Nina Ilić

Faculty of Philosophy, University of Novi Sad
nina.ilic@ff.uns.ac.rs

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REFLEXIVE AND ANTI-CAUSATIVE VERB PRODUCTION REVISITED

Abstract: The aim of the present research was to reexamine the production of reflexive and anti-causative *se*-verbs in Serbian at different stages of language acquisition after a nine-month period from the first experiment (Ilić, 2019). The results of the first experiment suggest the following order of acquisition: lexical reflexive > true reflexive > anti-causative verbs. Moreover, they speak in favour of the Continuity Hypothesis (Snyder et al., 1995; Snyder & Hyams, 2015), since the children were able to produce reflexive forms correctly from the earliest tested age. The verbs which were tested in both experiments were true reflexive (e.g. *kupati se* 'wash oneself'), lexical reflexive (e.g. *vrteti se* 'spin') and anti-causative *se*-verbs (e.g. *otvoriti se* 'open'). A total of sixty subjects belonging to three age groups (40-51, 52-63, 65-77 months, twenty participants in each group) took part in the research. The data collection technique was a verb elicitation task, and the children were asked to name the activities presented in the visual stimuli. The number of tested verbs was the same for each verb type (six per group). The production of verbs across age groups improved in comparison with the first experiment. The production of lexical reflexive verbs was significantly better than the production of anti-causative verbs in the youngest group. Therefore, the results of the follow-up experiment have confirmed the suggested order of acquisition. However, no differences were found in the two older groups, which indicates that the production of more complex verb types improves considerably between the ages of four and five.

Key words: verb production, reflexive verbs, anti-causative verbs, L1 acquisition, longitudinal study

1. Introduction

The paper presents the results of a follow-up research into the acquisition of *se*-verbs in Serbian as L1. The purpose of the follow-up experiment was to reexamine the production of true reflexive, lexical reflexive and anti-causative *se*-verbs of the same participants at a later stage of language acquisition. The results of the first experiment (Ilić, 2019) suggest the following order of acquisition: lexical reflexive > true reflexive > anti-causative verbs and support the Continuity Hypothesis. They confirmed the initial hypothesis that anti-causative verbs are acquired after reflexive verbs because they are syntactically and semantically more complex. Namely, anti-causative verbs involve the complex syntactic process of detransitivisation, which is characterized by the deletion of +Cause theta role (present in the argument structure of their transitive variants). The only theta-role that is present in their argument structure is the Theme theta-role, which is mapped onto the subject. This makes these verbs more difficult for children to master than reflexive verbs, which mirror prototypical semantic notions since there is a volitional animate agent that affects the state of a patient. However, the patient is animate and coreferential with the subject in this case.

Regarding the structure of the paper, section 2 provides a theoretical background and section 3 describes the method. Section 4 presents the analysis of the results obtained. Finally, in section 5, we summarize the main points of the research, discuss implications for the theory and provide suggestions for future research.

2. Theoretical background

2.1. Maturation Hypothesis versus Continuity Hypothesis

The results of cross-linguistic research on the acquisition of different types of verbs do not converge. Whereas one strain of research has shown that reflexive verbs are acquired at a very young age, the other has shown that the acquisition of more complex verbs is delayed. The former studies speak in favour of the Continuity Hypothesis, whereas the latter support the Maturation Hypothesis.

Borer and Wexler's Maturation Hypothesis (1987) is centred around the idea that children have difficulty producing A-chains, i.e. verbs which involve movement to an argument position. This type of movement occurs when an argument moves from a lower position inside the VP (verb phrase) to the position of the specifier of TP (tense phrase) to become a subject. Many studies have provided support for the Maturation Hypothesis (Miyamoto et al., 1999; Babyonyshev et al., 2001; Lee & Wexler, 2001; Ito & Wexler, 2002). Importantly for the present study, this type of movement is found with unaccusative and anti-causative *se*-verbs in Serbian.

On the other hand, studies supporting the Continuity Hypothesis have shown that children do not actually have difficulty producing A-chains. Snyder et al. (1995) found evidence for early sensitivity to the unergative/unaccusative distinction. The results of their study suggest that children produce different auxiliaries with reflexive and non-reflexive clitic pronouns successfully in French and Italian. In these languages, reflexive forms (analysed as unaccusative constructions in which a Theme argument surfaces as a subject) are used with the auxiliary *be*, while non-reflexive forms are used with the auxiliary *have*. More recently, Snyder and Hyams (2015) claimed that children are capable of producing even anti-causative verbs, or "formally, but not semantically, reflexive clitic constructions (FRCCs)" as they termed them, quite early. Since they found examples from the spontaneous speech of Italian and French children as young as two, showing adult-like performance on FRCCs, they argue that children do not have difficulty with A-chains.

2.2. The results of the first experiment and the hypotheses of the study

Three GLMER analyses conducted in the first experiment (Ilić 2019) showed the following: lexical reflexive and true reflexive verbs were produced significantly better than anti-causative verbs in the groups of three-year-olds and four-year-olds; lexical reflexive verbs were produced significantly better than anti-causative verbs in the group of five-year-olds as well, but the contrast between true reflexive and anti-causative verbs was no longer found. Since the children produced reflexive verb forms correctly from the earliest tested age, the results speak in favour of the Continuity Hypothesis. Although the production of anti-causative verbs was less successful, many of the children's non-target answers for anti-causative verbs were verbs of the same syntactic complexity, which could not be coded as target because they were semantically inappropriate. Therefore, Ilić (2019) concludes that the lower production of anti-causatives should not be attributed to the problem with A-chains (as would be assumed under the Maturation Hypothesis), but rather to the process of detransitivisation and deletion of +Cause theta role.

