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# Diachronic evolution of the subordinator *kak* in Russian

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**Abstract:** In Russian, the subordinator *kak* ‘how’ is both a manner question word and an eventive complementizer. The Russian linguistic tradition explains the colexification of the two functions in terms of a semantic shift from manner as characteristic of a situation to event description as a whole. Alternatively, a grammaticalization scenario from manner complements to event/propositional complements has been suggested: manner complements originally have a propositional frame, which is foregrounded concurrently with the loss of the manner meaning, giving rise to both eventive and propositional interpretations. This article is aimed at testing both hypotheses. We study several large Old Russian manuscripts, starting from the first available documents of the 11th century, and show that at the earliest documented period Old Russian *kako/kakъ* could be used in all types of complement clauses. It could introduce eventive, propositional, manner and irrealis purposive-like complements. Accordingly, the evolution of the subordinator *kak* in complementation involves a narrowing of its functional domain. We classify Old Russian texts based on the period and trace the gradual loss of particular functions during the centuries. Thus, we show that the Russian data supports the second grammaticalization scenario.

**Keywords:** complementizer; grammaticalization; semantics; subordination; subordinator

## 1 Introduction

One of the common diachronic sources of complementizers is manner question words (Boye and Kehayov 2016; Güldemann 2008; Heine and Kuteva 2019). Synchronically, many languages show polysemy of manner question words and eventive

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complementizers (Boye and Serdobolskaya 2018), as in the following examples from Russian:

- (1) *Kak pro-j-ti k metro?*  
 how PV-go-INF to metro  
 ‘How to get to the metro?’
- (2) *Ja zna-ju, kak on šel k metro.*  
 I know-PRS.1SG how he go.PST(M.SG) to metro  
 ‘I know how he got to the metro.’
- (3) *L'on'ka Kozyr' vide-l, [kak on slom'-a golov-u*  
*Ljonka Kozyr see-PST(M.SG) how he breaking-CVB head-ACC.SG*  
*v-lete-l na stancij-u], poetomu prитай-s'a s*  
*PV-fly-PST(M.SG) into station-ACC.SG this.is.why hide-PST-REFL with*  
*ostal'n-ymi pacan-ami za pakgauz-om...*  
*other-INSTR.PL guy-INSTR.PL behind warehouse-INSTR.SG*  
 ‘Ljonka Kozyr saw him rush (lit. fly breaking head) into the station, this is why he hid with other guys behind the warehouse.’  
 (RNC: A. Gelasimov. Stepnyje bogi. 2008)

In (1) the interrogative pronoun *kak* introduces a question, and in (2) a manner complement describes one type of manner, namely, the route. The example in (3) represents a complement clause, as well as (2); however, it does not have the semantics of manner: the subject *Ljonka Kozyr* does not hide because the manner of running is in some way particular. Rather, he merely notes that the running took place, and has hidden to avoid meeting the other subject. In the literature on complementation (Asher 1993; Hengeveld and Mackenzie 2008), this meaning is characterized as eventive (or state-of-affairs). The complementizer use of *kak* as in (3) is presumably related to its use as a manner question word in (1) and (2).

The Russian linguistic tradition attributes the use in (3) to the semantic shift from manner as characteristic of a situation to event description in general (Arutjunova 1988). Its grammaticalization arguably follows the scheme below:

- (i) manner question word (1) > manner complementizer (2) > eventive complementizer (3)

Another grammaticalization scenario of complementizers from manner expressions has been proposed by Boye and Serdobolskaya (2018) based on cross-linguistic data. They claim that manner complements originally have a propositional frame. Propositional complements (e.g., *Peter claims that John is a spy*) are usually defined as information units (Hengeveld and Mackenzie 2008: 144), which have a truth value. By contrast,

eventive complements as in (3) do not involve truth a value (see Dik and Hengeveld 1991: 233; Boye 2012: Chs. 4 and 5). Boye and Serdobolskaya (2018) suggest that in the case of manner complementizers the manner meaning may be bleached and lost, while the proposition is brought to the forefront concurrently with the loss of the manner meaning and the conventionalization of the manner expression.

(4) *I saw how they kept killing each other* (Boye and Serdobolskaya 2018: n.p.)

This happens through a specific stage where the proposition carries a nuance of “vividness” (‘imagine how surprising it is’), which is then bleached and lost. The resulting complementizer is then used widely with many complement-taking verbs and covers both eventive and propositional complements (see Section 3.2.2 for a detailed definition of events vs. propositions and references).

This grammaticalization path may be represented as follows:

- (ii) manner question word (1) > manner complementizer (2) > propositional/eventive complement with a specific nuance of vividness > propositional/eventive complementizer (3)

A crucial difference between the two scenarios lies in the predictions they make: (i) predicts that the main function of the new complementizer would be the eventive one, while (ii) argues that two semantic types, events and propositions, would be possible. In Modern Russian the main function of *kak* in complements is the eventive one, so the first scenario seems to be more plausible for Russian. There is, however, a common point between the two scenarios: both assume that the complementizer has grammaticalized from manner complements. Below we show that for Russian this can be disputed; we suggest that both the eventive and the propositional readings were already present in independent sentences with *kako*.

To test the two scenarios and pinpoint the diachronic development of the manner word *kak* in Russian, we performed a study of several large Old Russian manuscripts, starting from the first available documents of the 11th century (see Appendix 1). The texts in the sample were chosen in such a way that they involve different genres; there are hagiographies, spiritual and moral texts, law texts (all of these are traditionally classified as samples of written language highly influenced by Old Church Slavonic), birchbark letters (close to spoken language) and chronicles (traditionally viewed as a mixed genre involving spoken language in the characters’ speech and written language elsewhere). All the examples with *kako* (249 examples in this sample) were manually taken from these sources and semantically annotated. We also semantically annotated 402 examples taken from a randomized query (*kak*; 18th century) in the Russian National Corpus (RNC). Based on these samples of data, we show that *kako* could introduce both propositions and events in Old Russian, which is an argument for scenario (ii). Then we propose a possible elaboration of the grammaticalization scenario for the complementizer *kak* in Russian.

The article starts with the list of meanings of *kak* in subordinate clauses in M(odern) R(ussian); then O(ld) R(ussian) material is examined in Section 3. In Section 4, we discuss the two grammaticalization scenarios. Section 5 contains the conclusions.

## 2 Functions of the subordinator *kak* in MR

In MR the interrogative pronoun *kak* ‘how’ is used both in independent sentences and in subordination. In independent sentences, it is not only an interrogative word in questions as in (1) but is also widely used in exclamations (4) and as a linker introducing the meanings of role (5) and function (6) (termed as “conjunction use” in the Russian linguistic tradition).

- (4) *Kak on-a krasiv-a!*  
 how he-F.SG beautiful-F.SG  
 ‘How beautiful she is!’
- (5) *On sejčas rabotaj-et kak terapevt.*  
 he now works-PRS.3SG as therapist  
 ‘Currently, he works **as** a therapist.’
- (6) *On ispol’zova-l et-u otkrytk-u kak zakladk-u.*  
 he used-PST(M.SG) this-F.ACC.SG postcard-ACC.SG as bookmark-ACC.SG  
 ‘He used this postcard **as** a bookmark.’

Furthermore, *kak* forms part of many specific constructions (“syntactic phrasemes” in Boguslavsky and Iomdin 1982), such as emphatic constructions with interrogative pronouns and the negation marker *ne* (structured as “interrogative pronoun + *kak* + negation + NP/Adv + P”, see (7)) and parenthetical adverbial phrases and clauses, e.g., *kak pravilo* ‘as a rule’ (lit. ‘how rule’), *kak obyčno* ‘as usual’ (lit. ‘how usually’), *kak govorits’a* ‘as they say’ (lit. ‘how is said’).

- (7) *Kto, kak ne vrag, mog et-o sdela-t’?*  
 who how not enemy can.PST(M.SG) this-N.SG do-INF  
 ‘Who but an enemy/if not an enemy could do this?’

In subordination, *kak* occurs in complement clauses encoding events (3) and manner (2) (Arutjunova 1988: 116). It can also introduce various types of adverbial clauses and phrases, including similitive (8) and equative phrases and clauses (9), specific types of temporal clauses such as immediate sequence (10) and temporal reference meaning (11), and clauses of reason (12) (Arutjunova 1988; Kobozeva and In’kova 2018; Morkovkin 2003; Švedova 1980).

- (8) *On svo-i knig-i piš-et, [kak rabočij*  
 he his-ACC.PL books-ACC.PL write-PRS.3SG how worker(NOM.SG)  
*detal-i štampuj-et].*  
 component-ACC.SG stamp-PRS.3SG  
 'He writes his books **like** a worker makes machine components.'  
 (Kobozeva and In'kova 2018: 185)
- (9) *...derzaj, synok, — gl'ad-ish', stan-esh' tak-im že*  
 venture(IMP.SG) son see-PRS.2SG become-PRS.2SG such-M.INSTR.SG EMPH  
*sil'n-ym, kak ja.*  
 strong-INSTR.M.SG how I  
 'Come on, venture, my son, and you will probably be as strong as I am.'  
 (RNC: A. Zilbert. Ukreplenie tonusa. In *Stolica*, 1997.03.18)
- (10) *[Kak pri-jed-eš'], po-zvoni.*  
 how PV-COME-PRS.2SG PV-call(IMP.SG)  
 'Call me **as soon as** you have arrived.'
- (11) *Uže pjatnadcat' let [kak net v živ-yx ni papy,*  
 already fifteen years how NEG.COP in living-LOC.PL NPI dad  
*ni et-oj ženščin-y]...*  
 NPI this-F.GEN.SG woman-GEN.SG  
 'Dad and this woman passed away fifteen years ago.' (lit. 'It is fifteen years since...').  
 (RNC: M. Baru. Princip neopredelennosti. In *Volga*, 2015)
- (12) *Ja govori-u eto tebe ne so zla, a po duš-e...*  
 I tell-PRS.1SG this you.DAT not with anger but along soul-LOC.SG  
*[kak ty jest' moj syn]...*  
 how you be.PRS my(M.NOM.SG) son  
 'I am telling you this not because I'm angry, but from my heart... **because** you are my son...'  
 (Kobozeva and In'kova 2018: 189)

It must be specified that in clauses of reason, *kak* occurs marginally; it is only possible with the copula and carries a specific archaic nuance. In MR it mostly occurs in literature from the beginning of the 20th century to represent the direct speech of illiterate characters. Besides, *kak* is a part of many complex connectors such as *tak kak* 'because'; *kak i* 'just as'; *s tex por kak* 'starting from...'; *kak budto* 'as if'; *kak tol'ko* 'as soon as' and many others.

