PROCESSING OF EVENTIVE COMPLEMENTS IN TATAR

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Annotation. The paper investigates selectional properties of a perception verb from a psycholinguistic perspective. It is the first study of processing effects of a matrix verb in Tatar. We argue that a perception verb can select either the eventive or the entity complement across languages. In the case of the eventive complement, the human parser prefers a clause analysis to the determiner phrase analysis.
Key words: Perception matrix verb, selectional properties, processing effect, eventive complement, entity complement, Small Clause, Determiner Phrase.

Introduction

The pilot study reported in this paper is the first step of a project investigating multilingual processing, i.e. the participants' sensitivity to certain syntactic prompts in their first (L1), second (L2), or third (L3) language [5], [6], [7], [8]. The pilot study investigates parsing strategies used by native speakers of Tatar to process two types of complements to a perception verb.

The influence of a perception verb on subsequent sentence processing has been studied in Romance languages [1], [3], [4], English [2], Russian and Armenian [8]. In the original assumption, Grillo and Costa (2014) claim that a perception verb triggers a structural anticipation for an eventive complement alongside an entity complement. Consider, example (1):

(1) a. Maria *saw* (who? / what?) [$_{DP}$ the dog [which was black]] *(entity complement)*
b. Maria *saw* (what event?) [$_{CP}$ the dog was running] *(eventive complement)*

Sentence (1a) illustrates an entity complement, which has a form of a determiner phrase (DP). The object of the matrix verb *saw* is the DP *the dog which was black*. In a detailed analysis, *the dog* modifies the matrix predicate and is modified by the relative clause (RC) *which was black*.

Example (1b) is an eventive complement, whose structure is a full subordinate clause (CP). The entire clause *the dog was running* is a complement of the matrix verb *saw*, where *the dog* and *was running* have a subject-verb relationship. The difference in meaning between the two examples in (1) is depicted in (2).

(2) a. Maria *saw* → the dog → the dog was black *(entity complement, 1a)*
b. Maria *saw* → the running → the runner was the dog *(eventive complement, 1b)*

To exhaust all structural possibilities for an eventive complement in English, consider example (3). The eventive complement in (3) has a form of a subordinate Small Clause (SC). Same as in (1a), *the dog* and *running* demonstrate a subject-verb relationship.

(3) a. Maria *saw* [$_{SC}$ the dog running] *(eventive complement)*
b. Maria *saw* → the running → the runner was the dog

Extending the list of examples, one can notice that eventive vs. entity complements demonstrate a consistent structural difference in Romance, Germanic, and Slavic languages [2], [4], [5], [6], [7]). The entity complement is a DP, whereas the eventive complement is a clause (CP/SC). The same distinction is anticipated in Tatar.

Following Grillo and Costa [2], the eventive complement should be a preferred parsing option when the matrix clause contains a perception verb (see also [6], [1]. The experimental data come from the sentences where a perception verb is followed by an entity complement (DP) modified by a restrictive RC. The RC analysis 'competes' with the eventive complement demonstrating that the latter has a processing preference. Compare examples in (4):

(4) a. Mary a écouté [$_{DP}$ **la mère de la femme** [$_{RC}$ qui parlait de cosmétiques]].
Mary heard the mother-ACC of the woman-Gen who talked about cosmetics
French, restrictive RC-reading:
Mary heard the mother of the woman who talked about cosmetics.

b. Mary a écouté [$_{CP}$ [$_{DP}$ **la mère de la femme**] [$_{CP}$ qui parlait de cosmétiques]]].
Mary heard the mother-ACC of the woman-Gen who talked about cosmetics
French, eventive-reading:
Mary heard the talking about cosmetics by the mother of the woman.

Grillo and Costa [1] argue that because of the eventive complement speakers of Romance languages consistently disregard the second grammatical option for RC analysis (see 5b below). Consider two parsing analysis of the restrictive RC in (5). Example in (5a) is a copy of (4a), it illustrates high attachment of the RC, whcih is partially compatible with the eventive complement. Sentnece (5b) presents an alternative structural analysis, which is called low attachement.