The aim of the present research is to test the production of the same verb types. Taking into consideration the theoretical claims made in this section and the results obtained in the first experiment, the initial hypothesis is that the production of anti-causative verbs would be the least accurate among the tested verb types. Lexical reflexive verbs proved to be the easiest type to produce in the first experiment, and we expect to observe this tendency in the present study as well.

3. Method

3.1. Participants and procedure

After a nine-month period, the same participants were tested. A total of sixty monolingual Serbian-speaking participants (N=60) belonging to three age groups (twenty participants in each) took part in the experiment. Out of 60 participants, only one participant could not be tested again. A girl from the youngest group tested transferred to a different kindergarten and could not be reached, so another participant of the same age (born in the same month) was tested instead, so as to maintain the same number of children in each group. All the remaining participants were present and ready to cooperate again, many of them not remembering that they had done something similar before, or even the interviewer in some cases. For the sake of comparability with the results of the first experiment, the children will be referred to as three-year-olds, four-year-olds, and five-year-olds, although their mean ages almost reached the age of four (M=46.75, SD=2.88), five (M=59.65, SD=2.99), and six (M=70.55, SD=4.19) at the time of the follow-up experiment. Gender was not controlled for in the research (for more detailed information about the participants see Ilić, 2019).

The children were tested in December 2019, in "Maslačak" kindergarten, "Radosno detinjstvo" preschool facility in Novi Sad. The procedure was exactly the same as the one in the first experiment. The only difference was that the sessions lasted a few minutes shorter on average, because the children responded to the stimuli more quickly, most likely due to their greater maturity. The children were asked to name the activities presented in the pictures. Each stimulus contained two pictures, and the interviewer would elicit the answer for the second picture, after having described the activity in the first. She would ask the child what the person in the picture was doing (stimuli testing true and lexical reflexive verbs) or what happened (stimuli testing anti-causative verbs). For more detailed information about the procedure see (Ilić, 2019).

3.2. Design

The independent variables were verb type with three levels (true reflexive, lexical reflexive, and anti-causative verbs) and age. The dependent variable was verb production (coded as target or non-target). The data were analyzed with Mixed Effects Logistic Regression (GLMER). Three GLMER analyses were conducted for each of the three age categories, for verb type with three levels; three more GLMER analyses were conducted for separate verb types, for age group with three levels. The effect of verb length and frequency was also examined. Verb frequencies were taken from Serbian Web Corpus (SrWaC). Verb length was quantified by counting the number of letters.

The data collection technique was a structured interview with a verb elicitation task. The children were asked to name the activities presented in the stimuli. Three verb types were tested in the experiment:

1. true reflexives: *oblačiti se* 'dress oneself', *umivati se* 'wash one's face', *brisati se* 'wipe oneself', *kupati se* 'wash oneself', *češljati se* 'comb one's hair', *šminkati se* 'put on make-up';
2. lexical reflexives: *igrati se* 'play', *penjati se* 'climb', *vrteti se* 'spin', *ljuljati se* 'swing', *spuštati se* 'slide', *smejati se* 'laugh';
3. anti-causatives: *otvoriti se* 'open', *zatvoriti se* 'close', *upaliti se* 'turn on', *ugasiti se* 'go out', *pokvariti se* 'stop working', *polomiti se* 'break'.

3.3. Coding

Answers were coded as target when the children produced the target verb, or non-target when they did not give an answer or produced a non-target word. Self-corrections were allowed. Closely synonymous verbs, which belong to the same verb type, and therefore have the same number of arguments, were also accepted as target. Alternative verbs which do not belong to the same verb type were not accepted as target.

Non-target answers were coded in the following way:

1. Non-target verbs (e.g. *ona briše svoje lice sa ovim* 'she is wiping her face with this' instead of *šminka se* 'she is putting on make-up')
2. Verbs with full complements/implicit agents instead of their variants with the clitic *se* (e.g. *umiva lice* 'he is washing his face')
3. Made-up verbs
4. Other (adjective *otvorena* 'open' instead of the verb 'open').

4. Results

4.1. Three-year-olds

In the youngest group tested, the production of true reflexive verbs reached almost 90% (N=107, M=5.35, SD=0.81), while the production of lexical reflexive verbs was over 95% (N=116, M=5.8, SD=0.41). In comparison to the results from the same group nine months earlier, presented in Figure 1, there were 13 more true reflexive verbs produced, and 11 more lexical reflexive verbs produced. The improvement was even more prominent in the case of anti-causative verbs. Thirty-seven more anti-causative verbs were produced. The production of anti-causative verbs, somewhat unexpectedly, was over 70% (N=87, M=4.35, SD=1.22).

