Subject Pronoun Interpretation in Very Young Croatian Monolingual Children

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SUBJECT PRONOUN INTERPRETATION

IN VERY YOUNG CROATIAN MONOLINGUAL CHILDREN

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ABSTRACT

This thesis reports the findings of an experimental study on the interpretation of subject pronouns in Croatian monolingual children aged 4-6 years. Croatian is a *pro*-drop language, which means that it allows for the subject pronouns to be realized overtly (these are the so-called overt pronouns) or to remain phonetically empty (these are the so-called null pronouns). Because the mastery of subject pronouns relies on both morphosyntactic and discourse-pragmatic knowledge, their acquisition may prove to be a difficult process.

The task used to test children's interpretation of null and overt subject pronouns was a picture selection task. The participants were presented with two pictures and had to choose the one which corresponded to the meaning of the sentence presented orally. The sentences consisted of a main and a subordinate clause. Main clauses contained a noun acting as the subject and a noun acting as the object, while subordinate clauses contained either a null or an overt pronoun. The pronouns were ambiguous as both nouns, matched in gender, number and animacy, could be linked to them.

The results showed that 4-, 5- and 6-year-olds differed from adults in their interpretation of both null and overt subject pronouns. The responses of all groups of children in the null pronoun condition were split between the main clause subject and the main clause object, and differed statistically from those of adults, which demonstrated a bias, albeit weak, towards the main clause subject. With regard to the overt pronoun condition, children aged 5 and 6 years demonstrated a bias towards the main clause object as the antecedent, although statistically not as strongly as adults. From the statistical point of view, the responses of all groups of children differed from adults' in this condition. Overall, the results suggest that adult-like antecedent preferences with

null and overt subject pronouns develop past the age of 6 in Croatian monolingual children, although some preliminary signs of this development are already present at the age of 5.

1. INTRODUCTION

Over the past few decades, numerous studies have been conducted on the properties lying at the syntax-discourse interface. The acquisition of one such property, the interpretation of pronominal subjects in *pro*-drop languages, has been shown to be problematic to both monolingual and bilingual speakers, because their mastery requires integration of different types of knowledge.

Pro-drop-languages, such as Croatian and Italian, allow for pronominal subjects to be expressed in the form of null and overt pronouns, the use of which is guided by discourse-pragmatic principles. However, the violation of these principles does not result in sentences being ungrammatical, but merely infelicitous.

The interpretation of null and overt subject pronouns in ambiguous intra-sentential contexts in Italian has been captured by the Position of Antecedent Strategy (PAS), proposed by Carminati (2002). According to the strategy, null pronouns are used to refer to the subject, while overt pronouns refer to the referent which is not in the subject position. This strategy has been subsequently shown to apply to some other languages, including Croatian (Kraš, 2008b).

Studies that have been conducted to test monolingual and bilingual children's interpretation of pronominal subjects (e.g. Kraš & Stipeć, in press; Kraš, Rubčić, & Stipeć, 2014; Serratrice, 2007; Sorace, Serratrice, Filiaci, & Baldo, 2009) suggest that the acquisition path of null and overt subject pronouns differs. It seems that adult-like preference regarding the interpretation of null pronouns are acquired earlier than that of overt pronouns. At what age exactly does the PAS start guiding children's interpretation of pronominal subjects is not clear. This study attempts to fill in that gap by looking at the interpretation of subject pronouns in Croatian as the first language (L1) in children aged 4-6 years.

This thesis is organized as follows. The interpretation of subject pronouns is described in Chapter 2. Chapter 3 contains the main findings reported in previous studies on the L1 acquisition of the antecedent preferences regarding null and overt subject pronouns in Croatian and Italian. The methodology and the results of the present study are presented in Chapter 4. The results are discussed in Chapter 5. Chapter 6 brings the conclusion.

2. INTERPRETATION OF SUBJECT PRONOUNS

2.1.   *Pro*-drop parameter

One of the most influential linguistic frameworks is the theory of Universal Grammar developed by Noam Chomsky (1965, 1970, 1975, 1981, 1986). The theory postulates a set of principles and parameters that constrain language acquisition. More precisely, it is proposed that there are certain components and rule systems that are invariable across all natural languages, called principles, and properties that are allowed in some languages, but are considered ungrammatical in others, called parameters. Parameters represent choice points with respect to which languages may differ. As languages vary in many aspects, it is up to children to acquire the features of their language. This process is conceived as parameter setting. Parameters can be described as a set of switches, with two settings (positive or negative) on each switch, set by child's exposure to language. Based on their linguistic experience, children identify which setting is available in their language at each choice point (Berko Gleason & Bernstein Ratner, 2009; Harley, 2014; Rizzi, 1993).

According to Rizzi (1993), there are two opposing views on the process of parameter setting over time. According to the first, parameter setting is a slow process and requires a lot of exposure to relevant linguistic experience (Hyams, 1986). This view allows for parameter resetting, which accounts for restructurings in children's grammars. The other view states that parameter setting occurs quickly as a given property emerges and that very little relevant experience is needed for parameters to be set (Deprez & Pierce, 1993; Pierce, 1989; Poeppel & Wrexler, 1993). In addition, once the parameters are set, their resetting is not possible.

Nonetheless, restructurings in children's grammars do occur. However, they are not a result of parameter resetting, but the maturation process.

A parameter that is particularly relevant for this thesis is the *pro*-drop or the null-subject parameter. It refers to the possibility of dropping a subject[1] pronoun in a sentence in some languages and leaving a subject of a tensed verb phonetically empty (Rizzi, 1986; 1993). Such phonetically empty subjects are called null subjects, which are distinguished from phonetically expressed or overt subjects. If the *pro*-drop parameter is set positively, the child's language will display this characteristic. If set negatively, this characteristic will not be displayed in the child's language (LaFond, 2001).

The positive setting of this parameter is manifested in the possibility to construct sentences with null subjects in finite clauses, as can be seen in the Croatian sentence in (1a). The meaning of the sentence in (1a) is the same as the meaning of the sentence (1b), which contains an overt pronoun in the role of the subject. Languages in which it is grammatical to drop a subject pronoun in tensed clauses, such as Croatian, Italian and Spanish, are called *pro*-drop languages. Non-*pro*-drop languages, such as English and French, disallow null subjects and require the use of an explicit subject. To construct a grammatically correct sentence in English, the subject must be included, as shown (2).

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[1] In some languages, it is possible to omit a pronoun in other positions as well, such as the object position (Rizzi, 1986, 1993).

(1) a. *pro* Marljivo je radila   na svojoj novoj knjizi.

           hard   is worked on   her   new   book

     b.   Ona je marljivo radila na svojoj novoj knjizi.

       she is   hard worked on   her   new   book

       'She was working hard on her new book.'

(2) a. *Was working hard on her new book.

     b.   She was working hard on her new book.

Pro-drop and non-*pro*-drop languages differ in a number of properties. *Pro*-drop languages are considered to have rich inflectional systems, which allow a pronoun to recover certain aspects of its reference from other parts of the sentence, namely through rich agreement specification (Huang, 1989; Rizzi, 1986). In Croatian, the finite verb agrees with the subject in person and number. Therefore, a subject of a finite clause is allowed to be dropped because the morphological marking of the subject-verb agreement is rich enough to determine the reference of a missing subject.

1.2.   Anaphora resolution

The term *anaphora* is commonly used to refer to a relation between two linguistic elements called the anaphora and the antecedent. Because these two elements refer to the same referent, the

interpretation of the anaphora is determined by the interpretation of its antecedent. Linguistic elements that can be employed as anaphora include pronouns, empty categories, reflexives, names, and descriptions (Huang, 2000). Because this thesis is concerned with the interpretation of null and overt subject pronouns, only those two types of anaphora will be presented.

When we try to comprehend a certain utterance containing an anaphoric relation, we must work out what the anaphora in that utterance refers to, i.e. we must identify its antecedents. This process is called anaphora resolution. What makes anaphora resolution difficult is that often it is not easy to determine the antecedent of the anaphora. If there is more than one possible antecedent, the anaphora is ambiguous (Harley, 2014).

Anaphora can easily be disambiguated if additional context is provided. Other than morpho-syntactic cues, such as matching the anaphora and the antecedent in gender and number, discourse-pragmatic relations also play an important role in anaphora resolution. Our background knowledge helps us cope with anaphoric ambiguity (Harley, 2014).

Different types of anaphora can be distinguished. For example, we can differentiate between inter-sentential and intra-sentential anaphora, as in (4a) and (4b) respectively, that is, between anaphora across and within sentences.

(4) a. Ella closed the door. She needed peace and quiet.

   b. Ella closed the door because she needed peace and quiet.

Based on the position of the anaphora in a given sentence, we can distinguish between forward anaphora and backward anaphora (also known as cataphora). When the antecedent is placed before the anaphora, we talk about forward anaphora, as in (5a). Anaphora which precedes its antecedent is called backward anaphora (5b)[2].

(5) a. Lana turned some lights on before she went to bed.

   b. Before she went to bed, Lana turned some lights on.

1.3.   Anaphora resolution in *pro*-drop languages

As mentioned earlier, *pro*-drop languages allow for subject pronouns to be realized overtly or to be phonetically empty. The two options are not completely interchangeable. They differ in their distribution and linguistic features. That is why the mastery of null and overt subject pronouns requires both knowledge of the morphosyntactic properties of pronominal subject expression (i.e. whether and in which positions a phonetically empty pronoun is permitted in a language) and knowledge of the discourse-pragmatic constraints that govern the use of pronominal subjects in context (e.g. whether or not a certain context requires the pronoun to be expressed or omitted) (Sorace & Filiaci, 2006). Both aspects play an important role in anaphora resolution.

It has been suggested that the two options available in *pro*-drop languages, null and overt subject pronouns, serve different functions in discourse. Because the recoverability of null pronouns is dependent on the presence of an antecedent with the topic status (Sorace, 2000), the

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[2] Some studies (e.g. Tsimpli, Sorace, Heycock & Filiaci, 2004) use the reversed definition of the terms forward anaphora and backward anaphora.

null subject is considered to be the default option when the discourse topic is to be maintained. On the other hand, the overt subject is considered as the "marked" option, i.e. the option used when the shifting of the topic is required (Tsimpli et al., 2004).

This has been expressed by Sorace (2000) in the form of the [+/–Topic Shift] feature. If the discourse topic remains the same, the feature is set to [–Topic Shift], and the null pronoun is used. If a new topic is introduced, the feature is then set to [+Topic Shift], calling for the use of the overt pronoun. This is illustrated in the Croatian sentences in (6). The null pronoun in (6a) refers to the subject of the first sentence, i.e. the girl, whereas the overt pronoun in (6b) most likely refers to a referent other than the subject of the first sentence.

(6) a. Djevojčica$_i$ je napisala   zadaću. *pro*$_{i/*j}$ Sretna je.

      girl   is   wrote   homework   happy is

  b. Djevojčica$_i$ je napisala   zadaću.   Ona$_{?i/j}$ je sretna.

      girl   is   wrote   homework   she   is happy

    'A girl wrote her homework. She is happy.'

Based on the assumption that null and overt pronouns have distinct functions, Carminati (2002) proposed a strategy for intra-sentential anaphora resolution in Italian that relies on both pragmatic and syntactic aspects of language processing, called the Position of Antecedent Strategy (PAS). Carminati suggests that within sentences in Italian, null and overt pronouns have distinct

antecedent biases, i.e. they prefer antecedents in different syntactic positions. More precisely, she proposes and experimentally shows that the null pronoun prefers an antecedent in the subject position, while the overt pronoun prefers an antecedent in a non-subject position, i.e. in a lower position in the phrase structure. This can be seen in (7), which is an example adapted from Carminati (2002, p. 33). The null subject of the subordinate clause is more likely to refer to the main clause subject than the object. In contrast, rather than referring to the main clause subject, the overt pronoun is more likely to refer to the main clause object or to an extra-sentential referent, mentioned in previous discourse.

(7) a. Quando Mario$_i$ ha telefonato a Giovanni, *pro*$_i$ aveva appena finito   di mangiare.

       when   Mario has telephoned to Giovanni,   had   just   finished of eating

   b. Quando Mario ha telefonato   a Giovanni$_i$, lui$_i$ aveva appena   finito   di mangiare.

       when   Mario has telephoned to Giovanni, he   had   just   finished of   eating

       'When Mario telephoned Giovanni, he had just finished eating.'

Carminati (2002) argues that the distinct uses of null and overt pronouns are based on the preferences these pronouns have for antecedents with respect to their prominence. Specifically, null pronouns prefer the most prominent antecedent in the context, while overt pronouns prefer a less prominent one. According to the notion of prominence, the prominence of an antecedent is determined by syntactic position. Antecedents in the subject position are considered to be more

prominent than antecedents in lower structural positions, such as the direct object and the indirect object.

A number of studies (e.g. Filiaci, 2010; Kraš, 2008b; Teodorescu, 2018) have been conducted to investigate whether the generalization of the PAS to other *pro*-drop languages is possible. The findings of these studies suggest that the extent of such cross-linguistic applicability depends on the particular language in question. As already stated, Kraš (2008b) has shown that the PAS can be applied to Croatian. Antecedent preferences of Croatian monolingual adults regarding the choice of antecedent with null and overt pronouns have been shown to be the same as those of Italian monolingual adults in equivalent contexts obtained in Kraš (2008a).

