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Ditransitive structures in Croatian adult and child language

The role of animacy and givenness

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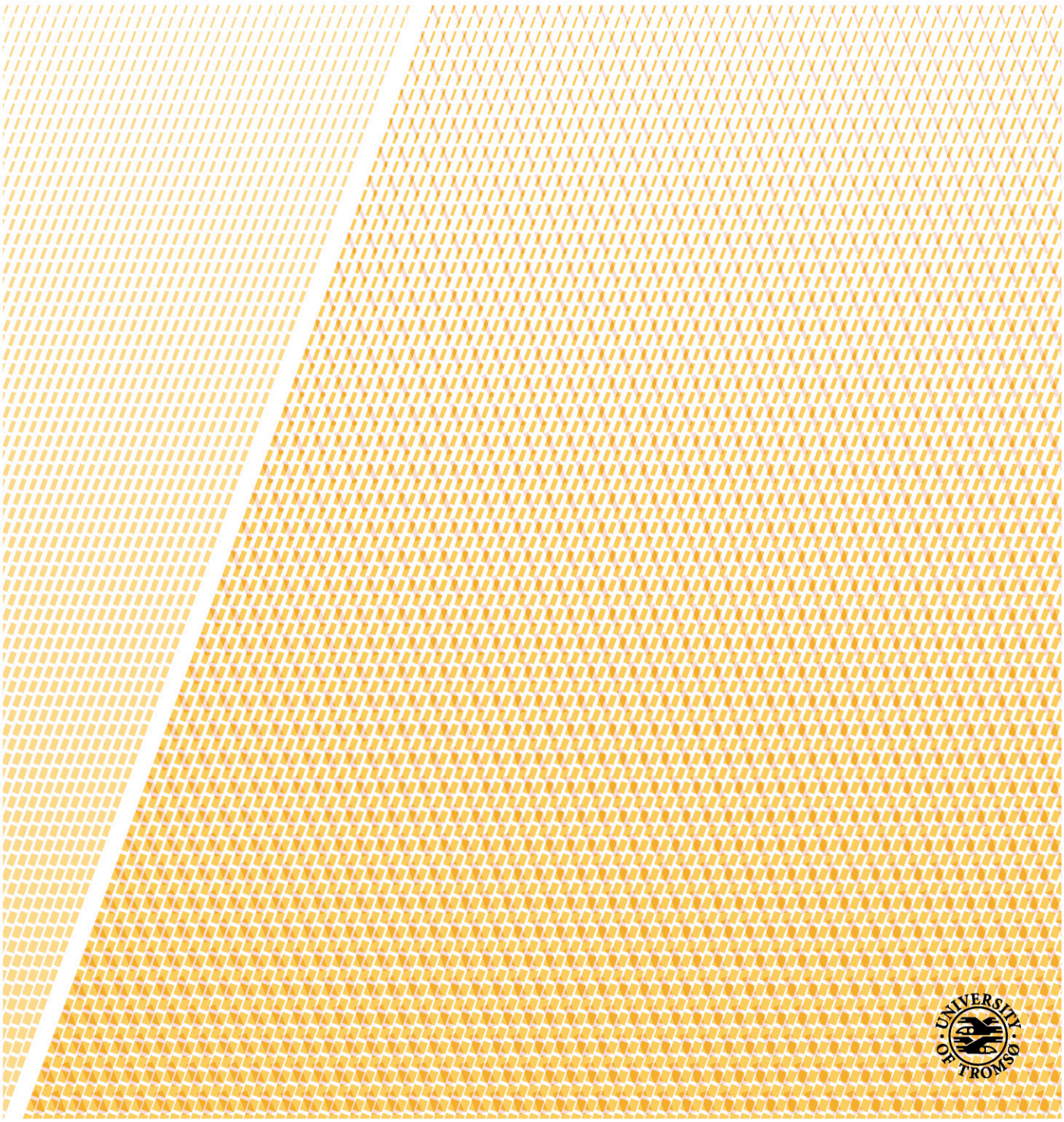
Marta Velnić

A dissertation for the degree of Philosophiae Doctor – October 2017



Ditransitive structures in Croatian adult and child language: The role of animacy and givenness

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A Thesis submitted for the degree of Philosophiae Doctor

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To my boys

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Acknowledgements

This Journey started some five years ago, as a turning point from student to independence. Five years is simultaneously a short and a long time, as it went by so quickly, but looking back at it life has happened in the meantime, quite literally. Symbolically, I ended up doing a full circle and ending where I have started: the recent relocation of my office has brought me to my academic origins (Anthropology), but also where I first lived when I came to Tromsø: Breiviklia. It has been a miraculous journey and I am sad, excited, and relieved to see it end. Hopefully, there is beer at the end of the tunnel.

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Abstract

This dissertation explores the effects that a semantic factor, animacy, and a pragmatic factor, givenness, have on the relative ordering of the two objects (IO-DO vs. DO-IO) in Croatian ditransitive structures. While the effects of animacy are explored only at a global level (object ordering), the effects of givenness are explored also in the choice of referring expressions. The effect that these factors have is explored both in adult and child language in a way that offers valuable insights for both groups. This research provides a new analysis in the acquisition of ditransitive structures as it reveals a major role of animacy in shaping children's object order.

The results show that when the two factors are neutralised, there is an indication of DO-IO being the basic object order. Conversely, I find that the IO-DO is more frequently used both in naturalistic and in experimental data, but this frequency can be attributed to the fact that in double object structures the IO is prototypically animate and the DO is prototypically inanimate. I argue that both adults and children are sensitive to animacy, but children are more sensitive to it than adults. With regard to givenness, I find that it influences both object order and choice of referring expression in the adults, but only the choice of referring expression in the children's data.

Keywords: ditransitive structures, animacy, givenness, word order, referring expressions, language acquisition, Croatian

List of papers

Paper 1

Velnić, Marta -" The influence of Animacy, Givenness, and Focus on Object Order in Croatian Ditransitives", accepted, in revision for *Studia Linguistica*.

Paper 2

Velnić, Marta -" Acquisition of ditransitive structures in Croatian child language", to appear in *FDSL 2015 Proceedings*.

Paper 3

Velnić, Marta -" Object Order Variation in Croatian with regard to Animacy and Givenness: A Ditransitive Elicitation Task", under review in the *Journal of Slavic Linguistics*.

Paper 4

Velnić, Marta -" The effects of discourse topic on global and local markers in Croatian ditransitives", accepted, in revision for *Glossa*.

Part I: Introduction

The aim of this dissertation is to provide insight into how children acquire ditransitive structures in Croatian. In Croatian both possible object orders are allowed: indirect object-direct object (IO-DO) and direct object-indirect object (DO-IO), thus resulting in variation in the input that children are exposed to. Since the two orders are both grammatical but are not used in the same contexts, children must get attuned to the fine-grained distinctions between the alternating orders in order to use double object structures appropriately. This dissertation analyses the effects of two factors that can be shown to influence the choice of word order in ditransitives.

The first factor is a semantic one: *Animacy*. It does not vary depending on the context. The second factor, *Givenness*, is a pragmatic factor and thus dependent on the discourse. More precisely, whether a referent is animate or not is inherent to the referent and stays stable in the discourse, while the givenness value (given / new) is referent-external and is entirely dependent on the discourse: a referent usually starts out as [-*given*] (unless it is unique or physically present), and becomes [+*given*] after its first mention. The effects of these factors are described through the animacy hierarchy, human>animate>inanimate (Yamamoto, 1999), and the *given before new* principle (Clark & Haviland, 1977), entailing that both the [+animate] and [+given] argument are preferably placed preceding arguments that are [-animate] and [-given]. Thus, they are considered triggers of movement. By investigating how these factors influence the object order in ditransitive sentences, I will show how animacy influences the sentence at a global level, while givenness influences it at a local level in child language. The main focus is on how the relative object order, DO-IO vs. IO-DO, is affected by these two factors. This is what I will refer to as the global level. Influence at the local level is used here to refer to the choice of referring expression (RE): NPs, pronouns, clitics, and null referents (omissions); and these investigated with respect to givenness only.

This thesis explores how animacy and givenness affect word order in ditransitives in different groups of speakers (adults vs. children), using various methodologies. The dissertation consists of four articles. One of the papers investigates which factors influence

object order in the adult language through an acceptability judgment task. Another paper focuses on naturalistic data and pursues a comparison of the input and output. Two articles use semi-structured elicitation tasks to investigate those contexts that were not frequently available in the naturalistic data, in order to answer more fine-grained questions pertaining to the interaction between givenness and animacy as well as the effect of givenness on referring expressions. Thus, the range of methodologies includes naturalistic (corpora) and experimental data, the latter structured both in terms of comprehension (acceptability judgment task) and production (elicitation). The results of the studies provide a coherent picture of how animacy and givenness affect word order and referential choice in double object constructions, as the findings from one paper are confirmed and sometimes amplified in others.

The main finding of this dissertation is that animacy strongly affects children's choice of word order. Adults' preferences are also affected by it, but to a lesser degree. Since, prototypically, the direct object is inanimate and the indirect object is animate, we find an abundance of IO-DO orders across the studies. However, both adults and children favour DO-IO when animacy is controlled for. Because of the latter observation, I suggest that DO-IO is the underlying object order in Croatian ditransitives. Preschool children are sensitive to the distinct use of IO-DO and DO-IO, and use DO-IO more when animacy is neutral, but are not adult-like yet. Finally, the results of the papers in this dissertation suggest that children are more likely to mark givenness locally, through referring expressions, than globally, with object order.

This Introductory Chapter is organised in the following way: I first describe some specifics of the Croatian language (section 1); section 2 focuses on the theoretical background of ditransitive structures. Next, there is a section focusing on the two factors: animacy (3.1.) and givenness (3.2.) and the effects they have been found to have on word order in adult and child language in previous research. In section 4, I summarize the main goals of my research and formulate the predictions. In section 5, I outline the papers that are contained in this dissertation, highlighting the main findings and providing a description of the Double Object Database (5.1), which has been an essential tool for setting up each part of this research. A discussion of the papers' findings follows (section 6), with a unified perspective of the results. In section 7, I outline the remaining open

questions and propose how these can be further explored. The conclusion (section 8) summarizes the contribution of this research to the factors that shape children's productions when acquiring alternating structures and provides intuitions with regard to the discussion on underlying word order in Croatian.

1 The Croatian Language

Croatian is the official language spoken in the Republic of Croatia, which has around 4,2 million people, according to the population estimate for 2015 (Radić, 2016). The language is often referred to as Serbo-Croatian, a terminology that indicates the mutual intelligibility of the two languages but also the former political union of the two nations, along with Bosnia-Hercegovina, Slovenia, and Macedonia, as Yugoslavia. I use the term Croatian in this dissertation to refer to the language in question, as my research has been conducted exclusively in Croatia and on Croatian speakers.

Croatian has seven cases; central to the discussion of this study are the Accusative (ACC) and Dative (DAT), as they are used to mark the DO and IO, respectively. Croatian is considered a free word order language (Siewierska, 1998). Since I am discussing the possibilities of DO-IO and IO-DO ordering, this availability of word order choice is crucial for this research, because, as mentioned in the introduction, the two word orders are both grammatical but are used in different contexts. The underlying structure for transitive sentences is claimed to be SVO (Browne, 1993; Siewierska, 1998) because it has the widest contextual applicability and can be the answer to general questions such as 'What happened?'. Furthermore, it is the most frequent order if NPs are used to refer to the subject and the object. While determining the basic order for ditransitives is not the main focus of this dissertation, the results nevertheless indicate that DO-IO is the underlying order.

Even if all/most word order combinations are possible, the constituent order is determined largely by the topic-comment structure, the most frequent situation being that the subject is the topic and the verb and the object are the comment (Browne, 1993). In Croatian, clitics are fixed in second position, either after the first word or the first constituent (Browne, 1993; Schütze, 1994), which is why they have been largely avoided

in this study, as they cannot be informative in the study of word order variation in ditransitives.

2 Ditransitive structures

In section 2.1, I outline some basic concepts of ditransitive structures along with the possible ways in which the thematic roles are marked. In section 2.2 the different contextual uses are described, such as caused possession and caused motion between the English alternates; followed by studies that have been conducted on the underlying word order focusing on the studies that employ neutralising the triggers of movement as a main source for determining the underlying word order (2.3). Section 2.4 provides an overview of ditransitive structures in Croatian, focusing mainly on the structures analysed in the dissertation.

2.1 The alignment of ditransitive structures

Ditransitive sentences concern a special class of verbs, ditransitive verbs, which can take three arguments: the subject (S), the direct object (DO), and the indirect object (IO). The DO has the thematic role of theme, while the IO has the role of the recipient. Malchukov, Haspelmath, and Comrie (2010) define the typical ditransitive construction as containing a verb of physical ('give', 'send') or mental ('tell') transfer, describing a scene in which an agent causes an object to pass into the possession of an animate recipient. Malchukov et al. (2010) also define the different alignment types of ditransitive structures that can be found cross-linguistically: the *neutral alignment*, the *indirective alignment*, and the *secundative alignment*. The alignments are categorised according to how the two objects (theme and recipient) of the ditransitive sentence are marked when compared to the object (patient) of the transitive sentence. Thus, in the neutral alignment, both arguments of the ditransitive sentence are marked the same way as the object of the transitive sentence. An example of this is the Double Object Dative (DOD) in English.

(1) Transitive sentence:

Marlon kicked a ball.

(2) Ditransitive sentence with neutral alignment:

Marlon gave Stig a ball.

English, however, has dative alternation (Oehrle, 1976), which means that it has two alternate structures of different alignments for expressing ditransitive structures (Haspelmath, 2015). Thus, the alternate alignment that English has is the *indirective alignment*. Here the theme of the ditransitive sentence has the same marking as the patient in transitive sentences, while the recipient receives a different marking from the two (Malchukov et al., 2010). In the structure with indirective alignment in English, the theme has no marking like the transitive object in (1), and the recipient is marked with the preposition 'to' as shown in (3). The structure is thus referred to as the Prepositional Dative (PD).

(3) Marlon gave a ball to Stig.

The object order in the two English alternates is fixed: the DO precedes the IO in the PD, while the IO comes before the DO in the DOD.

Croatian is also a language in which the ditransitive structure can be expressed through the indirective alignment, and the main focus of this study is the contextual applicability of order variants of the Croatian indirective alignment. In this structure, the patient in transitive sentences is marked with the Accusative case (4), and so is the theme in ditransitive sentences (5), while the recipient is marked with the Dative case. Examples of a transitive sentence and the indirective alignment are displayed for Croatian in (4) and (5) respectively.

(4) Transitive sentence:

Marlon *čita* *knjigu.*

Marlon-NOM reads book-ACC

”Marlon is reading a book.”

(5) Ditransitive sentence with indirective alignment:

a. *Marlon* *daje* *knjigu* *Stigu.*

Marlon-NOM gives book-ACC Stig-DAT

”Marlon is giving a book to Stig.”

b. *Marlon* *daje* *Stigu* *knjigu.*

Marlon-NOM gives Stig-DAT book-ACC

”Marlon is giving Stig a book.”

As shown in (5), the object order is not fixed and both variants (DO-IO and IO-DO) are grammatical. Croatian has dative alternation as it also displays the third and last type of alignment defined by Malchukov et al. (2010): the *secundative alignment*. In this type of alignment, the recipient in the ditransitive is marked the same way as the patient in transitive sentences, while the theme is marked differently. With the secundative alignment in Croatian, the recipient is marked with Accusative case (like the patient), while the theme is marked with the Instrumental (INS). An example is given in (6), word order variations apply.

(6) a. *Marlon* *nudi* *Stiga* *jabukom.*

Marlon-NOM offers Stig-ACC apple-INS

“Marlon is offering Stig an apple.”

b[1]. *Marlon* *nudi* *jabukom* *Stiga.*

Marlon-NOM offers apple-INS Stig-ACC

“Marlon is offering an apple to Stig.”

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[1] My intuition is that this variant is less well-formed than (6a), but examples like this are clearly treated as grammatical by Zovko-Dinković (2007): e.g. *Lena je poslužila čajem i keksima goste*. (Lena-NOM served tea-INS and bicuits-INS guests-ACC).

This structure is not the focus of my studies, the reasons for this will be explained in section 2.4.

The main difference between English and Croatian dative alternation consists in how the contextual variations are expressed: in English, pragmatic differences (such as givenness, focus, weight) are signalled by alternating between the two structures above (PD/DOD); in Croatian, since one of the structures, the secundative, is quite marginal and limited to only a handful of verbs (section 2.4), contextual variations are expressed within the indirective alignment by the word order variations of the Accusative and Dative case.

2.2 Contextual use of the alternates

According to Levin (2008) a difference in the contextual use of the English PD and DOD alternates is to signal caused possession or caused motion: the two structures present in English reflect the change that the DO is undergoing: change of state (caused possession) and change of place (caused motion). Hovav and Levin (2008) proposed a verb-sensitive approach, according to which the PD and DOD alternates are used differently if the verb can encode both caused possession and caused motion. The 'give'-type verbs only encode caused possession, while the 'throw'-type and 'send'-type verbs can express both event types. Thus, 'give'-type verbs can have both the DOD and the PD construction, but always encode caused possession, regardless of which structure is used. The use of either structure with the 'give'-type verb depends on Information Structure. According to Levin (2008), in 'throw'-type and 'send'-type verbs, the DOD is used to express caused possession, while the PD can be used to express either event. The 'throw'-type and 'send'-type verbs differ because the former also encode manner, while the 'send'-type verbs are more sensitive to animacy (Levin, 2008). The distribution of this encoding is summarised in Table 1.

Table 1: Distribution of caused possession and caused motion encoding in English (Levin, 2008)

	PD	DOD
'Give'-type	Caused possession	Caused possession
'Throw'-type	Caused motion or caused possession	Caused possession
'Send' (theme inanimate)	Caused motion or caused possession	Caused possession
'Send' (both animate)	Caused motion	-

In Croatian, caused motion is signalled by the use of the PP to mark the recipient/goal. However, for 'send'-type verbs with two animate objects, the PP is optional, as caused possession is not an available reading and thus both structures (with and without PP) signal caused motion like in (7).

(7) a. *Učitelj je poslao učenike ravnatelju.*
teacher-NOM is-AUX sent pupils-ACC principal-DAT
b. *Učitelj je poslao učenike kod ravnatelja.*
teacher-NOM is-AUX sent pupils-ACC at principal-GEN
"The teacher sent the pupils to the principal."

Although I have encountered this type of PP ditransitives in the production of some of the participants (in a condition with the verb 'send' and two animate objects, where the caused motion reading was the only one available), this structure is not discussed further in the dissertation. The main reason is that other factors (such as the weight of the PP) can intervene on the object ordering, and thus obscure the effects of animacy and givenness.

Going back to the wider contextual applicability of the PD discussed in Levin (2008), a number of studies conducted on the dative alternation (Brown, Savova, & Gibson, 2012; Clifton & Frazier, 2004; Kizach & Mathiasen, 2013) also indicate that the PD is contextually more applicable than the DOD. The wider applicability of the PD will be

further discussed in the section on givenness (3.2). Brown et al. (2012) claim that the PD is the more canonical structure, evidence of that being that, in English, all dative verbs have the PD structure, but only a subset can alternate into a DOD structure (p.195)[2]. Nevertheless, the DOD is attested more frequently in a corpus of English adult oral language discussed in Bresnan (2007). However, the high frequency of the DOD may be a result of the tendency of recipients (IO) to be animate, and of the themes (DO) to be inanimate (as will be extensively discussed in section 3.1, animate referents tend to precede inanimate referents).

2.3 The underlying word order

The discussion on the underlying order is a central and relevant one. At the same time, it is not the main focus of this dissertation, as I aim to discover the contextual differences that drive the use of IO-DO vs. DO-IO in Croatian. However, these factors (animacy and givenness) are assumed to trigger movement; the orderings based on these properties are outlined in section 3. Thus, when there is no trigger, i.e. the context is neutral/balanced, there is no movement, and thus taking the context into account should contribute to revealing the underlying word order. According to my results, DO-IO surfaces in neutral contexts when no triggers for movement are present, and this provides an indication that it is underlying. I will first outline the two main approaches regarding the underlying order (derivational and non-derivational) and then move on to describing the studies that investigate the underlying word order by relating the structures to the context in terms of presence/absence of triggers for movement, which resemble the approach that this study takes.

There are two main approaches in treating ditransitive structures: the derivational approach, referred to also as the single meaning approach, and the non-derivational approach, also referred to as the multiple meaning approach. The former supposes a derivational relation between the English PD and DOD, and thus the meaning of the two

[2] DOD uses of the supposedly PD-only verbs were found in corpora (Bresnan, 2007)

structures is unvaried. According to Larson (1988), the PD is the underlying structure and the DOD is derived from it (see also Baker (1988) and Den Dikken (1995) for discussion in favour of this view). Baker (1988, p. 46) coined the Uniformity of Theta Assignment Hypothesis according to which *the identical thematic relationships between items are represented by identical structural relationships between those items at the level of deep structure*. Thus, since in the PD and DOD the thematic roles of theme and recipient/goal remain unvaried, the deep structure, the underlying representation, must also be identical to the two structures. He also states that his hypothesis indicates that there is an empty preposition which governs the recipient/goal in the DOD, entailing that PD is the underlying structure. Similarly, Den Dikken (1995) stipulated a transformational relationship between the two structures. With the DOD being derived from the PD and with the indirect object always containing a PP, but with an empty head in the DOD.

By contrast, the non-derivational approach assumes that there is no derivational relation between the two structures and they are thus both base-generated (Marantz, 1993). This approach also entails that there can be differences in meaning between the two structures, one of which was already presented in the previous section in terms of caused possession (DOD) and caused motion (PD) (Levin, 2008). Oehrle (1976) focuses on other differences in meaning, such as intentionality and the possibility to cancel the possession relation. Notice the semantic difference of the examples from Oehrle (1976) in (8) and (9).

(8) a. I baked a cake for Max, but now that you're here, you may as well take it.
b. *I baked Max a cake, but now that you're here, you may as well take it.
(9) a. Originally, I bought this tea-kettle for my wife, but I decided to keep it.
b. *Originally, I bought my wife this tea-kettle, but I decided to keep it.

In the first set of examples the difference in meaning relates to the time when the intention is determined: in (8a) the intention is asserted at the time of the utterance, while in (8b) the indention holds subsequently as well, and results in an inappropriate use of the DOD. In example (9a), the intention does not have to hold subsequently, thus the possession is cancellable, but that is not the case in (9b).

Studies that use context to define the underlying word order suppose a derivational approach, but rely on the analysis of contexts in which a structure is accepted to indicate what the underlying word order is. Here I focus on the studies conducted on languages that signal ditransitive structures with case. The general idea of this approach is that the underlying order is the one that can be used in most contexts, and the structure that permits maximal focus projection (entire sentence in focus) is always unmarked (Müller, 1999). The context is established based on various factors such as givenness, focus, and animacy as properties of the objects. Thus, we should expect to find the underlying order if it is applicable to a wide range of contexts and if it is the one preferably used in neutral contexts.

I will focus on the studies conducted on German (Müller, 1999; Røreng, 2011) and Russian (Titov, 2017). Both of these languages use the Accusative to mark the theme and the Dative to mark the recipient. An example of both object orders in the two languages is given in (10) and (11).

(10) German - Røreng (2011):

a. *Peter hat dem Studenten das Buch gegeben.*
   Peter has the-DAT student the-ACC book given

b. *Peter hat das Buch dem Studenten gegeben.*
   Peter has the-ACC book the-DAT student given
   "Peter gave the student the book." / "Peter gave the book to the student."

(11) Russian - Titov (2017):

a. *Ivan peredal agentu pismo.*
   John delivered agent-DAT letter-ACC

b. *Ivan peredal pismo agentu.*
   John delivered letter-ACC agent-DAT
   "John delivered the agent the letter." / "John delivered the letter to the agent"

Studies on German have made divergent claims with respect to which object order is underlying. It has been argued that IO-DO is the underlying order (Lenerz, 1977), or that both orders are basic but dependent on the verb (Haider & Rosengren, 2003; Meinunger,

2000). According to Røreng (2011), the main problem with the latter formulation is that there is no agreement on which verbs belong to which class. The proposal for IO-DO being underlying is based on the observation made by Lenerz (1977) (given in Røreng (2011)) that the DO-IO order is ungrammatical when the DO is in focus, but the IO-DO is possible with either DO or IO in focus. Lenerz's (1977) conclusion is based on an analysis conducted on only three verbs ('give', 'give as a gift', and 'show') and only in contexts of animate IO and inanimate DO, thus this investigation is too limited for providing strong conclusions.

Müller (1999) discussed these word orders in terms of marked and unmarked, in the framework of optimality theory. He claimed that clause-internal word orders in scrambling languages exhibit degrees of markedness, rather than a strict division between well- and ill-formed (Müller, 1999, p. 778). This is also what one of my tasks investigates. The markedness of a structure is inversely proportional to the variety of contexts that it can occur in: the more context types it can occur in, the less marked it is. Müller also postulates that degrees of markedness do not reflect the degree of deviation from the underlying structure, and in his view unmarked and underlying do not necessarily match. According to Müller (1999) DO-IO is the underlying order as it is possible for an IO anaphor to be bound by a preceding DO, but the opposite relation is not possible. He investigates a variety of verbs, including the ones previously classified as having different underlying orders and provides a unified account that DO-IO is underlying to all verbs in German. Some examples are shown in (12) and (13).

(12) a. *daß man die Gäste$_1$ einander$_1$ vorstellte*
that one the-ACC guests each other-DAT introduced
" That the guests were introduced to each other."
b. **daß man den Gästen$_1$ einander$_1$ t$_1$ vorstellte*
that one the-DAT guests each other-ACC introduced

(13) a. *daß der Arzt den Patienten$_1$ sich$_1$ im Spiegel zeigte*
that the doctor the-ACC patient himself-DAT in mirror showed
"That the doctor showed the patient$_1$ to himself$_1$ in the mirror."

b. ?**daß der Arzt dem Patienten$_1$ sich$_1$ t$_1$ im Spiegel zeigte*
that the doctor the-DAT patient himself-ACC in mirror showed
"That the doctor showed himslef$_1$ to the patient$_1$ in the mirror."

Müller's use of the optimality theory framework outlines how the attested orders are a result of the interaction between factors such as definiteness, animacy, focus, and case; I have ordered them based on their ranking (high to low) presented by Müller (1999). Müller (1999) claims the underlying order of the objects is DO-IO, and IO-DO is obtained through scrambling but it is also considered unmarked. Overall, this proposal has been argued to be problematic (Anagnostopoulou, 2008), and I will thus take into account the claim that he makes for DO-IO being underlying, but I rely more on Røreng's (2011) methodology for considering the contextual factors as triggers for movement.

Røreng (2011) conducted a corpus study which focused on NP-NP combinations of ditransitive structures. IO-DO was by far the most frequent order in the corpus, but for the purposes of the cited study, the same amount of IO-DO and DO-IO orders were included for a total of 688 occurrences of 195 different verbs. Thus Røreng's data provide a concise picture of the word order and its relation to verbs, unlike studies like Lenerz (1977) in which only a handful of verbs were taken into consideration. Røreng (2011) analysed the occurrences with regard to animacy and focus, in terms of background>focus structure (this structure will be discussed in section 3.2), as factors influencing word order. She found that the vast majority of the occurrences can be accounted for with reference to these two factors. She further argues that DO-IO is the underlying word order, as there were only three occurrences that could not have been triggered by the factors under examination, and they exhibited the DO-IO order. Thus, the IO-DO order is mainly caused by animacy (as IOs are typically animate) and background>focus structure. With regard to the relative strength of the two factors in terms of triggering movement, Røreng (2011) found that focus is a stronger factor than animacy. A corpus study conducted on child and child-directed speech by Sauermann (2016) confirms this finding, as the majority of DO-IO occurrences were balanced with regard to definiteness, givenness, or pronominality.

For Russian, divergent claims were made with respect to what the underlying word order is. For example, Bailyn (2010) claims that DO-IO is underlying, while Dyakonova

(2007) holds the opposite view, namely of the IO-DO being the underlying order. Bailyn (2010) reaches his conclusion through the analysis of Instrumental secondary predicates, as only the Accusative object can control into such clauses (14), and reciprocal binding which is along the lines as the data from Müller (1999) presented in (12) and (13). He reaches the conclusion that the DO-IO, or *Higher-accusative* as he refers to it, is the underlying order.

(14) a. *Maša našla Sašu golym.*
Masha$_i$ found Sasha$_k$-ACC nude$_k$-INS
"Masha found Sasha nude."
b. **Maša pomogla Saše golym.*
Masha$_i$ helped Sasha$_k$-DAT nude$_k$- INS
"Masha helped Sasha nude."

Dyakonova (2007) provides evidence against this view from non-agentive readings and narrow and wide focus. She claims that non-agentive readings are available with ditransitives taking a dative and an accusative argument (15). With respect to narrow and wide focus she considers the IO-DO structure to be more applicable because it can either have narrow focus on the theme or wide sentence focus, while the DO-IO structure can only have narrow focus on the goal and can refer to a given theme. However, no contextual explanation is provided, and factors such as animacy were disregarded. The two structures are presented in (16).

(15) *On podaril mne prekrasnyh detej.*
He-NOM gave me-DAT beautiful-ACC children-ACC
"I have beautiful children thanks to him."

(16) a. *Nastya kupila Sergeyu mašinu.*
Nastya-NOM bought Sergey-DAT car-ACC
"Nastya bought Sergey a car."

b. *Nastya kupila mašinu Sergeyu.*
Nastya-NOM bought car-ACC Sergey-DAT
"Nastya bought a/the car for Sergey."

In relation to my studies, I focus mainly on the most recent study on this matter, Titov (2017), because of the attention that was payed to the triggers for movement. Titov (2017) approaches the issue by investigating contexts of neutral animacy and focus to reveal the underlying order[3]. Her investigation reveals that when the ditransitive sentence is neutralised, DO-IO surfaces as the underlying order, and is thus in contradiction with Dyakonova (2007). However, Titov (2017) provides a more in-depth analysis as she relates the possible readings to the contexts and balances focus and animacy independently. Titov (2017) relates the issue to the concept of the *relative interpretive prominence* of objects, and prominence is related to context as *material that is contextually prominent precedes material that conveys information not (yet) prominent in the discourse*. She claims that DO-IO is expected to capture the majority of possible configurations related to the relative prominence of the two objects. Consequently, the derived structure should be resorted to when the basic structure fails to capture a specific interpretation. For the following examples in a neutral context and with both animate objects, Titov (2017) claims that the example in (17a), with DO-IO order, can signal the following situations: when both referents are definite, both referents are indefinite, or when the DO is definite and the IO is indefinite. The example in (17b), with the IO-DO order, on the other hand, can only express the one situation which the DO-IO cannot capture, that is, when the IO is definite and the DO indefinite. Thus, the scrambled structure is licensed only by the definite preceding the indefinite.

[3] Titov (2017) refers to it as the *canonical* order.

(17) Russian – Titov (2017)

a. *Ivan* *peredal* *špiona* *agentu.*
John-NOM handed spy-ACC agent-DAT
"John handed the spy to the agent." /
"John handed a spy to an agent." /
"John handed the spy to an agent."

b. *Ivan* *peredal* *agentu* *špiona.*
John-NOM handed agent-DAT spy-ACC
"John handed the agent a spy."

Thus, when givenness, referentiality and animacy are neutralised, the DO-IO surfaces as the underlying order.

My approach is quite similar to Titov's with regard to accounting for the context and the preferences of word order therein. However, unlike Titov (2017), I test speakers' judgments in various contexts of animacy, givenness, and focus, including the neutral context. Even if the main goal of this dissertation is to observe the effect of the two factors, the preference/use of DO-IO is clear in the neutral contexts with no triggers for movement, which indicates that it is the underlying order.

2.4 Ditransitive structures in Croatian

I have already shown in section 2.1 that Croatian has two possible ways to mark the objects in ditransitive structures. Here, I focus more on the indirective alignment (Accusative/Dative combinations), which is the core of this study.

In Croatian ditransitives, all combinations of subject, verb, and objects are grammatical, but are attested with different frequencies. The position of the subject will not be discussed any further. Some of the possible word orders are presented in (18).

(18) a. *Marlon* *je* *dao* *loptu* *Stigu.* (S-V-DO-IO)
Marlon-NOM is-AUX gave ball-ACC Stig-DAT

b. *Marlon* *je* *loptu* *dao* *Stigu.* (S-V-DO-IO)

Marlon-NOM is-AUX ball-ACC gave Stig-DAT

c. *Loptu je Marlon dao Stigu.* (DO-S-V-IO)
ball-ACC is-AUX Marlon-NOM gave Stig-DAT

d. *Marlon je dao Stigu loptu.* (S-V-IO-DO)
Marlon-NOM is-AUX gave Stig-DAT ball-ACC

e. *Marlon je Stigu dao loptu.* (S-IO-V-DO)
Marlon-NOM is-AUX Stig-DAT gave ball-ACC

f. *Stigu je Marlon dao loptu.* (IO-S-V-DO)
Stig-DAT is-AUX Marlon-NOM gave ball-ACC
"Marlon gave a/the ball to Stig."

The examples in (18) show that a variety of orders is possible, but these can be grouped into sets that only take object order into account: DO-IO (examples 18a-18c) and IO-DO (examples 18d-18f). The dissertation mostly focuses on the relative order of the two objects (DO-IO vs. DO-IO), but the position of the verb is also taken into consideration in some of the papers. More precisely, Paper 1 takes the following orders into consideration: VDI, DVI, VID, and IVD[4].

Gračanin-Yuksek (2006) provides an analysis for the parallelism between some of the Croatian structures seen in (18) and the English PD and DOD alternates. She claims that, in Croatian, under neutral intonation, VDI is the semantic equivalent of the PD, IVD is equivalent to DOD, while VID is structurally ambiguous, as it can be derived from both structures. Her analysis suggests that VDI and IVD are base-generated orders. My data can neither confirm nor disprove this claim, as our approaches are different: she analyses the distribution of these orders in particular constructions such as the ban against nominalisations, causative readings, quantifier scope, and two-goal constructions, while I look at it through the neutralisation of animacy and givenness. The structures analysed by Gračanin-Yuksek (2006) and their English equivalents are presented in (19).

[4] When the structures are described with regard to the position of the verb, the abbreviations for the two objects, IO and DO, are further reduced in order to avoid long acronyms; thus, VDOIO is abbreviated to VDI and so on.

(19) a. *Marlon je dao loptu Stigu.*
Marlon-NOM is-AUX gave ball-ACC Stig-DAT
"Marlon gave the ball to Stig." (PD)

b. *Marlon je Stigu dao loptu.*
Marlon-NOM is-AUX Stig-DAT gave ball-ACC
"Marlon gave Stig the ball." (DOD)

c. *Marlon je dao Stigu loptu.*
Marlon-NOM is-AUX gave Stig-DAT ball-ACC
"*Marlon gave the ball to Stig." (PD)*
or "Marlon gave Stig the ball." (DOD)

My approach is closer to those of Røreng (2011) and Titov (2017): we consider that some object orders are more marked than others (thus requiring a particular context), while the more widely applicable one(s) is/are unmarked and can in a sense be considered as underlying. The way my results contribute to this issue will be discussed in section 6.2.

A brief overview of the ditransitive structures with Accusative (recipient) and Instrumental (theme) cases is in order, along with the reason for their exclusion from the central discussion. These structures also allow both DO-IO and IO-DO orders (example 6 in section 2.1), but they were excluded due to their low frequency. There was an attempt at eliciting such structures in one of the tasks with the verb 'to offer', but very few participants made use of the Instrumental/Accusative alternative. Moreover, verbs that can alternate between the two alignments are limited to three verbs (*nuditi* 'offer', *služiti* 'serve', and *darivati* 'give as a gift'), eight if their aspectual pairs[5] are counted (Zovko-Dinković, 2007). In addition, the verbs 'to offer' and 'to serve' are also subject to semantic restrictions, as their recipients can only be human, and their themes are limited to things

[5] Most verbs in Croatian have perfective and imperfective pairs; thus the full set of verbs that has case alternations is the following: *nuditi* ('to offer'-imperfective), *ponuditi* ('to offer'-perfective), *služiti* ('to serve'- imperfective, atelic), *posluživati* ('to serve'- imperfective telic), *poslužiti* ('to serve'-perfective), *darivati* ('to gift'-imperfective), *darovati* ('to gift'- perfective) , *podariti* ('to grant'- perfective).

consumed through the mouth, such as food, drink, and cigarettes (Zovko- Dinković, 2007). Due to such limitations, these structures are excluded from further discussion.

To conclude this section, Croatian uses case marking to express the thematic roles in a ditransitive sentence. The marking of the theme with the Accusative and the recipient with the Dative is taken into consideration in this study. These two arguments can occur in both orders (DO-IO and IO-DO), and the main focus of this dissertation is the question of how the factors animacy and givenness influence the choice of object order.

3 Factors influencing object order in ditransitives

As it has been mentioned in the Introduction (section 1), ditransitive structures provide a fertile ground for research, due to their complexity and variation: small changes in the pragmatic context yield different word orders. In this dissertation, I focus on one semantic and one pragmatic factor: respectively animacy and givenness. The main difference between those two factors is that animacy is an inherent and constant property of the discourse referents, whereas givenness reflects the context of the discourse. Thus, a referent can, and in most cases will, change its givenness value from [-given] to [+given] as the discourse progresses. With regard to both factors, the context they create makes a structure more or less acceptable, but not ungrammatical.

In this section, I first provide some previous research on animacy and how it relates to word order, with special attention to ditransitives. This includes an overview of what we know about how children acquire it. Section 3.2. focuses on givenness and its effect on word order and referring expression in adult and child language.

3.1 The effects of animacy on word order

Animacy influences speakers in their word order choice, often causing the animate argument to be placed first. Siewierska (1988, p. 30) describes this tendency for a number

of languages through the Personal Hierarchy, which is categorised according to person (1st-3rd) for human referents, and then continues with decreasing animacy as presented in (20).

(20) Personal Hierarchy (Siewierska, 1988):
1st > 2nd >3rd > higher animals > other organisms > inorganic matter > abstracts

Yamamoto (1999) provides a more thorough division of the hierarchy, which is not viewed linearly, but rather as human-centred. Yamamoto (1999) states that the hierarchy varies depending on the community in which the language is spoken, as some parts of the scale are influenced by cultural factors, such as what is viewed as food. A model of the Animacy Scale provided by Yamamoto (1999, p. 22) is given in Figure 1.

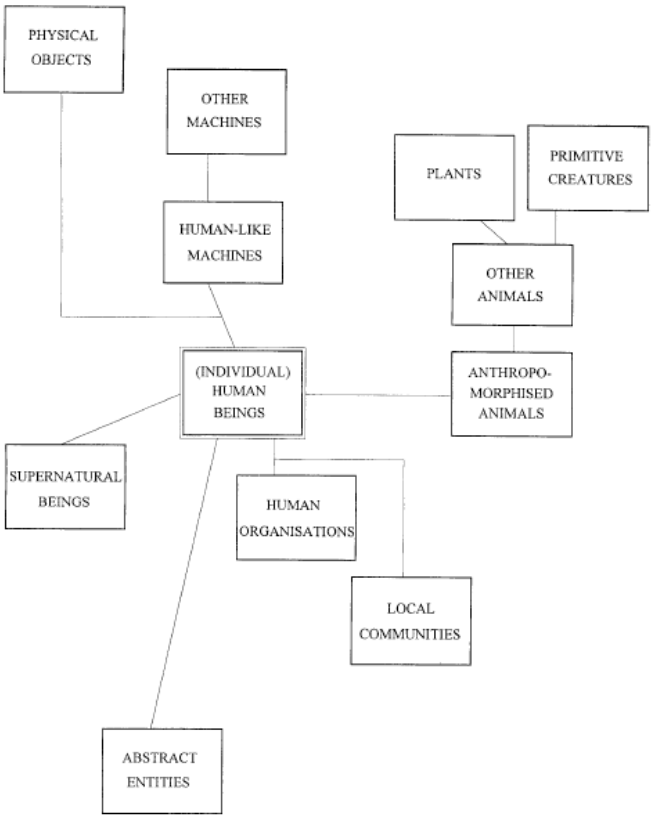

Figure 1:Animacy Scale according to Yamamoto (1999)

These hierarchies offer a very detailed view of the classification of entities, but they are both too detailed for the purposes of this dissertation. Yamamoto (1999) claims that the general animacy scale distinguishes animate form inanimate, and human form non-human (21). This is the scale most commonly used in linguistics.

(21) Human > Animate > Inanimate

Dahl and Fraurud (1996) also point out the anthropocentric view of animacy, as they argue that the pervasiveness of animacy has deep cognitive roots, and this might be due to the anthropocentric world-view that humans have; this could explain why the animacy-first linearization is cross-linguistically constant.

Branigan, Pickering, and Tanaka (2008) considers animate entities to be conceptually highly accessible. According to McDonald, Bock, and Kelly (1993) this is also related to grammatical roles as conceptually accessible arguments tend to be assigned to higher-level grammatical roles. This explains why most subjects are animate. Keeping in mind the human-centred view proposed by Yamamoto (1999), as humans and as language users, we tend to pay more attention to the animate, when compared to the inanimate. This makes animate referents more easily retrievable, and as a consequence, they are placed first in a sentence. Van Nice and Dietrich (2003) refer to this as *animate-first*, and the phenomenon has been noticed cross-linguistically and in a variety of structures.

In addition, having an animate argument expressed as the first argument can also be related to thematic role, as agents and beneficiaries are most likely to be animate. The Thematic Role Hierarchy from (Choi, 1996, p. 41) is offered in (22).

(22) Agent > Beneficiary > Experiencer/Goal > Instrument > Patient/Theme > Locative

This is relevant with regard to the research on ditransitives that I present in this dissertation as what I call the *prototypical animacy* condition is an animate recipient/goal and an inanimate theme, and in accordance to the hierarchy in (22), the goal precedes the theme. The hierarchy presented in (21) and the hierarchy in (22) go hand-in-hand as agents/beneficiaries/experiencers are human/animate, while the

instruments/themes/locatives are inanimate. Additionally, Artstein (1999, p. 2) explains that the co-occurrence of an element from the high end of the animacy scale with an element from the low end of the thematic role scale results in markedness. Consequently, having a theme that has the feature [+human] and an agent that is [-animate] is marked, because in this case either the animacy hierarchy or the thematic role hierarchy will have to be violated: if the latter hierarchy is respected, the inanimate argument will precede the animate one, while if the animacy hierarchy is respected the theme will precede the agent. When the high/low ends of the two hierarchies match (e.g. animate agents and inanimate themes), the result is an unmarked structure: agent precedes theme and animate precedes inanimate. Thus, having agents and beneficiaries that are human—or at least animate—along with inanimate themes represents the most natural case. Thus, in ditransitive structures that consist of an agent expressed as the subject, a recipient/goal that is the IO, and a theme that is the DO, the structure is unmarked when the IO is human or animate (high end), and the DO is inanimate (low end), because this way both hierarchies are respected. The corpus study conducted by Dahl and Fraurud (1996), mentioned above, on Swedish captures exactly this: the DO is mostly expressed with inanimate referents, while the IO has animate referents.

Perhaps the best-known work in relation to the animacy-first order has been conducted on the preference of active vs. passive voice, related to an animate agent in the former and an animate patient in the latter case (Ferreira, 1994; Gennari, Mirković, & MacDonald, 2012). Speakers of English and Spanish were found to have a strong tendency to use active sentences when the agents are animate, but prefer passive voice when the patients are animate, entailing that speakers prefer animate subjects. Thus, the speakers were more inclined to use structures such as 'The manager was worried by the layoffs' rather than 'The layoffs worried the manager'[6].

Another domain in which animacy has proven to be influential is the choice of possessive structure. Rosenbach (2003) tested native speakers of British and American English by using a questionnaire and found that animacy, topicality, and semantic relation

[6] Examples taken from Ferreira (1994).

of the possessor and possessum[7] influence the choice between the English s-genitive and of-genitive ('the boy's mother' vs. 'the mother of the boy'). However, Rosenbach's (2003) task reveals that even though the factors interact, animacy has a more substantial effect than topicality, and thus the speakers were more likely to choose the s-genitive (possessor-possessum) when the possessor was animate (i.e. 'the boy's mother'), and the of-genitive (possessum-possessor) when it was inanimate (i.e. 'the wheels of a lorry').

