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The effect of coordinate structure on the licensing of *čto*-clauses in noun complement constructions: An experimental study

Previously, *čto*-clause complements of nouns were found to be more acceptable in constructions with collocations as opposed to non-collocations, which was taken to support the hypothesis whereby *čto*-clauses are introduced by a silent preposition licensed by incorporation into a complex predicate (created in collocational constructions). The paper presents the results of an acceptability rating study testing the prediction of this account, namely, that embedding the noun in a coordinate structure should block the incorporation and hence licensing of *čto*-clauses. In addition, an alternative hypothesis is examined according to which *čto*-clauses are more acceptable in collocations due to their higher frequency.

Key words: Russian, experimental syntax, noun complement clauses, collocation, coordination, frequency

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Экспериментальное исследование приемлемости придаточных с союзом *что* в функции сентенциального актанта существительного в конструкциях с сочинением

Предыдущие исследования показали, что придаточные со *что* при существительных более приемлемы в конструкциях с коллокациями, чем в конструкциях без коллокаций. Это может служить подтверждением ранее высказанной гипотезы о том, что такие придаточные вводятся нулевым предлогом, лицензируемым путем инкорпорации в сложный глагол в конструкциях с коллокациями. В настоящей работе приводятся результаты эксперимента на вынесение суждений о приемлемости, проверявшего предсказание данной гипотезы, согласно которому сочинительная конструкция будет блокировать инкорпорацию и тем самым приводить к неграмматичности придаточного. Также в эксперименте проверялась альтернативная гипотеза, согласно которой большая приемлемость придаточных при коллокации связана с большей частотностью последних.

Ключевые слова: русский язык, экспериментальный синтаксис, придаточные при существительных, коллокация, сочинение, частотность

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1. Introduction

Like their English counterparts, declarative sentential complements in Russian (*čto*-clauses) can appear not only in direct (nominative subject / accusative object), but also in oblique/PP positions, where they alternate with the (P +) *to* + *čto*-clause construction (*to,čto*-clauses), which consists of the demonstrative *to* ‘that’ case-marked by P or V and followed by a *čto*-clause, as shown in (1a).

- (1) Ona uverena (v tom), čto on pridet.
 she.NOM certain in it.LOC that he will come

Previous work aimed to uncover semantic/grammatical factors governing the choice between the two clause types [Knyazev, 2016] found that there is a strong preference to realize complements of nominalizations like ‘hope’, ‘conviction’, etc. and of relational nouns such as ‘likelihood’, etc. as *to,čto*-clauses (but not *čto*-clauses) unless the noun forms a ‘set collocation’ with the higher verb (in which case both clause types are possible), cf. collocation ‘express conviction’ in (2a) vs. non-collocation ‘strengthen (one’s) conviction’ in (2b).¹

(2) a. COLLOCATION

- Ona **vyrazila** **uverennost’** (v tom),
 she.NOM expressed conviction.ACC in it.LOC
 čto on pridet.
 that he will come

b. NON-COLLOCATION

- Èto **usילו** **uverennost’** ??(v tom),
 this strengthened conviction.ACC in it.LOC
 čto on pridet.
 that he will come

The contrast in (2), referred to as the ‘collocational restriction’ (on *čto*-clause complements of nouns), was later tested in an acceptability rating study [Knyazev, to appear a] using a 2 × 2 factorial design crossing factors CLAUSE TYPE and (NON-)COLLOCATION, following experimental work on island effects [Sprouse et al., 2016]. In that experiment, which contrasted 12 collocations and non-collocations of the same N, as in (2), a (super-additive) interaction was found showing that, although *čto*-clauses were associated with a decrease in acceptability relative to *to,čto*-clauses in both constructions, this decrease was 0.43 points greater in the non-collocational constructions.

¹ For further discussion of the contrast between *čto*- and *to,čto*-clauses see [Kobozeva, 2013].

These results were taken to support the grammatical account of the collocational restriction proposed in [Knyazev, 2016], according to which:

a) *to,čto*-clauses in oblique/PP positions are introduced by a silent preposition, which must be licensed by abstract incorporation into a higher verb;

b) the noun can reanalyze with the verb to form a complex verb only in collocational constructions.