The question arises as to which constructions are the source constructions and which developed later. Specifically, we aim at discovering whether *kak* + eventive complements is a newly developed construction or whether it existed already in early periods of OR.

### 3 Functions of the subordinator *kakъ/kako* in OR

#### 3.1 *Kako* in independent clauses

Historical dictionaries and grammars give the following list of functions for *kakъ/kako* in OR (the original form of *kakъ*; both phonetic variants are referred to below as *kako*) in independent sentences: a question word of manner (13), more rarely – a question word with ablative, temporal and reason meaning, also used in polar questions of surprise (14) and exclamations, in the complex *e(g)da kako* meaning ‘suppose’ (15) (Slovar’ 1975; Sreznevskij 1893).<sup>1</sup>

- (13) ты еси слѣпъ: како можеши царство държати? азъ есмь царь  
*ty jesi slěp-ъ: kako mož-eši carstv-o dърža-ti?*  
 you be.PRS.2SG blind-NOM.M.SG how can-PRS.2SG kingdom-ACC.SG hold-INF  
 ‘You are blind. **How** can you rule the kingdom? I am the tsar.’  
 (NPL. XIII–XIV.)

Questions of indignation and surprise may be introduced by *kako* with the interrogative particle *li*.

- (14) Како ли тебе не узрю з дѣтми, сыну мои...?  
*Kako li tebe ne uzrj-u z dět-mi syn-u*  
 how Q you.ACC NEG see-PRS.1SG with children-INS son-VOC  
*moi*  
 my. NOM.SG  
 ‘Will I never see you and your children, my son?’  
 (Slovar’ 1975: 27. XVI)

- (15) еда како обратить Богъ тобою Рускую землю въ покаянье, а Гречьскую  
 землю избавишь отъ лютыя рати.  
*eda kako obrat-itъ Bog-ъ toboju Rusk-uju*  
 whether how direct-PRS.3SG God-NOM.SG you.INS Russian-ACC.F.SG  
*zemlj-u vъ pokajanj-e...*  
 land-ACC.SG in repentance-ACC.SG  
 ‘(The brothers are persuading the Byzantine princess Anna to marry a Russian prince.) **Suppose** God will use you to make the Russian land repent and save the Greek land from the fierce enemy.’  
 (PVL. XI–XII)

<sup>1</sup> We omit here the use of *kako* as an indefinite pronoun of manner, as an approximator with the particle *by*, a part of idiomatic complexes *kako pravo* ‘honestly’, *kako stoja* ‘immediately’.

This meaning can also be introduced by constructions *da ne kako* (lit. ‘let<sub>NEG</sub> how’), *ci kako* (lit. ‘whether how’). Another specific construction is the use of *kako* in the beginning of an independent sentence (often with the particle *da*) in the meaning ‘let it be as [God will/Saint Virgin will etc.]’:

- (16) и нынѣ затерялъ еси правду мою и свою ти, не идешъ ни къ своему царю, ни къ Ногаю на исправу; да како мя съ тобою Богъ розсудитъ.  
 ...*da kako mja sъ toboju Bog-ъ rozsud-itъ*.  
 so how I.ACC with you.INS God-NOM.SG judge-PRS.3SG  
 ‘(You did not keep your promises) and now you have lost my and your truth. You are going neither to your tsar, nor Nogay for the trial, so let it be as God will judge between me and you.’  
 (Suzd. XII–XIV)

Note that in (13) and (16) *kako* preserves the manner meaning, while in constructions like (14) and (15) it does not: the focus is on the truth value/epistemic value of the sentence, and not the manner of never seeing his son/repentance. Thus, the constructions in (14) and (15) semantically involve propositions (see Section 3.2.2 for details). Both of these uses are lost in MR.

## 3.2 Complement clauses with *kako*

### 3.2.1 A basic survey of functions of *kako* in complement clauses

The sources state that *kako* introduces complement clauses of manner (17) and other types of complements (“izyasnitel’nyj sojuz”) (Bulakhovskij 1958; Lomtev 1956: 543; Slovar’ 1975, 7: 29), see (18).

- (17) И присылаше къ нему, розирая нарядъ его, и **како** строить городъ.  
*I prisyl-aše къ njemu rozira-ja narjad-ъ jeho*  
 and send-IMPF.3SG to he.DAT examine-CVB order-ACC.SG his  
*i [kako stro-itъ gorod-ъ].*  
 and how rule-PRS.3SG town-ACC.SG  
 ‘And he (Izjaslav) sent to him (Andrey or his father) to examine his order (regulations) and **how** he is ruling the town.’  
 (Suzd. XII–XIV)

- (18) И въставъ начать сказывати, како видѣ Святую Богородицю, идущю  
къ собѣ со мѣста.  
*i vьsta-vъ nača-tь skazyva-ti [kako vidě*  
and get.up-CVB begin-AOR.3SG narrate-INF how see.AOR.3SG  
*Svjat-uju Bogorodicj-u]...*  
Saint-ACC.F.SG Mother.of.God-ACC.SG  
'When he came to his senses he began to narrate **that** he saw the Holy Virgin  
came to him from the icon (from the place).'

(HG. XII)

The sources do not differentiate between eventive and propositional complements, which are described in detail in Section 3.2.2.

Below we list other complement constructions attested in OR, which are not considered in any further detail.

The construction *kako* + conjunctive mood (aorist of the verb 'be' + perfect participle in -l) is attested in complements with the purposive meaning in earlier texts (Bulaxovskij 1958: 341; Istrina 1923: 130–131):

- (19) ...печашеся о душахъ ихъ [**како быша** спаси сѧ].  
*peč-aše-sja o duš-axъ ixъ [kako byša*  
worry-IMPF.3SG-REFL about soul-LOC.PL their how be.AOR.3PL  
*spas-l-i sja].*  
save-PF-PL REFL  
'He worried about the 30 people for them to be saved.'

(PVL. XI–XII)

In the 14th century, the aorist forms of 'be' in the conjunction mood construction were replaced by the petrified form *by* (2nd and 3rd singular aorist of 'be'), which was reanalyzed as a subordinating particle (Istrina 1923: 131; Pičxadze 2010). The purposive meaning is also expressed via a construction "*kako* + dative + infinitive" (Lomtev 1956: 520) (a similar construction with *jako* is described in Istrina 1923: 196):

- (20) И цѣловаша крестъ Рюрикъ къ Олговичемъ, и Олговичи къ Рюрику,  
како имъ поити всѣмъ къ Галичю.  
*i cělova-ša krest-ъ rjurik-ъ къ olgovič-emъ, i*  
and kiss-AOR.3PL cross-ACC.SG Rurik-NOM.SG to Oleg's-DAT.PL and  
*olgovič-i*  
Oleg's-NOM.PL  
*къ rjurik-u, kako imъ poi-ti vsěmъ къ galicj-u.*  
to Rurik-DAT.SG how they.DAT go-INF all.DAT to Galich-DAT.SG  
'And [they] swore on the cross: Rurik to the descendants of Oleg and the  
descendants of Oleg to Rurik, that they would all go to Galich.'

(Suzd. XII–XIV)



The infinitive + *kako* (optionally with the particle *by*) is also used to introduce complements of verbs of speech (Istrina 1923: 136) and modal verbs:

- (21) Блудъ же не възмогъ како бы погубити ѿ, замысли лестью...  
*blud-ъ že ne vьzmog-ъ [kako by pogubi-ti i],*  
 Blud-NOM.SG EMPH NEG can-PTCP.PST how IRR kill-INF he.ACC  
*zamysli lestь-ju*  
 decide.AOR.3SG deceit-INS.SG  
 ‘Blud could not kill him and decided to deceive him.’  
 (PVL. XI–XII)

Furthermore, *kako* occurs with particles (which might be analyzed as complex complementizers): it may introduce indirect polar questions (22) with the interrogative particle *li* (22), propositional and manner complements with the emphatic particle *ti* (23) and complements of apprehensive meaning with the particle/subordinator *e(g)da* (24). All of these combinations are absent from MR.

- (22) а иного не вѣдаю како ли ты венилеса како ли что дале юси рубль на собѣ.  
*a in-ogo ne vѣdaj-u kako li ty*  
 and other-GEN.M.SG NEG know-PRS.1SG how Q you  
*veni-l-e-sja*  
 give.ransom-PF-M(SG)-REFL  
*[kako li čto da-l-e jesi rubl-ъ na sobě].*  
 how Q what give-PF-M(SG) be.PRS.2SG rouble-ACC.SG on REFL.LOC.SG  
 ‘(I know that you have given money. This I know indeed,) but I don’t know anything else: how exactly you have decided upon the ransom and **whether** you have given one rouble for yourself.’  
 (NovgB 30. XIV)

- (23) Виждь, како ти начятъкъ добрымъ дѣломъ поучение святыхъ книгъ!  
*vižь [kako ti načjatъk-ъ dobry-imъ děl-omъ*  
 see.IMP how EMPH beginning-NOM.SG good-DAT.PL deed-DAT.PL  
*poučenij-e svjaty-ixъ knigъ]*  
 study-NOM.SG saint-GEN.PL book-GEN.PL  
 ‘See **that** the study of saint books is a start for good deeds!’  
 (Izb. XI)

The complex *e(g)da* + *kako* is attested in apprehensive contexts, e.g., with the verb ‘fear’:

- (24) ...то видѣвъ Александръ убояся, **еда како** умножаться и осквернять  
 землю и загна ихъ на полунощныя страны въ горы высокія.  
*Aleksandr-ъ uboja-sja [eda kako umnož-atъ-sja...*  
 Alexander-NOM.SG fear.AOR.3SG-REFL whether how multiply-PRS.3PL-REFL  
 ‘Seeing this, Alexander was afraid **that** they would propagate and spoil the  
 earth and chased them into northern lands onto high mountains.’  
 (PVL. XI–XII)

The functions of *kako* in adverbial clauses are numerous and will be examined in Section 3.4. The next section is devoted to particular types of complements that are of specific importance for the aim of this article – propositional, eventive and manner complements.