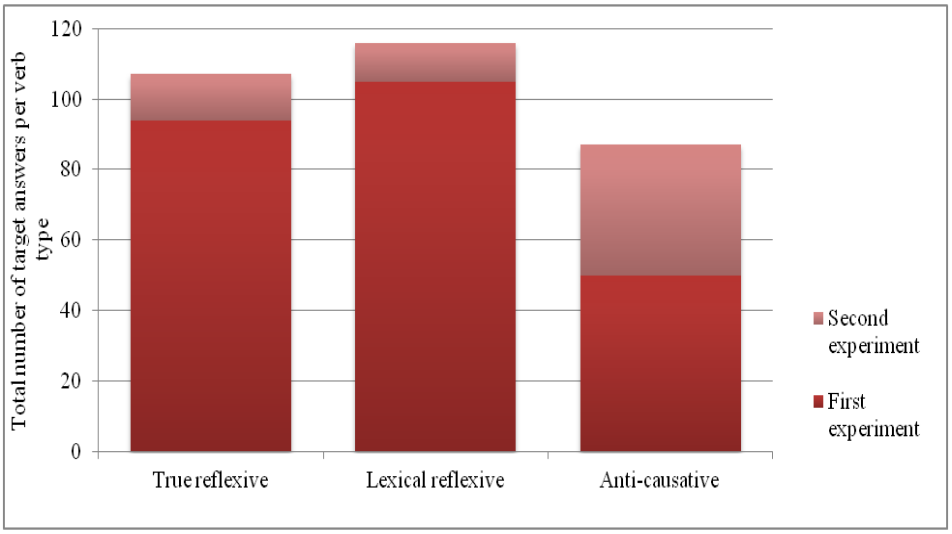

Figure 1. Increase in the verb production of three-year-olds after a nine-month period

The GLMER model comparing the production of true reflexive, lexical reflexive, and anti-causative verbs shows that lexical reflexive verbs were produced significantly better than anti-causative verbs (β=2.930; z=2.397; Pr(>|z|)=.016*), but a difference between the production of true reflexive and anti-causative verbs was not found (β=1.228; z=1.313; Pr(>|z|)=.189). As it can be seen in Table 1, no other effects were found.

Random effects	*Variance*	*SD*
Subject : Intercept	.405	.636
Stimuli :Intercept	.961	.980

Fixed effects	*Estimate*	*SE*	*z-value*	*p-value*
Intercept	.954	.743	1.282	.199
Trial Order	.016	.021	.784	.433
Verb frequency	-.205	.417	-.493	.926
Verb length	-.036	.390	-.092	.926
Verb type (lexical reflexive)	2.930	1.222	2.397	.016*
Verb type (true reflexive)	1.228	.935	1.313	.189

Table 1. GLMER analysis on the sample of 3-year-old children

When it comes to inter-subject variability in producing individual verb types, SD was below 1 for true reflexive verbs (SD=0.81), and lexical reflexive verbs (SD=0.41). Inter-subject variability in producing anti-causative verbs was not very high (SD=1.22) either. There were no children who failed to produce any anti-causatives (compared to three such participants in the first experiment) or produced only one anti-causative verb (compared to three participants in the first experiment). Detailed information on the number of correctly produced verbs per type is provided in Appendix 1a.

4.2. Four-year-olds

After a nine-month period, the production of all verb types was over 100 verbs in the group of four-year-olds. The production of true reflexive verbs reached 95% (N=114, M=5.7, SD=0.66), with an increase of 5 verbs in comparison to the first experiment, and the production of lexical reflexive verbs was 100% (N=120, M=6, SD=0), with an increase of 3 verbs. The production of anti-causatives improved noticeably, as presented in Figure 2. There were 24 more anti-causative verbs (N=102, M=5.1, SD=0.85), which means that the production of anti-causative verbs reached 85%.

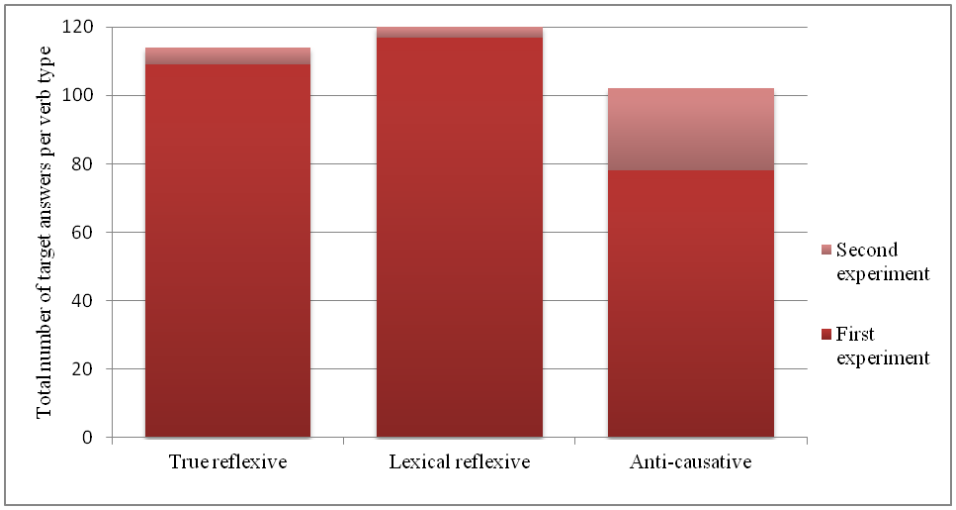

Figure 2. Increase in the verb production of four-year-olds after a nine-month period

There were no significant differences between the production of true reflexive, lexical reflexive, and anti-causative verbs, which is presented in Table 2.

