

9. Tests for distinguishing arguments and adjuncts and their application to Croatian locative phrases

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In this paper, we have described the application of tests for distinguishing arguments and adjuncts to two types of Croatian locative phrases. The first type of phrase appears as a third complement with three-place verbs of putting and it is usually defined as a directional location or a goal. The second type of locative phrases appears with two-place verbs with a second complement bearing the semantic role of either a (stative) location or a (directional) location, i.e. goal. We have applied the following tests to two types of phrases: omission test, implication test, *do so* test, *this happened* test, replacement test, substitution test, paraphrase with a dependent clause, *wh*-island test, dialogue test, and iterativity test (Ágel 2000; Helbig 1992; Needham & Toivonen 2011; Przepiórkowski 2016a; Šojat 2008). We have concluded that the *wh*-island test and the iterativity test do not give substantial evidence for these types of phrases. The remaining eight tests are useful in Croatian with certain limitations: all examined phrases are confirmed as arguments. All locative phrases behave uniformly as arguments according to the implication test and as adjuncts according to the replacement test.

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1. Introduction

In this paper, we will examine the application of tests for distinguishing arguments and adjuncts to two classes of locative phrases (locative phrases which appear with two-place and three-place verbs). We roughly call all examined phrases *locative phrases*, although we are aware that some express a location whereas other express a goal and despite the fact that all phrases are prepositional. Although the difference between arguments and adjuncts is tacitly present in most grammatical descriptions, their distinction is

not always clear (Needham & Toivonen 2011: 1).¹²⁶ Therefore, in several approaches, different procedures have been suggested for distinguishing between arguments and adjuncts, but none of them is universally applicable. For example, some tests that differentiate arguments from adjuncts in English (word order test, preposition stranding test, pseudocleft test or the VP preposing test) are not applicable to Croatian at all. On the other hand, some tests give very different results when applied to different languages.¹²⁷

In this paper, the selection of tests will be applied to the locative phrases: the omission test, the implication test, the *do so* test, the *this happened* test, the replacement test, the substitution test, the paraphrase with a dependent clause, *wh*-island test, the dialogue test, and the iterativity test. The omission test, the implication test, the replacement test, and the paraphrase with a dependent clause originate in German dependency framework (Helbig 1992). The *do so* test and *this happened* test are used in both dependency and generative grammar (Lakoff & Ross 1967; Ackema 2015; Brown & Miller 1991; Helbig 1992). The *wh*-island test originates from generative grammar, and the dialogue test is designed in functional generative description (Sgall, Hajičová & Panevová 1986). By using tests from different theoretical approaches, this research is not aligned with only one specific theoretical approach, but instead, in general follows dependency grammars, but also incorporates some insights from generative grammar. Functional generative description from which we took the dialogue test is also a variety of dependency grammar. We think that the employment of two different theoretical approaches is justified by our aim of finding which tests function well for Croatian. Establishing the tests for distinguishing arguments and

¹²⁶Needham & Toivonen (2011), and Toivonen (2016, 2021) research extensively the difference between arguments and adjuncts and tests for distinguishing them. Their work is mostly written in the theoretical framework of lexical functional grammar, but their conclusions are important in general.

¹²⁷For example, the coordination of *wh*-words which refer to arguments and adjuncts behaves differently in English and Croatian. While in Croatian it is possible to adjoin the *wh*-word which refers to an adjunct with any *wh*-word which refers to an argument, in English adjunct *wh*-words can be conjoined only with an argument *wh*-word which refers to an optional argument. Although the test can be applied to Croatian, the results do not point to the argument vs. adjunct status of some phrases (Gračanin Yuksek 2007).

adjuncts, could, in our view, precede analysing some data in a certain theoretical framework.¹²⁸

The results of the application of ten tests to the locative phrases were evaluated based on the authors' judgements and results were also checked with fifteen L1 speakers of Croatian.¹²⁹ The example sentences were constructed by the authors. However, their construction was inspired by corpus examples. Ten verbs divided into two syntactic classes (bivalent and trivalent verbs) were chosen to check the applicability of tests to Croatian data. Since for both syntactic groups of verbs it has been more or less stated that their examined complement is an argument, our goal was to see if this would be confirmed by standard syntactic tests (already applied in other languages), see for example Samardžija (1986), Šojat (2008), Palić (2011). Also, these two groups of verbs were selected since we wanted to see if the tests for distinguishing arguments and adjuncts function differently for bivalent and trivalent verbs.

After the introduction (section 1) and description of two classes of verbs whose complements will be examined (section 2), the tests for distinguishing arguments and adjuncts used for these two groups of locative phrases will be briefly presented, as well as their application to locative phrases with two groups of verbs (section 3). Through the application of these tests, their disadvantages and advantages will be emphasized. The results will be discussed in section 4 and the conclusion will be laid out in section 5.

2. Two syntactic classes of verbs with locative phrases

Levin (1993) defines verbs of putting as verbs that refer to putting some entity at some location, the putting can be done in some manner, or it can refer to moving something in some direction. The first type of phrases that are examined here appears with the verbs of putting. These verbs are three-place predicates whose meaning includes a participant (agent) who throws or puts some object (patient/theme) at some location (goal). Their

¹²⁸ See Buttinelli (*this volume*, Chapter 11) for a view of the distinction between arguments and adjuncts conceived as a continuum in the context of Cognitive Grammar.

¹²⁹ We have checked our judgements by an informal questionnaire that was given to the fifteen colleagues in the Institute of Croatian Language who are all L1 speakers of Croatian.

third argument is often characterized as a directional location (goal) and its status will be examined here. Complements¹³⁰ of the following verbs are investigated: 1. *baciti* ‘throw, cast’, 2. *složiti* ‘compose, put together, arrange, set’, 3. *staviti* ‘put, set, place, lay’, 4. *nastaniti* ‘inhabit, settle, colonize’, and 5. *trpati* ‘put, load, stuff’. All of them are non-stative verbs with an agentive subject. In (1–5) there are sentences with verbs of putting with the third (examined) part underlined:

- (1) *Brat je bacio kamen u vodu.*¹³¹
 brother.NOM.SG AUX throw.PTCP.ACT.M.SG stone.ACC.SG into water.ACC.SG
 ‘The brother threw a stone into the water.’
- (2) *Kuhar je složio janjetinu i krumpir na tanjur.*
 chef.NOM.SG AUX arrange.PTCP.ACT.M.SG lamb.ACC.SG and potato.ACC.SG
 on plate.ACC.SG
 ‘The chef arranged the lamb and potatoes on a plate.’
- (3) *Jan je stavio lonac na štednjak.*
 Jan.NOM.SG AUX put.PTCP.ACT.M.SG pot.ACC.SG on stove.ACC.SG
 ‘Jan put the pot on the stove.’
- (4) *Država je nastanila ljude duž granice.*
 state.NOM.SG AUX settle.PTCP.ACT.F.SG people.ACC.PL along border.GEN.SG
 ‘The state has settled the people along the border.’
- (5) *Ana trpa papirić u džep.*
 Ana.NOM.SG puts little paper.ACC.SG into pocket.ACC.SG
 ‘Ana puts the paper into the pocket.’

¹³⁰ Although the term *complement* is sometimes interchangeable with the term *argument*, we use the term *complement* as a cover term for both arguments and adjuncts, so for any dependent of the verb (that is for both *kruh* ‘bread’ and *škola* ‘school’ in the sentence *Brat jede kruh u školi* ‘Brother eats bread in the school’). Various authors assign these terms to either syntax or semantics. For example, Koenig, Mauner & Bienvenue (2003: 68) suggest that a *complement* and a *modifier* belong to syntax and *argument* and *adjunct* to semantics. On the contrary, Ackema (2015: 246) suggests that a *modifier* is a semantic notion and an *adjunct* a syntactic notion. Ernst (2002: 7) considers an *adjunct* to be both a syntactic and semantic notion, and an argument only a syntactic notion (exactly opposite of Koenig, Mauner & Bienvenue 2003).

¹³¹ We provide glosses for examples whose structure deviates from the structure of the English translation. Beside this, considering that we apply different tests to the same examples, we provide glosses for the first appearance of an example. Glosses follow the Leipzig Glossing Rules (Bickel *et al.* 2015).

A third complement with the Croatian verbs of putting is always a prepositional phrase if not an adverb (*Ana trpa papirić tamo* ‘Ana puts the paper there’) and it refers to a goal of an action. In English, some verbs of this class show locative alternation, and to a lesser extent in Croatian too (s. Zovko Dinković 2003). According to Zovko Dinković (2003), the prefixed counterparts of the verb *trpati* ‘put, load, stuff’, which is part of our investigation, *natrpati* (perfective) and *natrpavati* (imperfective), show the locative alternation (*Natrpao je džep papirićima* ‘He loaded the pocket with small papers’).