Effects of animacy have also been noticed within ditransitive structures, but not many studies have explicitly tested the effect of animacy, because the tasks testing ditransitives usually leave the prototypical animacy condition intact, and instead test how these structures are influenced by givenness. Thus, most of the studies of ditransitives will be outlined in the section in relation to the effects of givenness (section 3.2).

A study that investigates specifically animacy in the domain of ditransitives is Kempen and Harbusch (2004); they conducted a corpus study on German ditransitive sentences. The authors checked the order of each of the possible pairs of grammatical functions included in a ditransitive structure (S & DO, S & IO, DO & IO) in relation to animacy. The results show that, when the IO is inanimate, it is not likely to precede the subject (3 instances of IO-S and 39 instances of S-IO), but when both S and IO are animate, the IO becomes more likely to precede the subject (17 occurrences of IO-S and 20 occurrences of S-IO) (Kempen & Harbusch, 2004, p. 177). Kempen and Harbusch (2004) conclude that there is a direct influence of animacy on word order. They also find an effect of animacy on grammatical function (i.e., subjects are more likely to be animate). They, however, claim that the two effects are not linked and that animacy affects language production on two separate levels: linearization and grammatical function. Ortmann (1998, p. 75) describes the object order of Sesotho as animacy-driven: both object orders are allowed when animacy is balanced, but, if only one of the two objects is animate, it has to precede the inanimate object.

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[7] Rosenbach (2003) classifies them in prototypical and non-prototypical relations based on how likely the argument is to be either the possessor or the possessum, e.g. the boy's eyes are a prototypical combination while the mother's future is classified as less prototypical.

In sum, animacy influences word order in an animate-first direction, and this has been observed in a variety of structures (passives, possessives). However, studies related directly to animacy and its use/influence in ditransitive structures are uncommon, as in most of the studies on ditransitives the animacy conformation is left as prototypical: IO is typically animate and DO inanimate.

3.1.1 **The effects of animacy on word order in child language**

In relation to the acquisition of animacy, its high conceptual accessibility renders it a relatively easy concept to grasp, and consequently, children distinguish animate from inanimate NPs and use them in an adult-like manner by the age of two (de Marneffe, 2012, p. 34). In a study conducted by Rescorla (1981), it was found that, at the age of two, children comprehend the vocabulary for agents and actors better than the vocabulary for inanimate referents. More precisely, children had the most categorisations and terms for animals, followed by the number of terms for vehicles, and they had the fewest terms for fruit.. This is compatible with the animacy hierarchy seen in (21): animals are [+animate], vehicles are somewhere in between animate and inanimate entities, and fruit is [-animate].

In relation to the use of animacy in syntactic contexts, Lempert (1989) conducted a study with English pre-schoolers and found that children were more able to use the passive construction when they were taught the passive verb with an animate patient, when compared to children that were exposed to these structures with an inanimate patient. Sugisaki (2007) analysed occurrences of the Japanese copula for location verbs, which has two distinct forms depending on the animacy of the subject. The author found that, from the earliest productions (age 1;5-2;1), children exhibited the obligatory animacy agreement.

Children have also been found to be attentive to the property of animacy in their ditransitive productions. Cook (1975) conducted an act-out task with a wide age range of English-speaking children (ages 5–10) and presented evidence that the comprehension of ditransitive sentences is better when the animacy is prototypical (animate IO and inanimate

DO) than when it is not (inanimate IO and animate DO)[8]. Moreover, both configurations with unbalanced animacy (IO-animate/DO-inanimate and DO-animate/IO-inanimate) were better comprehended than the constructions with balanced animacy (both objects animate, or both inanimate). With regard to animacy and structure, Cook (1975) shows that the children had no problem in giving an animate theme to an inanimate recipient if the instructions were expressed with the PD, but they were not able to do so when the instructions had a DOD structure. He claims that the children used a semantic strategy in the DOD construction, and thus interpreted the inanimate object as the theme and the animate object as the recipient. This indicates that the DOD structure is more difficult to comprehend, and that children rely on semantics (the animate entity is the recipient) more than on syntax (the first NP is the recipient).

Evidence for the preference of the animate-inanimate order is also found in corpora: Snyder (2003, p. 53) conducted a corpus study on ditransitive structures in English and found that children (age range 3–8) rely heavily on animacy in their word order choices. However, animacy cannot be the only relevant factor, because the corpus had only animate IOs and mostly inanimate DOs (as we would expect in naturalistic speech), but the IO-DO orders amount to around half of the attested examples. In addition, the author found that, when the DO was animate, the PD structure (DO-IO) was used significantly more than when the DO was inanimate ($p < 0.001$). Snyder's (2003, p.56) analysis also reveals that children rely less on animacy as they grow older, as the animate DO is associated with the PD structure 90% of the time in the youngest children (age 3–4), and it steadily decreases until it reaches 50% at ages 7 and 8. According to Snyder (2003), this is due to givenness becoming more relevant, as the proportion of IO-DO and DO-IO is constant across the three age groups, thus entails that other factors become relevant when animacy is found to have decreased its effect. I outline Snyder's results on givenness in section 3.2.1.

With regard to languages in which the [+human] object obligatorily precedes the [-animate] object, Demuth, Malillo, Francina, and Christopher (2005) conducted a study on

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[8] The configuration of inanimate IO and animate DO was constructed by a simple rotation of the 'giving' relation of the test objects, such as 'give the man to the book', a sentence that would have been very unlikely outside the experimental setting.

animacy in ditransitives in Sesotho children of an age range of 3–12 years. In Sesotho, animate objects occur immediately after the verb and are followed by the other object; the reverse is ungrammatical. The study showed that all age groups place the human object before the inanimate one. The order is less strict when the two objects are not at the extremes of the hierarchy; thus, in animate-inanimate and human-animate pairings, the productions of the younger groups were less target-consistent. In the condition with two inanimates, one of which was the benefactor, all age groups up to the age of eight performed at chance level, with the 12-year-olds performing like the adults and placing the benefactor first. These results indicate that children take animacy into consideration from as early as age three, but they refine the animacy hierarchy at a later stage, while the overlap of animacy with thematic roles is acquired even later (Demuth et al., 2005, p. 441).

In relation to animacy and case marking, children seem to be more precise with case marking in the roles cannot be disambiguated through animacy: Drenhaus and Féry (2008) conducted an elicited imitation task with German children (age range 3;9–6;8). This study is of particular interest for this dissertation, because the authors balanced the animacy in their task. They found a higher rate of case errors when animacy was prototypically distributed than when both objects were animate, as in the latter condition the IO was more consistently marked with the Dative, while in the former condition the children overused the Accusative marking, thus using it also to mark the recipient. Drenhaus and Féry (2008) argue that this is due to case marking being used to disambiguate the arguments in terms of theme and recipient when the animacy is balanced, while in the prototypical condition the listener can rely on other strategies, such as the animate object being the recipient and the inanimate one being the theme. This means that, within the prototypical condition, animacy contributes to our understanding of what the thematic roles of theme and recipient are, while, with balanced animacy, this needs to be disambiguated more explicitly; thus, the children are more precise with their use of the dative for marking the IO.

To summarize, there are many studies in the literature suggesting that children are attentive to animacy from an early age. Animacy has been shown to influence the interpretation (Cook, 1975), production (in terms of word order) (Demuth et al., 2005; Snyder, 2003) and case marking (Drenhaus & Féry, 2008) of ditransitive structures in child language.

3.2 The effects of givenness on word order

Unlike animacy, givenness is not a constant property of a referent, and consequently, the interlocutors have to keep on updating the referents' status with regard to this property as the discourse progresses. In this section, I discuss the effects that givenness has globally, i.e. at the sentence level, expressed through word order, along with the effect that givenness has on word order in children. The local effects (choice of referring expression) of givenness in adults and children are outlined in section 3.3. The terms *global* and *local markers* are taken from Hickmann, Hendriks, Roland, and Liang (1996) who have defined the former as entailing the level of the utterance structure, while the latter signalling the choice of nominal determiners (definite/indefinite). Here I treat the two types of markers somewhat differently: for global markers, I focus only on the object order, while for local markers I extend the list of referring expressions to NPs, pronouns, clitics, and omissions. In my view, omissions can be considered an intersection between global and local markers; omissions obviously have an influence at the local level since the referring expression is omitted, but also at a global level since, if one of the objects is missing, there is no object order to be observed.

In this dissertation, I consider givenness from the listener's perspective: an object is considered [+given] when it is known to the listener. Therefore, it needs to be part of an established common ground between the speaker and the listener, and in this way, it is similar to the grammatical concept of *definiteness* (Lyons, 1999). I treat definiteness as a grammatical realisation of the pragmatic factor of givenness. Givenness can be accomplished in many ways: uniqueness (Lyons, 1999), familiarity (Lyons, 1999), physical presence (Hughes & Allen, 2013), visual availability (Matthews, Lieven, Theakston, & Tomasello, 2006), accessibility (Hughes & Allen, 2013), and, perhaps most importantly in my tasks, previous mention (de Marneffe, 2012). Previous mention is also defined as anaphoric definiteness by Lyons (1999), because the referent has been mentioned before and is thus known (given) from the linguistic context. Thus, on this view, what is given is also part of the background, and it is also eligible to be the topic, as topics

are usually given arguments. Therefore *given*, *topic*, and *background* share some common properties, as do their respective counterparts *new*, *comment*, and *focus*. I will not go into the full array of differences that these concepts present. This dissertation is concerned mainly with the effects of givenness defined as above; nevertheless, I use the concepts of topic and focus to reinforce [given] and [new], respectively.

The relation of givenness to word order is that given information usually precedes new information (Birner & Ward, 2009; Clark & Haviland, 1977), as topic precedes comment (Gundel, 1988) and background precedes focus (Gundel, 1999). According to the *given>new principle*, if all other factors are equal, speakers will prefer to place the information that is familiar to the listener first, and place the new information later (Birner & Ward, 2009). This communicative role of language goes back to the Prague School Linguistics according to which the sentence structure reflects the impact of the communicative function of language: these features include topic-comment and theme-rheme structures (Hajičová, 1994). Firbas (1971) refers to this as the *Concept of Communicative Dynamism* according to which the elements in a sentence push the communication forward, with the initial elements having a low degree of communicative dynamism (no new elements), and as the sentence progresses the degree of dynamism increases (new elements). The linear arrangement is a factor of the communicative dynamism, along with the context and semantic structure (Firbas, 1971). Since the formulations of the Prague School Linguistics, the topic/focus articulation along with the given>new principle, has been claimed as valid in a variety of Slavic languages: Polish (Grzegorek, 1984; Siewierska, 1993), Russian (Dyakonova, 2007; Kallestinova, 2007; Titov, 2017), Czech (Kučerová, 2007, 2012) for which the principle has originated, and also Croatian (Browne, 1993; Kučerová, 2012).

With regard to the listener's perspective, Prince (1992, p. 301) divides the notions of given/new into hearer-based or discourse-based. The former influences the way we refer to a referent, based on the assumptions we have about the hearer's knowledge about that referent. With regard to the former notion, a referent may evoke an entity that has or has not yet occurred in the current discourse, because the speaker knows it is part of the hearer's knowledge regardless of the current state of the discourse. The latter notion of givenness relates to the listener's knowledge gained during the current discourse. In this dissertation,

I am concerned with discourse-based givenness, but the two might amply coincide in an experimental setting, since the participant and experimenter do not have access to each other's knowledge previous to the task.

The notion of topic is related to givenness as topics are usually given (old information). However, topics are not simply given information, but they are rather expressing *pragmatic aboutness* (Reinhart, 1981). Nevertheless, because sentence topics must correspond to an already established referent (Reinhart, 1981), it will be considered given information. Consider the sentences in (23): the second one, being used in an out-of-the-blue context, is a presentational sentence that introduces a new referent, while the following sentence has one of the referents from the previous sentence as topic.

(23) A: What happened?
B: I just saw Bridget all dressed up wearing high heels.
C: She has a big date tonight and was very excited about it.

The topic in the last sentence of (23) satisfies the *old-information criterion* and also passes what Reinhart (1981) refers to as *the about test*, as the sentence can be paraphrased like in (24).

(24) As for Bridget, she has a big date tonight and was very excited about it.

However, not all given information is the topic. Consider the example presented in (25), taken from Reinhart (1981, p. 73):

(25) Context: A man talking about how his grandson is difficult to please.
And its uh got good taste. It's good. And the cereal, grandma don't like cereal but she finished (it) to the last (dish). And I enjoy ... I like it too. It's tasty! And I uh ... *He didn't want the cereal*. (*He) doesn't eat (it*). said "Todd it wouldn't kill ya, taste it!"

The topic of the few first sentences is the cereal, but in the sentences marked with italics, the topic of the sentence is the grandson because the conversation is about the grandson

and him being picky with the food, even if the cereal is given information and in the immediate awareness of the listener.

If a topic is overarching to a more ample discourse than it can be referred to as discourse topic (DT). Van Dijk (1977, p. 56) defines the DT in terms of sequential topic which is defined in terms of repeated reference to a referent in the discourse. He however specifies that the individual sentences contained within the DT stretch can still have individual topics. The difference between the two notions is exemplified in (26). The example is taken from one of the stories used in Paper 4; *the bell* (DO) is the DT.

(26) a. A cat was walking through a meadow and lost her bell.
b. A dog found the bell.
c. The dog gave the bell to her puppy.
d. The puppy was playing with the bell while a crow was watching him.

In 26c, *the puppy* is the topic of the sentence, but *the bell* is the DT, as it is what the discourse is about. The DT is thus a given argument that keeps recurring in the discourse, it is a sequential topic (Van Dijk, 1977), like the grandson's behaviour in (25) or the bell in (26). This concept of topic is made use of in Paper 4 in to reinforce givenness and make it more evident to the child that the argument in question is [+given]. According to Arnold (1999) the strength of a trigger[9] is defined as a competitive property, and topic and focus are more salient than referents that are not the topic or in focus. Thus, the DT should be the most salient/prominent argument, more so than the other referents that are simply given. Thus, we can consider DT as a strengthened givenness factor. Consequently, the DT is expected to have a bigger effect on word order than a simply [+given] object.

Unlike givenness and topic, focus is the information that is not part of the common ground between the interlocutors. The notion of semantic focus used in this dissertation (only in Paper 1) is taken from Gundel (1999), according to whom focus represents new information that is being asserted or questioned in relation to the background. The notion of focus is tested only in one of the tasks in this dissertation (the acceptability judgment

[9] In Arnold (1999) it is referred to as *salience*.

task, Paper 1) and it is treated as an answer to a wh-question, I disregard the instances in which focus is placed on given information. Thus, [+given] and [+focused] information are in complementary distribution in my work. This also entails that, unlike givenness, focus influences the argument to be placed last, or at least towards the end of a sentence, according to the *given>new* and *background>focus* linearizations.

Thus, word order is heavily influenced by information structure, which means that speakers tend to formulate their utterances by having the following order: given>new, topic>comment, background>focus. Ditransitive structures have also been found to conform to these effects.

Having outlined the basic theoretical assumptions of the given>new order and its relation to the topic>comment and background>focus order, I move to outlining the research that has been conducted on the application of the given>new order with special attention to ditransitive structures.

Skopeteas and Fanselow (2010) summarize the syntactic mechanisms that speakers of various languages use to accommodate the given>new order. These mechanisms involve scrambling (Georgian, Czech, Hungarian), passivation (German, American English, Québec French, Dutch), and clitic left dislocation (Greek). The word order alternation in double object constructions can clearly be seen as a case of scrambling to accommodate a given>new word order.

Collins (1995) analysed corpus data of Australian English and found a relation between givenness of the referent and the structure (DOD or PD) in which it appears. He states that definite (given) recipients are more likely appear in the DOD construction as 96% of the DOD contained definite recipients, while only 63% of the recipients were definite in the PD. He also found that the theme was more likely to be expressed with an indefinite NP in the DOD (79%), and more likely to be definite in the PD construction (60%).

The two alternates, PD and DOD, have been found to have some asymmetries with regard to comprehension and the given>new order. Clifton and Frazier (2004), Brown et

al. (2012) (for English) and Kizach and Balling (2013) (for Danish)[10] found a facilitative effect on comprehension when the presented order was given>new in the DOD, but not in the PD; also, they found a low acceptance rate of new>given structures expressed with the DOD. These studies used reaction times (Clifton & Frazier, 2004; Kizach & Balling, 2013), and self-paced reading (Brown et al., 2012). Kizach and Balling (2013) claim that the DOD structure is more complex, and thus the additional cognitive load of having the new argument precede the given one makes it more difficult to process. Brown et al. (2012) suggests that discourse information is incorporated into the structure of the DOD, but not of the PD, and so the DOD has constraints on how the given and new information are ordered, allowing only for given>new. Returning to what was outlined in section 2.2, we see that the results obtained by these studies suggest that the PD is more contextually applicable than the DOD.

3.2.1 The effects of givenness on word order in child language

With regard to children's data and the acquisition of the given>new principle, the main challenge that children might face while acquiring the principle is taking the listener's perspective into account. For example, Schaeffer and Matthewson (2005, p. 54) argue that children lack a pragmatic concept that allows them to systematically distinguish between their own beliefs and the beliefs of the interlocutor. They refer to this as the *concept of Non-Shared Assumptions* [11] , according to which the speaker's and the listener's assumptions are always independent. They claim this might happen because children consider what is known to them to be part of the common ground, and this consequently influences what is marked as [+given] by the children. This is the reason why children might take a long time to account for givenness through word order, as they are marking what is given for them, but not necessarily given for the listener. Regarding the various

[10] Danish also has the PD and DOD alternation.

[11] Referred to also as Non-Shared Knowledge in Schaeffer (1999)

definitions of givenness, research has shown that *previous mention* has more effect on children's choice of referring expression than *physical presence* (Matthews et al., 2006).

The research on givenness in child language has found some divergent results regarding the timeline of children acquiring and applying givenness in discourse. Unlike animacy, givenness is a contextual property, and the speaker, in this case the child, has to be able to assess what the listener knows, in order to mark it appropriately. I will first outline studies that investigated givenness in other domains and found the effect of givenness/topic, and then move on to describing the studies that investigated givenness in ditransitive structures.

The acquisition of givenness has been studied in many domains of language, such as subject omission, topics, and V2 constructions, and divergent results were reached. For the first domain, Gordishevsky and Avrutin (2004) investigate Russian which allows optionality with regard to pro-drop, as the overt subject/object do not signal additional emphasis as it does in languages such as Italian or Spanish. The distribution of subject omission is dependent on contextual requirements which relate to givenness as the omission is claimed to be allowed when the items are recoverable from the linguistic (given) or situational (physically present) context (Gordishevsky & Avrutin, 2004). The longitudinal data from Gordishevsky and Avrutin (2004) revealed that information structure is available to young Russian children (age range: 1;8-2;0 and 2;0-2;6), but there is a clear development between the two age groups as the second one is more adult-like. When children make omissions in a non-adult-like manner, Gordishevsky and Avrutin (2004) attribute it to the concept of Non-Shared Assumptions (Schaeffer, 1999). The authors conclude that the sensitivity to linguistic discourse is fast to develop and thus assume that parts of it are innate. De Cat (2003, 2009) claims that French children have the necessary pragmatic competence to encode topics. She provides both spontaneous (De Cat, 2003) and elicitation data (De Cat, 2009). In the latter study, she investigated how French children (mean age: 2;11/4;0/5;2) mark topics. In French, topics are expressed as dislocated phrases, and are referred back to with a pronominal element inside the clause, while non-tropicalized subjects are expressed without dislocation. The author found that children progressively reduced the use of subject clitics as they employed more dislocated NPs for the topics. Even the youngest children used dislocated NPs to encode the topic, and never

used indefinites in this position (De Cat, 2009). As it has been discussed in section 3.2, topics are a pragmatic/discourse factor, so the fact that children are able to mark it as such entails that children are attentive to pragmatic factors form early on. Westergaard (2003,2008) analysed the acquisition of Norwegian children with regard to subject placement with respect to negation and wh-questions and found divergent results. In case of wh-questions pragmatics has been found to have an effect in child Norwegian: V2 order when the subject was new, V3 when it is given (Westergaard, 2003), as it was found in the adult data. However, in the order of subject and negation it did not play a role (Westergaard, 2008). In Norwegian, given subjects should precede negation while new subjects should follow it. Westergaard (2008) finds that children always place the DP subjects after the negation, but the pronoun subjects are placed in both positions, even when they can be considered given. The conclusion is that pragmatics is not responsible for the non-target like behaviour because if the concept of Non-Shared Assumptions were the cause, children would place objects that are new (given to them) in the position designated for given arguments, but what is observed in Westergaard (2008) is that children treat given subjects as new; thus, what must be the cause of the non-target-like behaviour is the economy of movement as children produce movement only when there is clear evidence for it.

With regard to the acquisition of the dative alternation in English, the DOD has been found to be more difficult to comprehend than the PD structure: going back to the Cook (1975) study presented in section 3.1 in relation to his findings on animacy, the aforementioned study also found that children of all ages had a higher ratio of correct answers when the act-out scene was communicated in the PD structure, than in the DOD structure. Children improved significantly with age with regard to the DOD construction, but not the PD, since the error rate was quite low even in the youngest group. These results show that children understand the PD better than they understand the DOD construction. However, Snyder and Stromswold (1997) have shown that the DOD and PD constructions are acquired as a group, along with other constructions[12]. They analysed corpus data from

[12] The other constructions include verb-particle constructions, VP-NP-PP constructions of the 'put' class, V-NP-VP constructions with verbs of causation and perception, and resultatives.

12 children of an age span of 1;4-2;6, and they found children treat the two ditransitive constructions as grammatically related (due to the age correlation of the acquisition of the two), but also that the DOD was acquired before the PD. The authors do not relate the order of acquisition of the two structures to parental input, as there was no correlation between the lower rate of the PD in the adult speech and the age of acquisition (Snyder & Stromswold, 1997, p. 291). They also found that, once the children had acquired both structures, the DOD was used more frequently.

The studies that analysed the effect of givenness in ditransitive structures can be divided into the ones that find a givenness effect and ones that do not. The first group comprises research conducted on languages that exhibit a contrast between PD and DOD (such as English and Norwegian), while the second group of studies was conducted on languages that use Accusative/Dative case marking (Russian, Ukrainian, and German). These studies are explained in more detail in Paper 3, so I will not describe the methodology but only summarize the main finding in each of the two groups.

Studies finding an effect of givenness in child language ditransitives include: Snyder (2003)(corpus) and Stephens (2015)(experimental-production) conducted on English, and Anderssen, Rodina, Mykhaylyk, and Fikkert (2014) (experimental-production) conducted on Norwegian. Investigating a corpus, Snyder (2003) found that the children start paying more attention to givenness from age five, and increasingly from that point on. Her results show that three and four-year-old children place the [-given] IO last (target-like) only 20% of the time. This significantly increases with age, as five- and six-year-old children do it 70% of the time, and seven- and eight-year-olds increase to 80% of the productions. The behaviour of the youngest group was discussed in section 3.1.1 in relation to animacy: these children were found to heavily rely on animacy, and since the IO is always animate in the corpus, they used the DOD construction regardless of the fact that the first object argument, the IO, is [-given] in the discourse. The two experimental studies Anderssen et al. (2014) and Stephens (2015) find a givenness effect, but also a preference for the PD, which is sometimes overused. This is in line with the adult comprehension data discussed above (Brown et al., 2012; Clifton & Frazier, 2004; Kizach & Balling, 2013), as the PD was accepted with both given>new and new>given orders, while the DOD was accepted only with the given>new order.

The following studies do not find a clear effect of givenness on word order, but find a preference for the IO-DO order: Mykhaylyk, Rodina, and Anderssen (2013) (production) for Russian and Ukrainian, and Höhle, Hörnig, Weskott, Knauf, and Krüger (2014) (production) for German. Mykhaylyk et al. (2013) use the same methodology as Anderssen et al. (2014) but find an observable age difference, as the older children (5-6 year-olds) produced more DO-IO in the theme-given condition (target-like), but IO-DO was still the generally preferred object order. Höhle et al. (2014) checked how faithfully the children reproduced ditransitive structures that violated word order (*ACC-DAT)[13] or definiteness (*indef-def) constraints. They found that children faithfully reproduce sentences with no violations, but, in the case of violations, they reproduce definiteness violations more readily than word order violations, thus they would repeat the indefinite>definite order of the target sentence, but the DO-IO sentences were often reproduced with the IO-DO order.

Thus, it seems that the effect of givenness is integrated more easily in ditransitive constructions if a language has PD and DOD alternates than in languages with case marking for the theme and recipient. Complexity seems to be an issue for the PD and DOD alternating languages, as the former is claimed to be less complex than the latter for both adults (Brown et al., 2012; Clifton & Frazier, 2004; Kizach & Balling, 2013) and children (Cook, 1975). This structure is also found to be more contextually applicable, as it can accommodate both given>new and new>given orders, while the DOD cannot (only given>new) (Brown et al., 2012). Thus, children overproduce the less complex and more applicable order.

In the case of the case-marking languages seen in this section, no claims have been made on the relative complexity of the two orders. However, in those languages, regardless of the object order, the marking of the thematic roles is unvaried, and thus the recipient and theme are always distinguishable. This is not the case for the DOD structures which makes them complex as the thematic roles are not distinctively marked. The children acquiring a case-marked language seem to pay less attention to givenness that the children acquiring

[13] They consider IO-DO is the unmarked order.

English or Norwegian, and overproduce the IO-DO order. I believe that the reasons for this is the animacy of the IO, which will be discussed in the light of my findings in section 6.3.

3.3 The effect of givenness on referring expressions

Part of the research in this Dissertation focuses on the effect that givenness has on local markers: the choice of referring expressions. I will thus outline some previous research conducted on the choice of referring expression.

Just like word order alternations, referring expressions (RE) are also sensitive to givenness. One approach that takes RE into account is the Givenness Hierarchy (GH) defined by Gundel, Hedberg, and Zacharski (1993). Table 2 provides an overview of this hierarchy as it is presented in Gundel et al. (1993) for English and Russian.

Table 2: Referring expression in relation to the Givenness Hierarchy.

Cognitive status	In focus	Activated	Familiar	Uniquely identifiable	Referential	Type identifiable
RE English	it	that, this, this N	that N	the N	indefinite this N	a N
RE Russian	Ø on 'he'	on, eto 'this', to 'that'	Eto N, to N	Ø N		

The hierarchy signals the most appropriate form for every cognitive status (in Table 2). According to the GH, using a RE designed to a status higher up in a hierarchy leads to unsuccessful communication, like for example referring with 'that'/'this' or 'this N' to a referent that has the status of *uniquely identifiable,* and thus according to the GH requires a definite article. However, each cognitive status can be expressed with an RE designated to any lower status, and still lead to successful communication. For example, a referent that has the cognitive status *activated* is most appropriately referred to by using either 'that'/'this' or 'this N', but it can be referred to with any expression positioned to the right

of it in Table 2. Nevertheless, speakers should conform to the GH and should avoid being over-specific. The reason for this is that the use of full expressions for a referent with a high cognitive status could suggest to the listener that the referent is not salient, a possible shift of attention, or provide unnecessary information that slows processing down (Fukumura, van Gompel, & Pickering, 2010).

3.3.1 The effect of givenness on referring expressions in child language

The studies focusing on the use of REs in child language (Gundel & Johnson, 2013; Sauermann, 2016), have found that children generally use REs correctly, i.e. according to the GH (table 2), but can still sometimes use the wrong referring expressions due to a misinterpretation of the hearer's knowledge (Tedeschi, 2008). Recall Schaeffer and Matthewson (2005)'s proposal that this happens because children have not yet developed an understanding of the concept of Non-Shared Assumptions. As a result, children consider what is known to them (but not necessarily known to the listener) to be common ground. Schaeffer and Matthewson (2005) describe this principle for the use of definite and indefinite articles in children, but the principle can apply to any givenness effect, including the use of REs.

According to the Givenness Hierarchy, the speaker can express a referent with an RE that is more informative than necessary. Thus, children can misuse the hierarchy in two ways: by overusing fuller expressions and consequently rendering the dialogue over-specific (but still accomplishing successful communication), or by overusing pronouns and null expressions (which will most likely lead to unsuccessful communication). The studies below are grouped by their result, depending on whether the children are reported as being under-specific or over-specific in their use of REs. I start with summarizing the studies with the former result, as it is a more serious violation.

Studies that found that children tend to be under-specific with their use of REs entail that they use reduced expressions when an NP is in order. Campbell, Brooks, and Tomasello (2000) found that English-speaking children use mostly pronouns in response to both general ('What happened?') and specific ('What did the ball do?') questions. The

authors also found that the children are sensitive to the discourse as they increased the production of full NPs when answering the general questions. Nevertheless, the fact that mostly pronouns were used makes them under-specific with their references (Campbell et al., 2000, p. 1344). Tedeschi (2008) elicited specific and general questions from Italian children of various ages (2–5 years). Even though the data shows a progression from under-specific to over-specific with age, I classify this study with the under-specification findings because the younger children under-specify REs much more than the 5-year-olds over-specify them. The two- and three-year-olds overuse clitics and pronouns with the general questions. Full expressions are not overused in the specific questions by the two-year-olds, but the three-year-olds use them one fifth of the time. The five-year-olds did not overuse reduced expressions, and have a marginal overuse of the full expressions in the condition of specific questions: they prefer to be over-informative than under-informative, but their productions are almost adult-like.

Within the group of studies that find that children are over-specific in their use of REs, Wittek and Tomasello (2005) used a methodology similar to Campbell et al. (2000), but the study was conducted on German-speaking children. They obtained the opposite result of Campbell et al. (2000): children over-used NPs with specific questions, but this significantly decreased from age 2;0 to 3;6. The overuse of pronouns and null expressions was marginal in the general condition in all the age groups. Thus, German children preferred being over-specific in their production and overused NPs when a pronoun would have sufficed. Matthews et al. (2006) also used the methodology of general and specific questions on English-speaking children. Conditions with and without prior mention of the referent were added to the original methodology. All age groups (two-, three-, and four-year-olds) showed sensitivity to these conditions. The children over-specified and under-specified REs in a very similar way, with a slight tendency to over-specify, especially in the youngest group. In a corpus study conducted on longitudinal and cross-sectional data of French children, Orvig et al. (2010) found that children acquire the contexts for the use of clitics very early (around the age of 2), even though they might sometimes misuse them: children used a clitic in contexts where there was no immediate mention, but they also used another RE in contexts where the referent has been immediately mentioned and would thus

require a clitic. However, the latter occurrences are more numerous, which suggests that children are over-specific rather than under-specific.

Other studies found correct usage of REs in children—for instance, Sauermann (2016) corpus study on German. Here the children's distribution of REs was similar to the child-directed speech from the same corpora, regarding both the expression of the DO and the IO. Another corpus study, conducted by Rozendaal and Baker (2010) on English, found that adults overuse both pronouns and NPs to the same extent (pronouns for discourse-new referents, and NPs for discourse-given referents), children up to 2;6 make more pragmatic mismatches than adults but use over-specific and under-specific referents in the same amount, while children aged 3;3 are adult-like in their overgeneralizations. Gundel and Johnson (2013) investigated a corpus of English speaking children by applying the Givenness Hierarchy from Gundel et al. (1993). They found instances of indefinite and definite NPs in the higher statuses of the Givenness Hierarchy, such as *In focus*, *Activated*, and *Familiar*, in which more reduced forms would have sufficed (cf. Table 2). Thus, the authors conclude that children younger than four years are over-specific. However, Gundel and Johnson (2013) also point out to the limits of corpus data: it provides little opportunity for errors, because most of the referents are at least *activated*, implying that a demonstrative with or without the noun, the definite article, and the indefinite article can be used in that context, even though these forms would clearly come across as over-specific. This entails that, in naturalistic data, since in children's speech it is the *here and now* that is usually discussed, children have more opportunity for being over-specific than under-specific.

It would thus seem that children are more similar to adults in naturalistic data, while in specific experimental settings they are still lacking some pragmatic aspects of the interlocutor's expectation of what RE should be used. The reason for this might be that naturalistic data does not provide the contexts that are set up in the experimental data, the referents are available one way or another, and therefore the children have less opportunity to misuse a RE. Either way, it seems that children are not very likely to use reduced expressions when they are unsure, and would rather be over-specific than under-specific, which means that they are sensitive to the listener's perspective.

To sum up, when compared to the studies that investigated the effect of givenness on word order, the effect that givenness has on referring expressions seems more

consistent. This entails that children are sensitive to givenness but might not apply it to word order as many other factors can interfere, such as animacy or weight, while referring expressions are guided mostly by givenness. A study that investigates the effect of newness (givenness) on both global and local markers is Hickmann et al. (1996): they analyse the utterance structure and nominal determiners in speakers of English, French, German, and Chinese (both adults and various age groups of children). Their results show that local markings emerge first, due to the greater functional complexity of global markers. The obligatory markers differed among the languages investigated in Hickmann et al. (1996); Chinese was the only language which had obligatory global markers but optional local markers. The study revealed that, even in Chinese, local newness markings were used earlier than global ones (Hickmann et al., 1996, p. 615). Thus, local nominal determiners and use of referring expressions are easier for children to grasp than the movements related to givenness.

Thus, returning to the studies referred to in section 3.2.1 (which investigated the effect of givenness on word order in ditransitive structures), I will now describe what the REs used in these tasks were. Anderssen et al. (2014) did not divide the responses based on their referring expressions when conducting the analysis, but they report on omissions. Anderssen et al. (2014) found a clear effect of givenness on omissions, as children omitted only given objects. Stephens (2015, p. 416) categorised the responses into indefinite NP, definite NP, and pronoun. She also reports a correlation between givenness and pronominality, since [+given] arguments were realized as pronouns 80% of the time. Additionally, the pronominal form influenced word order, as pronominal themes occurred first, even if they were new. Pronouns were also used as responses in the study conducted by Mykhaylyk et al. (2013), but unfortunately the study does not report to what extent these were related to givenness. However, Mykhaylyk et al. (2013) found a givenness effect in the omissions in Russian and Ukrainian children similar to the one found by Anderssen et al. (2014) in Norwegian.

Overall, it seems that children mark givenness more readily through local markets, be that RE of definiteness, than on global markers, i.e. word order.

3.4 Summary of the effects of animacy and givenness on word order

Animacy and givenness have the following general effect on word order: [+animate] arguments precede [-animate] arguments, and [+given] arguments precede [-given] ones. From the data presented in the previous sections, it seems that children are faster to acquire and apply the *animate-first order* than to follow the *given>new principle*. The literature also suggests that children acquiring a language with case marking are less target-like in their choice of object order with regard to givenness, as they over-produce IO-DO and pay little attention to givenness in the ordering of the objects. On the other hand, children acquiring a language with dative alternation use the PD in a wider context than the DOD, just like adults. However, the impact of givenness is reflected equally in the omission rate of Norwegian (Anderssen et al., 2014) and of Russian and Ukrainian (Mykhaylyk et al., 2013). As it was seen in section 3.3.1, Previous studies also suggest that marking givenness more locally, i.e. through REs, surfaces earlier than the given>new order; and I have suggested at the beginning of section 3 that omissions can be seen as an intersection between global and local markers.

Summarising, previous research has found a bigger effect of the semantic factor, animacy, than the pragmatic factor, givenness. This is due to the fact that children are attentive to animacy from early on, from the age of two, according to de Marneffe (2012). Furthermore, animacy is not contextually variable. Givenness, on the other hand, is context-dependent, and children have been argued to lack the Principle of Non-Shared Assumptions (Schaeffer and Matthewson (2005). Additionally, local givenness markers emerge earlier than global ones (Hickmann et al., 1996). Consequently, I expect that the Croatian pre-schoolers will also take animacy into consideration more than givenness, and also that givenness will be more easily expressed locally than globally.

4 Goals of the present study

Having presented the state of the art with respect to the key notions of this dissertation, this section aims to outline the rationale behind this research. It has been found that animacy is acquired early and that children are attentive to it (de Marneffe, 2012). At the same time, the findings of the research conducted on givenness show divergent results and no general age consensus, even though effects of givenness have been found in various domains of the linguistic production (De Cat, 2009; Gordishevsky & Avrutin, 2004; Gundel & Johnson, 2013; Matthews et al., 2006; Wittek & Tomasello, 2005), including ditransitives (Anderssen et al., 2014; Stephens, 2015). Nevertheless, the effects found on ditransitives are stronger in the domain of (given) object omission than object ordering (Anderssen et al., 2014; Mykhaylyk et al., 2013).

The studies that I have presented in the previous sections did not explicitly compare a semantic/non-contextual factor to a pragmatic/contextual factor in child acquisition. This is a rather interesting combination since, on the one hand, the majority of the studies that investigate the acquisition of pragmatics or the attentiveness to context, disregard the animacy hierarchy. On the other hand, animacy is researched with regard to structure choice (active vs. passive, of/'s genitive) irrespective of other factors in the context. Thus, considering both animacy and givenness as part of the context in a series of studies that balance one or both of these factors, presents a fresh approach to already amply researched factors.

The research of the effect of givenness on word order finds fertile ground in Croatian as the topic/focus distinction (relatable to given/new) was originated by Mathesius in the Prague School Linguistics for Czech, for which it was claimed that topic and focus are the prevailing factors that determine word order (Hajičová, 1994). Accordingly, other Slavic languages have been found to comply to that order (Dyakonova, 2007; Grzegorek, 1984; Kallestinova, 2007; Kučerová, 2007; Siewierska, 1998). Thus, the effect of givenness was first investigated in the adult data, in order to make a more general contribution to the given>new order in Croatian and thus also to the Slavic Languages. Nevertheless, givenness was investigated also in terms of its effects of referring expressions due to the divergent results that were found in acquisition on a global and local

level. Additionally, Croatian is an understudied language, especially in the domain of language acquisition, thus the results are relevant for placing Croatian on the map of linguistic research in general.

The understudied status of Croatian leads me to explain the choice of the participants: this research was conducted both on adults and on children. The latter are the main focus of this dissertation but, with very scarce data available on Croatian ditransitive structures, a study only on the adult judgments was necessary in order to help formulating the research questions of the tasks targeted directly on children.

Ditransitive structures were a fit choice for this research as the two structures are both amply used in the target language. The ditransitive structures were also widely studied with regard to givenness in other languages, therefore adding Croatian to this line of literature will foster comparisons at a cross-linguistic level. Moreover, the two objects exhibit a more balanced relationship in terms of thematic role than the subject and the object do; as Arnold (2001, p. 139) claims, thematic role influences accessibility so that subject referents are more accessible that the object referents.

Thus, the purpose of this study is to shed light on the dynamics of the acquisition of Croatian ditransitive structures and what effect animacy and givenness have on word order and the choice of referring expressions. The more general findings that might accompany this research is the interplay of semantic and pragmatic factors as triggers for movement.

Based on the presented findings, I predict that children will be more attentive to animacy because this is not a contextual factor. Givenness might have an effect, depending on whether the children pay attention to the contextual factors in the given task. I have set up two different tasks: one has givenness in terms of prior mention, the other one has it in terms of discourse topic. I expect the latter to have more impact because it is a more consistent form of givenness. Nevertheless, based on the studies presented in the previous section, I expect the effect on local markers, i.e. referring expressions, to be more evident than the effect on global markers, i.e. word order. For the adults, if givenness is marked with word order in Croatian, I expect that they will conform to the given>new principle.

5 The papers and their main findings

In this section I will outline the main findings of each paper contained in this dissertation. This dissertation consists of four papers, with the following publication status:

1. "The influence of Animacy, Givenness, and Focus on Object Order in Croatian Ditransitives": accepted, in revision for *Studia Linguistica*
2. "Acquisition of ditransitive structures in Croatian child language": to appear in *FDSL 2015 Proceedings*
3. "Object Order Variation in Croatian with regard to Animacy and Givenness: A Ditransitive Elicitation Task": under review *Journal of Slavic Linguistics*
4. "The effects of discourse topic on global and local markers in Croatian ditransitives": accepted, in revision for *Glossa*

However, before outlining the papers (section 5.2), I will describe the Double Object Database project (section 5.1) which was a proved to be a crucial baseline for the entire project.

5.1 The Double Object Database

In addition to the submitted work, I have created a Double Object Database (DODB), in order to get a structured insight into the spontaneous production of ditransitive structures in Croatian child language and child-directed speech. The DODB (Velnić, 2014) can be found online and is available for browsing[14]. The data it contains constitute the foundation of every study presented in this dissertation.

The DODB contains ditransitive occurrences obtained from the child corpus on Croatian (Kovačević, 2004) openly accessible in CHILDES (MacWhinney, 2000). The

[14] https://marta.velnic.net/double-object-database

corpus contains speech from three children, two girls and one boy, age range 0;10–3;2. The DODB is divided into child-directed speech (CDS) and child speech, and the occurrences therein are categorised according to object order (IO-DO and DO-IO) or omissions (overt IO and overt DO), referring expression (NP, pronoun, and clitic), and object case. The cases that I have accounted for are: Accusative that marks the DO or the IO in the Accusative/Instrumental alternation (Zovko- Dinković, 2007), the Genitive that marks the DO if it is a mass noun, the Dative that marks the IO, and the Instrumental that can mark the DO. As previously mentioned, most of the productions were combinations of Accusative and Dative. I have also marked the prepositions linked to an object, when present.

The DODB contains a total of 1141 occurrences, divided into 35 different categories, based on the criteria specified above. The children's occurrences amount to 563 entries, while CDS constitutes the remaining 578 entries. Paper 2 goes into more detail comparing the production of the two types of speaker, and I will not discuss this matter any further here. The list of all categories and the number of occurrences they contain is shown in Table 3; the '/' sign signals an omission.

Table 3: Categories contained in the DODB and the total occurrences contained (both types of speakers).

DO-IO			IO-DO		
1st object	2nd object	Number of occurrences	1st object	2nd object	Number of occurrences
DO CL ACC	/	6	IO CL ACC	/	1
DO CL ACC	IO NP DAT	1	IO CL DAT	/	253
DO NP ACC	/	151	IO CL DAT	DO NP ACC	243
DO NP ACC	IO CL DAT	29	IO CL DAT	DO NP GEN	64
DO NP ACC	IO NP DAT	18	IO CL DAT	DO PR ACC	53
DO NP ACC	IO PR DAT	1	IO CL DAT	DO CL ACC	12
DO NP ACC	IO NP ACC +Prep.	2	IO CL DAT	DO CL GEN	4
DO NP GEN	/	25	IO CL DAT	DO NP INS +Prep.	3
DO NP GEN	IO CL DAT	2	IO NP DAT	/	57
DO NP INS	/	1	IO NP DAT	DO NP ACC	50
DO NP INS	IO CL DAT	1	IO NP DAT	DO NP ACC +Prep.	1
DO PR ACC	/	36	IO NP DAT	DO NP GEN	5
DO PR ACC	IO CL DAT	18	IO NP DAT	DO PR ACC	3
DO PR ACC	IO NP DAT	2	IO PR DAT	/	49
DO PR ACC	IO PR DAT	4	IO PR DAT	DO NP ACC	34
DO PR ACC	IO NP GEN +Prep.	1	IO PR DAT	DO NP GEN	6
DO PR GEN	/	1	IO PR DAT	DO PR ACC	2
			IO PR DAT +Prep.	/	2
Total	299		**Total**	842	
Grand total		1141			

If we break these down into four macro-categories consisting only of object order and omission, we can see that the IO-DO clearly is the predominant object order (Table 4). The

distribution holds also when we separate the occurrences per speaker type (adults and children) presented in table 5.

Table 4: Distribution in four macro-categories

IO-DO	DO omitted	DO-IO	IO omitted
480	362	79	220
1141			

Table 5: Distribution in four macro-categories divided per speaker type

Adults				Children			
IO-DO	DO-om	DO-IO	IO-om	IO-DO	DO-om	DO-IO	IO-om
241	161	60	116	239	201	19	104
578				563			
1141							

The naturalistic data contained in the DODB also show how the IO is predominately expressed as a clitic: 74% when the IO is overt. This poses the biggest limitation to our observations of naturalistic speech, because the clitic is fixed in second position in Croatian (Schütze, 1994), and thus, in the majority of occurrences, it is syntax and not pragmatics that determines the object ordering.