Random effects	*Variance*	*SD*
Subject : Intercept	.078	.280
Stimuli :Intercept	1.198	1.094

Fixed effects	*Estimate*	*SE*	*z-value*	*p-value*
Intercept	1.768	.919	1.923	.054.
Trial Order	.049	.028	1.738	.082.
Verb frequency	.397	.610	.651	.514
Verb length	-.119	.479	-.250	.802
Verb type (lexical reflexive)	9.676	24.077	.041	.967
Verb type (true reflexive)	1.085	1.157	.938	.348

Table 2. GLMER analysis on the sample of 4-year-old children

Inter-subject variability among four-year-olds was below 1 in producing all verb types. When it comes to the production of true reflexive verbs (SD=0.66), 80% of four-year-olds reached maximum production. In the case of lexical reflexive verbs, inter-subject variability was zero (SD=0), since all the participants produced all the verbs. Finally, when it comes to the inter-subject variability in the production of anti-causative verbs (SD=0.85), there were only seven four-year-olds (35%) who produced the maximum number of anti-causative verbs. For the number of correctly produced verbs per type among four-year-olds, see Appendix 1b.

4.3. Five-year-olds

The production of five-year-olds in the follow-up experiment yielded very similar results. The production of true reflexive verbs (N=113, M=5.65, SD=0.59) and lexical reflexive verbs (N=120, M=6, SD=0) was virtually the same as the production in the group of four-year-olds in the follow-up experiment. In comparison to the results from nine months earlier, presented in Figure 3, there were three more true reflexive verbs produced, and one more lexical reflexive verb produced. The production of anti-causative verbs increased by 15 verbs (N=107, M=5.35, SD=0.81). It reached 89%, which was the highest percentage of anti-causative verbs produced in the study.

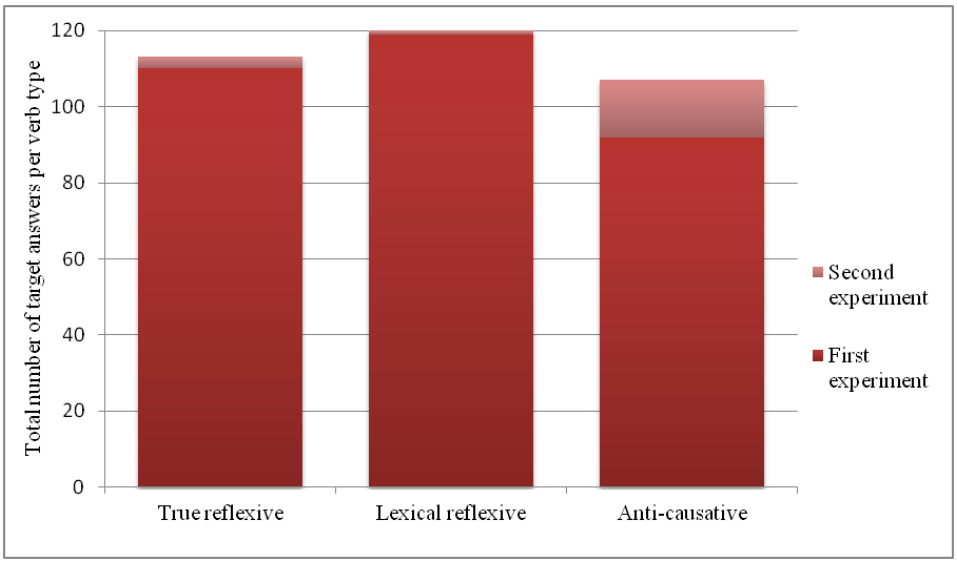

Figure 3. Increase in the verb production of five-year-olds after a nine-month period

No differences were found between the production of true reflexive, lexical reflexive, and anti-causative verbs in this group either, as shown in Table 3.

Random effects	*Variance*	*SD*
Subject : Intercept	1.152	1.073
Stimuli :Intercept	1.564	1.251

Fixed effects	*Estimate*	*SE*	*z-value*	*p-value*
Intercept	1.989e+00	1.129e+00	1.762	.078
Trial Order	6.954e-02	3.515e-02	1.978	.047
Verb frequency	2.881e-01	6.577e-01	.438	.661
Verb length	2.358e-01	6.839e-01	.345	.730
Verb type (lexical reflexive)	1.803e+01	2.604e+03	.007	.994
Verb type (true reflexive)	9.832e-01	1.369e+00	.718	.472

Table 3. GLMER analysis on the sample of 5-year-old children

Inter-subject variability among five-year-olds was below 1 for all verb types. When it comes to the production of true reflexive verbs (SD=0.59), as many as 70% of the five-year-olds reached maximum production. As was the case in the previous group, inter-subject variability in producing lexical reflexive verbs was zero (SD=0), since all the participants produced all the verbs. However, there was inter-subject variability in producing anti-causative verbs (SD=0.81). In addition, 55% of the five-year-olds reached maximum production of anti-causative verbs. For more detailed information, check Appendix 1c.

