Complementizer-trace effects in Russian

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This paper presents and discusses the results from an acceptability judgment task conducted to test complementizer-trace effects in Russian. In addition, in this study I investigate (i) the differences in the transparency of two types of finite embedded clauses with two different complementizers for the argument extraction (ii) and the effect of a high adverb on the acceptability of the subject extraction. While providing reliable data on the presence of complementizer-trace effects 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 despite the type of complementizer (2).

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

(2) a. Who do you think that Sue met __?
b. Who do you think Sue met __?

This phenomenon has come to be known as the complementizer-trace effect. Although several possible explanations have been suggested to why such a constraint should exist, no consensus has been reached on that matter. Complementizer-trace effects were quickly identified in other languages as well, which reinforced the assumptions about its 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 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 the indicative clauses with the complementizer *chto* 'that' exhibit complementizer-trace effect, while the same is not true for the subjunctive clauses with the complementizer *chtoby* 'that.SUBJ'. Dyakonova (2009:216) reports that there is "a

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massive 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 experimental methods in the field of complementizer-trace effects have 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 *that*-trace effect in English. In German, however, the claims about the lack of the complementizer-trace effect 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 degradedness of subject extraction in German is 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) as the support for the prosodic account of *that*-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 the two finite embedded clauses with different complementizers for the argument extraction and the effect of a high adverb on the acceptability of subject extraction. In addition, I also discuss whether using context in the experimental study affects the 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 ones that will be relevant further in the discussion of the results of my study. 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 proposed that ungrammaticality of subject extraction over an overt complementizer was due to the *that*-trace filter, that specifically ruled 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 (Kandybowicz 2006)
*<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

Many other accounts, however, attribute the unacceptability of subject extraction to the structural constraints. Some researchers connect *that*-trace effect with the Nominative Island constrain (NIC, Chomsky 1980; Kayne 1980; Pesetsky 1979, 1982); this constraint, that

prohibits an anaphor to be free in S (=CP), rules out the structures like (1a) since an overt complementizer prevents the extracted subject from binding its trace in the embedded clause. The 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, 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 movement of the subject to Spec,CP. A nominative subject is also claimed to bear a *u*T feature. Thus, it 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 moved further up in the structure by successive cyclic movement. In Erlewine (2020) the following variant of this notion is proposed:

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

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 for a subject 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 a 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. 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.

2.1. 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.

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

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 (6) 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 projection AdvP (in the spirit of Cinque 1999). Extra functional material makes subject movement from Spec,TP to Spec,CP no longer violate Spec-to-Spec anti-locality. Consequently, subject can reach Spec,CP and be moved out to the higher clause.

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

(7) Double *that* complements (Pesetsky 2021:(78))
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.
b. But the simple analysis which suggests **that** because American investment takes place

[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).

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)
c. He thinks **that** if you are in a bilingual classroom **that** you will not be encouraged to learn English. (McCloskey 2006)

Basing on this data, Pesetsky proposes that sentences like (6) 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 clauses without violating anti-locality. The Exfoliation of the CP of the adverbial phrase, 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 (8b) (compare to (8a), where object extraction over an adverbial is shown). Thus, sentences in (6) do not constitute an exception to complementizer-trace effect in English.

(8) 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 quite 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 finite embedded clause: indicative and subjunctive. Indicative clauses are introduced by the complementizer *chto* 'that' (9a), while subjunctive clauses are introduced by the complementizer *chtoby* 'that.SUBJ' (9b).

(9) a. ivan skazal chto masha prinesla shampanskoje
Ivan said that Masha brought champagne
'Ivan said that Masha has brought champagne.'
b. ivan xotel chtoby masha prinesla shampanskoje
Ivan said 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. (10a) and (10c) with (10b) and (10d). No examples with the indicative embedded clauses are given.