The second type of locative phrases appears with verbs *boraviti* ‘stay’, *dosegnuti* ‘reach’, *dospjeti* ‘arrive, get to, reach’, *nastaniti se* ‘settle in/down’, *ležati* ‘lie, be’. All five verbs are bivalent. Two of them are stative verbs (*boraviti* ‘stay’, and *ležati* ‘lie, be’), while verbs *dosegnuti* ‘reach’, *dospjeti* ‘arrive, get to, reach’, and *nastaniti se* ‘settle in/down’ are non-statives. Therefore, the second argument of the verbs *boraviti* ‘stay’ and *ležati* ‘lie, be’ is (stative) location, while the second argument of verbs *dosegnuti* ‘reach’, *dospjeti* ‘arrive, get to, reach’ and *nastaniti se* ‘settle in/down’ is directional location, i.e. goal. Examples are given in (6–10):

- (6) *Moj rođak boravi u Chicagu.*
 my.M.NOM.SG cousin.NOM.SG stays in Chicago.LOC.SG
 ‘My cousin is staying in Chicago.’
- (7) *Brat je dosegnuo do najviše police.*
 brother.NOM.SG AUX reach.PTCP.ACT.M.SG to highest.F.GEN.SG shelf.GEN.SG
 ‘The brother reached the highest shelf.’
- (8) *Egipatske starine dospjele su u Italiju.*
 Egyptian.F.NOM.PL antiquities.NOM.PL arrived AUX in Italy.ACC.SG
 ‘Egyptian antiquities have arrived in Italy.’
- (9) *Župnik se privremeno nastanio u Novim Selima*
 pastor.NOM.SG REFL temporarily settle.PTCP.ACT.M.SG in Nova(PL).LOC Sela(PL).LOC
u privatnoj kući.
 in private.LOC.SG house.NOM.SG
 ‘The pastor temporarily settled in Nova Sela in a private house.’
- (10) *Dinara leži na granici između Hrvatske i Bosne*
 Dinara.NOM.SG lies on border.LOC.SG between Croatia.GEN.SG and Bosnia.GEN.SG
i Hercegovine.
 and Herzegovina.GEN.SG
 ‘Dinara lies on the border between Croatia and Bosnia and Herzegovina.’

Except for the verb *dosegnuti* ‘reach’ (7), which can also be transitive (*Dosegnuo je najvišu policu* ‘He reached the highest shelf’), all the remaining verbs of this class are intransitive in Croatian. On the other hand, the verbs with the first types of locative phrases (1-5) are transitive. Both types of prepositional phrases are very often cited in the analysis of dependency grammars as examples of phrases that were not recognized as arguments in traditional grammars. In dependency grammars, these types of complements are primarily placed in the special class of complements¹³² (Engel 2009, Palić 2011). Palić (2011) calls the second complement of verbs *boraviti* ‘stay’, *ležati* ‘lie, be’, *dosegnuti* ‘reach’, *dospjeti* ‘arrive, get to, reach’, *nastaniti se* ‘settle in/down’ and the third complement of the verb *nastaniti* ‘inhabit, settle, colonize’ the (obligatory) adverbial of place (*obvezna priložna oznaka mjesta*). Belaj & Tanacković Faletar (2017: 233), within cognitive grammar, call them *obligatory adverbial complement of place* (*obvezna adverbijalna dopuna mjesta*). Palić (2011) does not include the third complement of verbs *baciti* ‘throw, cast’, *složiti* ‘compose, put together, arrange, set’, *trpati* ‘put, load, stuff’ and *staviti* ‘put, set, place, lay’ in his exhaustive list of adverbial complements, supposedly not considering them to be adverbial complements.

Engel (2009: 145–146), for example, would classify the prepositional phrase in (6) and (10) under the situational complement (*Situativergänzung*), while complements with other verbs presumably under directional complement (*Direktivergänzung*). In literature written in English, these complements are sometimes considered to have the semantic role of location. Some authors distinguish between semantic roles of location and spatial goal (Levin & Rapport Hovav 2005) which is expressed in dependency grammar with placement of complements in different classes. For example, it is clear that verbs *boraviti* ‘stay’ and *ležati* ‘lie, be’ have prepositional complements whose semantic role is location, while verbs of putting, and verbs *dosegnuti* ‘reach’ and *dospjeti* ‘arrive, get to, reach’ have a prepositional complement with the semantic role of goal. However, it is not easy to decide whether the complement of the verb *nastaniti se* ‘settle in/down’ bears a semantic role of

¹³²In dependency grammars, it is common to make a list of classes of complements that are found in the individual language (nominative complements (subject complements), genitive complements, accusative complements, prepositional complements, etc.). See such a list in Samardžija (1986) and Šojat (2008) for Croatian and Mrazović & Vukadinović (2009) for Serbian.

a location or of a goal. Although the verb *nastaniti se* ‘settle in/down’, in our opinion, describes a dynamic event, the prepositional phrase with this verb is marked with the locative case, which is very often linked to the semantic role of location.¹³³

3. Tests for distinguishing arguments and adjuncts and their application to the prepositional locative phrases

3.1. Omission test¹³⁴

The omission test, also called the optionality test (Schütze 1995; Needham & Toivonen 2011), is a standard test for the separation of obligatory elements from non-obligatory elements in a sentence. If a syntactic phrase can be omitted and the sentence remains grammatical, the omitted syntactic phrase is either a non-obligatory argument or an adjunct. If the sentence becomes ungrammatical after a phrase is omitted, this syntactic phrase is an obligatory argument. While adjuncts can be always omitted, some arguments can be also omitted with certain verbs. The examples of dispensable arguments are, for example, objects of verbs *drink* and *eat* (*John likes to drink (tea)*). Williams (2015: 68) formulates that as follows: «So if removing a dependent results in *unacceptability*, this is good initial evidence that the omitted dependent is an argument. (...) If a dependent can acceptably be omitted, it need not be an adjunct...» So, the omission test does not say which elements in a sentence are arguments and which are adjuncts, but actually extracts obligatory arguments. The situation is even more complex if we assume that there are also obligatory adjuncts, as some authors do (Grimshaw & Vikner 1993; Goldberg & Ackerman 2001).¹³⁵ In dependency grammar, the omission test is applied to (simple) sentences to reach the so-called ‘syntactic minimum’.

¹³³ One of the reviewers questioned the statement that this phrase’s semantic role is goal.

¹³⁴ In German the omission test is called *Eliminierungstest* (Helbig 1992), *Weglassprobe*, *Reduktionstest* (Helbig & Schenkel 1969). Ágel (2000) also mentions all three terms.

¹³⁵ Grimshaw & Vikner (1993) mostly mention the obligatory adjuncts found in passives of accomplishment verbs (*The best tomatoes are grown *(by organic farmers)*), but Goldberg & Ackerman (2001) also list some other examples. One of the reviewers asked how these authors justify the concept of obligatory adjuncts and how then they can make a difference between arguments and adjuncts. In fact, they do not explain their view of the difference between arguments and adjuncts.

The idea behind this procedure was that all elements which are not in the scope of the predicate's valency can be omitted from a sentence (Šojat 2008: 22).

The omission test reveals that only the third argument of verbs *baciti* 'throw' (11) and *složiti* 'arrange' (12) can be omitted. According to the omission test, they are either optional arguments or adjuncts. The arguments of all other verbs cannot be omitted, which indicates that investigated complements of the verbs *staviti* 'put, set, place, lay' (13), *nastaniti* 'inhabit, settle, colonize' (14), *trpati* 'put, load, stuff' (15), *boraviti* 'stay' (16), *dosegnuti* 'reach' (17), *dospjeti* 'arrive, get to, reach' (18), *nastaniti se* 'settle in/down' (19), and *ležati* 'lie, be' (20) are obligatory arguments.

- (11) *Brat je bacio kamen.*
'The brother threw a stone.'
- (12) *Kuhar je složio janjetinu i krumpir.*
'The chef arranged the lamb and potatoes.'
- (13) **Jan je stavio lonac.*
'*Jan put the pot.'
- (14) **Država je nastanila ljude.*
'*The state has settled people.'
- (15) **Ana trpa papirić.*
'*Ana puts a paper.'
- (16) **Moj rođak boravi.*
'*My cousin is staying.'
- (17) **Brat je dosegnuo.*
'*The brother reached.'
- (18) **Egipatske starine dospjele su.*
'*Egyptian antiquities have reached.'
- (19) **Župnik se privremeno nastanio.*
'*The pastor temporarily settled.'
- (20) **Dinara leži.*
'*Dinara lies.'

3.2. Implication test

The implication test¹³⁶ examines if the verb presupposes or implies an entity in its state or action. Therefore, with this test, the presence of semantic arguments is examined, not their actual syntactic realization. In dependency grammars (Schumacher *et al.* 1981: 145; Engel 2009), this test is only applied if the examined syntactic phrase can be omitted by the omission test. If a syntactic part cannot be omitted without the sentence becoming ungrammatical, the test is not applied. However, we have applied this test to all locative syntactic phrases.¹³⁷ If a syntactic element phrase can be omitted from the sentence, then one must see if there is a relation of implication between the sentence with omitted part and the sentence which contains it. So, if, for example, from the sentence *Somebody eats* always follows *Somebody eats something*, we are dealing with an implication relation.¹³⁸ An additional testing of an implication is the procedure in which the examined argument has to be denied and the sentence must bring a contradiction: *He ate, but he ate nothing*.

Helbig (1992: 87) points out that the implication test is similar to the dialogue test, but need not be equated with it. While for the dialogue test the important distinction is whether something is known to a speaker or not, this distinction is not relevant for the implication test. Helbig also criticized this test by saying that the sentence *Someone eats* also implies that someone eats *somewhere* and *sometimes*, in the same way as it implies that something is eaten.

Needham & Toivonen (2011: 3) mention the core participant test, which is also similar to the implication test. With this test, two events are compared, for example, the eating and sleeping event in order to see how many participants are necessary for the realization of an event; for sleeping one, and for eating two. Needham & Toivonen (2011: 3) further note: «the

¹³⁶ In the German literature, this test is called either *Implikationstest* (Schumacher *et al.* 1981; Helbig 1992) or *Folgerungstest* (Schumacher *et al.* 2004; Engel 2009).

¹³⁷ One of the reviewers asked how we have justified not strictly following the procedure of German dependency grammar. As we said at the beginning, our approach is the combination of two (even three) approaches whose aim is to see which tests are most suitable for the Croatian data. So, we do not follow any of the approaches strictly.

¹³⁸ Researchers working in German dependency grammar (for example Schumacher *et al.* 1981) often stress that the implication test must be performed in pair with the substitution test which examines verb specificity.

intuition of whether a participant is conceptually necessary is very basic, but is not always useful.» With that, they have in mind the English verbs such as *saddle*, which involve three entities but only have two participants.