Since there were no significant differences found in producing the three tested verb types in the groups of four-year-olds and five-year-olds, the results suggest that more complex verbs cease to pose a difficulty for children at the age of five. In order to check this, we conducted three additional GLMER analyses, testing the effect of age on the production of verb types, provided in the next section.

4.4. The effect of age on the production of verb types

The results of the GLMER analysis comparing the production of true reflexive verbs in the three age groups after a nine-month period are graphically presented in Figure 4. The y-axis shows the total number of target answers out of 120 observations per age group. The analysis shows that the difference in the production of true reflexive verbs was not significant between three-year-olds and four-year-olds (β=.879; z=1.701; Pr(>|z|)=.089), or even between three-year-olds and five-year-olds (β=.692; z=1.407; Pr(>|z|)=.159) after a nine-month period. There was no difference in the production of true reflexive verbs between four-year-olds and five-year-olds either (β=-.187; z=-.326; Pr(>|z|)=.744). An effect of verb length was found, though (β=-.349; z=-1.961; Pr(>|z|)=.049*), whereas there was no effect of verb frequency on the production of true reflexive verbs (β=-.104; z=-.471; Pr(>|z|)=.637). It can be concluded that this verb type is acquired at a relatively young age.

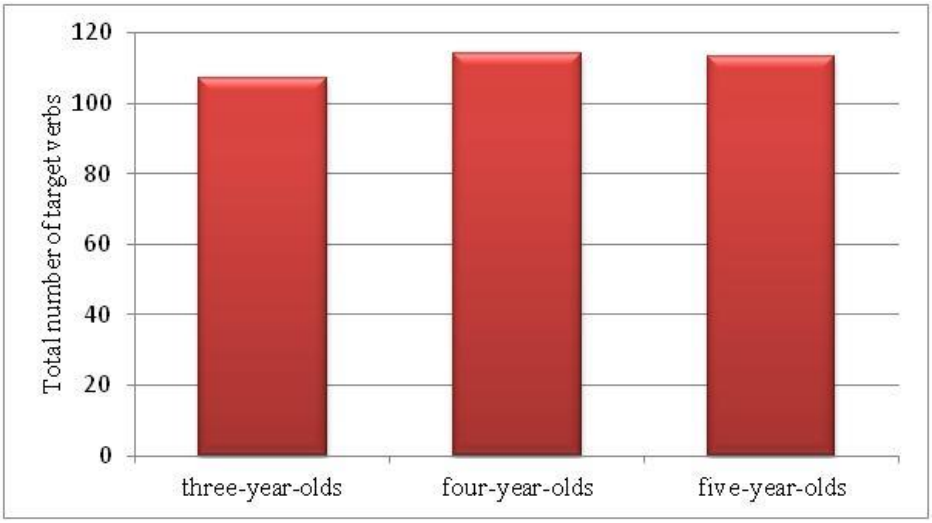

Figure 4. Differences in true reflexive verb production between groups

The second GLMER analysis comparing the production of lexical reflexive verbs across the age groups gave the same results, presented in Figure 5. The production of five-year-olds was not significantly better than the production of three-year-olds (β=3.414e+01; z=.001; Pr(>|z|)=.999). Furthermore, there was no difference in the production of lexical reflexive verbs between four-year-olds and three-year-olds (β=4.424e+01; z=.002; Pr(>|z|)=.998), nor in the production of four-year-olds compared to five-year-olds (β=9.520e+00; z=-.002; Pr(>|z|)=.998). Therefore, the results of the follow-up experiment confirm that lexical reflexive verbs are fully acquired around the age of four as well. An effect of verb length was found (β=1.517e+00; z=1.983; Pr(>|z|)=.047*), but there was no effect of frequency on the production of lexical reflexive verbs (β=7.318e-01; z=1.082; Pr(>|z|)=.279).

