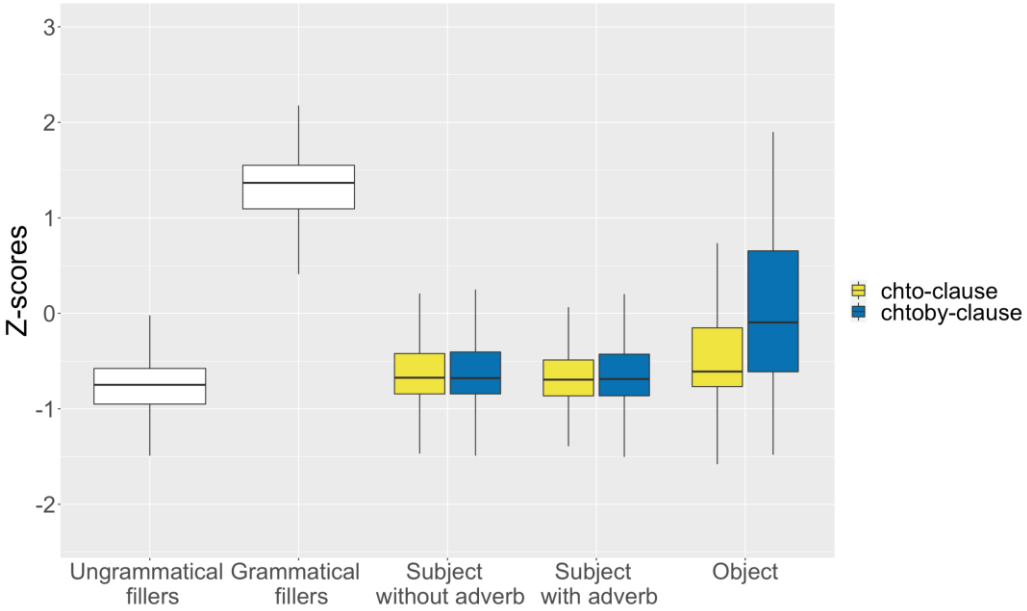


Figure 1. Acceptability ratings for the version of the experiment without the context.

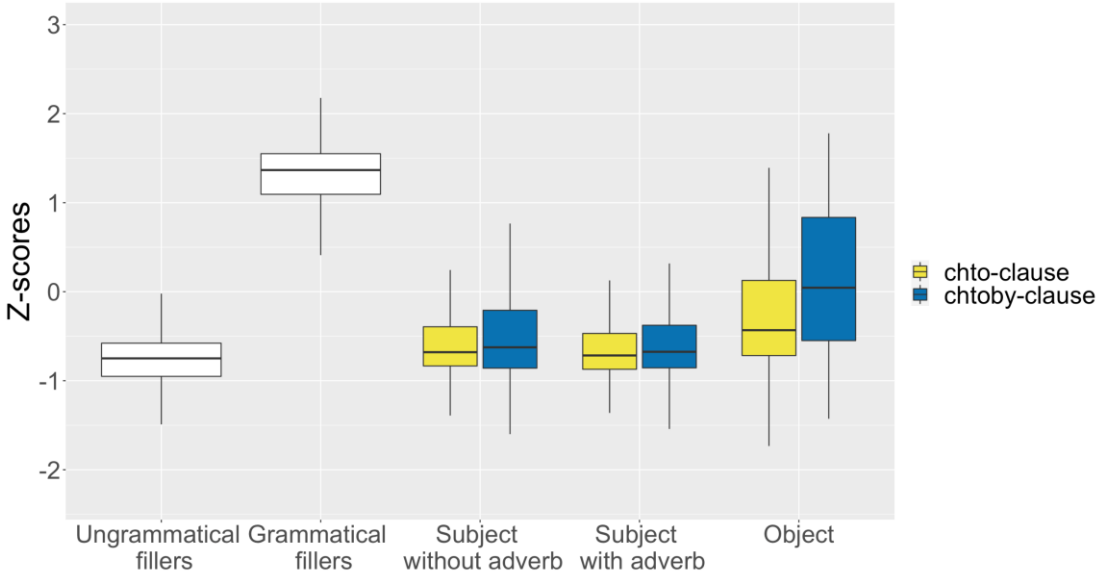


Figure 2. Acceptability ratings for the version of the experiment with the context.