(5) a. Mary a écouté [$_{DP}$ **la mère de la femme** [$_{RC}$ qui parlait de cosmétiques]].
Mary heard the mother-ACC of the woman-Gen who talked about cosmetics
French, restrictive RC-reading, high attachment:
*Mary heard **the mother** of the woman who talked about cosmetics*
(The mother was talking about cosmetics)

b. Mary a écouté [$_{DP}$ **la mère de** [$_{DP}$ **la femme** [$_{RC}$ qui parlait de cosmétiques]]].
Mary heard the mother-ACC of the woman-Gen who talked about cosmetics
French, restrictive RC-reading, low attachment:
*Mary heard the mother of **the woman** who talked about cosmetics*
(The woman was talking about cosmetics)

According to Grillo and Costa [2], native speakers of Romance languages follow a structural prompts triggered by a perception verb. They anticipate the eventive complement and parse the DP *the mother of the woman* as the subject of the embedded verb. This projects to the RC analysis, where *the mother (of the woman)* becomes the only possible doer of the act of *talking* (5a).

A similar effect of a perception verb on RC resolution has been established in English, Russian and Armenian [3], [5], [6], [7], [8]. The current paper continues investigating processing effects of a perception verb and adds Tatar to the linguistic map of the study.

At this stage we investigate whether there is a preference for an eventive complement over the entity complement to a perception verb in Tatar. We take into consideration that Tatar is a head-final language, which does not allow structural ambiguity in RC resolution. Besides, the eventive complement can have a form of a DP or a SC in Tatar. The sectional properties of a perception verb in Tatar are explained in the next section. It is followed by research questions, hypothesis and a detailed report of an informal pilot study with 7 adult speakers of Tatar. The paper finishes with the Discussion of the results and the implications of the study for future research.

Selectional properties of a perception verb in Tatar

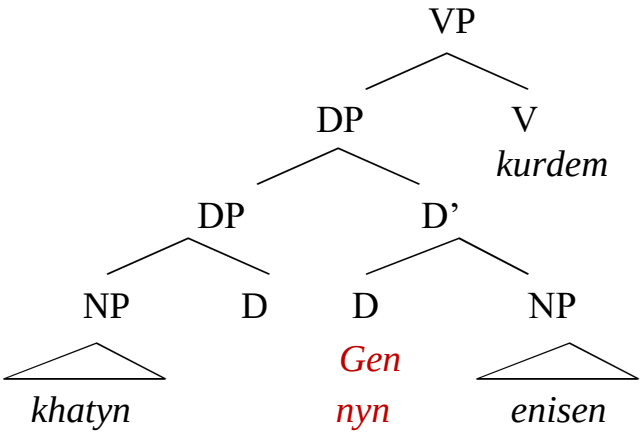
Previous literature has established that a perception verb can have two types of complement in languages like French, English, Russian and Armenian. The first type is an entity complement, which has a form of a DP. In its turn, it can be modified by, for example, an RC (5 a/b). The second complement is an eventive complement, whose form is a CP/SC in either Romance languages, English, Russian or Armenian.

Tatar follows the same pattern allowing a perception verb to take either an entity complement or an eventive complement. However, Tatar is a head-final language,

where the complement immediately precedes its head. This feature excludes a word order overlap between the eventive and the entity complement in Tatar. Consider example (6) and its syntactic tree in (7).

(6) Min [$_{DP}$ khatynnyn] enisen] kurdem
I woman-GEN mother-ACC saw
Tatar: I saw the mother of the woman

(7)