According to the results of the application of the implication test, all third or second complements of examined verbs are arguments (21–31).

- (21) **Brat je bacio kamen, ali nije ga bacio nikamo.*
 ‘*The brother threw a stone, but he threw it nowhere.’
- (22) **Kuhar je složio janjetinu i krumpir, ali nije ih složio nikamo.*
 ‘*The chef arranged the lamb and potatoes, but he arranged them nowhere.’
- (23) **Jan je stavio lonac, ali nije ga stavio nikamo.*
 ‘*Jan put the pot, but he put the pot nowhere.’
- (24) **Država je nastanila ljude, ali nije ih nastanila nikamo.*
 ‘*The state has settled people, but it has settled them nowhere.’
- (25) **Ana trpa papirić, ali ga ne trpa nigdje/nikamo.*
 ‘*Ana puts a paper, but she puts it nowhere.’
- (26) **Moj rođak boravi, ali ne boravi nigdje.*
 ‘*My cousin is staying, but he is staying nowhere.’
- (27) **Brat je dosegnuo, ali nije dosegnuo ni do kuda.*
 ‘The brother reached, but he reached nowhere.’
- (28) **Egipatske su starine dospjele, ali nisu dospjele nikamo.*
 ‘*Egyptian antiquities have reached, but they have reached nowhere.’
- (29) **Župnik se privremeno nastanio, ali nije se nastanio nigdje.*
 ‘*The pastor temporarily settled, but he settled nowhere.’
- (30) **Dinara leži, ali ne leži nigdje.*
 ‘*Dinara lies, but it lies nowhere.’

3.3. *Do so* test

The *do so* test also known as VP anaphora test (Needham & Toivonen 2011) is used for a structural (syntactic) distinction between verbal arguments and adjuncts. According to this test, *do so* may substitute for a verb phrase containing a non-stative verb and its arguments (31), while it cannot replace

only a verb if the verb is transitive (32) (e.g. Lakoff & Ross 1976; Ackema 2015: 260).¹³⁹ Consider (31) and (32) from Ackema (2015: 260):

(31) *John ate a banana yesterday, while Geraldine did so today.*

(32) **John ate a banana, while Geraldine did so an apple.*

According to the test, elements that occur after *do so* are outside the verb phrase and they are adjuncts. Therefore, direct objects and indirect objects, directional adverbs and affected locatives are arguments, while time, place, manner, duration, frequency, instruments, and comitative are adjuncts.

When applied to Croatian data, the verb phrases *učiniti/postupiti isto* ‘to do/act the same (so)’ are used. The first application of the *do so* test to Croatian was in Brač (2018), where *učiniti isto* was suggested as a correlate of *do so*. Although Lakoff & Ross (1967) point out that the test is not suitable for stative verbs, we have observed that the test is only applicable to agentive verbs (i.e. it cannot be applied to dynamic verbs without an agent). Therefore, we have not applied the test to the verbs *boraviti* ‘stay’, *ležati* ‘lie, be’, and *dospjeti* ‘arrive, get to, reach’.

(33) *Brat je bacio kamen u vodu,*
 brother.NOM.SG AUX throw.PTCP.ACT.M.SG stone.ACC.SG into water.ACC.SG
a sestra je učinila isto u zrak.
 and sister AUX do.PTCP.ACT.F.SG so into air.ACC.SG
 ‘The brother threw a stone into the water, and the sister did so into the air.’

(34) *??Kuhar je složio janjetinu i krumpir na*
 chef.NOM.SG AUX arrange.PTCP.ACT.M.SG lamb.ACC.SG and potato.ACC.SG on
tanjur, a konobar je učinio isto na pladanj.
 plate.ACC.SG and waiter AUX do.PTCP.ACT.M.SG so on tray.ACC.SG
 ‘??The chef arranged the lamb and potatoes on a plate, and the waiter did so on a tray.’

(35) **Jan je stavio lonac na štednjak, a*
 Jan.NOM.SG AUX put.PTCP.ACT.M.SG pot.ACC.SG on stove.ACC.SG and

¹³⁹ According to Schütze (1995), the same results can be obtained with pseudo-clefting (Vestergaard 1997): *What John did on Tuesday was meet Mary*; **What John did on the shelf was put the book*.

- Maja je učinila isto na radnu ploču.*
 Maja AUX do.PTCP.ACT.F.SG so on worktop.ACC.SG
 ‘*Jan put the pot on the stove, and Maja did so on the worktop.’
- (36) **Država je nastanila ljude u prazne kuće*
 state.NOM.SG AUX settle.PTCP.ACT.F.SG people(PL).ACC in empty.F.ACC.PL houses.ACC.PL
na granici, a Crveni križ učinio je isto u hotele.
 on border.LOC.SG and Red Cross do.PTCP.ACT.M.SG AUX so in hotels.ACC.PL
 ‘*The state settled people in empty houses on the border, and the Red Cross did so in hotels.’
- (37) ??*Ana trpa papirić u džep, a Marija čini isto u torbu.*
 Ana.NOM.SG puts paper.ACC.SG into pocket.ACC.SG and Marija does so into
 bag.ACC.SG
 ‘??Ana puts a paper into a pocket, and Marija does so into a bag.’
- (38) ??*Moj brat dosegnuo je do najviše*
 my.M.NOM.SG brother.NOM.SG reach.PTCP.ACT.M.SG AUX to highest.F.GEN.SG
police, a ja sam učinio isto do druge police.
 shelf.GEN.SG and I AUX do.PTCP.ACT.M.SG so to second.F.GEN.SG shelf.GEN.SG
 ‘??My brother was reaching for the highest shelf, and I did so for the second shelf.’
- (39) ??*Župnik se privremeno nastanio u Novim Selima, a*
 pastor.NOM.SG REFL temporarily settle.PTCP.ACT.M.SG in Nova(PL).LOC Sela(PL).LOC and
bivši župnik učinio je isto u susjednom selu.
 former.M.NOM.SG pastor.NOM.SG do.PTCP.ACT.M.SG aux so in next.N.LOC.SG village.LOC.SG
 ‘??The pastor temporarily settled in Nova Sela, and the former pastor did so in the next village.’

If we look at these results, it seems that only the verb *baciti* ‘throw, cast’ (33) can be replaced with the *učiniti isto* phrase and its third complement can be repeated in the second clause, which would indicate that the third complement is an adjunct. The *do so* replacement of the verb *dosegnuti* and its second complement is also marginally acceptable.

There are several problems with this test.¹⁴⁰ First, as it was already said the *do so* test can only be applied to non-stative verbs, moreover to agentive verbs.

¹⁴⁰ Many authors (e.g. Miller 1992; Przepiórkowski 1999) claim that the *do so* test cannot be used as a test for a structural distinction between arguments and adjuncts. On the other hand, Haspelmath (2014) mentions a variant of *do so* test as the only test which can be, perhaps, applied cross-linguistically.

Second, the Croatian verbs *činiti* or *postupati* are not equivalent to the English verb *to do* that is both the main verb and auxiliary. *Činiti* and *postupati* are the main verbs in Croatian with their own argument structure which is different for each of those two verbs. *Činiti* is a transitive verb with an accusative and dative complement whereas the verb *postupati* and its perfective form *postupiti* are intransitive verbs that can have a prepositional complement. Therefore, if the distributional properties of an examined verb match the distributional properties of the pro-verb (*činiti* and *postupati*), the acceptance of the complement with the pro-verb in the next clause will be higher. If the distributional properties of an examined verb and pro-verb do not match (*pružati* ‘give’ and *postupati* ‘do’), the sentence is unacceptable. So, if we use the verb *činiti* when testing the complement status of the dative noun phrase in the sentence in (40a) the result is that the dative noun phrase *odraslima* ‘adults’ is an argument, but if the replacement is made with the verb *postupati*, it turns out that the same dative complement is an adjunct (40b) (examples taken from Gračanin-Yuksek 2021). Obviously, both cannot be true.¹⁴¹

- (40) a. *Djeca pružaju utjehu odraslima, a odrasli to*
 children.NOM give comfort.ACC.SG adults.DAT.PL and adults it
čine djeci.
 do.PRS.3PL children.DAT
 ‘Children give comfort to adults, and adults do so to children.’
- b. **Djeca pružaju utjehu odraslima, a odrasli tako*
 children.NOM give.PRS.3PL comfort.ACC.SG adults.DAT.PL and adults so
postupaju djeci.
 do.PRS.3PL children.DAT
 ‘Children give comfort to adults, and adults do so to children.’

¹⁴¹ Miller (1992: 96; Przepiórkowski 1999: 290) noticed that: «the relevant factor for acceptability of a PP complement after *do so*, *do it*, *do that*, is not whether or not the corresponding complement of the antecedent verbs is within the VP [V'] of the antecedent, but whether or not the PP complement is acceptable as a complement for main verb *do* with a thematic role compatible with that which corresponding complement of the antecedent verb has with respect to the antecedent verb.»

3.4. *This happened* test

In difference to the *do so* test, which is related to the syntactic structure, *this happened* test is related to the semantic structure, i.e. it reveals if a (prepositional) phrase bears a semantic role (Hoffmann 2007). According to *this happened* test, if a sentence can be paraphrased by two sentences, one contains the “nuclear predication”¹⁴² and other the adverbial, i.e. adjunct (41) (Brown & Miller 1991: 90):

- (41) a. *John stood on the table. This happened in the bathroom.*
 b. **John stood. This happened on the table.*

The prepositional phrases with the verbs analysed in this paper are arguments according to this test (42–49). The native speakers of Croatian (that we have tested) have only marginally accepted the placement of the third argument of the verb *dosegnuti* ‘reach’ (47) in the second sentence. This test can be applied only to non-stative verbs too, but unlike *do so* test, the verbs to which the test applies do not need to be agentive. Therefore, we have not applied the test to the verbs *boraviti* ‘stay’ and *ležati* ‘lie, be’.

