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Introduction

The present study originates from an interest in the processes behind language acquisition.

If we ask ourselves which quality distinguishes man from other species, we can answer by saying that thought and speech faculties are the qualities that set humans apart from others. This shows how much of an important aspect of human life language is: language is acquired naturally and in a very short time by all children who are exposed to some linguistic input, but an incredible amount of information has to be analysed by children learning one or multiple languages. How is success in this task achieved? Do children have any innate knowledge guiding them in this process?

In order to try and unravel some of the doubts surrounding this subject a group of children aged between 1;11 and 3 years was tested both in comprehension and production of passive sentences.

These sentences are characterized by a non canonical order of constituents due to A-movement operations which make them particularly difficult to process. Borer and Wexler (1987) proposed that the syntactic structure behind passive sentences is complex and subject to maturation, such that children younger than 5 years of age cannot produce full passive sentences syntactically. Studies by Valian and Bencini (2008), Driva and Terzi (2008) Messenger et al. (2012), Manetti (2013), Volpato et al. (2013), on the other hand, have cast doubt on this hypothesis by showing that under experimental conditions children as young as 3 show evidence of comprehending and producing full verbal passives.

The present study aims to investigate syntactic representation and processing in even younger Italian speaking children, by means of a comprehension and a priming test.

This thesis is organized as follows. Chapter 1 gives an overview of current debates and competing theories in language acquisition: in essence this is the recurring nature vs. nurture debate in language and cognition. While the nativist account claims that children have some innate knowledge guiding the language acquisition process, the constructivist account denies the existence of any language-specific innate knowledge, placing the burden on the linguistic and non-linguistic input children receive, and domain general learning mechanisms such as statistical learning and pre-emption.

Chapter 2 delves into more theoretical issues related to the sentence structure under investigation and to the experimental technique employed, namely syntactic priming. Priming is a thoroughly investigated phenomenon in psychology occurring when prior exposure to a stimulus facilitates subsequent processing of the same or of a related stimulus. This phenomenon manifests itself also in natural speech: prior exposure to a certain syntactic structure facilitates comprehension and stimulates production of a sentence reproducing that same syntactic structure, hence it can be used in a controlled environment to analyse the syntactic representations of a specific structure in the mind of the speaker.

Chapter 3 presents the participants in the study and experimental materials and procedure, reporting and commenting on the data collected.

Both comprehension and production abilities were investigated by means of two tests: a sentence-to-picture matching task and a priming

test during which children were asked to repeat prime sentences; correct repetition of a sentence is per se evidence of the child correctly representing the syntactic structure of that sentence.

Both quantitative and qualitative analyses of children's performance is given in the third chapter.

1 Current debates in first language acquisition

1.1 Introduction

How do children acquire language? What's the process behind this achievement? Do they have some innate knowledge or does it all depend on the input received?

It's often said that what distinguishes humans from other animals is the ability to think and to put those thoughts into words; various experiments have been carried out trying to teach animals to learn to communicate or to try and stimulate their cognitive abilities mainly through behaviourist techniques[1]. Yet they all failed to find evidence for such a complex and developed communication mean in others than humans.

In the present study, I'd like to present two different accounts on language development which can be described with the *nature vs nurture* contraposition, or summarized with the Plato's dialogue between Meno and Socrates.

1.1.1 Meno's problem.

In this dialogue, Meno asks Socrates "*how will you inquire into a thing when you're totally ignorant of what it is? Even if you bump right into it, how will you know it is the thing you didn't know?"*. Meno's paradox states "*A man cannot search either for what he knows nor for what he doesn't. He cannot search for what he knows because he already*

[1] I'm referring to the case of Washoe, an ape, who had been teached ASL by Allen and Beatrice Gardner in the late sixties or Kohler and Yerkes studies on ape's cognitive abilities at the beginning of the nineteenth century.

knows it and he cannot search for what he doesn't know, for he doesn't know what to look for".

Socrates' answer takes sides for what we would nowadays call the nature account: according to him, souls are immortal, so they have learned things before transmigrating to the body; once they are in a body, they only have to recollect things they already know. Socrates is talking of *inborn knowledge*: he shows Meno that a slave knows more about geometry than he could have learned from experience only (something that reminds us of the poverty of the stimulus argument, which I will come back to later). By extension, Plato's problem refers to the gap between what humans experience and what they actually learn and do, which is exactly the subject of controversy between nativism and usage-based accounts.

1.1.2 Chomsky's proposal.

According to Chomsky's Universal Grammar theory, human beings are innately endowed with a set of structured linguistic knowledge which allows children to navigate around the immense linguistic input they are naturally exposed to. Evidence for innate predisposition to language comes from Home Sign Languages and NSL: Hunsicker & Goldin-Medow's (2012) analyses of home sign language suggests that even children who are not exposed to a natural language can create syntactic categories which determine possible combinations of signs based on hierarchical constraints, resembling thus other natural languages.

As soon as 2 days after they're born children show incredible sensitivity to phonetic properties of language and can distinguish both between their native language and a foreign one, and between two foreign languages (Mehler et al. 1988, Moon, Cooper and Fifer 1993); between 10 and 12 months they can start producing meaningful expressions without any explicit teaching, on the basis of positive evidence only and in a way that looks consistent across languages, both spoken and signed ones (Petitto and Marentette 1991 observe manual babbling in children exposed to sign languages).

The first evidence for this theory comes from cross-linguistic analyses: indeed, languages across the world (and across modalities) conform to certain constraints which are supposed to be somehow dictated by the brain: essentially every child expects to find certain constraints in the language they're acquiring because they are genetically equipped to cope with them. Cross-linguistic studies also brought to Universal Grammar Theory: language is not learned (apart from the lexicon) as it is deemed to surface at a certain time, and it actually just has to be set on the appropriate configuration (children know they have a set of possibilities when it comes to find out what the regularities in their language are).

Children can potentially acquire any language they are exposed to (albeit there's a critical period over which native competence cannot be acquired, especially when it comes to phonetics) and in order for this to be possible, language learning must be as much of an economic process as possible also because, even if there are some constant features, languages also have obvious dissimilarities.

In order for these variations to be accounted for, UG adopts the principles and parameters model: *principles are properties that hold*

within all languages, they allow languages to have some similarities and are the baseline for the linguistic input analyses; parameters, on the other hand, are properties that vary from language to language and they are those properties which have to be fixed on the right setting for any specific language.

An example of parameter is the pro-drop property: English and Italian both have subjects in their full sentences but Italian children learn that they can sometimes omit the subject while English children set the subject parameter on the omnipresent mode: English sentences always need an explicit subject. The children's task is then a selection rather than creation one because both principles and parameters are given by UG.

The nativist position holds that humans are *biologically* predisposed to develop languages and UG provides them with a blueprint consisting of principles and parameters that constraint the hypothesis space within which children move when acquiring the language they are exposed to. Importantly, UG is not a theory of the grammar of a particular language but "*it is only when supplemented by a universal grammar that we can provide a full account of the speaker-hearer's competence"* (Chomsky, 1965).

Usually grammars try to explain the irregularities of a specific language while UG does the exact opposite by accounting for those characteristics that languages share; UG is an empirical proposal about first stages of language acquisition rather than adult competence and determines the kind of analyses that speakers can adopt. The great merit of UG is then to allow children to go through a more economic task when acquiring language as they already have a predisposition to make certain choices, rather than being lost in a field with innumerable crossings to choose from. *Constraints* prevent children from forming misguided

hypothesis about form and meaning of linguistic expressions; essentially, they are guidelines for making hypothesis about what they experience in the real world. Cross linguistic research are very good advocates for this perspective as we encounter a vast variety of linguistic phenomena governed by the same constraints.

1.2 Nature vs. Nurture.

According to nativism children are born with some innate knowledge which guides them in the language acquisition process, while constructivism asserts that children learn how to speak thanks to a *creation* process and through paring of forms and meaning when it comes to acquire lexicon and syntax: it's the Nature vs. Nurture problem.

When trying to explain the acquisition of syntax one has to consider both the starting point, i.e. a child's innate endowment and the end point, i.e. adult syntactic competence. In order to account for how syntax is acquired we have to analyse the content from the starting to the ending point and observe the mechanisms that allow one person to get to that ending point (which is full adult competence) and evaluate how much of a weight the external input has (Valian, 2009).

Negative evidence has proven to be of little, if not no impact at all on children as they are mostly refractory to corrections and seldom get corrected when very young. They manage to make the most out of positive evidence maybe by a trial and error or a hypothesis testing process. Regardless this so-called *poverty of the stimulus*, children are capable to understand and produce an infinite number of sentences in their language, clearly discarding the hypothesis that their only means of

acquisition are imitation or memorization. They are, as a matter of fact, able to produce sentences they never heard before (both correct and incorrect ones) regardless of the fact that, especially in the first months and years of their life, they are sometimes exposed to a simplified version of the language (a trend that's been called motherese or care-giver speech) made up of very short sentences, with non-inflected verbs and slower pronunciation.

Another important source of evidence that argues against a simple learning-through-imitation account of language acquisition is that every child goes through a phase, the over-generalization phase, in which they over-generalize the rules they have managed to deduce about verb morphology and use an overregularized version of irregular verbs in the past tense even though they have never heard the form "goed" instead of "went" in the input they're naturally exposed to.