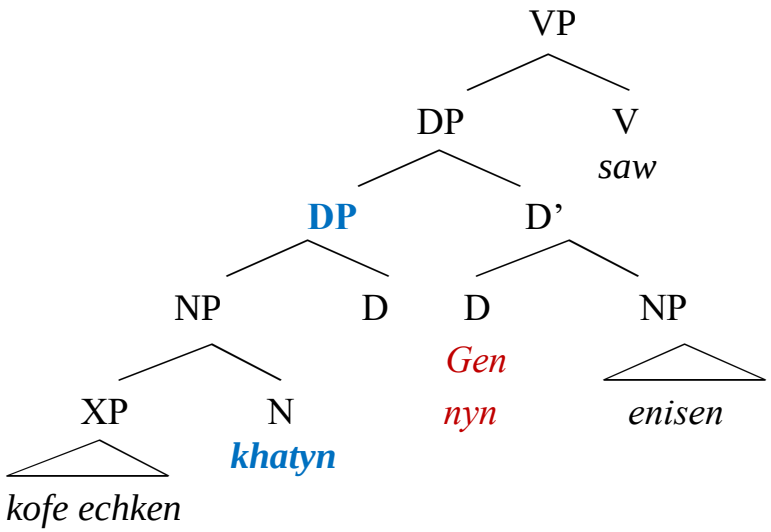


The example above demonstrates that a VP in Tatar has the following structure. The phrasal head V *kurdem* (*saw)* is modified by its complement, the complex DP *khatynnyn enisen (the woman's mother)*. The noun immediately preceding the verb is a direct object in the Accusative case. The other noun is part of the complex DP and has the Genitive case. The case marking for the Genitive case is highlighted in red.

The precedence of the complement to its head has an important influence on our linguistic target. Let us analyze the RC equivalent in Tatar, i.e. the case when the DP complement to the matrix verb is modified by an RC. Consider examples (8), (9), (10) and (11) below. Sentence (8) and its syntactic tree (9) illustrate the structure, whose interpretation is *the woman was drinking coffee).*

(8) Min [$_{DP}$ [$_{DP}$ [$_{RC}$ kofe ech*ken*] khatynnyn] enisen] kurdem
I coffee drinking woman-GEN mother-ACC saw
Tatar: I saw the mother of the coffee drinking woman.

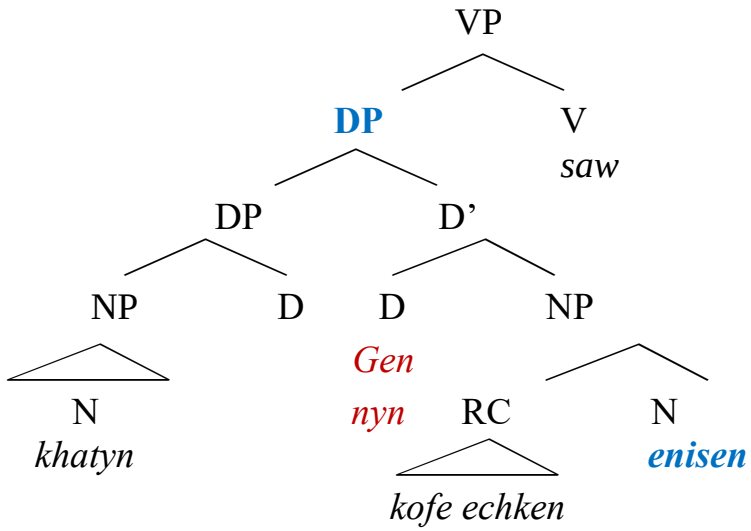
(9)



Example (8) patterns with LA reading of an ambiguous RC in French (5b). In Tatar, the RC *kofe echken (drinking coffee)* precedes its phrasal head *khatynnyn (woman)*. This structure yields only one interpretation – *the woman* was the doer of the activity of *drinking coffee*. An alternative reading, typical for Romance languages, English, Russian or Armenian *the mother was drinking coffee*, cannot be inferred from the same string of words in Tatar. The second interpretation requires a different placement of constituents and a different word order in a Tatar sentence, (10) and (11).

(10) Min [$_{DP}$ khatynnyn [$_{DP}$ [$_{RC}$ kofe ech*ken*] enisen]] kurdem
I woman-GEN coffee drinking mother-ACC saw
Tatar: I saw the coffee drinking mother of the woman.

(11)



The examples in (8-9) and (10-11) demonstrate that a change in meaning from *the woman was drinking coffee* to *the mother was drinking coffee* is acheived through a change in the linear word order in Tatar, which demonstrates that there is no structural ambiguity of the RC in Tatar (12).

(12) a. kofe echken ← khatynnyn ← enisen ← kurdem
coffee drinking *woman-GEN* *mother-ACC* *saw*
VP: saw →the mother → the mother was of the woman → the woman was drinking coffee

b. khatynnyn kofe echken ← enisen ← kurdem
woman-GEN *coffee drinking* *mother-ACC* *saw*
VP: saw → the mother → the mother was drinking coffee → the mother was of the woman

Please, notice that the entity compement preserves its case marking, the noun closest to the verb has an Accusative case, the other one – the Genitive case – irrspectively of which noun is modified by the RC. At this point, we can conclude that the entity complement in Tatar has a form of a DP which allows unrestricted number of subsequent modifications, similar to Romance languages, English, Russian and Armenian.