(10) a. u menja est' kniga, kotoruju ja xochu, chtoby vy prochli __
by me.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 xochu,
by me.GEN is book which.NOM I want
ctoby __ 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, chtoby masha ubila __
guy who.ACC I wished that.SUBJ Masha kill
'the guy, who I wanted Masha to kill'

d. *paren', kotoryj ja xotel, chtoby __ ubil mashu
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, these are certain concerns about the reliability of the data and its' 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 the indicative clauses (11) and not in the subjunctive clauses (12).

(11) a. *kto ty dumaesh' chto __ vypil vsjo pivo?
who you think that drank all beer
'Who do you think drank all beer?'

b. ?kogo ty dumaesh' chto ivan narisoval __ na zabore?
what you think that Ivan drew on fence
'Who do you think Ivan drew on the fence?' (Antonenko 2008:(22))

(12) a. ?kto ty xochesh' chtoby __ napisal stat'ju?
who you want that.SUBJ wrote paper
'Who do you want for to write a paper?'

b. ?chto ty xochesh' chtoby ivan kupil __?
what 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 *chto* 'that' appears in Spec,CP, while the complementizer *chtoby* 'that.SUBJ' consists of two parts — *chto* in Spec,CP and the subjunctive particle *by* in C[2]. The judgments in (11)-(12) can be explained in the following way.

[2] The assumption about the complementizer *chto* '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 complemetizers cannot occupy subject position.

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

(ii) *(to,) **chto** 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 properties similar to that of the English complementizer *that*, which allows English clauses to be subjects and to check features of T. Antonenko states that this might serve as evidence that the complementizer *chto* is not an instantiation of T-features moved to C. Building on the proposal in Landau

Object extraction is assumed to proceed successive-cyclically in both types of clause with nothing preventing it from moving out to the matrix clause. However, when it comes to subject extraction, the difference in the complementizers' structure plays a crucial role. Antonenko follows Rizzi (2006) and Rizzi & Shlonsky (2007) and postulates that after moving to the Spec,TP position subject gets frozen due to it satisfying the EPP feature on T. In the case of indicative clause that entails the unavailability of the subject DP to move any further. In subjunctive clause, however, there is another way of satisfying the EPP feature — by the particle *by* in C via head-head configuration (Rizzi & Shlonsky 2007). In this case, the subject of subjunctive clause is not required to stay in Spec,TP and can be moved out to the matrix clause.

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 indicative clause (13a) are in fact less acceptable than the sentences with object extraction out of subjunctive clause (13b).

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

b. kogo ty xochesh' chtoby ja priglasila __?
who.ACC you want that.SUBJ I invite
'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 subjunctive clauses does not. This is evident from the fact that subjunctive clauses, unlike indicative ones, exhibit sequence of tense (Khomitsevich 2007). The sentence in (14) is most likely to be interpreted as though the event of the embedded clauses precedes the event of the matrix clause. In (15), 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.

(14) ivan skazal chto olga gotovila
Ivan said that Olga cooked
'Ivan said that Olga was cooking.'

(15) ja treboval chtoby galya ushla
I demanded that.SUBJ Galya went.away
'I demanded Galya to go away.'

(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.

This difference affects the Spell-Out of the embedded structures. Dyakonova assumes that the uppermost projection of the clause, ForceP, is a phase. In the case of 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 possible additional restrictions on extraction out of the embedded clauses like the ones mentioned 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 judgements 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 the most important for 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 *chto* 'that' might be phonologically null are not clear and are in need of a careful examination (16). The complementizer *chtoby* 'that.SUBJ' can never be omitted (17).

(16) a. petja skazal **??(chto)** ty ne pridesh'
Petja said that you not come
'Petja said that you will not come.'
b. ja znaju **??(chto)** ty vresh'
I know that you lie
'I know that you are lying.'

(17) a. ja xochu ***(chtoby)** ty ushel
I want that.SUBJ you go.away
'I want you to go away.'
b. ona trebovala ***(chtoby)** vasja prines piva
she demanded that.SUBJ Vasja bring beer
'She demanded Vasja to bring beer.'