### 3.2.2 Propositional, eventive and manner complements with *kako*

Complementation studies define events (or states-of-affairs) as situations that (do not) occur in reality and are located in space and time (Asher 1993; Hengeveld and McKenzie 2008: 166; Vendler 1967a), e.g., **Shooting** occurred at a private residence, while propositions are defined as information units having a truth value (Asher 1993: 24–32), or events wrapped up in the mental frame of epistemic value and information source (Hengeveld and McKenzie 2008: 144), *John said that he was shot at*. The criteria of distinguishing between events and propositions have been widely discussed in the literature. It has been claimed that facts/propositions can contain epistemic expressions (Boye 2012; cf. *??I saw him maybe run[ning]*) and negation (Mittwoch 1990), while events cannot. Some violations are found with idiomatic combinations describing pragmatically plausible situations that require a description involving negation, as in *I heard the baby not cry* (cf. Miller 2003: 3) and *I kept walking onward until I heard him not following me anymore* (cf. Miller 2003: 9). Facts/propositions are not located in space and time (*???The fact that...happened yesterday*), cannot be perceived directly by the senses (thus, they are infelicitous in the context of direct perception) and do not have duration (*???The fact that...lasted two weeks*). Thus, they may include individual-level predicates (they do not have duration and are not observable by senses), while events cannot (Arutjunova 1988: 116).

The semantic notions described above are relevant not only for complement clauses but also for adverbial subordination and independent clauses (Boye 2012: 194). We assume that conditional and reason clauses allow propositions since they may take negation and contain individual-level predicates (Vendler 1967b). By contrast, temporal and simulative clauses do not. The same differentiation works for independent clauses, even if it is harder to observe in isolated sentences. Imperative clauses and clauses that form part of a narrative chain usually are eventive (Boye 2012), while

sentences with apprehensive meaning, epistemic judgments, some types of polar questions and sentences with negation are more likely to host semantic propositions.

Examples (14) and (15) above must include propositions: (14) is a polar question, and (15) involves apprehensive meaning (“suppose that”). Both of these contexts are freely compatible with negation and can include individual-level predicates. Thus, independent sentences introduced by *kako* in OR may involve propositions.

Let us now focus on OR examples. In general, it is not easy to differentiate between manner, eventive and propositional complements, judging from corpus examples, which often allow more than one interpretation. However, some contexts favor only one reading. For example, in (17) the subject is interested in the way of organizing and ruling the town, thus, the manner interpretation is obvious. By contrast, in (18) the very occurrence of the Holy Virgin coming out of the icon is a miracle and makes it the topic of the discussion. The subject makes a claim about seeing it, not about the way of seeing it, thus the eventive reading is favored. It is also important that the subject does not merely state the fact that the Holy Virgin came out of the icon (we know this because the narration takes some time and the speaker uses the form ‘began to tell’, not just ‘told that’). Rather, he is describing the whole event in detail. This latter interpretation favors the eventive reading of the complement and the translation of the complement-taking verb as ‘tell, narrate’; otherwise, the complement would be a proposition and the verb of speech would be synonymous to ‘say, state that’ (“he stated that he saw the Holy Virgin come to him...”).

By contrast, the following Example (25) has a propositional reading, because it describes a statement in a debt letter. The subject is not interested in the way of “willing to receive seven grivnas”, so the manner reading is ruled out. The eventive interpretation is also unlikely since debt letters are not intended to describe events, but rather to state that someone is a debtor, i.e., stating the truth of a proposition. Thus, we claim that *kako* introduces a proposition here.

- (25) про местѣткѹ памѣть на радослава [како ѿказаю было на местѣтке зѡ  
гривено про женьню тѣтбѹ]

<i>pro</i>	<i>mestjat-k-u</i>	<i>pa-mjat-ъ</i>	<i>na</i>	<i>radoslav-a</i>
about	Mestjatka-ACC.SG	debt.letter-NOM.SG	on	Radoslav-ACC.SG
<i>[kako otъkaza-l-o by-l-o na mestjat-k-e sedmъ]</i>				
how	fix-PF-M.SG	be-PF-M.SG	on	Mestjatka-LOC.SG
<i>seven</i>	<i>given-o</i>	<i>pro žen-ъn-ju</i>	<i>tatb-u]</i>	
grivna-GEN.PL	about	wife-ATTR-ACC.F.SG	theft-ACC.SG	

‘Debt letter about Radoslav and Mestatka [stating] **that** he (Radoslav) wished to receive seven grivnas (Old Russian currency) for the wife’s theft (a theft by Mestatka from Radoslav’s wife).’

(NovgB. 213. XIII)

In our sample, there are unambiguous examples of manner and eventive complements; however, ambiguous examples are also numerous. This is why we do not separate event and manner complements in our quantitative analysis in Section 3.2.3 (otherwise the sample would be too small).

Propositional versus eventive complements are much harder to differentiate in any particular language (compared to events vs. manner complements), as many complement-taking verbs take both of them. Note that propositions are not introduced by *kak* in MR (Arutjunova 1988; Zalizniak 1990), and thus special argumentation is needed to show that propositional *kak*-complements existed in OR.

Arutjunova (1988) has proposed two diagnostics distinguishing between propositions and events in MR, negation and individual-level predicates (see above). She shows that negation most often sounds awkward and requires the change of the complementizer to *čto* (the latter introduces propositions in MR) (26a). To convey this meaning, a construction without negation is used hosting the negated situation in the embedded clause (26b). Individual-level predicates are also unacceptable with *kak* (27).

- (26) a. *Ja videl, čto / \*kak poezd ne ustanovi-l-sja.*  
 I see-PST(M.SG) that how train(NOM.SG) not stop-PST(M.SG)-REFL  
 b. *Ja videl, [kak poezd pro-shël mimo,*  
 I see-PST(M.SG) how train(NOM.SG) PV-go(PST.M.SG) past  
*ne ustanavliva-ja-s'].*  
 not stop-CVB-REFL  
 lit. 'I saw how the train did not stop – I saw the train pass without stopping.'  
 (Arutjunova 1988: 116)
- (27) *On vide-l, čto / \*kak trolleybus pust. (RNC)*  
 he see-PST(M.SG) that how bus empty  
 'He saw that the bus was empty.'

In OR, however, individual-level predicates are widely attested with *kako*-complements (28), as well as negation (29).

- (28) Помышляешъ же мучение и страсть святаго мученика Никиты и святаго Вячеслава, подобно же сему бывъшю убиению, и [како святѣй Варварѣ отъць свой убойца бысть].  
*pomyšlj-aše-tъ že... [kako svjat-ěj Varvar-ě*  
 think-IMPF.3SG-3SG EMPH how saint-DAT.F.SG Barbara-DAT.SG  
*otъc-ъ svoj ubojc-a by-stъ].*  
 father-NOM.SG REFL.ADJ.M.SG murderer-NOM.SG be-AOR.3SG  
 'He remembered the martyrdom and agonies of Saint Nikita the Martyr and Saint Vyacheslav, who were killed similarly, and [remembered] **that** Saint Barbara's murderer was her own father.'  
 (HG. XII)

- (29) Не пѣѣтѣся ни о чемъ же и съмотри же пѣтицъ небесныхъ, како не сѣють, ни жнють, ниже събирають въ житѣнїя своя, нѣ отѣцъ небесный питаєтъ я...
- ...*sъmotr-i že pѣtic-ъ nebes-ъn-yixъ [kako ne sѣj-utъ...*  
 look-IMP(SG) EMPH bird-GEN.PL sky-ATTR-GEN.PL how NEG SOW-PRS.3PL  
 ‘Do not worry about anything and look at the birds of the air, **that** they do **not** sow or reap or store away in barns, and yet your heavenly Father feeds them.’  
 (HG. XI)

Negation is widely attested with *kako* in OR, unlike with *kak*-complements in MR.

Another weaker argument is the possibility to coordinate *kako* with *jako* in propositional complements:

- (30) И вы слышасте, **яко** хотѣша сътворити преже сего не имуще страха Божия и тацїи же безумнии и епископъ и **како** хотѣша бес правды убити и].
- i vy slyš-aste [jako хот-ѣша сътвори-ti <...>]*  
 and you(PL) hear-IMP.2PL SUB want-AOR.3PL make-INF  
*i [kako хот-ѣша бес pravd-y ubi-ti i]*  
 and how want-AOR.3PL without truth-GEN.SG kill-INF he.ACC  
 ‘Have you heard **that** a long time ago similar mad people who did not have the fear of God and their bishop wanted to do the same and **that** they wanted to kill another innocent saint.’  
 (HG. XIII)

*Jako* is a general subordinator in OR, covering a large spectrum of complement and adverbial subordinate clauses (Bulaxovskij 1958; Lomtev 1956) and interpreted based on the context. It is widely used to encode propositions in (in)direct speech and beyond (Vlasova 2014; Ševelëva 2009) and can be coordinated with *kako* in this function, as shown above.