Let us consider the structure of the second complement, the eventive complement, in Tatar. Its English and French equivalents were examplified in (3)

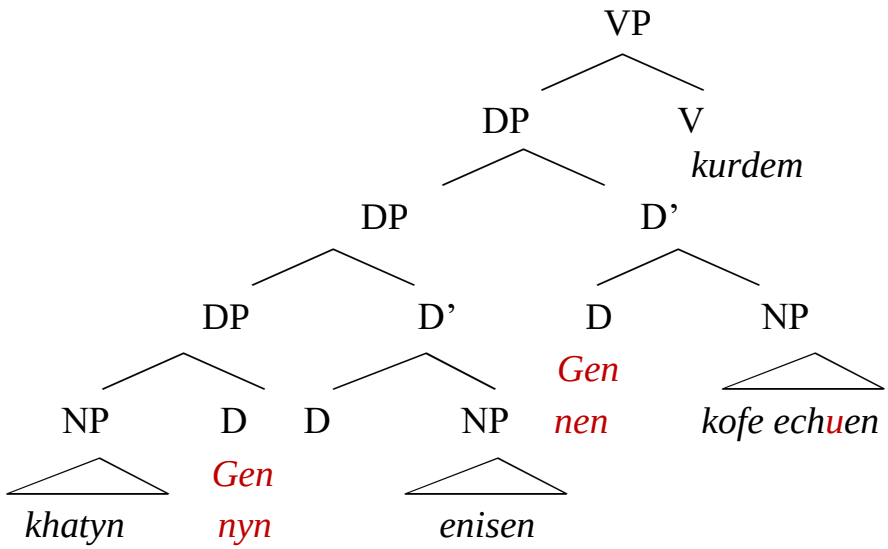
and (4b) above. In Tatar, the eventive complement promts the interpretation, like *I saw the event of drinking coffee by the woman's mother*, (13) and (14).

(13) Min [$_{DP}$ khatynnyn enisennen kofe ech*u*en] kurdem
I woman-GEN mother-GEN coffee drinking-ACC saw
Tatar: I saw the woman's mother's coffee drinking

Please, notice a change in case marking on the nouns *khatynnyn (the woman), enissennen (the mother)* and *echuen (drinking)* in examples (8), (10) and (12). The changing morphology is highlighted in red.

In the tree below, the eventive DP *kofe echuen (koffee drinking)* precedes the V *kurdem (saw)* and has an Accusative case, a marker of a direct object. The nouns modifing the head N have Genetive case. Putting all this together, the entire DP is a complex nominal with the head *ech*u*en (drinking)* and two posessives *enisennen (mother)* and *khatynnyn (woman),* (14).

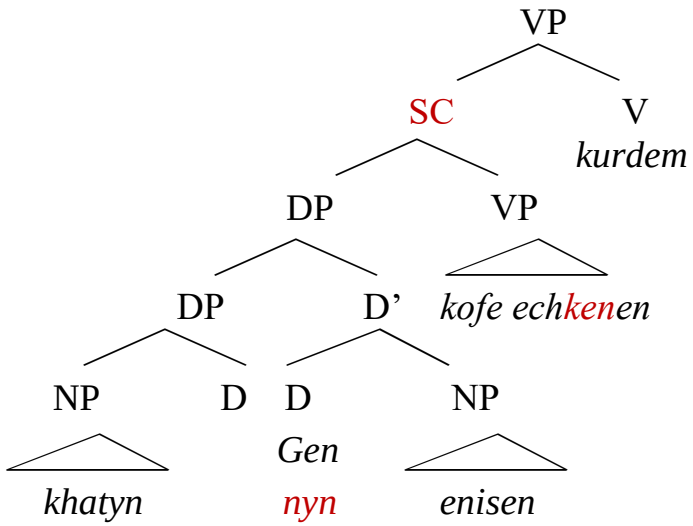
(14)



The second structural option for the eventive complement is a SC, (15) and (16).