4.1.2. The effect of high adverb

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[3] 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-symmetry 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, it would make a good support to the theories of that kind. Apart from that, it is also interesting to know 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 the 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 the second group was presented with a version where each sentence, including the filler sentences, was preceded by the context for it.

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 two levels: (i) finite indicative embedded clause with the complementizer *chto* 'that' (ii) finite subjunctive embedded clause with the complementizer *chtoby* 'that.SUBJ'. The second factor was the type of extracted argument (ARG). The factor had 3 levels: (i) extraction of object, (ii) extraction of subject and (iii) extraction of subject in the presence of a high adverb in the embedded clause. I used the adverb *odnazhdy* '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.

(18) a. ja xotel chtoby **odnazhdy** petja priglasil mashu v gosti
I wanted that.SUBJ **once** Petja invited Masha.ACC in guest.
'I wanted Petja to once invite Masha to visit.' {a=b}

[3] I did not use the presence of the 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 affected the results.

b.	??ja	xotel	chtoby	petja	**odnazhdy**	priglasil	mashu	v gosti
	I	wanted	that.SUBJ	Petja	**once**	invited	Masha.ACC	in guest.

Second, the adverb had to sound natural in both types of 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', *vozmozhno* 'possibly', *ochevidno* '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', *schitat'* 'consider') had indicative clause as their complement while the other 3 had subjunctive clause as their argument (*xotet'* 'want', *trebovat'* 'demand', *prosit'* 'ask'). The reason for using two different sets of matrix predicates was the following: the verbs that can take both types of 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 in the end of the sentence. One set of experimental items is shown in (19).

(19) a. Subject extraction, indicative clause, no adverb

kto	ty	dumaesh'	chto	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	dumaesh'	chto	odnazhdy	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	dumaesh'	chto	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	xochesh'	chtoby	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	xochesh'	chtoby	odnazhdy	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 xochesh' chtoby 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 (20) and sentences with *wh*-extraction out of complex NP island as ungrammatical ones (21).

(20) Grammatical fillers
a. ty znaesh prineset li masha vina k uzhinu?
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 babushki?
you found.out when Lena cook pie for grandma
'Did you find out when Lena is going to cook a pie for grandma?'

(21) Ungrammatical fillers
a. *chto ty poluchila otchet o tom
what you got report about it
chto nikita prochel za leto __?
that Nikita read during summer
'You got a report that Nikita has read what during summer?'
b. *pro chto tebe ponravilsja mal'chik 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 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. Items were presented using 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 (20) are most likely to get high ratings, while the ones featuring a strong island violation, as in (21), 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 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 context and 14 in the experiment with the context. After omitting their judgments, the raw ratings were then transformed into z-scores.

The mean ratings for the sentences in both versions of the experiment are shown below in Figure 1 and Figure 2.

