ACQUISITION OF DITRANSITIVE STRUCTURES IN CROATIAN CHILD LANGUAGE

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] We 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 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

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

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,a nd 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.

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)

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

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

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

(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	

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 odes 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 but it has been previously noted that it is a relevant factor for the object ordering in the adult language. 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 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

[5] Cedevita is a popular soluble drink in Croatia

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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