(15) Min [$_{SC}$ [$_{DP}$ khatynnyn enisen] [$_{VP}$ kofe echkenen]] kurdem
I woman-GEN mother-ACC coffee drinking-GERUND saw
Tatar: I saw the woman's mother's drinking coffee

(16)



In (15), the word *echkenen (drinking)* has verbal morphology. Another detail is case marking on the noun *enisen (mother)*. The examples above, demonstrate the canonical version – with an Accusative case on the head N *enisen (mother)*. However, native speakers of Tatar claim that this noun can have either an Accusative or a Genitive case, and both options are grammatical. This phenomenon is not uncommon across languages, but a detailed discussion of this matter goes beyond the topic of our paper. To illustrate the similarity brtween the Tatar (15-16) and English, consider examples in (17). The masculine pronoun replaces the DP *khatynnyn enisen(en) (the woman's mother)*. The choice of the masculine pronoun is deliberate and its purpose is to highlight the equivalent optionality in case martking in English.

(17) a. I saw him drinking coffee *(eventive complement, SC him-ACC).*
b. I saw his drinking coffee *(eventive complement, SC his-GEN).*

The analysis of eventive and entity complements in Tatar yeilds two conclusions. First, there is a structural distinction between the entity and the eventive complement in Tatar, with the entity complement being a DP and the eventive complement being a clause (SC). In this respect, Tatar patterns with Romance, languages, English, Russian and Armenian. Second, Tatar has two strcutural option for the eventive complement, the DP and the SC, which makes it different from the previously studied languages.

Research Questions and Hypothesis

Our study lays forward two objectives. First, we check the existing assumption that the eventive complement is easier for the human parser, and, therefore, it is a prefered structural analysis in Romance languages, English, Russian and Armenain [1] – [8]. Baring in mind, that Tatar does not allow for a word order overlap or for a partial structural overlap between the eventive and the entity complement, the studies with RCs and CP eventive complements cannot be replicated in Tatar. We use an acceptability judgement task and check whether the eventive complement gets higher ratings than the entity complement.

Second, we zoon into the specificity of the eventive complement in Tatar. Our syntactic analysis reveales that there are two structural options for the eventive complement, the DP and the SC. We aim to establish whether the clause analysis will be easier for the parser than the DP analysis. In other words, we preserve the same structural dichotomy, DP vs. SC/CP, that was investigated by Grillo and Costa (2014). Meanwhile, instead of comparing two types of complements to a perception verb we investigate a parsing preference within the structual variablity of the eventive one. We use an acceptability judgement task as well as an elicited production experiment in an informal pilot study.

Our study puts forward two Research Questions (RQs) and two Hypothesis :

RQ1: *Do adult native speakers of Tatar have a preference for the eventive complement over the entity complement?*
Hypothesis 1 to RQ1: *The eventive complement is a preferred structural option in Tatar, same as Romance languages, English, Russian or Armenian*.

RQ2: *Is there a preference for a clause analysis over the DP analysis within the eventive complement in Tatar?*
Hypothesis 2 to RQ2: *The clause analysis should be preferred over the DP analysis, by analogy with the data from the equivalent studies in Romance languages, English, Russian or Armenian*.

Experiment (informal pilot study)

Design

The design of the experiment was prompted by the RQs and the Hypotheses stated above. Seven adult native speakers of Tatar volunteered to participate in two experimental tasks. The participants signed an informed consent for prior to participation. Each task took 15-20 minutes of the participants' time. The participants were not compensated for doing the study.

The first task was an acceptability judgement task, where the participants were given a picture and a set of sentences describing the picture. They were asked to rate

the 'appropriateness' of each sentence on a scale from '1' – *absolutely inappropriate* – to '5' – *perfect*. The participants were instructed to consider the relevance of the sentence to the picture, its grammaticality and authenticity.

The second task was elicited production. The participants saw a picture where several people were involved into doing several activities. They were asked to describe the picture answering the question '*What do you see happening in the picture?*' The question prompted the use of the eventive complement. Besides, it gave us a chance to highlight other types of sentences the participants produced to describe the on-going events in the picture.

The first experiment addressed RQ1, the second experiment RQ2. The participants were aware that the tasks were connected, and the same picture was used. The experiments took place in different days, and the second experiment was conducted first. The order of experiments excluded a biased use of RCs in a picture-description task, which could be prompted by the presence of RCs in the acceptability judgement task.