- (42) **Brat je bacio kamen. To se dogodilo u vodu.*
 brother.NOM.SG AUX throw.PTCP.ACT.M.SG stone.ACC.SG this REFL
 happen.PTCP.ACT.N.SG into water.ACC.SG
 ‘*The brother threw a stone. This happened into the water.’

- (43) **Kuhar je složio janjetinu i krumpir. To se dogodilo na tanjur.*
 chef.NOM.SG AUX arrange.PTCP.ACT.M.SG lamb.ACC.SG and potato.ACC.SG that
 REFL happen.PTCP.ACT.N.SG on plate.ACC.SG
 ‘*The chef arranged the lamb and potatoes. This happened on a plate.’

- (44) **Jan je stavio lonac. To se dogodilo na štednjak.*
 Jan.NOM.SG AUX put.PTCP.ACT.M.SG pot.ACC.SG this REFL happen.PTCP.ACT.N.SG
 on stove.ACC.SG
 ‘*Jan put a pot. This happened on the stove.’

¹⁴² Nuclear predication comprises a verb and its arguments.

- (45) **Država je nastanila ljude. To se dogodilo*
 state.NOM.SG AUX settle.PTCP.ACT.F.SG people.ACC.PL this REFL happen.PTCP.ACT.N.SG
duž granice.
 along border.GEN.SG
 ‘*The state has settled people. This happened along the border.’
- (46) **Ana trpa papir-ić. To se događa u džep.*
 Ana.NOM.SG puts paper-DIM.ACC.SG this REFL happens into pocket.ACC.SG
 ‘Ana puts a paper. This happens into a pocket.’
- (47) ??*Brat je dosegnuo. To se događa do najviše*
 brother.NOM.SG AUX reach.PTCP.ACT.M.SG this REFL happens to highest.F.GEN.SG
police.
 shelf.GEN.SG
 ‘??The brother reached. This happened for the highest shelf.’
- (48) **Egipatske su starine dospjele. To se dogodilo u*
 Egyptian.F.NOM.PL AUX antiquities reached this REFL happen.PTCP.ACT.N.SG in
Italiju.
 Italy.ACC.SG
 ‘*Egyptian antiquities have reached. This happened Italy.’
- (49) **Župnik se privremeno nastanio. To se dogodilo*
 pastor.NOM.SG REFL temporarily settle.PTCP.ACT.M.SG this REFL happen.PTCP.ACT.N.SG
u Novim Selima.
 in Nova(PL).LOC Sela(PL).LOC
 ‘*The pastor temporarily settled. This happened in Nova Sela.’¹⁴³

In German dependency grammars (Helbig 1992: 80), *this happened* test is collapsed with a variant of the *do so* test¹⁴⁴ and is either called *Anschluss* test or *Geschehen* test (Ágel 2000)¹⁴⁵, with *tun*, *machen* ‘to do’ being proforms for action verbs and *geschehen* ‘happen’ a proform for event verbs. A variant of the *this*

¹⁴³ One of the reviewers thinks that *this happened* test can be applied only to the verbs which have prepositional phrase with the locative case on the noun as complements. In such cases, ungrammaticality would not follow from distributional incompatibility.

¹⁴⁴ According to Helbig (1992: 80) «the A (arguments) can – in contrast to E (adjuncts) – usually be removed from the sentence and repeated in the second clause with a pro-verb (e.g. *tun* ‘do’, *machen* ‘do, work’, *geschehen* ‘happen’). («Die A können – im Unterschied zu den E – in der Regel aus dem Satz herausgelöst und in einem zweiten Satz mit einem ‘Proverb’ (z. B. *tun*, *machen*, *geschehen*) angeschlossen werden...»).

¹⁴⁵ Ágel (2000: 176) thinks that *Geschehen* test is the central test to define argumenthood. The test is established on breaking up of complete predication and shifting the argument in the next clause.

happened test is to separate the tested constituent and place it in a dependent clause that begins with *which happened*. Osborne (2019: 18) calls it relativization diagnostic. For example, *Brat je bacio kamen, što se dogodilo u vodu* ‘The brother threw a stone, which happened into the water’.

3.5. Replacement test

By the replacement test¹⁴⁶ the examined phrase will be replaced with another syntactic phrase in order to prove or disprove that the examined phrase is selected by the verb and its morphological form is determined by that verb (in this case the same preposition which requires the same case form of the noun). This test is supposed to distinguish between arguments and adjuncts and it operates on the syntactic level. According to Ágel (2000: 180), the replacement test is used to test one of the valency relations (the so-called FOSP-relation; short for formal specificity). Ágel (2000), following Jacobs (1994), thinks that valency is not one relation, but rather consists of several relations, and formal specificity is one of three ‘classical’ valency relations.¹⁴⁷

The locative phrases, examined in this research, are adjuncts according to this test since they can be very often replaced by some other type of syntactic phrase with different morphological form (50–59).

- (50) *Brat je bacio kamen u vodu /*
 brother.NOM.SG AUX throw.PTCP.ACT.M.SG stone into water.ACC.SG
na krov / preko kuće.
 onto roof.ACC.SG over house.GEN.SG
 ‘The brother threw a stone into the water / onto the roof / over the house.’

¹⁴⁶ The replacement test is called *Ersatzprobe* or *Kommutationstest* in German literature (Ágel 2000: 180).

¹⁴⁷ Ágel (2000:172) says that valency consists of five relations and each valency relation corresponds to one of the tests for argument/adjunct distinction (1. obligatoriness/necessity (NOT), 2. argumenthood/logic valency (ARG), 3. formal specificity (government), FOSP, 4. semantic valency (selection), INSP, 5. subcategorization/subclass specificity (SUBKLASS). According to Ágel (2000: 172) obligatoriness (NOT); formal specificity (FOSP) and SUBKLASS (subcategorization or subclass specificity) are classic valency relations that have a grammatical, lexicographic, and didactic relevance.

- (51) *Kuhar je složio janjetinu i krumpir na tanjur / u lonac.*
 chef.NOM.SG AUX arrange.PTCP.ACT.M.SG lamb.ACC.SG and potato.ACC.SG on plate.ACC.SG in pot.ACC.SG
 'The chef put the lamb and potatoes on a plate / in a pot.'
- (52) *Jan je stavio lonac na štednjak / u ormarić / na stol / ispred djevojčice.*
 Jan.NOM.SG AUX put.PTCP.ACT.M.SG pot.ACC.SG on stove.ACC.SG in cabinet.ACC.SG on table.ACC.SG in_front_of girl.GEN.SG
 'Jan put the pot on the stove / in the cabinet / on the table / in front of the girl.'
- (53) *Država je nastanila ljude duž granice / na nove teritorije u napuštene kuće.*
 state.NOM.SG AUX settle.PTCP.ACT.F.SG people.ACC.PL along border.GEN.SG on new.M.ACC.PL territories.ACC.PL in abandoned.F.ACC.PL houses.ACC.PL
 'The state settled people along the border / in new territories / in abandoned houses.'
- (54) *Ana trpa papir-ić u džep / među knjige.*
 Ana.NOM.SG puts paper-DIM.ACC.SG into pocket between book.ACC.PL
 'Ana puts a piece of paper into the pocket / among the books.'
- (55) *Moj rođak boravi u Chicagu / na selu / među domorocima.*
 my.M.NOM.SG cousin.NOM.SG stays in Chicago.LOC.SG on village.LOC.SG among native.INST.PL
 'My cousin is staying in Chicago / in the countryside / among the natives.'
- (56) *Egipatske starine dospjele su u Italiju / na brod / do obale.*
 Egyptian.F.NOM.PL antiquities reached AUX in Italy.ACC.SG on ship.ACC.SG to coast.GEN.SG
 'Egyptian antiquities reached Italy / a ship / the coast.'
- (57) *Brat je dosegnuo do najviše police / najvišu policu.*
 brother.NOM.SG AUX reach.PTCP.ACT.M.SG to highest.F.GEN.SG shelf.GEN.SG highest.F.ACC.SG shelf.ACC.SG
 'The brother reached for the highest shelf / highest shelf.'
- (58) *Župnik se privremeno nastanio u Novim Selima u privatnoj kući / na osamljenom imanju.*
 pastor.NOM.SG REFL temporarily settle.PTCP.ACT.M.SG in Nova(PL).LOC Sela(PL).LOC in private.LOC.SG house.NOM.SG on dilapidated.N.LOC.SG estate.LOC.SG
 'The pastor has temporarily settled in Nova Sela in a private house / on a dilapidated estate.'

- (59) *Dinara leži na granici između Hrvatske i
Dinara.NOM.SG lies on border.LOC.SG between Croatia.GEN.SG and
Bosne i Hercegovine / među dvjema drugim planinama /
Bosnia.GEN.SG and Herzegovina.GEN.SG between two.F.INST other.INST.PL mountains.INST.PL
iznad rijeke
above river.GEN.SG*
'Dinara lies on the border between Croatia and Bosnia and Herzegovina / between two
other mountains / above the river.'

Obviously, the prepositional phrases with locative or directional meanings are not closely related to a verb, i.e. they are not selected by these verbs and their form is not determined by the verb. Similar to the replacement test is the *fixed preposition test* according to which «if the verb asks for a specific preposition, the PP is an argument» (Needham & Toivonen 2011: 4).