Behaviourist models are based on the assumption that learning takes place thanks to a series of stimulus-response associations, that is units of behaviours that stimulate other persons' behaviours: apparently children learn language either through positive or negative reinforcement (Skinner, 1957). Given a certain input the brain can manipulate it and use it and, once a minimum knowledge has been acquired, it can be generalized into rules and categorized. Tomasello (1992) citing Wittgenstein (1969) claims that "we can build up the more complicated forms from the primitive ones by gradually adding new forms." Keeping a detailed diary if his own child, Travis, Tomasello asserts that a gradual knowledge is built: only after having used a certain verb in multiple instances, can a syntagmatic category be assigned to its arguments and "not until the child has constructed a number of sentences in which various words serve as various types of arguments for various predicates

can she construct word classes such as noun or verb"; as a consequence complex sentence production is delayed accordingly to the creation of these categories.

Curiously, connectionists have also used overregularization of English past verbs as an evidence for their theory: apparently children would learn that, given a certain string of sounds at the end of the verb, it is directly connected to a specific form of past tense (for example by observing the conjugation of drink-drank-drank they would assume that every other verb with such consonantic configuration should be conjugated that way). Pinker (1996) has somewhat softened tis theory by including both associative and rule-based components: the first being responsible for the inflection of irregular words and the second being responsible for the creation of rules regarding regular words. What this theory, nor the usage- based and behaviourist theories, can explain is how people who are exposed to very degenerate input can acquire and further regularize their languages.

Empiricists claim that the richness of the input is fundamental but that only humans are sensitive to it, yet there are many examples against this view: even in environments where people are exposed to degenerate (pidgin language) input or no natural input (deaf children of hearing parents) have proven to be able to develop communication means that have an elaborate structure and actual function morphemes showing that some characteristic of language (regardless of the modality) are probably determined by an innate knowledge that every human being is born with, otherwise they wouldn't repeat themselves universally.

Syntactic knowledge (and language in general) is not acquired simply by memorization, repetition and reinforcement of previously heard sentences: being able to speak a language means being able to

produce and understand a potentially infinite number of sentences in that language. Since adult syntactic knowledge requires an abstract structure to capture it with a hierarchical representation some knowledge must be innate: you cannot get something from nothing!

1.2.1 The critical period.

Nevertheless, we have to consider that the development of this abilities is restricted to a critical period: a piece of evidence for this is given by the unfortunate examples given by children who have been deprived of any linguistic and social interaction for the whole of their childhood. An infamous representative for this category is Genie, a girl who was kept segregated in a house with no chance to have any social interaction and was discovered at the age of 13: she never developed a native competence regardless of the many years of speech therapy and rehabilitation.

Another important piece of evidence for the existence of a critical period comes from studies on new-borns who seem to be able to have better phonetic abilities and are capable to better discriminate two foreign languages not only from their mother tongue but also from one another at 4 days but already have some trouble discriminating them when they're 2 months old. Also, early L2 learners who are exposed to a second language later than at three years of age cannot discard or disguise the L1 accent as well as bilinguals who are exposed to a second language from an earlier age.

1.2.2 Bootstrapping of lexicon.

This sensitivity to speech segmentation and phonological qualities of language seems to be responsible also for the achievement of an essential module of language: the lexicon.

Let's consider how the input is presented to the child: a continuous stream in which words are not separated from one another by a clear pause, leaving intonation and stress to be the only clues for word recognition.

The first task the child has to face is the segmentation of speech stream into sentences and phrases, which are more easily discriminated than words as they have much clearer boundaries: children start from bigger units and then work their way down to recognition of words, syllables and phonemes. It's a top-bottom process leading to children's capability to encode the linguistic input in terms of language specific units.

This process is called *phonological bootstrapping of lexicon*: the term bootstrapping refers to the idea that clues of some abstract symbols or linguistic objects come from properties they're associated to and that are already available in the input itself. Cues for word acquisition are:

- Distributional regularities;
- Typical word shapes;
- Phonotactic constraints.

Children can analyse the speech stream and make a sort of statistical analyses of which cluster of consonants are more frequent and might belong to the same word (i.e. identify which sound cluster are permitted in their language) while, hearing a less frequent cluster, they

are most likely to analyse it as belonging to two different units. According to this model, lexical acquisition proceeds in two steps: first children identify and store words in their memory and then they proceed to match them with a less or more precise meaning. What's important in this model is the concept that meaning assignment comes always second, as it can't happen prior to word identification. (Guasti, 2002).

How do toddlers know that labels refer to some objects or actions? One hypothesis is that they recognize in other humans their disposition to refer to things and assume that's their intention too (Bruner, 1978). But how do they match the word to the object? One may suppose that they proceed via a hypothesis formation and testing procedure and essentially must associate the word with what is perceived in their surroundings at the time of utterance. But this cannot always work: a certain situation may give a vast variety of possible referents for that word or, as Quine would put it, one cannot know if the word *gavagai* refers to the whole rabbit or to its legs only (Quine, 1960).

Another problem arises from functional words: one can easily point to a red ball, but cannot point to the referent of the preposition "to".

Markman (1994) claims that children have some assumptions, called biases, that guide them in the lexical acquisition process:

a) The whole object bias;
b) The mutual exclusivity bias;
c) The taxonomic bias.

Of course, this line of reasoning works especially well for nouns, which also happen to be the most used category of words used in children first utterances (Gertner, 1982; Caselli et al., 1995; Gilette et al., 1999). When children at about 20- 24 moths have a vocabulary spurt they also

start constructing more complex sentences. The question is then, is it this augmented lexical availability that also allows them to access some syntactic information and have a breakthrough in syntax?

1.2.3 Syntactic bootstrapping.

As I will better explain later, syntax is meaning-dependent and that becomes immediately clear if we take a look at verbs and their argument structure. Can children take advantage of the syntactic context to determine word meaning?

The link between syntax and semantic is particularly evident in verbs. Arguments define the participants in an event and can be distinguished based on their thematic roles: each verb can and must assign a specific number of arguments for it to be meaningful. For example, the verb push requires two arguments: a pusher and a person/object being pushed; on the other hand, the verb fall, requires one argument only and cannot host more than one argument, as a) to d) show:

a) The cat pushes the ball.
b) *The cat pushes.
c) The ball falls.
d) *The cat falls the ball.

Syntactic structures are a projection of lexical properties, therefore by observing the structural environment in which a novel verb is used one can guess certain aspect of its meaning. Syntactic information has to be analysed together with extra-linguistic context. The information about the number of arguments that each verb requires and the thematic roles it assigns to them is called argument structure and it is believed to be

stored in the mental lexicon, as a part of the lexical entry of each verb (Grimshaw, 1990; Shapiro, 1997).

In Italian and in English, the canonical order of constituents presupposes the subject to be expressed by the NP preceding the verb, while the NP following represents the object of the verb.

Studies by Naigles (1990) using a preferential look paradigm have shown that children can exploit syntactic information on non-words to distinguish between a transitive or an intransitive use of nonce verbs.

Of course, this task is very difficult but children are assisted by constraints given by Universal Grammar which narrow down the possibilities among which children can choose the correct parameter for their language. But how exactly can they manage to distinguish which words are nouns and which are verbs? How can they break into the syntactic system having no language-specific knowledge?

Children must be able to build some kind of structural representation, categorize words and identify the grammar functions of arguments; but how do they acquire this knowledge? A preliminary step seems to be the identification of minimal chunks of information, that is constituents.

In this task children must be guided by phonological cues, to which they're known to be very sensitive. Another piece of information comes from nouns which, as we've seen already, are acquired first: thus, phonology and semantic both contribute to syntax bootstrapping.

This acquisition process seems to develop in layers in which every piece of information is stored and utilized to achieve syntactic mastery.

By 9 months children show the ability to identify clause and phrase boundaries thanks to phonological cues, even if at this stage, they might

not have assigned a hierarchical order to the sentence. At this stage, this ability works just as a guide to segment speech units, but does not provide a one to one matching between phonological and syntactic units.

At a later stage, they can work their way down to the identification of words and meaning assignment; some words can have their meaning assigned thanks to a word-to-world mapping procedure (Fisher et al., 2010). If the child hears a sentence like "Mommy eats pasta" while seeing the mother perform this action, the child, not knowing the meaning of the word "eat" as yet, would anyway assume it to be the verb if she knows that the other two words are nouns: indeed, she expects the sentence to have an argument-predicate-argument structure and manages to give each constituent its role; knowing that nouns are arguments, the unknown word would immediately get assigned the predicate state. So, it is linguistic innate knowledge, together with extra-linguistic context, that allows the child to grasp the meaning of a specific verb and to build a more general knowledge about verbs as a syntactic category.

In this process, humans seem to be guided by certain biases, one of which is the "causative interpretation of the scene": as demonstrated by Lidz, Gleitman, Gleitman (2003), comparing young and adult speakers of Kannada on nonce verbs utilized as causative, children are more sensitive than adults to syntactic cues. Kannada verb have the peculiarity to use a specific suffix indicating the causative use of the verb, but only adults showed sensitivity to morphological cues, while children proved to be more sensitive to syntactic ones and take advantage of those information when using the verbs in new frames. They also expect the first argument to be the agent performing an action on the post-verbal argument; exploiting this knowledge children can build a

partial syntactic structural representation and successively build a syntactic structure on compliance with X-bar theory.

1.2.4 Usage-based account.

Usage based accounts on the other hand, claim that language acquisition does not differ from acquisition of knowledge in other cognitive domains like social skills, reading and the alike. Learning of any of these abilities is achieved thanks to domain-general mechanisms which are not specific to any kind of fact about the world.