Participants

The profile of the participants is provided in *Table 1* below.

Table 1. Profile of the participants of the study

Name	Age	Education	Social status	Native language	Dominant language[1]	Other languages
Mary	20	BA	student	Tatar/Russian	Russian	English (pre-intermediate)
Violette	55	MA	hired employee	Tatar/Russian	Tatar	-
Nancy	55	MA	hired employee	Tatar/Russian	Russian	-
Laura	47	MA	hired employee	Tatar/Russian	Tatar	German (elementary)
Susan	28	MA	self-employed	Tatar/Russian	Russian	English, French, Turkish (elementary)
Olga	31	MA	hired employee	Tartar/Russian	Russian	-
Nina	35	MA	hired employee	Tatar/Russian	Russian	English (intermediate), Italian (elementary)

[1] By *dominant language* we mean the language most often used for daily communication.

The study tested seven adult native speakers of Tatar, whose names were disguised for privacy reasons. All participants have been speaking Tatar from birth and using it in every-day life alongside Russian. All the participants were adults, 18 years of age and above. The participants had BA level of education and above. Some of the participants reported exposure to languages other than Tatar or Russian. For our study, knowledge of other languages is not crucial. We report it to provide a complete profile of our participants.

Materials

The experimenters provided the participants with a picture and the assignments to fulfill. Both experiments used *Picture 1,* but gave the participants a different assignment.

Picture 1. Picture for the experimental tasks 1 and 2

Experiment 1. The acceptability judgement task provided the participants with 10 sentences and asked to assess these sentences on a scale from ‘1’ to ‘5’. There were 6 target sentences and 4 distractors.

The target sentences contained two instances of each type of complement. There were two entity complements, whose form was a DP modified by an RC. One entity complement had an RC modifying the entire DP, the another one an RC modifying the noun within the complex DP. There were also two sentences with the DP eventive complement and two sentences with the SC eventive complement. *Table 2* presents a full set of the experimental tokens.

Table 2. Acceptability judgement task: Experimental tokens

Sentence type	Example
Entity: DP+RC	Min agachtan alma torgan eninen balasyn kurem. I tree apple taking mother-GEN child-ACC see.
Entity: DP+RC	Kojma yanynda ir khatynnyn alma ashyj torgan balasyn kure. Fence next man woman-GEN apple eating child-ACC see.
Eventive: DP	Khatynnyn balasy alma agachlarynyn kisuen karap tora. Woman-GEN child apple-trees-GEN cutting-ACC watches.
Eventive: DP	Almalar tashygan ir fermanyn tavyklarynyn valchyklar belen ashatuyn kurep aldy. Apples carrying man farm-GEN chickens-GEN crumps with feeding-ACC saw.
Eventive: SC	Min fermanyn eshchelerenen rehetlenep eshlegenen ishetem I farm-GEN workers-ACC joyfully working-GER hear.
Eventive: SC	Sez fermanyn bakchasynyn nichek ejbet itep yasalganyn fotografiyada kuresez You farm-GEN garden-GEN how well having done-GER photo see.

There were 4 distractors, or sentences with grammar errors. The order of the sentences was pseudo randomized to make sure the sentences of the same type did not occur next to each other.

Experiment 2. The elicited production task asked the participants to describe what was going on in the picture. This assignment used a question prompt (18) to elicit the production of eventive complements.

(18) What do you see happening in the picture?

The participants were encouraged to produce as many sentences as they could. The participants' production data were recorded, transcribed and analyzed later on.

Results

The data of Experiment 1 were analyzed with linear regression model, the *lm* package in R, *lm(formula = Rating ~ Condition, data = Tatar)* . The dependent variable was Rating, the independent variable – Condition. The independent variable *Condition* had 3 levels, coded as 1 = Relative clause; 2 = Nominal Eventive Complement; 3 = Verbal Eventive Complement. The output of the statistical analysis is provided in *Table 3*.