The occurrences inserted in the DODB were obtained by searching various forms of a ditransitive verb (not lemma) in the Kovačević corpus (Kovačević, 2004) present in the CHILDES corpora (MacWhinney, 2000). The verbs included in the searches are (given in order of frequency in the DODB): *dati* 'give', *donijeti*/*donesti* 'bring', *pokazati* 'show', *baciti* 'throw', *nuditi* 'offer', and *prodati* 'sell'. The verb 'give' was chosen because it is the prototypical ditransitive verb and all the studies on ditransitive structures discuss it; 'bring', 'show', and 'throw' were chosen for their high possibility to appear in Child Directed Speech: children are often asked to bring/show/throw something. The verb 'offer' was selected due to its possibility to be presented with an Accusative/Instrumental structure; while the verb 'sell' was chosen because it was noticed during the searches for

other verbs and it seemed to be more attested compared to others. For each verb, I searched for various forms, including the imperative, past perfect for masculine and feminine gender, present 3rd person singular, infinitive, and optative.

In addition, every object, including the omitted ones, was marked for an array of properties (including some which I do not focus on in this dissertation). However, I start by describing the properties from the ones most relevant to this dissertation.

Given, *present*, and *salient* can all be regarded to fit under the umbrella term of *accessible* (Hughes & Allen, 2013), and an object that can be described as neither *given, present* nor *salient*, would be considered new. Newness was not explicitly marked, but the absence of the accessible markings signals that an object is *new*. *Given* is defined as being previously mentioned within the last five utterances before the target utterance, and it thus signals linguistic givenness; *present* means that the object is physically present in the immediate space of the discourse, while *salient* entails that the object is at the centre of attention (for example, a ball would be salient if the interlocutors are currently playing with it). The second relevant cluster of properties is *human* and *animate*: *human* signals that the referent is human, while *animate* indicates that it is an animal, but is also extended to dolls, since they have a superior level of animacy to the objects that are truly inanimate. A lack of marking indicates that the object is *inanimate*.

Moving on to properties that were not taken into account for this dissertation, I have also marked the objects for *weight*; this was only possible in utterances with both overt objects, as an object can only be heavy with respect to the other object. Weight was defined in terms of syllables: if an object was longer than the other object by five or more syllables, it was considered heavy. *Focus* and *contrastive focus* were marked only in terms of intonation, and not in relation to the background>focus structure. The utterances were listened to and changes in intonation or stress were marked. This marking was unfortunately not possible for all the files contained in Kovačević (2004), as some of the audio files were not available. *Last mention* was marked when both objects were [+given], and it signalled which object was the one mentioned last in previous discourse. *Caused motion* was marked to indicate that the ditransitive action involved change of location. The absence of this marking entailed *caused possession,* which was considerably more numerous in the DODB. Finally, objects were marked for *syntactic persistence,* which

entailed that the structure (word order) was the same as the immediately preceding utterance.

Each occurrence in the DODB is categorised according to the parameters seen in Table 3; it contains the text of the ditransitive occurrence, and it is also marked by verb (lemma) and keyword (actual form of the verb). Crucially, the occurrences are also marked for the speaker type (child or adult), and for the corpus location: the file they are contained in and the line. The latter is crucial for locating the occurrence at any time, and checking the context if needed. Note that all the properties mentioned in the previous paragraph were marked based on the wider context where the occurrence appeared.

Overall, the DODB has proven to be a crucial tool for investigating how children use ditransitive structures: it has provided a neat overview of the productions and the categorisation was extremely helpful for assessing which structures were being produced and how it related to the two factors I am focusing on. It provides a vital gaze on how the naturalistic data is structured and what it can and cannot give us in terms of researching the effects of animacy and givenness. Nevertheless, it has a number of limitations, which is why experimental tasks were key to discovering the true effects of animacy and givenness. The main limitation of the data contained in the DODB was the lack of animacy balance (only the IOs were animate) and an abundance of givenness balance (most of the objects were in some way accessible). In addition to that, the majority of referring expressions included a clitic IO, which heavily influenced object order. The DODB can still be extended by introducing new data, or refined, by marking other categories. A future project is to add ditransitive occurrences from HrAL (Kuvač Kraljević & Hržica, 2016), which is a corpus of Croatian adult spoken language, thus facilitating three-way comparisons between children's speech, CDS, and adult-adult speech. It can also be adapted to include data from languages other than Croatian, by adding a *language* tier.

5.2 Outline of the papers

In this section, I provide an outline of each paper from the list in section 5.

Paper 1 "The influence of Animacy, Givenness, and Focus on Object Order in Croatian Ditransitives"

The first paper, "The influence of Animacy, Givenness, and Focus on Object Order in Croatian Ditransitives", tested how animacy and givenness, in addition to focus, influence the word order preference of adult speakers of Croatian. This study was conducted in order to gain some insight into how adults use ditransitive structures, and what their preferences were with regard to the factors that are investigated in this dissertation. I also wanted to see if the factors were equally strong. The methodology consisted of an acceptability judgment task (AJT), in which we tested four word orders: VID, IVD, VDI, and DVI. All three factors (*animate-first*, *given>new*, *background>focus*) had an effect on word order. The participants were 82, with an age range of 18-53 years of age (mean age=23). Firstly, the data indicates that, when the factors are neutral, the DO-IO is preferred (VDI and DVI to the same extent). This order is also preferred when only animacy is neutral. Focus only strengthens the effect of givenness—more precisely, the preference for a certain word order is stronger when the new argument is also in focus (i.e. being explicitly asked about). In terms of the strength of the factors, it seems that animacy is stronger than givenness as it guides the general level of acceptability of IO-DO and DO-IO orders, and givenness operates within a single animacy setting. The results indicate that focus is stricter than givenness, as the conditions with explicit focus had clearer preferences when compared to conditions of a simple given/new contrast, where both object orders were judged more similarly to each other. Additionally, in the focused examples, the effect of animacy was visible only when neither object was in focus (subject focused); thus indicating that focus, or a combination of focus and givenness, is stronger than animacy.

Paper 2 "Acquisition of ditransitive structures in Croatian child language"

The second paper, "Acquisition of ditransitive structures in Croatian child language", focuses on comparing child utterances to CDS, in the occurrences with no omission inserted in the DODB (Table 6). The main finding is that children overgeneralize what is most frequent in the input in terms of verb ('give'), object order (IO-DO), and object form (IO=clitic), thus resulting in a high frequency of *daj mi DO* ('give me-cl DO') structures. However, I claim that this most frequent production is not acquired as a chunk, but is productive, as children use the verb and a variety of clitics in different contexts. In the other productions, children seem to mirror the frequency of the adults with regard to which object order is mostly produced with a certain order of referring expressions. This is evident from Table 6 (Table 3 in Paper 2), reproduced from the paper.

Table 6: The distribution of object forms within the two object orders

Form	Adult IO-DO	Adult DO-IO	Child IO-DO	Child DO-IO
NP-NP	55	18	0	2
NP-PR	3	0	0	1
NP-CL	0	26	0	6
PR-NP	15	2	25	1
PR-PR	0	3	2	1
PR-CL	0	10	0	8
CL-NP	144	1	170	0
CL-PR	15	0	38	0
CL-CL	12	n/a	4	n/a
Total	244	60	239	19
Total	304		258	

The study also looked at *animacy* and *accessibility*, and found very little variation with regard to these factors, as all recipients were animate, and most of the objects were accessible. Nevertheless, there were two examples of DO-IO order in the child data, in which the DO was not accessible. This indicates that, around the age of 2;4, children still do no take the listener's perspective into account at all times.

Paper 3 "Object Order Variation in Croatian with regard to Animacy and Givenness: A Ditransitive Elicitation Task"

In the third paper, "Object Order Variation in Croatian with regard to Animacy and Givenness: A Ditransitive Elicitation Task", I conducted an elicitation task in order to obtain the contexts of givenness and animacy that were lacking in the naturalistic data of the DODB. Hence, this setting tested four conditions of givenness, intended as previous mention: *No object given*, *DO given*, *IO given*, and *both objects given*; it also tested two conditions of animacy: *prototypical* (IO-animate DO-inanimate) and *balanced* (both animate). The participants were 59 monolingual Croatian children (mean age=4;4) and 36 adult controls (mean age=21). In both adults and children, a givenness effect was found in the condition for given DO, but the givenness of the IO did not impact the results. In the condition with prototypical animacy, givenness had the opposite effect in the two groups: adults structured their utterance given>new, and children prefer the order new>given. Both groups show increasing use of DO-IO when animacy is balanced. This is attributed to the effect that animacy has in both children and adults. Adults had a strong preference for the DO-IO when animacy was balanced, in line with what was found in Paper 1. These points will be important in the discussion in the next section. Based on the results of this study, I argue that the general IO-DO preference found in children's production is the result of a strong animate>inanimate preference.

Paper 4 "The effects of discourse topic on global and local markers in Croatian ditransitives"

In the fourth paper, "The effects of discourse topic on global and local markers in Croatian ditransitives", I have used the concept of discourse topic (DT) to observe the effect of givenness. A DT will obviously be [+given], and can be seen as a topic that is maintained throughout a longer stretch of discourse, since the argument that is the DT has been established throughout the discourse as a [+given] referent. Note that, here, animacy was not balanced, and the prototypical setting of animacy (in which the recipient is animate but the theme is not) was used. The participants included 58 monolingual Croatian children (mean age= 4;4) and 36 adult controls (mean age=21). This study does not find an effect of DT on object order in the child data, as children produce IO-DO in the same proportion when the IO is the DT and when the DO is the DT. Nonetheless, an effect was found in the adult word order. However, there was an effect of the DT on referring expression in both types of speaker, as an argument is more likely to be omitted or expressed as a clitic when it is the DT. The difference between adults and children was a more over-specific use of REs by the children (they used more NPs overall), but the children did not use the clitic form to refer to the DO, while the adults did. This might be related to the fact that the DO was inanimate.

Overall, both adults and children are sensitive to animacy, but, with regard to givenness, it affects adults both on a global (word order) and local level (referring expressions), while children are affected by it only at a local level. This can be summarised in Table 7.

Table 7: Summary of the effects of animacy and givenness found on global and local markers.

	Adults		Children	
	Global	Local	Global	Local
Animacy	Weak	No	Yes	Yes (?)
Givenness	Yes	Yes	No	Yes

A note on animacy is also necessary. We have seen in section 3.2 that the animacy scale can contain many levels, depending on how we choose to look at it, with the central ones being Human, Animate, and Inanimate. Nevertheless, animacy is treated as a binary feature in all of the experimental studies of this dissertation, the naturalistic data from the double object database being an exception. The acceptability judgment task conducted on the adults distinguishes between human and inanimate arguments, while the two tasks that also had children as participants set the distinction at an animate/inanimate level. In the latter tasks, the animals depicted in the task have anthropomorphic properties, so their animacy level might be designated above the 'animate' level, but since there are no humans in the task, the distinction remains binary, regardless of where exactly we place the animal referents.

I now move on to discuss the unified result of the four papers, and what we can learn about the use of ditransitive structures in Croatian and the effects of animacy and givenness.

6 Discussion of the results

The goal of this dissertation was to establish how children acquire ditransitive structures with respect to the order of the two arguments and the realisation of REs, and how animacy and givenness affect their choices as compared to adult speakers. The papers that are included in this dissertation analyse different angles of this issue but the obtained results are coherent as the findings are reconfirmed in all the tasks. The findings of the papers outlined in section 5.2 can be summarized in the following way:

1. A discrepancy between the object order preferred in the AJT and the most frequent word order in spontaneous production;
2. The effect of animacy on word order and DO-IO as the underlying word order;
3. The effect of animacy on child language;
4. The effect of givenness.

These findings do not come from different individual studies, but rather can be seen when looking simultaneously at the results from some or all of the papers in this dissertation (based on different methodologies). The IO-DO object order is more frequently attested both in the naturalistic data and in the elicitation tasks when animacy is prototypically distributed. Nevertheless, DO-IO seems to be the underlying order. This is apparent from the adult data in the AJT, and also from the object order they produce when animacy is balanced in the elicitation task described in Paper 3. Animacy has an effect on object order in the language of both children and adults, but children are more sensitive to it. Also, when animacy is balanced, children also show a preference for DO-IO, that is, the neutral order. The effect of animacy can be observed in all of the tasks: in the AJT, very much so in the naturalistic data, and in both elicitation tasks. The effect of givenness comes out as less obvious. The adults were not sensitive to the manipulation of givenness in the elicitation task in Paper 3, but its effects were obvious from the AJT and from the elicitation task in Paper 4, where it influenced both adults' word order preferences and their choice of referring expressions. The children have been shown to be less sensitive to givenness, as it did not influence object order consistently. Both new>given and given>new object orders were found in both the naturalistic and the experimental data. However, the children did exhibit sensitivity to givenness, as it affected their choice of referring expressions just like in the case of the adults. These findings will be discussed in turn. Finding regarding the effect of animacy and the underlying order are discussed together, due to the close connection of the results.

6.1 Discrepancy between the object order preferred in the AJT and the most frequent word order in spontaneous production

In the DODB, there is a predominance of IO-DO productions for both adults and children, and this is consequently reflected in the NP-NP combinations analysed in Paper 2 which analyses the IO-DO and DO-IO occurrences from the DODB. Nevertheless, for now, I will take only the adult naturalistic data into consideration. The manipulation of animacy in the AJT reveals that the speakers prefer the DO-IO orders when the DO and IO have the same

animacy value (both human or both inanimate). This part of the discussion relates to the role of animacy, and provides a setting that will be amply discussed in the following two sections. The preference for DO-IO was not observed in the DODB, because, as mentioned before, instances of such values were not present: the IO was always animate and the DO was almost always inanimate[15]. Thus, I cannot make any claims about what happens in the naturalistic data in cases of balanced animacy. Moreover, the recipient in the corpus was not simply human, but additionally 1st or 2nd person singular, typically one of the interlocutors. The speaker and the listener have been shown to have a special status in the discourse (Hughes & Allen, 2013), which means that the IO was also likely to be more accessible than the DO. This can explain the difference between the high acceptance of DO-IO in the neutral contexts, and the production of IO-DO in naturally-occurring prototypical contexts. Thus, once the standardised pattern of naturalistic language is manipulated, other preferences surface. Croatian speakers are attentive to animacy and the word order preferences change considerably once animacy is neutralised.

However, the discrepancy between naturalistic usage and experimental preference I discuss here is more fine-grained: VID was the least accepted object order in the AJT, but it is overwhelmingly frequent in the naturalistic data. More precisely, the use of IO-DO is clearly guided by the animacy-first order. However, since VID is strongly disliked in the AJT, we might ask why the speakers use it so abundantly, since other IO-DO word orders (such as the more preferred IVD) could also be used to express a purely animate-first order.

Because of the difference between the spontaneous and experimental results in the studies in this dissertation, I will now look more thoroughly into the occurrences of the DODB, and categorize them into word orders that include also the position of the verb. The current analysis consists of the comparison of the results in Paper 1 and Paper 2, and it is not part of any of the papers included in the dissertation. I have also looked into the HrAL

[15] In cases where both objects are animate, the IO was still higher up on the animacy scale, as it was Human, while the DO was Animate (a pet or a doll).

corpus[16] (Kuvač Kraljević & Hržica, 2016), because it provides adult-adult conversation, which might differ from CDS. Tables 8 and 12 represent the four word orders in the CDS of the DODB and in the instances taken from HrAL (Kuvač Kraljević & Hržica, 2016), respectively.

However, as only NP-NP combinations were used in the AJT, the discrepancy might be caused by the difference in referring expressions used with ditransitives in the DODB and the AJT. Here, I explore the possibility that the use of NP-NP combinations is the cause of the discrepancy between word order preference and word order usage. This is why here I am considering only NP-NP combinations form the DODB and HrAL (Kuvač Kraljević & Hržica, 2016). A reason for the high frequency of VID in naturalistic data could be related to the IOs often being expressed as clitics, and to the fact that clitics are fixed in second position (Schütze, 1994). Another possible reason is that the construction *daj mi DO* ('give me-cl DO'), which is very frequent, as discussed in Paper 2. In Table 8, I have grouped the occurrences in the DODB according to their word order, including only NP-NP combinations, and excluding the ones in which the IO is one of the interlocutors. The latter were excluded due to their special status in the discourse, discussed by Hughes and Allen (2013).

Table 8: NP-NP combinations in CDS that do not include 1st or 2nd person singular.

IO-DO		DO-IO	
VID	IVD	VDI	DVI
48% (13)	7% (2)	44% (10)	7% (2)
15		12	
27			

[16] The searches were conducted on the verbs 'give', ' bring', and 'show' in the forms also contained in the DODB.

Table 8 shows that even when clitics and 1st and 2nd person objects are excluded, VID remains the most frequent word order. Hence, the discrepancy between the dis-preference for VID in the AJT and its frequent use in naturalistic data is still present.

I have also considered adult-to-adult speech, summarised in the tables 9 and 10.

Table 9: Occurrences of ditransitive structures in HrAL (all REs).

IO-DO			DO-IO		
VID	IVD	IDV	VDI	DVI	DIV
38% (69)	35% (63)	6% (11)	1% (4)	1% (3)	17% (30)
143			37		
180					

Table 10: Occurrences of ditransitive NP-NP structures in HrAL.

IO-DO	DO-IO	
IVD	VDI	DVI
33% (1)	33% (1)	33% (1)
1	2	
3		

In adult-to-adult communication, VID and IVD are used with almost the same frequency when all referring expressions are taken into consideration (Table 9). The word order distribution from HrAL still does not mirror the preferences we have observed in the experimental setting of Paper 2. The NP-NP occurrences from HrAL are limited to three occurrences only, which is not surprising since the sample is small, but it is relevant to note that none of the occurrences has the VID order. Since the crucial occurrences were found to be limited, we can look into the NP-NP combinations obtained from the elicitation tasks in Papers 3 and 4. The word orders used in these papers are the offered in table 11.

Table 11: Distribution of word order in NP-NP combinations of the adult data in the elicitation tasks.

IO-DO		DO-IO		
VID	IVD	VDI	DVI	DIV
38% (206)	8% (44)	52% (283)	1% (8)	0,3% (2)
250		293		
543				

From the distributions of word order shown in table 11, it seems that VID is still a highly attested word order, so its dis-preference in the AJT cannot be justified by the use of NP-NP structures, because, even in NP-NP structures, it is highly attested. What is not attested, however, is a higher frequency of IO-DO, as the two word orders are represented to similar extents (46% vs. 54%), with the DO-IO orders being slightly more numerous.

Thus, the discrepancy between acceptability and production still holds, but it cannot be attributed to the factors investigated in this dissertation or to the different REs used in the naturalistic data vs. the AJT setting. Perhaps it relates to the more general asymmetry between comprehension and production in word order variants (McDonald et al., 1993). Through a series of repetition (production), and judgment (comprehension) tasks of English transitive and conjunctive sentences, McDonald et al. (1993) found that the speakers were more permissive in production than in comprehension, with regard to the animate-first order. They attribute this to the different role that speakers and comprehenders have: the former know the message behind the structure they are creating, while the latter have to piece these interpretations together (McDonald et al., 1993, p. 221). Thus, a speaker may use a structure that is less preferred by the comprehender. This can be noted in the data presented in the current section: speakers use VID, but comprehenders dislike this structure. Gračanin-Yuksek (2006) claims that VDI and IVD are both base-generated, and that VID can be derived from both structures: the derivation from the former involves the movement of the IO, while in the latter it is the verb that moves. She claims that because of the two possible derivations, VID is contextually ambiguous between the

two. This ambiguity is a potential reason for the observed discrepancy, as speakers use the ambiguous order in their production, but, as comprehenders, they dislike it, as they prefer unambiguous messages. More investigation is needed to determine the exact cause of this discrepancy.

6.2 The effect of animacy on word order and DO-IO as the underlying word order

Animacy is a central factor for the research contained in this dissertation, and we can thus find effects of it in all the papers. The issue regarding the underlying word order was not in the direct scope of my studies, and it has not been explicitly tested for. However, some of the results that have surfaced are worth discussing, especially in relation to the animacy factor. Based on the results of the AJT outlined in the previous section, it seems that, when animacy is controlled for, DO-IO surfaces as the underlying object order. This makes animacy a crucial factor for word order influence as it is obviously a trigger for movement. The approach under which the underlying object order in ditransitives was revealed is similar to the principle used by Müller (1999) in section 2.3. According to Müller (1999, p. 728), the more contexts a construction can occur in, the less marked it is. In Croatian, DO-IO surfaces as the least marked structure, and thus indicates that it is the underlying one.

Adults prefer DO-IO orders in conditions of balanced animacy. Moreover, from Paper 1, we can see that they are sensitive to the very fine distinctions of animacy, as they respond differently depending on the way in which animacy was balanced. The participants provided different levels of acceptability to the available word orders when the referents were both inanimate or both humans. The difference in the judgments consisted in a stronger DO-IO preference with both animates, with the exception of the IO-given and both animate examples, which had an IVD preference. In the condition with both inanimate, the preference for DO-IO was less pronounced, but also less variable, as the contexts with no given objects and with the given IO displayed roughly the same average judgment. This indicates that the speakers are sensitive to the very fine distinction of how animacy is balanced. Specifically, note the examples presented in (27): example (27a) represents a

condition with two inanimate objects (IO=silk dress, DO=dry cleaner) and example (27b) represents the condition with two animate objects (IO=principal, DO=student).

(27) a. Context:
Mrzim kad prljam stvari. Opet moram…
hate-1ST.SG when dirty-1ST.SG things-ACC again must-1ST.SG
"I hate it when I dirty my things. Once again, I have to…"

VID: *odnijeti kemijskoj čistionici svoju svilenu haljinu*
bring-INF chemical-DAT cleaner-DAT my-REFL.ACC silk-ACC dress-ACC

IVD: *kemijskoj čistionici odnijeti svoju svilenu haljinu*
chemical-DAT cleaner-DAT bring-INF my-REFL.ACC silk-ACC dress-ACC

VDI: *odnijeti svoju svilenu haljinu kemijskoj čistionici.*
bring-INF my-REFL.ACC silk-ACC dress-ACC chemical-DAT cleaner-DAT

DVI: *svoju svilenu haljinu odnijeti kemijskoj čistionici.*
my-REFL.ACC silk-ACC dress-ACC bring-INF chemical-DAT cleaner-DAT

"…bring my silk dress to the dry cleaner's."

b. Context:
Danas je učiteljica bila jako nervozna.
Today is-AUX teacher-NOM was very nervous

Zato je bez razloga…
because is-AUX without reason-GEN

"Today, the teacher was very nervous. That's why, for no reason…"

VID: *poslala ravnatelju učenika.*
sent-3RD.SG principal-DAT pupil-ACC

IVD: *ravnatelju poslala učenika.*
principal-DAT sent-3RD.SG pupil-ACC

VDI: *poslala učenika ravnatelju.*
sent-3RD.SG pupil-ACC principal-DAT

DVI: *učenika poslala ravnatelju.*
pupil-ACC sent-3RD.SG principal-DAT

"…she sent a pupil to the principal."

The condition with two inanimate objects (27a) is not as balanced as the condition with two human objects (27b). First of all, the recipient in the former can be interpreted as a goal, and it is difficult to find a recipient that is truly inanimate but is not a location. Thus, the IO in (27a) can be either interpreted as a location or as the people at the dry cleaner's. Example (27b) truly has the two objects at the same level of the animacy scale; even if the principal could be interpreted as a location as well, the preference for DO-IO surfaces more clearly.

The relevance of animacy is confirmed by the results from the elicitation task in Paper 3, where the adult participants used the two orders in an equal proportion in the prototypical animacy condition, but, when the animacy was balanced, produced DO-IO at ceiling level.

The Croatian result is in line with the findings obtained by Røreng (2011) for German and Titov (2017) for Russian (outlined in section 2.3).

Thus, animacy seems to be a strong trigger of movement as it influences word order quite strongly in the adult language: there is a difference in judgment depending on whether the animacy is prototypical or balanced. Another indication for animacy as a trigger to movement is that the majority of the IO-DO productions from naturalistic data can be explained through the animacy of the IO. In the next section, I discuss the effect that it has on child language, and how the two groups differ with regard to their sensitivity to it and their use of DO-IO.

6.3 The effect of animacy on child language

Here I discuss the effect that animacy has on word order in child language, touching upon their acquisition of the underlying word order. Based on previous research, I have predicted that children should be more sensitive to animacy than adults are; this was confirmed by my findings, but a more in-depth discussion is warranted.

I will also claim that animacy is the cause of the apparent preference that children have for IO-DO. Previous studies, like Mykhaylyk et al. (2013) for Russian and Ukrainian

and Höhle et al. (2014) for German, have found a preference for IO-DO in children's productions. A higher usage of IO-DO was also found in my studies: in the naturalistic data (Paper 2), in the elicitation task in the study on the DT (Paper 4), and in the prototypical animacy condition of the elicitation task in Paper 3. What all of these studies have in common is the prototypical animacy condition, which is unbalanced for animacy as the IO is animate but the DO is not.

We can see that the preference for IO-DO changes significantly when animacy is balanced. The study in Paper 3 provides a condition with balanced animacy (both animate), in which children use the DO-IO in higher proportions than the IO-DO. In the prototypical animacy condition, the word order distribution amounts to 73% in favour of IO-DO, while, when both IO and DO are animate, the use of this word order is only 48%[17]. This difference is statistically significant at $p<0.001$. If the children's preference for IO-DO in the unbalanced animacy condition was not due to the influence of animacy, children should exhibit a preference for the same object order in the task with balanced animacy. IO-DO should thus be preferred, both in the prototypical condition and in the balanced animacy condition. Accordingly, children have started to acquire that DO-IO is used in balanced conditions, but are not yet adult-like.

Hence, animacy is the cause of the apparent preference that children have for IO-DO in both naturalistic and experimental data seen so far: naturalistic data usually has an imbalance of animacy, and the result is a high proportion of IO-DO. The studies mentioned earlier only tested conditions in which only the IO was animate, and this has thus lead to the conclusion that IO-DO is the preferred word order.

In light of my data, it would seem that the studies that claim to have found a preference for IO-DO in child language are more likely to have found an animacy-first effect. The preference for IO-DO is guided by a combination of the children's tendency to place animate objects in front of inanimate ones, and the fact that the recipient is highly likely to be animate, while the theme is not. From the results obtained by Paper 3, we can

[17] The values given here are the average of the percentiles across the givenness conditions; for more detailed data and statistics see Paper 3.

see that the children do not have a general preference for IO-DO, as previously believed. They are sensitive to animacy, and disregard the IO-DO order when animacy is balanced.

The results from Paper 3 also indicate that children are more sensitive to animacy than adults are, in agreement with Snyder's (2003) finding. This surfaces in relation to the fact that children are not adult-like with regard to the use of DO-IO in conditions of balanced animacy (the use of DO-IO is still significantly lower than in the adults). Thus, the different proportion of the responses in the two animacy conditions must be mostly animacy-driven, and children rely on this factor more than adults. Unfortunately, the children I have tested are too close in age and do not show different results based on age.

The fact that children rely more on animacy than adults is indicated also by the results obtained in Paper 4. This paper did not test animacy explicitly (it did not offer conditions other than the prototypical one), but it provides additional insight into the fact that children favour the IO-DO order in their responses. More precisely, the distribution of the two word orders in the baseline condition (neither object is the discourse topic) in the elicitation task in Paper 4 is the same as the average distribution of word order in the prototypical condition (of all the givenness conditions) in Paper 3: 72% IO-DO and 23% DO-IO (the remaining examples are omissions) in Paper 4. Recall that the average of the productions in Paper 3 was 73% and 27% in favour of the IO-DO.

The main finding with regard to animacy is that it shapes naturalistic data so heavily that it has obscured what seems to be the underlying object order (Paper 2). It is also a factor taken for granted, and it has not explicitly been taken into consideration by a majority of the research on ditransitive structures. Studies that only take spontaneous data into account, like corpora, will very likely face the same problems as the DODB, more specifically, an abundance of prototypical animacy. Even for the English dative alternation, the PD was claimed to be more contextually applicable, although Bresnan (2007) found that the DOD is more attested in corpora and claimed that this is caused by the animacy of the recipient. My findings suggest that animacy should more often be accounted for. Consequently, none of the studies referred to in section 3.2.1 (on the acquisition of givenness) had balanced animacy, and, in my opinion, this might have interfered with the findings regarding the preferred word order.

Thus, in light of the effect of animacy and the seeming preference of IO-DO found in Croatian child language, it is natural to return to the discussion from section 3.2.1, regarding the reason why German, Russian, and Ukrainian children seem to prefer IO-DO. In languages such as English, the choice between PD and DOD as alternating structures is not only context-bound. The DOD has been found to be more difficult to comprehend for the children (Cook, 1975), and also for the adults when presented in a new>given order (Brown et al., 2012; Clifton & Frazier, 2004; Kizach & Balling, 2013). Kizach and Balling (2013) claim that this is due to the complexity of the DOD. Consequently, animacy plays a less important role when it comes to the choice of word order in languages with PD and DOD alternation. The reason for this might be that the word order favoured by animacy-first in the prototypical condition is DOD, but its complexity interferes in the word order choice. In the case of German and Russian, IO-DO and DO-IO have not been reported as being different when it comes to complexity, and animacy seems to plays a bigger role in object order choice. In these languages, the thematic roles are marked at all times on the objects through case: Accusative for the theme and Dative for the recipient. Thus, the different tendencies are dependent on animacy and complexity. in the languages that display an alternation between PD and DOD, the DOD (IO-DO order) is more complex due to its neutral alignment, whereas in languages that use case, the marking for the thematic role is available at all times and thus animacy can surface as a strong trigger for movement. Therefore, in a prototypical setting (recall that the studies did not balance animacy), children that are acquiring a case-marking language will prefer IO-DO due to animacy-first, while children acquiring languages with dative alternation will prefer PD, because it is the less complex structure.

According to Snyder (2003), children were found to become less attentive to animacy as other factors begun influencing their word order choice. Givenness is one of these factors, and, in Snyder's corpus, children started paying attention to it around age four. The following section outlines the main findings regarding givenness in my own research.

6.4 The effects of givenness on word order and referring expressions in ditransitive structures

The effect of givenness on ditransitive structures is less clear-cut than the effect of animacy. I discuss the findings and the possible reasons for the obtained results here. I investigated the effect of givenness in two ways: on global markers that operate at the sentence level (object order) and on local markers, which influences the choice of referring expressions. I first discuss the findings related to the global markers, as they are present in all the papers, while the findings for the effect on referring expressions are confined to the elicitation task that looked into the effects of Discourse Topic (Paper 4).

In the AJT, conducted on adults only, an effect of givenness is found within every animacy condition (*IO animate*, *neither animate*, *both animate*), which suggests that animacy establishes the main trend of object order preference, and the effect of givenness is seen within this trend. More precisely, in the examples where the IO is animate and the DO is not, IO-DO orders are generally preferred, but the preference varies according to whether the IO, the DO, or neither object is given. The givenness effect is best observed in the prototypical animacy condition, and when both objects are animate. The AJT also tested the effect of focus, formulated as an explicit question: the referent that was being asked about was considered focused. One third of the test conditions had focus as a factor. An example of focused IO and given DO (prototypical animacy) is presented in (28).

(28) Context:

Kome	*ćeš*	*pokloniti*	*ovu*	*šalicu?*	
whom-DAT	will-AUX	gift-2ND.SG	this-ACC	cup-ACC	

"Who will you give this cup as a present to?"

VID:	*Poklonit*	*ću*	*svome*	*ujaku*	*tu*	*šalicu*
	gift-1ST.SG	will-AUX	my-REFL.DAT	uncle-DAT	that-ACC	cup-ACC
IVD:	*Svome*	*ujaku*	*ću*	*poklonit*	*tu*	*šalicu.*
	my-REFL.DAT	uncle-DAT	will-AUX	gift-1ST.SG	that-ACC	cup-ACC
VDI:	*Poklonit*	*ću*	*tu*	*šalicu*	*svome*	*ujaku.*
	gift-1ST.SG	will-AUX	that-ACC	cup-ACC	my-REFL.DAT	uncle-DAT
DVI:	Tu	šalicu	ću	poklonit	svome	ujaku.

that-ACC cup-ACC will-AUX gift-1ST.SG my-REFL.DAT uncle-DAT

"I will give this cup to my uncle."

Since in the AJT the given and focused object were in complementary distribution, the focused object strengthened the effect of new information, and consequently the participants had a strong preference for having the given object first and the focused object last. Thus, having also focus as a trigger for movement made the speakers' preference much clearer. Within the focus conditions, the effect of animacy was only observed when neither object was in focus. Overall, the results from the AJT reveal that Croatian (adult) speakers are attentive to givenness, but it seems to be a weaker factor than animacy. Unless also focus is involved. Since we did not have examples with only focus but no givenness (all new but an argument also focused), it is hard to say whether the fact that focus seems to be a stronger factor than animacy is caused by focus only or by the combination of focus and givenness.

The corpus data (Paper 2) did not reflect the result obtained by the AJT, mostly because the data was uniform and there were few relevant contexts where only one of the object referents was given. However, the corpus data revealed the possibility that children and adults behave differently: children had instances (n=2) of new>given, while adults produced only the given>new orders. However, the two occurrences in question have DO-IO order which could entail that the givenness trigger is not strong enough so they produce what has been discussed to be the underlying word order. This, however, does not explain why the animacy of the IO does not trigger movement in these two cases, as it obviously usually does. Of course, no strong conclusions can be made based on the basis of only two occurrences. However, this observation is supported by the fact that children show a tendency for producing new>given orders in the elicitation task in Paper 3, while adults do not. This signals that children and adults behave differently with regard to givenness and word order.

Moving on to the elicitation tasks, in Paper 3 I tested four conditions of givenness: *nothing given* (all new), *DO given*, *IO given*, *all given*. The first and the last conditions were considered the baseline, while the conditions with one given object were the target conditions. An effect of givenness was found only in the *DO given* condition, in both adults

and children. However, adults and children behave differently in this condition (with prototypical animacy), as the former increase their productions of DO-IO, as expected, while children produce fewer in comparison to the responses they give in the other conditions, thus revealing a tendency of new>given order. Recall that the IO was animate and the DO was given, which leads to the two factors tested (animate-first and given>new) having opposite effects; this can explain the special status of the *DO-given* condition for the child data. However, the effect that the givenness of the DO has on the production of object order in the child data changes when animacy is balanced. In these conditions, children increase the productions of the DO-IO order as compared to the other conditions, which is exactly what the adults did in the prototypical condition with respect to the given DO. Unfortunately, we cannot compare the effect of givenness for children and adults, as adults produced only DO-IO constructions when animacy was balanced, with no regards to givenness. The reason for this lack of givenness marking is possibly task-related and discussed in more detail in Paper 3.

The given DO thus seems to be a stronger trigger for movement than the given IO: the *DO-given* condition differed from the baseline, while the *IO-given* condition did not. The reason for this might be that the IO has a constant trigger (animacy) and compared to that, the trigger that givenness provides is too weak. Nevertheless, my results cannot confirm this, thus the reasons behind givenness triggering movement differently when it is a factor of the DO or the IO remain in need of a more thorough investigation.

An effect of givenness, implemented as discourse topic, has been found in adults in the elicitation task in Paper 4. The effect consists of the participants using more IO-DO compared to the baseline when the IO is the DT, and more DO-IO with respect to the baseline when the DO is the DT. The distribution of object order in all three conditions (baseline and the two targets) is statistically significant. This entails that adults are attentive to givenness and it is possible that it was not set up as a strong enough trigger in the task reported in Paper 3. No effect on object order was found in the children's responses, where the object order was equally distributed in favour of the IO-DO in both target conditions. However, there was a noticeable increase of object omission in the two target conditions, with the omitted argument typically being the discourse topic. This brings us to the local

effects of givenness in terms of the choice of referring expression, as an omission can be considered an intersection of global and local markings.

For the discussion of local markers, I focus only on the results from Paper 4, as it also tested the use of referring expressions. The use of DT proved to be quite successful, as it yielded an effect of givenness/DT on object order in the adults, unlike when givenness was tested only in terms of previous mention (Paper 3). As already discussed in the background section, given arguments and topics do not have a one-to-one correspondence, but topics are given even though they are not necessarily the only argument that is given (Reinhart, 1981).

The task revealed an effect of givenness on the use of referring expressions in both child and adult data, as the given element was more likely to be reduced, i.e. omitted or expressed with a clitic. The use of pronouns was extremely rare, confined to a few productions in the child data, but not in the adult data. We can thus define three types of RE in Croatian: full NP, clitic, and omission. We also found that the use of RE is related to argument type: subjects are typically omitted when they are the DT (there is no nominative clitic), while IOs are mostly expressed as a clitic or omitted. This was also observed in the corpus data (Paper 2). However, children do not cliticize the DO, while adults do it 17% of the time when it is the DT. Thus, the adults use three types of REs for both DOs and IOs (NP, clitic, null), while children use these three types for the IO (NP, clitic, null) but only two of them (NP and null) for the DO and the subject. The results reveal that, overall, children use more NPs than adults, which is in accordance with what most of the studies outlined in the background (section 3.3.1) report with regard to under- and over-specification. Thus, Croatian children tend to be over-specific as well.

The results of this study show that children are attentive to givenness, but they express it more consistently with REs. This entails that the marking of givenness starts from a local level, and then develops as the children start applying givenness to the global level at a later stage. Unfortunately, none of the studies in this dissertation show when givenness marking emerges at a global level. For this, older children need to be tested.

With regard to omissions, which can be considered an intersection between global and local markers, children exhibit sensitivity to givenness in their use of omissions, as they do not omit new objects. This effect of omissions has also been found in other studies

that aimed to test the effect of givenness on word order, but found a clear effect of givenness on the omissions (Anderssen et al., 2014; Mykhaylyk et al., 2013). In addition, my research also finds that the children are cautious with how they use their REs, exhibiting a tendency be over-specific in their use of nominal referents.

7 Open questions and further research

The research reported in this dissertation makes a valuable contribution to the on-going discussion of the use and the acquisition of ditransitive structures. Based on the results reported here, we now have a clearer understanding of what the underlying word order in ditransitives might be in Croatian, and how these structures are affected by animacy and givenness in both child and adult language. Nevertheless, many questions still remain, opening up interesting possibilities for future research.

The data I have presented points strongly in the direction of DO-IO being the underlying order of the two objects, but more evidence is needed in order to establish this with full certainty. For example, structures other than the Accusative/Dative ditransitives could be investigated such as the secundative structures which have Accusative/Instrumental markings (section 2.4), and also structures of caused motion (Levin, 2008) that include a PP for marking the recipient/goal. By investigating the preferred orders in these structures with and without factors that trigger movement, we could establish with more certainty what the underlying order is.

All the studies show a clear effect of animacy on object order, but a bigger data set—containing more verbs and/or novel verbs, and tested in both prototypical and balanced conditions of animacy—would provide a deeper understanding of what guides the children's attentiveness to animacy such as the verb-type (Levin, 2008), or the type of balance (animate-animate vs. inanimate-inanimate). Examples of the former were observed in the AJT carried out with adults only, where the contrast between the conditions where both arguments were either animate or inanimate was found to be influential. Also, by testing older children, we could observe how the attentiveness to animacy changes until it reaches the target adult level. Furthermore, testing ditransitive structures with balanced

animacy in other languages for which it has been claimed children have a IO-DO preference could reveal the true nature of the animacy effect cross-linguistically.

With regard to givenness, I have found that Croatian children mark givenness with local marking and not global marking. Increasing the age span of the children could reveal when exactly the children start using word order to mark givenness, and whether that affects the over-specification of RE that we see in Paper 4. However, it also seems that givenness is a stronger trigger when it is a factor of the DO than of the IO. The research in this dissertation is unfortunately unable to answer this question, but it is an interesting observation and further research can elucidate why this happens.

8 Conclusions

The main finding of this study is that the importance of animacy on the word order of ditransitive structures may have been underestimated. Animacy is a factor that is always at play in these structures, but rarely explicitly grammaticalized, and hence paid very little attention to. However, as all of my studies show, it plays a major role for every ordering choice in ditransitives. Children pay more attention to animacy, and thus behave significantly different than adults in their word order choices. Children have less experience with language and the world, and thus have had less exposure than adults to the conditions necessary for producing DO-IO. Nevertheless, the children have started acquiring this and use the two object orders in different proportions based on the animacy condition. This was illustrated by the children's responses in Paper 3, when the DO-IO was predominantly used in the condition of balanced animacy. My results show how strongly animacy shapes the naturalistic data of ditransitive structures, but also how exposure to the predominant IO-DO order does not alter the preference for DO-IO when the triggers of movement (mostly animacy) are absent. Speakers are very attentive to animacy, but are also quick to disregard the IO-DO order once animacy is no longer a factor.

Thus, this set of studies also indicates that DO-IO is the underlying word order for Croatian ditransitives. I conclude this based on the fact that it surfaces when there are no factors that trigger movement of the IO across the DO. As seen in the papers of this

dissertation (see Discussion), but also due to the fact that most of the IO-DO occurrences can be explained with reference to unbalanced animacy. The status of DO–IO as the underlying word order is in line with the results of previous research: Røreng (2011) for German and Titov (2017) for Russian claim that DO-IO is the underlying order due to its wide contextual applicability. In a study of German naturalistic data, Røreng (2011) has also found a predominance of IO-DO, but nevertheless has also found that the occurrences that are absent from triggers (animacy and focus) have the DO-IO order. Thus, she concludes that DO-IO is the underlying order. The conclusions regarding underlying word order and animacy are closely related, since when the animacy values are manipulated, we can see both how animacy is shaping word order, and how the speakers' preferences clearly change when it is balanced.

The effect of givenness was observed at a global and local level. At a global level, it had a stronger effect on adults than on children: the adults had a clear preference for given>new, while children also produced the opposite order. Givenness had a clearer effect at a local level for the children; Paper 4 showed that the effect of givenness is expressed through the choice of referring expression, rather than object order alternation. Thus, the data presented here indicate that givenness marking starts at a local level, that is, expressing a given argument with a reduced form, and at a later stage, not revealed in the current studies, it is applied to a more global level that consists of reordering the arguments.

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Part II: Papers

THE INFLUENCE OF ANIMACY, GIVENNESS, AND FOCUS ON OBJECT ORDER IN CROATIAN DITRANSITIVES

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Abstract

This study aims to investigate how animacy, givenness, and focus influence object order (direct/indirect) preference in Croatian ditransitive structures. An online survey testing acceptability judgements of four target word orders in various contexts was conducted on 82 native speakers of Croatian. We found that all three factors have an effect on word order preference. The study reveals a preference for DO-IO orders once animacy is neutralized and found that focus influences object order more strongly than a simple given/new contrast. The preferred word order is verb-direct-indirect because of its high judgment score across the task, indicating a wide contextual applicability.

1. Introduction

Factors that influence word order in ditransitive sentences have been widely studied cross-linguistically, and it is commonly agreed that definiteness, givenness, weight, pronominality, animacy, and focus influence the choice of dative structure (De Marneffe, 2012). More precisely, these factors follow a *harmonic alignment* according to which definiteness, givenness, pronominality, and animacy influence word order by placing the definite/given/pronominal/animate constituent in front of the constituent that does not have these properties; conversely, properties such as weight and focus affect word order by favoring the heavy or focused constituent to follow the constituent without this property. This study aims to find out how the preference of the order of the verb (V), indirect object (IO), and direct object (DO)[1] in Croatian ditransitive sentences varies in contexts with different animacy, givenness, and focus values of the object(s). Some of the factors discussed in De Marneffe (2012) are not included in the present study. The reason for the exclusion is summarized in the next paragraph.

This study focuses on pragmatic rather than syntactic factors that influence word order in ditransitives. As a result, only NPs were considered and other referring expressions (clitics and pronouns) were excluded. The main reason for doing so is that in Croatian, clitics obligatorily occur in the second position (Schütze, 1994). As

[1] The abbreviations IO and DO are used when the objects are referred to in isolation and with regard to their relative word order (IO-DO/DO-IO), whereas when we refer to word order including the verb the following abbreviations will be used: VID, IVD, VDI, and DVI.

clitics are used more frequently than pronouns, the object that is realized by a clitic will always occur in this position. Thus, clitics have been omitted from the study as their placement is purely syntactic, even though the choice of referring expression is clearly determined by pragmatics. Furthermore, as pronouns typically signal given arguments and are light, they have been excluded as well. Thus, in this study we will consider NP objects, and as we constructed them with equal length, as weight is not a factor in this study. We also decided not to test for definiteness in this task due to an imbalance of the status of definite and indefinite markings: Croatian does not have obligatory definiteness marking, but has more means for marking definiteness (demonstratives, possessives, and possibly some types of adjectives) than indefiniteness, the latter including the quantifier *neki* 'some' or numeral *jedan* 'one'. These can also be ambiguous between specific and non-specific readings. The task nevertheless contains some instances of determiners in order to keep the task more natural. The definiteness markings are not expected to play a role in word order preference as they match the given and new values of the objects.