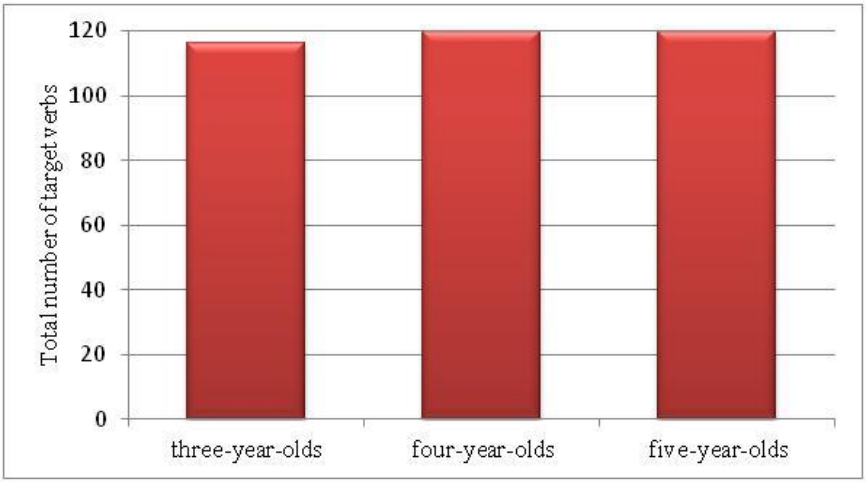

Figure 5. Differences in lexical reflexive verb production between groups

The last GLMER analysis comparing the production of anti-causative verbs differs from the previous two. Five-year-olds produced anti-causative verbs significantly better than three-year-olds (β=1.434; z=3.538; Pr(>|z|)=.000***). Moreover, anti-causative verbs were also produced more accurately by four-year-olds than by three-year-olds (β=1.010; z=2.731; Pr(>|z|)=.006**). However, no difference in the production between four-year-olds and five-year-olds was found (β=.424; z=.998; Pr(>|z|)=.318). Interestingly, neither the frequency effect (β=-.025; z=-.047; Pr(>|z|)=.962), nor the effect of verb length (β=-.093; z=-.318; Pr(>|z|)=.750) was found. The results are presented in Figure 6.

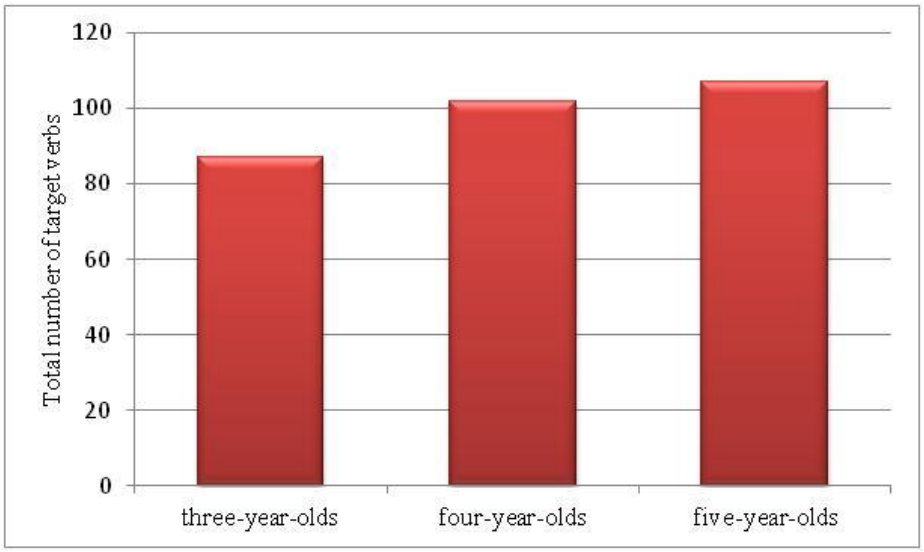

Figure 6. Differences in anti-causative verb production across groups

The data from the longitudinally repeated experiment confirm the tendencies observed in the first experiment. The results indicate that the developmental pattern of the acquisition of the tested *se*-verbs in Serbian starts with lexical and true reflexive verbs, whereas the acquisition of anti-causative *se*-verbs is delayed. It appears that the production of this verb type improves considerably between the ages of four and five. We proceed to the qualitative analysis of non-target answers.

4.5. Non-target answers

4.5.1. True-reflexive verbs

The number of non-target answers for true reflexive verbs decreased in all the tested groups. There were 13 non-target answers in the group of three-year-olds, which is half of the non-target answers in the same group in the first experiment (26). There were only 6 non-target answers in the group of four-year-olds (compared to 11 nine months earlier), and 7 in the group of five-year-olds (compared to 10 in the first experiment). The majority of non-target answers belonged to the category of transitive variants of verbs, i.e. verbs with complements (20/26). The number of verbs that were used with complements in the youngest group represented around 8% of all the children's answers for this verb type (9/120). Non-target verbs were used instead of the verbs *oblačiti se* 'dress' and *šminkati se* 'put on make-up' (3). Interestingly, one verb that was used instead of the target *šminka se* 'she is putting on make-up' was of the same syntactic complexity. In fact, the verb *farba se* 'she is painting herself' can be used in Serbian when a person dyes their hair, but not for the act of putting on make-up, which is why this verb could not be coded as 'target'. Finally, there was an interesting example of an existing verb used with the wrong valency, therefore coded as a 'made-up verb' – the verb *spušta se*. The lexical reflexive verb can only be used with animate subjects to imply an activity of sliding/moving downwards (*Rečnik srpskoga jezika* [the Dictionary of the Serbian Language], 2011:1235). However, the participant produced it as a response to the stimulus eliciting the verb *oblači se* 'he is dressing', while her intention was to refer to the activity of pulling the shirt down, as she interpreted the presented situation. An appropriate response in case of such an interpretation would have been *spušta majicu* 'he is pulling his shirt down', but that is a transitive verb, which could not be coded as target anyway.

As for the non-target answers in the other two groups, there were 5 transitive variants of true reflexive verbs and one answer categorized as 'other' produced in the group of four-year-olds, and 6 transitive variants and one non-target verb in the group of five-year-olds, which can be seen in Table 4. What needs to be pointed out is that the answer that was categorized as 'other' included both the clitic *se* and an object in producing the verb *češljati se* 'comb oneself'. This was the only time in both experiments that a child produced a reflexive verb with an object.