2. PREVIOUS RELEVANT STUDIES ON THE ACQUISITION OF NULL AND OVERT SUBJECT PRONOUNS

3.1. Empirical evidence from adults

Carminati (2002) conducted a number of experiments in which she obtained support for the PAS. The validity of the PAS has also been shown in a number of language acquisition studies, which are focused primarily on bilinguals, either L1 speakers undergoing attrition, second language (L2) learners or simultaneous bilinguals. One of the most influential studies in this area of research is Tsimpli et al. (2004), in which a group of 20 Italian monolingual adults were tested in addition to three other groups of speakers (Italian near-native speakers of English, Greek near-native speakers of English and Greek monolingual adults). One of the tasks in the study was a picture selection task on intra-sentential anaphora resolution in Italian. The sentences used in the task consisted of a main and a subordinate clause. Half of the sentences contained a null subject pronoun and another half an overt subject pronoun. The pronoun was always in the subordinate clause. Half of the sentences contained instances of forward and the other half of backward anaphora. Examples of test items are provided in (8a) and (8b), featuring forward and backward anaphora respectively (Tsimpli et al. 2004, 266).

(8) a. L' anziana signora$_i$ saluta la ragazza$_k$ quando lei$_{k/l}$ /*pro*$_i$ attraversa la strada.

the old   woman greets the girl   when she   crosses the street

'The old woman greets the girl when she crosses the street.'

b. Quando lei$_{k/l}$ /*pro*$_i$ attraversa la strada, l' anziana signora$_i$ saluta la ragazza$_k$.

    while   she   crosses   the street the   old   woman greets the girl

    'While she crosses the street, the old woman greets the girl.'

Participants were asked to indicate which of the three pictures presented to them matched correctly the meaning of the sentence. In all three pictures one character performed the action described in the main clause, but the pictures differed in characters that performed the action described in the subordinate clause. The options given to the participants were the subject of the main clause, the object of the main clause and an extra-linguistic element, i.e. the character that was not mentioned in the main clause. The results showed that in the sentences with forward anaphora, Italian monolingual adults strongly preferred the main clause object as the referent for the overt pronoun, whereas they allowed for either the main clause subject or the main clause object to be the possible referent for the null pronoun. In the sentences with backward anaphora, the preferred choice of referent for the null pronoun was the main clause subject, whereas the preferred referent for the overt pronoun was the extra-linguistic referent.

Belletti, Bennati and Sorace (2007) and Sorace and Filiaci (2006) obtained results in line with Tsimpli et al. (2004), testing different groups of Italian monolingual adults (in addition to a group of English near-native speakers of Italian) by means of the same task. The same is true of Serratrice (2007), which used an aural version of the same task to test a group of English-Italian bilingual children and a group of Italian monolingual children in addition to a group of Italian monolingual adults.

The results of Kraš (2008a) are slightly different from the results of the previously mentioned studies. By means of a modified version of the same task it was shown that in the sentences with forward anaphora, Italian monolingual adults (who were tested along with Croatian near-native speakers of Italian) were more biased towards the main clause subject than the main clause object as the null pronoun antecedent, which is even more consistent with the PAS than what was found in the previous studies (although note that the main clause object is not an infelicitous choice). Another result which was different in this study concerns the antecedent preferences of the overt pronoun in the sentences with backward anaphora, which were shown to be split between the main clause object and the extra-linguistic referent. These differences might be due to different methodology.

Turning now to Croatian, Kraš (2008b) investigated anaphora resolution in Croatian monolingual adults by means of a translated version of the task used in Kraš (2008a). The results obtained were fully consistent with those of Kraš (2008a): in sentences with both forward and backward anaphora with the null pronoun, the preferred choice of referent was the main clause subject; regarding the overt pronoun, participants preferred the main clause object as an antecedent in the sentences with forward anaphora and opted for either the main clause object or the extra-linguistic referent in the sentences with backward anaphora.

A study testing Croatian monolingual adults by means of a different task is Kraš and Stipeć (2013), based on Stipeć (2012). In addition to a group of Croatian monolingual adults with Down syndrome and a group of typically developing children aged 6-7 years (for a review of the results of the latter group, see 3.2), the study included a group of Croatian monolingual adults aged 18-25 years. The task used was an aural picture selection task containing sentences with forward anaphora. All the sentences in the task consisted of a main and a subordinate, temporal, clause

introduced by the conjunction *dok* ("while"). The main clause always preceded the subordinate clause and contained the subject and an object matched in gender, number and animacy. Half of the sentences contained a null, and half an overt pronominal subject in the subordinate clause, as illustrated in (9a) and (9b) (Stipeć, 2012, p. 36).

(9) a. Puž$_i$ je pozdravio mrava$_j$ dok   je *pro$_{i/j}$* čitao   novine.

　　snail is   greeted   ant   while is   reading newspaper

　b. Puž$_i$ je pozdravio mrava$_j$ dok je on$_{i/j}$ čitao   novine.

　　snail is greeted   ant   while is he reading newspaper

　　'The snail greeted the ant while it was reading the newspaper.'

The results showed that adults had a slight, but noticeable preference for the main clause subject as the antecedent of the null pronoun. They also demonstrated a clear object antecedent bias with the overt pronoun.

The results obtained in the above studies point to a similar interpretation of null and overt subject pronouns in ambiguous anaphoric contexts in Italian and Croatian monolingual adults. The results are largely in line with the PAS, which means that monolingual adults demonstrate a bias towards the subject antecedent with the null pronoun, and a bias toward a non-subject with the overt pronoun. The only deviation from this is a split preference between the subject and the object antecedent obtained for the null pronoun in forward anaphora in several studies with Italian monolingual adults. However, it should be noted that Italian monolingual adults demonstrated a

clear preference for the subject antecedent with the null pronoun in Kraš (2008a), similarly to Croatian monolingual adults in Kraš (2008b) and Kraš and Stipeć (2013), which is in line with the PAS.

3.2. Empirical evidence from children

The acquisition of the antecedent biases of null and overt subject pronouns in *pro*-drop languages captured by the PAS has proven to be rather difficult. This process has also been shown to be subject to cross-linguistic variation, with children of different L1s acquiring adult-like antecedent preferences at different ages (Teodorescu, 2018). Some cross-linguistic similarities have also been shown to exist; for example, Croatian and Italian monolingual children have been shown to acquire the antecedent biases of overt subject pronouns later than those of null subject pronouns. More precisely, it has been shown that Croatian monolingual children aged 7-12 years (Kraš & Stipeć, in press) and Italian monolingual children aged 6-10 years (Serratrice, 2007; Sorace et al., 2009) choose the subject as the antecedent of the overt subject pronoun significantly more often than monolingual adults do, suggesting that adult-like antecedent preferences of overt subject pronouns develop after childhood. When exactly such preferences develop has not yet been determined. However, children still demonstrate a clear bias towards the object antecedent with the overt subject pronoun, although less strongly than adults. It has also been shown that children's antecedent preferences pertaining to null subject pronouns are adult-like from a very young age. Not enough research has been carried out to determine at what age these preferences emerge. In what follows, we take a closer look at the relevant studies into the monolingual acquisition of null and overt subject pronouns.

Starting with Croatian, using a picture selection task to test the antecedent biases of null and overt subject pronouns in forward anaphora contexts in Croatian (for a task description see 3.1), Kraš and Stipeć (2013) found that Croatian monolingual children aged 6-7 years had an unclear choice of antecedent with null subject pronouns, their responses being split between the subject and the object of the main clause. In the overt pronoun condition, both adults and children were biased towards the object antecedent. However, adults' preference for the object antecedent was significantly stronger than that of children.

Kraš and Stipeć (in press), extended their previous study (Kraš & Stipeć, 2013), to include the data from five additional groups of monolingual children in it, namely those aged 8, 9, 10, 11 and 12 years. It was found that in the null pronoun condition, all groups of children had the antecedent preferences split between the main clause subject and object, with 8- and 10- year-olds' preferences significantly differing from those of adults. In the overt pronoun condition, it was found that all groups of children significantly differed from adults in their antecedent preferences: despite the fact that, similarly to adults, they demonstrated a bias towards the object antecedent, their bias was weaker than that of adults.

Turning now to Italian, the findings for which are also relevant for the present study, Serratrice (2007) included a group of Italian monolingual children aged 6-9 years in her study. She reported no significant differences between these children and a control group of monolingual adults regarding their interpretation of null subject pronouns, but found that the two groups significantly differed in their interpretation of overt subject pronouns in backward anaphora. Unlike adults, children found the extra-linguistic referent to be an unlikely antecedent of overt subject pronouns. Instead, they interpreted the overt pronoun as the object or the subject of the main clause. In addition, Serratrice (2007) found a significant difference in the extent to which

children and adults interpreted the overt pronoun as the main clause subject, children doing this to a greater extent than adults.

Using a different type of task compared to the studies mentioned above, Sorace et al. (2009) investigated the acceptability of Italian and English pronominal subject forms in [+/–Topic Shift] contexts. The study encompassed ten groups of participants, including two groups of Italian monolingual children, aged 6-7 and 8-10 years. The task used was an acceptability judgement task that followed a short video clip showing four characters. One character performed an action which was commented upon by the character himself or the other characters. Participants were asked to decide which character spoke 'better' Italian or English, depending on the language tested. Examples of experimental items demonstrating [+TopicShift] and [–TopicShift] conditions in Italian are shown in (10a) and (10b) respectively (Sorace et al., 2009, p. 467).

(10) a. (Minnie and Daisy in the foreground; Mickey and Donald in the background)

Minnie: Daisy è caduta!

'Daisy has fallen! '

Donald: Minnie ha detto che è caduta!

'Minnie has said that (she) has fallen.'

Mickey: Minnie ha detto che lei è caduta!

'Minnie has said that she has fallen.'

b. (Minnie and Daisy in the foreground; Mickey and Donald in the background)

Minnie: Sono caduta!

'I have fallen!'

Donald: Minnie ha detto che è caduta!

'Minnie has said that (she) has fallen.'

Mickey: Minnie ha detto che lei è caduta!

'Minnie has said that she has fallen.'

The results showed that in the [–TopicShift] condition, in which the null pronoun would be the appropriate choice, a group of younger children significantly differed from the adult group, accepting the overt pronoun more often than adults. No significant differences between the two groups of children and adults were found in the [+TopicShift] condition; in this condition, both groups of children and adults accepted the inappropriate null pronoun to a similar degree.

Anaphora resolution in Italian was also tested in monolingual adolescents aged 13-14 years (in addition to Croatian-speaking child L2 learners of Italian of the same age) in Kraš (2015) using the same picture selection task as in Kraš (2008a). In the sentences with forward anaphora, participants preferred the subject as the antecedent of the null pronoun, being biased toward the object as the antecedent of the overt pronoun. In the sentences with backward anaphora, participants were biased toward the subject as the antecedent of the null pronoun, but were indecisive between the subject and the object when looking for the antecedent of the overt pronoun.

To sum up, studies testing Croatian and Italian monolingual children's antecedent bias pertaining to null and overt subject pronouns in their native language suggest that the PAS guides children's antecedent selection to a lesser extent than it does for adults, especially as far as overt pronouns are concerned. Most studies found that both children and adults prefer the non-subject antecedent with the overt pronoun, while Kraš (2015) found that Italian monolingual children are in fact indecisive between the subject and the object as the antecedent of the overt pronoun in the sentences with backward anaphora. In studies in which a non-subject preference with the overt pronoun was found in children, this preference was weaker than in the case of adults. As for the null pronoun, it has been found that both children and adults have a preference for the subject antecedent (albeit this preference was rather weak in some cases) and no statistically significant differences were found between children and adults. This suggests that the antecedent preferences of null subject pronouns are acquired earlier than those of overt subject pronouns in both Croatian and Italian. When exactly these preferences are acquired remains to be determined.

4. THE STUDY

4.1.   Research questions and predictions

This study aims at determining the preferences of Croatian monolingual children aged 4-6 years regarding the choice of antecedent with null and overt subject pronouns in ambiguous forward anaphora contexts. More precisely, it seeks to answer the following research questions:

1. Do Croatian monolingual children aged 4-6 years have adult-like antecedent preferences with null subject pronouns?

2. Do Croatian monolingual children aged 4-6 years have adult-like antecedent preferences with overt subject pronouns?

With regard to the first research question, the prediction is that at the age of 4-6 years, Croatian monolingual children do have adult-like antecedent preferences with null subject pronouns. This prediction is to some extent based on the findings of the studies reviewed in 3.2, especially Kraš and Stipeć (in press), which found that Croatian monolingual children aged 7 years do not differ significantly from adults in their antecedent preferences with null subject pronouns. It needs to be stressed, however, that none of these studies provides a firm basis for this prediction as they do not include children younger than 6-7 years. To the best of our knowledge, such children have not been tested on this linguistic property before.

As for the second research question, based on the studies reviewed in 3.2, we predict that Croatian monolingual children aged 4-6 years do not have adult-like antecedent preferences with overt subject pronouns. However, we do predict that children's object-bias has already started developing within this age range despite the fact that it is not as strong as the adults'.

4.2. Participants

The study included 64 Croatian monolingual speakers divided into four groups with regards to their age. There were three groups of children, aged 4, 5 and 6, and a control group of adults in the study. All groups contained 16 participants. The data in the group of adults were the same as in Stipeć (2012) and Kraš and Stipeć (2013; in press). The children attended one of the several Croatian-medium kindergartens in two different parts of Croatia: the Koprivnica-Križevci County and the Primorje-Gorski Kotar County. All the children were typically developing as far as language development is concerned, as ascertained by their teachers. The adults were university students from different parts of Croatia studying for an academic degree in a range of non-language-related disciplines. Participant details are summarized in Table 1.