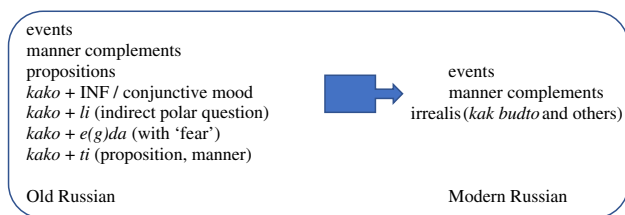
Thus, we conclude that *kako* in OR in (25) and (28)–(30) introduces propositions. This use is not observed in MR; in the modern translations of these examples, the complementizer *čto* would be used instead. As for event and manner complements with *kak(o)*, they are widely attested both in MR and OR.

### 3.2.3 Distribution of the functions of *kako* in complement clauses

As shown in Sections 3.2.1 and 3.2.2, the list of functions of *kako* in complement clauses is much larger than in MR, including not only eventive (18) and manner complements (17), but also propositions (25), irrealis complements with the

conjunctive mood and the infinitive, see (20)–(21) (this is summarized in Scheme 1 below). We aimed to identify the stages of evolution of these meanings and uses of *kako* and identify which meaning or use is basic at a given period, and which meaning or use is diminishing or increasing. To attain this goal, we counted the frequencies of various uses of *kako* in a limited sample of texts, following the methodology proposed by Hilpert and Gries (2009) and Diessel and Hilpert (2016). We compiled a sample of several large manuscripts starting from the earliest available documents of the 11th century up to the 16th century and retrieved all the examples with *kako* (omitting the use of *kako* as an indefinite pronoun with the meaning ‘somehow’). The sample was constructed in such a way as to include documents from various periods. To make our sample consistent from the point of view of language varieties, we limited our research, first, to documents created in the north or center of Russia and, second, to original documents (translations were excluded). The list of the documents is given in Appendix 1. For the 18th century, we used a randomized query from the RNC.

It must be specified that even though OR is sufficiently represented in corpora (the historical subcorpus of the RNC and the OR part of the TOROT Treebank accessible at <https://torottreebank.github.io/>), the corpus queries are hardly useful when trying to conduct semantic analysis of OR. Most often, subordinate clauses and subordinators allow for more than one interpretation, given that most of the subordinators and particles had a much larger distribution among the types of subordination than in the modern language (Bulaxovskij 1958: 398–399). Moreover, it has been argued that in OR texts, like in other languages of this period, the notion of a sentence, or a complex sentence, is itself problematic. The texts are not constructed as sequences of (complex) sentences but as paragraphs containing narrative chains (Keršienė and Preobrazenskaja 1983). Each member of the chain was introduced by a specific particle or subordinator (often both a particle and a subordinator), and sometimes it is impossible to decide which clause is the embedding clause, the one on the left or the one on the right. Thus, the semantic interpretation of each example requires an analysis of the larger context, and the context of one or two sentences does not offer enough



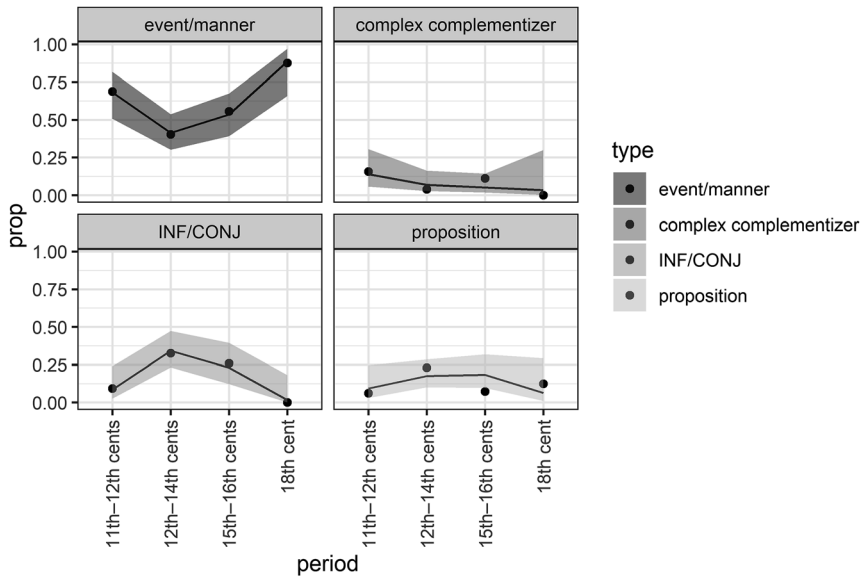
**Scheme 1:** Functions of *kako*.

**Table 1:** Distribution of major complement types among complement clauses with *kako*.

Simple/complex complementizer	The single complementizer <i>kako</i>			Complex complementizers with <i>kako</i>	Total number of examples in columns to the left
Morphosyntactic properties	Complements with the INF/CONJ	Indicative complements		<i>kako li, e(g)da kako, kako ti</i>	
Semantics	(%)	Propositional (%)	Event and manner (%)	(%)	
11th–12th centuries	3 (9.4)	2 (6.3)	22 (68.8)	5 (15.6)	32
12th–14th centuries	17 (32.7)	12 (23.0)	21 (40.4)	2 (3.8)	52
15th–16th centuries	7 (25.9)	2 (7.4)	15 (55.6)	3 (11.1)	27
18th century	0	2 (12.5)	14 (87.5)	0	16

information to decide their exact meaning. This is why we did not base our analysis on the material of corpus queries for the 11th–16th centuries, and only used it for the material of the 18th century (texts from the 17th century have not been studied). For other periods we have studied the original manuscripts. Solitary ambiguous examples have been rejected. All this explains why our sample is rather small: it includes 68 examples for the earliest period (11th–12th centuries), 108 examples for the second period (12th–14th centuries) and 73 examples for the 15th–16th centuries. For the 18th century, we made use of a randomized corpus query, taking the first 396 sentences. The results on the distribution of complement, adverbial and independent clauses in the whole sample are represented in Figure 2 in Section 4.1.

Let us now focus on complement clauses, which are examined in detail in Table 1. The whole number of complement clauses comprises 35 examples from the 11th–12th centuries, 57 examples from the 12th–14th centuries, 28 examples from the 14th–16th centuries and 19 examples from the 18th century. The distribution of complement clause types is represented in Table 1 and Figure 1. This table is a fragment of the larger Table A1 given in Appendix 2. Here we have omitted the complement types that are represented by a small number of examples and are irrelevant to the present discussion: first, the indirect question of degree (“I did not imagine **how big** the project could be”) and irrealis complements (31); both emerged in the 18th century. We have also omitted ambiguous examples allowing both



**Figure 1:** Proportions of complement types in the four periods of OR (the plot shows the observed proportions with a 95 % confidence interval according to a multinomial logistic regression model, with ‘period’ as an ordered quadratic predictor; see the Supplementary Materials for details).

eventive and propositional reading. As was discussed in Section 3.2.2, these two meanings cannot always be distinguished, and many corpus examples are ambiguous between the two readings. Since our article is focused on the distribution of events and propositions, we omit the ambiguous examples in the discussion below Table 1. The results are visualized in Figure 1.

It must be taken into account that the resulting sample of complement clauses with *kako* is rather small hindering any solid statistically-based conclusions. However, our main goals are, first, to show that the discussed uses are attested in the discussed periods, and that they are not marginal. Second, even if small nuances in figures are not telling, we may at least observe basic tendencies in the development of functions, i.e., their expansion or loss.

Complement clauses with *kako* have been attested since the 11th century (Shevelëva 2009), and our results show that they could not only encode events and manner complements (the reason for grouping these two meanings is given in Section 3.2.2), but, in principle, all the major types of complements. More specifically, these include propositions, purposive-like complements with the conjunctive mood or with the infinitive, infinitival complements of modal verbs, complexes with the particles *ti* and *li* and with the subordinator *e(g)da*. These complexes were used to



encode irrealis prospective complements (events and propositions), polar indirect questions and complements of the verb ‘fear’, respectively.

The statistical results visualized in Figure 1 reveal the expansion of infinitival (conjunctive) complements in the 12th–14th centuries and their gradual loss in the following periods; in the 18th century they are completely absent from our sample. Along with the expansion of the infinitival complements the event/manner complements decreased in frequency in the 12th–14th centuries and constantly increased afterward. In the modern language, these two types of complement clauses are the only ones preserved from the OR period.

As for propositions and complements with complex complementizers, the change in frequency is too small to arrive at robust conclusions and does not exceed the expected values (the values expected under the null hypothesis, that is, the hypothesis of random frequency). It is well-known that the analyzed complex complementizers were completely lost by the 18th century. However, the data on propositions offers an interesting result, which has not been yet mentioned in the literature: namely, that *kak* could introduce propositions in the 18th century. Given that in the modern language it is not possible (Arutjunova 1988), the complete loss of this meaning must have happened in the 19th century.

In sum, in complementation we do not observe a spread of functions of *kako*, but a narrowing of functions, see Scheme 1. It must be specified that MR has developed a complex complementizer *kak budto* (by) encoding irrealis complements of perception verbs (Letuchiy 2015):

- (31) ...*mne po-kaza-l-os'*, [*kak budto ja sejčas tol'ko rodi-l-sja*].  
 I.DAT PV-seem-PST-N.SG-REFL how as.if I now only be.born-PST(M.SG)-REFL  
 ‘It seemed to me as if I was just born.’  
 (RNC: M. Saltykov-Ščedrin. *Nezaveršennye zamysly i nabroski*. 1869–1872)

However, this is the only context in complementation that arose in Middle Russian. The process of grammaticalization of *kako* as a complementizer involves a narrowing of its functions, as shown in Scheme 1. This does not fit well with the scenario proposed in (i): this scenario predicts that the first function to develop from manner complements is that of eventive complementizer. Thus, we would expect to find examples of *kako* as a manner complementizer and eventive complementizer at some stage of language development, while other uses would be found in more recent documents. Instead, it seems that *kako* first propagated to all types of complements and then narrowed its functions to eventive and manner complements as shown in Scheme 1.