Therefore, the purpose of this paper is to discuss how animacy, givenness, and focus influence and interact with word order in Croatian ditransitives. Croatian is an understudied language in this regard, as most of the studies on word order have been conducted on other Slavic languages.

Thus, an acceptability judgment task (AJT) was set up, with an array of conditions with different values of the three factors that are the focus of this study, and 82 native speakers of Croatian took part in it.

The results show that animacy, givenness and focus have an effect and interact in their influence on word order. There is a clearer effect of givenness when animacy is neutral, which can be seen by comparing conditions where the IO is animate to the conditions in which both or neither object is animate. We also found that when animacy is neutralized (no-animate and both-animate) the DO-IO orders (VDI and DVI) are preferred to IO-DO orders (VID and IVD). This signals a discrepancy between our findings and naturalistic data, since corpus data from the Double Object Database (DODB) (Velnić, 2014) (Kovačević, 2004) and the Croatian Adult Spoken Language Corpus (HrAL) (Kuvač Kraljević and Hržica, 2016) show that the IO-DO object order is by far the most frequent one. This study also found that the word order with the widest contextual applicability is VDI, as it is well accepted in all conditions and the preferred one in neutral conditions (no-animate/both-animate and no-given).

The paper is structured as follows: we provide a background section divided in two parts, the first one outlining the Croatian ditransitives (section 2.1) and the second one describing the factors and their effects (section 2.2). In the following section, we lay out the research questions and predictions (section 3). Then we proceed with a methodology section (section 4), and the results (section 5) followed by a discussion (section 6). The last section is reserved for the conclusions.

2.1 Ditransitive structures in Croatian

Since Croatian is defined as a 'free' word order language, all possible word order combinations of subject, verb (V), direct object (DO) and indirect object (IO) in

ditransitive sentences are attested, but the variants are not interchangeable, as they depend on pragmatic factors (Siewierska, 1998). Research on the pragmatics of Slavic languages has mostly been conducted on Russian, Czech, and Polish. Mithun (1992) states that in these languages, pragmatics has strong effects on word order when compared to languages like English, where syntactic roles primarily determine word order. Observing the effects of pragmatic factors on word order is more straightforward in ditransitive structures, because the prominence of one of the objects is contextual, whereas this would not be the case in a subject-object relation of transitive sentences where the subject is more prominent than the object because the subject has potential control over the action expressed by the sentence (Lamers and De Hoop, 2004). So, the relative ordering of the two objects should be the result of pragmatic factors and not of thematic role. Some examples of word order possibilities of ditransitive sentences are provided in (1).

(1) a. Ana daje Marku jabuku. - S**VID**
anne-NOM gives-3rd.SG mark-DAT apple-ACC

b. Ana daje jabuku Marku. - S**VDI**
anne-NOM gives-3rd.SG apple-ACC mark-DAT

c. Ana Marku daje jabuku. -S**IVD**
anne-NOM mark-DAT gives-3rd.SG apple-ACC

d. Ana jabuku daje Marku. -S**DVI**
Anne-NOM apple-ACC gives-3rd.SG mark-DAT

e. Jabuku Ana daje Marku. - DSVI

apple-ACC anne-NOM gives-3rd.SG mark-DAT

f. Marku Ana daje jabuku. – ISVD

mark-DAT anne-NOM gives-3rd.SG apple-ACC

In the current study, we focus on the boldfaced orders (1a-1d), excluding the subject (S) because Croatian is a subject-drop language. When the subject is omitted, (1e) and (1f) correspond to (1d) and (1c) respectively. We do not take the verb-final possibilities (IDV and DIV) into consideration.

We have checked the distribution of three ditransitive verbs ('give', 'bring', and 'show') in the HrAL spoken corpus of Croatian (Kuvač Kraljević and Hržica, 2016) and found IO-DO (n=143) orders to be considerably more frequent than DO-IO orders (n=37). In terms of verbal (V) position. Table 1 shows the distribution of word orders found in HrAL.

Table 1: Distribution of word orders from HrAL

IO-DO			DO-IO		
VID	IVD	IDV	VDI	DVI	DIV[2]
69	63	11	4	3	30
143			37		

[2] Unfortunately, DIV was not included in the study as the HrAL corpus of spoken Croatian was opened after the data for the study has been collected. This study was designed based on the proportions of word orders found in child directed speech in the CHILDES corpus because it was the only source of spoken Croatian available at the moment.

A closer look to the data reveals that the high amount of IO-DO orders might be due to extensive use of clitic form of the IO (n=130). When these are excluded, the number of IO-DO orders (n=38) is reduced with respect to DO-IO orders (n=16). This is why in the current study we only include NPs.

The verb-final word orders have been excluded due to their ambiguity with respect to the relative and absolute interaction of word order and definiteness (Šimík and Burianova, 2017). According to Šimík and Burianova (2017), if the definiteness of a bare NP is related to its relative position (i.e. *relative generalization*) in a sentence, it is definite when it is preverbal; whereas if the relation of word order and definiteness is absolute (i.e. *absolute generalization*), then an NP is definite when clause initial. In this study, we are interested in the positioning of the two objects in a double object structure, so we have reformulated the two generalizations in the following way: we consider relative the relation of word order and givenness (definiteness) when the two objects are adjacent and both follow the verb (VID, VDI); while the absolute relation is when the object is clause initial, thus preceding the verb (IVD, DVI). Both of these relations maintain the given>new order. Consequently, IDV and DIV are excluded because the objects are both preverbal and adjacent to each other, thus the first object is in both the relative and the absolute position. The different implications of these two relations will be further explained in our predictions.

When a language has two syntactic structures for expressing the arguments of a ditransitive verb, it is referred to as Dative Alternation (Oehrle, 1976:7). An example of Dative Alternation in English is found in (2) with the Prepositional Dative (PD) in (2a) and the Double Object Dative (DOD) in (2b).

(2) a. John gave a book to Mary.

b. John gave Mary a book.

Gračanin-Yuksek (2006) draws a parallelism between Croatian word order and the Germanic alternating structures of PD and DOD seen in (2). She claims that IVD (1c) is the semantic equivalent of DOD (2b) and VDI (1b) is equivalent to the PD (2a), while VID (1a) is structurally ambiguous between the two structures; no claims were made on the DVI. Moreover, it has been claimed for Germanic languages that PD is an ambiguous structure that can be used across contexts, while the DOD is more contextually bound (Clifton and Frazier, 2004for English), (Kizach and Balling, 2013For Danish).

However, Gračanin-Yuksek (2006) analyzed this parallelism under neutral intonation. Here we are analyzing the word order preferences in very specific contexts, so the two studies are not directly comparable. But if VID is structurally ambiguous, we can expect it to be more contextually applicable and thus well accepted across the array of conditions tested in the survey. We expect the object-

first orders to be more contextually bound due to the prominent (fronted) position of one of the objects.

With respect to the relative relation (VID and VDI) and the absolute relation (IVD and DVI) of word order and givenness, the preferred relation that Croatian speakers have should be revealed in the more contextually bound conditions (when one object is given); while the word order with the widest contextual applicability will be observed based on the overall judgments and the judgments of the neutral conditions.

2.2 Factors: animacy, givenness, and focus

Now we move on to describing the effects of the factors involved in this study. The effect of animacy on word order can be referred to as the animacy-first effect. This entails that in animacy-mixed pairs, animate entities will tend to come first (Van Nice and Dietrich, 2003). A consequence of this is the use of animate nouns as subjects. Animacy and grammatical role also interact, as the stereotypic agent is animate and the patient is inanimate (Van Nice and Dietrich, 2003:829). With regard to theme (DO) and recipient (IO) in ditransitives, the prototypical theme is inanimate, while the recipient is animate. Thus, in ditransitive sentences, animacy is strongly related to the IO.

Animacy is a semantic property (it does not depend on the context) and this may cause animates to be more conceptually accessible than inanimates. Conceptual accessibility is related to how retrievable an item is from memory

(McdonaldBock and Kelly, 1993). According to Branigan, Pickering and Tanaka (2008) this tends to make them highly accessible conceptually and thus easier to retrieve; this influences both word order and grammatical function assignment, in that what is highly accessible is placed in front of what is not. Van Nice and Dietrich (2003) explored the relation of animacy and word order on passive constructions in German by using picture description tasks. The images depicted transitive actions with four combinations of animate/inanimate agents and patients. They found increased passivisation when only the patient is animate; conversely the condition with an animate agent and inanimate patient elicited the least passives. They concluded that it is accessibility that leads to the selection of animate agent first. Gennari, Mirković and Macdonald (2012) investigated production preferences related to animacy in English, Spanish, and Serbian relative clauses. The results showed that animacy exerts a strong influence when passive relative clauses were chosen in English, but less so for the other two languages, and especially for Serbian because passives are infrequently used in general. The results of most interest for the current study are the ones on Serbian, due to its close relation to Croatian. Serbian speakers do not need to use passivation in order to start the sentence with the animate referent; because of free word order the referents can simply be rearranged. This is why the use of passive is not necessary to ensure that the (animate) patient is placed first. They find that in Serbian, case marking dominates production choice (p.156). Therefore, the results find that Serbian speakers produce active sentences overwhelmingly across all animacy conditions. The authors conclude that the effect

of animacy is minimal in Serbian for this task. However, this is not necessarily due to the limited effect of animacy, but rather due to the fact that passives are simply not extensively used. Thus, the effect of animacy should be sought elsewhere. From this perspective, our test provides a better testing ground for the effect of animacy, since it involves judgments on word orders that do not include passives.

In sum, we can conclude that animate elements tend to precede inanimate ones and that languages have mechanisms that provide a possibility for the animate-first order. Passivisation will thus be used in some languages, while in free word order languages the referents will simply be rearranged. The same can be applied to the Dative Alternation: in some languages speakers will have to use different structures in order to accommodate the desired word order, while in free word order languages this can be accomplished with a different ordering of arguments. With Croatian being a free word order language, a word order rearrangement is enough to accommodate the animate-first tendency.

With regard to givenness, we want to investigate whether the given before new (given>new) principle also applies to Croatian. According to this principle, Firbas (1964), referring back to Mathesius, claims that in languages such as Czech, sentences open with a theme and close with a rheme which roughly correspond to given and new information. According to the given>new principle, speakers typically prefer to place given information earlier in the sentence and new information later in the sentence (Birner and Ward, 2009). This way of arranging elements in a sentence was already mentioned in connection with the notion of Harmonic

alignment (De Marneffe, 2012) above. Other ways of organizing sentences according to information structure are: theme-rheme (Firbas, 1964), topic-comment (Gundel, 1988), and background-focus (Jacobs, 1986). All of these will be discussed in more detail below. Given information is thus related to background information and new information is related to focus.

For Slavic languages, most of the research on the given>new principle has been conducted on Czech (Firbas, 1964, Kučerová, 2007, Kučerová, 2012, Šimík, Wierzba and Kamali, 2014), and Polish (Grzegorek, 1984, Siewierska, 1993). We have already seen from Firbas (1964) that themes tend to precede rhemes in Czech. Other studies conducted on Czech suggest that only SVO, the basic word order, can be used in a variety of contexts, while other orders can only be used when they comply with the given>new principle (Kučerová, 2007). In Kučerová (2012) the research is expanded to Russian and Serbo-Croatian; she concludes that in these languages given elements precede new ones, and a new>given order is ungrammatical. In contrast to that, Šimík, Wierzba and Kamali (2014) claim that given objects can occur anywhere in the sentence, excluding the final position when there is neutral intonation, which has sentence final stress in Czech. Thus, the authors relate givenness to prosody, as a given argument cannot be stressed. The final position is possible for a given argument as long is it not stressed, which means that the sentence does not have neutral intonation. This approach makes the role of the given>new principle less strict, since also prosody interacts with word order to convey what is given. With regard to Polish, Grzegorek (1984) states that the communicative

principle is more relevant than the grammatical principle for ordering the arguments in a sentence: old (given) information is placed before the verb while the information in focus (new) is marked by clause final position. Siewierska (1993) focuses on the topic>comment structure; but for the purposes of this literature review the topic can be compared to what is given and the comment to what is new, even though the two concepts do not map directly on to one another. In her study conducted on a Polish corpus of transitive sentences, the effect of weight is compared to the effect of givenness. The results showed that weight does not account for the attested word orders and thus the topic-comment structure must be responsible for the word orders in the corpus.

With regard to focus as a factor influencing word order[3], Pereltsvaig (2004) defines focus as the new, non-presupposed, and informative part of the clause; focus is thus the part of the information that is communicatively more relevant than the background (Klabunde, 2004). Gundel (1999:295) refers to this kind of focus as 'semantic focus': it represents the new information that is being asserted or questioned in relation to the background; it is implicitly or explicitly the answer to the relevant wh-question in a certain context. This is the method we use to elicit our focus conditions (see Methodology section).

[3] In this paper, we are only concerned with focus as an element contributing to information structure. Contrastive focus is not included in this study.

Focus can be manifested in a language in various ways and Büring (2009) lists the following: pitch accent placement, prosodic phrasing, constituent ordering, use of special focus morphemes, or not marking focus at all. The current study was an acceptability judgment task with no audio, and it is thus unable to reveal if Croatian uses intonation as a means of focus marking. The manifestation of focus we are interested in this study is constituent ordering.

Røreng (2011) states that the focus of a sentence contains the main message, and that in German, word order is used to mark focus. She conducted a corpus study in German and found that the variation in object ordering in ditransitives is due to animacy and focus-background structures, with the animate object preceding the inanimate and the backgrounded object preceding the focused object. She also found that IO-DO is the more common order in the corpus, but nevertheless claims that DO-IO is the basic word order; despite the low frequency, it is revealed in contexts when focus and animacy are neutralized. This entails that in the naturalistic data, the majority of IOs is animate, and a lot of them are also part of the background.

For Russian, Kallestinova (2007:53) conducted a series of comprehension and production experiments on word order. The experiment of particular interest for this study is the one in which the production of various word orders of ditransitives with focus on S, IO, and DO is tested. Her data reveals that there is a very strong tendency to produce SVID and SVDI, and she considers those to be the basic ditransitive word orders. The second most frequent orders are SIVD and SDVI, ensuring that the focused object is always in final position.

Focused information is thus often defined as corresponding to new information; but instead of being contrasted with given information, it is contrasted with background information (background>focus). Background and focus often amount to a simple given/new distinction (Klabunde, 2004) and thus focus and givenness represent opposite sides of the same phenomenon, because like new information, focus follows what is the background, that is, given information. However, in our task, focused information is not simply new, as the focused element is being explicitly asked about (Gundel, 1999) and thus adds salience to the referent that is explicitly in focus when compared to the referents that are only new. Consequently, in this task, givenness and focus cannot have the same referent.

Following the presented literature, the given>new principle should also apply for Croatian, but no explicit tests have been conducted on this matter. Therefore, the judgments of given objects should reveal if there is preference for the given object to precede the new object; in addition, the setup of the focused object not being simply new will reveal whether Croatian speakers pay attention to explicit focus by having stronger preferences for a certain word order when an object is focused, compared to the same givenness condition when the object is simply new. Animacy is part of this study because of its close relation to the indirect object: indirect objects are usually animate in ditransitives since they have the role of recipient and prototypically only animate entities are able to receive objects. We expect to find an effect as described for other languages, but the present research will reveal more about the interaction of these factors on word order in Croatian.

3. Research questions and predictions

The present study aims to find out if and how the three factors influence word order preference and how they interact in doing so. We have thus designed an Acceptability Judgment Task (AJT) that will be thoroughly described in the following section. Our research questions are the following:

1. Does Croatian follow the animate-first order?
2. Does Croatian follow the given>new order?
3. Does Croatian follow the background>focus order?
4. How do these factors interact?
5. What role does the position of the verb play?
6. Which word order has the widest contextual applicability and what word order is preferred in neutral conditions?

Based on the literature we have no reason to assume that the three factors will not be influential in Croatian or that they will act differently; we thus predict that the three factors influence word order as previously found in other languages. We also predict that these factors will interact, and from these interactions we will see how influential a factor is. The survey contains contexts with and without focus, and as focus and givenness are in complementary distribution, we expect the conditions with focus to fortify the givenness effect when compared to the conditions where the

new object is not in focus, and thus to provide a quantitative difference rather than a qualitative one.

Since all the word orders that are included in this study are grammatical and attested, we do not expect any order to be judged as completely unacceptable. Our prediction is that the word order pairs with the same object order (VDI with DVI, VID with IVD) will have similar judgments in each condition.

Verb placement is also expected to play a role with regard to the preference either for the relative or the absolute relation of word order and givenness based on Šimík and Burianova (2017). Since this relation is linked to givenness, we expect to find a preference for either verb-first (relative relation) or object-first (absolute relation) word orders when one of the two objects is given.

When it comes to finding the word order with the widest contextual applicability, we predict that on of the less prominent word orders, where the object is not fronted so verb-first (VID and VDI), will be the most widely accepted one. According to Gračanin-Yuksek (2006) VID is structurally ambiguous and it has also been found to be the most frequently used word order in naturalistic data (Kuvač Kraljević and Hržica, 2016, Velnić, 2014). Thus, we expect it to be more contextually applicable, and this should result in it being more readily accepted across the task, especially in neutral conditions.

4. Methodology

The test consisted of an online acceptability judgment task (AJT) that provided different contexts consisting of various combinations of the three factors (see Materials below). These context sentences were followed by the four target word orders that the participants had to judge on a 5-point Likert scale. The four target word orders (VID, IVD, VDI, and DVI) were randomized for each context.

4.1 Materials

The survey was created using SurveyGizmo and was available online. It contained a total of 12 contexts distributed over 18 targets. The experiment contained a total of 41 sentences including fillers. Tables 2 and 3 show the distribution of examples per contexts.

Table 2: Contexts without explicit focus[4]

	Balanced animacy		Unbalanced animacy
	Both animate	Both inanimate	IO animate
DO given	1	1	2[5]
IO given	1	1	2
No given	1	1	2
Total	12		

We have seen various definitions of focus in section 2 and we have chosen to set up the focus conditions as an answer to a wh-question, since that is the explicit and most straightforward way of defining focus (Gundel, 1999, Klabunde, 2004). Therefore, the context sentence was a wh-question, and the focused element was the answer (see example 5 below). Table 3 provides an overview of the target examples with focus.

[4] Due to a compiling error, one of the examples in this slot has only 25/82 responses

[5] These sentences contain arguments that are new but not asked about like in the examples in table 2

Table 3: Contexts with focus

Focus	Balanced animacy: Both animate	Unbalanced animacy: IO animate
IO focus	1	1
DO focus	1	1
S focus	1	1
Total	6	

All the examples consisted of two sentences: the context sentence, that had the function to introduce the given object or to set the focus with a wh-question; and the target sentences which were presented in the four target word orders (VID, IVD, VDI, and DVI) randomized for each example. So, an object was considered [+given] if it had been mentioned in the context sentence, it was [-given] when it had not been mentioned in the context sentence; an object had the [+focus] value when it was the answer to a question provided in the context sentence, otherwise it is not considered in focus. Animacy was set as a binary distinction of +/- animate, as all animates had human referents and all inanimate referents were not human.

This is not a fully crossed design, since there were no examples with an animate DO and inanimate IO. The reason for this is that it is a quite an unnatural situation, and the examples would be marked, and it would require the use of infrequent verbs, e.g. 'to sacrifice'. In such a marked context, it would be hard to distinguish whether

a word order preference is linked to the properties of the objects or to the verb and the context as a whole. Examples (3) -(5) provide an example for each factor.

(3) CONDITION: Both Animate, No Given

Context sentence:

Danas je učiteljica bila jako nervozna.

today is-AUX teacher-NOM was very nervous.

Target (expressed with four different word orders in a random order):

VID: Zato je bez razloga poslala ravnatelju učenika.

because is-AUX without reason-GEN sent-1st.SG principal-DAT pupil-ACC

VDI: Zato je bez razloga poslala učenika ravnatelju.

IVD: Zato je bez razloga ravnatelju poslala učenika.

DVI: Zato je bez razloga učenika poslala ravnatelju.

'Today the teacher-F was very nervous. That is why she sent the pupil to the principal.' (VID, VDI, IVD, and DVI alternatives are provided for the participant to judge).

(4) CONDITION: IO Animate, DO Given

Context sentence:

A: Imaš li još uvijek onaj svoj kalkulator?

have-2nd.SG Q-particle more still that-ACC your-ACC calculator-ACC

B: Ne, nažalost nemam, sad koristim onaj na mobitelu.

no unfortunately do_not_have-1st.SING now use-1stSING that on mobile

Target (expressed with four different word orders in a random order):

VID: Pred puno godina sam dala nećaku kalkulator

ago many years have-AUX gave-1stSING nephew-DAT calucator-ACC

VDI: Pred puno godina sam dala kalkulator nećaku

IVD: Pred puno godina sam nećaku dala kalkulator

DVI: Pred puno godina sam kalkulator dala nećaku

'A: DO you still have that calculator of yours? B: No, unfortunately I don't have it, now I am using the one in my mobile. Many years ago, I gave the calculator to my nephew.' (VID, VDI, IVD, and DVI alternatives are provided for the participant to judge).

(5) CONDITION: DO Focus, IO Animate

Context sentence:

Što ćeš ponuditi kolegama kad dođu kod tebe?

what will-AUX offer colleagues-DATwhen come-3rd.PL to you-GEN

Target (expressed with four different word orders in a random order):

VID: Ponuditi ću kolegama palačinke.

offer-1st.SG will-AUX colleagues-DAT pancakes-ACC

VDI: Ponuditi ću plačinke kolegama.

IVD: Kolegama ću ponuditi palačinke.

DVI: Palačinke ću ponuditi kolegama.

'What will you offer to your colleagues when they come to visit? I will offer pancakes to my colleagues.' (VID, VDI, IVD, and DVI alternatives are provided for the participant to judge).

4.2 Participants

A total of 82 native speakers of Croatian completed the survey; the ages were between 18 and 53 (mean=23.3), and 16 were male. The participants found out about the survey through social media and we distributed web links along with QR-codes to students of the Economy, Law, and Philosophy faculty at the University of Rijeka. Before starting the survey the participants had to accept that their answers will be used for research purposes. Sensitive data was not collected: the participants did not provide their name so there was no need for anonymisation.

4.3 Procedure

The survey was created with SurveyGizmo. Before starting the survey the participants had to fill in a questionnaire concerning their age, gender, native language, what other languages they spoke, and where they grew up. The participants then had to proceed with the survey by reading the context sentence and then judge the follow-up sentences based on their contextual acceptability on a 5-point scale, with 1 being unacceptable and 5 perfectly acceptable. The order in which the four word order targets were presented was randomized.

5. Results

First, we wanted to make sure that there is no bias towards any of the used word orders. We did so by looking at the mean for each word order in the survey (table 4). Since this is an Acceptability judgment task, and all of the word orders are grammatical, a very low score was not expected for any of the word orders. We also looked into the distribution of the highest judgment score (judgment=5) per each participant to check if any of our participants had a preferred word order and thus judged it with a 5 across the task. No such outliers were found.

Table 4: average judgments in the AJT

All conditions	VDI	DVI	VID	IVD
	3.96	3.70	3.07	3.41

Table 4 shows a high similarity of the judgments values of the four word orders, entailing that there was no bias towards a particular word order, and thus any difference that might be found in the following sections can be considered context related.

5.1 Comparison of the models

The survey items do not have a fully crossed design as the six conditions with focus have an additional factor (+Foc) on one of the items (IO or DO), and that would

make a single statistical model too complex. We have thus chosen to have two separate analyses: one including only the targets without questions that provide explicit focus (data from table 2); the other one including only the examples with explicit focus (data from table 3). With regard to the analysis regarding the responses from table 2, we have set up a model (*All mod* in table 5) using linear mixed effects in R that included the DO-IO preference and three factors (the levels for each factor are presented in brackets): animacy (IO, No, Both), givenness (IO, No, DO), and verb placement (Verb-first, Object-first). Participant and the order in which the word order appeared in each condition were set as random effects. Following that, we have set up three additional models, each excluding one of these three factors (No Animacy mod, No Givenness mod, and No Verb Placement mod). Following that, a likelihood ratio test was conducted: it consisted in using ANOVAs to compare the model with all the factors with a model without one of the factors in order to establish the significance of its effect on word order acceptability. We find that all of the three factors are responsible for word order choice in the AJT. Animacy affected the DO-IO over IO-DO preference (p-value=$5.98e^{-10}$); givenness affected the DO-IO over IO-DO preference (p-value=$6.955e^{-05}$); and verb placement also had an effect (p-value=$2.2e^{-16}$), entailing that the participants had different preferences on verbal position in different contexts. The concise results of the statistical analysis are presented in table 5.

Table 5: Results of ANOVAs of the full model with the models without one factor

	Df	AIC	BIC	logLik	deviance	Chisq	Df	p-value	Significance
No Animacy mod	9	7230.8	7280.6	-3606.4	7212.8				
All mod	21	7186.3	7302.3	-3572.1	7144.3	68.549	12	$5.98e^{-10}$	***
No Givenness mod	9	7202.4	7252.1	-3592.2	7184.4				
All mod	21	7186.3	7302.3	-3572.1	7144.3	40.087	12	$6.955e^{-05}$	***
No Verb placement mod	12	7292.9	7359.2	-3634.5	7268.9				
All mod	21	7186.3	7302.3	.3572.1	7144.3	124.64	9	$2.2e^{-16}$	***

The same method was applied to the data with focus: a model was set up including DO-IO preference, animacy, verb position, givenness, and whether the context sentence was formulated with a wh-question or not (focus vs. non-focus). Then it was compared to a model that did not have 'question' as a variable. Thus, this model included the full dataset as the key comparison is between the examples with a question (given-focus distinction) and without a question (given-new distinction). The results show that the presence of explicit focus influences DO-IO over IO-DO preference (p-value=0.02), but less so than the previous factors. The concise results of this test are presented in table 6.

Table 6: Results of ANOVAs of the model with focus with the model without focus

	Df	AIC	BIC	logLik	deviance	Chisq	Df	p-value	Significance
No-Foc model	11	5959.1	6017.7	-2968.5	5937.1				
Foc model	19	5957.0	6058.3	-2959.5	5919.0	18.046	8	0.02088	*

However, tables 5 and 6 are not directly comparable as they are conducted on different data sets, since the latter includes the examples with focus and the former one does not, and there are fewer examples with explicit focus than examples with a simple given-new distinction. The following sections will provide a more graphic insight on the relevance and interaction of the factors. These results confirm that all of the factors are influential, but do not tell us anything about their interaction. In the next section, we will look into the variation in word order preferences in different conditions.

5.2 The influence of animacy, givenness, and verb placement on word order preference

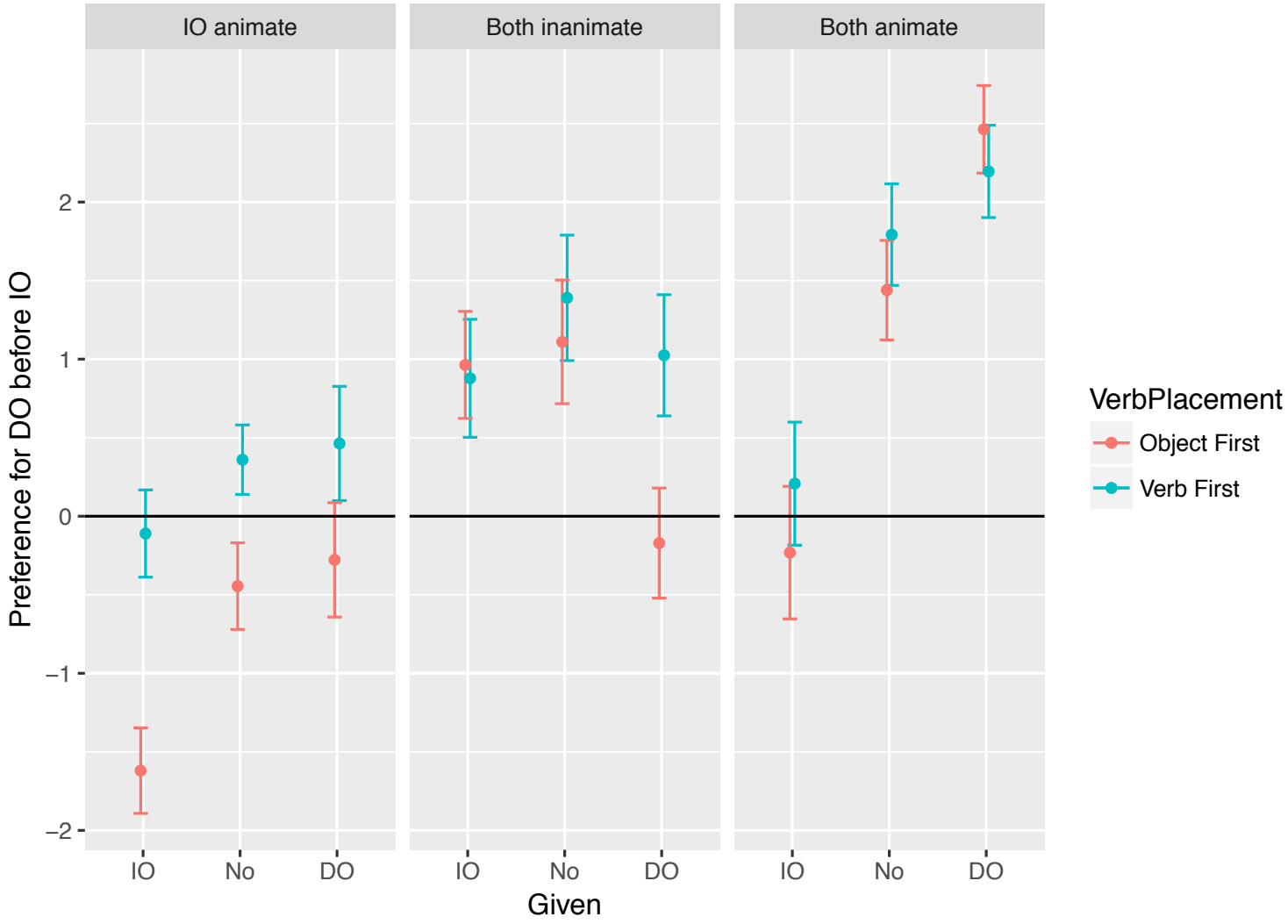
The analyses in the previous section showed that all factors affect word order preference to a high degree. Figure 1 shows the IO-DO and DO-IO preferences in the task as a result of animacy, givenness, and verb placement. The examples with explicit focus are excluded from the data in figure 1 because the additional factors

of [+/- focus] would have made the graph unintelligible. The graph was plotted with a 95% confidence interval: if the two bars do not overlap the difference is significant at a p-value <0.05; this graphical visualization of significance is valid for the entire figure: within a condition and for comparing conditions.

In figure 1 we can see the interaction of the factors: the participants' preferences are grouped into three sections based on the animacy values of the objects: IO, none, and both; givenness values are represented on the x-axis: IO, No, and DO for each animacy section; the y-axis represents the preference of DO-IO order: the bar below the 0 line signals a preference of IO-DO order, while the bar above the 0 line signals a DO-IO preference; the colors of the bars represent verb placement: the red bar is object-first (IVD and DVI), while the blue bar is verb-first (VID and VDI); which one is preferred depends on the position of the bar with respect to the 0 line.

The animacy effect is clear in the graph as the preference shifts progressively from IO-DO to DO-IO as the animacy becomes more balanced: we can see that from the bars moving from the lower part of the graph towards the top part. However, we expected the two conditions with balanced animacy (No and Both) to give similar results, but as we can see from figure 1, that is not the case. A possible reason for that is examples with no animate objects are difficult to convey, and even when on the surface level both are inanimate, the IO is never truly inanimate.

Figure 1: interaction of animacy, givenness, and verb placement



For example, some of the IOs that were used here as inanimates are 'the lawyer's office' and 'the dry cleaners' and they can very easily be intended as 'the lawyers in the lawyer's office' and 'the staff at the dry cleaner's' respectively, and are thus more animate than 'the documents' or 'my silk dress' that were used as respective DOs in these examples. Conversely, in cases when both objects are animate (e.g. IO='professor' DO='student'), they both have the same degree of animacy and this condition is truly balanced in this regard. This can explain why the acceptability values in No-animate conditions are in between the IO-animate and both-animate conditions.

The givenness effect can be observed within each animacy quadrant: the bars for the IO-given and DO-given conditions are significantly different from each other: the bars of the IO-given conditions tend to be in the lower part of the figure (IO-DO preference), whereas the DO-given conditions have the bars significantly higher in the figure (DO-IO preference) when compared to the IO-given conditions. the DO-given values pair with the no given values in the IO-animate and both animate conditions, which means that DO-IO is the preferred order both in cases of neutral and DO givenness.

We can observe the preference for verb placement by looking at the distance between the red and blue bar in each condition. Verb placement plays a role when the IO is animate (the bars are far apart, especially in the IO-given condition), not so much in the other conditions since the two verb placement bars have a big overlap. An exception is the condition of given DO and No animate object. This example

thus requires some additional attention and we have to look at the judgment values and the example itself. In this example, the given DO is "the application" and the IO is "the ministry"; the IO is in the dative case as the rest of the data set, but it might have been interpreted either as a location or as the 'people working in the ministry'. Caused location is not a factor that we have accounted for in the task, and we do not know what effect it might have on word order. We can see from table 7 that a high judgment value for both VDI (4.29) and IVD (3.89) is causing the irregular distribution of the bars in figure 1, so that both object order and verb placement play a role. For a more detailed overview, the means for every word order in each condition are presented in table 7.

Table 7: means of word orders for the conditions represented in figure 1

Givenness	VDI	DVI	VID	IVD	Animacy
IO	3.39	2.58	3.51	4.19	IO
No	4.03	3.82	3.67	4.27	
DO	3.55	3.42	3.71	4.18	
IO	4.54	3.48	3.67	2.52	No
No	4.08	3.92	2.69	2.81	
DO	4.29	3.71	3.26	3.89	
IO	3.65	3.65	3.45	3.89	Both
No	4.24	4.46	2.45	3.02	
DO	3.89	4.58	1.69	2.12	

5.3 Comparison of the effect of focus and givenness

Focus was excluded from the analysis in the previous section in order to have a straightforward graphic representation of the influence of two factors. Since focus and givenness are in complementary distribution in this task, here we will analyze whether word orders are accepted differently in conditions where the focus is explicit (with wh-questions) compared to the condition where one of the objects is simply new. Figures 2 and 3 show the acceptability judgments for the IO-animate and both-animate conditions respectively. The two figures are divided into two sections based on what is given (DO or IO): in case of a given DO, the IO is considered new or in focus, depending on the presence/absence of a question, and vice versa. The presence of explicit focus is expressed on the x-axis: if the context sentence did not have an explicit question asking about the new object (examples 1 and 2), then we do not consider the object being in focus, conversely, if there was a question asking for the object (example 3), then the object is focused. Examples with no explicit focus were already looked into in the previous figure, here they are reintroduced for comparison purposes. The word order preference and verb placement are marked as in figure 1. We expect explicit focus to have an extra effect on top of the givenness effect, which will strengthen the preference for a specific word order.

Figure 2: comparison of explicit and non-explicit focus conditions when IO-animate

Figure 2: Comparison of explicit and non-explicit focus conditions when IO-animate

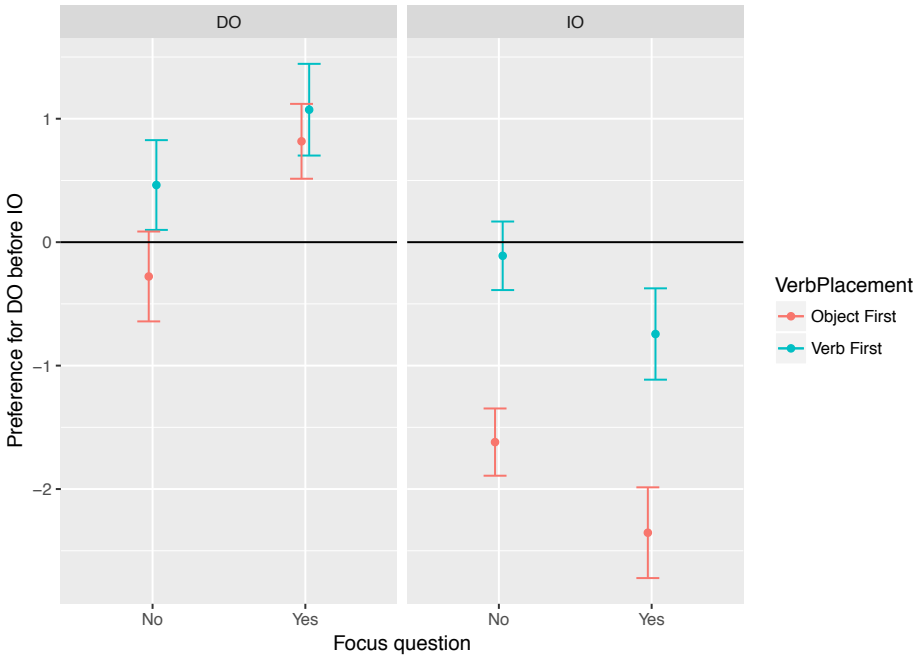
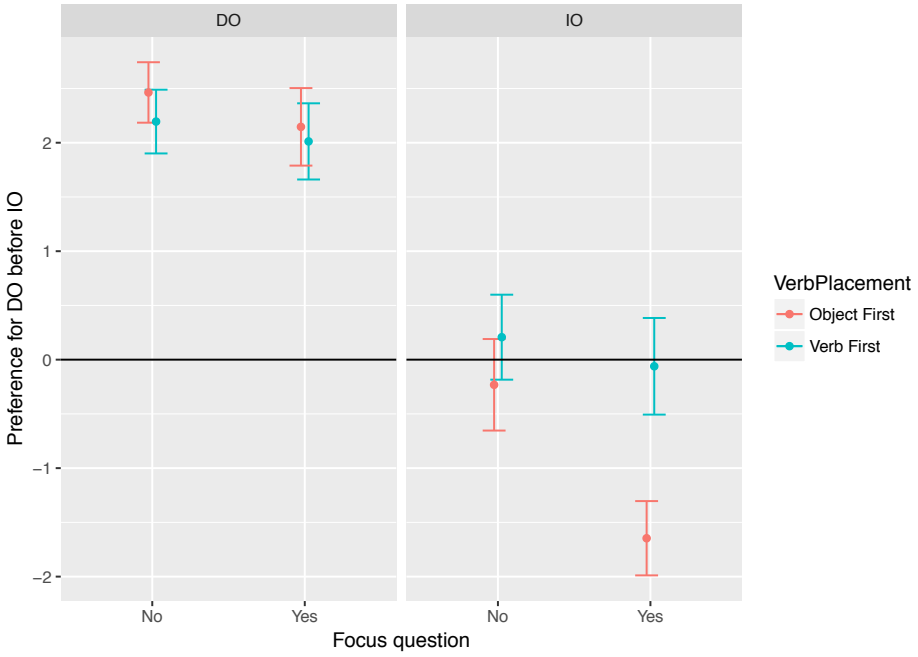


Figure 3: Comparison of explicit and non-explicit focus conditions when Both-animate



Figures 2 and 3 suggest that having an object in focus does not change the response trend as it is the same in the two focus conditions (No and Yes). Overall, we can see that focus strengthens the preference from the condition where there is no explicit focus; this difference is significant when the bars do not overlap. So, in figure 2 (IO-animate) in the DO-given quadrant, where the IO is new or in focus, there is a significant difference regarding the acceptance of IVD that is well accepted when the IO is not in focus, but only IO-final orders are accepted when there is an explicit question asking about the IO. This is only a quantitative effect of focus, as preference for a certain word order is strengthened, but not altered when compared to the condition with a simple given/new distinction.

In the IO-given quadrant, where the DO is either new or in focus, the trend of responses is the same, but based on the position of the bars, we can see that IVD is judged as significantly more acceptable when the DO is in focus, and VID is marginally better accepted as the two bars have a minor overlap.

When both objects are animate (figure 3), there is no difference in the judgments when the IO is new/focused; there is however a significant difference for the acceptance of IVD, since it is much better accepted when the DO is in focus compared to when it is just new information. So here there is also a qualitative effect of focus, because when there is no focus, there is no preference of either IO-DO or DO-IO, but when the DO is focused, IO-DO is accepted significantly more.

Animacy does not seem to play a role, as the word order preferences are fairly similar in figures 2 and 3 based on what is in focus. There is an observable animacy effect in the condition when neither object is in focus, i.e. when the subject is focused. These examples are not represented in the graphs, but we provide the means of the judgments in table 8, along with the other means of the focus condition. These means show how the preference of word order depends on the animacy value.

The means of the data in figure 2 and 3 are presented in table 8; some of the values are repeated from table 7 in order to have a direct comparison of the conditions in question.

Table 8: means of word orders for the conditions represented in figures 2 and 3

Focus/new	VDI	DVI	VID	IVD	Animacy
IO-new	3.55	3.42	3.71	4.18	IO
IO-focus	4.02	4.02	2.95	3.20	
DO-new	3.39	2,58	3.51	4.19	
DO-focus	3.19	2.46	3.54	4.56	
IO-new	3.89	4.58	1.69	2.12	Both
IO-focus	4.01	4.54	2.00	2.40	
DO-new	3.65	3.65	3.45	3.89	
DO-focus	3.19	2.46	3.25	4.10	
S-focus	3.34	3.18	3.56	3.84	IO
S-focus	4.45	4.46	2.52	2.59	Both

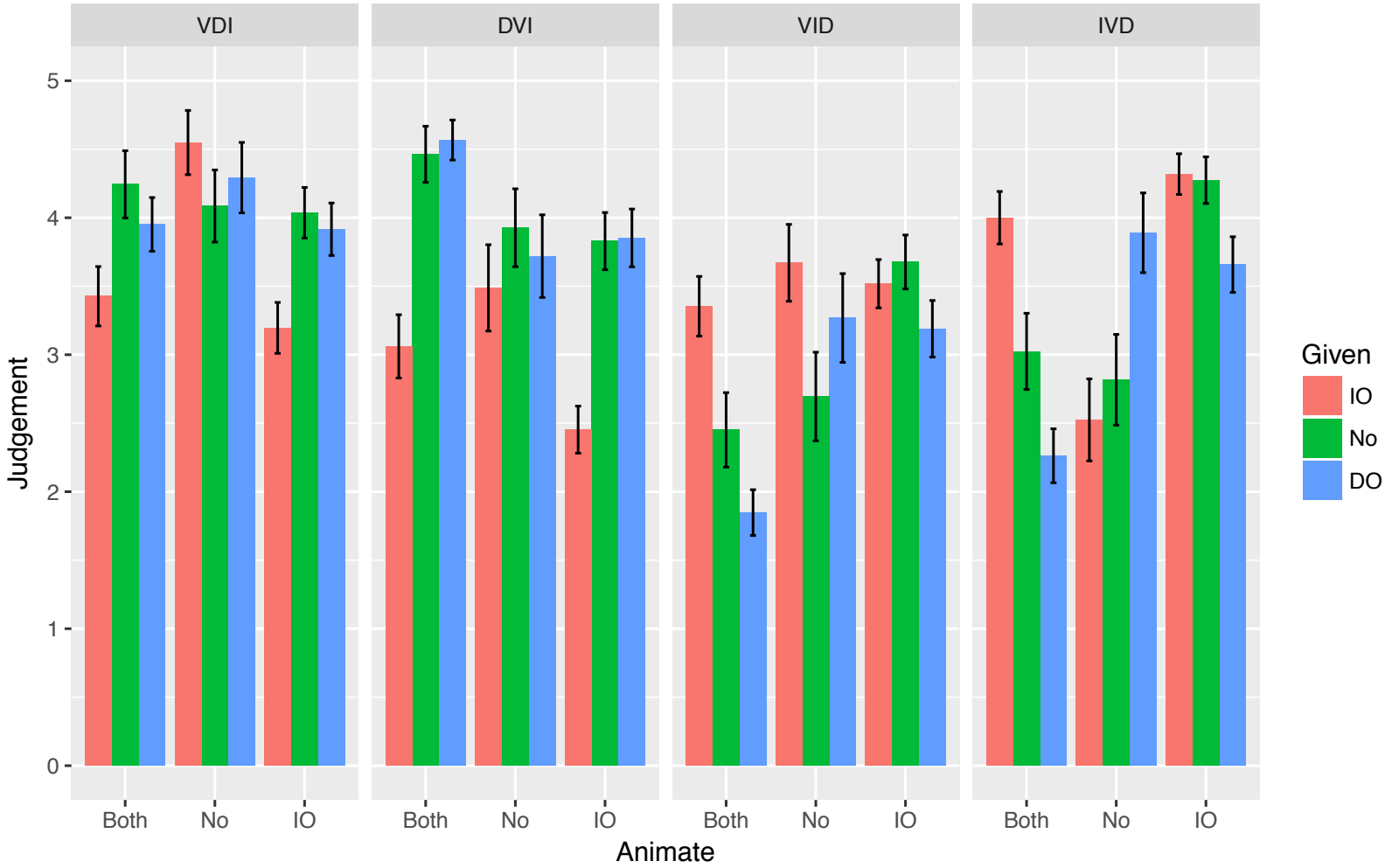
5.4 Widest contextual applicability

Our prediction was that the word order with the widest contextual applicability will be highly accepted across all conditions. Here we will see if there is such a word order and which one it is. Figure 4 depicts the judgment of the four word orders. However, again due to a simpler graphic representation of factors, the conditions with focus were not included. The full array of judgments can be seen in tables 7 and 8.