Group	Age range	Mean age
4-year-olds	4;3 – 4;11	4;8
5-year-olds	5;0 – 5;10	5;5
6-year-olds	6;0 – 6;8	6;3
Adults	18 – 25	20;9

Table 1. Participant characteristics.

4.3. Instrument

The data were collected using an aural picture selection task. The task was originally designed by Stipeć (2012) to test the interpretation of null and overt subject pronouns in the context of forward anaphora in people with Down syndrome and typically developing children aged 6-7

years. Thus far, the task was also used in Kraš and Stipeć (2013), Kraš and Stipeć (in press) and Kraš, Rubčić and Stipeć (2014).

The task consisted of 16 experimental and 16 control sentences. All the sentences were formed by two clauses, one main and one subordinate. The main clause contained two animate nouns acting as the subject and the object. In the experimental sentences, the subject of the subordinate clause was either an overt pronoun or a null pronoun. The subject and object of the main clause were matched in gender and number with the pronoun, and the pronominal subject of the subordinate clause could ambiguously refer to either of the two nouns. Half of the nouns in the sentences were masculine and half were feminine. All nouns denoted animals. Subordinate clauses in all sentences followed the main clause. Experimental sentences with null and overt pronouns have been illustrated in (10a) and (10b) above.

In the control sentences, the subordinate clause did not contain a null or an overt pronoun, but, instead, it denoted atmospheric conditions, as illustrated in (12). In contrast to the experimental sentences, the control sentences were unambiguous. They were used to make sure the task did not exceed participants' comprehension abilities, attention and working memory, and they also acted as fillers.

(12) Kokoš   je gurnula patku dok je padala tuča.

chicken is pushed duck while is falling hail

'The chicken pushed the duck while it was hailing.'

Each sentence was presented orally together with a set of two pictures. The pictures illustrated the action described in the sentence. The number of characters in the pictures was always two, and the characters represented the subject and the object of the main clause. In the pictures that accompanied the experimental sentences, it was the action expressed in the subordinate clause that was depicted, and in the pictures that accompanied the control sentences, it was the action described in the main clause that was shown. In each set of two pictures corresponding to the experimental sentences, in one picture it was the subject character and in the other the object character that was performing the action described in the subordinate clause. Therefore, in the former case, the pronoun that was used in the subordinate clause was interpreted as referring to the subject antecedent, and in the latter case to was coreferential with the object antecedent. In the pictures accompanying the control sentences, in one picture it was the subject character and in the other the object character that was performing the action described in the main clause. Because the experimental sentences were ambiguous, their meanings could be matched to either of the two pictures in the set, while this was not the case with the control sentences, which were unambiguous. The pictures were drawn by hand and the position of pictures was systematically varied so that the picture depicting the correct or the PAS-consistent choice appeared on the left half of the times, and on the right the other half. Examples of picture sets are given below. Figure 1 shows the pictures accompanying the example sentences in (10) and Figure 2 contains the pictures accompanying the example sentences in (12). In Figure 1, the picture on the left depicts the action described in the subordinate clause performed by the subject of the main clause, while the picture on the right depicts the same action performed by the object of the main clause. As for Figure 2, the picture on the left illustrates the object, and the picture on the right the subject of the main clause performing the action described in the sentence.
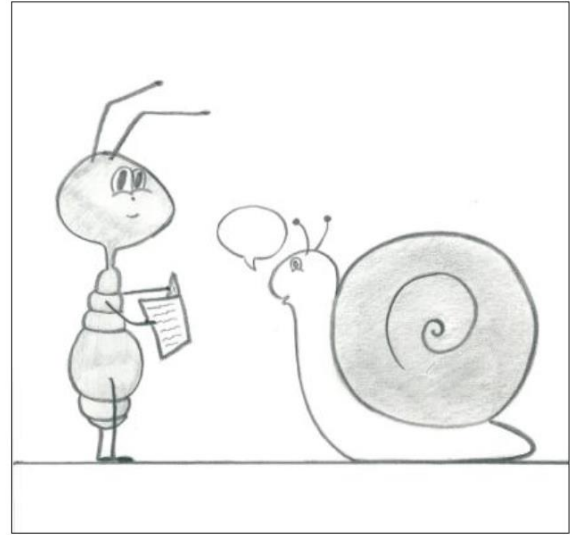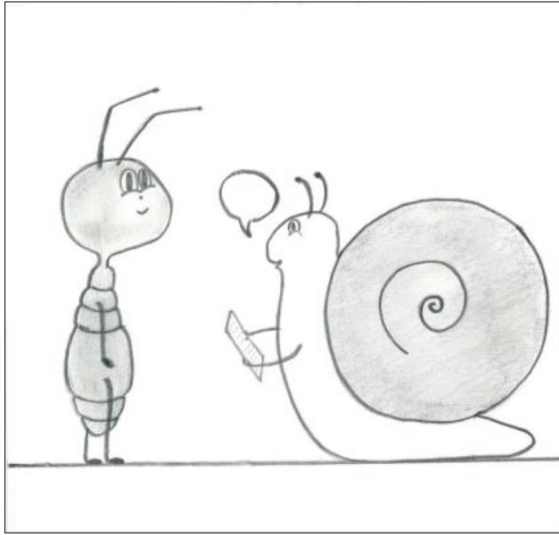
Figure 1. Example of a picture set for experimental sentences

Figure 2. Example of a picture set for control sentences

A full list of experimental and control sentences with corresponding pictures, along with some practice items, can be found in Appendix.

4.4. Procedure

Prior to the testing, children's parents or caregivers were informed about the experiment and asked to give their consent for the testing of their child. Testing was performed individually in a quiet room. Participants were first presented with a picture, and then with the sentence. The sentences were read in a neutral tone by the experimenter. Participants were then asked to point to the picture which matched the meaning of the sentence. In the case of the experimental sentences, they were thereby revealing their interpretation of the ambiguous subject pronoun, i.e. identifying the pronoun antecedent. Their responses were noted by the experimenter. Testing time was not limited, and the testing of each participant lasted 13 minutes on average.

The sentences were presented in a fixed random order. Two presentation lists were created: List A and List B. The two lists differed in type of pronoun used in the subordinate clause of each of the experimental sentences. The sentence that included a null pronoun in List A included an overt pronoun in List B. Control items were the same in both lists. Participants were distributed equally across the two lists, eight participants in each group being presented with List A, and eight being presented the List B.

4.5. Results

In this section, the results for the two experimental conditions, null and overt, as well as for the control condition are presented. For each condition, the distribution of the subject and the object responses is shown as a mean percentage score for each group of participants.

Figure 3 shows the distribution of responses in the null pronoun condition. All groups of children opted for the subject and the object response approximately half of the time with a very

slight preference for the object response. On the other hand, the adults were biased towards the subject response, albeight slightly, as predicted by the PAS.

	Age 4	Age 5	Age 6	Adults
■ Object	52,34	57	53,13	40,63
■ Subject	47,66	43	46,09	59,38

■ Subject ■ Object
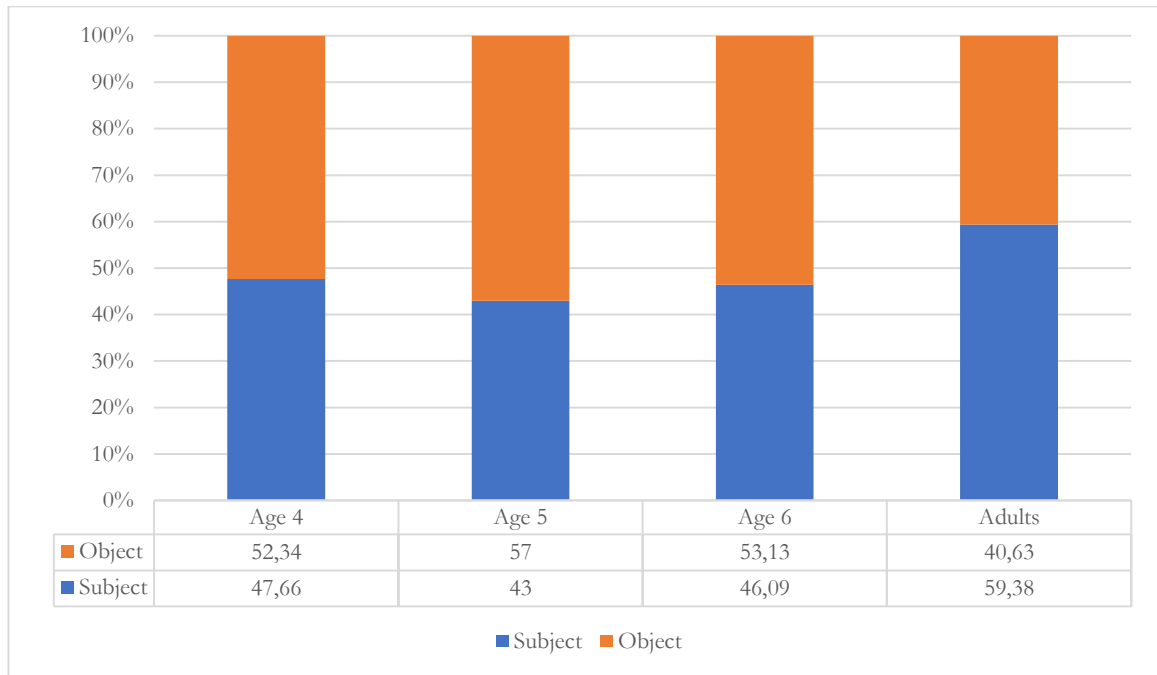
Figure 3: Mean responses in the null pronoun condition

The distribution of responses in the overt pronoun condition can be seen in Figure 4. All participant groups predominantly chose the object as the overt pronoun antecedent, this preference being very weak in 4-year-olds. Compared to the other groups, the adults demonstrated the strongest bias toward the object response, followed by 6- and 5-year-olds.
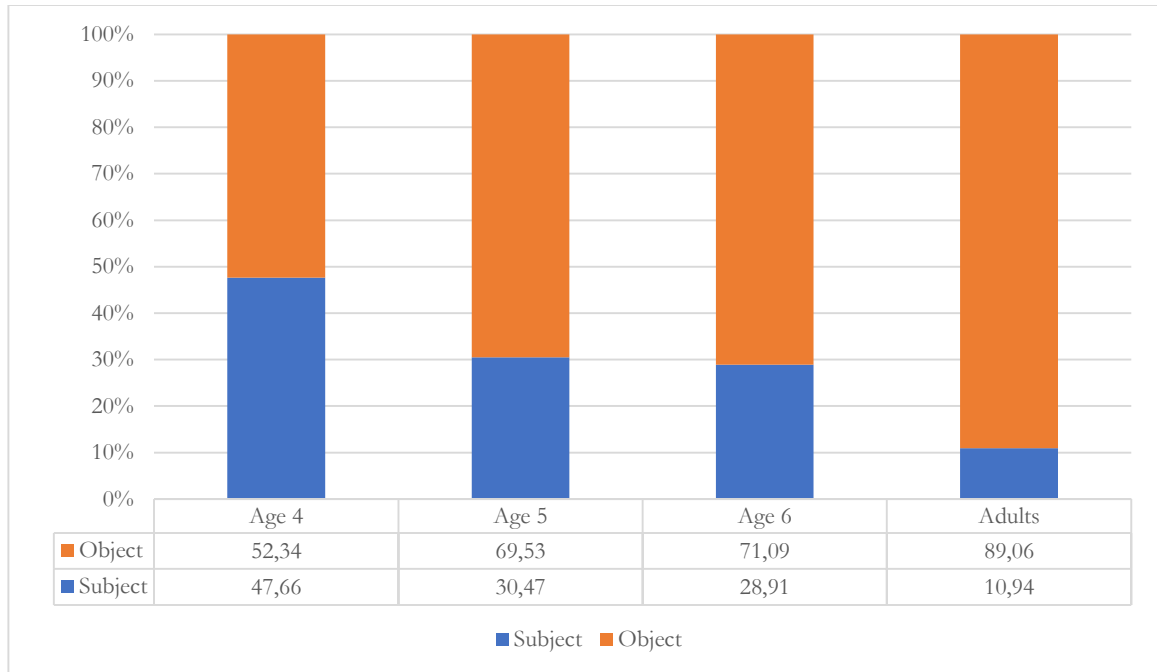
Figure 4: Mean responses in the overt pronoun condition

In order to assess the significance of the trends shown above, logistic regression modelling was performed. The analysis was carried out by means of the statistical software R (R Core Team, 2012). Adults were the baseline group for the regression analysis. The outcome variable was the choice of antecedent and the predictor variables were participant group, pronoun type and their interaction. The model estimates are shown in Table 2.