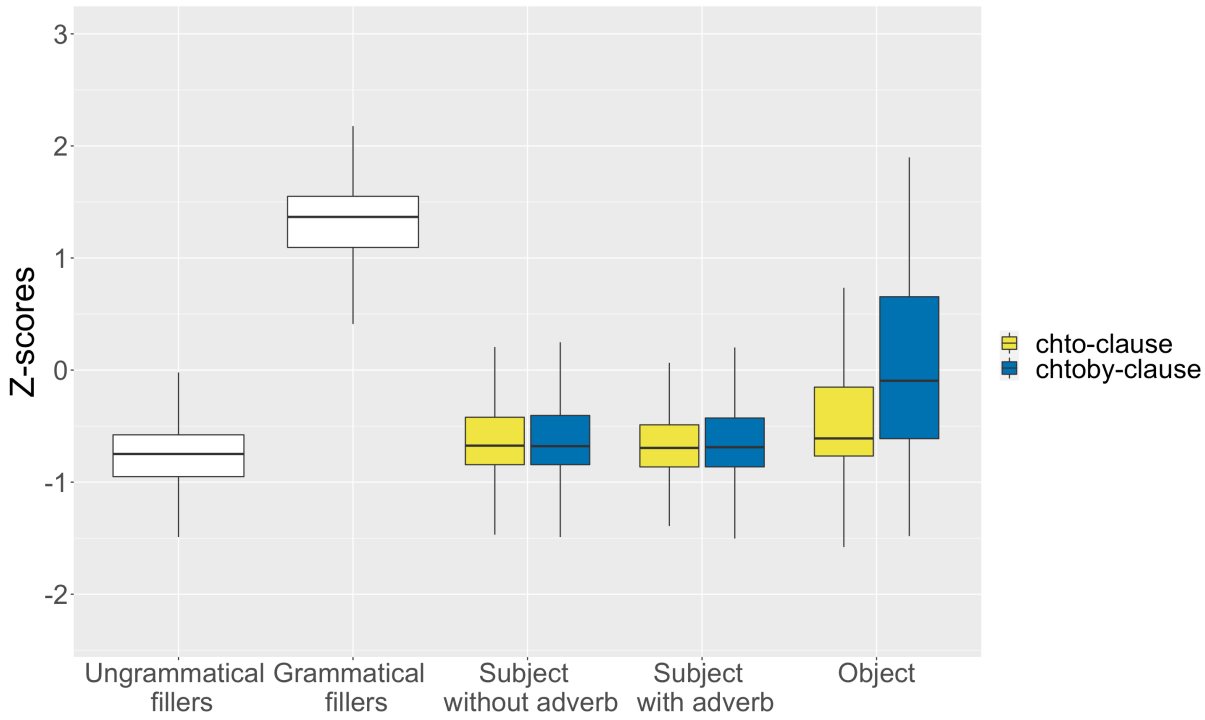

Figure 1. Acceptability ratings for the version of the experiment without context.