3.6. Substitution test

With the substitution test, the verb next to the examined phrase is substituted by another verb. If a sentence remains grammatical after the verb is replaced by another verb, then the examined phrase is an adjunct (Ágel 2000; Šojat 2008). If a substitution yields an ungrammatical sentence, the questioned phrase is an argument. According to Ágel (2000: 187), the substitution test examines verb specificity. Verb specificity is also one of the central valency notions according to Ágel (2000: 187). Dependency grammar claims that arguments are specific for the subclass of verbs. Therefore, arguments (complements, in the dependency grammar terminology) divide all verbs from an individual language into specific classes (German *Subklassenspezifik*), whereas adjuncts do not divide the verbs into specific classes. Dependency grammars argue that arguments are specific to a class of verbs, not to each verb (Engel 2009: 130; Šojat 2008: 31; Ágel 2000: 187). Underlying the verb specificity is also the idea that adjuncts are compatible with almost all verbs. However, this assumption has been put under scrutiny lately. Among other authors, Przepiórkowski (2016a: 565) has also questioned the assumption that adjuncts can be attached to any verb mostly without restrictions, stating that «...very few adjunct types may really depend on every verb». One has to keep in mind that some authors working in the dependency grammar framework distinguish between the linguistic compatibility of verbs and accompanying phrases (linguistic knowledge, *Sprachwissen*) and the compatibility of verbs and accompanying phrases which relies on world

knowledge (*Weltwissen*, Ágel 2000). It is completely clear that not every adjunct can be attached to every verb, but the question is whether this incompatibility is based on linguistic or non-linguistic factors.¹⁴⁸

If we apply this test to locative phrases, it seems that most verbs can be replaced only by similar verbs (from the same semantic class) when surrounded with examined phrases, which speaks for treating these phrases as arguments. It seems that the verbs *nastaniti* ‘inhabit, settle, colonize’ from the example (63) and *boraviti* ‘stay’ from the example (65) can be replaced by some verbs outside its semantic class (*Država je zatvorila ljude duž granice* ‘The state has imprisoned people along the border’, *Moj rođak jede u Chicagu* ‘My cousin eats in Chicago’) which speaks for treating the phrase *duž granice* ‘along the border’ and *u Chicagu* ‘in Chicago’ as adjuncts.

However, the situation is somewhat complicated with verbs that have three complements. If the examined complement is the last in the string, the substituted verb is usually next to the second complement, not the third. Therefore, it is not clear to which extent the acceptability of the new sentence is influenced by the compatibility of the verb and its object (second complement), and to which extent by the compatibility of the verb and the third complement.

- (60) *Brat je bacio / gurnuo / izbacio / zavitlao / *razveselio se / *pojeo kamen u vodu.*
‘The brother threw / pushed / ejected / swirled / *cheered / *ate a stone into the water.’
- (61) *Kuhar je složio / stavio / namjestio / *pojeo / *sjećao se / *izgradio janjetinu i krumpir na tanjur.*
‘The chef arranged / put / set / *ate / *remembered / *built the lamb and potatoes on the plate.’
- (62) *Jan je stavio / složio / *pojeo / *sjećao se lonac na štednjak.*
‘Jan put / set / *ate / *remembered the pot on the stove.’
- (63) *Država je nastanila / naselila / globila / zatvorila / *sjećala se ljude duž granice.*
‘The state settled / inhabited / fined / imprisoned / *remembered the people along the border.’
- (64) *Ana trpa / stavlja / *jede / *sjeća se papirić u džep.*
‘Ana loads / puts / *eats / *remembers the paper into the pocket.’

¹⁴⁸For example, the adverb *rado* ‘gladly’ cannot be attached to verbs that do not express voluntary activity or the adverb *uvijek* ‘always’ to verbs that express an activity that can happen only once (s. Mrazović & Vukadinović 2009: 577).

- (65) *Moj rođak boravi / jede / sjeća se u Chicagu.*
‘My cousin is staying / eating / remembering in Chicago.’
- (66) *Brat je dosegnuo / *jede / *sjeća se do najviše police.*
‘My brother reached / *ate / *remembered to the highest shelf.’
- (67) *Egipatske starine dospjele su / *nalaze se / izgubile su se u Italiju.*
‘Egyptian antiquities have reached / are located / got lost (in) Italy.’
- (68) *Župnik se privremeno nastanio / naselio / *je pojeo / *se sjeća u Novim Selima u privatnoj kući.*
‘The pastor temporarily settled / inhabited / *ate / *remembered in Nova Sela in a private house.’
- (69) *Dinara leži / prostire se / izbija / *zaposjeda / *zauzima na granici između Hrvatske i Bosne i Hercegovine.*
‘Dinara lies on / spreads / breaks out / possesses / takes the border between Croatia and Bosnia and Herzegovina.’

3.7. Paraphrase with dependent clause

According to dependency grammars, adjuncts can be replaced by separate sentences, as they are truly reduced sentences. The adjunct *in der Schule* ‘at school’ from the sentence (70a) can be replaced with a subordinate temporal clause (*als er in der Schule war* ‘while he was at school’) (70b), whereas an argument *in Dresden* from the sentence (71a) ‘in Dresden’ cannot (71b), (Helbig 1992: 78; Šojat 2008: 121).

- (70) a. *Er ass sein Brot in der Schule.*
‘He ate a sandwich at school.’
b. *Er ass sein Brot, als er in der Schule war.*
‘He ate a sandwich while he was at school.’
- (71) a. *Mein Freund wohnte in Dresden.*
‘My friend lived in Dresden.’
b. **Mein Freund wohnte, als er in Dresden war.*
‘*My friend lived while he was in Dresden.’

As Helbig (1992: 78) further explains, if the test is applied to obligatory arguments, the result is an ungrammatical sentence, but if the test is applied to optional arguments, it results in sentences with different meanings, as shown in (72a) and (72b).

- (72) a. *Ušao je u tramvaj.*
 enter.PTCP.ACT.M.SG AUX into tram.ACC.SG
 ‘He entered the tram.’
- b. *Ušao je dok je tramvaj bio tamo.*
 enter.PTCP.ACT.M.SG AUX while AUX tram been.M.SG there
 ‘He entered, while the tram was there.’

Not all adjuncts can be paraphrased by the same type of adverbial dependent clauses. Subject-oriented adverbs can be paraphrased by temporal sentences with copula (72c), object-oriented adverbs can be paraphrased by independent main clauses, datives are again paraphrased in a different way. Helbig (1992: 79) cites Heringer (1970) and says that this paraphrase supports the claim that adjuncts are predicates of the rest of the sentence.

Šojat (2008) points out the shortcomings of this test by quoting Engel & Schumacher (1978) and Vater (1972) who say that not every adjunct can be paraphrased by a sentence. According to Šojat (2008: 122) and Vater (1978: 29), some arguments can be paraphrased too. Consider the following example taken from Šojat (2008: 122):

- c. *Teta Frida je preživjela rusku okupaciju. → Teta Frida je preživjela kada/dok su Rusi okupirali Berlin.*
 ‘Aunt Frida survived the Russian occupation. → Aunt Frida survived when/while the Russians occupied Berlin.’

In sentences with *baciti* ‘throw, cast’ (73), *složiti* ‘compose, put together, set, arrange’ (74), and *nastaniti* ‘compose, put together, arrange, set’ (76), the paraphrase yields a sentence with different or peculiar meaning, and in all other cases, the result is an ungrammatical sentence (75, 77–82). This would suggest that the phrases next to *baciti* ‘throw, cast’, *složiti* ‘compose, put together, arrange, set’, and *nastaniti* ‘inhabit, settle, colonize’ are optional arguments, and all other phrases are obligatory arguments.

- (73) a. *Brat je bacio kamen u vodu.*
 ‘The brother threw a stone into the water.’
- b. *#Brat je bacio kamen dok je bio u vodi.*¹⁴⁹
 ‘#The brother threw a stone while it was in the water.’

¹⁴⁹ One of the reviewers drew our attention to the fact that the nouns *brat* ‘brother’ and *kamen* ‘stone’ (subject and the object of the main clause) are of the same number and gender. Therefore, the phrase *dok je bio u vodi* ‘while it was in the water’ can refer to *kamen* ‘stone’ as well as to *brat* ‘brother’, but the intended meaning was the one in which *dok je bio u vodi* ‘while it was in the water’ refers to *kamen* ‘stone’.

- (74) a. *Kuhar je složio janjetinu i krumpir na tanjur.*
 ‘The chef arranged the lamb and potatoes on a plate.’
 b. *#Kuhar je složio janjetinu i krumpir dok su bili na tanjuru.*
 ‘#The chef arranged the lamb and potatoes while they were on the plate.’
- (75) a. *Jan je stavio lonac na štednjak.*
 ‘Jan put the pot on the stove.’
 b. **Jan je stavio lonac dok je bio na štednjaku.*
 ‘Jan put the pot while it was on the stove.’
- (76) a. *Država je nastanila ljude duž granice.*
 ‘The state settled people along the border.’
 b. *#Država je nastanila ljude kad su bili duž granice.*
 ‘#The state settled people while they were along the border.’
- (77) a. *Ana trpa papirić u džep.*
 ‘Ana put the paper into a pocket.’
 b. **Ana trpa papirić dok je bio u džepu.*
 ‘*Ana put the paper while it was in a pocket.’
- (78) a. *Moj rođak boravi u Chicagu.*
 ‘My cousin is staying in Chicago.’
 b. **Moj rođak boravi dok je u Chicagu.*
 ‘*My cousin is staying while he is in Chicago.’
- (79) a. *Brat je dosegnuo do najviše police.*
 ‘The brother reached to the highest shelf.’
 b. **Brat je dosegnuo dok je bio do najviše police.*
 ‘*The brother reached while he was to the highest shelf.’
- (80) a. *Egipatske starine dospjele su u Italiju.*
 ‘Egyptian antiquities reached Italy.’
 b. **Egipatske starine dospjele su dok su bile u Italiji.*
 ‘*Egyptian antiquities reached while they were in Italy.’
- (81) a. *Župnik se privremeno nastanio u Novim Selima u privatnoj kući.*
 ‘The pastor temporarily settled in Nova Sela in a private house.’
 b. **Župnik se nastanio dok je bio u Novim Selima u privatnoj kući.*
 ‘*The pastor settled while he was in Nova Sela in a private house.’
- (82) a. *Dinara leži na granici između Hrvatske i Bosne i Hercegovine.*
 ‘Dinara lies on the border between Croatia and Bosnia and Herzegovina.’
 b. **Dok je na granici Hrvatske i Bosne i Hercegovine, Dinara leži.*
 ‘*Dinara lies while it is on the border between Croatia and Bosnia and Herzegovina.’