Predictor variable	Estimate	*SE*	*Z*	*p*
Intercept	0.3795	0.1800	2.109	.03498*
Group (4-year-olds)	-0.4733	0.2524	-1.875	.06076*
Group (5-year-olds)	-0.6626	0.2535	-2.614	.00896*

Group (6-year-olds)	-0.5047	0.2525	-1.999	.04566*
Pronoun Type (overt)	-2.4766	0.3355	-7.381	<.001*
Group (4-year-olds) x Pronoun Type (overt)	2.4766	0.4186	5.917	<.001*
Group (5-year-olds) x Pronoun Type (overt)	1.9347	0.4258	4.543	<.001*
Group (6-year-olds) x Pronoun Type (overt)	1.8133	0.4246	4.270	<.001*

Table 2: Logistic regression model with the adults as a baseline

Positive values indicate that the chance of the subject being selected is increased. On the other hand, negative values indicate that the chance of the subject being selected is decreased. Asterisks reveal which predictors contribute significantly to the subject selection. The intercept line contains default values of the predictor variables, in this case values pertaining to the chance of adults selecting the subject response in the null pronoun condition. A significant intercept suggests that adults are more likely to opt for the subject than the object antecedent in the null pronoun condition, as seen in Figure 3. In contrast, a significant effect of pronoun type indicates that adults are less likely to select the subject than the object in the overt pronoun condition, as shown in Figure 4. This confirms their bias towards the object antecedent with the overt pronoun.

The effects of group show whether different groups of children differ from adults in the null pronoun condition. It can be seen that all groups of children, i.e. 4-, 5- and 6-year-olds, differ significantly from adults in their selection of the subject as the antecedent of the null pronoun, with a lesser chance of selecting it than adults. This can be seen in Figure 3. On the other hand, significant interactions between different groups of children and pronoun type reveal that all groups of children are more likely to select the subject antecedent in the overt pronoun condition

than adults, suggesting that all adults prefer the object more strongly than any group of children, as shown in Figure 4.

Before moving on to discussion, the distribution of responses in the control condition is shown in Figure 5. It can be seen that all participant groups overwhelmingly chose the correct response in this condition, i.e. the matrix subject, indicating that they were able to cope with the task demands[3].

	Age 4	Age 5	Age 6	Adults
■ Object	9,77	10,55	13,67	0
■ Subject	90,23	89,45	86,33	100

■ Subject ■ Object
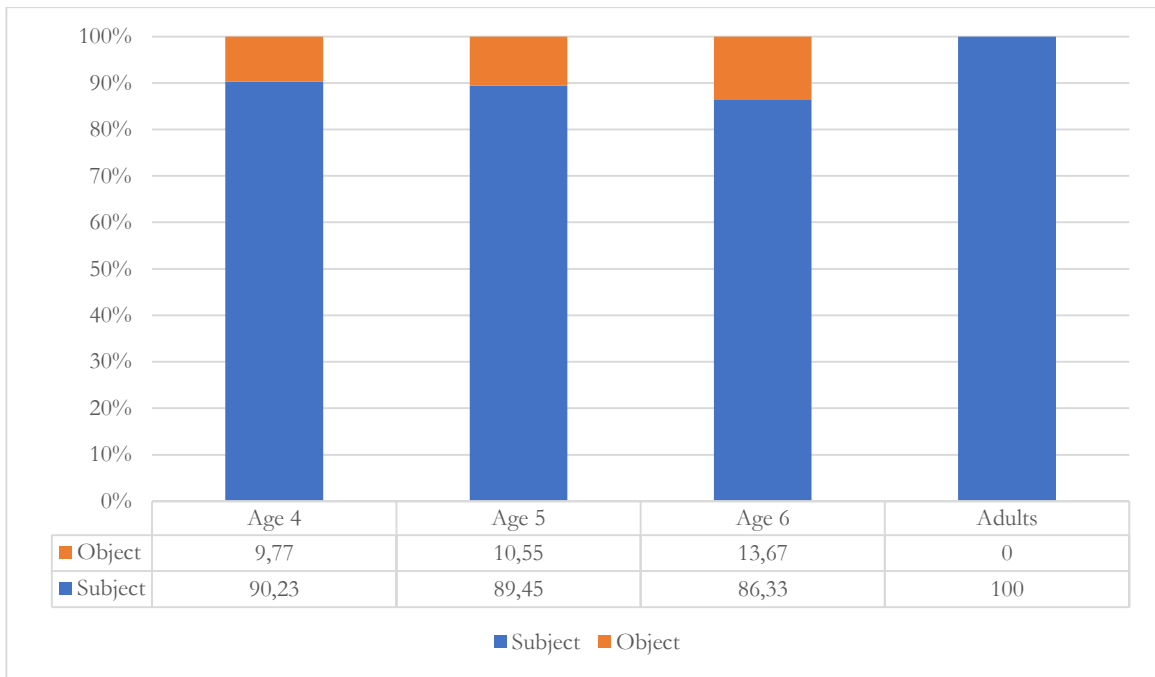
Figure 5. Mean responses in the control condition.

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[3] Moreover, the participants were pre-selected based on their responses in the control condition, such that only the individuals who gave at least 75% of correct responses were included in the study. In this way we wanted to exclude the possibility of some children being too cognitively immature to take part in the study.

5. DISCUSSION

The study was designed to explore the preferences of Croatian monolingual children aged 4-6 years regarding the choice of antecedent of null and overt subject pronouns in ambiguous forward anaphora contexts. More specifically, the study was concerned with the timing at which these children develop their antecedent biases with different types of subject pronoun. We sought to find out whether children aged 4-6 years have adult-like antecedent preferences with null subject pronouns and whether they have adult-like antecedent preferences with overt subject pronouns. Based on the results of previous related studies (Kraš & Stipeć, 2013; Kraš & Stipeć, in press; Serratrice, 2007; Sorace et al., 2009), we predicted that at the age of 4-6 years, Croatian monolingual children do have adult-like antecedent preferences with null subject pronouns, but do not have adult-like antecedent preferences with overt subject pronouns The first prediction is, however, only partially based on the results of previous studies as, to the best of our knowledge, children younger than 6-7 years have not been tested with regard to this linguistic property before. We supplemented the second prediction with the one stating that despite children's non-adult-like antecedent preferences with overt subject pronouns, their object-bias with overt pronouns has already started developing within this age range.

Our predictions were only partially confirmed. Regarding the first prediction, it was shown that 4-, 5- and 6-year-olds do differ from adults in their antecedent preferences with null subject pronouns. Compared to adults, they are less likely to select the subject as the antecedent of the null subject pronoun. This means that their antecedent preferences with null subject pronouns become adult-like past the age 6. Taking into consideration the finding of Kraš and Stipeć (in press), the study with the same instrument and control group and thus directly comparable to this one, that children aged 7 do not significantly differ from adults in their antecedent preferences with null

subject pronouns, we could perhaps tentatively conclude that the age at which Croatian monolingual children acquire adult-like antecedent preferences with null subject pronouns is the age of 7. However, taking into consideration the fact that despite the absence of statistically significant difference with most groups of children in Kraš and Stipeć (in press), all groups of children in this study had their antecedent preferences split between the subject and the object with null subject pronouns, we can conclude that the subject-bias of the null subject pronoun develops past the age of 12 in Croatian monolingual children. However, it needs to be stressed that the object-bias of the null subject pronoun in forward anaphora contexts is not infelicitous, even though it is not consistent with the PAS, and that it was indeed found in the studies on Italian (Belletti et al., 2007; Serratrice, 2007; Sorace & Filiaci, 2006; Tsimpli et al., 2004). It might be explained by working memory constraints as the object antecedent is linearly closer to the pronoun.

Our second prediction was confirmed. The results have shown that all groups of children differ from adults in their antecedent preferences with overt subject pronouns, preferring the object antecedent to a lesser extent, especially 4-year-olds. This finding is in line with the findings of other studies dealing with monolingual children's interpretation of overt subject pronouns, namely Kraš and Stipeć (in press), Serratrice (2007) and Sorace et al. (2009), which have also found that children's object-bias with the overt subject pronouns is weaker than that of adults. However, in our study we have also found that, as predicted, children's object-bias with overt pronouns has already started developing between the age of 4 and 6, and that it is, in fact, rather obvious at the age of 5. This finding suggests that around the age of 5 Croatian monolingual children begin to acquire the object preference with the overt pronoun, or, in other words, that they start showing sensitivity to the PAS at this age, although they do it to a significantly lesser extent than adults.

However, the findings of Kraš and Stipeć (in press) suggest that not even at the age of 12 years, the object bias is as strong in Croatian monolingual children as it is in adults.

6. CONCLUSION

This study has provided experimental data on the interpretation of null and overt subject pronouns in Croatian in very young monolingual children, more precisely those aged 4-6 years. The study focused on these children's choice of antecedent with null and overt subject pronouns in ambiguous forward anaphora contexts. To the best of our knowledge, until now, there have been no studies concerned with subject pronoun interpretation in Croatian in children younger than 6-7 years.

Overall, our study has shown that Croatian monolingual children aged 4-6 years have neither adult-like antecedent preferences with null subject pronouns nor with overt subject pronouns. However, while their object-bias with overt subject pronouns has already started developing at this age (more precisely, at the age of 5), their subject-bias with null subject pronouns has not yet emerged at this age. When exactly Croatian monolingual children's antecedent preferences with subject pronouns become fully adult-like, both in terms of which antecedent is preferred and how strongly it is preferred, remains to be explored.

Although this study helped shed some light onto the monolingual acquisition of the antecedent preferences regarding the interpretation of null and overt subject pronouns in Croatian, many issues remain open. The present study was only concerned with the sentences containing forward anaphora. It would be useful to include instances of backward anaphora in the design of future studies to gain a deeper insight into this phenomenon. In addition, it would be valuable if future studies used a different type of task or sentences. So far, the studies mainly investigated intra-sentential anaphora in sentences with adverbial clauses. Inter-sentential anaphora and anaphora with different types of subordinate clauses are yet to be explored when it comes to very

young children (see Kraš & Šopar, 2018, for an experimental exploration of inter-sentential anaphora in Croatian monolingual adults and adolescents). Furthermore, investigating production, in addition to comprehension of anaphoric sentences might be beneficial in attempt to further understand the phenomenon, as the previous studies, at least in Croatian, were mainly concerned with comprehension. Finally, due to the variation in results of the studies which explored the PAS in different languages (or even in the same language, as demonstrated in section 3.1.), more research is needed to explore the extent to which the findings of our study apply cross-linguistically.

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APPENDIX

PICTURE SETS AND CORRESPONDING SENTENCES

PRACTICE ITEMS

1. Glista je špijunirala muhu dok se odmarala u hladu.
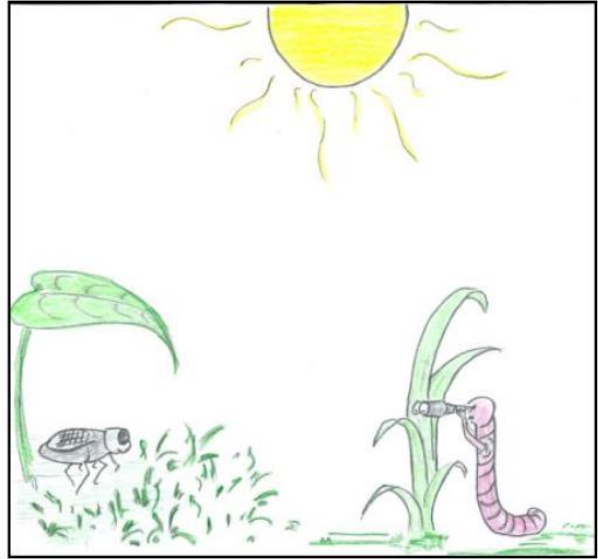
2. Cvrčak je slušao slavuja dok je izlazilo sunce.
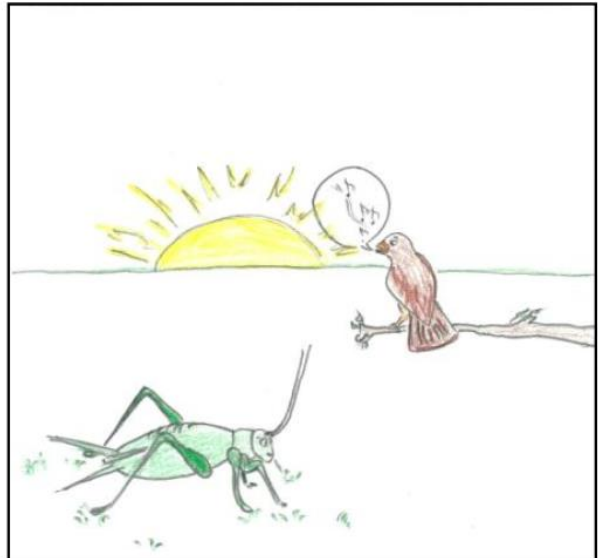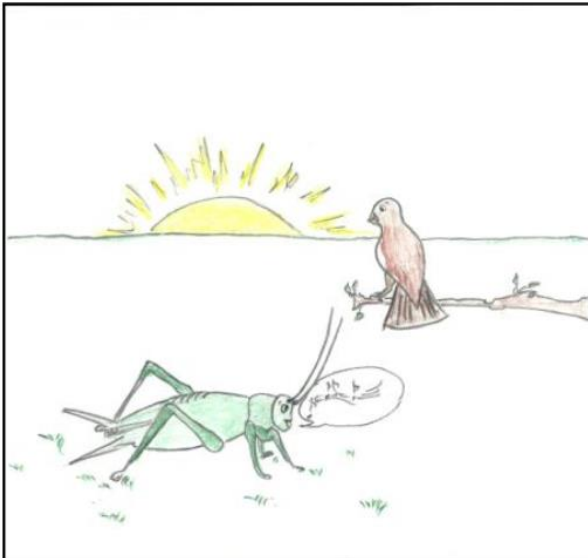
3. Bumbar je izazivao pauka dok je on stajao na listu.
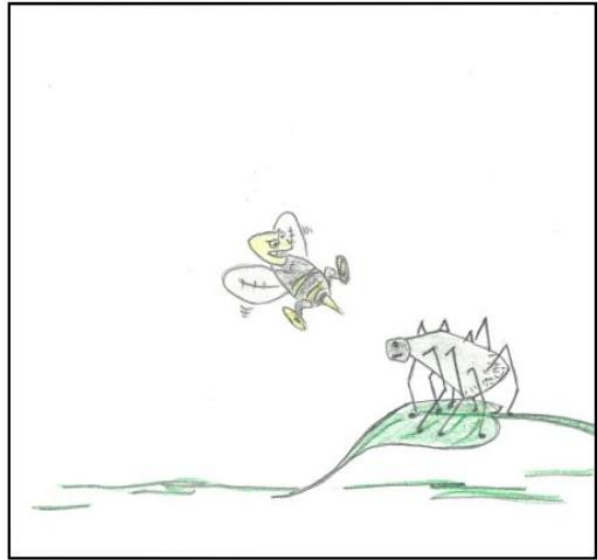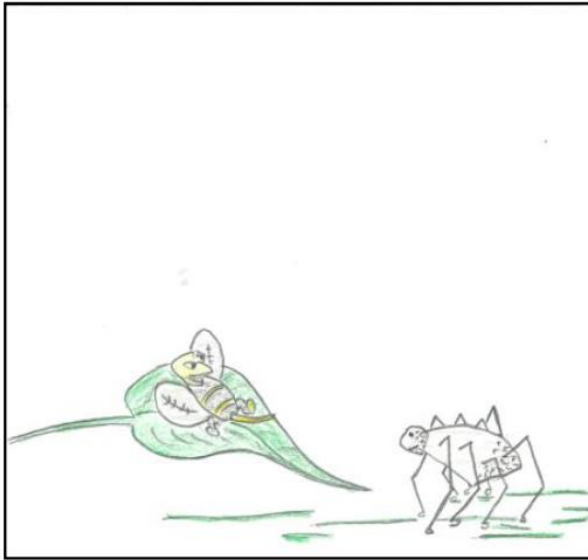
EXPERIMENTAL ITEMS