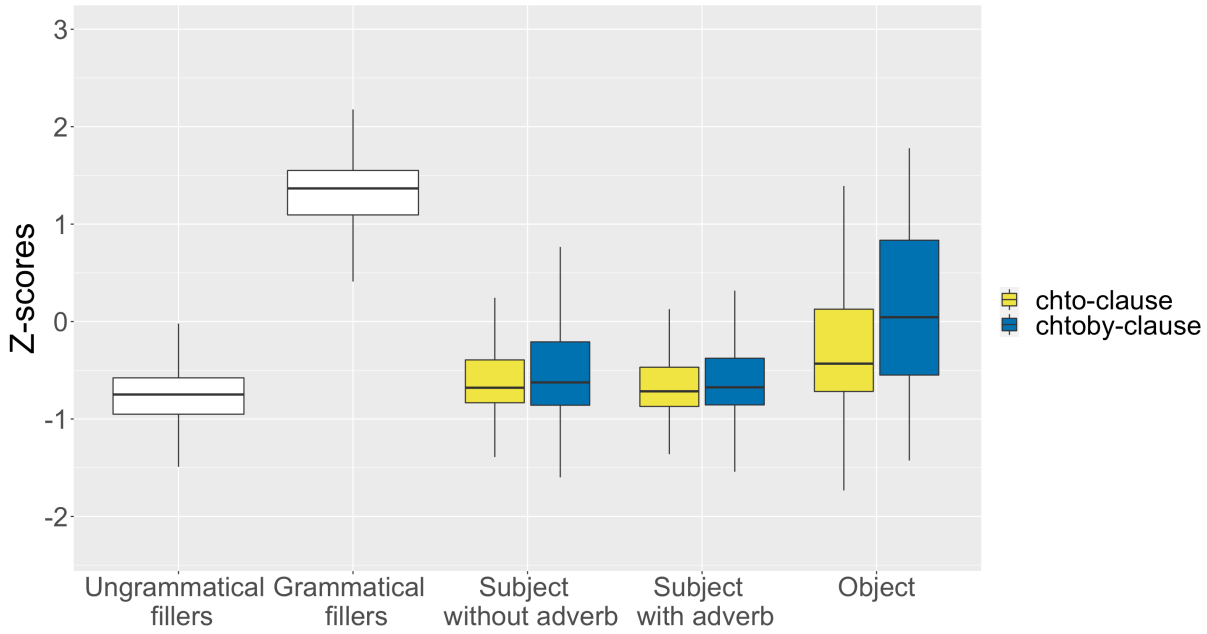

Figure 2. Acceptability ratings for the version of the experiment with context.

The results of the experiments were then analyzed separately from each other using a linear mixed model with random intercepts for participant 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 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 subject with and without a high adverb present was not significant ($p = 0.3374$). Finally, Tukey test has also demonstrated that the type of embedded clause only had an influence on object extraction ($p << 0.0001$), while the ratings of the sentences with subject extraction both in the absence ($p = 0.9978$) and in presence of the high adverb ($p = 1$) were not significantly affected by it.

As for the experiment with the usage of context, the results turned out to be the same. Both CL ($\beta = 0.16815$, SE = 0.036, $\chi2(1) = 18.8$, $p < 1.451e\text{-}05$) and ARG ($\chi2(2) = 103.53$, $p < 2.2e\text{-}16$) 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 an adverb ($p = 0.2153$), while the ratings for the object extraction differ both from the rating for the subject extraction in the absence of an 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 ($p < 0.0001$).

4.4.1. Context

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

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

p-values actually show that context may affect 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 context does not affect the experimental results at all.

5. Discussion

My results demonstrate that in Russian subject extraction is indeed rated lower than extraction of object. 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 clause 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 *chtoby* 'that.SUBJ'. In opposition, my experiment suggests that extraction of 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 also leaves room for the complementizer-trace effect to be explained by additional restrictions of the grammar. The assumption about two different factors that can affect argument extraction in Russian actually coincides with the empirical data[4].

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

The experiment has shown that the presence of a high adverb makes 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 does not affect the participant's 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. Older theories, based on the notions of NIC and ECP, actually predict the absence of the adverb obviation (see Culicover 1993), thus matching with the results of the study; however, they do not seem to be able to explain the apparent difference between Russian and English. The same considerations apply to the theory in Pesetsky & Torrego (2001), which does not expect the adverb obviation to exist either. It is hard to see how the presence of an adverb could affect the properties of subject and 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 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.

[4] 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 in the data in this paper for the future. For more discussion of approaches to the interpretation of experimental data, see Sprouse (2015).

The Exfoliation theory, on the other side, might provide some insights for the variation across languages. If the 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 (23), unlike English (22).

(22) 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))

(23) a. *my znayem chto fakticheski chto pravitel'stvo sozdalo oligopoliju
we know that in.fact that government created oligopoly
'We know that the government has p created an oligopoly.'
b. *my xotim chtoby fakticheski chtoby pravitel'stvo sozdalo oligopoliju
we want that.SUBJ in.fact that.SUBJ government created oligopoly
'We want the government to create an oligopoly in fact.'

Adverb obviation is a factor that should be examined further, especially from a cross-linguistic perspective. Despite that, it can be concluded that the data of this study still raises certain questions about the adequacy of the existing theories.

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 a complementizer and an extraction site do not hold against the data in Russian. In addition, the data raise certain complications for the structural theories as well. My study also sheds light on the asymmetries between two types of embedded finite clause in Russian by showing that the empirical data coincides with the data from Dyakonova (2009), rather than from elsewhere, thereby validating her ideas about the nature of the differences in object extraction. Finally, I show that Russian data might provide a counterexample against assumption in Sprouse (2007) about the insignificance of the presence of the context in the experimental studies their results.

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Abbreviations

ACC	accusative
GEN	genitive
NOM	nominative
Q	question particle
SUBJ	subjunctive

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