Given the logic of experimental syntax studies such as [Sprouse et al., 2016], the decrease in acceptability of *čto*-clauses in non-collocational constructions can be explained by a (grammatical) violation of the licensing conditions associated with silent P.

Although the experimental results are consistent with the proposed grammatical account, they are not conclusive as the collocations and non-collocations (within a sentence set) in the experiment above differed widely along various dimensions including broad semantics and frequency. For example, one cannot exclude an alternative hypothesis according to which *čto*-clauses are simply stored in memory along with associated V-N combinations in an item-based fashion, whereas *to,čto*-clauses are fully productive and depend only on the semantics of the construction (henceforth, the “frequency hypothesis”). The frequency hypothesis would predict a contrast in acceptability for *čto*-clauses between collocational V-N combinations, which are more frequent, and non-collocational ones, which are less frequent, but no contrast for *to,čto*-clauses. This difference would result in a super-additive interaction.

This hypothesis was tested in [Knyazev, to appear b], which contrasted 12 pairs of semantically similar collocations with a higher vs. lower corpus frequency (e.g., *vyrazit' uverennost'* ‘express conviction’ vs. *vyskazat' uverennost'* ‘voice hope’) using a forced-choice task. Although the results showed no effect of frequency and hence no support for a frequency-based account, the difference in the design of this experiment from the design of the experiment in [Knyazev, to appear a], makes it hard to compare the two experiments directly. Moreover, in a follow-up analysis a marginal correlation was found between the proportion of *čto*-clause responses and the log frequency of V-N, suggesting that frequency might still play some role in acceptability.

In view of the limitations of the studies reported above, a more direct way of testing the predictions of the account in [Knyazev, 2016] is called for. In particular, the account predicts that if incorporation of silent P (by hypothesis, introducing a *čto*-clause) is blocked by some syntactic configuration such as embedding in a coordinate structure, a *čto*-clause

will become ungrammatical. In addition, a frequency-based account must be tested within the same design in order to be able to directly compare the two effects. This paper reports the results of an acceptability rating study which (in a single design) simultaneously tested the effects of embedding the noun in a coordinate structure and the effect of frequency of the V-N collocation on the acceptability of *čto*-clauses.

The paper is structured as follows. In section 2 the main competing hypotheses are introduced, and the design of the experiment is discussed. Section 3 discusses the materials and the procedure used in the experiment. Section 4 presents and discusses the results of the experiment. Section 5 concludes.

2. The hypotheses and design

2.1. The coordination hypothesis

According to [Knyazev, 2016], *čto*-clause complements are underlyingly nominal expressions and are subject to the Case Filter. The crucial assumption of the account is that in apparent ‘Caseless’ positions, e.g., those associated with oblique/PP selecting verbs, *čto*-clause are licensed by the silent preposition P_{HOLD} , which has the semantics of the relation of holding propositional content. It is further assumed that P_{HOLD} must incorporate into a verbal head in order to get licensed (the incorporation has the semantic effect of predicate conjunction). Assuming that in collocational V-Ns such as (2a), N itself can abstractly incorporate into V to create a complex predicate (cf. the analysis of *make the claim* in [Davies, Dubinsky, 2003]), P_{HOLD} associated with such V-Ns will be licensed by virtue of incorporation into this complex predicate, as schematized in (3a).² By contrast, in non-collocational V-N, as in (2b), no complex predicate will be created and thus P_{HOLD} and the *čto*-clause will fail to be licensed.

This account predicts that even in collocational V-N such as (2a) whenever incorporation of N to V is disrupted, a complex predicate will fail to be created, thus blocking licensing of the *čto*-clause. One such configuration is coordinate structure, generally taken to be an island for movement (including incorporation). The prediction then is that if the complement-taking N is conjoined with a noun phrase (xNP), the incorporation of this N (or, more precisely, the $P_{\text{HOLD}} + \text{N}$ complex) into V will be blocked, leading to ungrammaticality, as in (3b).