Figure 4 clearly shows that there is a difference between DO-IO and IO-DO orders, as the former are overall judged as more acceptable than the latter. Recall that in the previous sections, IVD was judged more highly than VID, and it is obvious from figure 4 that the observed difference is due to an overall low acceptance of VID.

Between the two DO-IO orders, VDI seems to be overall better accepted since it has a higher judgment value than DVI in 6/9 conditions in figure 4. It is better accepted in all conditions where neither object is animate (no-animate), and it is also much better accepted than DVI in the condition with IO-animate and IO-given; here DVI is at the limit of grammaticality with a mean score of 2.58. Our prediction was that the verb-first orders would be better accepted; but based on the claim of the ambiguity of VID, we considered it more likely to be the most widely applicable order. Contrary to that prediction, VID is the least accepted word order in the AJT. The possible reasons for that will be outlined in the discussion.

Figure 4: means of each word order per condition



We also made a prediction about the neutral context, namely that the order that is most widely accepted through the survey, should be the word order with the best score in the full neutral context. In figure 4 the neutral context is the green bar (no-given) of the first and second set of columns (Both and No-animate). VDI seems to be more prominent when both objects are animate, while VDI has the best judgment in the No-animate condition. Either way there is a very consistent difference between DO-IO and IO-DO orders, and the difference between VDI and DVI is minimal in both neutral conditions. As based on the finding above, VDI is the best accepted word order, but the high acceptance of DVI places it in a more prominent position than we expected, indicating that the position of the verb might not be relevant for differentiating the two DO-IO orders.

6. Discussion

Here the data from the results section will receive a more thorough explanation and we will indicate how the data fits the predictions made for the research questions.

The results showed that animacy, givenness, and focus influence word order preference as it was outlined in the literature and that there is an interaction of the three factors. In order to explain what the interaction consist of, an explanation of the progression of the figures from the Results section is in order. Figures 1-3 are relevant for observing the interaction of the factors, while figure 4 is necessary for establishing the order with the widest contextual applicability.

In figure 1, when the IO is animate and given we can see a strong preference for IO-DO over DO-IO as both bars are below the 0 line. This is the condition in the task with the strongest preference for IO-DO, as two factors (animacy and givenness) influence the placement of the IO. The preference for object-first is very strong in this condition as we can see that the IVD (4.19) is preferred over VID (3.15). We can see it from the two bars being far away from each other. Givenness plays a role as the IO-DO order becomes less preferred and verb placement is less relevant.

When neither object is animate, the preference for DO-IO becomes stronger, and the relevance of verb placement decreases. When both objects are animate there is a very clear givenness effect, as the IO-given condition shows a preference for IO-DO, while the two other givenness conditions group together with a DO-IO preference, reaching the highest values of DO-IO preference in the survey. The two neutral conditions (No-given in no and both animate) have very similar results and a preference for DO-IO.

The figures regarding focus (figures 2 and 3) show that there is a quantitative difference in word order judgments when we compare the conditions with a given-new contrast to the conditions with a given-focus contrast. This means that a focused object has a stronger effect on word order preference than simply an object that is new. A qualitative difference was also found: the preference for IVD is significantly stronger in the DO-focus condition when compared to the IO-given condition with no explicit focus (figure 3). This means that in the condition with focus, having more contrast

between the two objects is preferred; and thus, IVD which places the objects far apart, is preferred to VID. The effect of animacy in the conditions with focus is diminished as the mean judgments are the same for the IO-focused conditions in both animacy conditions, as well as for the DO-focused conditions (table 8). The animacy effect becomes noticeable in the conditions where neither object is in focus (subject-focus). Here, the IO-DO orders are preferred when the IO is animate, while DO-IO orders are preferred when both objects are animate. This entails that focus is a stronger factor than animacy, unlike the given-new contrast in which animacy interacts more strongly with word order (figure 1). Thus, the study revealed that all three factors (animacy, givenness, and focus) contribute to word order preference in Croatian.

Our second prediction was that the word order pairs (VID and IVD, VDI and DVI) will have similar results in each condition, and this is what we find for most of the conditions (tables 7 and 8). The study has also revealed that DO-IO is judged better than IO-DO across the task, and, more precisely, that the word order with the widest contextual applicability is VDI (figure 4). Surprisingly, VID, which is a highly frequent word order in naturalistic data (HrAL (Kuvač Kraljević and Hržica, 2016) and the DODB database (Velnić, 2014), is the least accepted word order in the task as it is judged worse than other word order across the task. We have thus found a discrepancy between the naturalistic data and the survey judgment. This discrepancy is not uncommon and has been also found in other studies, such as McdonaldBock and Kelly (1993). The cause for the VID being highly attested but not preferred is that in the

naturalistic data the vast majority of IOs is animate and, moreover, expressed with clitics (130 out of the 180 occurrences found in HrAL) and are consequently fixed in second position; while the AJT tested a different array of animacy contexts that are not frequently attested in naturalistic data and thus reveals a preference for the DO-IO which is not mirrored in every day speech. Thus, our prediction that VID and VDI would be the better accepted word orders was not borne out, since only VDI is well accepted across the task, while VID is definitely not.

From the contexts in which one object is given, we can attest whether the speakers prefer the relative or the absolute relation of word order and givenness. The prediction was that in these contexts we should observe a preference for either verb-initial or object-initial orders, depending on whether the speakers preferred the relative or absolute position of the given object. We consider VID and VDI having a relative ordering of the objects, while IVD and DVI having the absolute ordering. Taking figure 4 into consideration, the DO-IO orders do not seem to have different preferences, since DVI is preferred to VDI in the both-animate DO-given condition (means=4.58 and 3.89), but VDI is preferred in the No-animate DO-given condition (means= 4.29 and 3.71). In the IO-animate DO-given condition they are judged with the same score (VDI=3.55, DVI=3.42). Within the IO-DO orders there seems to be a preference for the absolute relation, since VID has a low acceptance across the task, so IVD is also better accepted in the conditions with the given IO (both-animate IO-given and IO-animate IO-given). Nevertheless, VID is strongly preferred to IVD in the No-animate

IO-given condition (means= 3.67 and 2.52). However, as previously mentioned, VID was poorly accepted across the task so perhaps the preference for the absolute relation within the IO-DO orders is caused by a dis-preference for VID rather than a preference for IVD. Thus, the adaptation of the relative/absolute distinction postulated by Šimík and Burianova (2017) for Czech, does not seem to hold for Croatian, as what we find is an obvious dis-preference for one of the orders, rather than a concise preference for verb-first or object-first order.

7. Conclusions

In the AJT, most of the word orders were judged with a high enough value in order to be considered appropriate for a certain context, entailing that Croatian indeed allows an array of word orders even when it comes to more complex structures such as ditransitives. The speakers were also not biased for any of these orders (table 4) so the differences in acceptability are due to the different pragmatic contexts.

The study found that animacy, givenness, and focus contribute to the word order preference and interact in doing so: the effect givenness is strengthened as animacy becomes balanced and focus enhances the established givenness effect as the preference for a certain word order is clearer when an object is focused compared to the examples with no explicit focus.

The study also reveals an overall preference for DO-IO orders and that VDI is the word order with the widest contextual applicability as this word order is highly

accepted across all conditions, neutral conditions included. Thus, the position of the verb was found to be marginal as both DO-IO orders are overall better accepted.

VID is the word order with the worst judgments overall. Thus, contrary to our prediction, verb-first orders are not both more commonly accepted.

Overall, this study shows how relevant animacy, givenness, and focus are and reveals a high acceptance of DO-IO orders that has so far been unnoticed due to a frequent production of IO-DO orders. The reason behind an overwhelming amount of IO-DO productions in naturalistic data is the animacy of the IO because, as the study shows, the IO-DO preference declines as animacy becomes balanced. The study also shows that with regard to givenness and focus, focus is stricter than givenness, as the conditions with explicit focus had clearer preferences when compared to conditions with conditions of a simple given/new contrast where both object orders were judged more similarly to each other.

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ACQUISITION OF DITRANSITIVE STRUCTURES IN CROATIAN CHILD LANGUAGE

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Ditransitive structures involve a certain degree of complexity because they require a verb and three arguments: agent, recipient, and theme. In free word order languages, such as Croatian, all combinations of (S)ubject, (V)erb, and (O)bjects order are attested (Siewierska, 1998). This can pose some challenges for the language-acquiring child since the word orders are governed by pragmatic factors such as *animacy*, *givenness, pronominality, weight, focus,* and others. In this paper, I will be focusing on how Croatian children acquire ditransitive structures and their word order permutations and how *animacy* and *accessibility* affect word order in these structures.

The data used for this study is the Kovačević corpus of Croatian (Kovačević, 2004) located in the CHILDES database (MacWhinney, 2000). These data have been inserted in a database which allows more efficient categorisation and browsing of the occurrences (Velnić, 2014). I have investigated the object orders that children use in their first ditransitive structures and have also compared it to the Child Directed Speech (CDS) from the same corpus. The data reveals that most of the children's utterances are confined within the IO-DO order having the structure 'daj mi +DO' (give-IMP me-DAT.cl + DO). It is important to establish whether the most attested structure is a chunk or a productive structure, since the acquisition of object clitics is known to be problematic for some languages such as French, Italian, and Catalan in which children rarely produce the object clitics in natural speech and frequently omit them in obligatory environments (Babyonyshev & Marin, 2006):24. On the other hand, the acquisition of object clitics is not problematic in languages such as Spanish and Greek (Babyonyshev & Marin, 2006). If 'daj mi + DO' is a chunk, much like English 'gimme' (a colloquial contraction of "give me"), we will be unable to consider ditransitive structures a vast portion of the corpus data. Either way, it is unfortunate that this section of the data is not useful for deducting the effect of the two properties on object order since the clitic in Croatian has a fixed syntactic position (section 2.2).

I will also observe the importance of animacy and accessibility in child language with its relation to object ordering, with the aim to reveal whether children are attentive to these properties.

The article is organized as follows. In section 2, I provide a background section concerning the two factors (animacy and accessibility) and a short background on clitics in Croatian; in section 3 the specifics of the database used for this study are outlined and the various word orders that can be found in child and adult language are compared; following that in section 4 I investigate whether 'daj mi' is acquired as a chunk; in section 5 I focus on the proportions of IO-DO and DO-IO in both groups of speakers and how that relates to the animacy and accessibility of objects. Section 6 is reserved for the discussion and the conclusions.

2.1 Animacy and accessibility as factors influencing word order

Animacy is a relevant factor because it is an early emerging factor for children since they can distinguish animate form inanimate in an adult-like manner form the age of two (de Marneffe, 2012). Animate entities are likely to enter into syntactic productions more quickly than inanimate ones and therefore we expect the structure to be animate before inanimate. In case of double object structures the IO is almost always animate, while the DO is not. This may lead to unidirectionality of the animacy effect.

The second factor is accessibility. Hughes and Allen (2013) have conducted a study on the relatedness of subject omission and the accessibility of the subjects and have shown that children are sensible to this factor and are more likely to omit a subject that is accessible. 'Accessible' is an umbrella term that includes different factors such as prior mention, physical presence, disambiguation, joint attention, animacy, person, and others.[1] I do not consider all of these factors under accessibility but only givenness (prior mention), presence (physical presence), and saliency (centre of attention). Unlike Hughes and Allen (2013), animacy is treated separately from accessibility in this study. In the DODB an object is coded as given when it has been mentioned within five lines from the target utterance; present means that the object is physically present in the immediate surroundings of the interlocutors; and salient entails that an object is prominent or at the centre of attention in the discourse, i.e. if

[1] For more details see Hughes and Allen 2013, p.17

the child and the caregiver are throwing the ball, the ball is salient regardless of whether it has been mentioned or not.

Givenness has been shown to influence object ordering, so that in contexts with given themes, the theme will appear first and trigger the use of DO-IO word order, while in contexts with given recipients the recipient will precede the theme, resulting in the inverted order, IO-DO (de Marneffe, 2012):35. A study Russian and Ukrainian was conducted by Mykhaylyk, Rodina, and Anderssen (2013) showing that children use the IO-DO order even in theme-given contexts, thus suggesting that IO-DO is the underlying word order, and that children have not yet acquired the movement (p.286). In this paper, I discuss the preference for IO-DO in relation to the IO being animate and expressed with a clitic.

2.2 Clitic placement in Croatian

In Croatian clitics are obligatorily placed in second position (Schütze, 1994).[2] Moreover, if there is a clitic cluster containing more than one clitic, those will have to be ordered in a very precise way:

Q(uestion particle) > AUX (except *je*)[3] > DAT > ACC/GEN > REF(lexive)> AUX *je*

This is relevant for the study because, as we will see in section 3.2, the most numerous type of structure contains Dative clitics, and therefore cannot tell us much about the influence of animacy and accessibility on word order because the position of at least one constituent is syntactically fixed. Moreover, in case of both objects being expressed as clitics, semantic and pragmatic factors will not influence the order as the objects will be syntactically fixed into DAT>ACC (IO-DO).

3. Children's ditransitive productions

In this section I will discuss the proportions of object ordering in ditransitive sentences and the properties of those objects. But first I will describe the structure of the database in section 3.1.

[2] Intended both as after the first word and after the first constituent

[3] Auxiliary 'be'-3rd.sing

3.1 The DODB: content and structure

The purpose of the Double Object Database (DODB)[4] (Velnić, 2014) is to allow refined searches regarding the choices that speakers, both adult and children, make when it comes to the order of objects in ditransitive constructions. As mentioned before, the occurrences are taken from the Kovačević corpora (Kovačević, 2004) (from CHILDES), which include files of three Croatian children (ages 0;10-3;2), and are inserted into the database; the insertions contain verbs that are used ditransitively, coded for speaker type (child or adult). So far six verbs are included in the database: 'bring', 'give', 'offer', 'sell', 'show', and 'throw'; for each verb, multiple forms are included: the imperative, past perfect for masculine and feminine gender, present 3rd person singular, infinitive, and optative. Each occurrence is assigned to a category that is specified based on object order: IO-DO, DO-IO, or omissions (only IO or only DO produced), the object is then defined in terms of case such as dative (IO), accusative (DO-count), or genitive (DO-mass); and form (NP, PR(onoun), and CL(itic)). Additional properties have been specified for the objects, but for the purpose of this article I will only be focusing on *animate* and *accessible* defined in section 2.1.

3.2. Ditransitive structures: usage

The DODB has a total of 1141 occurrences, 562 of which are full ditransitives with no omissions. The full ditransitive sentences are distributed among the speakers in the following way: adult (n=304) and child (n=258). Tables 1 and 2 show the distribution of object orders per speaker type.

Table 1: object order distribution in adult occurrences

Adults	IO-DO	DO-IO
	244	60
Total	304	

Table 2: object order distribution in child occurrences

Children	IO-DO	DO-IO
	239	19
Total	258	

[4] http://linguistics-db.velnic.net:8080/double-object

From the data provided in tables 1 and 2 it is obvious that IO-DO is the predominant word order in both types of speaker; the DO-IO is much less frequent. I compared the productions of children and adults with a Chi-square by comparing the productions of each word order. The test reveals that children produce significantly less DO-IO structures than their caregivers with a significance of $p<0.001$.

An important difference between adults and children is verb usage. As has been mentioned, six verbs have been put in the DODB. 'Give' is the most frequent ditransitive verb in the adult data (185/304 occurrences), however the use of this verb in the child data is almost exclusive and leaves very little room for any other verb (243/258 occurrences). It seems that children start producing ditransitives from the most prototypical ditransitive verb 'give' and make very little use of other verbs: 11 'bring', 2 'throw', 2 'show', 0 'sell', and 0 'offer').

A more precise distribution of occurrences that also takes the form of the objects into account is presented in table 3.

Table 3: The distribution of object forms within the two object orders

Form	Adult IO-DO	Adult DO-IO	Child IO-DO	Child DO-IO
NP-NP	55	18	0	2
NP-PR	3	0	0	1
NP-CL	0	26	0	6
PR-NP	15	2	25	1
PR-PR	0	3	2	1
PR-CL	0	10	0	8
CL-NP	144	1	170	0
CL-PR	15	0	38	0
CL-CL	12	n/a	4	n/a
Total	244	60	239	19
Total	304		258	

The most frequent form of both adults and children is CL-NP, and since it is the IO that is most frequently expressed by a clitic, the choice of this form for the IO could be one of the reasons why IO-DO is more frequent than DO-IO. The CL-CL

occurrences are syntactically fixed because the Dative clitic always precedes the Accusative one (section 2.2).

Because of the abundance of CL-NP structures in the child data (170/258), I have checked whether 'daj mi' is a productive structure or just a chunk. If it is a chunk, those occurrences cannot be counted as ditransitives and this would entail that Croatian children produce much less ditransitives than it seems. These results are presented in the following section.

4. The status of 'daj mi'

'Daj mi + DO' is by far the most frequent structure within the DODB (n=156), both among adult and children speakers. The nature of the Croatian object clitic makes it so that 'mi' is fixed in second position resulting in quite limited ordering possibilities for the rest of the constituents.

As has been previously specified, object clitics can be problematic to acquire in some languages. However, these studies refer to DO clitics; the acquisition of IO clitics has received very little attention.

Nevertheless, it is crucial to check whether 'daj mi' is a chunk or if it is productive. The first step is to check whether 'daj' appears alone before it appears with 'mi' and whether there is a stage with both 'daj' and 'daj mi'. The corpus data (Kovačević, 2004) shows that 'daj' appears without 'mi' in the early files, but 'daj mi' does not take long to follow. The ages in which the first instance of 'daj mi +DO' is attested are 1;10.21 (ANT), 1;6.28 (MAR), and 1;3.1 (VJE). For the last child 'daj' appears simultaneously with 'daj mi' as far as the corpora can tell because they both appear in the same file. Examples of 'daj' for each child are presented below with the translation on the side of the example. The target child tier is presented in **bold**.

(1a) DRA: sad si tati dala lopticu ? Age: 1;3.15
now you-REFL dad-DAT gave-2ND.SING.FEM ball-ACC
"Now have you given dad the ball?"
ANT: daj toji@b eje@b
give--IMP toja-DAT
" give Toja (Antonija)."

(1b) **MAR**: ruku daj [/] ruku daj ruku Age: 1;6.0
hand-ACC give-IMP hand-ACC give--IMP hand-ACC

(1c) **VJE**: aaa@b daj . Age: 1;3.1

give--IMP

MIR: to ti ne smijem dati maco .

That-ACC you—DAT.CL not may-1ST.SING give-INF kitty-VOC

"Kitty, I can't give that to you."

'Daj' appears alone before it appears with 'mi'. But also, after 'daj mi' appear together, 'daj' continues to appear either in isolation or with other clitics or the pronoun. This suggests that 'daj mi' is a productive structure at this stage. By searching for 'daj' in the files succeeding the production of 'daj mi' we can confirm that there is a stage with both 'daj' and 'daj mi'. All the examples in (2) take place after the child has already produced 'daj mi'.

(2a) **ANT**: daj ovoga meni . Age: 2;8.1

give-IMP this_one-ACC me-DAT.PR

(2b) **MAR**: daj ovo (.) ne to ne to (.) a ovo . Age: 2;9.4

give-IMP this-ACC no that-ACC no that--ACC this-ACC

(2c) **VJE**: a daj meni to . Age: 2;4.14

give-IMP me-DAT.PR that-ACC.

Secondly, I checked whether the imperative and the dative clitic are productive. Thus, I have searched for occurrences where 'daj' appears also with other clitics, and if the clitic 'mi' appears also in other contexts. Below you can see the occurrences of 'daj' combining with other clitics such as: 'mu'- 3rd.masc.sing, 'joj'-3rd.fem.sing, 'nam'-1st.pl, and 'im'-3rd.pl. These combinations are not very frequent, and start at a later age with respect to the 'daj mi' combination. The combinations 'daj nam' and 'daj im' were not found with a ditransitive use, but only as light verbs in giving a kiss. The results of 'daj mu' and 'daj joj' are presented below.

(3a) **MAR**: *ajde daj mu to (.) daj mu to* . Age: 2;7.25

come_on give-IMP him-DAT.CL that-ACC.PR. Give-IMP him-DAT-CL that-ACC.PR

(3b) **VJE**: *daj daj mu kapu.* Age: 2;1.5

give-IMP give-IMP him-DAT.CL hat-ACC.

(3c) **ANT:** *daj daj joj cipejice od jenatice.* Age: 2;5.5

give-IMP give-IMP her-DAT.CL shoes-ACC of Renata-GEN (Renata's shoes).

(3d) **MAR***: i sad daj joj meko.* Age: 2;8.8

and now give-IMP her-DAT.CL milk-ACC.

Even though there are not many examples, it is obvious that ‘daj’ can appear with other clitics. The reduced amount of variation could be caused by the fact that ‘daj’ is an imperative and children at this age are mostly requesting things to be given to them and not to someone else.

Furthermore, the clitic ‘mi’ is very abundant throughout the corpus and it is used with other ditransitives such as ‘bring’ and ‘throw’. Undoubtedly, ‘mi’ is used very productively and children have no problem parsing it as a self-standing morpheme. Some examples follow in (4).

(4a) VJE: *ovaj tu balon mi donesi .* Age: 2;11.0
this-ACC here balloon-ACC me-DAT.CL bring-IMP

(4b) **MAR**: *baki [= baci] mi baki [= baci].* Age: 1;6.0
throw-IMP me-DAT.CL throw-IMP.

(4c) **VJE**: *(h)oćeš mi dati ?* Age: 1;9.24
will-1ST.P.PRESENT me-DAT.CL give-INF
“Will you give me?”

I have also checked whether children used the pronoun equivalent of ‘mi’, ‘meni’, in a string with ‘daj’. This entails that children are able to interchangeably use either the clitic or the pronoun, however the use of the pronoun is much less frequent and starts at a later age. Examples follow.

(5a) **ANT**: *daj meni šosić .* Age: 2;7.18
give-IMP me-DAT.PR skirt-ACC.

(5b) **MAR**: *daj meni kakavo [: kakao] .* Age: 2;5.30
give-IMP me-DAT.PR cocoa-ACC.

(5c) **VJE**: *daj daj meni ovoga .* Age: 2;4.9
give-IMP give-IMP me-DAT.PR this_one-ACC.

From these findings, we can easily conclude that ‘daj mi’ is productive in child language, and that it is a proper ditransitive structure from which children start their production of double object structures.

5. The influence of animacy and accessibility on object order

Unfortunately, the children hardly produce any NP-NP structures, which are optimal for observing the effect of the properties because there is no syntactical confound like with clitics or the pronoun first effect REF in case of a pronoun. Since only 2 NP-NP

combinations are present in the child data (table 3), the following occurrences will be also taken into account: NP-PR and NP-CL because the marked order of the NP preceding the pronoun in the former and the fronted NP in the latter might be due to some noteworthy factors, PR-PR because both objects are expressed with the same referring expression. This leaves us with a total of 12 occurrences in the child data and 105 in the adult data. Table 4 shows the distribution of animacy and accessibility in these categories in both types of speakers.

Table 4: Distribution of animacy and accessibility in the corpus

Animate	Adult		Child		Accessible	Adult		Child	
	IO-DO	DO-IO	IO-DO	DO-IO		IO-DO	DO-IO	IO-DO	DO-IO
Both	1	0	0	0	Both	55	44	2	8
IO	57	47	2	10	IO	2	0	0	2
DO	0	0	0	0	DO	0	1	0	0
Neither	0	0	0	0	Neither	0	2	0	0
Total	105		12			105		12	

The table clearly shows that there is no longer a predominance of the IO-DO orders as seen in table 3; it seems that once the clitic form is not considered, the two orders are similarly distributed in the adult data and the DO-IO is the more frequent form in the child data. The cause of the preference of the IO to be expressed as a clitic or a pronoun (table 3) is that in this data set the recipient is mostly the 1st person singular, and thus less form variation is used for the IO.

Table 4 also shows that the IO is always animate, while the DO never is (with one exception), and both objects have at least one property that makes them accessible. In the adult data there are three examples of unbalanced accessibility and in all three the accessible object precedes the inaccessible one. In the child data, there are 2 occurrences in which the DO is not accessible but the object order is DO-IO. These are of particular interest and two of them are presented in (6) and (7). These are also the only two NP-NP occurrences presented in the child data.

(6) *daj pokaži to-tobogan mami.*
Come-on show-IMP slide-ACC mom-DAT
"Show the slide to mom" Age: 2;3.20
Context: the child and the grandmother are looking through a picture dictionary , and she asks the grandmother to show the (picture of the) slide to the mother that has just

arrived, but the slide is not depicted on the current page and the grandmother has to search for it in the book, it also has not been previously mentioned in the discourse.

(7) *daj (.) daj cipejice jenati.*
Give-IMP give-IMP shoes-ACC Renata-DAT.
"Give the shoes to Renata." Age: 2;5.4
Context: the child runs into the other room barefoot and the mother is telling her not to do that and says that she needs to dress her, put on her shoes. Then the child says to the mother to give the shoes to Renata (a doll) because her feet are cold. The mother then says that the doll's shoes were probably left at another location.

Unfortunately, also when looking at the wider context, neither of the two examples has straightforward properties that justify a DO-IO order. In example (6) the slide is not even present, in example (7) there was no prior mention of the shoes and they are not present since the mother tells the child that they were probably left behind. However, there was mention of being barefoot and of the need to get dressed, so clothing can be considered salient, but not the clothing and shoes of the doll. These two isolated examples of NP-NP do not point towards a preference of given before new.

Thus, the data in table 4 does not provide the necessary contrasts to infer on the interplay of animacy and accessibility; it does however tell us how frequent these factors are in CDS and in the children's first ditransitive utterances. Interestingly enough, examples of new>given order were found in the child data.

An interesting form-order category is NP-CL of DO-IO order because the DO is the first constituent of the sentence and thus might have some interesting properties. The properties of the DOs in this category are the following: 8 out of 9 are *given*, only one is *present*. I display some of these occurrences in (8) and (9).

(8) *cedevite mi daj .*
cedevita-GEN me-DAT give-IMP
"Give me some cedevita.[5]" Age; 2;1.19

(9) *ovaj tu balon mi donesi .*
this here balloon-ACC me-DAT bring-IMP
"Bring this balloon over here to me." Age: 2:11.0

In these two examples the DO is so prominent in the discourse that it can be defined as the discourse topic (DT), which can be seen as a more continuous givenness. The DT was not coded in the DODB. DT can account for another 3 examples in the group. In the remaining occurrence the child is singing, the lyrics are a bit different form the

[5] Cedevita is a popular soluble drink in Croatia

original song but the object order is the same to the original, so the properties of the objects might not be relevant for this example.

The fact that children have much less variety compared to adults in verb, structure usage, and object form poses some limitations when it comes to observing the effect of the properties because most of the occurrences are confined in categories with the clitic IO (n=212/256). However, from the distribution of occurrences across the object forms, we can see that once the clitic form of the IO is taken out of the equation, the distribution of the two object orders is equalized, though with the IO taking exclusively the pronominal form (see table 3).

6. Discussion and conclusion

The child data on ditransitives is quite uniform when compared to the adult data both from the point of view of verb usage (predominance of 'give') and structure (predominance of IO-DO).

Nevertheless, I was able to show that 'daj mi' is not acquired as a chunk so we can consider the vast amount of 'daj mi +DO' as ditransitives and initial structures from which children start out their ditransitive productions.

The data also suggests that children are sensitive to the frequency in the input: the most frequent structure in the child data mirrors the one in the adult data both in terms of object order and object form; although adults show more variety in their productions. By looking at the other object order and object form categories (table 3), we can see that the distribution of utterances is similarly distributed in the two speaker types: majority of DO-IO within NP-CL (adults: 0 IO-DO vs. 26 DO-IO, children: 0 IO-DO vs. 9 DO-IO), majority of IO-DO within PR-NP (adults: 15 IO-DO vs. 2 DO-IO, children: 24 IO-DO vs. 0 DO-IO), and majority of DO-IO within PR-CL (adults: 0 IO-DO vs. 10 DO-IO, children: 0 IO-DO vs. 5 DO-IO). It seems that children acquire ditransitive structures from what is most frequent in the adult data but overuse them resulting in less variety in their productions.

The low diversity of children's productions is quite limiting for making good observations about the properties that guide the object ordering. The focus of this paper were two properties: animacy and accessibility that should both be placed before their inanimate and inaccessible counterpart. Since the corpus gives us a limited portion of the language we do not get a variety of properties, namely: all IOs have the property of animate, while most of the objects in the corpus are accessible

since in child language the discourse is about the here and now. However, the animacy of the IOs, cannot be the only factor responsible for object placement, since DO-IO orders are attested even with only the IO being animate; but it can, along the choice of clitic for expressing the IO, be a factor for the high frequency of IO-DO. Accessibility, however, does not seem to be of the utmost importance for children since there were DO-IO occurrences where the DO was not accessible and it did not have other strong features to justify its position.

Previous research has also shown a bias towards the productions of IO-DO structures in a children's elicitation task in Russian and Ukrainian (Mykhaylyk et al., 2013), they explain that it is because of the underlying word order. However, the data discussed here suggests that once the clitic expressions are excluded, or at least limited, the IO-DO is no longer predominant. Moreover, as mentioned in the previous paragraph, a lot of IO-DO forms can be attributed to animacy, even though it is not the only factor responsible for this distribution.

This study provides a crucial starting point for future research on ditransitive structures in Croatian child language, such as designing an experiment that checks specifically for the effects of givenness on word order, and an experiment that examines the relevance of discourse topic on word order, that was suggested by the corpus data.

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The Effects of Animacy and Givenness on Object Order in Croatian Child Language

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0. Abstract

This study investigates how givenness and animacy influence object order (IO-DO vs. DO-IO) in ditransitive constructions in Croatian child language. We have conducted an elicitation task with 59 monolingual Croatian children (mean age=4;4) and 36 adult controls (mean age=21), in which the participants were asked to describe images depicting ditransitive actions. These actions differed with regard to givenness (DO given, or IO given) and animacy (IO animate, or both IO and DO animate). Both groups demonstrated an animacy effect, as the preference for DO-IO significantly increased when both objects were animate, compared to when only the IO was animate, with adults showing the highest preference. A givenness effect, however, was found only when the DO was given. The children exhibited a new>given preference when only the IO was animate, but, when both objects were animate, there was an indication of given>new. We conclude that adults prefer the DO-IO order, and children are strongly influenced by animacy.

1. Introduction

This study investigates how non-syntactic factors such as animacy and givenness are reflected on object order in ditransitive structures in Croatian pre-schoolers and adults. In ditransitives structures in Croatian, both object orders—indirect-direct object (IO-DO)

and direct-indirect object (DO-IO)—are grammatical and attested. However, word order is sensitive to animacy and givenness, and thus IO-DO and DO-IO are used in different contexts. The main difference between these factors is that the animacy of a referent is constant (and not contextually bound), while givenness is dependent on the context. This makes animacy easier to grasp (and therefore acquired more easily), since attention to the context is not required. Conversely, givenness requires the child to observe the discourse and update their judgment about whether an argument is given or not at a specific point in the discourse. Both animacy and givenness influence the argument to be placed first (i.e. animate-first, given before new). Thus, the animate argument should precede the inanimate argument, and given (old) information should come before new information.

We have tested 59 monolingual Croatian children (mean age=4;4) and 36 adult controls (mean age=21) with an elicitation task in which they described pictures depicting ditransitive actions across three sets of pictures. The givenness of the recipient (IO) and the theme (DO) were manipulated throughout their occurrence in the target pictures, and reinforced with pictures of the same referent, before presenting the next target picture. The subject and IO were always animate, while the animacy of the DO was manipulated (inanimate vs. animate). This setup provided two animacy conditions: prototypical animacy condition (IO-animate and DO-inanimate), and the balanced animacy condition (both objects animate).

The results show that both children and adults were sensitive to animacy, as the occurrence of DO-IO orders was considerably increased when both objects were animate, compared to the condition when only the IO was animate. Both groups displayed a givenness effect when the DO was given, since the proportion of object

orders was significantly different in this condition from the rest of the task. No effect was observed related to the givenness of the IO. For the children, we found a new>given preference in the prototypical animacy condition, but the trend of responses changed when the animacy was balanced, and showed an inclination towards given>new.

The paper is structured as follows: in the background section, we describe the ditransitive structures in Croatian, and provide a summary of the animacy-first order and the given before new principle, along with previous child language studies. Next, we proceed to formulating our research questions and laying out the predictions. The methodology and the results sections follow. In the Discussion section, the results are discussed in relation to our predictions. A brief summary concludes the paper.

2. Background

In this section, we outline the literature necessary for formulating the research questions and predictions. We focus on the key factors: ditransitive structures, animacy, and givenness.

2.1 Ditransitive structures

Ditransitive structures are comprised of three arguments: the subject, the direct object (DO) and the indirect object (IO). The main interest of this study is relationship between the DO and IO. Various languages have different strategies for arranging the two objects. If a language has overt case marking, such as German or Croatian, both object order variants are possible, as shown in example (1). These languages use the accusative case

to express the theme (DO) and the dative case to express the recipient (IO). Languages with no overt case marking, like English, have two different structures used to convey the different object orders, like in example (2).

(1) a. Marlon daje Stigu jabuku.
Marlon$_{NOM}$ gives Stig$_{DAT}$ apple$_{ACC}$
'Marlon is giving Stig an apple.'
b. Marlon daje jabuku Stigu.
Marlon$_{NOM}$ gives apple$_{ACC}$ Stig$_{DAT}$
'Marlon is giving an apple to Stig.'

(2) a. Marlon gave Stig an apple. – Double Object Dative (DOD)
b. Marlon gave an apple to Stig. – Propositional Dative (PD)[1]

A structural variation in ditransitives is present in a very limited portion of the Croatian lexicon, appearing only with three verbs: *(po)nuditi* 'offer', *(po)služiti* 'serve' and *pokloniti* 'give as a gift' (Zovko- Dinković, 2007). The alternative expresses the recipient with the accusative and the theme with the instrumental case. An example of the two structures using 'offer' is presented in example (3).

(3) a. Marlon je ponudio Stigu jabuku.
Marlon$_{NOM}$ is$_{AUX}$ offered Stig$_{DAT}$ apple$_{ACC}$
a' Marlon je ponudio jabuku Stigu.
Marlon$_{NOM}$ is$_{AUX}$ offered apple$_{ACC}$ Stig$_{DAT}$
b. Marlon je ponudio Stiga jabukom.
Marlon$_{NOM}$ is$_{AUX}$ offered Stig$_{ACC}$ apple$_{INS}$
b' Marlon je jabukom ponudio Stiga
Marlon$_{NOM}$ is$_{AUX}$ Apple$_{INS}$ offered Stig$_{ACC}$
'Anna offered cake to her parents.'

[1] Croatian also allows PP constructions, but only in cases where it is intended as a change of location, and not a change of possession: e.g. *Ivan je bacio loptu prema Ani* (John$_{NOM}$ threw ball$_{ACC}$ towards Anna$_{DAT}$), in which case we do not expect Anna to catch the ball. These structures are not elicited in the current task, but have occurred when both objects were animate, most likely due to an interpretation of a caused motion (Levin, 2008). These occurrences were excluded due to the weight of the PP.

This possibility of case alternation is why 'offer' was chosen as one of the verbs to be elicited in our task[2].

2.2 The effect of animacy on word order and its acquisition

As previously mentioned, the animacy of a referent does not vary based on the context of discourse: if a referent designates an animate being, it will be animate, regardless of whether it has already been given, or whether it is in focus. It is a semantic, not a pragmatic, property that shapes information structure. Animate entities are conceptually highly accessible, and thus easier to retrieve (Branigan, Pickering, & Tanaka, 2008). Animate entities are also more likely to be prominent in the discourse, because discourse prominence is related to the speakers' empathy, and animate entities are more eligible than inanimate entities to be prominent (Malchukov, 2008).

There is a vast body of research that indicates that animacy influences word order in the direction of animacy-first, which means that animate arguments precede inanimate ones. For example, animacy is found to influence the preference of passive/active structures, depending on whether the patient or the agent is animate (Ferreira, 1994 for English; Gennari, Mirković, & MacDonald, 2012 for English and Spanish; Van Nice & Dietrich, 2003 for German). More relevant to the present study, animacy was also found to have an effect on the choice of dative structure in a corpus study conducted on German (Kempen & Harbusch, 2004). The authors found that there is a direct effect of animacy on linearization.

[2] The alternating structure (accusative-instrumental) in example (3b) failed to be elicited in the children, most likely due to the low frequency of this structure; the adult controls had only produced it twice in the task. Thus, this structure is disregarded for the rest of the analysis.

For Croatian, an acceptability judgment task was conducted on the adult population by Velnić (submitted), and it was found that, when animacy is balanced (by having both objects either animate or inanimate), the DO-IO variant is preferred to the IO-DO variant. When only the IO was animate, IO-DO orders were accepted much better, compared to cases where the animacy was balanced. This suggests that animacy is a relevant factor in word order choice in Croatian.

In ditransitive structures, animacy is closely linked to the IO, as prototypically the recipient is animate, and the theme is not (henceforth *prototypical animacy*). Thus, the IO should be in a privileged position, appearing as the first object. However, if animacy were the only factor at play, we would rarely see realisations of the DO-IO order in any language. But that is not what happens, as DO-IO occurrences were found in Croatian corpora (Kovačević, 2004; Kuvač Kraljević, 2016), albeit to a lesser extent than the IO-DO.

Studies on animacy in child language suggest that animacy is acquired rather early, since children from around the age of two are able to distinguish animate from inanimate NPs in an adult-like manner (de Marneffe, 2012). Like in adults, an obvious effect of animacy is noticed in the studies of active/passive use, with preference for passive sentences when only the patient is animate (Lempert, 1989).

With regard to the effect on ditransitive structures, Snyder (2003, p. 56) shows that young children (around the age of three) are very attentive to animacy in their choice of ditransitive structure, and rely less on animacy as they grow older. Snyder's (2003) corpus data (from English and Tahitian French) suggest that, as children rely less on animacy, other factors influence their word order choices. She argues that children use animacy as a stand-in for information status, until they are able to grasp what constitutes given

information for the interlocutor. The fact that animacy is more relevant at a young age suggests that there will be a difference between children and adults regarding its relevance in determining word order.

Apart from the above, there are few studies that focus specifically on the effects of animacy.

2.3 The effect of givenness on word order and its acquisition

Many languages are affected by the given before new principle (henceforth given>new), which entails that, if all other factors are equal, speakers will prefer to place the information that is familiar to the listener first, and place the new information later (Birner & Ward, 2009).

The given>new principle originated for the Slavic languages with the Prague school linguistics (Firbas, 1964), and the effects of this factor are still debated. More precisely, divergent implications were made on how strict the principle is, in the case of Czech: strict (Kučerová, 2012) or less strict (Šimík, Wierzba, & Kamali, 2014). Kucerová (2007) suggests that, in Czech, only SVO, the basic word order, can be used in a variety of contexts, while other word orders must be used only in contexts that relate to the givenness values of their elements. In Kučerová (2012), the research is expanded to Russian and Serbo-Croatian[3]; the claim is that, in these languages, givenness is always marked, with given elements preceding new ones, and a new>given order is argued to be ungrammatical. The analysis provided by Šimík et al. (2014) for Czech is less strict,

[3] Term used by Kučerová (2012)

and the authors claim that given objects can occur anywhere in the sentence, excluding the final position, which receives default main sentence stress.

More specifically for Croatian, Velnić (submitted) found a givenness effect in an acceptability judgment task on word order choice conducted on adult speakers. In this experiment, IO-DO structures were considered more acceptable when the IO was given, while the DO-IO was judged better in conditions when the DO was given, or when neither object was given. Conversely, the data from Velnić (2014) indicate that IO-DO is predominant in naturalistic speech, with much fewer cases of the DO-IO order being attested (Child Directed Speech: 60/304 occurrences were DO-IO, Children: 19/258 occurrences were DO-IO). Velnić (accepted) analysed a portion of these data and found limited occurrences of new>given in the child data (2/12 of DO-IO occurrences); the adult data displayed only the given>new order.

Ditransitive structures can accommodate given>new with the DO-IO order when the theme is given, and with the IO-DO order when the recipient is given. Clifton and Frazier (2004) and Brown, Savova, and Gibson (2012) (for English) along with Kizach and Balling (2013) (for Danish) have shown that having a given>new order facilitates sentence processing for DOD but not for the PD (examples (2a) and (2b) above). It has been suggested that discourse information is incorporated into the structure of the DOD, but not that of the PD, and thus the DOD has constraints on how the given and new information is ordered, allowing only for given>new (Brown et al., 2012). Kizach and Mathiasen (2013) have also found that native Polish speakers learning Danish as a second language acquire the native Danish pattern quickly, implying that Polish has the same givenness asymmetries between DOD and PD as Danish. In languages that do not have different structures for dative alternation, such as German and Russian, it has been found

that DO-IO is the canonical order (Røreng, 2011 for German; Titov, 2017 for Russian) due to its wide contextual applicability, while the IO-DO is either contextually motivated (Røreng, 2011) or signals a meaning not available to the DO-IO (Titov, 2017). While both of these studies dealt with the background/focus distinction, rather than the given/new distinction, their findings are still applicable in terms of which word order is the underlying one.

Studies conducted on the effect of givenness on child language have reached divergent results, and there is still no general consensus regarding the age when givenness is in place. Some studies have found a new>given preference in young children (Baker & Greenfield, 1988; MacWhinney & Bates, 1978); however, these experiments are excluded here, since they were conducted on children in the one- or two-word stage, and thus do not apply to the present study.

First, we summarize the studies that find a given>new effect. Going back to Snyder (2003) whose corpus study was already outlined in the section on animacy. In the mentioned corpus study Snyder (2003) also found a progressive effect of givenness on word order in ditransitive sentences. Before the age of 7 the givenness effect is noticeable, but other factors—such as animacy and weight—are more important in determining word order, and the corpus even contains new IOs being placed before the DO at ages of 6 and 7 (p.53). At age 7, givenness becomes the most relevant factor for object placement, but the children are not adult-like yet. The author does not state explicitly in which proportion the two object orders are attested in the corpus, so we cannot conclude which word order is preferred.

A clearer effect of givenness was obtained by Stephens (2015) with elicited production tasks. She found that four-year-olds tend to produce given>new orderings in

their dative constructions. In conditions with given themes (DO), children categorically produced the PD (DO-IO order); when the recipient (IO) was given, the participants were more likely to produce a DOD (IO-DO order) (p.416). The same pattern was found in the adult controls (p.424). This is consistent with the studies on adult language referred to above, which found a stronger givenness effect on given themes, compared to given recipients (Clifton & Frazier, 2004; Kizach & Balling, 2013).