3.8. Extraction out of *wh*-islands

In line with observations made within generative grammar, there are specific parts of a sentence that do not allow syntactic material to be extracted or moved out of them. These parts have been called islands since Ross (1967). The islands can be strong (sequences from which nothing can be extracted) and weak (sequences from which only some elements can be extracted). Weak islands are of some importance for the argument/adjunct distinction; namely, it is commonly assumed that only arguments can be extracted from weak islands, but not adjuncts (Chomsky 1986; Miliorini 2019). Weak islands include *wh*-islands, negative islands, and factitive islands. We have tried to examine the argument/adjunct status of our locative phrases by inserting them into interrogative sentences starting with question particle *li* (presumably *wh*-islands) and then extracting them to the beginning of the sentence. There are two main problems with this potential test for distinguishing arguments and adjuncts.

Firstly, many authors doubt that the possibility of extracting some elements and the impossibility of extracting others from weak islands is connected with argument/adjunct distinction (for explanations of extraction possibilities not related to argument/adjunct distinction s. Miliorini 2019). And secondly, it is not clear if Croatian *wh*-clauses starting with the question particle *li* are *wh*-islands. Here are some examples (83), but we hesitate to use this test as a reliable tool in our further investigation since we are not sure about what counts as a weak island in Croatian.¹⁵⁰

(83) a. *Brat je bacio kamen u vodu.*

‘The brother threw a stone into the water.’

b. *Marija se pita je li brat bacio kamen u vodu.*

‘Marija is wondering if the brother threw a stone into the water.’

c. *??Kamo se Marija pita je li brat bacio kamen?*

‘Where to is Marija wondering if the brother threw a stone?’

d. *??Gdje se Marija pita je li brat bacio kamen?*

‘Where is Marija wondering if the brother threw a stone?’

¹⁵⁰ One of the reviewers of the book asked for the reason why we included the *wh*-island test in our argumentation given that it is not clear how to use it properly and it does not give any reliable results. It should be noted that we tried to apply it to Croatian, but we showed that it is not applicable in its original form to Croatian as a tool for distinguishing between arguments and adjuncts.

- e. ??*Kada se Marija pita je li brat bacio kamen u vodu?*
 ‘When is Marija wondering if the brother threw a stone into the water?’

Under (83a) there is an example sentence with the locative phrase we are examining. The example (83b) contains the examined clause included in the interrogative sentence with *li*, and in (83c) and (83d) examined phrase is moved to the beginning of the sentence in the form of *wh*-words. Both sentences with *kamo* ‘where to’ and *gdje* ‘where’ were examined since most speakers do not differentiate between *kamo* and *gdje*. The example (83e) is a sentence that serves as a checking sentence in which an adjunct is extracted. Although Croatian speakers differ to a great extent in whether they accept the sentences similar to (83c) and (83d),¹⁵¹ it seems that the extraction of temporal adjuncts as in (83e) is worse than the extraction of locative phrases, which has been confirmed by native speakers of Croatian (83c, 83d). The distinction speaks in favour of locative phrases being arguments.

3.9. Dialogue test

The dialogue test was conceived within the functional generative description (Sgall, Hajičová & Panevová 1986). According to the test, we can check if some participants of an event are semantic arguments by asking a question about them. If we are dealing with an argument, it need not be present in a surface structure, but information about it is always present in the speaker’s mind.

If we have an utterance under (84a) and we ask an utterer to answer the question under (84b), their answer cannot be (84c) ‘I don’t know’ since the place where someone has arrived is a semantic argument of the verb *arrive*.¹⁵²

- (84) a. *Charles arrived by car.*¹⁵³
 b. *Where did he arrive?*
 c. # *I don’t know.*

¹⁵¹ For many native speakers of Croatian these sentences are more or less unacceptable, but for one author of this paper and for one of the reviewers sentences are grammatical. Therefore, we marked the sentences with two question marks.

¹⁵² This test implies that a verb is presented together with its argument structure in speakers’ mind.

¹⁵³ The dialogue is adapted from Sgall, Hajičová & Panevová (1986: 109).

The test accounts for the fact that very often some complements are not expressed but are nevertheless semantic arguments of the verb. Sgall, Hajičová & Panevová (1986: 109) state that the procedure is most successful with adverbial modification such as *arrive somewhere*, *behave in a certain way*. Helbig (1992: 86) concludes that this test is relevant to make the primary distinction between arguments and adjuncts, not the distinction between obligatory and optional arguments. Przepiórkowski (2016b) confirms that the dialogue test identifies semantically obligatory arguments which can be omitted when contextually provided, so he concludes that the test is specifically designed for syntactically optional expressions.

If we apply this test to locative phrases researched in this paper, it seems that the answer to the question about the knowledge of these arguments cannot be *I don't know*. In the case of locative phrases with the verbs *baciti* 'throw, cast' (85), *složiti* 'compose, put together, arrange, set' (86), *staviti* 'put, set, place, lay' (87), and *trpati* 'put, load, stuff' the answer *I don't know* is somewhat more acceptable than with other verbs. According to the answers, all phrases are arguments, but the third argument of the verbs of putting can stay less known to the speaker. Further research is needed to explain this fact.

- (85) a. *Brat je bacio kamen.*
 'The brother threw a stone.'
 b. *Kamo ga je bacio?*
 'Where did he throw it?'
 c. *?Ne znam.*
 'I don't know.'
- (86) a. *Kuhar je složio janjetinu i krumpir.*
 'The chef arranged the lamb and potatoes.'
 b. *Kamo/Gdje ih je složio?*
 'Where did he arrange them?'
 c. *?Ne znam.*
 'I don't know.'
- (87) a. *Jan je stavio lonac.*
 'Jan put the pot.'
 b. *Kamo ga je stavio?*
 'Where did he put it?'
 c. *?Ne znam.*
 'I don't know.'

3.10. Iterativity test

The iterativity test is employed in many different theories – functional generative description, LFG, HPSG, and generative grammar (Przepiórkowski 2016a). It is often said that adjuncts can be iterated freely, but arguments cannot (Przepiórkowski 2016a, 2016b, Williams 2015).¹⁵⁴ However, things are not so simple – adjuncts cannot be freely added to some structures without any restrictions (89):

(88) *They came home yesterday.*

(89) **They came home yesterday today.*

(90) *They came home yesterday around noon.*

After a closer look at examples, linguists reached a conclusion that adjuncts can be iterated only if they refer to the same entity with a different size of granularity (90) (Przepiórkowski 2016a, 2016b). Goldberg (2002: 334) has formulated that in the following way: «Adjuncts can freely be added as long as they do not imply a semantic contradiction; in particular, they must be construed to have concentric semantic scope such that one more narrowly specifies another.»

Williams (2015) has a broader look at the doubling of adjuncts. He says that although adjuncts cannot change the syntactic category, their doubling can result in the unacceptability of a sentence or different distribution of the string which is due to other reasons (phonological, semantic, and pragmatic factors). He also points out that actually no semantic relation can be doubled without coordination regardless of their argument or adjunct status (Williams 2015; Przepiórkowski 2016a) which can be connected with the long-standing observation that only one semantic role of each type may occur in a single clause.¹⁵⁵ After establishing this, it is difficult to prove that

¹⁵⁴ Williams (2015: 69): «Adjuncts may be iterated freely without any effect on syntactic well-formedness.»

¹⁵⁵ Williams's (2015: 163) explanation boils down to *Role Iteration Generalization* (RIG) which says that: «Generally or always, two distinct dependents do not bind the exact same type of semantic relation.» It means that no pair of dependents (arguments and adjuncts) can share the same relation to the same event. RIG is expressing *Role Exhaustion*: When a dependent is assigned a relation to some (group of) event(s), it identifies *all* and *only* the individuals in that relation to that (those) events.

there is any difference in the iterativity of the two categories. Sometimes instruments and undoubted complements can be iterated too.¹⁵⁶

According to this, it is easy to create an iteration of examined locative phrases especially if the extension of the location is different. Sometimes we can even add the second phrase without means of coordination. Some of the examples are given in (91–96).

- (91) *Brat je bacio kamen u vodu, tik do druge obale.*
‘The brother threw a stone into the water, right next to the shore.’
- (92) *Kuhar je složio janjetinu i krumpir na tanjur na stol.*
‘The chef arranged the lamb and potatoes on a plate on the table.’
- (93) *Država je nastanila ljude u napuštene kuće duž granice.*
‘The state has settled the people in abandoned houses along the border.’
- (94) *Moj rođak boravi u kući u Chicagu.*
‘My cousin is staying in a house in Chicago.’
- (95) *Brat je dosegnuo do najviše police iznad onih knjiga.*
‘The brother reached to the highest shelf above those books.’
- (96) *Župnik se privremeno nastanio u Novim Selima u privatnoj kući.*¹⁵⁷
‘The pastor temporarily settled in Nova Sela in a private house.’