Acquisition of language is carried out in a fragmentary fashion via statistical analyses on the input: children can take advantage of lots of relevant cues they retrieve in the input, these cues are successively used to make assumptions about more general rules governing the language.

Some of these mechanisms (which are also used to make generalization about other phenomena than language) are:

- Distributional analyses;
- Analogy;
- Cut and paste type of operation;
- Pattern memorization; etc.

Children thus end up with shallow records of construction types and templates that encode linguistic input, these are nothing more than chain of words, combined and roughly organized and categorized thanks to a basic and inductive process. It is exactly this ability to make inductions that allows them to extend productions beyond experience and which explains the creativeness in their production; *creativeness,*

which, in any case is thought to have been majorly overestimated by the nativist account (Tommasello, 2000).

Both core phenomena and idiosyncrasies of the language must be acquired and the fact that core phenomena are more easily and promptly learned would be due to their higher frequency in the input. In addition to this, these idiosyncratic phenomena cannot be explained by a parameter and principles account because there's a too wide variety of them across languages (Goldberg, 2006). Accordingly, children can work their way up to more complex phenomena only after they have acquired more basic structures and an evidence of this theory would be the fact that children's language is nothing but a simplified version of adult's language.

The generalization children end up making are the by-product of *linguistic form* and *communicative function* analyses, the latter being strictly related to meaning. For example, negator like NO/NOT are taken to express three basic meanings: non-existence, rejection and prohibition (Cameron et al., 2007).

In this view, acquiring language competence also means acquiring and developing social skills, and the so-called imitative learning (which is something different from mimicking, i.e. repetition of words with no understanding of them) is an essential step. Cultural (imitative) learning requires the identification and understanding of the speaker's intention; the speaker's intention is here defined as the aim to influence and manipulate the hearer's attention. In order to have a full understanding of the speaker's communicative intention the child has do decipher both social (situational) and formal (i.e. constituents of the sentence) information. Importantly for the usage-based account, this mechanism will surface both in verb use (children do not use a verb in a construction

different from which they have heard it) and in mechanical use of objects, proving that mechanisms governing language acquisition spread through any other kind of skill development.

Both adults and children, are guided by some information-theoretic notions when meaning interpretation is underway; these are: topic, focus domain and background elements (Goldberg, 2006). To summarize, the conservative-learning model sees children's first productions as repetition of previously heard sentences/structure, which are not to be intended as verbatim repetition as nominal substitutions can be easily made.

Tomasello (2000) advocates for the validity of this model especially when it comes to verb learning: children's verb productions up until three years of age are limited to forms they encountered in the input; when they happen to make some mistakes, those are purged thanks to:

- *negative evidence* (remember that, on the nativist account children only exploit positive evidence);
- *entrenchment* (their validity is excluded observing their absence in adult production);
- *pre-emption* (adults using an alternative construction in response to the wrong one).

Evidence against this model comes from the well observed phenomenon of *root infinitives*, which are most definitely not found in adults' productions. Tomasello considers them an imitative feature nonetheless: these are a *truncation phenomenon*. Children who fail to conjugate verbs are actually repeating part of an adult very common production: questions.

d) Does John eat grapes?

e) ~~Does~~ John eat grapes.

Sentence e) would be explained by an auxiliary deletion process, truncation being equivalent to omission of the first verbal element of adult questions.

Unfortunately for this model, it fails to hold cross-linguistically: to begin with, it is not attested in Italian and Spanish children, nor German kids happen to utter things like "gehen musst" even if this kind of combination in quite frequent in adult language as f) shows:

f) "Mami sagt dass du ins Bett *gehen musst*". [2]

Nonetheless the same kind of explanation is said to hold for apparently more complex children's productions: sentences showing a non-canonical order of constituents do not prove that they have acquired competence of a more complex structure but are also repetition of input-found utterances.

"The key point is that structure combining does not mean simply combining words, but rather it means combining whole constructions that the child has previously mastered. Children learn various kinds of constructions from early in development - varying in both complexity and abstractness - and so when they want to express some new meaning, one thing they can do is to juxtapose or integrate those existing structures in some way." (Tomasello, 2000)

This is, from my point of view, ill-accounted for by experiments in which both TD and AD children fail to repeat complex sentences,

[2] Crain et al. 2012

showing that if there's some problem in building the underlying syntactic structure the sentence cannot be correctly repeated.

To summarize the usage-based account claims that, notwithstanding the fact the children are somehow biologically prepared for language (and other skills) acquisition that does not mean that the continuity of grammar model should work, as it is not believed that children have a complete and abstract knowledge of syntax comparable to adults' one when they start producing strings of words.

1.3 Language and other cognitive abilities.

Evidence against the usage-based claim that language and other cognitive abilities develop via the same mechanisms is the fact that we have instances of pathologies that show clear dissociation of those skills.

Specific language impairment, as the name suggests, affects children who show delayed or atypical patterns of language acquisition while having normal PIQ and no hearing impairment, no abnormalities of oral structure or problems in oral function; they show no evidence of obvious neurological impairment or impaired neurological development; no symptoms of impaired reciprocal social interaction or restriction of activities that are typical of autism or PDD (Friedmann, Novogrodsky, 2008).

The mirror image of SLI is Williams Syndrome: subjects affected by this pathology show mental retardation, elfin facial appearance, several medical anomalies, they show difficulties with simple, everyday tasks as tying their shoelaces, low results with logic tests such as putting things in order from the larger to the smallest item and even difficulties

in drawing objects. On the other hand, they are described as friendly and talkative subjects, and their language faculty, although reaching lower level of accuracy compared to their age peers, is much more developed than other cognitive faculties.

1.4 Different studies on syntax acquisition

In the next section, I will report results from other studies aimed at understanding how much syntactic knowledge young children have.

1.4.1 Studies on determiner acquisition.

Determiners, as opposed to other high-frequency categories, such as nouns or adjectives, are characterized by their reduced acoustic salience and do not benefit from clear semantic correlates, as you can point to a ball but not to the referent of the article “a” in the space.

Bottari et al. 1998 analysed Italian determiner system and observed that, from a semantic point of view, determiners serve as reference specifiers for the nominal expression they occur with.

From a syntactic point of view, determiners assign argumenthood to nominal expressions, something that becomes particularly evident in languages with *expletive articles*.

In Italian, this phenomenon can be observed with proper names (although that’s limited to northern regions), kinship terms or in generic statements.

Bottari et al.'s experiment aimed at studying possible asymmetries in determiner acquisition between typical and atypical language development, and one important find was that, while TD children seem to have an adult-like competence of the determiner system from the moment children are able to create the context for its use, SLI children show a higher rate of omission.

One striking difference was found in the use of *monosyllabic placeholders*, schwa-like elements that are assumed to be sufficient to satisfy the determiner parameter for Italian. While younger children exploit MPHs in their natural speech, these are never found in the AD population.

Valian (2009) argues that children and adult syntactic categories are developed in a continuous way, that is to say that children do not have to create the syntactic category of determiner, but they rather have to map words into a category that they already possess.

Evidence for this nativist account comes from distributional tests: Valian (1986) collected data from spontaneous speech of children aged 2 (MLU 3-4) and found that they are able to distinguish determiners from adjectives, and do not categorize them as two equal modifiers. She never found children to sequence them erroneously nor she found children to use more than one determiner in a row, something that can occur with adjectives.

Contrasting results come from a study by Kemp, Lieven and Tommasello (2005), who tested children's understanding of determiner and adjective categories in three group of children aged between 2 and 6 years using both priming and novel-word tasks.

Their aim was to check children's creativity with the use of determiners with non-words presented as nouns and to distinguish between item specific and structural priming effects on children based on their age.

The author's conclusion was that 2-year-old children did not have a fully developed determiner system (even though the first task itself was acknowledged to be quite taxing in terms of memory for them), and that only older children showed pure syntactic priming effects.

1.4.2 Studies on Verb acquisition.

Earlier I reported that children's first words are mostly nouns, while verbs appear later; I also said that, when trying to decipher the meaning of a new word, children exploit both environmental and syntactic cues.

At around 2 years children start combining words to create more complex utterances: the question is, do these utterances show children's knowledge of syntactic parameters of their language or are they simplified versions of adult speech?

As we know, languages variate with regards to word order[3], English and Italian being head initial languages, and Japanese and Turkish being head-final. This property is called the *head direction parameter* and it accounts for differences in languages which have complements either to the right or to the left of their heads.

[3] Kayne (1994) actually challenges this view by saying that all languages have an SVO order, and variations at PF are due to movement of constituents.

The question is, do children show competence as far as head direction parameter is concerned?

Studies based on both natural speech data collection (Bloom 1970; Brown 1973) and preferential looking paradigm on children as young as 17 months (Hirsh-Pasek and Golinkoff 1996) show that children are aware of this parameter and can use it both in comprehension and production.

Hirsh-Pasek and Golinkoff's (1996) children were shown two videos and heard a description (an active sentence using a transitive verb) that would be correct for one of them only, the other one being flawed by thematic role inversion. Children did show to rely on canonical constituents' order for their language and preferred to look at the video matching the description.

With regards to sentence-to-world mapping procedure, Brown (1957) claims that children can take advantage of both morphemic and syntactic cues when deciding if a newly heard word is a noun or a verb. Using a picture-matching task he proved that children were able to correctly select an image showing an action when asked to point at "sibbing" and an image depicting an object when asked to point at "a sib".