Thus, in the 11th century *kako* functions as a complementizer with a general meaning, which is specified in the larger context; note, however, that even at this point the manner/event use is the dominating one (as it covers 67 % of its use).

### 3.3 Adverbial clauses with *kako* in OR

For *kako* in OR, Sreznevskij (1893), Istrina (1923), Lomtev (1956), Bulakhovskij (1958), Slovar' (1975), and Morozova (1983) list the functions of a “comparison marker” (a standard marker in similitive and implicit equative clauses, see Kobozeva and Serdobolskaya 2021), an adverbial subordinator of time, condition and manner, a marker of parenthetical clauses with the meaning ‘source of information’ and as forming part of a complex subordinator with the particle *by* (which occurs in irrealis complements as in (21) and purposive adverbial clauses). The adverbial functions of *kako* that we have identified in our sample follow the list of Slovar' (1975) and Sreznevskij (1893). Temporal clauses with *kako* have the meaning of immediate sequence (‘as soon as’) as in (32) or specification of time. This latter can denote the beginning of the situation (‘since’) as in (33) or the overlap of two situations in time (34); both include clauses making a more precise indication of time used with time-denoting nouns and expressions.

- (32) како приде са грамота тако пришли ми цоловѣкъ на жерепоцъ зане ми  
здѣсе дѣлъ много.

[*kako* prid-e sja gramot-a] tako prišl-i mi  
how come-PRS.3SG this.F.SG letter-NOM.SG so send-IMP(SG) I.DAT  
colovĕk-ъ na žerepc-ĕ...  
person-ACC.SG on horse-LOC.SG

‘[As soon as you get this letter], send me a man riding a horse because I am very busy here.’

(NovgB. 43. XIV)

- (33) како ты оу мене и чѣстное дрѣво възъмъ и вевериць ми не  
присълещи то деватое лето

[*kako* ty u mene i čstn-oje drĕv-o vŕzъм-ъ  
how you from I.GEN.SG and honorable-ACC.N.SG tree-ACC.SG take-CVB.PST  
i veveric-ъ mi ne prisъл-eščĭ] to devjat-oje let-o  
and money-GEN.PL I.DAT NEG send-PRS.2SG that ninth-NOM.N.SG year-NOM.SG

‘It is already nine years [since you swore on the cross (to pay me; lit. since you took the honorable tree) and you do not send me the money].’

(NovgB. 246. XI)

- (34) Въ лѣто 6903, мѣсяца ноября 28, какъ обѣдню поють, преставися  
пресвященный Федоръ, архіепископъ Ростовъскый и Ярославъскый.

въ lĕt-o 6903, mĕsjac-a nojabrj-a 28 [*kakъ* obĕdnj-u  
in summer-ACC.SG 6903 month-GEN.SG November-GEN.SG 28 how mess-ACC.SG

*poj-utʲ], prestavi-sja presvjaščenn-yj Fedor-ъ*  
 sing-PRS.3PL pass.away.AOR.3SG-REFL reverend-NOM.M.SG Theodor-NOM.SG  
 ‘In 6903 (1395), on the 28th of Novemer, **as** the mess was sung, the reverend  
 Theodor, archbishop of Rostov and Jaroslavl, passed away.’  
 (Suzd. XIV)

These functions are also observed in MR; however, with restrictions concerning the ordering of clauses. Conditional clauses with *kako*, not attested in MR, are only found in OR.

- (35) ...но како начнеть от лѣта платити, тако же платить...  
*no [kako načn-ety ot lět-a plati-ti], tako že plat-ity*  
 but how begin-PRS.3SG from year-GEN.SG pay-INF so EMPH pay-PRS.3SG  
 ‘If a merchantman has borrowed money from someone and travels  
 somewhere and is shipwrecked or plundered or suffers from wildfire, then  
 he ought not to be forced (e.g., to sell his house etc.) or sold; but [if he pays his  
 debt yearly] then let him pay.’  
 (RP. XIV)

Clauses of reason (36) are marginal and stylistically restricted in MR, see the comment to (12) above.

- (36) И побѣжа Михалко изъ города къ святому Георгію, **како** было ему  
 своимъ полкомъ уразити нашу сторону и измясти люди...  
*i poběža mixalk-o izъ gorod-a къ svjat-omu*  
 and flee.AOR.3SG Mikhalko-NOM.SG from town-GEN.SG to saint-DAT.M.SG  
*georgij-u, [kako by-l-o jemu svoimъ polk-omъ*  
 George-DAT.SG how be-PF-N.SG he.DAT REFL.ADJ.INS.SG regiment-INS.SG  
*urazi-ti naš-u storon-u i izmjas-ti ljudi]*  
 attack-INF our-ACC.F.SG side-ACC.SG and defeat-INF people.ACC  
 (There were two political groupings, one of them wanted Mikhalko to be the  
 prince of Novgorod.) ‘And Mikhalko fled from town to the Saint George  
 monastery, [because he had to attack our side with his regiment and defeat  
 the men]...’  
 (NPL. XIII–XIV)

Adverbial manner clauses are widely attested both in MR and in OR:

- (37) осподине како єсьмъ порадилесе тако и живу а василке село пустоши  
*ospodin-e [kako єсьмъ porjadi-l-e-se] tako i živ-u*  
 gentleman-VOC how be.PRS.1PL arrange-PF-PL-REFL so and live-PRS.1SG

*a vasilk-e sel-o pustoši.*  
 while Vasilke-NOM.SG village-ACC.SG ruin.PRS.3SG  
 ‘Sir, I live **as** we have arranged (according to the conditions we have discussed), while Vasilke brings the village to ruin.’  
 (NovgB. 359. XIV)

Even though historical dictionaries claim that *kako* is a comparison marker, Kobozeva and Serdobolskaya (2021) show that in the 11th–14th centuries the use of *kako* in comparison is restricted to equative clauses involving an implicit parameter:

(38) *a продаи какъ и тѣ по тому же*  
*a proda-i [kakъ i tѣ] po tomu že*  
 and sell-IMP(SG) how and this.PL according that.DAT EMPH  
 ‘(I have sent you six barrels of wine.) Sell them [on the same conditions] **as** those other ones.’  
 (NovgB. 39. XIV)

The subordinate clause in (38) refers to the exact conditions of selling the wine, which is explicitly indicated in the context. It must be emphasized that it is not about similarity; rather, the speaker aims at identifying the extent of a parameter he did not mention explicitly (conditions and price). In Kobozeva and Serdobolskaya (2021) this meaning is introduced as “an implicit parameter equative”. They show that other comparison contexts are chiefly introduced by *aky* in the 11th–14th centuries. Starting from the 14th century, *kako* expanded into the contexts of *aky*, and in Middle Russian it is largely used as a similitive and equative standard marker (in terms of Treis 2017).

Purposive clauses may be introduced by the construction with *kako* and the conjunctive mood or the infinitive with the irrealis particle *by* (Istrina 1923: 196; Lomtev 1956: 526–532; see also above):

(39) ...нача Ростиславъ утопати предъ очима Володимерима; и нача хватати за него, како бы помощі ему, и мало и самъ не утопе.  
*nača xvata-ti za njego, [kako by pomošč-i jemu]...*  
 begin.AOR.3SG grasp-INF for he.GEN.SG how IRR help-INF he.DAT  
 ‘Rostislav began to sink in front of Vladimir, and [Vladimir] seized him [**in order to** help him], and barely sank.’  
 (Voskr. XVI)

Our sample also includes several instances of *kako* in complex adverbial subordinators such as *ašte ti kako* ‘if’ (lit. ‘if EMPH how’).

In sum, adverbial subordinate clauses with *kako* involve both propositions (conditional and reason clauses) and events (manner, similitive, purpose and temporal clauses).

The exact figures for the above-described constructions are given in Table 2. This Table is a part of the larger Table A2 given in Appendix 2. Here we omit a number of adverbial clause types: first, all the examples with a potentially ambiguous interpretation (e.g., a well-expected ambiguity between condition and temporal clauses, reason and temporal clauses); second, complex subordinators including *kak(o)* as a part (since they are independent subordinators, and their functional distribution is different from that of plain *kak(o)*). The percentage in parentheses is calculated from the number of examples in the next to last column. The last column in italics gives the whole number of adverbial clauses for each period (see the details in Table A2 in Appendix 2).

In OR *kako* has more functions in adverbial subordinate clauses, in comparison to MR (see also Bulaxovskij 1958), and Table 2 shows that its frequency drops in three types of clauses. Conditional clauses with *kako* are not attested in our sample after the 15th century, clauses of reason become stylistically restricted already in the modern period, and purpose clauses were lost by the 18th century. The other three types, marked by grey color, remain widely used in MR.

The loss of conditional and reason clauses can be explained as follows. Semantically, conditional and reason clauses involve propositions, while temporal, manner and similitive/equative clauses are eventive (see Section 3.2.2). Thus, eventive subordinates are widely used in MR, while propositional subordinates (conditional and reason clauses) become severely constrained in use or lost. In this way, adverbial clauses demonstrate the same restrictions in MR as complement clauses: in OR *kako* is widely used to introduce both propositions and events, while in MR *kak* is restricted to events. Note that propositions are attested in both complementation and in adverbial clauses even in the 18th century.

Infinitival purpose clauses disappeared along with the loss of this construction in complementation (with manipulative, speech commands and modal verbs) by the 18th century.

There is one type of adverbial clause that developed after the 16th century and is widely used in MR – i.e., similitive, equative and related meanings. By related meanings we refer to comparative clauses (inequality comparison), additive constructions (“X, just as Y”) and role meanings (“he applied as a student”). Kobozeva and Serdobolskaya (2021) show that these constructions were raised in the 17th century, where *kak(o)* expanded into the contexts previously covered by *aki(aky)*, replacing the latter. In that function, *kak* spread quickly, which can be seen from the fact that in the 18th century, this type’s frequency was the same as the sum of all other types in Table 2 (48.3 %).