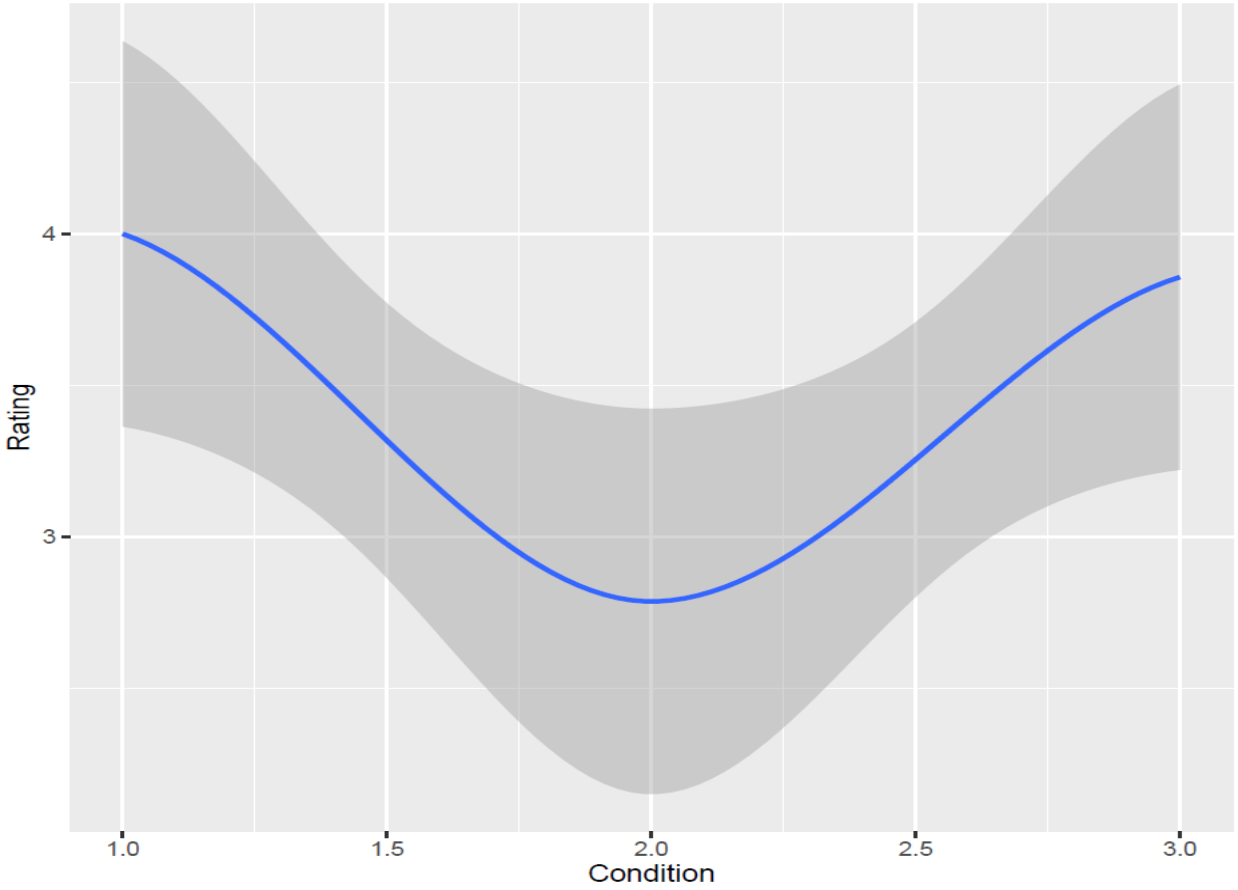
Table 3. Acceptability judgment task: Rating ~ Condition

	Estimate	Std. error	t-value	Pr(>|t|)
Intercept	3.69048	0.52544	7.024	1.74e-08 ***
Condition	-0.07143	0.24323	-0.294	0.771

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The variability in Rating in ***Experiment 1*** does not reach statistical significance, $p = 0.7$, which can be explained by the limited amount of data and the low power of the analysis. However, *Picture 2* demonstrates a noticeable dependency between *Condition* and *Rating*. There is a clear tendency to rate the entity complement and the SC eventive complement higher than the DP eventive complement.

Picture 2. Rating by Condition



The X-axis in Picture 2 presents the three levels of the variable *Condition*: 1) DP+RC entity complement; 2) DP eventive complement and 3) SC eventive complement. The Y-axis provides the average *Rating* obtained for each level. The blue curve depicts the drop and rise of the *Rating* from one level of *Condition* to another. The grey stripe reflects the range of variability in *Ratings*.