Naigles (1990) using a preferential looking paradigm, demonstrated that children can also take advantage of verb's argument structure when making hypothesis about a novel word meaning: they preferred to look at a picture displaying a causative action when the nonce-verb was used as a transitive one, and to a non-causative action when the verb was used as an intransitive one.

Other sources of evidence in favour of a full competence account from a very young age come from the distributional properties of verbs. In languages like Dutch and German, verbs appear in different positions depending on their finiteness features: infinitives are clause final, while finite verbs appear in second position. Another peculiarity of these languages is that, a subject can appear in the first position regardless of finiteness features of V, but non-subject element (objects or adverbs) can occupy that position only when V is used in its finite form. Children's use of distributional properties appears adult-like from the beginning, bringing evidence against the small-clause hypothesis, which claims that children's first productions do not include the Inflectional node.

A phenomenon contrasting with an early abstract knowledge of V properties, comes from so-called *Root Infinitives*: production of infinitive verb forms in main declarative sentences is sometimes attested in children younger than 3 years.

This phenomenon is subject to cross-linguistic variation, as it is quite frequent in German, French and English but almost never found in Italian or Catalan children; this might be due both to the fact that the latter are pro-drop languages and to specific morphological properties of languages.

Italian morphology is very rich, and omission of person and tense agreement morphemes would result not only in an incorrect word, but in an impossible one:

g) *Tu mang.
Tu mang**i**.

In German, for example, production of an underspecified form of the verb would still result in a possible word, even if that's not the correct form:

h) *Ich mach. [imperative 2nd p]
Ich mache.

RI, thus, usually do not occur in pro-drop languages, in wh-questions, are never introduced by non-subject NPs and are incompatible with Aux. Children producing RI clauses know that verb's finiteness features determine verb movement to I, as example i) from French shows, negation particles are used accordingly to finiteness features:

i) Pas manger la poupeé.
La poupeé ne mange pas. [4]

Two theories have tried to explain these occurrences: one claims for optional under-specification of finiteness features, the other claims for a truncation of the clause at a level below TP.

The first theory stresses the fact that children do use finite forms as well as optional non-finite ones, meaning that children are aware of the fact that a main clause must include a specification of tense by means of agreement but sometimes fail to express that feature.

The truncation model (Rizzi 1993), on the other hand, is based on the hypothesis that all clauses include a CP node, which may or may not be expressed. RI are truncated clauses that do not include any node higher than VP; this would be proved also by the fact that Wh-question, which necessarily require a CP node, are not affected by this phenomenon. This model proposes that in RI clauses, tense

[4] Examples from Guasti M. T. (2002)., *Language Acquisition*, Ch. 4. The MIT Press Cambridge.

specifications are not given by grammatical features but by the context in which sentences are uttered.

Valian (2006) tested children's understanding of tense features, independently from aspectual ones. The main questions of her study were:

- Are children's first production lexically-specific or do they include abstract syntactic-representations?
- Failure to include tense markers in early production is due to optionality (or performance limits) or absence of tense features?
- Do children distinguish aspect from tense as soon as they start producing meaningful strings of words?

In Comries (1976) words, tense relates the time of utterance to some other time, while aspects are "different views of internal temporal constituency of a situation". Most importantly, *tense* does not necessarily correspond to temporal interpretation of the sentence, as the present tense can indeed refer to different *times*.

Children were divided into three groups (2, 3 and 4-years old) in order to look for any developmental pattern in children's understanding of tense independently of aspect. The experiment contraposed auxiliary will and did, copula is/was and progressive is/was; the last contrast was predicted to be particularly difficult for the younger group based both on previous studies (Wagner, 2001) and on suffix *-ing* suggesting an ongoing action.

As mentioned earlier, younger children often fail to express tense markers, especially in nonnull subject grammars, and this led some to

suggest that children's grammar lacks tense features and that it consequently lacks the category of the Verb.

Valian tested 73 monolingual English-speaking children, 48 experimental items were created and all children were exposed to the three contrasts mentioned above. Tensed elements were pronounced with a contrastive stress in order to overcome the risk of their lower acoustic salience compromising children's performance.

For example, the experimenter showed the child a picture with two smiling bears, then she substituted one happy bear with a sad one and asked the child to point to the bear that *was* happy (italics indicates emphatic stress on the part of the experimenter).

In order to be successful, children had to recognize the constrast implied by the stress and follow the logic out (*was* but *is* not anymore) but there's still controversy on 2-year-olds ability to follow this logic.

The experimenters did not measure the number of correct answers but the extent to which the two tenses were recognized as different across stimuli.

Although 2 and 3-years old children tested by Valian showed lower accuracy scores than the older group, children showed evidence of having a representation of the tense feature (and consequently of the syntactic category Verb, contra Tomasello, 2002) independent of aspect.

The youngest group, as expected, had lowest accuracy rates in the progressive contrast and did not make a strategic use of adverbial cues, suggesting that lexical meaning did not yield a role in their interpretation of sentences. Failure with past progressive, considered along with their success with auxiliary and copula, further suggests that tense is

independent from aspect and, if anything, aspect can actually have a negative interference.

Younger children's lower accuracy could also be due to their lower processual means which were also put to the test in the experiment: sometimes children looked at the correct item while pointing at the wrong one giving supporting evidence for theory-of-mind hypothesis that knowledge does not always translates into action.

In the next chapter I will show how syntactic priming can be used to address these representational issues by investigating subconscious knowledge both in children and adults.

2 Priming and passives

2.1 How does priming work?

In the previous chapter we discussed how language production is, with no doubts (whichever account we stand for), a computationally taxing processing task. Speaking requires that the speaker select, retrieve and build lexical, syntactic and phonological, representations to express pre-verbal conceptual representations, or messages. One way to track and influence the choices behind an utterance formation comes from a very interesting phenomenon which can be both naturally found and psychologically controlled in laboratory settings: priming.

Priming occurs when a prior exposure to a stimulus influences subsequent processing of the same or related stimulus (Branigan, 2007). It relies on the processor's ability to recognize the stimulus, and that's why it can give us insights onto how language is mentally (abstractly) represented.

The first observation of the naturalistically occurring syntactic priming phenomenon goes back to the 1980s. Schenikein (1980) analysed a dialogue between two robbers noticing how, in response to his fellow, one of them replied by means of the same syntactic structure.

In a follow up semi-experimental study Weiner and Labov (1983) primed passive sentences in an in setting; Levelt and Kelter's analyses of shopkeepers's speech showed that they tend to repeat the form of the question in their answers.

Bock (1986) pioneered the first truly experimental syntactic priming study in the laboratory. She used an elicited production task to prime active and passive sentences production and prepositional vs direct object production. Participants were presented with audio-recorded

sentences and images on the computer screen and were asked repeat the sentences and describe the pictures in a cover running recognition memory task. Subsequent studies showed priming even when participants were not asked to repeat the sentences.

In conclusion, priming has also been proved to influence response latency, which means that speakers are faster to produce utterances or choose analyses, or even read expressions that they have recently encountered.

Various aspects that may enhance or decrease priming outcomes have been investigated, among these we have: cumulativity, inverse frequency interaction (less common constructions being more easily primed), lexical boost and decay.

The cumulativity of priming was demonstrated by Jaeger and Snider (2008), in a corpus study showing that the strength of the priming effect increases with the number of primes that precede it in the corpus.

Priming has also been found to show an inverse frequency interaction: less frequent syntactic structures are primed better than more frequent ones. This was first noted experimentally by Scheepers (2003) for relative clause attachment priming, and it has recently been confirmed by Snider and Jaeger (2009) for the direct vs prepositional object alternation. Corpus studies are consistent with these experimental findings.

The experimental records indicate that syntactic priming is affected by lexical repetition. If the prime and the target share open-class words, a stronger syntactic priming effect is found (compared to a condition where there is no lexical repetition between prime and target). This lexical boost effect has been demonstrated in many experiments, in

which the head word was repeated between primes and targets in one condition.

However, there is evidence against this hypothesis from studies that demonstrate lexical boost effects for constructions that do not involve verbs (Cleland & Pickering, 2003; Szmrecsanyi, 2005) and, more broadly, recent experimental suggest that the lexical boost effect is not necessarily attributed to head repetition (Raffray & Scheepers, 2009; Snider, 2008, 2009).

A number of experimental studies have investigated decay in syntactic priming, but the results do not provide a coherent picture. Some studies suggest that the syntactic bias introduced by priming decays quickly. In Levelt and Kelter's (1982) early study on priming in spontaneous, spoken language production, the effect disappeared after one clause. In later studies involving written sentence production, syntactic priming also ceased to be detectable when just one sentence intervened between prime and target (Branigan et al., 1999; Wheeldon & Smith, 2003). Reitter (2008) found strong decay effects for syntactic priming in spoken language corpora, which occurred in the first seconds after a syntactic decision.

Other studies contrast strongly with this. Hartsuiker and Kolk (1998) found no decay of priming in spoken language production when a one-second temporal lag was inserted between prime and target. In a spoken picture description task, Bock and Griffin (2000) and Bock, Dell, Chang, and Onishi (2007) demonstrated a form of syntactic priming that persists with up to ten intervening sentences. These results were corroborated by Branigan et al. (2000), who found that priming in spoken production persists, independently of a temporal lag or intervening linguistic material that delays the elicitation of the target.