**Table 2:** Distribution of adverbial clause types among the total number of adverbial clauses.

Time period	Conditional (%)	Clauses of reason (%)	Purpose clauses (%)	Temporal (%)	Manner clauses (%)	Simulative, equative and related meanings (%)	Total number in previous columns	Total of analyzed adverbial clauses
11th–12th centuries	0	0	2 (22.2)	2 (22.2)	5 (55.6)	0	9	10
12th–14th centuries	1 (4.3)	2 (8.7)	3 (13.0)	5 (21.7)	12 (52.2)	0	23	24
15th–16th centuries	0	1 (8.3)	3 (25.0)	3 (25.0)	5 (41.7)	0	12	12
18th century	0	27 (18.1)	0	7 (4.7)	16 (19.7)	72 (48.3)	149	194
Use in MR	not used	stylistically restricted	not used	widely used	widely used	widely used		

The omitted columns are given in Table A2 in Appendix 2.

## 4 Grammaticalization scenario of eventive *kako*

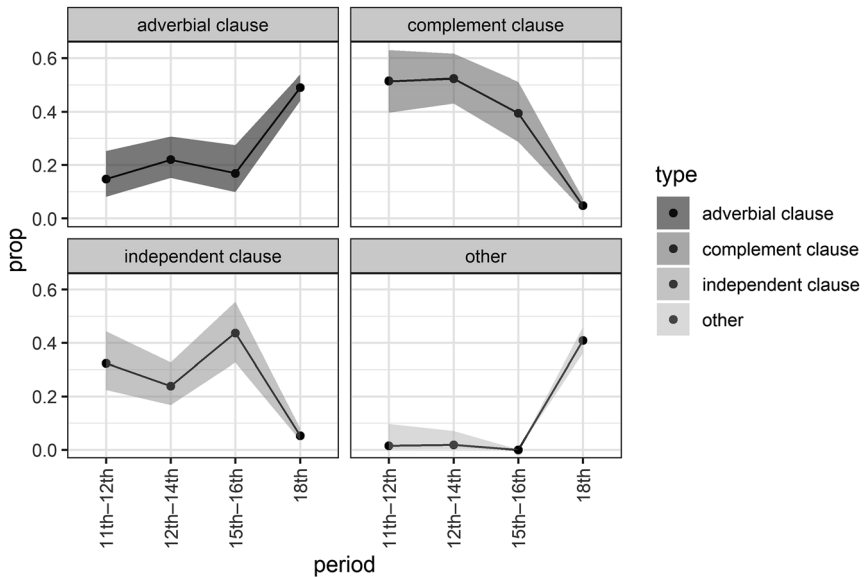
### 4.1 A specification of meaning of a complementizer *kako*

In Section 3 above we showed that in OR *kako* is widely used both in independent and in subordinate complement and adverbial clauses. The exact distribution among the three types of constructions is given in Table 3 and Figure 2. (The full version of this table including a detailed elaboration of the columns “Independent clauses” and “Other types” is given in Table A3 in Appendix 2.)

**Table 3:** Distribution of *kak(o)* among independent sentences, complement, adverbial clauses and other types.

Period centuries	Independent clauses	Complement clauses	Adverbial clauses	Other	Total number in columns to the left
11th–12th	22	35	10	1	68
	32.4 %	51.5 %	14.7 %	1.5 %	
12th–14th	26	57	24	2	109
	23.9 %	52.3 %	22.0 %	1.8 %	
15th–16th	31	28	12	0	71
	43.7 %	39.4 %	16.9 %		
18th	21	19	194	162	396
	5.3 %	4.8 %	49.0 %	40.9 %	

Figure 2 shows that complement clauses and independent sentences with *kako* are by far more frequent in OR texts than adverbial clauses. The increase of adverbial clauses is observed in the 18th century concurrently with the gradual decrease of complements and independent sentences in frequency. At this point, many old functions of *kako* in complementation and independent clauses were lost (conditional, complex *kako li*, *e(g)da kako*, *kako ti*) or diminished in use (propositional complements). By contrast, in the domain of adverbial clauses *kako* developed the use of a marker of a standard of similarity/equality and expanded into the contexts of *aky* (which completely disappeared towards the 19th century), see Kobozeva and Serdobolskaya (2021). Furthermore, in the 18th century, *kak* developed a large number of other functions hardly attested in older texts, such as a parenthetical use, a large number of new complex subordinators, specific constructions with verbs, and a use as a conjunction introducing NPs with role meaning, and with the meaning ‘example’, see Table A3 in Appendix 2. It seems plausible that concurrently with the decrease of *kako* in complementation, it underwent semantic specification as an eventive/manner complementizer.



**Figure 2:** Proportions of independent sentences, complement, adverbial clauses and other types of clauses with *kak(o)* (the plot shows the observed proportions with a 95 % confidence interval according to a multinomial logistic regression model, with ‘period’ as an ordered cubic predictor; see the Supplementary Materials for details).

We shall now focus on the specific complement types and especially on the two grammaticalization scenarios sketched in the introduction. As discussed above, the scenario associated with the semantic analysis in Arutjunova (1988) involves the development from manner complements to eventive complements (i), while the scheme suggested in Boye and Serdobolskaya (2018) involves the development of both eventive and propositional complements from manner complements (ii).

Synchronic polysemy of event and manner complements in MR seems to point to the grammaticalization scenario proposed in Arutjunova (1988), see (i). The basic explanation for this meaning shift is the expansion of internal characteristics of the carrying out the action (manner with ‘sing’ and ‘dance’, speed with motion verbs, etc.) to the description of the situation as a whole. However, assuming this development scheme, we would expect *kako* to be used in manner complements, then expand to eventive ones, while propositions may be the next step of development. Assuming this development pattern, we would not expect to find propositional complements in the earlier time periods. This does not conform to our data. By contrast, Boye and Serdobolskaya’s (2018) hypothesis predicts that we may simultaneously find eventive and propositional complements at the earliest time



periods, which is our case: in OR *kako* introduces all the major semantic types of complement clauses, including events and propositions.

Thus, it is most likely that *kako* did not follow the scheme (i), but first propagated to complement clauses in general (as predicted by (ii)), covering all the major complement types in OR, and then specialized on the event and manner contexts in MR. This specification happened gradually, after the complete loss of several complex complementizers and the general decrease of the frequency of *kako* in complement clauses.

Another point is how exactly the complementizer use was grammaticalized in specific complement types. Both the schemes (i) and (ii) assume that eventive (propositional) complements grammaticalize from manner complements such as *I know how he got to the metro* (2) (which, presumably, developed from indirect questions such as *I asked how he got to the metro* based on a “from question to subordination” shift, cf. Heine and Kuteva 2006: 204–243). This explanation seems to be the most straightforward one for manner complements: manner is the core meaning of *kako* in OR, and it is likely to have grammaticalized from independent manner questions. However, for other complement constructions observed in OR we offer another explanation based on the fact that similar constructions are present in independent sentences.

For example, it is most likely that *e(g)da kako* ‘suppose’ with verbs of fear (24) grammaticalized from apprehensive contexts involving *e(g)da kako* in independent clauses (15), *kako li* in polar questions (22) developed from *kako li* in independent questions (14), and *kako* with infinitives/conjunctive mood (19) grammaticalized from purposive clauses hosting the same construction (39).

Manner is known to be the vaguest of all situation modifiers (such as time, place, condition, reason, etc.), and manner expressions are well-known to develop a range of meanings that are hard to interpret and largely depend on the semantics of the verb they modify (Švedova 1998: 149). For example, in Russian *kak* is not only used in questions about a parameter of a situation like speed in (40a), but also in questions about a situation description, termed by Filipenko (2003) as “situation structure” ((40b) and (40c)), and even about some obligatory participants of a situation (40d).

- (40) a. ***Kak*** *on beža-l?* – *Bystr-eje vsex.*  
           how he run-PST(M.SG) fast-CMPR all.GEN.PL  
           ‘How did he run? Fastest of them all.’
- b. ***Kak*** *ty pro-vě-l leto?*  
           how thou PV-PASS-PST(M.SG) summer  
           ‘How was your summer?’ (lit. ‘How did you spend summer?’)
- c. ***Kak*** *gorc-y prazduj-ut svad’b-u?*  
           how Highlander-NOM.PL celebrate-PRS.3PL wedding-ACC.SG?  
           ‘How do Highlanders celebrate wedding?’

- d. **Kak** *tebja* *zov-ut?*  
 how thou.GEN call-PRS.3PL?  
 ‘What is your name?’ (lit. ‘How do they call you?’)

Questions similar to (40b) and (40c) usually inquire about a description of the situation as a whole, not just one of its aspects like manner in (40a) and route in (1) above. An appropriate answer to (40b) requires a whole story describing the weather, route and visited places, undertaken activities in (40c), while an appropriate answer to (40d) is a proper name.

Thus, the manner meaning of *kak* is expanded to the situation as a whole, including all its arguments and modifiers. This use arguably gives rise to the eventive reading, where *kak* does not denote manner, but encodes the event as a whole (see also Arutjunova 1988: 115–117). Therefore, the eventive reading of *kako* does not arise in complementation but is developed already at the stage of independent questions, contrary to scenarios (i) and (ii). The proposition reading is also observed in independent sentences with *kako*: namely, propositions are introduced by *kako li* in polar questions (14) and *e(g)da kako* in ‘suppose’-clauses (15). These uses could have reinforced the propagation of propositional complements with *kako* at the stage of its grammaticalization as a complementizer. In the same vein, we suppose that the multifunctionality of *kako* in adverbial subordinates is the result of the grammaticalization of independent questions with the same meaning, see Section 4.3.

As a consequence, eventive and propositional complements of *kako* are both attested in the earliest documented periods.<sup>2</sup> Then several uses are gradually lost and the meaning of *kako* specializes on manner/event contexts. The specification of this meaning could have been reinforced by the specific type of context analyzed in Section 4.2.