² According to standard assumptions, this process must proceed cyclically. First, P_{HOLD} incorporates into N and then the $[P_{\text{HOLD}} + \text{N}]$ complex incorporates into V.

- (3) a. $[_{V'} [[_{P}_{HOLD} + N] + V] [_{NP} [P_{HOLD} + N] [_{PP} P_{HOLD} [_{xNP} \check{c}to\dots]]]]$ (= (2a))
- b. $*[_{V'} V [xNP \& [_{NP} [P_{HOLD} + N] [_{PP} P_{HOLD} [_{xNP} \check{c}to\dots]]]]$ (= (4))

To test this hypothesis, examples like (4), with coordination, were contrasted with examples like (2a) above, without coordination. Given the logic of the previous studies [Knyazev, to appear a], the prediction is that in examples like (2a), *čto*-clauses will lead to a greater decrease in acceptability (relative to *to, čto*-clauses) than in examples like (4), which is equivalent to a non-zero (positive) difference between the differences between *čto* and *to, čto* in the two conditions, so-called “difference-in-differences”, or DD, which can be viewed as the measure of the “coordination effect”, as shown in (5), see [Sprouse et al., 2016]. In statistical terms, this hypothesis predicts a (super-additive) interaction between the factors \pm COORDINATION and CLAUSE TYPE (*to, čto* vs. *čto*).

- (4) Ona vyrazila **[[javnoe nedoumenie] i [uverennost'**
 she.NOM expressed obvious puzzlement and conviction.ACC
 ??(v tom), čto on pridet]].
 in it.LOC that he will come
- (5) $COORD_{to, \check{c}to} - COORD_{\check{c}to} > NON-COORD_{to, \check{c}to} - NON-COORD_{\check{c}to} \Leftrightarrow$
 $DD = (COORD_{to, \check{c}to} - COORD_{\check{c}to}) - (NON-COORD_{to, \check{c}to} - NON-COORD_{\check{c}to}) > 0$

2.2. The frequency hypothesis

According to the frequency hypothesis, discussed in [Knyazev, to appear b], the contrast between examples with collocational V-N in (2a) and non-collocational V-N in (2b) follows from the higher token frequency of the former. In accordance with usage-based approaches, the hypothesis assumes that experience (operationalized as token frequency) plays an important role in the acquisition of and mature competence with particular constructions. Crucially, it is further assumed that the effect of token frequency is modulated by higher “regularity” of the construction (operationalized as a higher type frequency) so that more regular constructions are less affected by token frequency (as compared to construction with a lower type frequency) as they are less dependent on experience. This leads to what has been described as Regularity × Frequency interactions [Christiansen, Chater, 2016]. Assuming that *čto*-clauses in oblique/PP positions are less regular than *to, čto*-clauses, they will be more strongly affected by the higher frequency of V-N (“frequency effect”), as shown in (6), accounting for the contrast between collocational and non-collocational V-N in (2a)–(2b).

$$(6) \text{ MOREFREQ}_{\check{c}to} - \text{LESSFREQ}_{\check{c}to} > \text{MOREFREQ}_{to,\check{c}to} - \text{LESSFREQ}_{to,\check{c}to} \Leftrightarrow \\ \text{DD} = (\text{LESSFREQ}_{to,\check{c}to} - \text{LESSFREQ}_{\check{c}to}) - (\text{MOREFREQ}_{to,\check{c}to} - \text{MOREFREQ}_{\check{c}to}) > 0$$

The frequency hypothesis in (6) further predicts that the same contrast will be obtained between collocational V-N with higher vs. lower token frequencies (in construction with *čto*-clauses). To test this hypothesis, collocations like (2a) were contrasted with semantically and structurally identical collocations with lower frequency, as shown in (7). In statistical terms, this hypothesis predicts a (super-additive) interaction between factors FREQUENCY and CLAUSE TYPE.