Hartsuiker et al. (2008) were able to resolve this apparent contradiction: they found that the lexical boost effect decays quickly, that is, an increase in priming with lexical repetition is only observable if there is no lag between the prime and the target.

2.1.1 How syntactic is syntactic priming?

How do we know if priming is genuinely syntactic? Exclusion of other possibilities might help us determine whether it is or not.

To begin with, Bock (1989) and Pickering & Branigan (1998) report results strongly suggesting that priming is not lexical as prepositional object construction with “for” can prime answers in which the preposition is substituted with “to”.

Other studies have examined whether the effects might be driven by semantic characteristics leading to repeatedly place in the same syntactic positions entities with common semantic properties (e.g., animacy, or conceptual roles, i.e., roles that entities play with respect to an action) but this hypothesis has been discarded with or, at least, it cannot be said to be the only factor responsible for priming, as this phenomenon occurs both with and without semantic overlap.

It is also excluded that its effects are strategic as usually people are completely unaware of the manipulation, and its effects have been found, with no significant difference to control, also on people suffering with amnesia Ferreira et al. (2005). Effects of priming on pre-schooler also rule put the possibility of a strategic pattern as children have been shown by Flavell, J., Miller, P., & Miller, S. (2002) to be particularly poor at devising and employing strategies.

Priming efficacy has been tested across modalities and it occurs on memory tasks, sentence recall, picture matching + description tasks, sentence completion, action description and response latency; written vs spoken variants have also been considered and priming effects extend from one to the other equally.

Different tasks show different degrees of effectiveness, Potter & Lombardi (1998) and Braningan (2000) both report that DO/PO sentences are more easily primed than passives, and production more strongly primed than comprehension both in monologue and dialogue tasks. Indeed, syntactic priming appears particularly strong in dialogue, to the extent that it has been proposed as a fundamental mechanism underlying speakers' convergence on the common semantic representations that effect successful communication (Pickering & Garrod 2004).

Thothathiri, Snederer (2008) report priming effects on children aged 3 and 4 by means of an online comprehension test which exploited preferential-looking paradigms.

As the authors report, contrasting evidence has been given on children syntactic representation by means of priming studies: Savage et al. 2003 claim that children younger than 6 years only show lexically specific effects, while Huttenlocher, Vasilyeva and Shimpi (2004) found contrasting evidence, corroborating the continuity hypothesis.

Thothathiri and Snederer, investigated effects of priming with dative sentences in comprehension, by means of an act-out technique: children were seated in front of a box containing 4 props and a camera hidden in the middle which tracked eye movement. In order to check if priming was restricted to specific lexical items or to abstract representations of the sentence structures, prime sentences contained

either the same verb as the targets or different verbs belonging to the same class. The authors found that both groups of children showed priming effects both within- and across-verbs.

The authors rule out the possibility that animacy features on characters might have been the actual priming trigger as, even if children exploited this semantic information, they would do so by linking the animacy feature to the thematic role assigned to the NP. Authors claim that in order to account for their results, syntax as to be eventually evoked. Arai et al. (2005) claim that priming in comprehension is more lexically-specific than priming in production tasks, but children's interpretation of dative sentences in this test does not borne out their hypothesis.

The results of this study also gather evidence in favour of the idea that priming does not necessitate of copious input for it to be effective, as first effects are observed already at stimulus number 2 or 4, depending on the subject.

2.2 Passive sentences.

Passivization of sentences is computationally complex and children do not encounter this structure as frequently as actives in the input and adults use strategies to avoid passive production (Gordon and Chafetz 1990, Demuth 1989).

Of course, testing passive sentence acquisition is very interesting for the subject discussed here as, if children younger than 3 years, showed competence in comprehension and production of passive this would be an evidence against the usage based account.

But what makes passive sentences so difficult?

The first and more obvious difficulty comes from the fact that it requires a reorganization of grammatical functions found in active sentences: the order of constituents is not the canonical one, the "first NP equals agent" assumption is discarded and verbal morphology undergoes some modification.

The object of an active sentence becomes the subject of a passive one, and the subject may be omitted or expressed by means of a PP headed by the proposition "by".

Passives involve movement of the subject from its canonical post-verbal position to Spec,IP, an A-position, which allows agreement of the subject and the V. The internal argument receives its thematic role before movement, and leaves a coindexed *trace* in the canonical object position.

When producing a passive sentence Verb morphology undergoes a modification expressed by the use of an auxiliary (get or be in English, essere or venire in Italian) plus past participle combination. The agent is not expressed by an NP in argumental position, but by a post-verbal

adjunct whose head is occupied by the preposition “by” (or “da” in Italian); interestingly this adjunct can be dispensed of even if case theory requires each and every verb to assign a specific number of arguments.

a) Italy beat Belgium.
b) Belgium was beaten (by Italy).

Sentences a) and b) express the same meaning by means of two very different structures. As we said, the verb, in this case “to beat” must assign a specific number of thematic roles in order to be semantically valid, as c) shows:

c) * Italy beat.

The obvious doubt that arises: how is it possible for sentence b) to be accepted? What property of passive sentences allows this idiosyncrasy?

It’s been argued that passives do not assign an external thematic role to NP in argumental position; but it is logically clear that there must be a beater of Belgium even if it isn’t phonologically expressed.

Chomsky (1965) observed another idiosyncrasy of passive sentences: they do not always translate perfectly into active ones.

d) Everyone in the room speaks two languages.
e) Two languages are spoken by everyone in the room.

The presence of quantifiers highlights the difference in meaning: while the active sentence means that each person in the room speaks any two languages, the second one means that everyone in the room speaks two specific languages.

2.2.1 Jaeggli and Roberts's proposal for passive derivation.

Jaeggli (1986) and Roberts (1987) argued that the agent of an active sentence is absorbed by the V morphology in a passive one, which implies that an external thematic argument cannot be assigned to an NP in A-position as it is just not available anymore.

f) It is widely believed that Bertie is a liar.

Examples like f) do not contrast with this hypothesis as the expletive "it" never receives a thematic role, but serves only the English requirement to have a phonologically expressed subject; Italian, being a pro-drop language, strengthen this view, as does example h) in which the expletive is not allowed, being a subject already present:

g) È generalmente creduto che Bertie sia un bugiardo.
h) *It was beaten Belgium.

The difference between g) and h) is that in the latter, V assigns the internal thematic role to the NP Belgium, while in the previous one this role is assigned to the phrasal complement. Expletives are indeed used in occurrence of phrasal complement, not NP complements, because only the latter need to be assigned a thematic role.

Other evidences that the external argument need not to be expressed as it gets absorbed by the passive verbal morphology comes from examples i) and j):

i) Food should never be served only for oneself.
j) The ship was sunk [PRO to collect the insurance money].

In i) the anaphor *oneself* must be bound in order to satisfy the Principle A of the binding theory: the binder can only be passive morphology; in j) we have a PRO referring to the person who sunk the

ship, this PRO is controlled by the passive morphology which assigns the thematic role of the external argument of the verb *sink*.

We conclude that, a V expressing a passive form, loses the faculty to assign accusative case to its internal argument; the only solution left is then to move the complement in the Spec, IP position: the complement, being in subject position, receives nominative case.

Properties of passivization can be summarized as follows:

- Verbal morphology modification;
- V's absorption of external thematic role;
- V's structural case absorption;
- Movement of V's internal argument to a position in which it can be assigned a case;
- Obligatoriness of this movement due to case filter;
- Emptiness of the subject position, allowing internal argument movement.

To sum up, passive sentences are complex structures involving movement of the NP in internal argument position to Spec, IP to receive nominative case, meaning that the final and phonologically expressed order differs from the order constituent were generated in.

2.2.2 A smuggling approach.

Collins (2005) argues against the case-absorption proposal, its great fault being the fact that this analysis assumes two different generation points for the external argument in passive and in active sentences. This idiosyncrasy in θ-role assignment is a clear violation of

UTAH (Uniformity of Theta-Assignment Hypothesis) by Baker (1988) according to which: *identical thematic relationships between items are represented by identical structural relationships between those items.*

The proposal thus, is that constituents are generated in their canonical position but are subsequently moved: in this case we have movement of the object in subject position. Passives involve movement of the patient NP to a higher position in the structure; the element moved leaves a trace (or a copy) which, occupying the base position, gets assigned a thematic role by the verb. The moved NP and its trace are connected via a chain (they are coindexed), which allows thematic role transfer to the moved phrase.