Category	three-year-olds	four-year-olds	five-year-olds	Total:
Non-target verbs Example	3 *farba se* paint.3sg.pres SE 'she is painting herself' instead of *šminka se* 'she is putting on make-up'	/	1 *ona koristi lak za usta* she.nom use.3sg.pres polish.acc for lips.acc 'she is using lip polish' instead of *šminka se* 'she is putting on make-up'	4
Transitive verbs Example	9 *češlja kosu* comb.3sg.pres hair.acc 'she is combing her hair' instead of *češlja se* 'she is combing herself'	5 *briše lice* dry.3sg.pres face.acc 'she is drying her face' instead of *briše se* 'she is drying herself'	6 *šminka usta* put on make-up.3sg.pres lips.acc 'she is putting on lipstick' instead of *šminka se* 'she is putting on make-up'	20
Made-up verbs Example	1 *se spušta* SE pull down.3sg.pres instead of *oblači se* 'he is dressing'	/	/	1
Other Example	/	1 *pa se onda češljala kosu* so SE then.adv comb.3sg.past hair.acc 'so then she combed herself her hair' instead of *češlja se* 'she is combing herself'	/	1
Total number of non-target answers:	13	6	7	26

Table 4. Non-target answers for true reflexive verbs across groups

4.5.2. Lexical reflexive verbs

As it is shown in Table 5, the number of non-target answers for lexical reflexive verbs was reduced to only 4 in the youngest tested group (compared to 15 in the first experiment). There were only two categories of non-target answers observed: non-target verbs and no answer. Three non-target transitive and unergative verbs were produced instead of the target *vrteti se* 'spin'. One child did not give any answer for the target verb *smejati se* 'laugh'. There were no non-target answers in the groups of four-year-olds and five-year-olds in the follow-up experiment, since all the target verbs were produced.

Category	three-year-olds	four-year-olds	five-year-olds	Total:
Non-target verbs Example	3 *pravi okrete* make.3sg.pres turns.acc 'she is making turns' instead of vrti se 'she is spinning' *pleše (2x)* dance.3sg.pres 'she is dancing' instead of vrti se 'she is spinning'	/	/	3
No answer	1	/	/	1
Total number of non-target answers:	4	0	0	4

Table 5. Non-target answers for lexical reflexive verbs across groups

4.5.3. Anti-causative verbs

As it can be seen in Table 6, there were 33 non-target answers in the group of three-year-olds, 18 non-target answers in the group of four-year-olds and 13 non-target answers in the group of five-year-olds, which makes a total of 64 non-target answers. Therefore, the total number of non-target answers was less than half of the non-target answers in the first experiment (140). Another important difference in comparison with the results from nine months earlier was that non-target answers were only found in four different categories (non-target verbs, transitive variants of *se*-verbs, made-up verbs, and other), as opposed to nine months before when the children produced verbs without the clitic *se*, nouns or did not give an answer as well. The answers belonging to the category of non-target anti-causative verbs were still the most numerous, constituting 55% of the total number of non-target answers (35/64).

Non-target verbs were most numerous in the group of three-year-olds, and they make up 18% of all the children's answers for anti-causative verbs (22/120). There were 6 transitive variants of the target verbs used, as had been the case in the first experiment. There were two instances of a made-up verb, which had already been noted in the first experiment (*oduvala se* 'it blew out SE' instead of *ugasila se* 'it went out'). This verb was coded as a made-up verb since the verb *oduvati* 'blow out' cannot be turned into an anti-causative verb, as it requires the presence of an agent. The answers in the category 'other', in which the participants answered with copular constructions or only adjectives, were no longer numerous (3).

The number of non-target answers decreased across groups. In the group of four-year-olds, there were 8 non-target verbs and 10 answers categorized as 'other'. In the oldest tested group, there were 5 non-target verbs, one transitive variant of the target verb, two examples of a made-up verb, and 5 answers categorized as 'other'.

After a nine-month period, non-target verbs were still produced for every tested verb in the youngest group. However, the distribution of different types of verbs that were used instead of the target anti-causative verbs differed considerably from those noted in the first experiment. The number of agentive non-target verbs decreased in comparison with the first experiment. Only 25% of the non-target verbs produced in the youngest group included the presence of an Agent (compared to 40% in the first experiment). The number of unaccusative verbs also decreased in comparison to the one produced in the first experiment; 20% of the non-target verbs were unaccusative. All the remaining verbs that were produced were non-target anti-causative verbs. Therefore, more than 50% of the non-target verbs were verbs of the same syntactic complexity. In most cases, they were semantically inappropriate for the given situation (e.g. *onda se sve pocepalo* 'then it all tore' instead of *vaza se polomila* 'the vase broke'). *Pokvariti se* 'stop working' was the

most common non-target verb, which was produced in response to stimuli testing different anti-causative verbs. The number of non-target verbs was the highest for the verb *ugasiti se* 'go out'. The children produced different non-target anti-causative verbs instead: *istopila se* 'it melted'; *pokvarila se* 'it stopped working'; *isključio se* 'it turned off'.