(7) Ona	vyskazala	uverennost'	(v	tom),
she.NOM	voiced	conviction.ACC	in	it.LOC
čto	on	pridet.		
that	he	will come		

Note that the contrast between (2a) and (7), should it occur, is not predicted by the grammatical account in (3), as both types of V-Ns are presumably derived by incorporation. Similarly, the contrast between (2a) and (4) is not predicted by the frequency hypothesis (at least without modification) as they involve the same surface strings “V + N + *čto*”. Thus, the results of the experiment will allow to decide which hypothesis is more consistent with the data.

3. Materials and procedure

The experimental items consisted of twelve sets of six lexically matched sentences given in Table 1. Each set included a pair of V-N collocations which were semantically and structurally similar but differed in frequency as well as one coordinated collocation based on the more frequent V-N, each with a *čto*- and a *to,čto*-clause. The pairs of collocations were selected based on a prior corpus study in such a way that the higher frequency V-Ns had a higher token frequency of *čto*-clauses, see Table 2.³ The coordinated collocations were constructed by (left-)conjoining the noun in the collocation by some semantically appropriate noun modified by an adjective. In order to exclude an analysis with coordination between N-heads, nouns that disallow a *čto*-clause in this construction were chosen as the first N. Additionally, the two Ns typically differed in gender and/or most adjectives were semantically incompatible with the second N. The actual sentences that participants rated were constructed by slightly modifying naturally occurring examples found on the Web.⁴

³ The corpus study was based on the texts written after 1950 in the Russian National Corpus (RNC), ruscorpora.ru. See [Knyazev, to appear b] for details.

⁴ Experimental sentences based on nine pairs of high vs. lower frequency V-Ns in Table 1 (sets 1–9) were directly taken from [Knyazev, to appear b].

The experimental sentences were divided into six lists in a Latin square design and interspersed with 24 fillers with different syntactic structures (8 grammatical, 8 ungrammatical and 8 of intermediate acceptability). Participants were instructed to rate the naturalness of experimental sentences on a 7-point scale (1 indicating a totally unnatural-sounding sentence). The experiment was hosted on Google Forms and advertised via social media. One hundred and seventy-five people participated in the experiment; their mean age was 28.05 (range: 16–62).

Table 1

Materials used in the experiment

	MOREFREQUENT/LESSFREQUENT	COORDINATED
1	<i>byla/ostavalas' nadežda</i> 'was / was left hope'	<i>byl oxotničij azart i nadežda</i> 'was wild excitement and hope'
2	<i>pojavilas' /zarodilas' nadežda</i> 'appeared / was born hope'	<i>pojavilas' finansovaja podderžka i nadežda</i> 'appeared financial support and hope'
3	<i>vyrazil/vyskalmaz nadeždu</i> 'expressed/voiced hope'	<i>vyrazil sderžannij optimizm i nadeždu</i> 'expressed restrained optimism and hope'
4	<i>daet/darit nadeždu</i> 'gives/presents hope'	<i>daet moral'noe udovletvorenje i nadeždu</i> 'gives moral satisfaction and hope'
5	<i>poterjal/poxoronil nadeždu</i> 'lost/buried hope'	<i>poterjala byloj entuziazm i nadeždu</i> 'lost former enthusiasm and hope'
6	<i>est'/soxranaetsja uverennost'</i> 'is/remains conviction'	<i>est' položitel'nyj nastroj i uverennost'</i> 'is positive attitude and conviction'
7	<i>pojavilas' /voznikla uverennost'</i> 'appeared/emerged conviction'	<i>pojavilos' duševnoe spokojstvie i uverennost'</i> 'appeared peace of mind and conviction'
8	<i>vyrazil/vyskalmaz uverennost'</i> 'expressed/voiced conviction'	<i>vyrazil javnoe nedoumenie i uverennost'</i> 'expressed obvious puzzlement and conviction'
9	<i>est'/imejutsja dokazatel'stva</i> 'are/exist proofs'	<i>est' ustanovlennye fakty i dokazatel'stva</i> 'are established facts and proofs'
10	<i>bylo/ostavalos' somnenie</i> 'was / was left doubt'	<i>byla smutnaja trevoga i somnenie</i> 'was vague anxiety and doubt'
11	<i>vozniklo/pojavilos' somnenie</i> 'appeared/emerged doubt'	<i>vozniklo nexorošee podozrenie i somnenie</i> 'emerged nasty suspicion and doubt'
12	<i>vyrazil/vyskalmaz somnenie</i> 'expressed/voiced doubt'	<i>vyrazil krajnij skepticizm i somnenie</i> 'expressed extreme skepticism and doubt'