Anderssen, Rodina, Mykhaylyk, and Fikkert (2014) conducted a semi-spontaneous production task on Norwegian children (ages 4-6). Like English, Norwegian exhibits the DOD and PD distinction. The authors find a givenness effect: the theme-given context yielded the PD structure most of the time, while the recipient-given condition was divided among PD and DOD productions, with the latter still being produced much more than in the theme-given conditions. However, the children also frequently omitted an object: half of the productions in the recipient-given condition are omissions, and the omitted object is almost exclusively the IO. Their conclusion is two-fold: firstly, children pay attention to givenness, but still overproduce the PD; secondly, the effect of givenness can also be observed in what children omit.

Among the studies that find no effect of givenness on word order, Mykhaylyk, Rodina, and Anderssen (2013) analysed the permutations of word order in ditransitive structures in Russian and Ukrainian 3-6-year-olds. The responses with no omissions were mostly expressed in the IO-DO order, with very little variation across the two givenness conditions. Although, there was an observable difference with age, as the older children used more DO-IO in the theme-given condition, but IO-DO was still the generally preferred object order. This suggests that Russian and Ukrainian children did not integrate the context in their ditransitive productions. However, when they omitted one object,

they seem to be sensitive to givenness as the omitted object is mostly the given one. It would seem that these children do not mark givenness through word order, but through other means, like using a null referent for the given argument.

Höhle, Hörnig, Weskott, Knauf, and Krüger (2014) conducted a test on German five-year-olds, in which they checked how faithfully the children reproduced ditransitive structures that violated word order (*ACC-DAT)[4] or definiteness (*indef-def) constraints. They found that children faithfully reproduced sentences with no violations, but, in the case of violations, they reproduced definiteness violations more readily than word order violations; meaning, that they faithfully reproduced the constraint-respecting IO-DO sentences, but the constraint-violating DO-IO sentences were also often reproduced as IO-DO. This entails that keeping IO-DO is more relevant than having the definite NP precede the indefinite NP. Givenness is not identical to definiteness, but they are related properties, as the given argument can be expressed with a definite NP, while a new argument is not likely to be expressed with a definite NP. However, the target sentences were provided in isolation, and a wider context might have strengthened the givenness effect in contrast to only marking it with a definite/indefinite article.

For Croatian, an analysis of the Double Object DataBase (Velnić, 2014), based on (Kovačević, 2004), shows a predominant use of the IO-DO order in both children and child-directed speech. Velnić (accepted) analysed this database and found that children use both given>new and new>given word orders. However, the corpus data had limited instances of combinations of given and new objects, as most of the objects were accessible. An overview of these studies is provided in table 1.

[4] They assume that IO-DO is the unmarked order

We can see that the findings correspond to whether the languages have Dative Alternation or not: if they do, the preference is for PD (DO-IO), if not, the IO-DO is preferred. It is also interesting to note that the child language studies on German and Russian and Ukrainian presented in this section seem to contradict the idea that DO-IO is the underlying word order (Røreng (2011) for German, Titov (2017) for Russian), since they show a preference for IO-DO.

Since Croatian does not have Dative Alternation, we should expect that IO-DO would also be the preferred word order amongst Croatian children, and they might choose to produce it even when the givenness context is set up against it.

Table 1: Overview of the findings from this section

Study	Language	Dative Alternation	Case Marking	Age Range	Task	Givenness Effect on Word Order	Object Order Preference
Anderssen et al. (2014)	Norwegian	Yes	No	4-6	Production	Yes	PD (DO-IO)
Stephens (2015)	English	Yes	No	3;10–5;4	Production	Yes	PD (DO-IO)
Snyder (2003)	English	Yes	No	3;3–8;1	Corpus	Yes, increasing with time	NA
Höhle et al. (2014)	German	No	Yes	4;5–5;6	Production	Yes, but weaker than the word order effect[5]	IO-DO
Mykhaylyk et al. (2013)	Russian and Ukrainian	No	Yes	3–6	Production	Weak	IO-DO
Velnić (accepted)	Croatian	No	Yes	0;10–3;2	Corpus	No	IO-DO preference

5 The sentences that violated the definiteness order were reproduced faithfully more frequently than the sentences that violated the DAT(IO)-ACC(DO) order, so there was an effect of givenness, but children were more likely to keep the preferred word order than to violate the definiteness order.

3. Research Questions and Predictions

The purpose of this study is to reveal how children integrate different animacy and givenness values in their ditransitive structures, and also to compare their use of word order to adult native speakers of Croatian. We will do so by attempting to answer the following research questions:

1. Do adults use different word orders to mark the different givenness conditions of the two objects?
2. Do children use different word orders to mark the different givenness conditions of the two objects?
3. Is the givenness effect clearer when animacy is balanced?
4. Do children and adults differ in their object order preferences in ditransitive structures?
5. Is there an animacy effect? Do the speakers have preference for different word order in situations of balanced and unbalanced animacy?
6. Do children pay more attention to animacy than adults?

The first research question is crucial in order to discover the target effect of givenness on word order, and thus make our results comparable across the two groups (adults and children). Givenness was shown to have an effect on word order preference in an acceptability judgment task on Croatian adult language (Velnić, submitted). Furthermore, the study on Croatian corpus data found no new>given orders in adults (Velnić, accepted). Thus, we expect that adults will use different word orders to signal givenness.

Based on the literature seen in section 2.3, we can expect that Croatian children will display an IO-DO preference, and we expect it to be the most frequently used word order. However, that does not exclude children being sensitive to givenness. So, taking into consideration the expected IO-DO preference, the children's sensitivity to givenness and how it affects object order should be most obvious when the given>new principle is in contrast to the IO-DO preference. We thus expect that the effect of givenness will be most clearly noticed when the DO is given and the IO is new.

We expect givenness to be a relevant factor in all conditions, but it will of course have a stronger effect on word order when animacy is neutralized. This is in accordance to Birner and Ward (2009), who states that the given>new preference surfaces when all other factors are equal. We thus predict a more obvious effect of givenness in the condition where both objects are animate.

With respect to the next question, we believe that the two types of speakers have different word order preferences. Firstly, findings from Mykhaylyk et al. (2013) and Höhle et al. (2014) indicate that children are less willing to deviate from their preferred order (IO-DO). Secondly, an acceptability judgment task conducted on Croatian found a preference for DO-IO (Velnić, submitted). Therefore, we expect the preferred orders (IO-DO for children, DO-IO for adults) to surface when the two objects have an equal givenness value. Nevertheless, if the ordering of the two objects is givenness-driven, we expect that when one of the objects is given, it will be the first object. Adults are expected to give givenness more consideration, and therefore vary their object order accordingly, thus producing more variation across the task.

We expect animacy to influence word order in both speaker groups, and this will be observed by comparing the condition where the IO is animate (i.e. prototypical animacy) to the condition with both-animate objects (i.e. balanced animacy).

With regard to the last research question, we expect that animacy will have a more prominent role for children, and they will thus have a stronger preference for IO-DO when the IO is animate. Accordingly, we expect to find a higher degree of DO-IO productions in both groups when the DO is also animate. However, as we expect the adult controls to rely more on givenness than on animacy, we do not expect that the adults will behave significantly different with regard to word order choice across the two animacy conditions when the given>new principle has to be applied to order the two objects.

4.Methodology

Here we outline the setup of the task.

4.1 Experiment

Our experiment tests two conditions of animacy and four conditions of givenness.

I refer to the two animacy conditions as prototypical animacy (IO-animate and DO-inanimate) and balanced animacy (both animate). Animacy is set up as a binary feature, animate/inanimate: the referents were either anthropomorphic animals or inanimate objects (e.g. cat or apple).

The four givenness conditions that are being tested are the following: none of the participants are given (No-G); the DO is given (DO-G); the IO is given (IO-G); or, all arguments are given (All-G). A referent is considered given if it has been already mentioned in the discourse. Thus, in any first image of an experimental set, nothing is given, because none of the referents had the opportunity to be mentioned before. Following that, if the DO from the previous image is present again, this creates the DO-G condition; if the IO from the previous image is repeated, we have the IO-G condition. The conditions were each illustrated by one action image, with the exception of the No-G condition, which consisted of two images: one in which no argument was given and another one in which the subject was given. They were merged under the No-G condition because neither object is given in both of those conditions, and the givenness of the subject is not relevant for the current study.

This experimental design was inspired by the puzzle task developed by Eisenbeiss (2011) for eliciting a broad range of case-marked forms, including double objects, in German. Eisenbeiss's method consisted of a puzzle board with cut-outs containing images depicting various actions, and puzzle pieces with the corresponding pictures to be put in the cut-outs. The children had to ask for the puzzle pieces corresponding to the pictures on the board and, since the pictures contrasted minimally one form the other, they were encouraged to mention all of the participants present in each picture. This method has proven to be successful, as it was engaging for the child, and target structures were easily obtained. In order to control for givenness and animacy, we hereby adapt the method by setting up the conditions mentioned in the previous paragraph. The main difference from the original task is that, here, the participants begin with an empty puzzle board, and the images were provided by the experimenter.

Three sets of images were used. Each set contained all givenness conditions presented, in the order as specified above (1. No-G; 2. DO-G; 3. IO-G; 4. All-G). Each set depicted a ditransitive action with the verbs *dati* 'give', *nuditi* 'offer', and *slati* 'send': the first two verbs had the prototypical animacy layout, while 'send' had balanced animacy. The verb 'give' was chosen because it is the prototypical ditransitive verb, and it is predominant in child language corpus data (Kovačević, 2004; Velnić, 2014). The verb 'offer' was chosen because it can yield structural dative alternation of case (Zovko-Dinković, 2007), as briefly described in section 2.1. Still, this alternation was not present in the children and had only two instances in the adult data. Lastly, 'send' was chosen in order to allow for balanced animacy, since it can accommodate an animate DO.

4.2 Participants

A total of 59 monolingual Croatian children between the ages of 3;7-5;2 (mean age=4;4, 26 males) were chosen. We chose this age range because it is similar to the range used by previous studies that tested ditransitives (Anderssen et al., 2014; Höhle et al., 2014; Mykhaylyk et al., 2013; Stephens, 2015). The children were recruited from four kindergartens in Rijeka, all part of a larger kindergarten group under the same administration. The parents had to sign an informed consent form in order for the children to participate.

The adult control group consisted of 36 participants aged 19-28 (mean age=21, 8 males). The participants were required to have been born to two Croatian parents and to have grown up in Croatia; other languages learned later in life were not controlled for. They each received a 100 Kuna (approximately 13 euros) gift certificate at a local

bookstore for their participation. The participants were recruited at the Psychology and Law department of the University of Rijeka.

4.3 Materials

The materials for this experiment consist of the images depicting ditransitive actions (action images), images of single participants that are meant to fortify the givenness effect (single images), and the image board. All the images were printed on white Plexiglas. An example of the images is depicted in figures 1 and 2.

The action images depicted actions of transfer, and were divided into the three sets already mentioned. Each set (n=3) contained five action images (total=15)[6], one for each givenness condition. The images were shaped differently from one another, and each set had one image corresponding to one shape on the board. We have also controlled for directionality, in that the order in which the participants were depicted varies (either left to right, or right to left), with the DO always depicted in the middle, in order to provide a clear depiction of the referents' interactions.

[6] Recall from section 4.1 that the No-Given condition consisted of two images.

Figure 1: Action image (from 'offer' set)

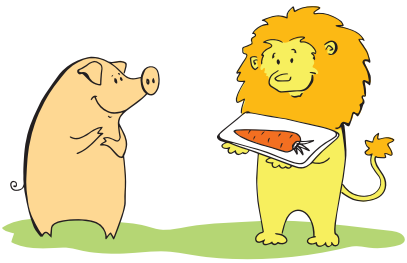


Figure 2: Single image (from 'offer' set)

The single images depicted one of the referents present in the action images. Their role was to reinforce the givenness condition, as they were presented in-between action images, and contained a referent present in the previous and in the following action image. Each set contained four single images (total=12).

All these images had to be placed on the board. The image board consisted of two wood planks attached to one another, with the top one containing five differently-shaped slots, one for each action image. At the bottom of the board there was a small shelf designated for the single images (subject, theme, or recipient) that reinforce which one is given in the following action image. An example of the board with some images placed on it is provided below.

Figure 3: Photograph of the image board with some images on it.[7]

4.4 Procedure

All the sessions were audio recorded. The recordings took place in a room on the kindergarten premises, where the child and the researcher could remain undisturbed. For the adult controls, the testing was conducted either in the psychology lab or in a classroom at the university of Rijeka. An audio recorder (model: Sony lcd-px333) was placed on the table, and the experimenter also manually recorded the children's responses as the testing proceeded. This was then used to facilitate the transcription process. The responses were not manually recorded for the adult controls, because the testing proceeded very smoothly, and the on-line transcription would have slowed the task down.

[7] NB: The way the images are placed on the board in the photograph is not exemplifying a real situation in the experiment

The distribution of the previously-mentioned shapes was different for each set. The shapes are not relevant for the study; their function was to make the task more entertaining for the child, and also to add more cognitive load to the task, so there is less chance for auto-priming. The images had the same order of givenness conditions across the sets: No-G, DO-G, IO-G, and All-G. There were two possible orders in which the images of a set could be presented, but the order of the givenness conditions remained unvaried. One of the orders in which the images were presented to the participants is shown in tables 2–4 for each verb. The referents (animals and objects) are different in every set, in order to avoid cross-condition givenness effects. Note that the descriptions in the tables below are merely describing what is on the action image, and do not reflect our expectations, or the actual productions of the participants.

Table 2: One possible order of images for 'give'

	Given	Action	Direction
1	**No given**	Fox gives apple to cat.	S>DO>IO
2	**S**	**Fox** gives flower to duck.	S>DO>IO[8]
3	**S & DO**	**Duck** gives **flower** to horse.	S>DO>IO
4	**S & IO**	**Fox** gives cake to **horse.**	S>DO>IO
5	**All**	**Duck** gives **apple** to **cat.**	IO<DO<S

[8] This image was originally supposed to have the IO<DO<S order, and it was illustrated that way, but during the printing process it was reversed and printed as a mirror image, which resulted in the inverse orders of the participants.

Table 3: One possible order of images for 'offer'

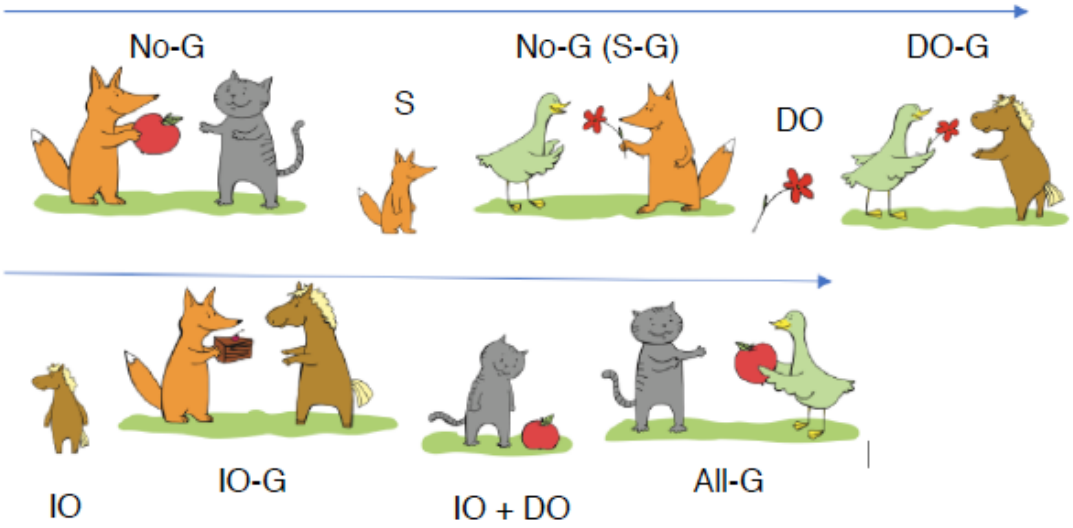
	Given	Action	Direction
1	**No given**	Lion offers lollipop to zebra.	S>DO>IO
2	**S**	**Lion** offers carrot to pig.	IO<DO<S
3	**S & DO**	**Pig** offers **carrot** to monkey.	IO<DO<S
4	**S & IO**	**Lion** offers sandwich to **monkey.**	S>DO>IO
5	**All**	**Pig** offers **lollipop** to **zebra.**	IO<DO<S

Table 4: One possible order of images for 'send'

	Given	Action	Direction
1	**No given**	Bunny sends puppy to elephant.	IO<DO<S
2	**S**	**Bunny** sends parrot to the turtle.	S>DO>IO
3	**S & DO**	**Turtle** sends **parrot** to the snail.	IO<DO<S
4	**S & IO**	**Bunny** sends mouse to **snail.**	IO<DO<S
5	**All**	**Turtle** sends **puppy** to **elephant.**	S>DO>IO

The second order in which the images could be presented to a participant is provided in the appendix. Thirty-four of the children received the images in order 1 (presented in tables 2-4) while 24 were presented with order 2. This imbalance is due to the fact that the two orders of images were presented on alternating days, and, on some days, there were more children tested than on other days. In the control group, 18 participants were given the images in order 1, and 18 in order 2. Figure 4 illustrates the task of presenting the images to the participants according to order 1 of 'give'.

Figure 4: Order 1 in which the images were given to the participant to elicit 'give'.



The task proceeded as follows. The experimenter and the participant sat opposite to each other. The image board was placed in front of the participant, positioned in such a way that the experimenter could not see what was being placed on it. The participant was instructed to receive the images, describe them, and place them in the appropriately-shaped slot. At the beginning of each puzzle set, the experimenter prompted the verb by saying "these images are about giving/sending/offering". The sets were given in a random order.

The images were given to the participant from a bag, facing down, so that the participant was the only one to see the image. After each action image, the participant received a single image of a referent that was present in the previous image, and that will also appear in the next action image. The experimenter and participant exchanged a few sentences about it, before proceeding to the next action image. The conversation usually consisted of the experimenter asking the participant whether this referent was the same

one as seen in the action image, or asking the participant whether they liked the referent on the single image. The latter strategy was more successful with children than with adults; the adults were not keen on expressing their liking for a referent. This was repeated until all five images of a set had been described and placed on the board. Once the board was complete, the experimenter and the participant took out all the images, the board was placed in front of the participant once more, and they proceeded with the next set of images. This was repeated for all three verb sets. At the end of the task, the child was accompanied back to the kindergarten group and the adult was given the reward.

As specified above, the sets were supposed to be given in a random order. However, after a few runs, we noticed that the 'send' set had less data loss in the children's productions if presented last. This set was harder than the other two, most likely due to an unprototypical situation of sending an animate referent to another animate referent. By having this set as the last one, the child was familiar with the procedure, and thus described the images more easily. We therefore proceeded by randomly giving one of the two IO-animate sets as first and second, while the both-animate set was given last.

5. Results

This section is dedicated to the results obtained by the task. We will start by accounting for the NA data, and then look into the responses to the different givenness conditions in each of the two animacy conditions. We compare children and adults within each of these sections.

5.1 Non-applicable data: production exclusions

The adult controls had 540 possible responses (5-targets x 36-adults x 3-sets) and we were able to use 439 of those. The NA data was due to: no ditransitive action (n=19), inverted referents (n=6), the use of clitics (n=6), and the use of a PP (n=70) that was excluded due to end-weight affecting the object order.

The children strongly overused the verb 'give' across all conditions, which still yielded a ditransitive. Hence, we are not excluding these data, as this task was not about testing the word order with a particular lexical verb, but about the effect of animacy and givenness on the object order combinations. Out of 885 possible responses (5-targets x 59-children x 3-sets), we were able to use 625 observations. The NA child data are categorized as follows: no response (n=5), no ditransitive action (n=74), use of a PP or a relative clause (n=39), case error with non-intelligible roles (n=6), referent inversion (n=67), omission of an object (n=58), use of a pronoun or clitic (n=10), experimenter's mistake (n=1).

Even though the use of a pronoun or a clitic is an indication of givenness, we have decided to exclude these forms, because they also influence word order, as a pronoun is usually placed before an NP, while clitics are syntactically fixed in second position. Furthermore, the data from the occurrences with a different structure cannot be used, because both PPs and relative clauses are more likely to be heavy, and thus their placement at the end of the sentence is dictated by weight.

The referent inversion consists of the child inverting the IO and DO roles by assigning the dative case to the target DO, and the accusative to the target IO. This was not a case mistake, since the children use the cases correctly in the other sets. Even

though we have accepted deviations from the intended verb, the inversion of the theme and recipient is a description of a different event entirely, and also influences the givenness conditions. All of the referent inversions were confined to the both-animate condition, where it was possible to invert the DO and the IO.

The children's object omissions will be discussed separately, in section 5.5.

5.2 Intended givenness vs. actual givenness

During the test, the child would often take an image, say what was on it, and then describe the action. In such cases, all the referents have to be counted as given. This problem only occurred infrequently in adults, as they typically did not mention anything prior to the ditransitive target. A crucial part of the data analysis is to observe how word order changes in relation to givenness. We thus had to account for what was actually given, and re-categorize the occurrences accordingly. Table 5 shows the final count of responses in each condition. Although adults did not deviate from the intended givenness condition, their number of responses is nevertheless provided in table 6. This is the final distribution of the data that will be analysed and discussed in the next section.

Table 5: Distribution of responses in the actual state of givenness in the child data

Condition	**No-G**[9]	**DO-G**	**IO-G**	**All-G**
N. responses	180	127	149	169
Total	625			

[9] Recall that the No-G condition includes two images for each set: No-G and Subject-G, because neither object is given in both of those conditions

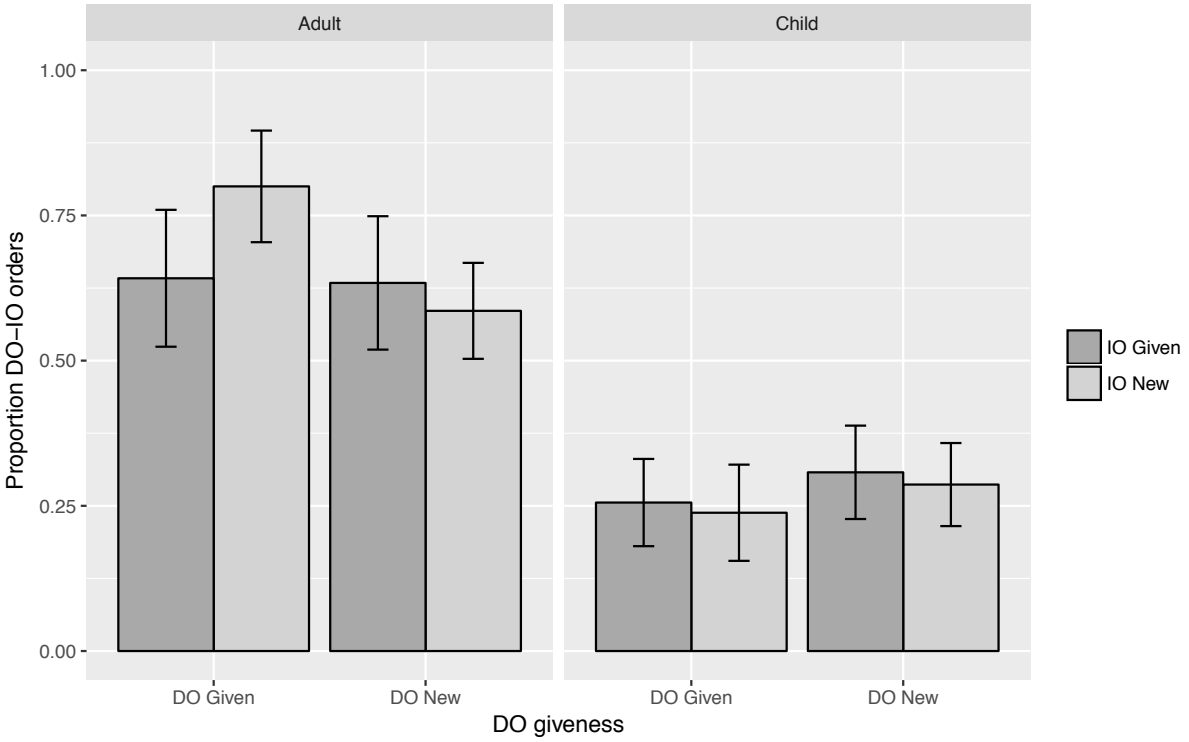
Table 6: Distribution of responses in the adult data

Condition	**No-G**	**DO-G**	**IO-G**	**All-G**
N. responses	177	86	91	85
Total	439			

5.3 Prototypical animacy condition

We first look at the responses in the IO-animate DO-inanimate condition, since this is the prototypical condition, which the speakers are exposed to the most. We have predicted that, for the children, the effect of givenness should be clearest in the DO-G condition, because it contrasts with what has been found to be the most frequently used object order (IO-DO). Figure 5 depicts the distribution of the object orders, grouped according to the givenness of the DO and the givenness of the IO. The tables containing the raw numbers can be found in the appendix (tables A1 and A2).

Figure 5: Distribution of object orders in adult and children, in the prototypical-animacy condition



The statistical analysis was set up as follows. We used a linear mixed effects model (Bates, Machler, Bolker, & Walker, 2015), and set up the contrasted conditions based on the givenness of the DO: DO-G and All-G were grouped together (DO-GG), and No-G and IO-G were grouped together (DO-nG). In the following tables, then, the first line below the intercept indicates the comparison of the two conditions in which the DO is given (DO-GG), to the conditions in which the DO is not given (DO-nG). Following that, the conditions within DO-GG and DO-nG respectively are compared in order to establish whether the givenness of the IO plays a role. The participant and set ('give' and 'offer')

were set as random effects. This model was conducted on the data of both groups together. The intercept is the distribution of the two object orders in adults.

Table 7: Summary of the model of the responses in the IO-animate condition

	Estimate	**Standard error**	**p-value**	**Significance**
Adults all (Intercept)	2.6135	1.3079	0.045	p<0.05
Adults DO-GG v DO-nG	1.6445	0.5933	0.0055	p<0.01
Adults DO-G v All-G	1.1505	0.4675	0.013	p<0.05
Adults IO-G v No-G	0.3192	0.3589	0.373	-
Children All	-3.4724	0.9508	0.00026	p<0.001
Children DO-GG v DO-nG	-2.2136	0.7300	0.00243	p<0.01
Children DO-G v All-G	-1.2283	0.5602	0.0283	p<0.05
Children IO-G v No-G	0.0259	0.4601	0.955	-

The significance obtained in the intercept indicates that the adults favour one object order over the other: the value in the estimate is positive, which entails that the object order preferred by the adults is DO-IO.

Next, the conditions where the DO is given (DO-G and All-G) and where it is not given (No-G and IO-G) were compared: the statistical analysis confirms that the two object orders differ in their proportions, based on the givenness of the DO (p<0.01). By examining the proportions of the object orders in the conditions within DO-GG and DO-nG, we can establish whether the givenness of the IO has any impact on object order in the current task. Consequently, the givenness of the IO is relevant when the DO is also given, as the amount of DO-IO orders decreases significantly, when compared to the

condition where only the DO is given ($p<0.05$); however, the givenness of the IO does not influence the proportion of word orders when the DO is not given (IO-G vs No-G).

When the overall distribution of object orders in the child data is compared to the one in the adult data, we can see that they are significantly different. The (-) sign in the estimate indicates that the preference is opposite than the one seen in the adults: children prefer IO-DO.

Moving on to the more fine-grained differences, when we compare the distribution of word orders with the DO given and the DO not given, we can see that the effect givenness has on word order in children is not the same as in the adults. The (-) sign in the estimate indicated that there is a decrease of DO-IO orders in the conditions in which the DO is given, when compared to the conditions when it is not given. Like in the adult data, the givenness of the IO has an effect within the DO-G group, but differently than in the adult data, its effect consists in a higher proportion of DO-IO with respect to the when only the DO is given. With regard to the last contrast, between No-G and IO-G, there is no difference, like in the adult data, meaning that the givenness of the IO does not influence object order once the DO is not given.

As predicted, children have a preference for IO-DO, and this stays fairly constant throughout the task. The adults use both object orders equally, with the exception of the DO-G condition, where the DO-IO is clearly preferred. Both groups show sensitivity to the given DO, the adults act target-like and produce more DO-IO, while the children use the least DO-IO orders when the DO is given.

5.4 Balanced animacy condition

This condition has considerably fewer observations (n=191 in total) than the previous condition, due to both this condition only including one set of images, and a higher rate of NA data. One reason for this is the possibility of using a PP. Another reason, limited to children, was referent inversion (seen section 5.1)

It has been stated in the predictions that the effect of givenness on word order will be clearer in this condition, because the animacy of the two objects has the same value. Surprisingly, the adults produced only DO-IO orders, with only one exception of IO-DO order.

Therefore, when both objects are animate, the only word order used is DO-IO, and there is no observable givenness effect. The raw numbers and percentiles are provided in the appendix (tables A3 and A4). This is a limitation of the task, and the possible reasons will be presented in the discussion. Because of this distribution of responses, there is no use in conducting a statistical test on the adults[10].

We can nevertheless compare the distribution of the data in the two animacy conditions, which will reveal whether the increase of DO-IO productions is significant. The model is set up without regard to the givenness conditions, as givenness obviously did not have an effect in the both-animate condition, and the effects of givenness were already discussed for the IO-animate condition in the previous section.

[10] The DO-IO preference we observed here is in accordance with the results of an acceptability judgment task obtained by Velnić (submitted), which showed that when the animacy was neutral, DO-IO orders were preferred to IO-DO.

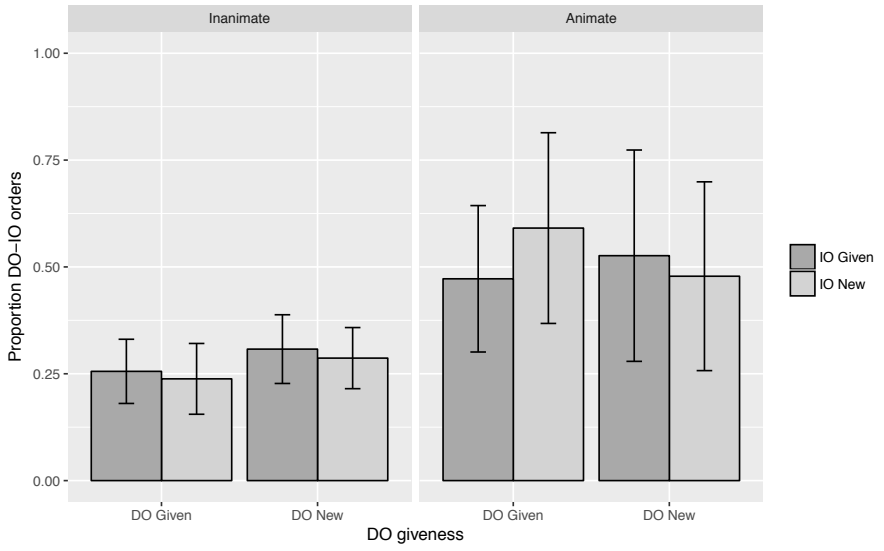
Table 8: Summary of the model for adult responses in the two animacy conditions.

	Estimate	**Standard error**	**p-value**	**Significance**
IO animate	0.9613	0.3501	0.006	p<0.01
Both animate	4.4766	1.0824	$3.54e^{-05}$	p<0.001

From table 8, we can see that the adults already have a preference for DO-IO in the prototypical animacy condition; however, this preference increases significantly when the DO is also animate.

We will go into more detail with the children's responses. In figure 6 the responses in the two animacy conditions are compared and the graph reveals that the trend in responses is different than in the prototypical animacy condition, as the IO-DO no longer dominates the children's productions. Moreover, the DO-G condition now has the highest proportions of DO-IO productions, unlike the previous condition, when the DO-IO productions were significantly decreased.

Figure 6: Comparison of the distribution of object orders in the child data, between the condition with an inanimate DO (prototypical) and the condition with an animate DO (both animate).



We have thus set up a comparison model of the two animacy conditions, but, unlike the setup for the adult data, the model for the child data takes the givenness conditions into account (table 9). The givenness contrasts were set up as previously. The intercept is the children's responses in the prototypical animacy condition.

The significance in the intercept indicates a preference towards one object order in the IO-animate condition. This preferred object order is IO-DO, as the estimate has a (-) sign; this was also seen in the previous section, when the productions of the two groups of speakers were compared. Furthermore, we can see that the production of DO-IO significantly decreases when we compare the conditions with a given DO to the conditions where DO is not given. The givenness of the IO does not seem to be of any relevance, as the two subsequent comparisons do not come out as significant.

The comparison of the data in the two animacy conditions reveals that children use significantly more DO-IO when both objects are animate. Moreover, the comparison of the DO-GG and DO-nG is almost significant ($p<0.1$), entailing that the DO-IO increases in conditions of given DO, contrary to what happens when only the IO is animate. The reason why this interaction is not significant might be due to the reduced amount of data elicited for the both-animate condition; thus, if the conditions had had an equal amount of sets, the result of this interaction would most likely have been significant. Again, the givenness of the IO does not seem to play a role.

Table 9: Summary of the model for children's responses in the two animacy conditions, with relation to givenness

	Estimate	**Standard error**	**p-value**	**Significance**
IO-animate (Intercept)	-1.4135	0.26244	7.20e-08	p<0.001
IO-animate DO-GG v DO-nG	-0.9289	0.4725	0.0493	p<0.05
IO-animate DO-G v All-G	-0.2025	0.3531	0.5663	-
IO-animate IO-G v No-G	0.3472	0.3103	0.2632	-
Both-animate	1.6436	0.3106	1.22e-07	p<0.001
Both-animate DO-GG v DO-nG	2.0227	1.1289	0.0732	p<0.1
Both-animate DO-G v All-G	0.6487	0.773	0.4013	-
Both-animate IO-G v No-G	0.0057	0.8124	0.9943	-

The results reveal that both children and adults are attentive to animacy, as the proportions of DO-IO orders significantly increase. The model set up for the child data reveals that children are more adult-like in taking givenness into account once animacy is no longer a factor (both-animate); this is apparent since the DO-GG conditions signal a given>new preference, and not a new>given preference as seen in the IO-given condition. The reasons for this will be further elaborated in the Discussion.

5.5 Omissions in the child data

Previous studies, such as Mykhaylyk et al. (2013) and Anderssen et al. (2014), found a significant amount of data related to givenness in the omissions. Since the production of object order does not signal sensitivity to givenness in the child data, we decided to check if the omissions are related to it.

Overall, the children have 58 object omissions, 42 of omitted elements being given. The adults did not have any omissions in the task. Table 10 shows this omission by element across the givenness conditions, the shaded values signal that the argument is given.

Most omissions occur in the All-G condition, and the IO has the highest omission rate (n=44). The most relevant omissions are DO and IO omissions in the DO-G and IO-G conditions, as these can signal whether the omission is related to givenness. Table 11 shows the distribution of these omissions along with the occurrences containing both objects. The shaded values signal an appropriate construction or omission in relation to givenness.

Table 10: Distribution of omissions in the child data

	No-G	DO-G	IO-G	All-G	Total
DO	1	2	2	9	14
IO	9	4	10	21	44
Total (omitted+overt)	154	108	126	171	559

Table 11: Distribution of word orders and omissions in DO-G and IO-G

	IO-animate		Both animate	
	DO-G	IO-G	DO-G	IO-G
DO-IO	23	38	12	10
IO-DO	60	56	4	5
Om DO	2	2	0	0
Om IO	1	7	3	3
Total appropriate productions	25	63	12	8

We can see that the omissions are marginal in the key conditions for this study, and we can make very few observations on the omission pattern. Firstly, the IO is much more prone to omission than the DO. This is not related to animacy, since the DO is not omitted more when it is animate. Overall, children omit slightly more given objects than new objects (12 vs. 6). However, these data are too scarce to suggest that children mark givenness through the omission of the given object, rather than through word order, as both strategies (the IO-DO order and the omission of the IO) show non-context related preferences.

6. Discussion

On the one hand, the data obtained from the task indicates a givenness effect on object ordering confined to the given DO, and did not capture any effect on the adults when both objects were animate. This could entail that our task failed to capture the givenness relation between the objects, and we will discuss the possible methodological limitations that could have caused this here. On the other hand, animacy appears to be a relevant factor for both types of speaker. The study also finds that adults have a strong preference for DO-IO, while children over-produce IO-DO due to animacy, but also seem to have a less pronounced, preference for DO-IO.

The first research question ('Do adults use different word orders to mark the different givenness conditions of the two objects?') was about the relation of givenness to word order in adults. We expected the adults to conform to the given>new principle, but we found an effect only when the DO was given. The balanced animacy condition displayed only DO-IO productions, and consequently, no givenness effect could be noticed there.

A possible reason for finding a limited givenness effect in the adult controls is that the task may have failed to distinguish between given and new elements. Perhaps the adults did not believe that the experimenter did not know which images she was taking out of the bag. In that case, they might have perceived everything as given, and thus did not have the need to mark givenness distinctly.

For the second research question ('Do children use different word orders to mark the different givenness conditions of the two objects'), we have predicted that, due to the possible preference for IO-DO, the givenness effect will be most noticeable in the DO-G condition. As in the adults, this is exactly what we have found. Children and adults, however, act differently with regard to this condition, as the former decrease their DO-IO productions (indicating a new>given preference), while, in the case of adults, the DO-IO productions increase, as was expected. In the balanced animacy condition, the DO-G condition continues to differ from the rest of the conditions. However, here we find a marginal given>new preference. The marginal effect is due to a reduced number of data points, and it would probably have been more significant if less data had been lost. The IO-G condition never differs from the baseline.

The next research question was whether there is a clearer effect of givenness when animacy is neutralized. We have predicted that the effect of givenness will be clearer when animacy is neutralized; this is, after all, the proper way to fully observe the effect of a factor. This prediction was however not borne out, as there was no givenness effect to be observed in the adult data since the DO-IO production is at ceiling level. For the children, we notice a significant change in the word order preference from IO-DO to DO-IO, and a more adult-like performance, if compared to the adults' production in the IO-animate condition (already discussed above). Nevertheless, we must consider the

answer to this inconclusive, and a new setup is needed in order to provide an unambiguous answer.

Regarding research question four, ('Do children and adults differ in their object order preferences in ditransitive structures?'), adults and children do seem to behave differently, as they seemingly have different object order preferences: the former prefer DO-IO, while the latter favour IO-DO. Adults prefer DO-IO, especially in the both-animate condition, where this is in fact the only word order produced. This tendency was also found in Velnić (submitted), when animacy or both animacy and givenness were neutral. The children's preference for IO-DO is limited to the condition of prototypical animacy, which is the one found in naturalistic data. The preference for IO-DO has also been found in other studies (Höhle et al., 2014; Mykhaylyk et al., 2013) and it had led us to predict that Croatian children will display the same tendency. In the balanced condition, the children were more adult-like, as they produced DO-IO 52% of the time. This brings us to the discussion of animacy.

Our next research question was about the animacy effect. Both children and adults had a significantly stronger preference for DO-IO when the DO was also animate. This confirms our prediction that animacy influences both types of speakers.

Research question six regarded animacy and whether it had a different effect on children than on adults. In accordance with the findings in Snyder (2003), we predicted that animacy would have a stronger effect on children. Our results deserve a thorough discussion on this matter.

The results suggest that animacy is a strong factor for determining word order in both types of speaker, and this is not in line with our predictions, as we expected animacy to be a stronger factor in children than in adults. The results can, however, be attributed

to an interaction of animacy with the different object order preferences in adults and children. More precisely, and in light of other data on Croatian, such as the acceptability judgment results obtained by Velnić (submitted), it is obvious that the preferred word order of adult speakers is DO-IO. So, since animacy influences object order choice, when the IO is animate, the adults produce their preferred order and the animate-first order in equal proportions. The production of DO-IO is increased with givenness in favour of the DO (DO-G condition), and then returns to the initial distribution, which is an interaction of word order preference and animacy of the IO. The givenness of the IO does not seem to be considered.

When animacy is no longer a factor (both-animate), adults produce DO-IO at ceiling level, as their word order preference is the only ordering mechanism that surfaces. The reason for this is open for discussion, since we expected adults to be the group that takes more factors (in our case givenness and animacy) into consideration when ordering the arguments. It nevertheless seems, contrary to any prediction, that adults choose based on the pragmatic availability of their preferred order, and that, once free from animacy constraints, they use that order exclusively. It is peculiar that givenness is completely ignored here, but we have already mentioned that this might be due to a task effect in which the adults considered all referents as given. If that is the case, animacy is the only factor tested on adults, and it has an effect that we have already discussed.

For the children, naturalistic data from Croatian suggests that IO-DO is the more frequently produced object order (Kovačević, 2004; Velnić, 2014). This is not strictly an indication of their preference for this order, since child-directed speech also contains a majority of IO-DO (Velnić, 2014). But taking into consideration other studies that have

also found this preference (Höhle et al., 2014; Mykhaylyk et al., 2013), we have predicted a preference towards IO-DO.

Let us, then, first outline the children's behaviour in our task, and see whether there really is a preference for IO-DO. In the IO-animate condition, children produced mostly IO-DO, because it is the more appropriate object order from an animacy perspective, to which we know children are attentive. The production of DO-IO significantly increases when animacy is balanced, entailing that it is a very relevant factor. If IO-DO was really their preferred order, it could have been used unvaryingly across the task, since its use is still appropriate from an animacy perspective. Here, the children also show a givenness effect similar to that observed in adults for the prototypical animacy condition, as the DO-G condition has more DO-IO productions than the other givenness conditions. Perhaps, once animacy is balanced, children have more cognitive capacity to integrate givenness in their word order choice. This is only a speculation, and there is no way of proving this based on the current data.

However, children do not reach ceiling level in any condition, as adults do in the balanced animacy condition. The data suggests that children do not prefer IO-DO, and are aware of the underlying status of the DO-IO, but are not yet adult-like. If they relied only on the appropriateness of the IO-DO, they could have used it consistently throughout the task. Thus, the predominant productions of IO-DO, seen in the naturalistic data and in some of the experimental studies cited here, are due to the animacy imbalance and children being very sensitive to it. Once that is removed, children speakers are freer to vary their productions and be more similar to the adults. To conclude, the object order choice we see in the task is an interaction of preferred object

order and animacy, and animacy seems to have a stronger effect on children than on adults, which is in line with what Snyder (2003) had found.

This means that the results obtained with regard to object order preference are due to an animacy imbalance which occurs in ditransitives prototypically. This is to be expected in naturalistic data. However, also the studies cited in section 2.3 that have not found a clear givenness effect, but rather an object order preference (Höhle et al., 2014; Mykhaylyk et al., 2013) have used the prototypical animacy. Thus, their results are most likely affected by the children's attentiveness to animacy and are an indication of children respecting the animate-first principle, rather than having a preference for IO-DO.

7. Conclusion

This study set out to explore the effects of givenness and animacy in ditransitive sentences of Croatian pre-school children. We found a strong animacy effect in both types of speakers, although children rely on animacy more than adults. An effect was also found for givenness, but limited to the condition in which the DO was given. Both types of speaker were more attentive to the DO being given, compared to the IO. This was a predicted result for the children (but not for the adults), as we expected them to take givenness of all the arguments into consideration. The reasons for which the givenness of the IO does not trigger an effect of word order are yet to be investigated.

We have also discovered that adults prefer DO-IO, while children tend to use more IO-DO, but do not have a strong preference for that object order. In the child data, there is an over-production of IO-DO when the IO is animate, but once animacy is balanced, the proportion of the two word orders is in favour of DO-IO. The predominance of IO-

DO productions in naturalistic data is due to the IO being animate and the DO being inanimate. This study shows that once animacy is no longer a factor, the DO-IO preference starts to surface. This suggests that children are very attentive to animacy, but that their word order preference is underlyingly adult-like. If their preference for IO-DO was as strong as the adults' preference for DO-IO, IO-DO would be the only object order produced in the task. We thus conclude that children are more attentive to animacy than adults.

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Appendix

Table A1: Second possible order of images for 'give'.