It should be taken into account that the proposed development scheme describes the facts observed in the period covered by written sources, that is, since the 11th century. We are not aware of the earlier facts of the language and can only speculate about them. It might be speculated that the hypothesis (i) is still plausible and that before the 11th century complements with *kako* first followed the “manner > event” semantic shift, then the “event > proposition” semantic shift, thus leading to the polysemy observed in Section 3.2.3. In the course of further development around the 11th century, this process might have turned backward and the functions of *kako* might have gradually decreased.

<sup>2</sup> It is possible, however, that *kako* first expanded to event complements, then further to propositional contexts, and the stage we observed in the 11th century is the intermediate one. However, since the relevant period (before the 11th century) is not documented, we cannot test this hypothesis.

## 4.2 A possible bridging context

Following Heine and Kuteva's (2019) scenario, it can be hypothesized that *kako* got fossilized as a complementizer following the scheme "question word in independent sentences > question word in indirect questions (embedded clauses) > complementizer". However, we suggest that the specification of *kako* as a complementizer may have happened through a specific bridging context (in terms of Evans and Wilkins 1998). Our sample has a substantial number of examples (e.g., in the 11th century there are four examples) involving the following syntactic structure, see (29) and the following example:

- (41) Лежащю ти въ твърдо покръвенъ хранинъ, слышащю же ушима  
 дъждевнѡе множѣство, помысли о убогыхъ, како лежать нынѣ,  
 дъждевными каплями, яко стрѣлами, пронажѣми...  
*romysl-i o ubog-uxъ [kako lež-atъ nynja*  
 think-IMP(SG) about wretched-LOC.SG how lie-PRS.3PL now  
*dъžd-ev-ъn-ymi*  
 rain-ATTR-ATTR-INS.PL  
*kaplj-ami jako strěl-ami pronažja-jem-i]*  
 drop-INS.PL SUB arrow-INS.PL pierce-PTCP.PASS-NOM.PL  
 'As you lie in a well-covered building and hear a heavy rain, think about the  
 poor, [who/how they are lying pierced by raindrops as arrows...]'  
 (Izb. XI)

The syntax of these examples poses the following problem: it is unclear whether the stimulus of the mental verb is actually *ubogixъ* 'the wretched' or the clause introduced by *kako* 'how they are lying pierced by raindrops (similarly, 'birds of the sky' or 'how they do not sow or harvest' in (29)). Intuitively, it seems that both of them are, but that contradicts the idea of one-to-one correspondence between arguments and the slots in the verbal argument structure.<sup>3</sup> The second argument could be an afterthought, but this is primarily expected in colloquial examples, and not in the written language, such as hagiographies and chronicles (note that these "double object constructions" are absent from birchbark letters which are generally believed to be stylistically close to colloquial speech).

Another solution is that the dependent clause in (29) and (41) is a relative clause modifying the NP *ubogixъ* (the wretched who are lying etc.). However, there are

<sup>3</sup> Such examples seem similar to *John, his behavior surprised me*; note, however, that this construction is colloquial and would not be frequent in the written texts. By contrast, the OR construction exemplified in (29) and (41) is widely used in written OR texts of our sample.

(almost) no relative clause examples with *kako* in either our sample or historical dictionaries and grammars (except for manner relativization as in (35)).<sup>4</sup>

In MR the written translation of (29) and (41) would require a change in the syntax of the construction, most probably a relative clause (a word-by-word translation would yield a colloquial sentence, unacceptable in the written language). However, similar examples are possible with nouns taking a clausal argument (with a role of content) and denoting a document or an oral message: “a tale that...”, “a story that” etc.:

- (42) *Spoj mne pesn-ju [kak devic-a za vod-oj*  
sing(IMP.SG) I.DAT song-ACC.SG how girl-NOM.SG for water-INSTR.SG  
*poutru š-l-a].*  
in.morning go-PST-F.SG  
‘Sing me the song [HOW the girl went for water in the morning].’  
(A.S. Pushkin. *Zimnij vecher*. 1825)
- (43) *Rasskaž-i mne istorij-u, [kak ty po-znakomi-l-a-s’*  
tell-IMP.SG I.DAT story-ACC.SG how you PV-make.acquaintance-PST-F.SG-REFL  
*s pap-oj].*  
with daddy-INSTR.SG  
‘Tell me the tale [HOW you met dad].’

We suppose that these “double-object” constructions could serve as a bridging context consolidating *kako* as a complementizer.<sup>5</sup>

4 There is a single example of *kako ti* that could be interpreted this way:

- (i) ать ти видѣло како ти было ѡ ивана ать постави ѥ передѣ людьми како ти  
взмоловить  
*postav-i i pьredѣ ljud-ьmi [kako ti vzmolovity]*  
put-IMP(SG) he.ACC in.front.of people-INS how EMPH say-PRS.3SG  
‘If [he] saw [me] take Ivan put him in front of the people [he will name].’ (call the witnesses  
he will name)  
NovgB. 502. XII.

This sentence belongs to a Novgorod birchbark letter that Zalizniak translated with a relative clause (<http://gramoty.ru/birchbark/document/show/novgorod/502/>). However, first, it is unclear whether he meant to interpret it as a relative clause syntactically; the sentence could have another interpretation “put him in front of the people on the conditions he will require”. Second, the example involves *kako ti* and not *kako*; third, it is the solitary one.

5 If, instead, the manner > event > proposition scenario is assumed, these constructions could have served as a bridging context from indirect questions of manner to eventive complements before the 11th century.

- (44) [think/look at X] [*kako* P] >  
 [think/look at [X] [*kako* P] systematic double stimulus >  
 [think/look [*kako* P]] clausal argument with *kako*

It can be hypothesized that at first, the double object constructions involved two independent sentences with an anaphor in the second one (“Look at the wretched. How they are lying pierced by raindrops!”), then they were reanalyzed as constructions involving a double object in the same sentence. Next, the noun replaced the anaphor in the second clause and the clausal argument remained as the only stimulus of the complement-taking verb (“Look COMP the wretched are lying, etc.”) following Lightfoot’s (1979) principle of avoiding structural complexity.

It is noteworthy that similar constructions, in which a *how*-clause contains a pronoun referring back to the PP in the previous context, are documented in Old English; they are termed as CLAN-constructions in López-Couso and Méndez-Naya (1996):

- (45) *Mæg gehyran se ðe wyle be þam halgan mædene, eugeniam phylippus dæhter.*  
*hu heo þurh mægþhad mærlíce þeah.*  
 ‘Let any who will hear about the holy virgin Eugenia, daughter of Philip,  
**how** she prospered wonderfully through virginity.’  
 (López-Couso and Méndez-Naya 1996: 350)

Note that in Modern English the question manner word *how* is also used both in manner (46a) and propositional complements (46b) (“declarative” *how* in Huddleston 1971):

- (46) a. *He told us **how** to change a flat tire.*  
 b. *He told us **how** he had a brother in Moscow.*  
 (Huddleston 1971: 178)

### 4.3 Development of adverbial clauses with *kako*

The considered data raises the question of why a manner question word could be used as an adverbial subordinator covering a rather large number of adverbial clause types: note that *kako* could introduce conditional and purpose clauses, which is impossible in MR, and clauses of reason, which are stylistically and syntactically restricted in MR. We explain this by the multifunctionality of *kako* in independent questions: in OR interrogative *kako* could be used not only in questions about manner (13), but, as Slovar’ (1975) states, also in questions about time (47), cause (48), and ablative; with the particle *li* it is used in rhetorical polar questions of indignation (14). Such a multifunctionality of manner words is well-expected, since among other ontological categories manner is the vaguest one and is susceptible to semantic shift.

- (47) Есть ми, господине, отъ твоего государя до тебя рѣчи наединѣ, и ты, господине, **какъ** велишь у себя быти?

*i ty gospodin-e kakъ vel-išъ u sebja by-ti*  
 and you gentleman-VOC how order-PRS.2SG to REFL.GEN be-INF  
 ‘I have a private message to you, Sire, from your sovereign. **When** will you order me to come to you?’

(Slovar’ 1975: 27. Beginning XVI)

- (48) ...вѣпрашаємъ же, како не ѡстави себѣ ничтоже, рече мое бо тѣло не  
 можеть то(гъ) понести  
*vъpraša-jem-ъ že [kako ne ostavi sebě ničtože]*  
 ask.PTCP.PST-NOM.M.SG EMPH how NEG leave.AOR.3SG REFL.DAT nothing.ACC  
*reč-e moje bo těl-o ne mož-etъ togo pones-ti*  
 say-AOR.3SG my because body-NOM.SG NEG can-PRS.3SG that.GEN.SG carry-INF  
 (The Babylonian tsar sent to Cyrus various gifts and decorations, but Cyrus took them and distributed them to his army.) ‘When he was asked **why** he did not leave anything to himself, he said: Because my body cannot wear them.’  
 (RNC: Pčela. Copy middle XV)

There is no doubt, however, that manner is the core meaning of *kako*, since manner questions prevail in number in all kinds of texts (e.g., 10 examples among the whole 38 examples in PVL) and it is the first meaning in all historical dictionaries, while other interpretations are much rarer. However, it is important that *kako* could also be used in other types of questions. These contexts gave rise to indirect questions of various semantic types, which were then grammaticalized in adverbial clauses, following the scheme “from question to subordination” proposed in Heine and Kuteva (2006).