1. a) Puž je pozdravio mrava dok je čitao novine

   b) Puž je pozdravio mrava dok je on čitao novine.
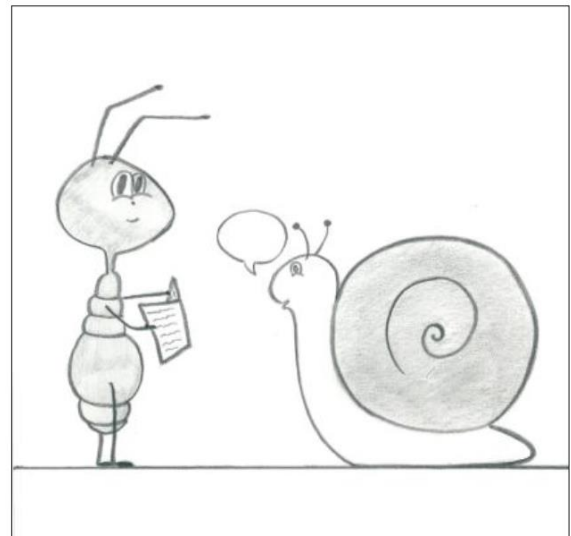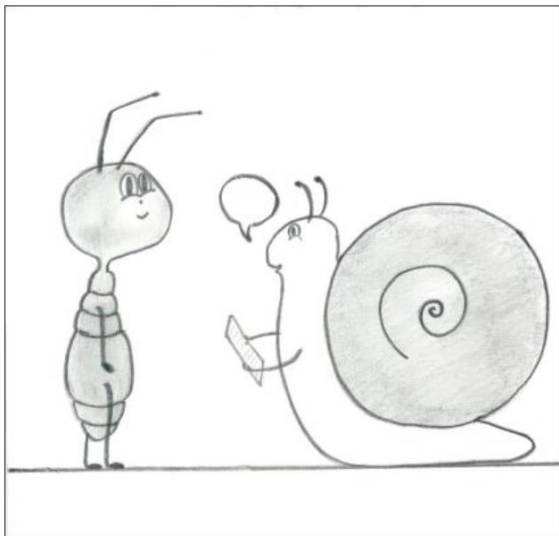
2. a) Majmun je uštipnuo slona dok je stajao na jednoj nozi.

   b) Majmun je uštipnuo slona dok je on stajao na jednoj nozi
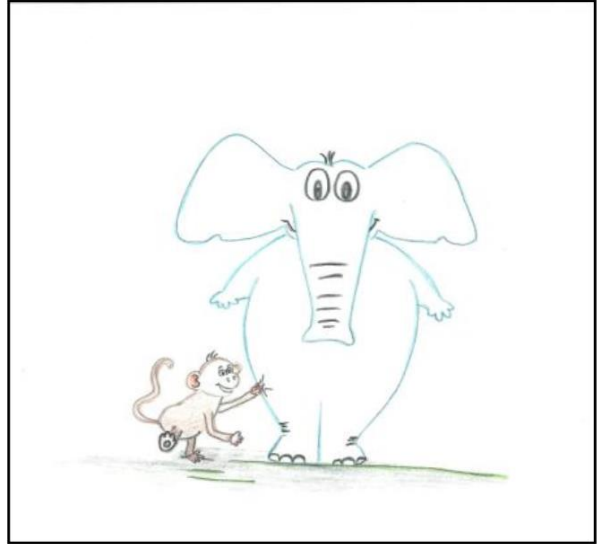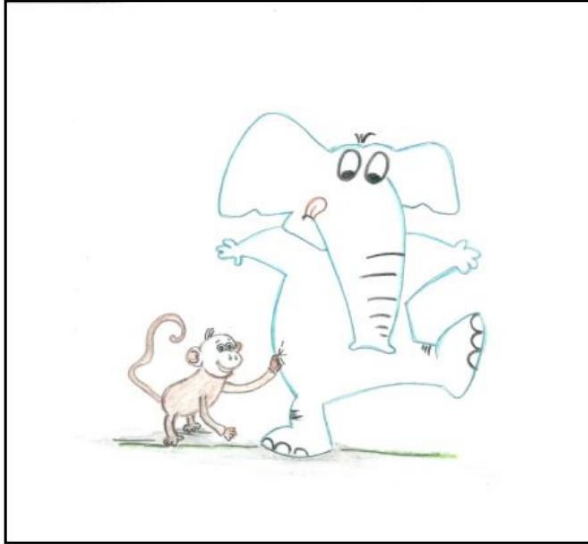
3. a) Lav je ogrebao tigra dok je žvakao plijen.

   b) Lav je ogrebao tigra dok je on žvakao plijen.
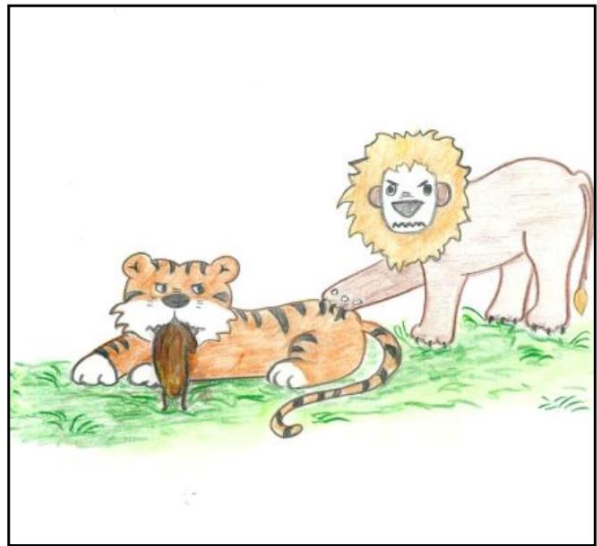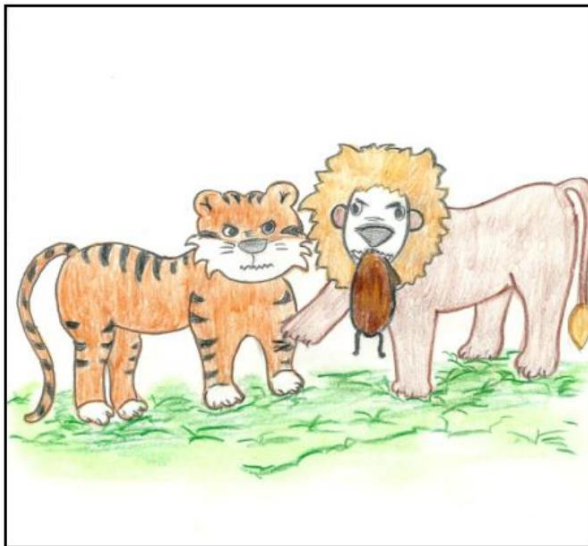
4.   a) Pijetao je čuvao pilića dok je kljucao po dvorištu.

   b) Pijetao je čuvao pilića dok je on kljucao po dvorištu.
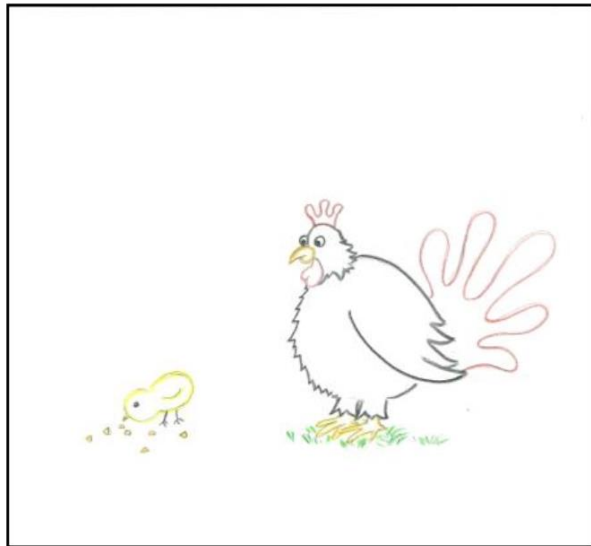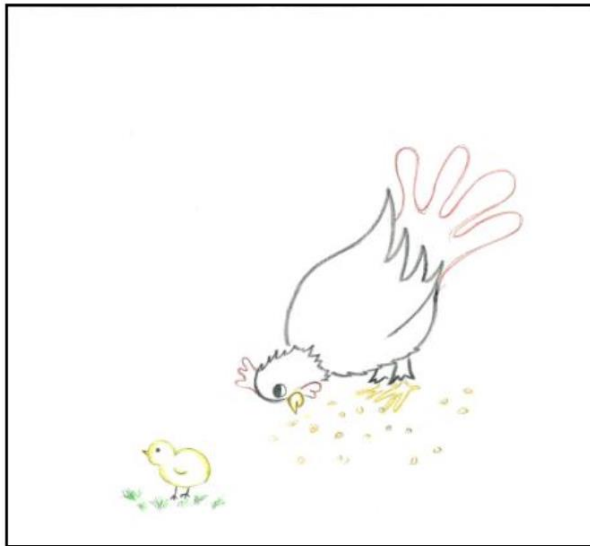
5.   a) Jež je mahao crvu dok je išao putem.

   b) Jež je mahao crvu dok je on išao putem.
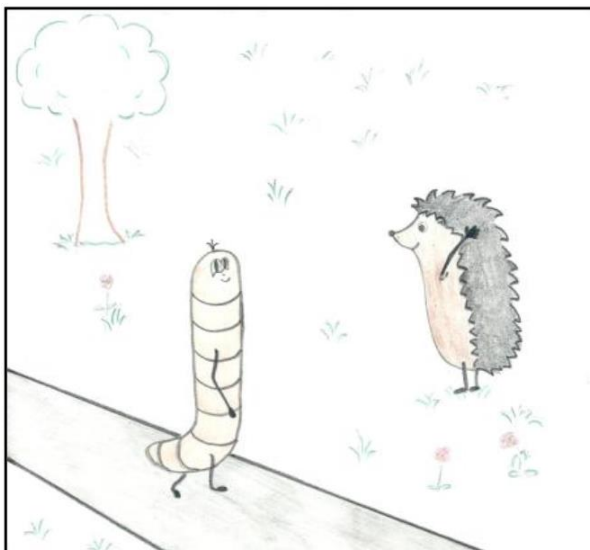
6. a) Medo se nasmijao mišu dok je plesao balet.