Category	Three-year-olds	Four-year-olds	Five-year-olds	Total:
Non-target verbs Example	22 *on se raspao* he.nom SE fall apart.3sg.masc 'it fell apart' instead of *pokvario se* 'it stopped working'	8 *sija* glow.3sg.pres 'it glows' instead of *upalilo se* 'it turned on'	5 *se isključila* turn off.3sg.fem SE 'it turned off' instead of *ugasila se* 'it went out'	35
Transitive verbs Example	6 *onda je došao vuk i upalio svetlo* then.adv come.3sg.past wolf.nom and turn on.3sg.past light 'then came the wolf and turned on the light' instead of *upalilo se* 'it turned on'	/	1 *ugasio je neko* extinguish.3sg.masc.past someone.nom 'someone extinguished it' instead of *ugasila se* 'it went out'	7
Made-up verbs Example	2 *oduvala* se blow out.3sg.fem SE 'it blew out' instead of *ugasiti se* 'go out'	/	2 *oduvala* se blow out.3sg.fem SE 'it blew out' instead of *ugasiti se* 'go out'	4
Other Example	3 *otvorena je* open.fem.adj is 'it is opened' instead of *otvorila se* 'it opened'	10 *upaljeno* (2x) turned on.neut.adj 'turned on' instead of *upalilo se* 'it turned on'	5 *robot je pokvaren* robot.nom is broken 'the robot is broken' instead of *pokvario se* 'it stopped working'	18
Total number of non target answers:	33	18	13	64

Table 6. Non-target answers for anti-causative verbs across groups

5. Discussion and conclusion

The results of the follow-up experiment have confirmed that the production of lexical reflexive verbs is most accurate since their production was significantly better than the production of anti-causative verbs in the youngest group tested, which implies that their production is better than the production of true reflexive verbs at this stage of language acquisition. However, no significant differences were found between any verb type in the two older groups after a nine-month period. Therefore, the results of the statistical analyses indicate that the differences in producing different verb types can no longer be found

around the age of five, which implies that the production of more complex verb types improves considerably between the ages of four and five.

One of the most important findings of the first and follow-up experiment is that children are sensitive to the difference between transitive and reflexive verb forms from the earliest tested age, which supports the results of previous research in favour of the Continuity Hypothesis (Snyder et al., 1995; Snyder & Hyams, 2015). Combining reflexive verbs with direct objects happened only once, in the follow-up experiment (*pa se onda češljala kosu* 'so SE then she combed hair'), and can therefore be taken as a lapse, rather than as evidence of lack of their sensitivity to reflexivity.

As far as non-target answers are concerned, the children's answers for true reflexive verbs speak of their tendency to use transitive verbs, which show canonical linking of semantic roles and syntactic functions (Pinker, 1984, 1989). The possibility of using verbs with complements instead of *se*-verbs explains the somewhat lower production of true reflexive verbs in comparison with lexical reflexive verbs, which do not have transitive paraphrases in the experimental context.

By simply looking at the number of non-target answers for anti-causative verbs produced, one could easily say that the results speak in favour of the Maturation Hypothesis, which predicts difficulty with anti-causative verbs due to the children's inability to form A-chains (Borer & Wexler, 1987; Miyamoto et al., 1999; Babyonyshev et al., 2001; Lee & Wexler, 2001; Ito & Wexler, 2002). However, in order to interpret the obtained results in the most accurate way, children's non-target answers need to be carefully looked at. From what was presented in Section 4.5.3., it can be concluded that children produce a considerable number of anti-causative verbs. However, these verbs could not be coded as 'target', because they were either semantically inappropriate or they were made-up (*oduvalo se* 'it blew out SE'). Made-up verbs point to the children's difficulty with subtle nuances in verb meaning, i.e. narrow constraints (Pinker, 1989). In the abovementioned example, the child applied the process of turning a transitive verb into an anti-causative one. However, the child had not yet learnt that the verb *oduvati* 'blow out' cannot be detransitivised, because it requires the presence of an Agent. Therefore, the author believes that the lower production of anti-causative verbs should not be attributed to the problem with A-chains (as would be assumed under the Maturation Hypothesis), but rather to the process of detransitivisation and deletion of +Cause theta-role. The obtained results are thus in line with Snyder & Hyams's (2015) predictions about the success in early production of anti-causative verbs, or FRCCs, as they named them.

In conclusion, the results of the follow-up experiment suggest that reflexive verbs are acquired before anti-causative ones. They speak against the Maturation Hypothesis and in favour of the Continuity hypothesis. Further research with younger participants is needed in order to confirm the observed tendencies.

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Appendix 1: Number of correctly produced verbs per type

Appendix 1a: Three-year-olds

	Number of participants						
Number of target answers	0	1	2	3	4	5	6
True reflexive	/	/	/	1	1	8	10
Lexical reflexive	/	/	/	/	/	4	16
Anti-causative	/	/	1	5	4	6	4

Appendix 1b: Four-year-olds

	Number of participants						
Number of target answers	0	1	2	3	4	5	6
True reflexive	/	/	/	/	2	2	16
Lexical reflexive	/	/	/	/	/	/	20
Anti-causative	/	/	/	1	3	9	7

Appendix 1c: Five-year-olds

	Number of participants						
Number of target answers	0	1	2	3	4	5	6
True reflexive	/	/	/	/	1	5	14
Lexical reflexive	/	/	/	/	/	/	20
Anti-causative	/	/	/	/	4	5	11