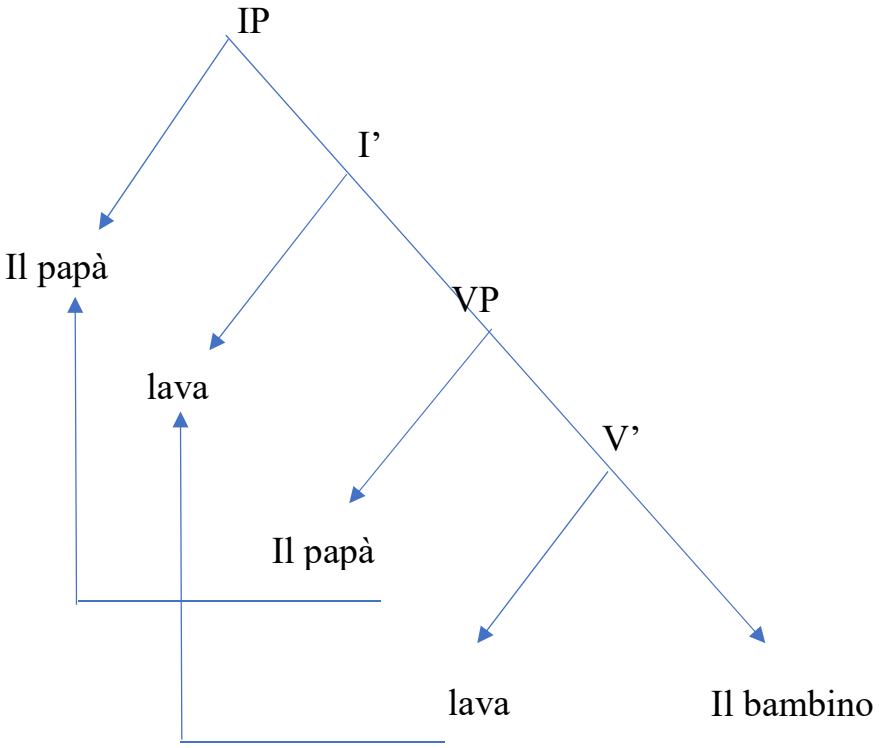
Collins starts from considerations derived from Rizzi's *Relatived minimality theory*. According to Rizzi (2001) each constituent in VP is characterized by a set of *Argumental* features, while constituents in CP are characterized by *Quantificational features.* In a sentence in which we have three constituents:

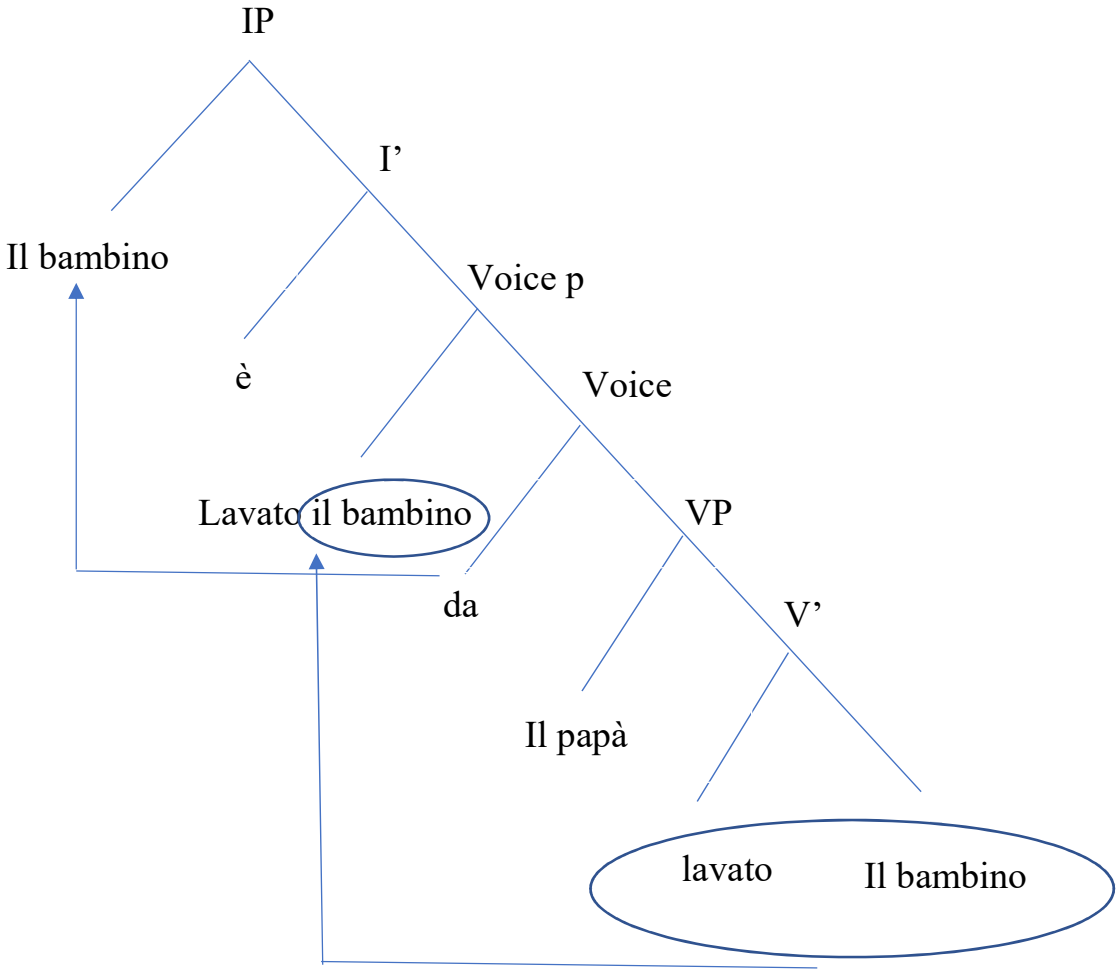
X ….. Z….. Y….

A syntactic relation (movement, agree, case checking, binding) between X and Y cannot be established if the intervening Z shares the same features as X and Y.

That is to say that, carrying Z the same features as the constituents at its sides, the sentence is ill-formed.

In order to avoid RM in passive sentences, Collins claims that passive sentences are formed through multiple local move operations, rather than by a long one.


IP
I’
Il papà
VP
lava
V’
Il papà
lava
Il bambino


IP
I’
Il bambino
Voice p
è
Voice
Lavato il bambino
VP
da
V’
Il papà
lavato
Il bambino

The above syntactic trees show the derivation process of an active and a passive sentence; in the second one we see smuggling: the verb and the object first move as a unique constituent, avoiding thus a RM effect due to the NP “Il bambino” crossing over the NP “il papà”; in a second moment, the object moves to Spec, IP assuming the subject position.

Since the object cannot move by itself, it attaches to the verb and moves to a position higher than the subject (which shares its argumental features); only after this first movement the object, “il bambino”, can move to the Subject position, Spec, IP.

Collins claims that, in line with the economic constraints of UG, smuggling of the Verb with the Object is a more economic solution: it prevents RM effects and exploits shorter, local movements of constituents.

2.2.3 Constraints on the acquisition of passives.

Studies on children acquisition of passive sentences claim that semantic and processing constraints play a role in children comprehension and production of passive sentences.

Maratsos et al. (1985) found that passive including *actional verbs* are easier than ones including *non-actional verbs* such as think, love, fear; Horgan (1978) claims that short passives, which do not include the by phrase, are easier than long ones and passive sentences expressing a change in the state of the patient due to agent intervention are better depicted in the child’s mind. Another asymmetry has been reported cross-linguistically between adjectival and verbal passives, the first being acquired earlier than the latter.

Borer and Wexler (1987) claim that English, Hebrew and German children's passive sentences are indeed adjectival passives, which are constructed starting from the basic argument structure of the verb (agent – verb – patient). Children would proceed by omitting the agent (thus not producing the by phrase), and creating a new argument structure of the verb (in past participle from) which suffices of the externalization of the previously internal argument (the patient), which finds itself in subject position. k) thus, becomes l):

k) Paul closed the door.
l) The door was closed.

According to Borer and Wexler l) is incompatible with the by-phrase and with non-actional verbs that do not result in obvious state variations.

Maturational constraints are held to be responsible for children's inability to produce passives which are not adjectival: the main difference between adjectival and verbal passives is the fact that only the latter involve movement of constituents to non-canonical positions, while in the former subjects/patients are base generated in pre-verbal position. The researchers claim that children younger than 5 years are yet to reach a maturation of A-chains which would allow them to identify and correctly assign the thematic role to the trace of the moved element, having no choice but to produce adjectival passives. Recent studies on passive acquisition by means of priming techniques challenge this view: children aged 3, 4 and 5 show evidence of an early abstract representation of syntactic structure supporting the nativist account.

Borer and Wexler (1987) claim that first passive productions are based on short adjectival passives; due to processing or maturational

constraints, children are unable to assign a thematic role to the noun in the by-phrase and end up omitting it.

Grodzinsky and Fox (1998), on the other hand, claim that semantic cues play an important role in children's understanding of passive and can use the preposition to assign the thematic role of the agent to the NP in the by-phrase. Crucially though, they can do it only when the action involves a clear agent-patient relationship, because this analysis cannot hold up for experiencer-theme verbs, as it would assign the wrong thematic role to the experiencer. Grodzinsky and Fox found that children have a lower accuracy rate when interpreting experiencer-theme passives.

Other researchers suggested that difficulty with passives is due to semantic factors making transitive verbs easier to process than intransitive ones: the first category being related to a clearer agent-patient interpretation and the latter being related to an experiencer-theme interpretation. This prediction wasn't borne out: to begin with, the connection hypothesized between syntactic (transitive-intransitive) and semantic (agent-patient vs experiencer-theme) values does not hold necessarily as sentence m) shows:

m) The boy was scared by his brother.

Moreover, Ferreira (1994) actually found that children in her study produced more experiencer-theme than agent-patient passives.

If grammar-based accounts attribute children's difficulty with passives to specific grammatical characteristics of this sentences, input-based accounts claim that the delay in acquisition is due to the fact that they are rarely found in the input.