Table 2

**Frequencies of *čto*- and a *to,čto*-clauses
with more and less frequent collocations (RNC)**

set	V-N _{MOREFREQ}		V-N _{LESSFREQ}		set	V-N _{MOREFREQ}		V-N _{LESSFREQ}	
	<i>čto</i>	<i>to, čto</i>	<i>čto</i>	<i>to, čto</i>		<i>čto</i>	<i>to, čto</i>	<i>čto</i>	<i>to, čto</i>
1	255	42	41	11	7	23	2	8	1
2	42	6	8	0	8	104	40	17	6
3	156	25	15	1	9	29	12	5	2
4	24	18	0	3	10	114	75	49	25
5	38	8	0	2	11	25	20	5	4
6	147	29	1	1	12	15	19	6	13

4. Results and discussion

4.1. Overall results

The ratings were z-score transformed in accordance with the usual practice in experimental syntax [Sprouse et al., 2016]. Grammatical fillers received the (transformed) rating of 0.61 (SD = 0.66), ungrammatical fillers the rating of -1.12 (SD = 0.51) and fillers of intermediate acceptability the rating of -0.4 (SD = 0.88). The (transformed) condition means are given in Table 3.

Table 3

Z-score means (SD) in the experiment

	<i>to, čto</i>	<i>čto</i>
COORD	0.62 (0.70)	0.17 (0.70)
NONCOORD/MOREFREQ	0.87 (0.46)	0.52 (0.63)
LESSFREQ	0.81 (0.52)	0.51 (0.62)

The ratings were entered into a linear mixed-effects model with clause type, construction type and their interaction as fixed effects. Construction type was treatment coded with more frequent/non-coordinated V-N as the baseline contrasted with less frequent and coordinated V-N. Following [Barr et al., 2013], a maximal random effect structure that allowed convergence was used.⁵

⁵ The model included random by-subject slopes for clause type and construction type, random item intercept and random by-item slopes for clause type and construction type and their interaction. *P*-values were obtained using Satterthwaite approximation from the lmerTest package for R.

The model revealed a main effect of clause type such that sentences with *čto*-clauses were rated lower than sentences with *to,čto*-clauses (Estimate = -0.35 , SE = 0.07 , $t = -5.10$, $p < 0.001$). The model also revealed a main effect of construction type such that sentences with coordination were rated lower than sentences with non-coordinated/more frequent collocations. (Estimate = -0.25 , SE = 0.06 , $t = -3.48$, $p < 0.004$). Interestingly, no interaction between clause type and construction type was observed as shown by the fact that the coefficients for both interaction terms in the model output were not significantly different from zero ($\check{C}TO * LESSFREQ$: Estimate = 0.06 , SE = 0.06 , $t = 0.89$, $p = 0.39$; $\check{C}TO * COORD$: Estimate = -0.11 , SE = 0.08 , $t = -0.38$, $p = 0.19$). These results are plotted in Fig. 1.

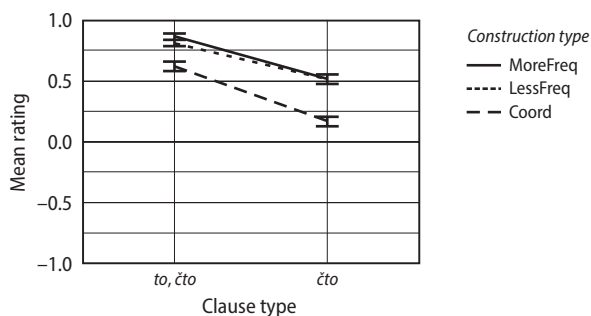


Fig. 1. Z-score means (SE) in the experiment

4.2. Results by items: Coordination

Although the interaction between coordination and clause type was not significant, we see a numerical trend in the predicted direction, i.e., *čto*-clauses were associated with a 0.11 points greater decrease in acceptability in the coordination condition. Thus, it was decided to inspect individual sets, as shown in Table 4.