    b) Medo se nasmijao mišu dok je on plesao balet.
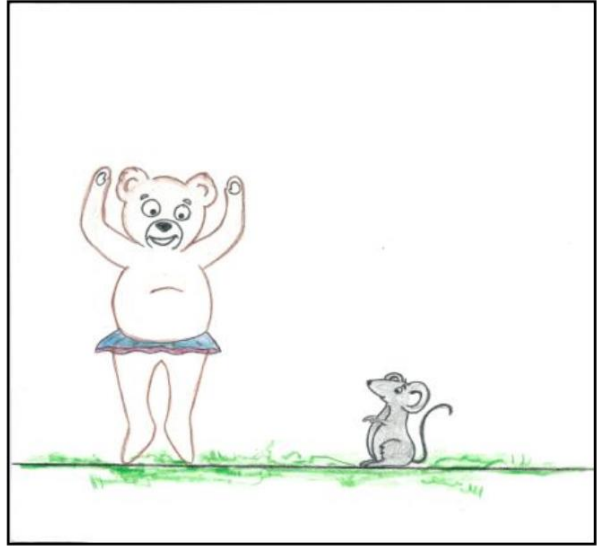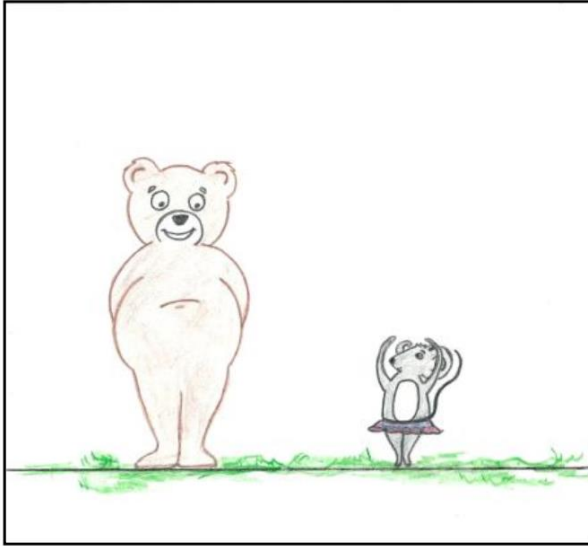
7. a) Konj je prigovarao magarcu dok je mahao repom.

    b) Konj je prigovarao magarcu dok je on mahao repom.
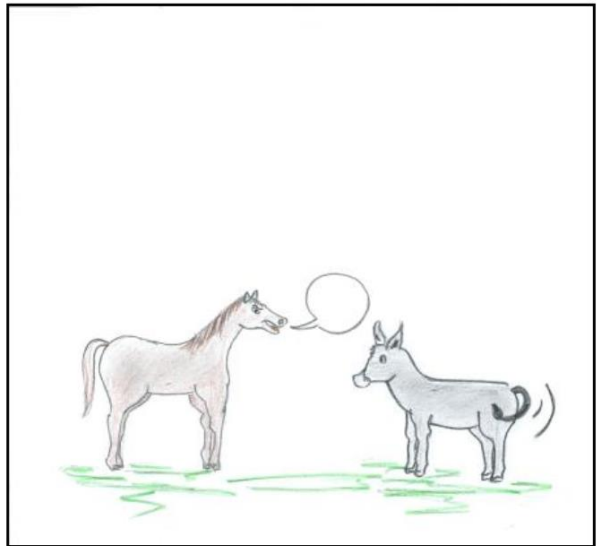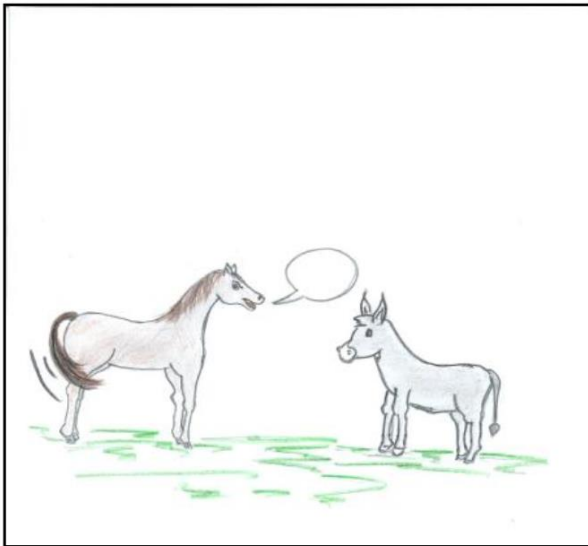
8. a) Orao se divio labudu dok je letio nebom.

   b) Orao se divio labudu dok je on letio nebom.
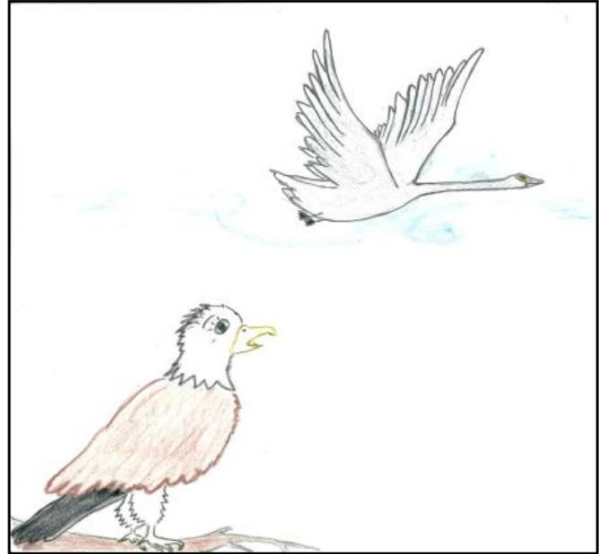
9. a) Deva je zaobišla zebru dok je nosila grane.

   b) Deva je zaobišla zebru dok je ona nosila grane.
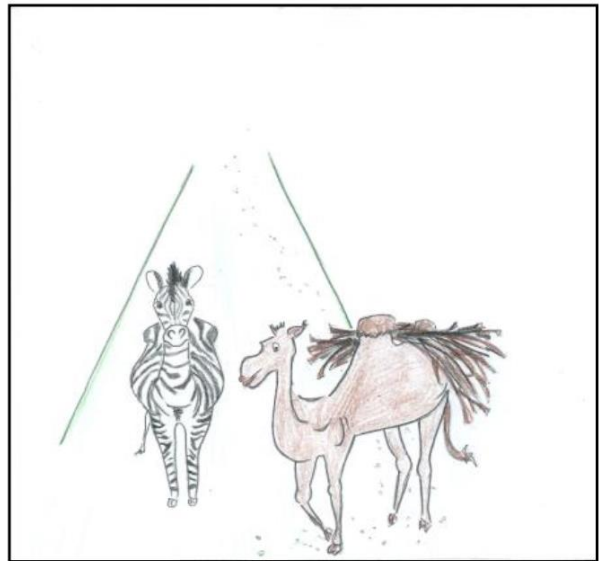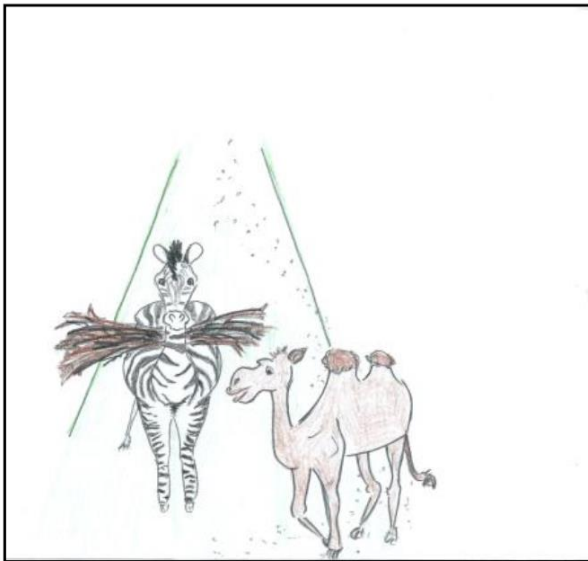
10. a) Vjeverica je zagrlila kornjaču dok je pričala priču.

b) Vjeverica je zagrlila kornjaču dok je ona pričala priču.
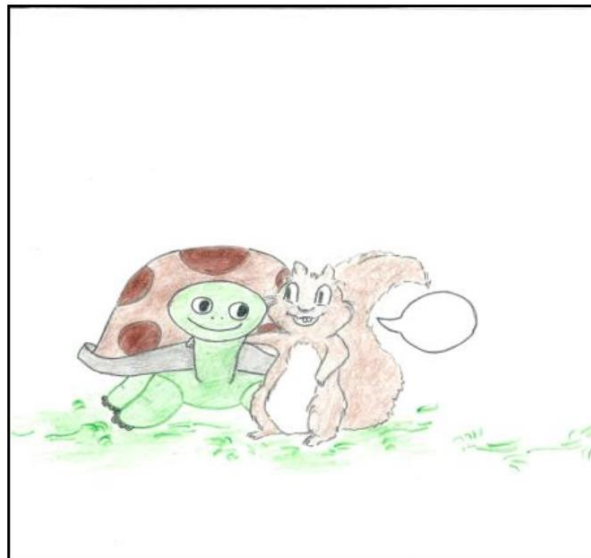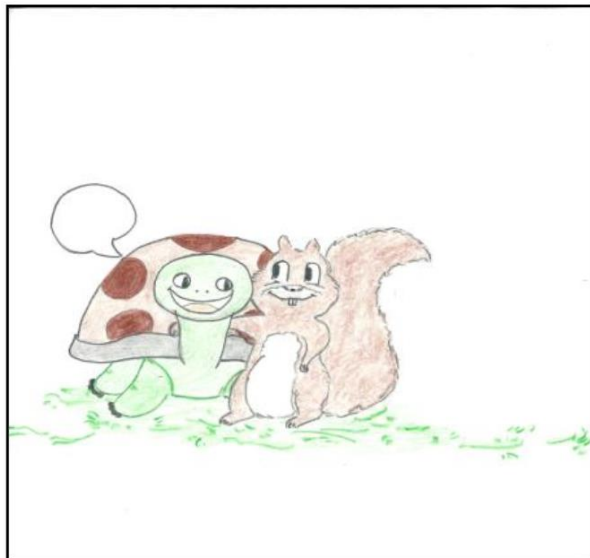
11. a) Pčela je pozvala bubamaru dok je bila na cvijetu.

b) Pčela je pozvala bubamaru dok je ona bila na cvijetu.
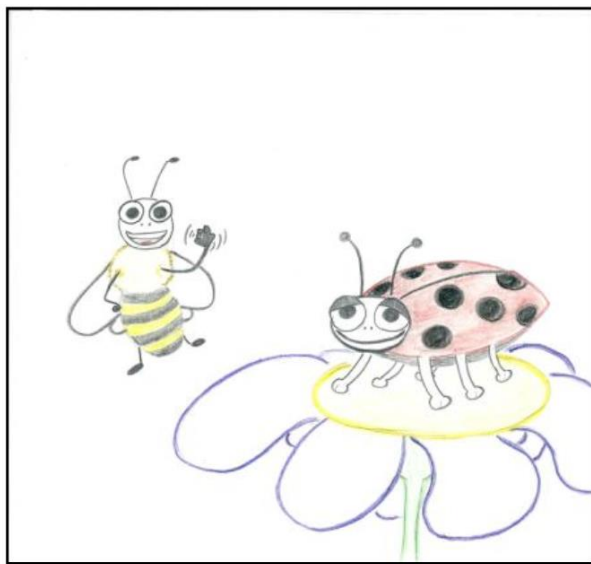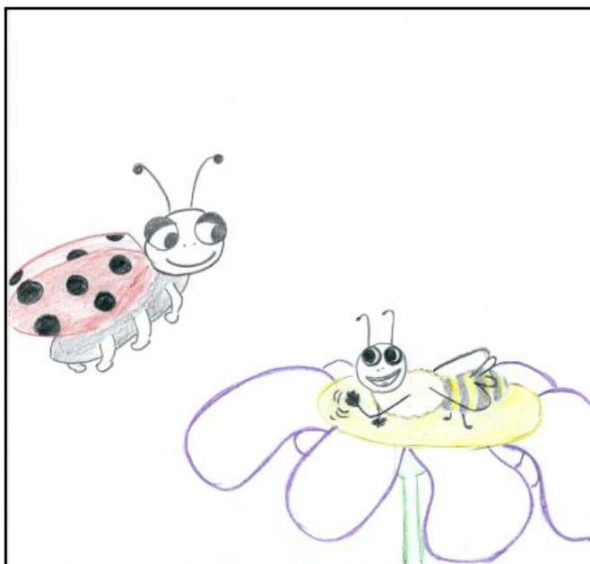
12. a) Lastavica je slikala rodu dok je sjedila u gnijezdu.

b) Lastavica je slikala rodu dok je ona sjedila u gnijezdu.
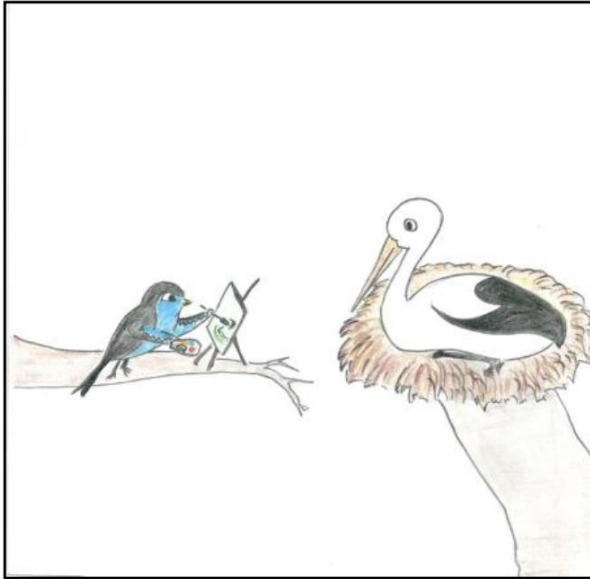
13. a) Krava je govorila ovci dok je ležala na travi.