An analysis of CHILDES Database (MacWhinney & Snow 1985), carried by Gorden and Chafetz (1991), highlighted that passive sentences (especially long ones) are a lot less frequent than active sentences in child-directed speech. The usage based account would thus predict short passives to be acquired earlier and better, but studies by Gordon and Chafetz (1990), Hirsch & Wexler (2006) did not borne out this hypothesis and found that both children and adults performance is slightly, though not significantly, better with long ones.

Studies on Sesotho and Inuktitut (Demuth, 1989; Allen & Crago 1996) have been carried out to test children's comprehension of passive sentences: the peculiarity of this languages is in fact the much higher frequency of passive sentences in natural speech. The usage-based account claims that, being passive sentences often encountered, children acquire them earlier than their English peers. On grammar-based account this discrepancy is explained by specific syntactic properties of Sesotho passives, which are always *resultative* and do not involve as long and complex A-movement operations.

Lau (2011) further challenges this view: in Cantonese passives represent only the 0.0002% of the input, yet children seem to acquire them quite early. Lau proposes that another variable allows their acquisition: consistency. Cantonese passives necessarily require the use of the particle *bei* which guides children in assigning thematic roles correctly, thus compensating for their scares frequency.

2.3 Different studies on passive acquisition.

Latest data on passive sentence acquisition in Italian children come from Volpato et al. (2016). This study finds its roots in observation and analysis of previous studies on passive acquisition which give some contradictory results based on variables like ±actional features on the verb (Maratsos et al. 1985), presence or absence of the by-phrase (Horgan, 1978; Orfitelli, 2012) venire vs essere auxiliary (Manetti, 2013); moreover, the authors are interested in testing correlation between syntactic competence and memory capacity (Montgomery et al. 2008).

Subjects were tested by means of a comprehension + digit span task and a production task: both children (aged between 3;5 and 6) and adults took part in the study; children were further divided into subgroups depending on their age.

The first task was comprised of 40 stimuli: subjects heard a passive sentence that correctly described only one of the three pictures they were shown and had to correctly match sentences to pictures; half of the passive sentences included the by-phrase and half didn't; both + and - actional verbs were used. Additionally, a span digit task taken from a standardized memory test was submitted.

Results show that +actional verbs are easier to understand and short passives are easier than long ones, for all groups but for some children of the middle-aged group who performed below chance level.

3-year-olds have an 81% accuracy with *venire* passives and no significant difference is observed between *essere* and *venire* passives; authors did find a difference between actional and non-actional verbs but attributed it to the task itself, considering that non-actional verbs are less

easily depicted. They also found that memory test results positively correlate with accuracy rates and conclude that no maturational hypothesis is required.

The production test consisted in a picture description task guided by the experimenter asking patient-oriented questions; the test comprised 24 stimuli and 12 filler sentences; ±actionality features were manipulated.

In all groups children produced passives sentences, but not every child did, showing that great variability is to be found in the population. Interestingly, G2 (the middle-aged group) shows lower production rates than G1, while almost every older child produced passive sentences. Overall, children produced sentences with both passives but preferred the auxiliary *venire*, maybe because it has a less ambiguous reading; a significant difference between comprehension and production accuracy is to be found, but difference between actional and non-actional verbs is restricted to the comprehension task corroborating the hypothesis that this discrepancy is caused by the difficulty in interpreting the image rather than in syntactic knowledge.

Results from Volpato et al. study show that Italian children aged 3;5 years efficiently comprehend and produce passive sentences regardless of ±actional features of the verb used and of them being adjectival short passives or actional long ones including a by-phrase.

Valian, Bencini (2008) report the results of a priming test on passives with younger children aged 35- 42 months. Children were divided into two groups: one of them received a passive priming and the

other an active priming; both groups were tested on comprehension of passive sentences with a picture matching task.

The goals of their study were to determine whether children exhibited a syntactic priming with passives, to establish the relation between comprehension and short-term priming in production and to examine whether priming might represent a mean of learning of a certain structure.

53 children took part in the experiment; they were divided in 3 groups based on prime exposure (passive, active or no priming).

The priming task was comprised of 8 prime stimuli and 8 target stimuli, all depicting transitive action with inanimate participants (e.g., a picture of a spoon stirring a soup). The comprehension test was comprised of 24 pairs of pictures depicting transitive events; children were shown two pictures in which the same action was depicted, the only difference being role inversion of the characters. Children had to first identify characters by pointing at them and then were asked to put a sticker on the picture describing the sentence they heard; all sentences were full passives.

They found that comprehension task did not prime children's production: the group primed with active sentences in the production task showed no effect of priming of passive and high accuracy rate in the comprehension task did not necessarily correlate with production of passives in the other group.

They also found that the lexical warm-up helped children reduce processing and cognitive demands allowing children to concentrate on the sentence structure, thus showing stronger priming effects and giving

evidence that previous similar experiments may have failed showing priming effects due to higher cognitive demands.

Results were analysed with different coding schemes, a lax and an adult coding scheme; the latter allowed for comparison with other studies on priming with adults and confirmed that younger and less skilled population (as well as impaired populations) are more easily primed.

One important find was that qualitative analysis showed that young children have much more difficulties in the repetition task resulting in omission of constituents, even when the stimulus is an active sentence. This is particularly interesting when comparing repetition and production skill: the experiment showed that less accurate repetition doesn't imply that children cannot access the syntactic structure as low accuracy rate in this task doesn't correlate positively with results in production of passives.

To sum up, results in this experiment, combining comprehension and production of passive sentences, provided evidence that young 3-year-olds do have an abstract representation of syntactic structures which can be primed successively, proving that children interpretation of thematic roles doesn't rely on linear order of constituents.

Messenger et al., 2012 used sentences with both agent-patient and experiencer-theme (+ theme-experiencer) as stimuli to prime agent-patient target sentences.

They compared a group of children aged 3-4 years with a group of adults (mean age 21) in three tasks: two elicited production and one picture matching task (the comprehension one was presented in later sessions).

The first experiment aimed at comparing adults and children's productions with agent-patient and theme-experiencer passive sentences; the second experiment aimed at comparing adults and children production with theme-experiencer and experiencer-theme sentences.

Both tasks used 24 target pictures depicting an animal as the agent/theme and a human as the patient/experiencer. The task was presented as a game using cards and 8 filler pairs of cards were used: these depicted the exact same image and when they were encountered the child and the experimenter had to say "snap".

The comprehension test was comprised of 36 stimuli, described with both active and passive sentences, passives being once again divided into agent-patient, theme-experiencer and experiencer-theme variables.

Children produced passive sentences irrespective of semantic constraints and to the same extent as adults did; agent-patient and theme-experiencer depicting pictures proved to be easier to interpret than experiencer-theme ones, both for adults and for children.

Importantly, any priming effect due to the order of thematic roles was overridden. 3 and 4-year-olds were found to have an abstract and primeable representation of passive sentences. The experimenters found a difference in production and interpretation of experiencer theme sentences, production showing higher accuracy rate; they think this difference might be explained by the experimental task itself rather than by a better competence in production over comprehension: images showing an agent-patient action are indeed visually clearer.

The authors stress that a very important factor when considering the outcomes of a study is the analysis of the task itself as the same

children might perform badly due to an increased difficulty in the task procedure. If children have difficulty in distinguishing two pictures, not necessarily in processing sentences, then they will perform poorly regardless of their syntactic knowledge.

This aspect is crucial in a picture matching task using experiencer-theme verbs because they are a lot more difficult to depict; as I will explain in the next chapter these difficulties were kept in consideration also in the present experiment both in the comprehension and the production tasks.

Manetti (2013) tested Italian 3 and 4-year-old children competence in passive sentences by means of an elicited production and two priming tasks. The aims of the study were to compare children and adults in an elicited production task in which participants were asked patient oriented questions and to analyse production of passives after exposing children to venire-passives and copula passives. In the elicited production task children produced mostly active sentences and avoided passive production through a pronominalization strategy (Clitic left dislocation sentences); adults, on the other hand, showed a preference for passive sentences after patient-oriented questions.

In the second part of the study children were divided into three groups (mean age 4) and were exposed to both active and passive primes, with a further differentiation in the auxiliary used in the priming sentence. Each child heard 12 actives and 12 passives; the experimental procedure was turned into a game in order to increase children's interest and cooperation.

Children's productions were coded twice: in the first analysis only full, adult-like passives were scored as passives, and in a second analysis reversed passives (characterized by a periphrastic morphology and

inversion of thematic roles) and deviant passives (e.g. passives in which *by* was substituted by another preposition) were included.

Overall children showed effects of active and passive priming; a significant difference between venire and essere-passives was found, with children producing less passives and more ClLD after copula-passives.

The most frequent error, when children produced passive sentences, was thematic role inversion; children also produced sentences with a wrong proposition and impersonal SI-passives with a by phrase (which are not allowed in adult grammar):

n) L'uomo viene innaffiato sotto la ranocchia.
o) L'infermiere si è preso dalla tigre.

A few instances of passivized novel verb and passivized intransitive verbs were encountered.

Importantly children aged 3;6 were found to be able to produce long verbal passives with a by phrase inconsistently with both Italian and cross-linguistic finds claiming that children reach competence with this structure only at 5 (Chilosi and Cipriani, 1998; Ciccarelli 1998; Borer and Wexler 1987; Maratsos 1985).

This study confirms findings from more recent studies by Volpato et al. (2011), Driva and Terzi (2008), and other studies reported above that proved children to be able to produce verbal passive sentences from 3 years of age.