The results of the two versions of the experiment were then analyzed separately from each other using a linear mixed model with random intercepts for participants and experimental items with the R statistical package lme4 (Bates et al. 2015). p-values were obtained by likelihood ratio tests of the full model with the effect against the model without the effect.

In the version of the experiment without the context, the analysis revealed the significance of CL ($\beta = 0.16$, SE = 0.027, $\chi^2(1) = 23.354$, $p << 0.0001$), ARG ($\chi^2(2) = 93.679$, $p << 0.0001$), and of CL x ARG ($\chi^2(2) = 48.484$, $p << 0.0001$). I also compared the levels of the argument type factor using the Tukey test. It showed that only the difference between object and subject extraction was significant, both in the absence of the high adverb before the subject ($p << 0.0001$) and in its presence ($p << 0.0001$). The difference between extraction of the subject with and without the high adverb present was not significant ($p = 0.3374$). Finally, the Tukey test has also demonstrated that the type of embedded clause only had an effect on object extraction ($p << 0.0001$), while the ratings of the sentences with subject extraction both in the absence ($p = 0.9978$) and in the presence of the high adverb ($p = 1$) were not significantly affected by it.

As for the experiment with the usage of the context, the results turned out to be the same. Both CL ($\beta = 0.16815$, SE = 0.036, $\chi2(1) = 18.8$, $p < 1.451e-05$) and ARG ($\chi2(2) = 103.53$, $p < 2.2e-16$) turned out to be statistically significant, as well as CL x ARG ($\chi2(2) = 15.084$, $p = 0.0005$). The Tukey test showed that there is no difference between subject extraction in the presence and in the absence of the adverb ($p = 0.2153$), while the ratings for the object extraction differ both from the rating for the subject extraction in the absence of the adverb ($p << 0.0001$), and in its presence ($p << 0.0001$). As in the other version of the experiment, the type of the embedded clause only affected object extraction ($p < 0.0001$).

Let me turn to discussing the effect of the context on the acceptability judgments. As shown above, the main results of the two versions of the experiment are very similar. Are there any significant differences between the two versions at all then? To test this, I ran a pairwise comparison of the acceptability ratings for different types of sentences in the experiment. p-values for the Wilcoxon test are shown in Table 1 below.

condition	p-value
All experimental sentences	**6.36e-07**
čto-clause, subject extraction, high adverb absent	0.4753
čto-clause, subject extraction, high adverb present	0.66
čto-clause, object extraction	**1.302e-08**
čtoby-clause, subject extraction, high adverb absent	0.03705
čtoby-clause, subject extraction, high adverb present	0.05392

condition	p-value
čtoby-clause, object extraction	**0.005027**
All filler sentences	0.001843
Grammatical filler sentences	0.05176
Ungrammatical filler sentences	**1.808e-07**

Table 1. Wilcoxon test for comparing judgments from two versions of the experiment

The p-values actually show that the context affects the ratings in certain cases. Namely, it affects the ratings for the object extraction and for the ungrammatical fillers. These results do not align with the claims made in Sprouse (2007), according to which the context does not affect the experimental results at all.

5. Discussion

My results demonstrate that, in Russian, subject extraction is indeed rated lower than object extraction. Thus, my data confirms that Russian also exhibits the complementizer-trace effect, which adds up to the assumptions about the universality of this constraint.

Notably, the difference between the acceptability of subject and object extraction holds for both types of clauses that were examined. This, in turn, contradicts the data of Antonenko (2008, 2010), who claims that subjunctive clauses do not display the complementizer-trace effect due to the structural properties of the complementizer *čtoby* 'that.SUBJ'. In opposition, my experiment suggests that extraction of the subject is affected by a restriction that is not intrinsic to a specific type of clause.

In addition, this study confirms the data in previous papers, according to which there is a difference between indicative and subjunctive embedded clauses with regard to transparency for object extraction (Dyakonova 2009). This result is welcome since it presents valid evidence for the judgments, which are quite subtle. Besides, it fits with Dyakonova's account of the asymmetry in object extraction out of the two embedded clauses. Notably, since Dyakonova does not discuss subject extraction, her theory leaves room for the complementizer-trace effect to be explained by some additional restrictions on the grammar. The assumption about two different factors affecting argument extraction in Russian actually coincides with the empirical data.[6]

Let us consider the relevance of the results of the experiment for the theories of the complementizer-trace effect.