Four out of 12 items (sets 1, 6, 8 and 12), shaded in Table 4, showed a positive DD_{COORD} , as defined in (5), with range 0.33–0.48, which is above the minimal threshold for island effects (= 0.25) in [Kush et al., 2018].⁶ In addition, set 7 showed a DD_{COORD} close to this threshold (0.20). One interesting feature that these sets share is that they are precisely those that showed the smallest effect of *čto*-clause (-0.02 – 0.25), shown in bold, operationalized as the difference between *to,čto*- and *čto*-clauses in the baseline condition ($\check{C}TO.EFFECT$).

⁶ Since there is no standardly accepted threshold for a grammatical (interaction) effect [Sprouse et al., 2016], the threshold suggested in [Kush et al., 2018] was used.

This observation was confirmed by a strong negative correlation between DD_{COORD} and the effect of $\check{c}to$ -clause ($r = -0.89$, $p < 0.001$), suggesting that a stronger decrease shown by $\check{c}to$ -clauses in the baseline condition is associated with a weaker effect of coordination. By contrast, there was no correlation between DD_{COORD} and the (independent) effect of coordination (COORD.EFFECT), operationalized as the difference between coordinated and non-coordinated collocations in the $to, \check{c}to$ condition ($r = 0.12$, $p = 0.69$).⁷

Table 4

Experimental effects by items

set	Čto. EFFECT	Čto. LESSFREQ	Čto. COORD	FREQ. EFFECT	COORD. EFFECT	DD _{FREQ}	DD _{COORD}
1	-0.02	0.01	0.33	0.10	0.19	0.03	0.35
2	0.41	0.23	0.36	0.34	0.09	-0.18	-0.05
3	0.52	-0.02	0.54	0.09	0.06	-0.54	0.02
4	0.50	0.41	0.48	0.01	0.07	-0.09	-0.02
5	0.92	0.74	0.39	0.03	0.15	-0.18	-0.53
6	0.08	0.48	0.41	-0.24	0.10	0.40	0.33
7	0.15	0.38	0.35	0.02	0.09	0.23	0.20
8	0.22	0.18	0.70	0.22	0.58	-0.04	0.48
9	0.35	0.14	0.38	0.11	0.35	-0.21	0.03
10	0.43	0.12	0.40	0.26	0.58	-0.31	-0.03
11	0.47	0.53	0.54	-0.07	0.63	0.06	0.07
12	0.25	0.45	0.66	-0.10	0.13	0.20	0.41

4.3. Results by items: Frequency

By-item DD-scores for the interaction between frequency and clause type (DD_{FREQ}), cf. (7), were inspected in a similar way. In this case we see little evidence for any interactions: only set 6 showed an effect greater than 0.25 (0.40); in addition, two others (sets 7 and 12) showed an effect of 0.20–0.23.

⁷ At first glance, the negative correlation between DD_{COORD} and the effect of $\check{c}to$ -clause is expected given that DD_{COORD} is calculated by subtracting the effect of $\check{c}to$ -clause (in the baseline condition) from the effect of $\check{c}to$ -clause in the coordinated condition, cf. (5). Note, however, that this is only the case if the latter effect is constant, which need not be the case. Note also that DD_{COORD} is also equivalent to the difference between the effect of coordination in the $\check{c}to$ -condition and the effect of coordination (in the $to, \check{c}to$ condition), i.e., COORD.EFFECT, as in (i). Yet, there was no correlation between DD_{COORD} and COORD.EFFECT.

There does not seem to be any clear property that sets these sets apart. Yet, we also see a marginally significant negative correlation between the effect of *čto*-clause and DD_{FREQ} ($r = -0.59$, $p = 0.05$), suggesting that the frequency effect is somewhat stronger for those sets that have a weaker effect of *čto*-clause in the baseline (more frequent) condition.