	Given	Action	Direction
1	No given	Fox gives flower to duck	S>DO>IO[11]
2	S	**Duck** gives apple to cat	IO<DO<S
3	S & DO	**Duck** gives **flower** to horse	S>DO>IO
4	S & IO	**Fox** gives cake to **horse**	S>DO>IO
5	All	**Fox** gives **apple** to **cat**	S>DO>IO

Table A2: Second possible order of images for 'offer'.

	Given	Action	Direction
1	No given	Lion offers carrot to pig	IO<DO<S
2	S	**Pig** offers lollipop to zebra	IO<DO<S
3	S & DO	**Pig** offers **carrot** to monkey	IO<DO<S
4	S & IO	**Lion** offers sandwich to **monkey**	S>DO>IO
5	All	**Lion** offers **lollipop** to **zebra**	S>DO>IO

[11] This image was originally supposed to have IO<DO<S order and it was illustrated that way, but during the printing process it was reversed and printed as a mirror image, resulting in the inverse orders of the participants.

Table A3: Second possible order of images for 'send'.

	Given	Action	Direction
1	No given	Bunny sends parrot to turtle	S>DO>IO
2	S	**Turtle** sends puppy to elephant	S>DO>IO
3	S & DO	**Turtle** sends **parrot** to snail	S>DO>IO
4	S & IO	**Bunny** sends mouse to **snail**	IO<DO<S
5	All	**Bunny** sends **puppy** to **elephant**	IO<DO<S

Table A4: Distribution of the adult responses in the IO-animate condition.

	No-G	**DO-G**	**IO-G**	**All-G**
DO-IO	59% (82)	80% (56)	63% (45)	64% (43)
IO-DO	41% (58)	20% (14)	37% (26)	36% (24)
Total	348			

Table A5: Distribution of the children's responses in the IO-animate condition.

	No-G	**DO-G**	**IO-G**	**All-G**
DO-IO	29% (45)	24% (25)	31% (40)	26% (34)
IO-DO	71% (112)	76% (80)	69% (90)	74% (99)
Total	525			

Table A6: Distribution of the adult responses in the both-animate condition.

	No-G	**DO-G**	**IO-G**	**All-G**
DO-IO	97% (36)	100% (16)	100% (20)	100% (18)
IO-DO	3% (1)	0%	0%	0%
Total	91			

Table A7: Distribution of the children's responses in the both-animate condition.

	No-G	**DO-G**	**IO-G**	**All-G**
DO-IO	48% (11)	59% (13)	53% (10)	47% (17)
IO-DO	52% (12)	41% (9)	47% (9)	53% (19)
Total	100			

The effects of discourse topic on global and local markers in Croatian ditransitives

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Abstract

This study investigates the impact that discourse topic (DT) has on (i) word order (global marking) and (ii) referring expression (local marking) in ditransitive structures in Croatian preschoolers and adult controls.

According to general pragmatic principles, the DT argument is expected to be placed before the rest of the sentence, thus complying with the (discourse)topic-comment order (Gundel 1988). It is also expected to be more likely to be expressed with a clitic or omitted altogether (Gundel, Hedberg, and Zacharski 1993).

We tested 58 monolingual Croatian children (mean age= 4;4) and 36 adult controls (mean age=21) in three conditions with different DTs (subject, direct object and indirect object) by using storybooks to elicit ditransitive structures, either the direct object-indirect object (DO-IO) or the indirect object-direct object order (IO-DO).

The results reveal that DT has an impact both on adult word order (DT-comment order) and referring expressions choice, while it has an effect only on children's referring expressions, as the children use IO-DO 75% of the time regardless of DT condition. This is in line with previous studies that find that children mark givenness/newness first on local and then on global markings (Hickmann et al. 1996, Anderssen et al. 2014, Mykhaylyk, Rodina, and Anderssen 2013). We also find that children are over-specific as their use of NPs is higher than the adults' use throughout the task (p.value=0.0006347).

Keywords: discourse topic, givenness, ditransitives, word order, referring expressions

1. Introduction

This study examines how Croatian monolingual children and adults use global markings (object order) and local markings (different referring expressions) to signal the discourse-pragmatic notion of discourse topic in ditransitive structures.

The global marking under investigation here is the relative ordering of the two objects in a ditransitive sentence, indirect-direct (IO-DO) vs. direct-indirect (DO-IO), in relation to the topic-comment structure, more specifically, when one object is the discourse topic, and the other one is not.

According to linguistic theory, the topic precedes the rest of the sentence, which is referred to as comment (Gundel 1988). The use of Referring Expressions (RE) is guided by a Givenness Hierarchy proposed by Gundel, Hedberg, and Zacharski (1993), according to which the more accessible argument is more likely to be expressed with a shorter form (such as a pronoun) or be omitted altogether. Additionally, the type of RE influences the order of the arguments: pronouns tend to precede NPs due to a general tendency for pronouns to precede NPs (Gundel, Hedberg, and Zacharski 1993, Bresnan et al. 2005), and they are also usually less heavy than NPs, and thus placed before them (Arnold et al. 2000).

It has been claimed that children signal givenness/newness through local markers first, and only later through global markers (Hickmann et al. 1996). On the one hand, the studies conducted explicitly on the acquisition of the topic-comment order (Hornby 1971, Dimroth and Narasimhan 2012) revealed that children do not necessarily place the topic before the comment. On the other hand, it has been shown that discourse cues are reflected in children's REs from early on (Tedeschi 2008, Matthews et al. 2006, Gundel and Johnson 2013).

In order to investigate the matter, we have tested Croatian preschool children (n=58, mean age=4;4) and adult controls (n=36, mean age=21), in three conditions with different arguments as the DT (subject=baseline, DO, and IO). The task made use of storybooks in which one of the arguments was the DT, while all the other arguments were considered accessible, because they were visually available to the participant and experimenter. The DT was

expected to precede the other arguments, and to be expressed with a pronoun, a clitic, or a null form. Thus, in the storybook about a cat whose friends give her presents to cheer her up (IO=DT), we expect productions like "The mouse is throwing *her* a candy". However, in the story about a bell that is passed from one character to another (DO=DT), we expect structures such as the following: "The frog is giving *it* to the hedgehog." However, due to the findings of previous studies, we expected the children to be more consistent with their REs than with word order.

The results revealed that the DT has an effect on word order in adults, but not in children, as the children mostly produced IO-DO constructions in the task. With regard to referring expression, the DT was expressed with a lighter form more often than the other arguments, in both children and adults; the preferred expression was dependent on the grammatical function of the argument: when they constituted the DT, subjects were omitted, IOs were expressed with a clitic, while DOs were still mostly expressed by NPs, but significantly less when it was the DT. Children used more NPs expressions than adults.

The paper is structured as follows: Section 2 is dedicated to the background, specifically to defining the DT and referring expressions, followed by summaries of the research conducted on the acquisition of the topic-comment structure, and the use of REs in children. Section 3 discusses the methodology used in the task, while Section 4 defines our research questions and predictions. After that, the results are presented in Section 5 and discussed in Section 6. The last section (Section 7) is reserved for the conclusions.

2. Background

In this section, we explain the topic-comment structure and the choice of referring expressions in terms of global and local markers. These terms were taken from Hickmann et al. (1996), who tested how the two types of markers (global=utterance structure, and local=nominal determiners) signify newness in speakers of English, French, German, and Chinese (both adults and various age groups of children).

In this study, we adopt somewhat different markers: for global markers, we focus only on the object order with regard to the topic-comment structure (Section 1.1), while for local markers, we extend the list of referring expressions to NPs, pronouns, clitics, and omissions (Section 1.2). We will refer to the NPs as 'full' expressions and to the remaining expressions as 'reduced'.

Hickmann et al. (1996) found that local markings emerge first, due to the greater functional complexity of global markers (p.592). The obligatory markers differed among the languages investigated in Hickmann et al. (1996); Chinese was the only language which had obligatory global markers but optional local markers. The study revealed that, even in Chinese, local newness markings were used earlier than global ones (Hickmann et al. 1996)p.615.

A similar result was obtained by two studies conducted on ditransitives, on Russian and Ukrainian, and Norwegian, respectively by Mykhaylyk, Rodina, and Anderssen (2013) and Anderssen et al. (2014). These studies each found one object order that children overuse: IO-DO in Russian and Ukrainian, and the prepositional dative (DO-IO) in Norwegian[1]. Despite this overuse, when omissions happened, they reflected givenness, as the omitted object was usually given. The results suggest that, while preschoolers do not yet implement the givenness value in their full utterances (by using the given before new order), they are nevertheless aware of what is given (and therefore licensed for omission) in the discourse. Additionally, Sauermann (2016) found in a corpus study of German child language, that children are more attentive to their REs than to the object order.

With regard to Croatian, the recipient (IO) is marked with the dative case and the theme (DO) with the accusative, and both IO-DO and DO-IO are grammatical structures (example 1). The REs that will be taken into consideration are NPs (Croatian does not have articles so we will not be dividing them in definite/indefinite NPs), Pronouns, Clitics (which are fixed in second position), and omissions. The last three are considered reduced with respect to the NP.

[1] The Anderssen et al. (2014) study also found an effect of givenness, while Mykhaylyk, Rodina, and Anderssen (2013) did not.

(1) a. Marlon je dao Stigu igračku.
Marlon.NOM is.AUX give Stig.DAT toy.ACC
"Marlon gave Stig a toy."
b. Marlon je dao igračku Stigu.
Marlon.NOM is.AUX gave toy.ACC Stig. DAT
"Marlon gave a toy to Stig."

2.1 (Discourse) topic-comment structure and its acquisition

Reinhart (1981) introduced the term *pragmatic aboutness* to address what the topic of a sentence is. According to Pereltsvaig (2004) topic is defined as the part of the clause that denotes discourse-accessible information that is matter of common concern for the speaker and the addressee. This entails that topics of new sentences have to be referentially linked to expressions in previous sentences. The current study focuses on the continuity of a referent as the DT, i.e., what Frascarelli and Hinterhölzl (2007) defines as *familiar topics*. We refer to it as discourse topic (DT), since it bridges over a number of sentences in the same discourse. In his work on topic continuity, Givón (1983) claims that topics are more easily available when persistent, which relates to the concept of DT that we are exploring in the current study.

No differences in the positioning of topics and DTs have been observed, so we will report both on studies regarding the topic>comment and the DT>comment order. The topic-comment structure is related to the given-new and background-focus orders (Gundel 1988, Siewierska 1988), even though the concepts do not fully overlap. According to Gundel (1988), it is generally accepted that topics precede comments.

The immediate goal of the current study is to discover whether Croatian children place the DT object before the non-DT object in their productions; more broadly, we also aim to shed light on how the DT is expressed in Croatian in general. This latter goal will be accomplished based on the data from the adult controls (see Methodology).

Discourse Topics have not been extensively studied in child language, and there are very few studies conducted explicitly on them (Hornby 1971, Dimroth

and Narasimhan 2012). For this reason, we also include studies on the acquisition of topics, such as Chien and Lust (1985) and De Cat (2009).

Hornby (1971) tested both comprehension of topic and production of topics in English-speaking children (ages 6, 8, and 10). The author found that even the youngest children in the study comprehend the topic of a variety of syntactic structures, and that, by the age of 8, there is a clear distinction of topic and comment in all the tested sentence types (p.1981). The production part of the study revealed that, regardless of age, the children were able to produce a topic-comment relation over 90% of the time, but they employed mostly stress to signal topichood. Stress remained the most frequently used strategy to signal topic across all age groups, but a decline can be noticed in favor of cleft, pseudo-cleft, and passive sentences.

Dimroth and Narasimhan (2012) investigates the effect of DT on the ordering of NP-NP pairs. They presented the objects one after the other to German 4- and 5-year-olds, with one of the objects also being talked about throughout the discourse (which makes it the DT). This data is compared to their previous study (Narasimhan and Dimroth 2008), in which DT was not a variable. The results do not differ, as the children prefer the new>given order regardless of topicality, and do not place the DT first.

Chien and Lust (1985) conducted an experiment on Chinese, a topic-prominent language. The aim of the task was to investigate if children can access the concepts of grammatical subject and pragmatic topic (p.1392) In Chinese, the subject and the topic are marked differently in certain constructions, even if they can be co-referential. The task consisted in an elicited imitation task of 'equi' sentences which provide a context for the subject and topic to be distinguished (such as "The puppy, its eyes like to move around.")[2], and in coordinate sentences used as controls which do not require reference to the subject. The results revealed that the children (age range=2;6-5;0) did not omit the topic where it was not grammatical, but omitted it as much

[2] Example taken from Chien (1985); Chinese is a topic-prominent language but these sentences require reference to the subject thus topic and subject are distinguished in this structure.

as the subject where it was possible, suggesting that they already sensitive to the distinction between subject and topic.

De Cat (2009) investigated how preschool children at different ages mastered the use of topic in French. Topics in French are expressed as dislocated phrases, and are referred back to with a pronominal element inside the clause, which is different from how a non-topicalised subject is expressed (i.e., without dislocation). The author found that children progressively reduced the use of subject clitics as they employed more dislocated NPs for the topics. Even the youngest children used dislocated NPs to encode the topic, and never used indefinites in this position, which entails that they are aware of the topic status of dislocated NPs (p.233). Thus, French children use word order to signal (sentence) topic.

To summarize, previous studies found different effects of (discourse) topic: from no effect (Dimroth and Narasimhan 2012), to the use of prosody (Hornby 1971), omission (Chien and Lust 1985) or dislocation (De Cat 2009) to signal topichood. However, these mechanisms might be specific to the languages of each experiment. Croatian does not provide the speaker with specific mechanisms for signaling topic, but it has been claimed by Browne (1993) that the constituent order is determined largely by the topic-comment structure. We thus expect that children will have to rely on word order, which is also used for signaling other domains of information structure.

2.2. Referring expressions and their acquisition

In this study, the choice of referring expressions (RE) is used to test for local markers of discourse topics (Section 1). A RE is the way a speaker chooses to express a referent in a certain context, either with an NP, pronoun, or no expression at all (omissions). Speakers use pronouns for already evoked referents; conversely, new referents are introduced with more descriptive forms (Arnold 2010). REs also influence word order, as pronouns typically precede fuller expressions. This influence is related to factors such as givenness and weigh, since referents expressed with pronouns are usually given, and pronouns are usually shorter than full NPs. These factors all contribute to *quantitative*

harmonic alignment (de Marneffe 2012): given>new (Clark and Haviland 1977, Kathryn Bock and Irwin 1980, Bresnan et al. 2005, Kučerová 2007), short before long (Arnold et al. 2000, Bresnan et al. 2005), and pronoun before non-pronoun (Gundel, Hedberg, and Zacharski 1993, Collins 1995, Bresnan 2005). The null expression/omission is a special kind of RE, because it excludes an argument from the linearization, and thus, we cannot observe the relative object order if an object is omitted. We thus consider it an intersection of global and local markers.

Referents that are highly prominent in the linguistic discourse — such as the ones denoting the topic — can be referred to by short forms, like unstressed pronouns or clitics- Less prominent referents, however, require more explicit forms, like definite or indefinite descriptions (Hendriks, Koster, and Hoeks 2014).

According to (Gundel, Hedberg, and Zacharski 1993), the *givenness hierarchy* (GH) accounts for the restrictions of the distribution of forms for a particular reference. The proposed idea is that the stages of the GH are cognitive statuses, and not linguistic forms; the latter encode the former and provide information on how to access the referent (Gundel and Johnson 2013). The representation of how REs relate to the givenness hierarchy from Gundel, Hedberg, and Zacharski (1993) is presented in Table 1 for English and Russian. We will assume that the scale for using REs in Croatian will resemble Russian, since both languages are Slavic, do not have articles, and are subject-drop languages.

	High end					Low end
Cognitive status	In focus	Activated	Familiar	Uniquely identifiable	Referential	Type identifiable
RE English	*it*	*that*, *this*, *this* N	*that* N	*the* N	indefinite *this* N	*a* N
RE Russian	Ø *on* 'he'	*on*, *eto* 'this', *to* 'that'	*Eto* N, *to* N	Ø N		

Table 1: Referring expression in relation to the givenness hierarchy.

A key aspect of the GH is that each cognitive status can be expressed with an RE designated to any lower status, and still lead to a successful communication, but using an expression for a mental status higher up in the scale leads to unsuccessful communication (Gundel, Hedberg, and Zacharski 1993, 276). This means that speakers could, in principle, always use full expressions—in which case the listener's perspective would not be necessary to account for, because the referent would always be explicit. Speakers, however, tend not to be over-informative. According to Grice's Maxim of Quantity, speakers make their contribution as informative as required, but not more informative than required (Grice, Cole, and Morgan 1975). The hierarchy in Table 1 does not specify the appropriate RE for topics, but the definition of *in focus* states that the referent is not only in short term memory, but also at the current center of attention, and also that these entities generally include at least the topic of the preceding utterance and higher-order topics (such as DT) (Gundel, Hedberg, and Zacharski 1993, 276). Therefore, we can safely assume that DT is placed on the highest point of the givenness hierarchy.

The GH does not provide the relative hierarchical order of pronouns and clitics either. However, we will assume that they are at the same level: Ø > Clitic/ Pronoun > Demonstrative > Noun. In Croatian, the clitic is obligatorily placed in second position (Schütze 1994), while the pronoun is freely ordered; moreover, the IO is very frequently realized by a clitic: in the Croatian Double

Object Database[3] (Velnić 2014), out of 559 occurrences of child and child-directed speech with no omissions, in 430 with IO is expressed as a clitic. However, the referent of the IO was one of the interlocutors (1^{st}SG, 2^{nd}SG, 1^{st}PL, 2^{nd}PL, or reflexive) most of the time (396/430).

Additionally, as some studies show, the use of pronouns can be related to grammatical functions. For example, investigating the use of pronouns in subjects and IOs, Arnold (2001) found that pronouns are used more often with IOs. Unfortunately, Arnold (2001) does not discuss the possibly different accessibility of the theme (DO) and the goal (IO), and the present study focuses also on the different REs used for the two objects. For Croatian, based on the data in the Double Object Database (Velnić 2014), it is possible that the preference for a specific RE is related to grammatical function, so that the IO is preferably expressed as a clitic.

There are two possible ways in which children can wrongly apply the GH: either by being under-informative, and thus using pronominal forms when an NP is required, or by being over-informative, and using NPs when the use of pronouns is expected. The former is a much stronger violation of the GH, since the hierarchy allows a higher cognitive status to be expressed with a RE designated for a lower cognitive status, but not vice versa. Being under-informative can thus leads to unsuccessful communication. Over-informativeness, on the other hand, can make the listener believe that the attention has shifted to a new referent (Arnold and Lao 2008). We will first outline the studies which found that children are under-informative.

Campbell, Brooks, and Tomasello (2000) investigated how contexts of general ("What happened?") and specific ("What did you do with the ball?") questions influences the production of REs in English-speaking children (mean ages: 2;6 and 3;6). The results indicate that children are sensitive to the context, as they produced an NP or a pronoun with general questions, and a null referent to respond to the specific questions. However, the results also point towards an overuse of pronouns, because the responses to the general questions

[3] The data sorted in the Double Object Database is taken from the Kovačević (2004) corpus present in the CHILDES database (MacWhinney 2000)

were more frequently pronouns than NPs in both age groups. Tedeschi (2008) also applied the methodology of general and specific questions on Italian children aged 2;6-6;5. Her results show a progression from under-informativeness to an almost adult-like use of REs: the youngest children exhibit the same amount of omissions in both question types (overuse of omissions in a general setting); the three-year-olds used clitics and omissions predominantly for the specific questions and used more NPs with general questions, but their use of clitics in the general questions was higher than that of the adults controls; the five-year-olds used only NPs in the general question and few NPs in the specific question, thus being over-informative, but almost adult-like.

The studies that found the tendency of over-informativeness are much more numerous. Continuing with the methodology of general vs. specific questions, Wittek and Tomasello (2005), tested German speakers aged 2;6 and 3;6 and found that they overuse NPs in the specific condition. Thus, unlike the results obtained by Tedeschi (2008), young German children were over-informative.

Matthews et al. (2006) expanded the methodology and added the conditions of *perceptual availability* and *prior mention*. English-speaking children aged 2, 3, and 4 were tested. Perceptual availability did not have an effect on the youngest group, as they used mostly NPs, regardless of whether the interlocutor could see the visual input or not. The other age groups used more NPs in the condition where the referent was not perceptually available to the interlocutor, and used less NPs in the condition where it was available — however, with a tendency to be more specific than necessary. In the tasks with prior mention, an effect was observed also for 2-year-olds as they used more nouns when the referent had not been previously mentioned. Thus, linguistic givenness had more effect on the RE choice than visual accessibility. The reason for this might be that two-year-olds are not good at assessing the listener's cognitive perception, but are nevertheless attentive to linguistic context.

Among the studies conducted on corpora, we will refer to Gundel and Johnson (2013) and Sauermann (2016). Gundel and Johnson (2013) applied the GH framework to child corpora of English-speaking children, and found that

children begin using REs appropriately by age 3. However, the corpus contained instances of indefinite and definite NPs in the higher GH statuses such as *In focus*, *Activated*, and *Familiar*, in which more reduced forms would have sufficed (check Table 1). Thus, children younger than four years were more specific than needed. However, the authors also point to the limits of corpus data, since it provides little opportunity for errors, as most of the referents are at least 'activated'.

Sauermann (2016) used corpora of German 2- to 4-year-olds to investigate how animacy, givenness, definiteness, and REs influence word order in double object structures. The corpus analysis showed that, within the IO-DO order, 60% of occurrences were pronoun>NP in both children and their mothers. Within the DO-IO structures, pronoun>NP occurred in the child-directed speech (39%), but rarely in the child language (9%), since they expressed most of the DO-IO utterances with two pronouns. Although the DO was expressed more often as an NP both by the children and the adults, when the DO was expressed as a pronoun, the probability of DO-IO increased; hence, RE can be considered a significant predictor of word order. Sauermann (2016) concludes that, for German-speaking children, the relative order of the two objects can be largely predicted by the type of RE that expresses the DO.

From these studies, we can conclude that children are rather over-specific than under-specific in their use of REs, but nevertheless sensitive to the discourse from very early on. Two-year-olds might have some difficulty in assessing the speakers' knowledge, but linguistic cues such as prior mention are strong enough to impact their RE choice.

3. Research Questions and Predictions

The current study aims to discover how being a DT affects the placement of the given argument (global markings) and which form it takes (local markings). Our task was guided by the following research questions:

1. How does DT influence object order? Do speakers use the DT>comment order to express the topic?

2. How does DT influence RE? Is an argument more likely to be expressed with a reduced expression (pronoun or null) when it is the DT?
3. Are children over- or under-informative?
4. Is there a preference for certain arguments (S, IO, DO) to be expressed with a specific RE?
5. Do speakers use global markers (object order) or local markers (choice or RE) more, to signal the DT?
6. Are there any differences between children and adults?

With regard to the first question, we expect to find an overall preference for the DT-comment order. However, we expect the DT to influence the object order of adults more than that of children, as previous research has shown that children might struggle with the correct topic placement (Hornby 1971, Dimroth and Narasimhan 2010).

For our second research question, in light of previous findings on children's use of REs, we predict that the DT object will be expressed with a pronominal (pronoun or clitic) in both types of speakers. The DT is also more likely to be omitted, based on the given object omission results obtained by Mykhaylyk, Rodina, and Anderssen (2013) and Anderssen et al. (2014).

If the children do not use REs in an adult-like manner, there are two possibilities: the full forms are either overused or underused. In light of what has been seen from previous research (Section 2.2), it is more likely that Croatian children will over-use NPs. This situation does not violate the Givenness Hierarchy proposed by Gundel, Hedberg, and Zacharski (1993), and still leads to a successful communication, but it signals that children have not yet acquired the in which contexts a pronominal form is preferred.

We expect to find a relation between RE and grammatical function: Croatian is a subject-drop language, and thus we expect to see many examples of subject drop when the subject is the DT; we also expect the IO to be expressed as a clitic quite frequently, as this is how these elements are frequently expressed in naturalistic data (Velnić accepted). The DOs are expressed either as NPs or pronouns in naturalistic data (Velnić 2014) — which

was also found by Sauermann (2016) for German — so we expect the DOs to be less prone to be expressed with a pronominal form than the IOs.

Concerning the fifth research question, according to the literature, children have less difficulty with expressing local markers of givenness (REs) than global markers (object order) (Hickmann et al. 1996). Furthermore, studies conducted on topic-comment order (section 2.1) or the on use of REs (section 2.2) suggest that children struggle with the former than the latter. Thus, we expect the children to be more target-like with their use of REs, than with ordering the objects based on which one is the DT. At the same time, we expect the adult controls to conform to both types of marking for the DT.

Table 2 summarizes the eight possible outcomes of RE and object order combinations. Recall that we consider all occurrences that include an NP as 'full forms', while the rest of the referring expressions are referred to as 'reduced'. Omissions are not taken into consideration in Table 2, because, when one object is omitted, there is no object order to be reported.

DT-comment	Comment-DT
Reduced-reduced	Reduced-reduced
Reduced-full	Reduced-full
Full-full	Full-full
Full-reduced	Full-reduced

Table 2: Possible combinations of object order and REs

The majority of occurrences are expected to fall within the DT-comment order; we also expect the DT to be expressed as a pronoun or clitic, because it is introduced in the context before the target utterance; consequently, we expect that the majority of occurrences should be reduced-full and reduced-reduced combinations. We do not expect to find full-reduced combinations in the DT-comment order, as this would violate the Pronominality Principle of the Quantitative Harmonic Alignment (de Marneffe 2012). We expect to find some occurrences of comment-DT order, especially in children, in case they are not yet using word order to signal Information Structure. However, whether the

participants produce more reduced-full or full-reduced combinations within the comment-DT order depends on what the speakers pay more attention to: the DT (givenness) or pronominality order. If the speakers pay attention to the former, we expect them to produce full-reduced combinations to signal the given status of the DT. If the speakers pay more attention to the latter, however, the pronoun will precede the full expression due to harmonic alignment (Gundel, Hedberg, and Zacharski 1993, Collins 1995, Bresnan et al. 2005), producing a DT that follows the comment and is expressed with an NP. Overall, we do not expect many of these combinations to occur, because the full-reduced (comment-DT) order violates pronominality order, while the reduced-full (comment-DT) order completely fails to signal the DT.

We have already outlined our prediction for the last research question: if the children prove not to be adult-like, they will most likely not mark the DT with object order, but they will use more reduced expressions for the DT.

An additional factor most likely affecting productions is animacy. The task in this study did not balance animacy, and we always use the prototypical animacy condition (IO-animate, DO-inanimate). A recent study by (Velnić Submitted) found a strong influence of animacy on object order in ditransitives in Croatian, more so in children than in adults, causing the IO to be placed first irrespective of whether it was given or not. Thus, keeping in mind the prototypical conformation of animacy in our task, we may expect to find the children to prefer the IO-DO order in the current task. This also means that there might be less deviation from the expected object order when the IO is the DT, than when the DO is the DT, because in the former animacy and DT are not in opposition. Moreover, Fukumura and van Gompel (2011) found that animacy also affects referring expression choice as animate entities were more likely to be expressed as pronouns in an elicitation task conducted on the adult population. Again, our task was not set up to investigate this, but depending on the results, we might come back to this in the discussion.

4. Methodology

The experiment was a semi-controlled elicitation task, using three storybooks, each one with a different grammatical function as the DT: the subject (S), the IO, and the DO. Since we are interested in how DTs influence the ordering of the objects in ditransitive structures, the S-DT condition is used to establish a baseline order of IO and DO, when neither object is the DT and both of them are new in every target image. Because the storybooks are visually available to both interlocutors, all the referents can be considered at least conceptually available with regard to the Givenness Hierarchy seen is section 2.2, but with different salience, following Arnold (1999). Arnold (1999) found that topic and focus are more salient than referents that are not the topic or in focus. Salience is defined as a competitive property, entailing that the RE with which an argument is expressed depends, among other factors, on contextual saliency. Thus, the DT should be the most salient argument, as this is what the discourse is about.

The animacy values of the arguments are constant in all three DT conditions. The main reason for not balancing animacy in the task is that IO-animate and DO-inanimate is the most naturally occurring situation, which we wanted to maintain throughout the task.

4.1 Materials

The task consisted of three storybooks, each with a different argument as the DT (subject, IO, and DO). Each storybook was made up of 13-15 images, 5 of which were target images and were meant to elicit a ditransitive structure. The pages were printed in an A5 landscape format; they were laminated and held together by a spiral. A detailed overview of the images contained in each book is presented in Tables 3–5, which describe the storybooks where the DT is the Subject, the IO and the DO, respectively. The target images are shaded in grey.

Image type	**Image description**
1. Cover	A happy squirrel in a Santa Claus hat.
2. Introduction	Bob the squirrel really loved making other animals happy, so he gave them presents. (Image of Bob surrounded by thought bubbles of smiley faces)
3. Target	Bob gives a present to a dog.
4. Filler	The dog opens the present and there is a bone inside; the dog is very happy.
5. Target	Bob gives some cheese to a mouse.
6. Filler	The mouse hugs the cheese.
7. Target	Bob gives some milk to a kitten.
8. Filler	The kitten is happy and licks its snout.
9. Filler	Bob goes up a tree to see if some other of his friends need anything that could cheer them up.
10. Target	Bob gives a banana to a monkey.
11. Target	Bob gives some flowers to a female squirrel.
12. Filler	She kisses him on the cheek.
13. Final	Bob goes to sleep with a smile on his face.

Table 3: **Subject** as Discourse Topic (baseline condition): *Bob the generous squirrel.*

Image type	Image description
1. Cover	A cat sleeping on a mat, it has a grumpy face and is surrounded by toys (not the toys that will be used in the booklet).
2. Introduction	The weather is nice, but Mina does not want to play outside. (Image of the cat sitting, sad/grumpy face, while the sun shines through the window)
3. Introduction	The other cats are playing outside and want Mina to join them. (Image of cats playing and a thought bubble with Mina's image. The experimenter says that is why they decide to bring interesting toys to her).
4. Target	Cat 1 brings Mina a mouse.[4]
5. Filler	Mina refuses to play with the mouse.
6. Target	The mouse then throws Mina some candy.
7. Filler	Mina eats the candy and goes back to sleep.
8. Target	Cat 2 brings Mina a ball of yarn.
9. Filler	Mina pushes the ball of yarn away.
10. Target	A puppy brings Mina a stick.
11. Target	Cat 1 brings Mina a ball.
12. Filler	Mina pushes the ball away.
13. Final	Mina's kittens come and she finally plays with them, she is happy.

Table 4: Indirect object as Discourse Topic: *Mina the grumpy cat.*

[4] This is the only instance of an animate DO in the task, but it is nevertheless lower on the animacy scale than the IO because it is perceived as a toy or even food. It did not affect the results as the DO was expressed as an NP by all the children.

Image type	**Image description**
1. Cover	A bell on the cover of the booklet.
2. Introduction	A cat, Bella, is walking in the grass, and she has a bell around her neck.
3. Introduction	The bell slips and falls in the grass; Bella doesn't notice.
4. Introduction	Bella is home and sees she has no bell; she is sad.
5. Filler	A dog finds the lost bell in the grass.
6. Target	The dog gives the bell as a gift to her puppy.
7. Filler	The puppy is playing with the bell, while a crow is watching from a tree.
8. Target	The crow steals the bell from the puppy.
9. Filler	The crow can't fly, because the bell is too heavy
10. Target	The crow throws the bell to the frog.
11. Filler	A hedgehog sees the bell falling.
12. Filler	The hedgehog asks the frog for the bell.
13. Target	The frog gives the bell to the hedgehog.
14. Target	The hedgehog goes to Bella and gives the bell back to Bella.
15. Final	Everybody is happy: Bella has her bell back on, and the two animals dance.

Table 5: **Direct object** as Discourse Topic: *The story of the lost bell*.

Figures 1, 2 and 3 show a target image from each condition.

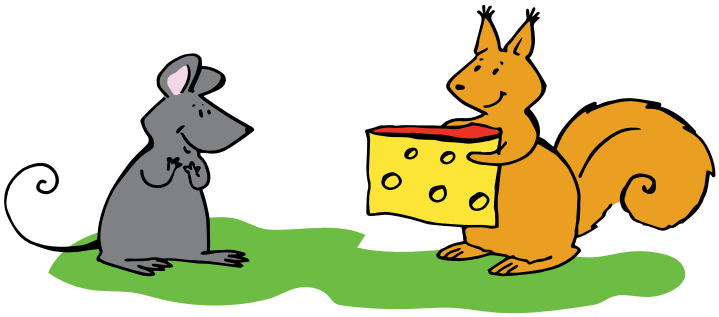

Figure 1: Bob the squirrel gives some cheese to a mouse (DT-S condition)

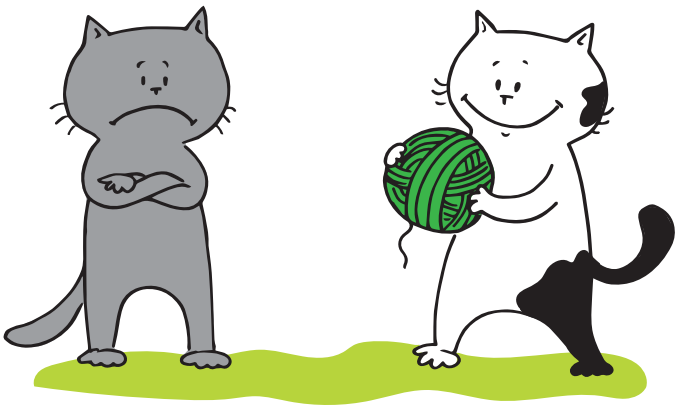

Figure 2: A cat gives Mina a yarn (DT-IO condition)

Figure 3: The frog gives the bell to the hedgehog (DT-DO condition)

4.2 Participants

A total of 58 Croatian monolingual children of ages 3;6–5;1 (mean=4;4) took part in the experiment. The children were recruited from four kindergartens in Rijeka; all were part of a larger kindergarten group. The parents were given an information sheet about the study, and had to sign a consent form in order for the children to participate.

We also tested 36 adult controls, between the ages of 19–28 (mean=21; 8 males). All the participants were born to two Croatian parents and had grown up in Croatia; other languages learned later in life were not controlled for. They each received a 100 Kuna (approximately 13 euros) gift certificate for a local bookstore. The participants were recruited at the Psychology and Law departments of the University of Rijeka.

This study has been approved by the Norwegian Ethics Committee (NSD) under reference number 40063.

4.3 Procedure

The recordings (audio only) were conducted in a room on the kindergarten premises, where the child and the researcher could be undisturbed. For the adult controls, the testing took place either in the psychology lab, or in a classroom at the university. The recorder (Sony ICD-px333) was placed on the table facing the participants. The researcher explained that they would be

reading a story together, and all three storybooks were placed on a table; the participant chose which one to start with, thus randomizing the order in which the storybooks were presented. Once the participant had chosen a story, the experimenter would begin to tell the story, by describing the images up to the first target image (tables 4-6); then the participant had to continue telling the story. After the first story was finished, the participant chose the next story to tell. For the adult controls, this task was integrated with another task, alternating between one storybook and a set from the second task; the children completed the two tasks on different days, and thus read the stories one after the other.

5. Results

In this section, we analyze the data on word order and referring expressions in both child and adult responses and compare the two groups at every level of the analysis. First, however, we will outline how the statistical models were set up as some of these models were used for the initial assessment of the data and are not explicitly discussed in the paper. A full summary of these models and the raw data can be found in the appendix.

5.1 Models

Three models were set up, using the linear mixed effect model from R (Bates et al. 2015): The first model analyzes the total word order distribution, the second one the word order distribution only within NP-NP combinations, and the third one analyzes the distribution of REs with regard to the DT. In each of these models, the participant and image order were set as random effects. The order of the story (1st (DT-S), 2nd (DT-IO), or 3rd (DT-DO)) was not set as a random effect, as it did not influence the results in any way: we compared the models with and without this factor as a random effect, and it was not significant. The DT condition and the group (children vs. adults) were the dependent variables.

From these models, we learned that the DT condition and group had significant effects, and we proceeded to test these more thoroughly. The said models will not be further discussed in this paper, and the full results obtained by these models are located in the Appendix (Tables A1-A3).

We thus proceeded by conducting a pairwise comparison (Lenth 2016) within group for each model described above. The results obtained by the pairwise comparisons will be discussed throughout the current section. We have also conducted ANOVAs between each initial model, with and without group being the dependent variable, in order to establish the difference between adults and children. The differences are summarized at the end of each subsection presenting the results.

5.2 The data

The task was quite engaging, and we obtained a ditransitive structure with most of the target images: a total of 789/870 data points for the children, and 502/540 for the adults. The non-applicable data was due to a failure to produce a ditransitive structure.

A response from the children (not the same child) is given for each condition below.

(2) DT-S condition (Child #36)

I onda je vjeverica dala pasu poklon

And then is.AUX squirrel.NOM gave dog.DAT present.ACC

"And then the squirrel gave a dog a present"

I vjeverica je dala jednom mišu sirić

And squirrel.NOM is.AUX gave one.DAT mouse.DAT cheese.ACC

'And the squirrel gave a mouse some cheese'

I maci je dao[5] mlijeko

And cat.DAT is.AUX gave milk.ACC

'And to the cat he gave some milk'

I majmunu je dala bananu

And moneky.DAT is.AUX gave banana.ACC

'And to the monkey he gave a banana.'

[5] The child here uses the masculine form of the verb and the feminine form in the sentence below, this is most likely due to the incongruence of the name Bob (masculine) and the noun for squirrel (feminine) in Croatian, so in this case Bob the squirrel can have both agreements.

I dala je njezinoj prijateljici cvijet
And gave is.AUX her.DAT friend.DAT flower.ACC
'And to his friend he gave a flower.'

(3) DT-DO condition (Child #16)
Pas je dao zvono drugom psu
Dog.NOM is.AUX gave bell.ACC other.DAT dog.DAT
'The dog gave the bell to another dog.'
Vrana je uzela zvono psu
Crow.NOM is.AUX took bell.ACC dog.DAT
'The crow took the bell from the dog.'
I onda je to dala žabi
And then is.AUX it.ACC gave frog.DAT
'And then she (the crow) gave that to a frog.'
Ona to daje njemu
She.NOM it.ACC gives him.DAT
'She is giving it to him.'
Onda je ježić to dao maci.
Then is.AUX hedgehog.NOM it.ACC gave cat.DAT
'Then the hedgehog gave that to the cat.'

(4) DT-IO condition (Child #4)
Miš joj je dao slatkiše
Mouse.NOM her-CL.DAT is.AUX gave sweets.ACC
'The mouse is giving her sweets.'
Kako je druga mačka je poklonila od uža lopticu
How is.AUX other.NOM cat.NOM is.AUX gifted of rope-GEN ball.ACC (it was a yarn)
'How the other cat is giving her a ball of yarn as a gift.'
I sad joj je pas poklonio stablo
And now her- CL.DAT is-AUX dog.NOM gifted tree ACC (ita was a branch)
'And now a dog is giving her a tree as a gift.'

Poklonila joj je za košarku loptu
Gifted her- CL.DAT is.AUX for basketball ball.ACC
'(It) gave her a basketball as a gift.'

From the sample above, it seems that children are attentive both to global markers (use of DO-IO in the DT-DO, and IO-DO in the DT-IO) and to local markers (the DT is, in most cases, omitted or pronominal). These markers are analysed with more detail in the following sections.

5.3 Word order distribution with regard to DT

Our first step in the analysis of the data is to see how the DT affected word order, without considering RE. Figures 4 (adults) and 5 (children) show the distribution of IO-DO and DO-IO word orders in the three DT conditions. Naturally, structures in which one of the objects has been omitted do not yield object order. Nevertheless, the proportions in the figures were calculated by taking into consideration all responses, including omissions. This provides us with a full overview of the adult and child productions. Omissions are discussed section 5.4. The raw data can be found in the appendix (Tables A4-A5).

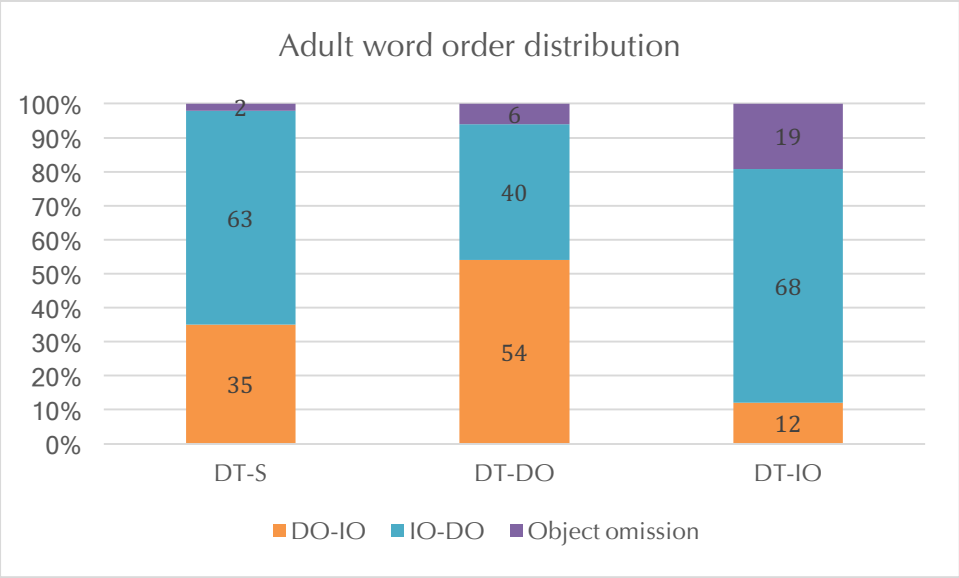

Figure 4: Adult word order distribution (all REs).

The IO-DO is the more attested order overall, but there is nevertheless a considerable decrease of the IO-DO order in the DT-DO condition, and a considerable decrease of the DO-IO order in the DT-IO condition. This entails that the DT influences word order in Croatian ditransitives.

It has already been outlined in the previous section how the statistical analysis has been set up. We thus proceed in explaining the results obtained with the pairwise comparison. The obtained results are shown in Tables 6 (adults) and 7 (children).

	Odds. ratio	Standard error	p.value
DT-S vs. DT-IO	0.188	0.07	<0.0001
DT-S vs. DT-DO	3.684	1.33	0.0009
DT-IO vs. DT-DO	19.594	9.014	<0.0001

Table 6: Summary of the model of pairwise comparison of object order distribution in the adult data.

The data from Table 6 shows that the distribution of word order is significantly different for each condition, entailing DT influences the order in which the adults express the objects in a ditransitive structure. From Figure 4, we can see that this difference is target-like, as the production of DO-IO increases when the DO is the DT, and it decreases when the IO is the DT.

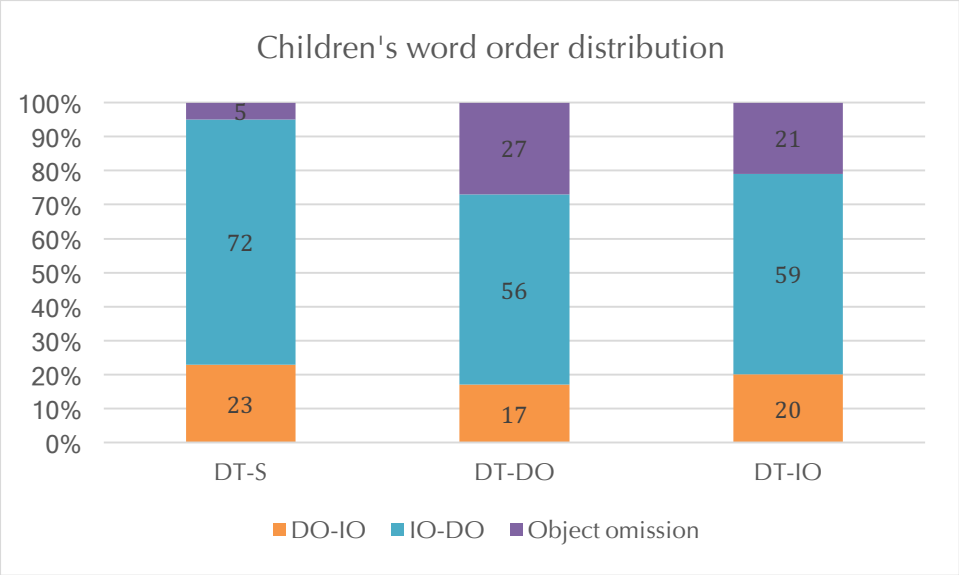

Figure 5: Children's word order distribution (all REs).