The remnants of this polyfunctionality are observed in MR: questions about reason and condition may sometimes be introduced by *kak*, as well as rhetorical “indignation” questions:

- (49) **Kak** sluči-l-o-s’, čto Gruzij-a vo-š-l-a v  
 how happened-PST-N.SG-REFL COMPL Georgia-NOM.SG PV-go-PST-F.SG in  
 sostav Rossijsk-oj imperi-i – On-a iska-l-a  
 composition(M.SG) Russian-GEN.SG empire-GEN.SG he-F.NOM.SG search-PST-F.SG  
 zaščit-y ot Persi-i.  
 support-GEN.SG from Persia-GEN.SG  
 ‘Why did Georgia become part of the Russian empire? – It needed support against Persia.’
- (50) **Kak** et-omu na-uči-t’-sja? — Čašče upražnja-t’-sja.  
 how this-DAT.SG PV-learn-INF-REFL frequent.CMPR train-INF-REFL  
 ‘How can one learn to do this? – You need to train as frequently as possible.’  
 (I. Gončarov. Obyknovennaja istorija. 1847)
- (51) *Ja ne s-dela-l zadani-e. – Kak ne s-dela-l?*  
 I NEG PV-do-PST(M.SG) homework-ACC.SG how NEG PV-do-PST(M.SG)  
 ‘I haven’t done the homework. – How come you haven’t?’

In (49) the answer includes a description of the motivation; in (50) the condition of success. Of course, both examples have a nuance of manner and do not constitute the core of the reason and condition questions; however, the answer to both of them presupposes an explanation of the reason/condition of situations under discussion.

Thus, the functions of *kak* in MR are beyond the internal characteristics of the situation or proper manner. However, word-by-word translations of (47) and (48) would be ungrammatical in MR. Thus, we claim that *kako* has undergone a gradual specification of meaning both in independent questions and in adverbial clauses, similar to complement clauses.

## 5 Conclusions

The present work aimed at identifying diachronic stages of development of the complementizer *kak* (going back to OR *kako*) in sentential arguments. Our aim was to find evidence for two possible scenarios of grammaticalization of manner words. One of them, proposed for Russian, involves the scheme “manner complementizer > eventive complementizer” (Arutjunova 1988), while another one, written in the typological framework, is based on the idea that manner complementizers may develop both eventive and propositional readings in complement clauses (Boye and Serdobolskaya 2018). It is noteworthy that both scenarios presuppose that this semantic shift happens in complement clauses.

Based on the analysis of the first OR documents from the 11th century, we show that the evolution of the subordinator *kako* in complementation involves narrowing its functional domain. At this stage, it could introduce all the basic types of complements, including events, propositions, irrealis prospective complements, indirect polar questions, apprehensive complements and manner complements. Thus, the semantics of *kako* in OR is much vaguer and largely determined by context, compared to MR. In the course of the 11th–20th centuries *kako* underwent a specification of meaning, and the propositional use was gradually lost.

Thus, the grammaticalization scheme “manner complements > event/propositional complements” seems to be the most plausible one, since it presupposes the same encoding of events, propositions and manner complements in the earliest period. The syntactic reanalysis could have included the bridging context of double object constructions with both an object and a situation as a stimulus (“Think about X how s/he did such and such”).

However, it is not excluded that *kako* was first used in manner complements and eventive complements, then expanded to propositional and irrealis contexts before the documented period, i.e., before the 11th century. This direction of change could explain the decrease of event/manner complements observed in the 12th–14th centuries (see Table 1 and Figure 1). Yet, our sample is not large enough to make strong claims. Moreover, since the earliest OR documents date from the 11th century, this hypothesis cannot be tested.

Both hypotheses assume that the complementizer developed from manner complements, while the latter arose from independent questions of manner (in the course of the “from question to subordination” process, see Heine and Kuteva 2006). However, we show that another path of grammaticalization is most plausible for OR: all the complement constructions with *kako* in the 11th century had their equivalents in independent sentences. Thus, we suggest that all the complement constructions with *kako* developed from independent sentences. In other words, we assume that the eventive reading of *kako* developed already at the stage of independent questions, contrary to both scenarios (i) and (ii).

In OR *kako* introduces propositions in complement clauses, independent clauses (polar questions and apprehensive contexts) as well as adverbial subordinate clauses (reason and conditional clauses). All these contexts are completely lost by the middle of the 20th century. In particular, adverbial clauses with *kako* underwent a change in their functional distribution: *kako* gradually took over the functions of the similitive/equative marker *aki*, *aky* (eventive contexts), while reason and conditional uses were lost in the 20th century. Thus, the propositional subordinates are gradually lost, and the eventive contexts are the only ones observed in MR, in the same way as in complement clauses.

Therefore, we assume that the main tendency of the semantic evolution of *kako* is that involving a semantic shift from proposition to event. Hence, the loss of functions involving meanings in the domain of propositions in all three types of examined clauses: complement and adverbial subordinates and independent clauses.

## Abbreviations

1/2/3	1st/2nd/3rd person
ACC	accusative
ADJ	adjective
Adv	adverb
AOR	aorist
ATTR	attributive
CMPR	comparative
COMPL	complementizer
COP	copula
CVB	converb
DAT	dative
EMPH	emphatic particle
F	feminine
GEN	genitive
IMP	imperative
IMPF	imperfect
INF	infinitive
INS	instrumental
IRR	irrealis
LOC	locative



M	masculine
N	neuter
NEG	negation
NOM	nominative
NP	noun phrase
NPI	negative polarity item
P	proposition
PASS	passive
PF	perfect
PL	plural
PRS	present
PST	past
PTCL	particle
PTCP	participle
PV	preverb
Q	question marker
REFL	reflexive
RNC	Russian National corpus at ruscorpora.ru
SG	singular
SUB	subordinator
VOC	vocative

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**Data availability statement:** The data used for Figures 1 and 2 are available at <https://zenodo.org/records/10793757>. Please contact the authors for further details.

## Appendix 1

### List of Old Russian manuscripts studied

Taken from *Polnoje sobranije russkix letopisej* (The complete collection of the Russian chronicles). Saint-Petersburg: tipografija Eduarda Praca, 1841:

PVL: *Povest’ vremennyx let* (Primary Chronicle). Lavrent’jevskij spisok (copy). 11th–12th centuries.

NPL: The first Novgorod chronicle. Synod manuscript. 13th–14th centuries.

Suzd: The Suzdal chronicle. 12th–14th centuries.

Voskr: The Voskresenskaja chronicle (up to page 172). 16th century.

From the electronic collection of birchbark letters (<http://gramoty.ru/birchbark/>)

NovgB: Novgorod birchbark letters. 12th–15th centuries.

Appendix 2

Detailed elaboration of quantitative data on all types of clauses with *kak(o)*.

Table A1: Distribution of complement clauses with *kak(o)*.

Simple/complex complementizer	The simple complementizer <i>kako</i>								Complex complementizers with <i>kak(o)</i>				Total
	Infinitive/Conjunctive				Indicative mood				Conjunctive mood		Indicative mood		
Morphosyntactic properties													
Period in centuries		Purposive-like, compl. of modal verbs	Propositions	Events	Manner complements	Event/manner complements	Events/propositions	Indirect questions of degree	Irrealis complements with <i>kak budto</i>	Indirect polar questions with <i>kako li</i>	<i>kako</i>	<i>ti</i>	<i>egda</i>
11th–12th		3	2	7	15	0	3	0	0	0	3	2	35
12th–14th		17	12	12	8	1	5	0	0	1	1	0	57
15th–16th		7	2	1	7	7	1	0	0	0	0	3	28
18th		0	2	2	12	0	0	2	1	0	0	0	19

The examples allowing an ambiguous interpretation (e.g., manner/event interpretation) are written with a slash.

Table A2: Distribution of adverbial clauses with *kak(o)*.

Period in centuries	Simple <i>kak(o)</i>						Complex subordinators			
	Temporal conditional	Temporal/Temporal reason	Conditional	Reason	Purpose	Manner	Comparison and related <sup>a</sup>	Temporal	Conditional	Reason Comparison Total
11th–12th	2	0	0	0	2	5	0	0	1	0 10
12th–14th	5	0	0	1	3	12	0	1	0	0 24
15th–16th	3	0	0	0	3	5	0	0	0	0 12
18th	7	6	5	0	27	16	72	32	0	2 27 194

The examples allowing an ambiguous interpretation are written with a slash (e.g., a well-expected ambiguity between condition and temporal clauses; reason and temporal clauses). <sup>a</sup>By comparison clauses we mean similitive, equative and comparative clauses. Related meanings include those of additive (X, as well as “Y”) and approximator (“similar to”).

Table A3: Distribution of all attested constructions with *kak(o)*.

Period in centuries	Independent clauses			Complement clauses		Adverbial clauses		Parenthetical clauses		Idioms		Kak as a conjunction with NPs		Total
	Questions/exclamations	‘[let it be] as God wishes’	Complexes <i>e(g)da kako, da ne kako, ci kako</i>									The meaning ‘such as’, ‘as an example’	Role meaning ‘(he applied as a student)’	
11th–12th	16	0	6		35	10		0	0	1		0	0	68
12th–14th	21	4	1		57	24		0	0	2		0	0	109
15th–16th	18	8	5		28	12		0	0	0		0	0	71
18th	21	0	0		19	194		95	41	0	4	22	22	396

<sup>a</sup>By the 18th century a number of specific constructions with *kak* developed, e.g., *Ne uspel + X + infinitive + kak ...* (lit. X did not have time to do something as...) ‘Barely/had X done something, when...’, *ne + imache/inako/drugoi ... kak + X + did it* (lit. not otherwise/in another way/ other/ ...) ‘it is X who did it’ etc. ‘All three complexes have an apprehensive meaning.

Data sources from the electronic collection of the Institute for Russian Literature, Russian Academy of Sciences <http://lib.pushkinskijdom.ru/>:  
 Izb: Izbornik (a collection of spiritual and moral texts). 1076  
 RusP: Russkaja Pravda (the Russian code of laws). XIV.  
 HG: Hagiographies and sermons. XII–XIV.  
 Vass: A story of sickness and death of Vassilij the III. XVI.  
 ANik: A. Nikitin. Journey beyond three seas. XV. (Cit. after Xoženije za tri morja Afanasija Nikitina/Edited by Ja. S. Lurje and L. S. Semënov. 3-e edn. Leningrad: Nauka, 1986.)

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