Since frequency was treated as a categorical variable, the difference in frequency between particular pairs of collocations in the experiment might have been too small to lead to a visible effect. Therefore, it was decided to test whether there is association between the log frequency of a collocation in construction with a *čto*-clause (see Table 2), and the effect of *čto*-clause for all 24 collocations (union of $\check{C}TO.MOREFREQ$ and $\check{C}TO.LESSFREQ$), ignoring the fact the collocations were matched in the experiment. This correlation was not significant ($r = -0.33$, $p = 0.11$). However, the (negative) correlation between the *proportion* of *čto*-clause and the effect of *čto*-clause did reach significance ($r = -0.44$, $p = 0.03$), suggesting that collocations with a higher proportion of *čto*-clauses tend to be less affected by the decrease in acceptability associated with *čto*-clauses.

4.4. Discussion

Overall, the experiment did not provide evidence for the effect of coordination (operationalized as a super-additive interaction between coordination and clause type). While there were independent lowering effects of both *čto*-clause and coordination, there was no decrease in acceptability of *čto*-clauses *with* coordination above and beyond those effects (i.e., we see a linear additive effect). Thus, the results fail to provide direct support for the grammatical account in (3). Nonetheless, 4 to 5 out of 12 items were associated with a stronger decrease in acceptability of *čto*-clauses in the coordination condition (0.33–0.48), as compared to the baseline. In addition, *all* items showed a stable lowering effect of *čto*-clause in the coordination condition (0.33–0.70), see column $\check{C}TO.COORD$ in Table 4. Given the operationalization of the coordination effect in (5), it is possible that this effect was “artificially” reduced by an independent effect of *čto*-clause. This interpretation is supported by the fact that the coordination effect is seen precisely in those V-Ns that do not show an effect of *čto*-clause, suggesting that it is somehow “absorbed” by the effect of *čto*-clause, see [Hofmeister et al., 2014] for some discussion. This raises questions about how the coordination effect should be operationalized. Perhaps it should be defined factorially (see [Sprouse et al., 2016]) only when other effects are not simply controlled for but *cancelled* (i.e., when there is no independent effect of *čto*-clause). Or perhaps it should be defined in *relative* rather than factorial terms (i.e., as the effect of *čto*-clause in the coordinated condition). These questions are left for future work.

As for the frequency hypothesis, the results provide little evidence for it. Apart from the lack of interaction between frequency and clause type, only 1 to 3 items out of 12 (with no clear pattern) showed any effect. Moreover, the effect of *čto*-clause was not consistently observed in the less frequent condition (see column ČTO.LESSFREQ in Table 4). While this might be due to a particular choice of materials so that a higher contrast in frequency might lead to a stronger effect, on the whole, frequency remains an unlikely source of the previously reported super-additive interaction, in accord with [Knyazev, to appear b].

5. Conclusion

I have examined two potential explanations for the so-called collocational restriction, according to which *čto*-clause complements of nouns are associated with a higher decrease in acceptability (relative to *to,čto*-clauses) if the noun belongs to a V-N collocation [Knyazev, to appear a]. Namely, (a) the grammatical account, whereby *čto*-clauses are introduced by a null preposition licensed by incorporation into a complex verbal head created in collocational constructions; and (b) the frequency account, according to which collocations have a higher frequency, affecting the acceptability of *čto*-clauses (but not *to,čto*-clauses). The study focused on the specific prediction of the grammatical account, according to which coordination should block incorporation of the null preposition and thus “unlicense” *čto*-clauses. These two hypotheses were tested in an acceptability study with a factorial design crossing factors construction type (more frequent/ non-coordinated vs. less frequent vs. coordinated collocations) and clause type (*to,čto*- vs. *čto*-clauses), where both hypotheses were operationalized as a super-additive interaction as in [Sprouse et al., 2016]. While the results did not provide direct support for either account, there is indirect evidence that the coordination effect was obscured by an independent effect of *čto*-clause, suggesting that coordination effect might be restricted to those collocations that are equally acceptable with *čto*- and *to,čto*-clauses.

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