With this in mind, it seems that iteration is difficult to pursue as a test for distinguishing arguments and adjuncts, and the results of this test were not considered as important for defining the argument/adjunct status.¹⁵⁸

¹⁵⁶ Przepiórkowski (2016a: 564) takes over an example of iteration of complements from Zaenan & Crouch (2009): *I count on you, on your kindness*. In this example, presumably two complements (*you, your kindness*) are pointing to the same.

¹⁵⁷ This example has not been changed, the verb *nastaniti* ‘settle’ is accompanied by two prepositional (locative) phrases from the beginning. The same is true for the example with the verb *nastaniti* ‘settle, colonize’ too.

¹⁵⁸ In Suozzi *et al.* (*this volume*, Chapter 10) the authors use the iterativity test in a slightly different manner. In the repetition of instruments they use two similar prepositional phrases with the same preposition, but they never claim that the same preposition should be used, which was pointed out to us by one of the reviewers of the book. As that may be true for instruments, we are not convinced that the test has to be applied in the same way with other (adverbial) phrases: **Išao sam u školu / na fakultet.* ‘I went to school / to the university’.

4. Discussion

In this paper, we presented ten tests, whose general overview is given in Table 1. The table also shows how a positive or a negative test value correlates with an examined phrase being an argument or adjunct.

Table 1. A general overview of the presented tests

TEST	+	-
1. Omission test	obligatory argument	optional argument adjunct
2. Implication test	argument	adjunct
3. <i>Do so</i> test	adjunct	argument
4. <i>This happened</i> test	adjunct	argument
5. Replacement test	adjunct	argument
6. Substitution test (replacement of a verb)	adjunct	argument
7. Paraphrase with a dependent clause	adjunct	obligatory argument
8. Extraction out of <i>wh</i> -islands	object	adjunct (subject)
9. Dialogue test	adjunct	argument
10. Iterativity test	adjunct	argument

In Table 2, we show the results of the application of eight tests to two groups of complements, trivalent and bivalent verbs with the locative phrase (location or goal). At first, we chose ten tests (shown in Table 2). The criteria for choosing tests were their applicability to Croatian, and applying tests from different theoretical approaches to see if they give similar results. According to the first criterion, some of the tests were excluded immediately. For example, the word order test, preposition stranding test, pseudocleft test or the VP preposing test are not applicable to the Croatian language due to its syntactic and morphological structure (for an extensive list of tests s. Needham & Toivonen 2011; Toivonen 2016). In the course of the investigation, we also excluded the extraction of *wh*-islands and the iterativity test. The extraction of *wh*-islands test is difficult to apply to Croatian, and we were not sure if we have applied it correctly, and for the iterativity test we think that it would not give us substantial evidence. As for the second criterion, the first seven tests are intensively used in dependency grammar, but some of them, for example, omission test and replacement test are used

universally. Testing by repeating a syntactic phrase (iterativity test) is also used in all linguistic approaches. The *do so* test is also used in generative grammar. The eighth test (extraction out of *wh*-islands) is conceived of in generative grammar, and the dialogue test in functional generative description.

Table 2. An overview of the applied tests and their results

Tests	Omission test	Implication Test /Core Participant test	<i>Do so</i> test	<i>This happened</i> test	Replacement test	Substitution test	Paraphrase with dependent clause	Dialogue test	Result
Verbs									
	- adj - opt. arg + obl. arg	+ arg	+ adj	+ adj	+ adj	+ adj	+ adj	+ adj - arg	
<i>baciti</i>	adj opt. arg.	+ arg	adj	arg	adj	arg	opt. arg	+/- arg	optional argument
<i>nastaniti</i>	obl. arg	arg	arg	arg	adj	arg	arg	- arg	argument
<i>složiti</i>	adj opt. arg	arg	arg	arg	adj	arg	opt. arg	+/- arg	optional argument
<i>staviti</i>	obl. arg	arg	arg	arg	adj	arg	arg	+/- arg	argument
<i>trpati</i>	obl. arg	arg	arg	arg	adj	arg	arg	+/- arg	argument
<i>boraviti</i>	obl. arg	arg	inapplicable	inapplicable	adj	arg	arg	arg	argument
<i>dosegnuti</i>	obl. arg	arg	+/-	adj	adj	arg	arg	arg	argument
<i>dospjeti</i>	obl. arg	arg	inapplicable	- arg	adj	arg	arg	arg	argument
<i>ležati</i>	obl. arg	arg	inapplicable	inapplicable	adj	arg	arg	arg	argument
<i>nastaniti se</i>	obl. arg	arg	arg	arg	adj	arg	opt. arg	arg	argument

A brief view of our results reveals that all examined phrases are arguments. The complements of all verbs behave uniformly on two tests. They are all arguments according to the implication test, and adjuncts according to the replacement test. The results of the other six tests differ depending on the verb. However, in this paper, we applied a scalar approach, by which we decide on the status of a phrase based on the predominance of tests that speaks either for argument or adjunct status. The omission test differentiates between obligatory arguments on one side and optional arguments and adjuncts on the other side. Hence, by this test, we can extract only obligatory arguments. All other tests extract both obligatory and optional arguments, but some of them differentiate between these two categories. The results of the paraphrase with a dependent clause indicate which argument is obligatory and which optional (ungrammatical sentence points to obligatory

arguments, and semantically peculiar sentences to optional arguments) according to Helbig (1992). The implication test and the dialogue test are specifically designed to reveal optional arguments.

According to the omission test, complements of all verbs except for verbs *baciti* 'throw, cast' and *složiti* 'compose, put together' have obligatory arguments, i. e. only these verbs are negative on the omission test, which means that their complements are either optional arguments or adjuncts. If we strictly followed German dependency grammars, we would not need to apply the implication test to complements of all verbs, only to complements of verbs *baciti* and *složiti*. However, we have applied the test to complements of all verbs and, as expected, all locative phrases with examined verbs are arguments (including the third arguments of verbs *baciti* and *složiti* which have turned out to be optional arguments – negative on the omission test, positive on the implication test). The third complement of the verb *baciti* 'throw, cast' is also positive on the *do so test* (the only complement positive to this test among all analysed complements), which indicates that it is an adjunct (33). Also, it is difficult to decide if the complement of the verb *dosegnuti* 'reach' can pass this test. The verb *dosegnuti* 'reach' is not completely ungrammatical when embedded in *do so* replacement, so we have put +/- in the corresponding box. As said earlier, the test should not be applied to verbs *ležati* 'lie, be', *boraviti* 'stay', and *dospjeti* 'arrive, get to, reach' since the first two verbs are stative, and the third is non-agentive. There are other shortcomings of this test mentioned in section 3; nevertheless, we have applied this test to these complements. The *this happened* test is not applicable to *boraviti* 'stay, be' and *ležati* 'lie, be' either, and the verb *dosegnuti* 'reach' is positive to this test, which means that it is an adjunct according to this test. All other verbs are arguments according to this test (*baciti* 'throw, cast', *nastaniti* 'inhabit, settle, colonize', *složiti* 'arrange', *staviti* 'put, set, place, lay', *trpati* 'put, load, stuff', *nastaniti se* 'settle in/down'). Since all verbs examined in this paper accept other morphological forms instead of examined prepositional locative phrase as its second or third complement, the morphological form of a prepositional locative complement is not 'dictated' by the verb, i. e. phrases are positive on the replacement test which indicates adjunct status. The application of the substitution test confirms the argument status of all examined phrases since verbs can be mostly replaced by verbs of the same semantic class except for some uncertainty in the application of this test to the construction with the verb

nastaniti se ‘settle in/down’.¹⁵⁹ As it is said earlier, the substitution test is clearer with bivalent verbs since the substitution of a verb occurs next to the examined phrase. According to the paraphrase with dependent clause, complements of verbs *baciti* ‘throw, cast’, *složiti* ‘compose, put together’, and *nastaniti se* ‘settle in/down’ are optional arguments, and the complements of verbs *nastaniti* ‘inhabit, settle, colonize’, *staviti* ‘put, set, place, lay’, *trpati* ‘put, load, stuff’, *dosegnuti* ‘reach’, and *dospjeti* ‘arrive, get to, reach’ are obligatory arguments. Dialogue test filters arguments from non-arguments and the answer to the question cannot be *I don’t know*. It seems that with verbs *baciti* ‘throw, cast’, *složiti* ‘compose, put together’, *staviti* ‘put, set, place, lay’, and *trpati* ‘put, load, stuff’ the answer *I don’t know* is easier to accept than with the other verbs, which we have marked in the table by +/-arg. That is probably connected to the fact that these verbs are also bivalent in some contexts.

As already pointed out, the biggest exception among all examples is a prepositional complement of the verb *baciti* ‘throw, cast’. This complement is an optional argument according to the omission test (if we connect this test with the implication test), and according to the paraphrase with a dependent clause. The complement is an adjunct according to the *do so* test and the replacement test. The result of the dialogue test is ambiguous. Although the results of two tests point to adjunct status, still more tests point to argument status, and precisely to the status of an optional argument. The complement of the verb *složiti* also turns out to be an optional argument according to two tests (the omission test and the paraphrase with the dependent clause), so we decided to define it as an optional argument (the result of the dialogue test is also ambiguous). The complement of the verb *dosegnuti* ‘reach’ is an argument according to five tests and it is an adjunct on two tests, and as we said, it is neither negative nor positive on the *do so* test. It seems that *do so* replacement is easier to imagine with trivalent verbs with the locative complement than with bivalent verbs with the locative complement. Some complements of trivalent verbs are also ambivalent on the dialogue test which speaks for their status of optional arguments (*nastaniti se* ‘settle in/down’ is also ambivalent on the dialogue test).