It is obvious that children have a strong preference for IO-DO; we can observe this preference in both target conditions (DT-DO and DT-IO). The proportion of IO-DO decreases in the two target conditions with respect to the baseline, but the proportion of DO-IO remains more or less the same. This is due to an increase in object omissions in the target conditions, and Figure 9 will show whether the omissions are linked to the DT. We now move on to observing what the pairwise comparison revealed for the child data.

	Odds. ratio	Standard error	p.value
DT-S vs. DT-IO	1.16	0.351	0.8667
DT-S vs. DT-DO	0.800	0.292	0.8145
DT-IO vs. DT-DO	0.686	0.275	0.6154

Table 7: Summary of the model of pairwise comparison of the conditions in the child data.

The distribution of the word orders is not significantly different in any condition. This suggests that children do not vary the use of their object order, in relation to the different DT. From Figure 5, we can clearly see that the word order that is mostly used is IO-DO. Its proportion is lower in the target conditions with

respect to the baseline; however, there is no increase of DO-IO order, which suggests that there are more omissions in the target conditions.

The ANOVA conducted with/without group as a factor (Table 8) has revealed significant differences in how children and adults use word orders. This is due to the children's overuse of IO-DO. Thus, children use IO-DO significantly more than adults.

	AIC	BIC	p.value
Without Group	1125.2	1165.3	0.02777
With Group	1122.4	1167.5	

Table 8: ANOVA comparison of the distribution of word orders in children and adults (all REs).

Nevertheless, clitics in Croatian are syntactically fixed is second position, and this dictates word order, therefore the effect of the DT on word order will be best observed if we only take NPs into consideration (Figures 6 and 7). Note that, in the following figures, the proportions are calculated based only on NPs; other REs (including omissions), were not taken into consideration.

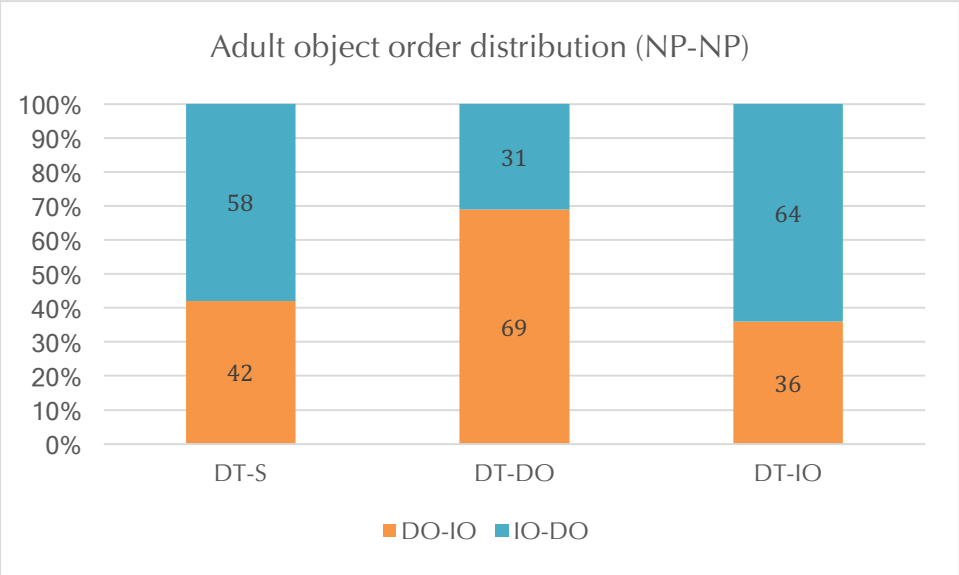

Figure 6: Adult word order distribution (only NPs).

As Figure 6 shows, adults use the two word orders with a similar proportion in the baseline condition. The object order preference is more pronounced in the DT-DO condition, when compared to the data in Figure 4. Furthermore, the target order (DO-IO in DT-DO and IO-DO in DT-IO) is used at similar proportions in the two target conditions. Again, pairwise comparisons were conducted on these data.

	Odds. ratio	Standard error	p.value
DT-S vs. DT-IO	0.288	0.149	0.0428
DT-S vs. DT-DO	7.169	3.26	<0.0001
DT-IO vs. DT-DO	0.04	0.255	<0.0001

Table 9: Pairwise comparison of object order of NP-NP occurrences in the adults.

As Table 9 shows, the difference between DT-S and DT-IO is less pronounced. This is due to the exclusion of the omissions, as the omissions were significantly more numerous in the DT-IO condition than in the baseline. Consequently, the distribution of IO-DO in the IO-DT condition comes out as more similar to the baseline. But now that the omissions are not accounted for, the distribution of the object orders in the DT-S and DT-IO is not different. The DT-DO condition still stands out, as it significantly differs from the other two conditions.

In the child data, the preference for IO-DO remains the same in all conditions (Figure 7). This is confirmed by the pairwise comparison displayed in table 10.

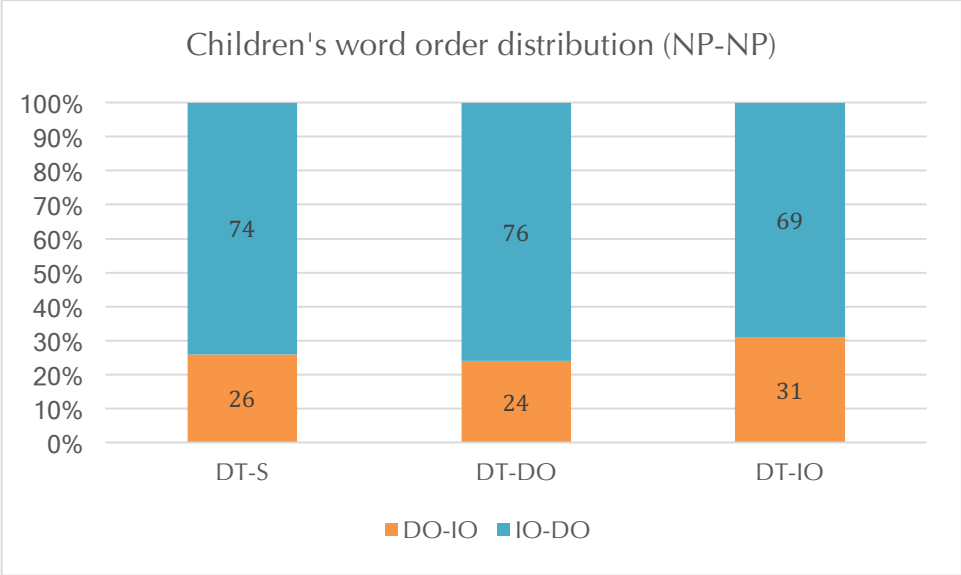

Figure 7: Children's word order distribution (only NPs).

	Odds. ratio	Standard error	p.value
DT-S vs. DT-IO	1.29	0.453	0.73338
DT-S vs. DT-DO	0.888	0.341	0.9492
DT-IO vs. DT-DO	1.461	0.653	0.6729

Table 10: Summary of pairwise comparison of object order in NP-NP occurrences in children.

As the results in Table 10 illustrates, the children do not display any object order difference between the three conditions. This means, as is obvious from Figure 4, that the children's tendency to use IO-DO does not vary depending on which argument is the DT (givenness). Possible reasons for this will be discussed in section 6.

The results in this section have revealed that the DT influences word order in the adults, but not in the children, as their preference for IO-DO remains stable across the tasks. The adults vary their object order according to DT, but the effect is most pronounced in the DT-DO condition, because the adults also have a tendency to overuse IO-DO, and, because of this, the distribution of the object orders in the baseline and in the DT-IO conditions appears more similar.

In order to test the impact of group on the model, we conducted an ANOVA comparing adults and children.

	AIC	BIC	p.value
Without Group	825.18	867.38	0.002609
With Group	818.11	865.01	

Table 11: ANOVA comparison of the distribution of word orders in children and adults (only NPs).

The group effect is more significant when only NP-NP combinations are taken into consideration. The most likely reason for this is that adults use the two object orders more equally in the baseline of the NP-NP combinations, while children continue using IO-DO to the same extent as in the previous test, thus making the difference between the two groups bigger.

We now move on to analyze the omissions that we have briefly commented on in the overviews provided in Figures 4 and 5; subsequently, we will take a closer look at the use of REs.

5.4 Distribution of Omissions with regard to DT

In Figure 5 in the previous section, we saw that there was a decrease of IO-DO productions in the two target conditions of the child data, as compared to the DT-S condition. However, the proportion of DO-IO remained the same as in the DT-S condition. As also illustrated in Figure 5, the discrepancy can be accounted for with reference to object omission in the child data. Figures 8 and 9 display the object omission in each condition, in adults and children respectively. Like for Figures 4 and 5, the whole dataset is taken into consideration for the totals.

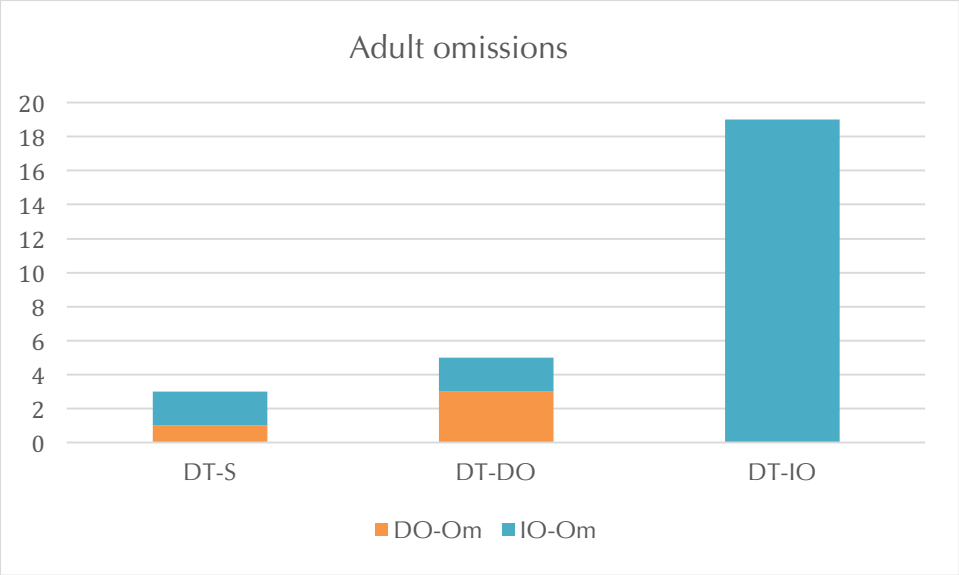

Figure 8: Proportion of omissions per condition in the adult data.

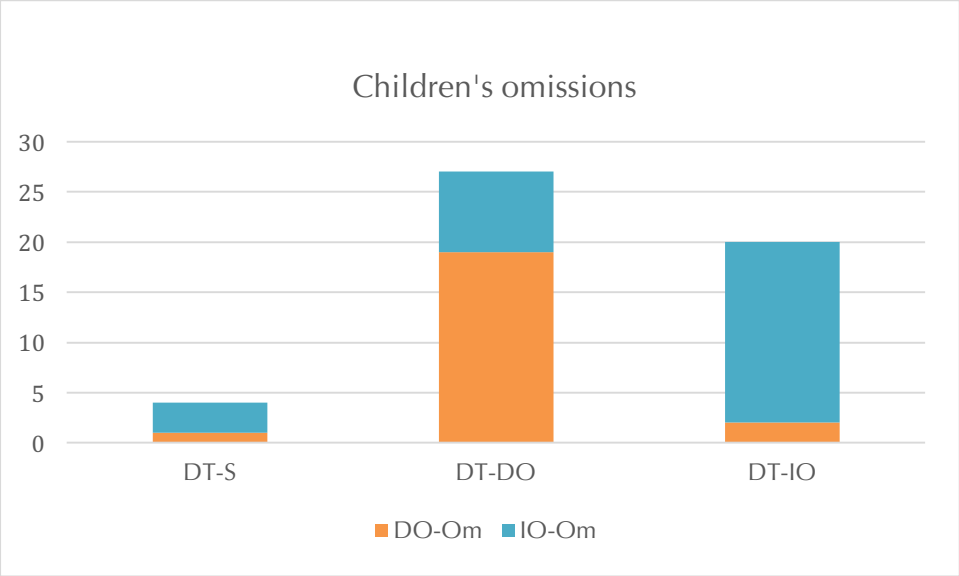

Figure 9: Proportion of omissions per condition in the child data.

In the DT-S condition, objects are rarely omitted by both adults and children. This is not a surprise, as they were both new in the discourse. In the other two conditions, the omission rate is higher for children than for adults. Children omit the DTs more than the other arguments. The IO seems to be more prone to omission than the DO, in both adults and children. This indicates that children

take DT into account, not by placing the DT object first, but by omitting it more frequently.

The DT seems to have a greater impact on the word order choice of adult speakers (the DT tends to precede the other object), while, for children, the influence of the DT is manifested by the omission of the DT object. The next section discusses how the DT affects all the types of RE that were encountered in the task more thoroughly.

5.5 Impact of DT on REs

In this section, we analyze how the RE of an argument changes when it is the DT, or when compared to the conditions where it is not the DT. The following figures provide an overview of RE for each grammatical function. The circled bar signals the DT.

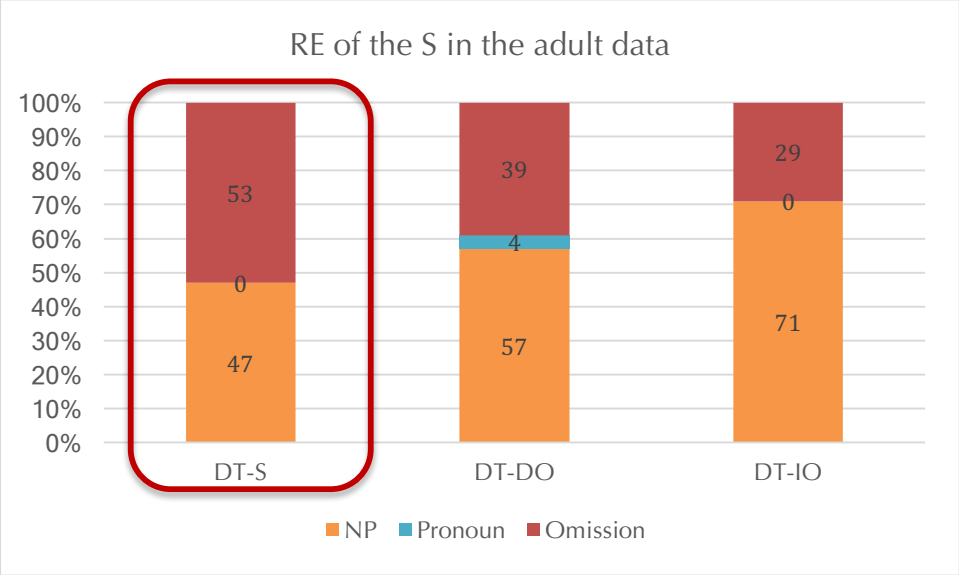

Figure 10a: REs used by adults to realize the S in the different DT conditions.

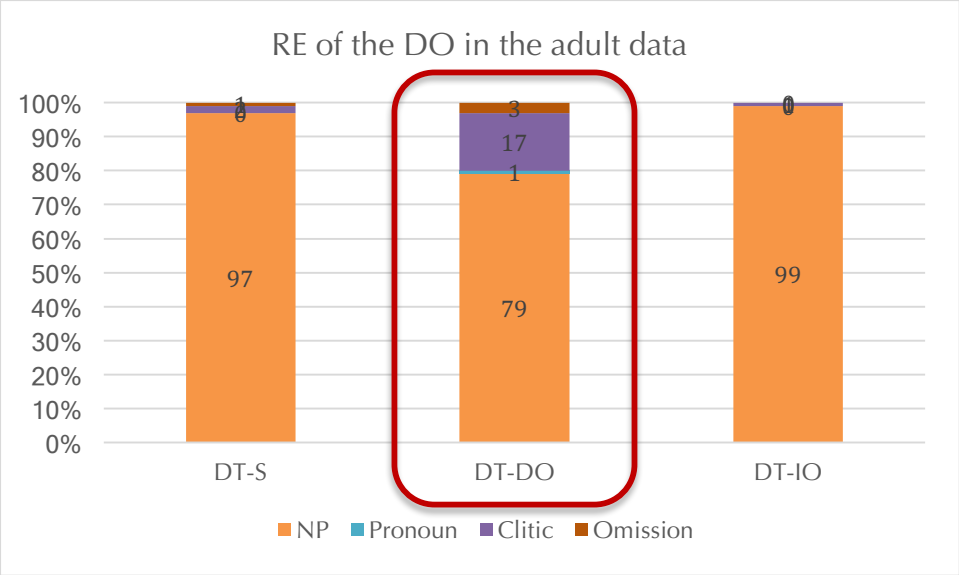

Figure 10b: REs used by adults to realize the DO in the different DT conditions.

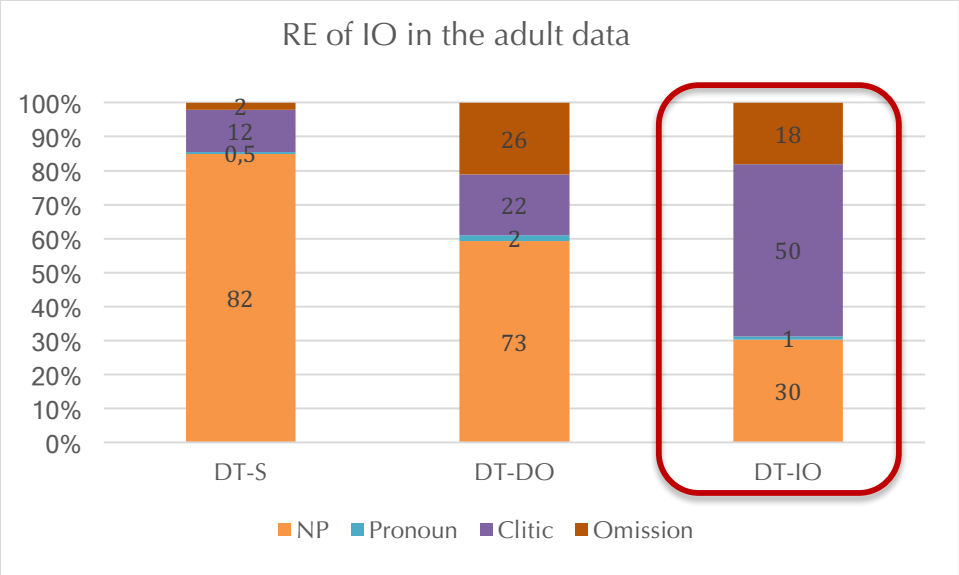

Figure 10c: REs used by adults to realize the IO in the different DT conditions.

Figures 10a-10c clearly show both how each grammatical function is preferably expressed with a certain RE, and also that the RE is less likely to be expressed as an NP, when it is referring to the DT. Thus, the S is expressed either as an NP or is omitted, but omissions happen more often when the S is the DT.

Similarly, the DO is also most preferably expressed as an NP, but less so when it is the DT, as in this case it can also be expressed by a clitic. Finally, the IO has the lowest proportion of NP usage when it is the DT, as it is frequently

expressed with a reduced expression (pronoun, clitic, omissions). The statistical analysis is provided in Table 12 below; the model is set up with the RE as a binary value, between full expressions (NP) and reduced expressions. The positive value indicates that the left-most condition is more likely to be expressed with a full expression, while the negative value indicates the same for the right-most condition.

	Odds. ratio	**Standard error**	**p.value**
DT-S vs. DT-IO	1.081	0.350	0.0057
DT-S vs. DT-DO	-1.949	0.529	0.0007
DT-IO vs. DT-DO	-3.030	0.412	<0.0001

Table 12: Pairwise comparison of the likelihood of each argument to be expressed as an NP when it is the DT (adults).

The pairwise comparison in Table 12 indicates that the subject is significantly more likely than the IO to be realized as a full NP when it is the DT. The comparison between the S and DO being DTs shows that the DO is more likely to be expressed with an NP. The last row indicates that the DO is much more likely than the IO to be an NP, when it is the DT. This means that the IO is the least prone to be expressed with an NP. The figures clearly show how likely an argument is to be reduced (expressed by a clitic or omitted): the IO is the most likely, followed by the S, and then by the DO, which is mostly expressed with an NP, even when it is the DT. The statistical analysis shows that all of these differences are significant.

Now we will move on the consider the use of RE in the child data. Figures 11a-11c provide an overview of RE for each grammatical function. The circled bar signals the DT.

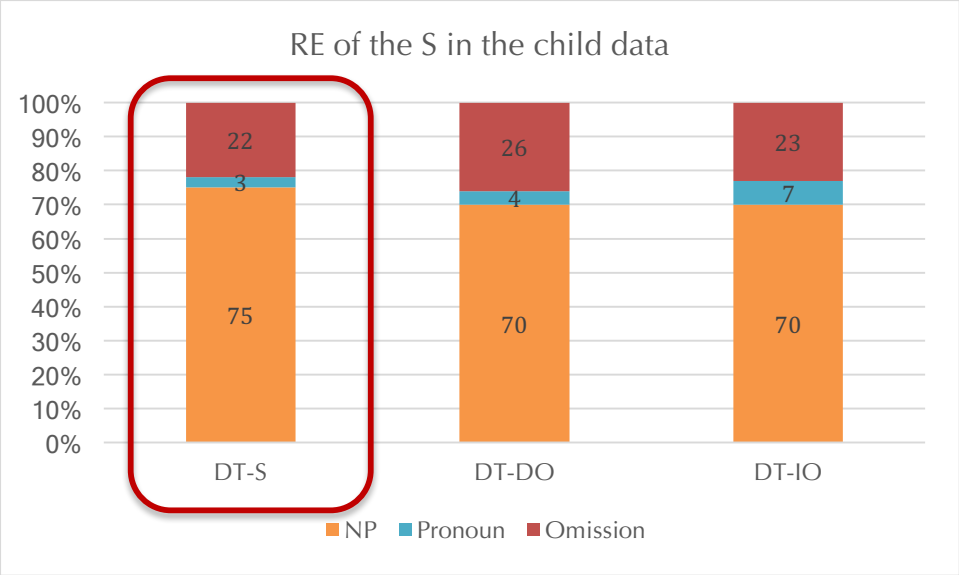

Figure 11a: REs used by children to realize the S in the different DT conditions.

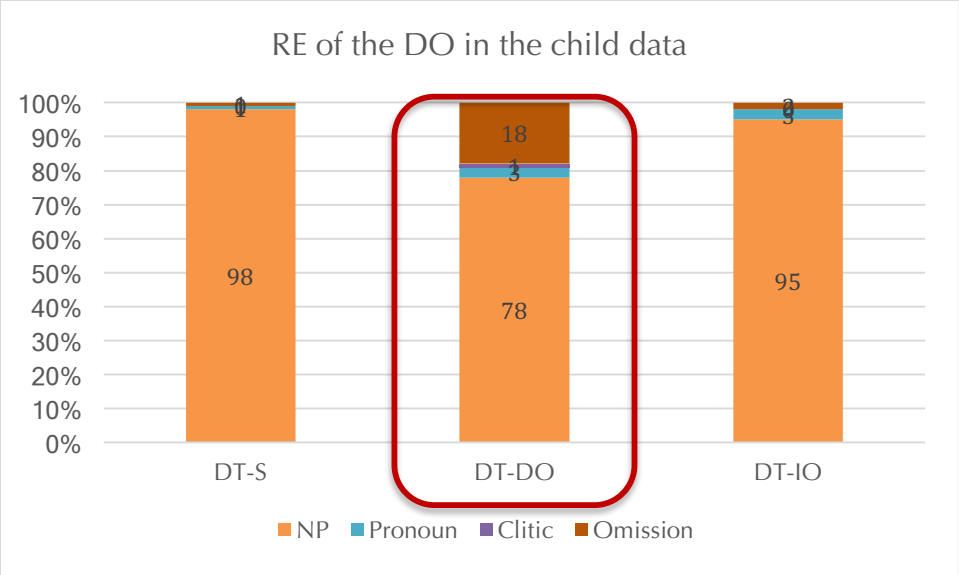

Figure 11b: REs used by children to realize the DO in the different DT conditions.

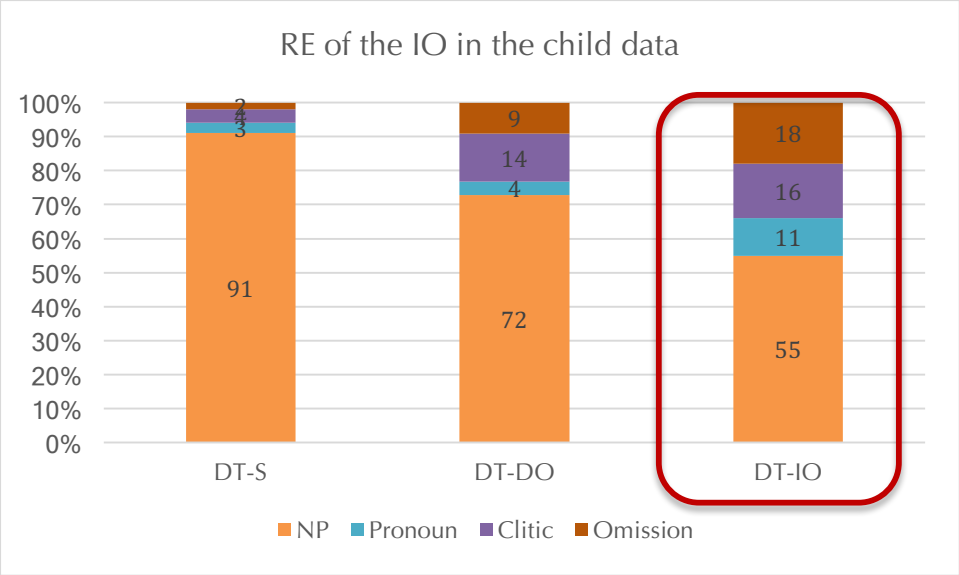

Figure 11c: REs used by children to realize the IO in the different DT conditions.

The children do not seem to be sensitive to whether the subject is the DT or not, since there is no change in the REs with respect to the DT condition. As in adults, the DO is mostly expressed with an NP, but again it is slightly less likely to be expressed by an NP when it is the DT. Finally, the IO is expressed much more frequently by a reduced form when it is the DT, since the proportion of NPs amounts to 54% in the DT-IO condition (compared to 91% and 72% in the other two conditions). Overall, the children reduce their REs to a lower degree than adults, and predominantly use NPs in the task. The data from Figures 10 and 11 indicate that children are more explicit than adults when expressing the referents in the task.

Just as in the case of the adults, a pairwise comparison within group was conducted, on the likelihood of each grammatical function to be expressed as an NP when it is the DT.

	Odds. ratio	Standard error	p.value
DT-S vs. DT-IO	1.349	0.314	0.0001
DT-S vs. DT-DO	-0.040	0.498	0.9964
DT-IO vs. DT-DO	-1.389	0.345	0.002

Table 13: Pairwise comparison of the likelihood of each argument to be expressed as an NP when it is the DT (children).

The statistical analysis indicates that the S is more likely than the IO to be expressed by an NP, but the S and the DO show no difference in their likelihood to be expressed as NPs. The IO is also less likely than the DO to be expressed as an NP. Thus, unlike adults, children express the DO and the S in the same way when they are the DT. This analysis examines the type of RE only when the argument in question is the DT. However, Figures 11a and 11b show that, even though NPs are used at the same proportion for the subject DT and the DO-DT, the DO is reduced more in the DT-DO condition with respect to the other conditions. This does not happen to the subject as the level of NP/omission use remains stable in all conditions. Unfortunately, the pairwise comparison cannot establish whether the use of NPs is significantly reduced in the DT-DO condition, with respect to the other conditions. However, the preliminary linear mixed effect model (table A3 in the appendix) showed that the adults and children are sensitive to the same manipulation when the DO is the DT. This entails that both children and adults express the DO significantly less with NPs when the DO is the DT.

The summary of the ANOVA comparing the use of reduced and full expressions in the two groups is presented in table 14.

	AIC	BIC	p.value
Without Group	1399.7	1441.0	0.0006347
With Group	1390.0	1436.5	

Table 14: ANOVA comparing the use of REs in adult and child data.

Children and adults obviously use REs in a different manner. So far, we have seen from the figures in this section that children use more full expressions than adults. Also, adults express all three grammatical functions differently, unlike children, who express the DT-IO differently from the other two functions but use the same REs to refer to the DT-S and DT-DO. We can see from the figures that, when compared to the adults, children do not pay attention to the DT status of the subject, but they decrease the use of NPs of the DO when it is the DT, thus reaching the same proportion of REs as the adults. With regard to the expressions of the IO, both types of speakers use the least NPs, as this argument is the most likely one to be omitted or expressed as a clitic. Another issue that comes out from the figures and most likely influenced the result in the table above, is that children, unlike adults, do not express the DO with a clitic. This could be related to the DO being inanimate as Fukumura and van Gompel (2011) found a correlation between animacy and RE choice.

In the following section, we discuss the result in relation to how they answer our research questions, and how this research correlates with previous studies discussed in the Background section.

6. Discussion

In this section, we will consider how the results can answer our research questions and how they relate to the predictions that we have made. We will focus on each research question in turn, but discuss the difference between children and adults (research question 6) as a part of the discussion for each research question.

To summarize the main findings, the DT has an effect on object order in adults, but not in children, as children show a constant IO-DO preference in all conditions. Whether an object is omitted is also dependent on whether it is a DT or not. However, the IO is more likely to be omitted than the DO in both adult and child data, but the children omit more objects than the adults overall. The results related to other REs reveal that children use reduced expressions to refer to DT-objects, but not DT-subjects. Furthermore, they tend to be over-explicit and use more NPs than adults.

Our first question was about the use of object order to mark the DT. We predicted that there should be an overall preference for the DT>comment order, but more consistently in adults. The study found that DT has an effect of object order in adults but not in children, as they use the same proportion of IO-DO in both target conditions. The high frequency of the IO-DO in the children's data is most likely caused by the unbalanced animacy that the task had, as previous research has found that Croatian children have a strong tendency to place animate object before inanimate ones (Velnić Submitted).

The second question was whether it is more likely for the DT to be expressed with a reduced RE. We have predicted that children should be more similar to the controls in expressing their arguments, than in their object order choice. The results confirmed this prediction: the DT argument was more likely to be reduced in the child data. Nevertheless, there were some differences between children and adults, as the children were not sensitive to the DT status of the subject, and omitted it at the same rate in all three conditions, even though they were sensitive to the same discourse manipulations for the objects.

Research question three was about the possible overuse of a certain RE type. The results found that children produce more NPs than adults overall, but simultaneously they omit more objects (Figures 1 and 2). This suggests that children understand that discourse has an effect on how we refer to the arguments, but they have not yet pinned down the fine-grained differences, and are using the two extremes of the scale. However, the overuse of full expressions also suggests that children take the listener's perspective into account, but are yet unable to assess the most appropriate RE.

Research question four was about the way different arguments were expressed, i.e. whether there is preference of expressing a grammatical function with a specific RE. The prediction was that there would be a relation, more precisely that the DT subject would have a tendency to be omitted, while the DT object would be expressed as a clitic. For the adults, the IO is the most likely argument to have a reduced expression, and it is very frequently expressed as a clitic or omitted when the it is the DT. The S is the second most likely argument to be reduced, and its expression is divided between NPs and

omissions, as there is no clitic for the nominative form in Croatian. The DO is the least likely argument to be reduced. The children also cliticise the IO quite often, and the IO is the argument with most reduction in the child data. Children were different than adults in the way they expressed the DO: while adults used the clitic 17% of the time, children's RE were divided between NPs and omissions. Thus, children have a three-way distinction for expressing the IO (NP, clitic, null) and a two-way distinction for the DO and the S (NP and null).

The next question was whether speakers used one strategy more than the other (object order or type of RE) to mark DT. The study found a difference between child and adults with regard to marking the DT, as adults use both means available in the task, while children do not use object order to signal the DT. As predicted, adults were more consistent with object order marking than children, and children were more attentive to REs. The possible object order (DT-comment/comment-DT) and RE (NP, pronoun, clitic, omissions) combinations were laid out in Table 2 in section 3 and we expected that most of the productions would have the DT-comment order and that the DT would be reduced, with the non-DT object being expressed with either an NP or a reduced expression. The occurrences that are realized with the comment-DT order are expected to have both full-full and reduced-reduced REs. Both full-reduced and reduced-full combinations within the comment-DT order are expected to be rare. Nevertheless, these combinations could provide an insight into whether the speakers pay more attention to the status of the DT (and thus use a reduced form even if it is placed in the second position), or to pronominality (in which case the pronominal form should precede the NP, and failing to signal the DT both through form and position). Tables 15 and 16 depict the answers, divided by group and DT-condition. The word order and RE combinations that show a (complete) disregard for the discourse status of the DT are marked by shaded cells.

	DT-comment DO-IO	Comment-DT IO-DO
Pr-Pr	0	6
Pr-NP	22	28
NP-NP	61	28
NP-Pr	0	0
Total	83	62

Table 15a: Adult answers in the DT-DO condition.

	DT-comment IO-DO	Comment-DT DO-IO
Pr-Pr	0	2
Pr-NP	83	0
NP-NP	30	17
NP-Pr	0	1
Total	113	19

Table 15b: Adult answers in the DT-IO condition.

	DT-comment DO-IO	Comment-DT IO-DO
Pr-Pr	2	2
Pr-NP	4	27
NP-NP	35	109
NP-Pr	2	0
Total	43	138

Table 16a: Children's answers in the DT-DO condition.

	DT-comment IO-DO	Comment-DT DO-IO
Pr-Pr	4	0
Pr-NP	53	3
NP-NP	92	41
NP-Pr	1	8
Total	150	52

Table 16b: Children's answers in the DT-IO condition.

Again, we can see that the adults use more DT-comment constructions than comment-DT constructions, in both target conditions. However, the difference between the two orders is greater in the DT-IO condition (113 vs. 19) than in the DT-DO condition (83 vs. 62), indicating that animacy is responsible for the high proportion of IO-DO orders in the DT-DO condition, also in the adult data. Conversely, children produce more IO-DO orders in both target conditions in the same proportion (76% and 74%). The data from Table 8 in the previous section already indicated that children do not vary their word order production according to what the DT is, but they are more prone to signaling this by omitting the DT object.

As predicted, when speakers use the DT-comment structure, they do not produce the comment with the reduced form and the DT with the full form:

there are no instances of this happening in the adult data, and only a handful in the child data (n=3). Adults also do not produce reduced-reduced combinations with the DT-comment order, while children do this rarely (n=6).

When the comment-DT structure is used, the full-full structure is the most frequent combination in both children (79%) and adults (56%), while the reduced-reduced combinations are not very frequent (1% for children and 10% for adults). Both types of speaker prefer the reduced-full combinations to full-reduced combinations in the comment-DT order. This kind of production is, however, only present in the DO-DT condition. The reason for this is two-fold: firstly, the IO-DO is an attested object order in this condition due to the animacy of the IO; secondly, the IO is reduced more readily than the DO. Thus, this combination is due to the speakers' attentiveness to animacy and the tendency in Croatian to express the IO as a clitic.

A surprising finding related to REs is that pronouns are almost never used, especially in the adult data. Pronominal use was expected to occur for the reduced S, since the clitic is not an option, but for both speaker groups, the productions were divided between full NPs and omissions. The S has the highest omission rate, most likely because Croatian is a subject-drop language. Overall, the adults used a surprisingly low number of pronouns, making us question the actual use of pronouns in natural language. The children use more pronouns than adults throughout the task, but are still more prone to using clitics.

In the Predictions (Section 2), it was also mentioned how animacy is a relevant factor for object ordering in Croatian (Velnić Submitted), and in the Methodology Section, we state how all the IOs were animate and all DOs inanimate, as it typically occurs in naturalistic speech. This animacy conformation had an impact on our results, and we can see that mostly in the children, as IO-DO (animate-first) is the predominately used object order; this also had an impact on the adults, as they showed a preference for IO-DO in the DT-S condition, although less pronounced than the children. The adults also used more target deviant word orders in the DT-DO condition than in the DT-IO condition. This is related to a higher usage of IO-DO orders overall, which is

also what is found in Croatian naturalistic speech (Velnić 2014, Kuvač Kraljević and Hržica 2016) and it is due to the animacy of the IO (Velnić Submitted). Moreover, as Velnić (Submitted) has claimed that children are more sensitive to animacy than adults, it would seem that this sensitivity to animacy is reflected also on the choice of RE (Fukumura and van Gompel 2011) as children do not cliticise the DO (inanimate), while adults do. This needs further investigation to check whether it is related to the grammatical function of the DO or to the fact that the DO was inanimate in our task.

7. Conclusions

The results found that children do not use word order to signal givenness, in our case manifested as DT, and instead they use mostly the IO-DO. The effect of DT is seen in adults, as the DT-comment structure is used most of the time, but adults also over-use the IO-DO structure when the DO is the DT. The most likely cause of over-usage is animacy, as the IO was animate and the DO was not.

Nevertheless, children signal what is given in the discourse by expressing the DT with a reduced RE. This is most obvious from the omissions, as children omit the DT more than the other arguments. Children omit much more than adults (Figures 5 and 6), but these omissions are related to DT.

The RE is related to the argument type: Subjects are expressed either with a full NP or with a null element, IOs have a high proportion of clitics, while DOs are mostly expressed with NPs. Adults also express DO with clitics, but children do not. Pronouns were not used in the task, except a few times by the children. This opens some interesting questions on whether pronouns are even used in Croatian when they do not have a contrastive connotation.

We thus conclude that topics are not marked by word order in Croatian preschoolers, a result already found in a number of studies (Hornby 1971, Dimroth and Narasimhan 2012). The children use IO-DO with the same proportion throughout the task, but mark what is given (the DT) by omitting it more easily. Overall, children use more full expressions than adults, which means that they are over-specific on the Givenness Hierarchy. This, in addition

to the fact that they omit more than adults, suggest that children are sensitive to the GH, but still in the process of acquiring the fine-grained distinctions, and are for the moment just using the two extremes of the GH. They are, nevertheless, sensitive to the various REs that can be used for different arguments, as they follow the same reduction pattern as the adult controls. Therefore, the effect of DT and the pragmatic functions related to it, such as givenness, are first expressed through REs, and through word order at a later stage. More research is needed to test when children stop overusing NPs and when they start using word order in an adult-like manner.

Abbreviations

ACC – Accusative case
AUX - Auxiliary
CL - Clitic
DAT – Dative case
DO – Direct object
IO – Indirect object
N - Noun
NP – Noun Phrase
NOM – Nominative case
PR - Pronoun

Appendix

	Estimate	**Std. Error**	**Z value**	**p.value**	**Significance**
(Intercept) Ad DT-S	0.8508	0.4182	2.034	0.041	p<0.05
Ad DT-DO	-1.3042	0.3611	-3.611	0.000304	p<0.001
Ad DT-IO	1.671	0.3802	4.395	$1.11e^{-05}$	p<0.001
Ch DT-S	0.8244	0.4582	1.799	0.072003	p<0.1
Ch DT-DO	1.5274	0.4149	3.682	0.000232	p<0.001
Ch DT-IO	-1.8247	0.4515	-0.042	$5.31e^{-05}$	p<0.001

Table A1: Statistical results of object order distribution in the different DT conditions in both participant groups.

	Estimate	Std. Error	Z value	Pr (>z)	Significance
(Intercept) Ad DT-S	0.6774	0.4901	1.382	0.1669	
Ad DT-DO	-1.9698	0.4547	-4.332	$1.48e^{-05}$	p<0.001
Ad DT-IO	1.2443	0.5176	2.404	0.0162	p<0.05
Ch DT-S	1.1344	0.5628	2.016	0.043848	p<0.05
Ch DT-DO	2.0878	0.5386	3.877	0.000106	p<0.001
Ch DT-IO	-1.5058	0.6069	-2.481	0.013092	p<0.05

Table A2: Statistical results of object orders of NP-NP occurrences.

	Estimate	Std. Error	Z value	Pr (>z)	Significance
(Intercept) Ad DT-S	-0.1765	0.4556	-0.387	0.6983	
Ad DT-DO	1.9494	0.5296	3.681	0.000232	p<0.001
Ad DT-IO	-1.0815	0.3503	-3.088	0.002018	p<0.01
Ch DT-S	-1-8494	0.4124	4.485	$7.30e^{-06}$	p<0.001
Ch DT-DO	-1.9088	0.3816	-5.002	$5.68e^{-07}$	p<0.001
Ch DT-IO	-0.2679	0.3555	-0.753	0.4512	

Table A3: Statistical results of RE variation according to DT.

Adults	DT-S	DT-DO	DT-IO
DO-IO	35% (63)	54% (83)	12% (20)
IO-DO	63% (113)	40% (62)	68% (113)
Object omission	2% (4)	6% (9)	19% (32)
Total	180	154	165

Table A4: Adult word order distribution in the task.

Children	DT-S	DT-DO	DT-IO
DO-IO	23% (71)	17% (43)	20% (52)
IO-DO	72% (224)	56% (138)	59% (150)

Object omission	5% (15)	27% (66)	21% (53)
Total	311	247	255

Table A5: Children's word order distribution in the task.

Adults	**DT-S**	**DT-DO**	**DT-IO**
DO-IO	42% (60)	69% (61)	36% (17)
IO-DO	58% (82)	31% (28)	64% (30)
Total	142	89	47

Table A6: Adult word order distribution of NP-NP combinations.

Children	**DT-S**	**DT-DO**	**DT-IO**
DO-IO	26% (64)	24% (35)	31% (41)
IO-DO	74% (185)	76% (109)	69% (92)
Total	249	144	133

Table A7: Children's word order distribution of NP-NP combinations.

Adults	**DT-S**	**DT-DO**	**DT-IO**
DO-om	0,06% (1)	3% (5)	0%
IO-om	2% (3)	2% (4)	19% (32)
Total:	180	154	165

Table A8: Adult omission distribution in the task.

Children	**DT-S**	**DT-DO**	**DT-IO**
DO-om	1% (5)	19% (46)	2% (6)
IO-om	3% (10)	8% (20)	18% (47)
Total:	311	247	255

Table A9: Children's omission distribution in the task.

Adult	**NP**	**Pronoun**	**Omission**
DT-S	47% (84)	0%	53% (96)
DT-DO	57% (89)	4% (6)	39% (61)

DT-IO	71% (117)	0%	28% (46)

Table A10: RE of the S in the adult data.

Adults	**NP**	**Pronoun**	**Clitic**	**Omission**
DT-S	97% (175)	0%	1% (2)	0,6% (1)
DT-DO	79% (123)	0,6% (1)	17% (27)	0,3% (5)
DT-IO	99% (164)	0%	1% (1)	0%

Table A11: RE of the DO in the adult data.

Adults	**NP**	**Pronoun**	**Clitic**	**Omission**
DT-S	82% (147)	0,5% (1)	12% (21)	2% (3)
DT-DO	73% (114)	2% (3)	22% (34)	26% (4)
DT-IO	30% (49)	1% (2)	50% (84)	18% (30)

Table A12: RE of the IO in the adult data.

Children	**NP**	**Pronoun**	**Omission**
DT-S	75% (213)	3% (8)	22% (62)
DT-DO	70% (174)	4% (11)	26% (65)
DT-IO	70% (178)	7% (18)	23% (58)

Table A13: RE of the S in the child data.

Children	**NP**	**Pronoun**	**Clitic**	**Omission**
DT-S	98% (278)	1% (2)	0%	1% (3)
DT-DO	78% (194)	3% (7)	0,4% (1)	18% (46)
DT-IO	95% (243)	3% (8)	0%	1% (3)

Table A14: RE of the DO in the child data.

Children	NP	Pronoun	Clitic	Omission
DT-S	91% (257)	3% (8)	4% (11)	2% (7)
DT-DO	72% (181)	4% (10)	14% (36)	9% (22)
DT-IO	55% (140)	11% (29)	16% (4)	18% (47)

Table A15: RE of the IO in the child data.

Competing Interests

The authors declare that there are no competing interests.

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