b) Krava je govorila ovci dok je ona ležala na travi.
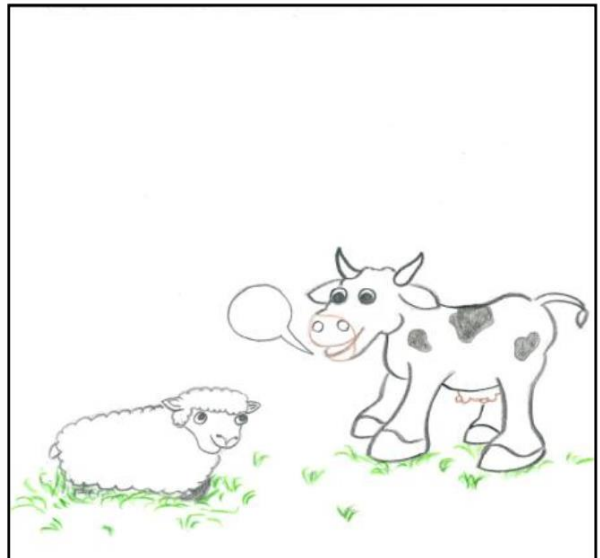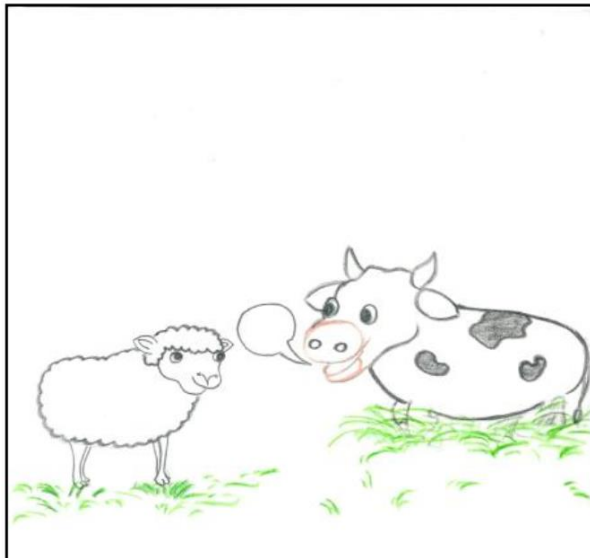
14. a) Žaba je namignula zmiji dok je plivala pod vodom.

   b) Žaba je namignula zmiji dok je ona plivala pod vodom.
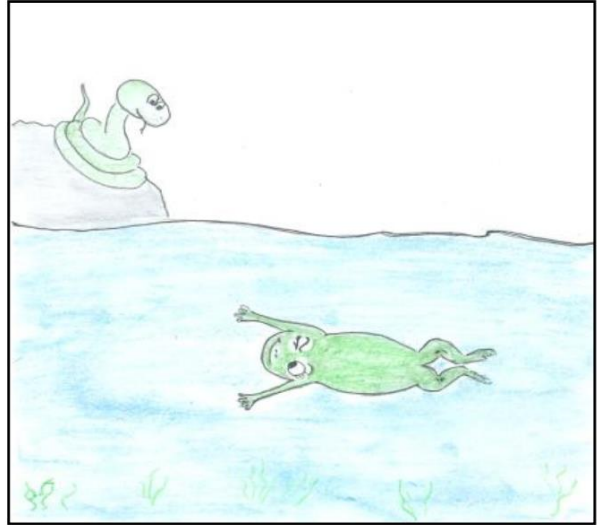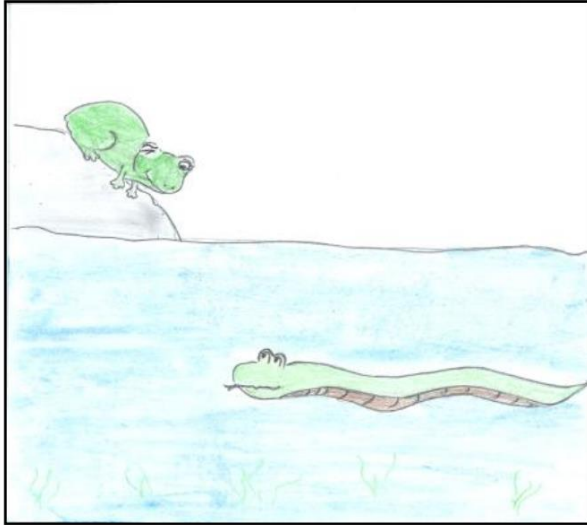
15. a) Sova je pjevala srni dok je promatrala nebo.

   b) Sova je pjevala srni dok je ona promatrala nebo.

16. a) Lisica je dovikivala gusjenici dok je prelazila cestu.

b) Lisica je dovikivala gusjenici dok je ona prelazila cestu.
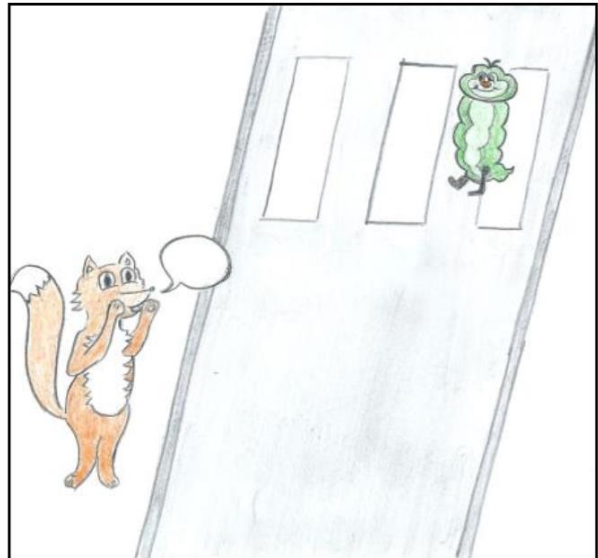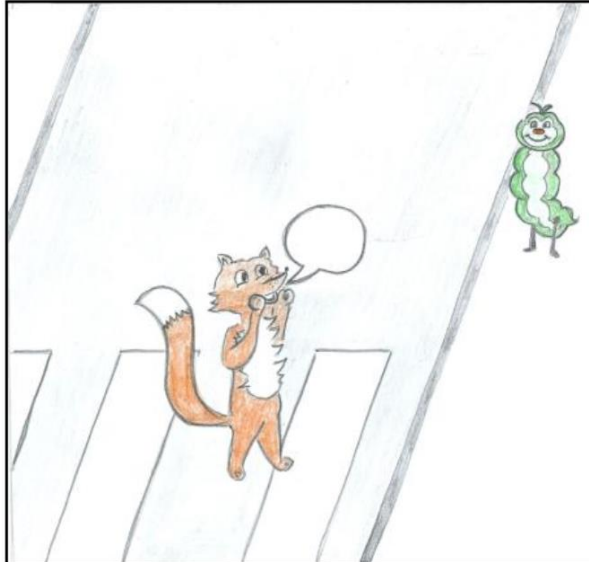
CONTROL ITEMS

1. Krokodil se približavao nosorogu dok je padao mrak.
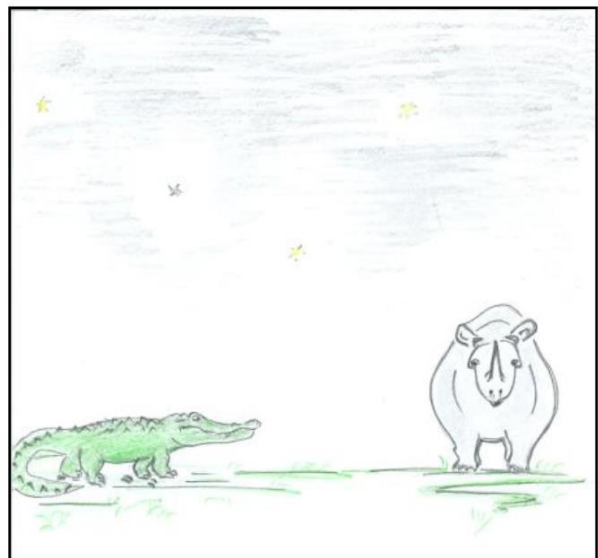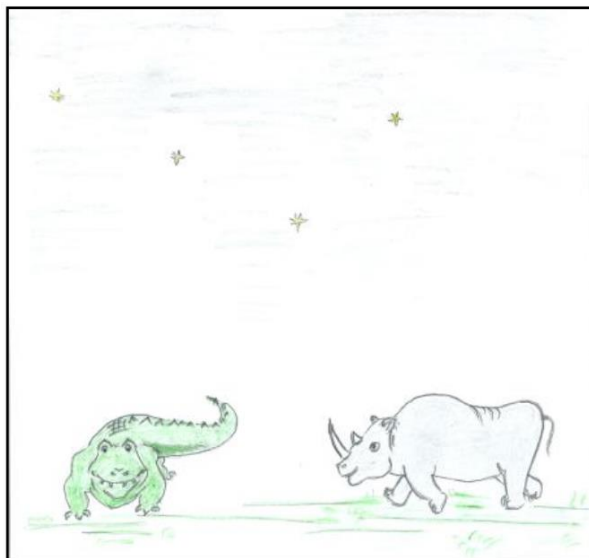
2. Vuk je prijetio leopard dok je bilo oblačno.
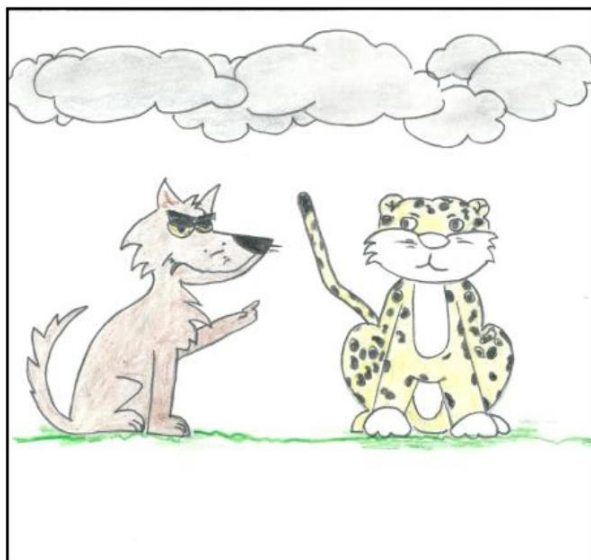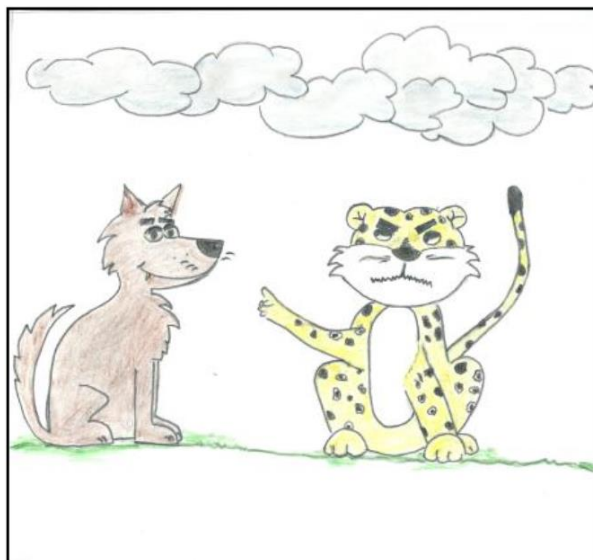
3. Rak je promatrao guštera dok se pjenilo more.
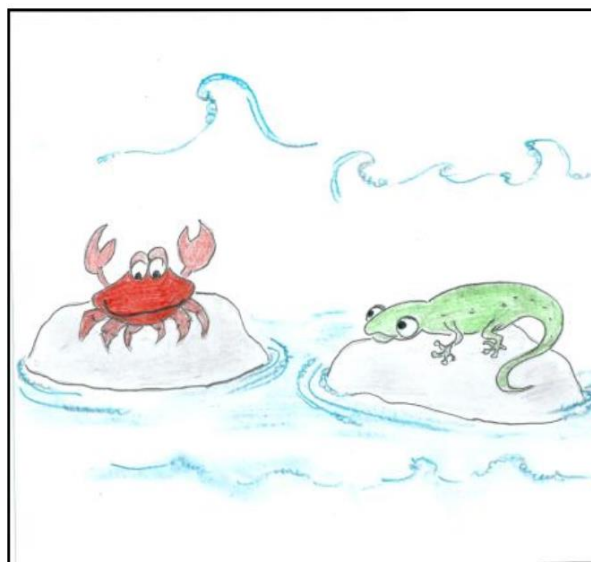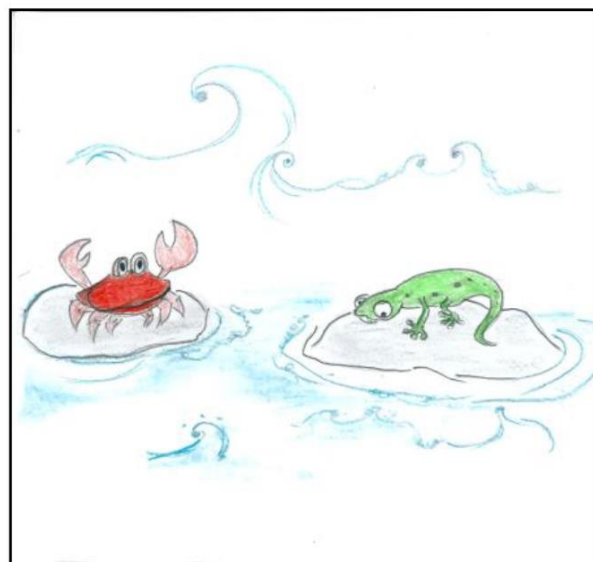
4. Dabar je otjerao goluba dok je padao snijeg.