¹⁵⁹ As it is pointed out in section 3.6, it is imaginable that *nastaniti* ‘inhabit, settle, colonize’ in the construction *nastaniti ljude duž granice* ‘to settle the people along the border’ can be replaced with a verb from other semantic class *zatvoriti* ‘imprison’ (*Država je zatvorila ljude duž granice* ‘The state imprisoned the people along the border’).

5. Conclusion

Finally, based on these tests we can conclude with certainty that the third complement of verbs *baciti* ‘throw, cast’ and *složiti* ‘compose, put together, arrange, set’ is an optional argument. For complements of other verbs, we cannot claim with certainty that they are either obligatory or optional arguments: they are obligatory arguments according to the omission test, but optional arguments according to some other tests. The second argument of bivalent verbs, cited here, is considered obligatory by linguists working both on Croatian and German (Helbig 1992; Samardžija 1986). Exactly non-optionality of complements of verbs *boraviti* ‘stay’, *ležati* ‘lie, be’, *dosegnuti* ‘reach’, *dospjeti* ‘arrive, get to, reach’, and *nastaniti se* ‘settle down/in’ has led the linguists working in dependency grammar to add this group of phrases into arguments (Helbig 1992; Engel 1999). The research has also shown that the iterativity test and extraction out of *wh*-islands are very difficult to apply to the complements of Croatian verbs, and that *do so* test and *this happened* test can be applied to a limited number of verbs.

In the future, if we would be able to apply these tests to complements of other semantic classes of verbs (or all semantic classes of Croatian verbs), it will be even clearer which tests would be most suitable for testing argument vs. adjunct status of complements in Croatian.

Appendix

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Abbreviations

#	semantic anomaly
*	strongly ungrammatical
??	ungrammatical, perhaps grammatical for some speakers
?	odd
ACC	accusative
ACT	active
adj	adjunct
arg	argument
AUX	auxiliary
DAT	dative
DIM	diminutive
F	feminine
GEN	genitive
INST	instrumental
LOC	locative
M	masculine
N	neuter
obl.	obligatory
opt.	optional
PL	plural
PRS	present
PTCP	participle
REFL	reflexive
SG	singular

References

- Ackema, P. (2015). Arguments and Adjuncts. In: Kiss, T. & Alexiadou, A. (eds) *Syntax – Theory and Analysis: An International Handbook*, 246–273. Berlin: De Gruyter Mouton.
- Ägel, V. (2000). *Valenztheorie*. Tübingen: Gunther Narr Verlag.
- Belaj, B. & Tanacković Faletar, G. (2017). *Kognitivna gramatika. Knjiga druga*. Zagreb: Disput.
- Bickel, B., Comrie, B. & Haspelmath, M. (2015). *Leipzig Glossing Rules*. Available online: <https://www.eva.mpg.de/lingua/resources/glossing-rules.php>, Accessed on 2023-12-06).
- Brown, K. & Miller, J. (1991). *Syntax: A Linguistic Introduction to Sentence Structure*. London: Routledge.
- Chomsky, N. (1986). *Knowledge of Language: Its Nature, Origin, and Use*. New York: Praeger.
- Engel, U. (2009). *Syntax der deutschen Gegenwartssprache. 4., völlig neu bearbeitete Auflage*. Berlin: Erich Schmidt Verlag.

- Engel, U. & Schumacher, H. (1978). *Kleines Valenzlexikon deutscher Verben*. Tübingen: Gunther Narr.
- Goldberg, A. (2002). Surface generalizations: An alternative to alternations. *Cognitive Linguistics*, 13(4), 327–356.
- Goldberg, A. & Ackerman, F. (2001). The Pragmatics of Obligatory Adjuncts. *Language*, 77(4), 798–814.
- Grimshaw, J. & Vikner, S. (1993). Obligatory Adjuncts and the Structure of Events. In: Reuland, E. & Abraham, W. (eds) *Knowledge and Language. Volume II: Lexical and Conceptual Structure*, 143–155. Dordrecht/Boston/London: Kluwer Academic Publishers.
- Gračanin-Yuksek, M. (2007). *About sharing*. PhD thesis, Massachusetts Institute of Technology.
- Gračanin-Yuksek, M. (2021). Application of complement/adjunct tests to Croatian verb phrases. Workshop presentation, Workshop held as a part of the project Syntactic and Semantic analysis of arguments and adjuncts in Croatian on 8th November 2021.
- Haspelmath, M. (2014.) Arguments and Adjuncts as Language-Particular Syntactic Categories and as Comparative Concepts. *Linguistic Discovery*, 12(2), 3–11.
- Helbig, G. (1992). *Probleme der Valenz- und Kasustheorie*. Tübingen: Niemeyer.
- Helbig, G. & Schenkel, W. (1969). *Wörterbuch zur Valenz und Distribution deutscher Verben*. Leipzig: VEB Bibliographisches Institut.
- Heringer, H.-J. (1970). *Deutsche Syntax*. Berlin: De Gruyter Mouton
- Hoffmann, T. (2007). Complements versus Adjuncts? A Construction Grammar account of English prepositional phrases. *Occasional Papers in Language and Linguistics*, 3, 92–119.
- Jacobs, J. (1994). *Kontravalenz*. Trier: Wissenschaftlicher Verlag.
- Koenig, J.-P, Maurer, G. & Bienvenue, B. (2003). Arguments for adjuncts. *Cognition*, 89, 67–103.
- Lakoff, G. & Ross, J. R. (1976). Why you can't do so into the sink. In: McCawley, J. D. (ed) *Syntax and Semantics. Volume 7: Notes from the linguistic underground*, 101–131. New York: Academic Press.
- Levin, B. (1993). *English verb classes and alternations: A preliminary investigation*. Chicago: University of Chicago Press.
- Levin, B. & Rappaport Hovav, M. (2005). *Argument realization*. Cambridge: Cambridge University Press.
- Miliorini, R. (2019). Extraction from weak islands: alternatives to the argument/adjunct distinction. *ReVel, edição especial*, 17(16), 37–58.
- Needham, S. & Toivonen, I. (2011). *Derived Arguments*. (Available online: web.stanford.edu/group/cslipublications/cslipublications/LFG/16/papers/lfg11needhamtoivonen.pdf, Accessed on 2022-11-14.)
- Osborne, T. (2019). *A Dependency Grammar of English. An introduction and beyond*. Amsterdam – Philadelphia: John Benjamins.
- Palić, I. (2011). O glagolima koji vežu obvezatne adverbijalne dopune u bosanskoj jeziku. *Suvremena lingvistika*, 72, 201–217.
- Schumacher, H., Bourstin, P., Frosch, H., Ballweg-Schramm, A., Ballweg, J., Kubczak, J. (1981). *Verbvalenz. Konzeption eines Wörterbuchs deutscher Verben. Zu Theorie und Praxis einer semantisch orientierten Valenzlexikographie*. Tübingen: Gunter Narr Verlag.

- Przepiórkowski, A. (1999). *Case Assignment and the Complement/Adjunct Dichotomy. A Non-Configurational Constraint-Based Approach*. PhD thesis, University of Tübingen.
- Przepiórkowski, A. (2016a). How Not to Distinguish Arguments from Adjuncts in LFG. In: Arnold, D., Butt, M., Crysmann, B., Holloway King, T. & Muller, S. (eds) *Proceedings of the Joint 2016 Conference on Head-driven Phrase Structure Grammar and Lexical Functional Grammar*, 560–580. Warsaw: Polish Academy of Sciences.
- Przepiórkowski, A. (2016b). Against the Argument-Adjunct Distinction in Functional Generative Description. *The Prague Bulletin of Mathematical Linguistics*, 106, 5–20.
- Reuland, E. & Abraham, W. (1993). *Knowledge and Language. Volume II: Lexical and Conceptual Structure*. Dordrecht/Boston/London: Kluwer Academic Publishers.
- Ross, J. R. (1967). *Constraints on variables in syntax*. PhD thesis, Massachusetts Institute of Technology.
- Samardžija, M. (1986). Valentnost glagola u suvremenom hrvatskom književnom jeziku. PhD thesis, University of Zagreb.
- Schumacher, H., Kubczak, R., Schmidt, J. & de Ruiter, V. (2004). *VALBU – Valenzwörterbuch deutscher Verben*. Tübingen: Gunter Narr Verlag.
- Schütze, C. T. (1995). PP Attachment and Argumenthood. In: Schütze, C. T., Ganger, J. & Broihier, K. (eds) *Papers on Language Processing and Acquisition. MIT Working Papers in Linguistics*, 26, 95–151. Cambridge (MA): MIT Press.
- Sgall, P., Hajičová, E. & Panevová, J. (1986). *The Meaning of the Sentence in Its Semantic and Pragmatic Aspects*. Dordrecht/Boston/Lancaster/Tokyo: D. Reidel Publishing Company.
- Šojat, K. (2008). *Sintaktički i semantički opis glagolskih valencija u hrvatskom*. PhD thesis, University of Zagreb.
- Toivonen, I. (2016). Revisiting the argument-adjunct distinction. Hand-out of a talk given at Stanford University, October 27, 2016.
- Vater, H. (1978). On the Possibility of Distinguishing between Complements and Adjuncts. In: Abraham, W. (ed) *Valence, Semantic Case and Grammatical Relations*, 21–46. Amsterdam: John Benjamins.
- Verspoor, C. M. (1997). *Contextually-Dependent Lexical Semantics*. PhD thesis, University of Edinburgh.
- Vestergaard, T. (1977). *Prepositional phrases and prepositional verbs: A study in grammatical function*. The Hague: Mouton.
- Williams, A. (2015). *Arguments in Syntax and Semantics*. Cambridge: Cambridge University Press.
- Zovko Dinković, I. (2003). Lokativna alternacija u engleskom i hrvatskom. *Studia Romanica et Anglicana Zagabiensia*, 47/48, 585–596.