[6] Here I adopt the weight-constraint approach to interpreting the gradience of the experimental data. According to it, each constraint has its certain value, which combined can generate a range of possible levels of acceptability. Another type of approach, the binary-category one, assumes that sentences can be either grammatical or not. It suggests that the gradience of judgments must be attributed to some non-syntactic constraint. I leave the discussion of whether this kind of explanation can be provided for the data in this paper for the future. For more discussion of approaches to the interpretation of experimental data, see Sprouse (2015).

The experiment has shown that the presence of a high adverb has no effect on the acceptability scores of subject extraction. First, this rules out the accounts based on the assumption that the complementizer-trace effect is due to the ban on the linear adjacency of the complementizer and the extraction site. The presence of a high adverb that is supposed to intervene between the complementizer and the extraction site did not affect participants' judgments. Thus, this result supports the previous claims about the inadequacy of prosodic theories (Toquero-Pérez 2020).

Structural accounts are not that consistent in their predictions. Theories based on the notions of NIC and ECP actually predict the absence of adverb obviation (see Culicover 1993), thus matching with the results of the study; however, they cannot explain the apparent difference between Russian and English. The same considerations apply to the theory in Pesetsky & Torrego (2001), which does not predict adverb obviation to exist either. It is hard to see how the presence of an adverb could affect the properties of the subject and of C and T heads. My results are also unexpected under Erlewine's (2020) anti-locality theory, provided that adverbials in Russian have the same structural properties as adverbials in other languages. One could argue that adverbials in Russian are merged as free adjuncts rather than as a part of a separate projection, thus not being able to prevent the subject movement from being too short. However, the syntax of adverbials is still an open question, as both the cartographic (Cinque 1999) and free adjunction approaches (see Haider 2000; Ernst 2002, a.o.) have their advantages and downsides. The proper examination of the syntax of adverbials in Russian is, however, beyond the scope of the current study, as well as the discussion of the compatibility of Erlewine's approach with the free adjunction view on adverbial syntax.

The Exfoliation theory, on the other side, might provide some insights into the reasons for the cross-linguistics variation. If adverb obviation in English is, in fact, due to the additional adverbial CP above the embedded clause, we actually do not expect the obviation to be possible in Russian since it does not allow for double complementizer structures (27), unlike English (26).

(26) We know [$_{CP}$ that for all intents and purposes [$_{CP}$ that the government created a rating agency oligopoly that prevented the market from enjoying more competition]].
(Pesetsky 2021:(78a))

(27) a. * my znajem čto faktičeski čto pravitel'stvo sozdalo oligopoliju
we know that practically that government created oligopoly
'We know that the government has practically created an oligopoly.'

b. * my xotim čtoby faktičeski čtoby pravitel'stvo sozdalo oligopoliju
we want that.SUBJ practically that.SUBJ government created oligopoly
'We want the government to practically create an oligopoly.'

Thus, the results of this study raise certain questions about the adequacy of the existing theories. They also show that adverb obviation is a factor that should be examined further, especially from a crosslinguistic perspective.

6. Conclusion

In this paper, I discuss the experimental study of the complementizer-trace effect in Russian. The results of the experiment provide additional support to the claims about the universality of the complementizer-trace effect. They also suggest that the theories attributing the ungrammaticality of analogous structures to the prohibition on linear adjacency of the complementizer and the extraction site do not hold against the Russian data. In addition, the data raise certain complications for the structural theories. The study also sheds light on the asymmetries between the two types of embedded finite clause in Russian by showing that the empirical data coincides with the data from Dyakonova (2009), thereby validating her ideas about the nature of the differences in object extraction. Finally, I show that the Russian data might provide a counterexample against assumptions in Sprouse (2007) about the insignificance of the presence of the context in the experimental studies.

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Abbreviations

ACC	accusative
GEN	genitive
NOM	nominative
Q	question particle
SUBJ	subjunctive

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