5. Jelen je pretekao ovna dok je puhao vjetar.

6. Bik je ubo jarca dok je bilo nevrijeme.
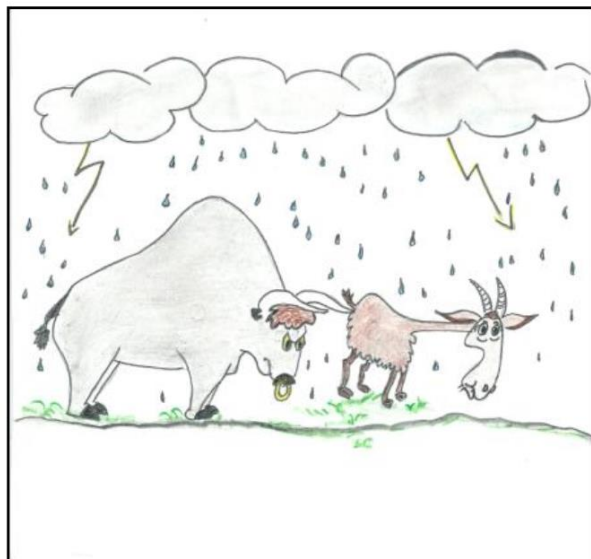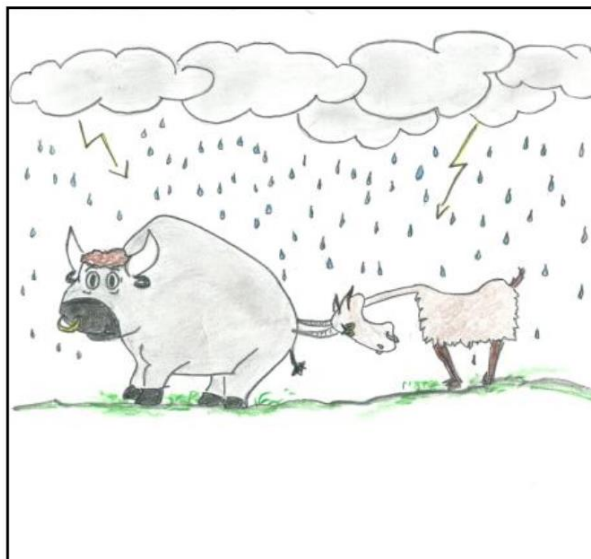
7. Klokan je preskočio zeca dok je bilo hladno.

8. Psić je slijedio tvora dok je bio pun mjesec.

9. Lavica se rugala žirafi dok je padala kiša.
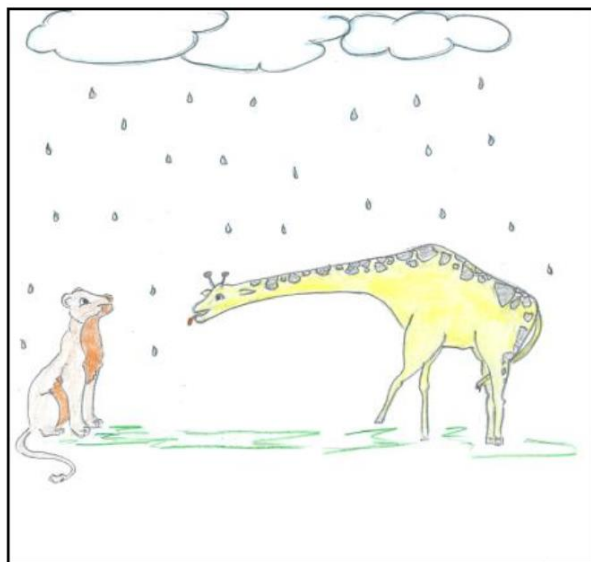
10. Guska je lovila vranu dok je bila magla.
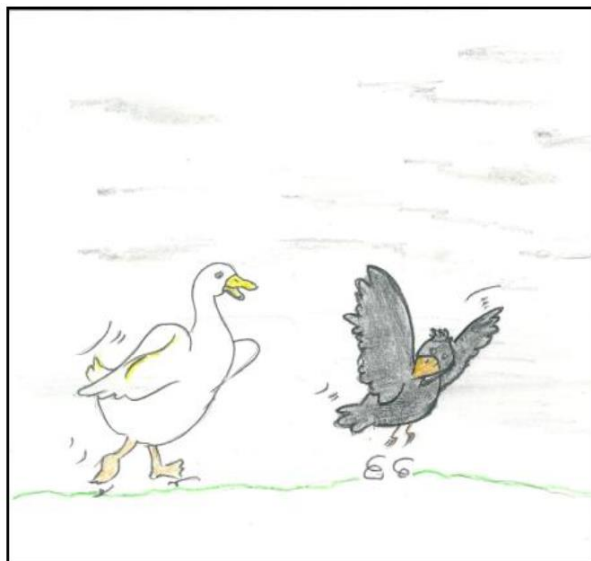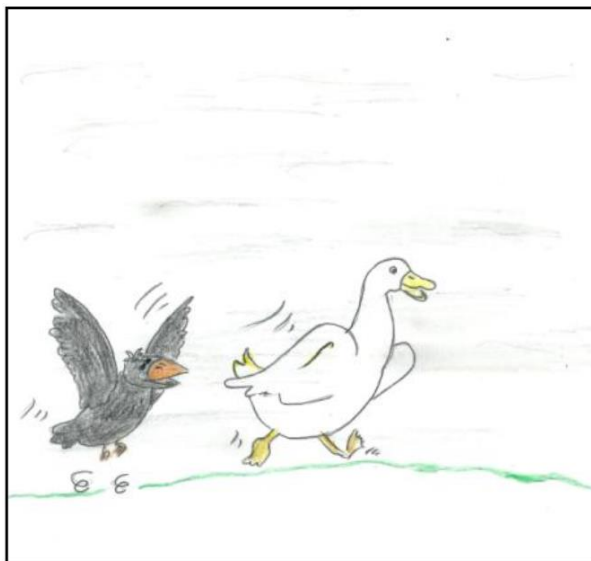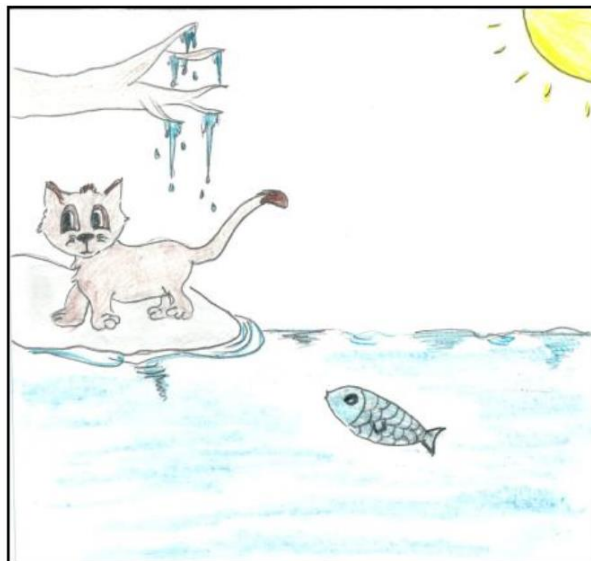

11. Koza je njušila svinju dok je bilo vruće.
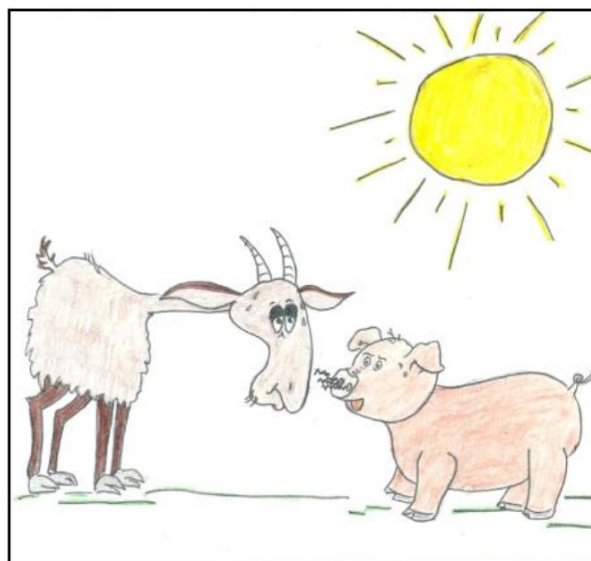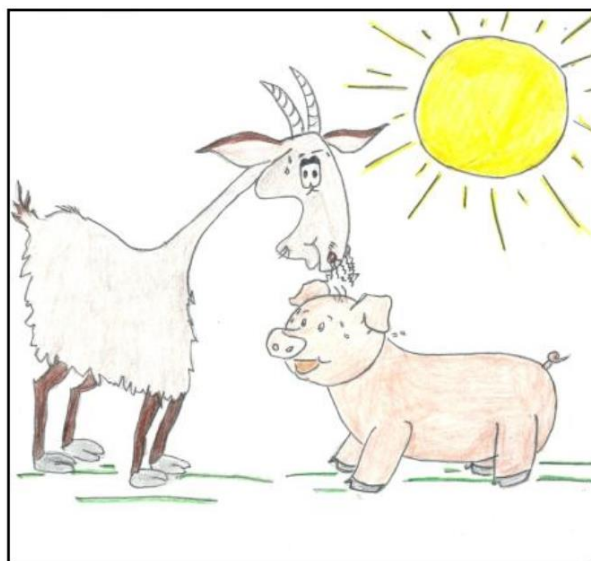
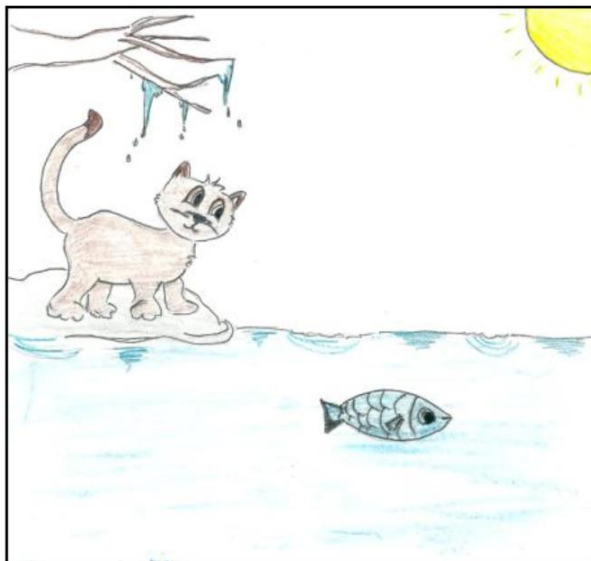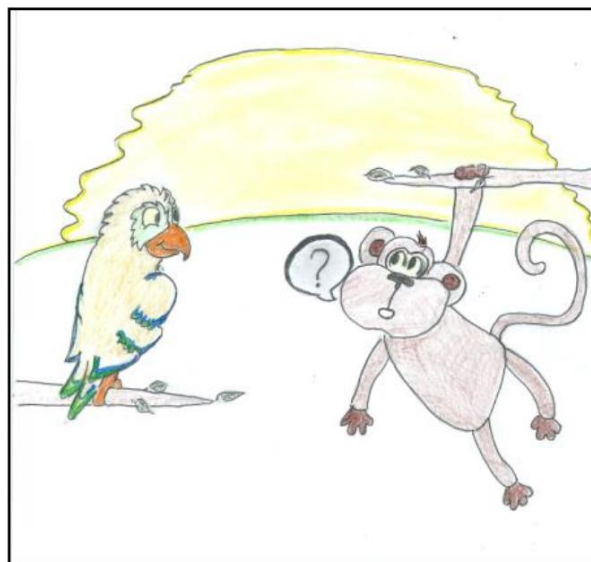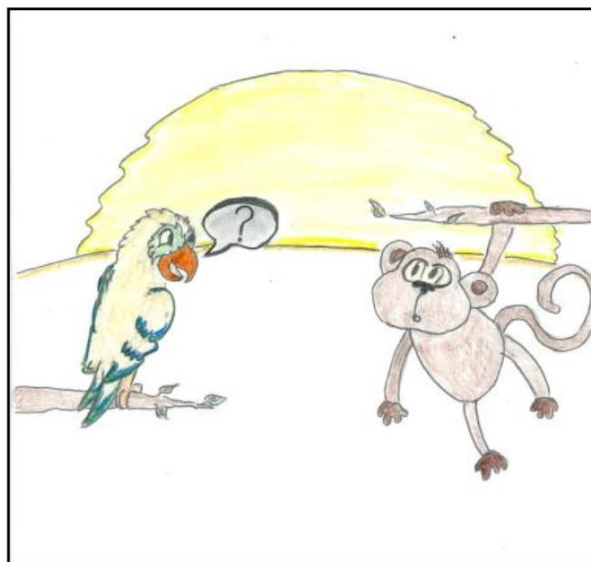12. Panda je podragala gorilu dok su sijevale munje.

13. Kokoš je gurnula patku dok je padala tuča.

14. Mačka je ugledala ribu dok se topio led.

15. Papiga je zapitkivala majmunicu dok je zalazilo sunce.

16. Osa je napala pticu dok je sijalo sunce.