On average, the DP eventive complement receives the lowest rating, ≈ 2.7, which means it is the least preferred structure of the eventive. The second structural option for the eventive complement is the SC. It is rated noticeably higher, at ≈ 3.7. If we take a look at the entire data set and compare the entity complement (DP + RC) to the eventive complement, the DP + RC is rated higher than both the SC and the DP eventive complements, 4.0.

The findings in ***Experiment 1*** were supported by the results in ***Experiment 2***. There were 114 sentences produced by 7 participants altogether. The use of a SC eventive complement was registered twice. There were no instances of the use of the DP eventive complement in the production corpus. These data go in line with the Rating results in ***Experiment 1***.

There was one use of the RC in the corpus of 114 sentences. However, we disregard these data because ***Experiment 2*** prompted the use of the alternative type of complement. Low usage of RC in the production task more likely results from the task-bias rather that reflects a real preference for the SC eventive complement over the entity complement in Tatar.

Discussion

The study reported in this paper investigates the effect of a perception verb on sentence processing by adult native speakers of Tatar. The study addresses two research questions. The first question checks whether the eventive complement is preferred to the entity complement in sentences with a perception matrix verb in Tatar. The eventive complement preference has been established in Romance languages, English, Russian and Armenian [1] – [8]. Our data do not contradict the previous results.

In *Experiment 1*, the DP entity complement modified by an RC was rated higher than the SC eventive complement. These results prompt a possible conclusion that the entity complement is a preferred structural analysis in Tatar sentences with a perception verb. To the best of our knowledge, Tatar is the only head-final language where selectional properties of a perception verb have been investigated from a psycholinguistic perspective. It is tempting to broaden our generalization and claim that head-final languages have the entity complement as the first parsing hypothesis in sentences with a perception verb. Whereas, head-initial languages demonstrate a preference for the eventive complement. This conclusion would be too hasty.

Let us zoom into the data prompted by our second research question, which focuses on the structure of the eventive complement in Tatar. It compares the SC eventives to the DP eventives. In the acceptability judgment task, our results demonstrated that SC eventive complements were rated *one* point higher than DP eventive complements, 3.7 vs. 2.7. With a bigger data pool, the ratings would have reached statistical significance. In the elicited production task, there were no instances of the DP eventive sentences. The usage of SC eventives was very low too. There were only 2 instances of SC eventives out of the total 114 sentences. The data of *Experiment 2* is not strong enough on its own. However, the results of both experiments considered together point in the direction of a consistent preference for a clause analysis for the eventive complement to a perception verb in Tatar.

At this point, it is important to remember that previous research has also established a preference for the clause analysis over the DP analysis [1] – [8]. Though, in head-initial languages the type of structure patterned with the type of complement, in Tatar, the contrast between the SC and the DP analysis occurs within the same type of complement, the eventive complement. Based on our data and the data from previous research, we argue that a preference for clause analysis in sentences with a perception verb is a universal parsing preference.

To be more specific, we claim that with other syntactic factors being balanced, the clause analysis is easier for the human parser than the DP analysis. By balanced syntactic factors we mean a partial structural overlap and an overlap in the word order. This overlap occurs between two types of complements in head-initial languages and within the one type, the eventive complement, in Tatar. In both, head-initial languages and Tatar, a perception verb creates an anticipation for an eventive complement, whose preferred structure is a clause, CP/SC.

Conclusions

The study makes a serious impact on the research in multilingual language processing. It establishes that in both head-final and head-initial languages, there is a parsing preference for a clause analysis over a DP analysis when the matrix clause has a perception verb. This pilot study opens a unique opportunity for an experiment with Tatar-Russian-English trilinguals. Following the previous research, such a study will measure an effect of a perception verb through its influence on RC resolution.

Our paper demonstrates that there is no structural ambiguity in RC attachment in Tatar. Therefore, there can be no transfer of the preferred pattern of RC resolution into either the participants' L2 Russian or L3 English. In this respect, Tatar presents a unique research opportunity to investigate non-native processing through a phenomenon not instantiated in the L1. To the best of our knowledge, there has been no studies of the processing effect of a perception verb with no potential influence from the participants' native language.

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