3 The present study

3.1 Introduction

Passive sentences are complex structures marked by an unconventional order of constituents due to A-movement of the object of an active sentences in the pre-verbal, Spec IP position. In order to understand the meaning and correctly assign thematic roles to the arguments of a fully reversible passive sentence, the children tested must be able to create a copy or trace of the moved constituent and assign it the correct thematic role.

Valian and Bencini (2008), Messenger et al. (2012), Manetti (2013) and by Volpato et al. (2013- 2016) report that children aged 3 to 4 years old show above chance competence in both comprehension and production of passive sentences: the present study investigates comprehension of passive sentences in younger children aiming to detect any developmental pattern in the acquisition of this type of sentences in a group of Italian children.

3.2 Comprehension test.

3.2.1 Introduction.

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3.2.2 Participants.

During the first month of my internship I got to know the children and establish rapport with them. I participated in all school activities along with the teachers and met the children's parents. I was in school between ten to twelve hours per week.

A meeting with parents was organized at the end of this first month to present the project and collect consent forms; a power point presentation and a brief simulation of the priming task were given during that meeting; all parents attending the meeting gave consent for their children to participate in the study and signed the consent form.

The consent process and associated consent form were organized as follows:

- Brief presentation of the experimenter;
- Brief explanation of the aim of the study;
- Explanation of experiment execution (where and who would take part in the experiment, means of data collection);

- Parents were asked to sign a consent for sound recording of the sessions.

The consent form also informed parents that if, at any moment, they or their children felt uncomfortable or unhappy to take part in the experimental task they could abandon the study group with no consequence; neither the participant nor the experimenter were asked an economic contribution.

A fac-simile of the consent form is given in Appendix A.

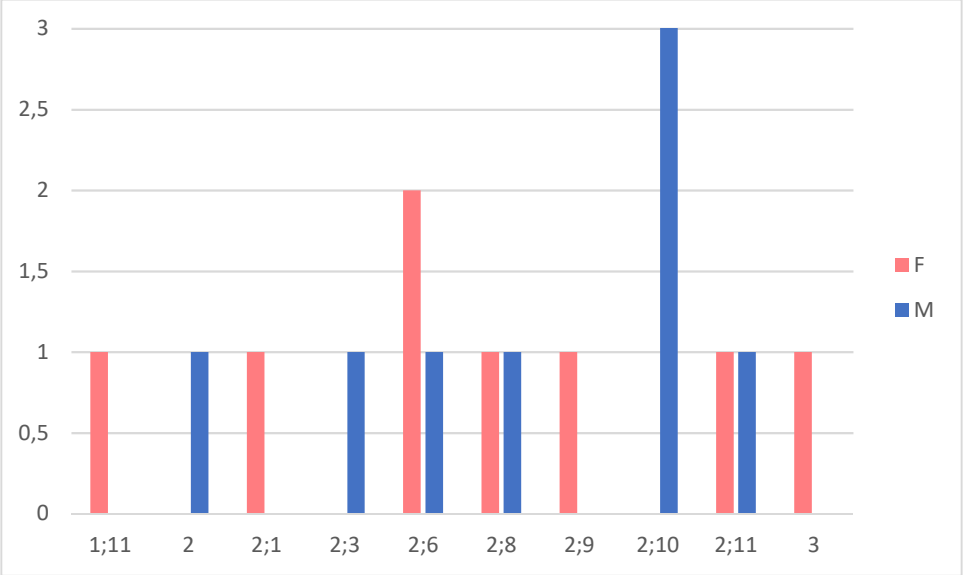
The group was composed of 17 children, aged between 1;11 and 3 years (MA 2;7), 8 females and 9 males, all from middle to upper-middle socio-economical background.

Even though no data was collected during ordinary activities at the centre, a general observation of the

children's linguistic abilities leads me to make a few considerations, which were particularly important when designing the second part of the experiment. Overall children did not show ability to produce long or complicated sentences in natural speech; less than half of them proved to be able to engage in a conversation with their peers or with teachers. Those who did show a tendency to speak more still had many difficulties in phonemes distinction, made some overgeneralization mistakes especially when conjugating verbs (e.g. "diccio" used instead of the correct form "dico"), but showed much creativity especially when asked to take turns with the experimenter in telling a story. Some of the less skilled children proved to have difficulties even in saying their names, others were very shy and only answered to precise or yes or no questions. All these variables

considered, less than half of them were tested in the production task and only five actually managed to complete the task.

Figure 1. Overview of subjects age and gender.



Children taking part to the tests all seemed to enjoy experiment and some even asked to repeat sessions.

3.2.3 Materials.

The first task to be administered was the comprehension task, which was an Italian adaptation of the comprehension task used in Bencini and Valian (2008). The task comprised 15 pictured reversible transitive events with animal and child characters (e.g., a bear washing a boy, a boy washing a bear) administered in two different presentation orders and in a semi randomized way. During this task children used stickers (produced by the children in another activity) which were to be attached on the chosen picture by children. At the beginning stickers comprised both images of animate and inanimate items but after a few

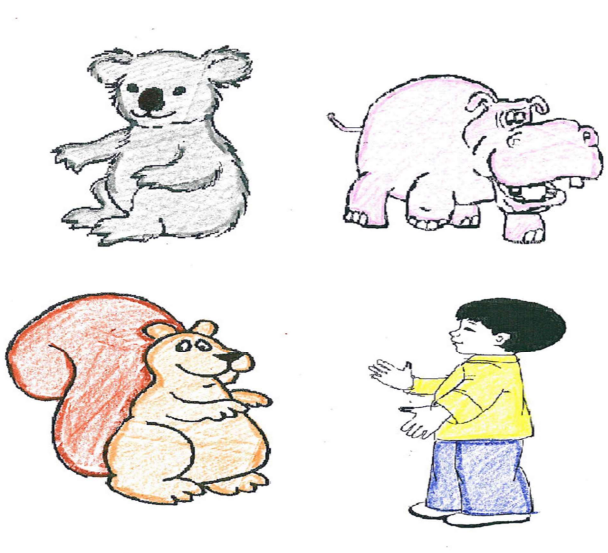
trials I decided to use only inanimate items in order to avoid any confounding variable; children seemed rather interested in stickers and sometimes used them to play or asked questions about them; they were left free to play with them for a minute or so as there were no filler sentences in the task.

The actual drawings in the comprehension study all depicted +animate characters, which means that all sentences were fully reversible passives.

In order to reduce the processing demands associated with lexical retrieval a lexical warm up session was carried out before each trial; children were shown drawings of the subjects which were to be found later on in the experimental pictures and asked either to name them or point at them. Four subjects per page were depicted and no action could be inferred by the drawings in the lexical warm up. Additionally, before asking the children to match the correct drawing to the passive sentence, they were asked once again to point to each character in both drawings.

This lexical warm up allowed to exclude lexical knowledge influence on the test results.

Figure 2: The drawing shows an example of the stimuli used in the lexical warm up phase which took place before the experimental task. Children were asked to either touch or name “il koala, lo scoiattolo, l’ippopotamo e il bambino”; characters were named randomly.



The comprehension test was administered via a picture to sentence matching task: for each stimulus children were presented two paper drawings depicting the same characters and the same action, the only difference between the two being the inversion of thematic roles of the character. Children were asked to put a sticker on the drawing depicting the sentence uttered by the experimenter; I decided to use stickers to increase children’s interest in the task by making it more playful.

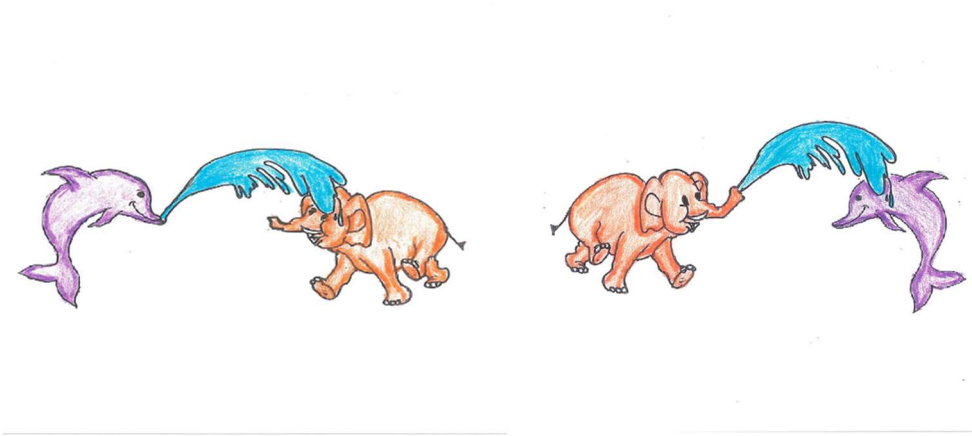
An example of an experimental stimulus is given in the next page.

Experimenter “Tocca l’elefante in ciascun disegno.”

Experimenter “Tocca il delfino in ciascun disegno”

Experimenter “In un disegno, l’elefante viene bagnato dal delfino. Sai dirmi quale?”

Figure 3: Item 14 representation. Two A4 sheets representing these images were placed in front of the child; one or the other drawing were described as the target picture to different children; disposition of drawings on the table was also semi-randomized.



Characters depicted were either animals or humans clearly defined in gender features; they were paired as follows: *serpent – rana, orso – bambino, bambino – bambina (X2), koala – scimmia, polpo – scoiattolo, paperino – topolino, cavallo – zebra, topo – puzzola, gatto – cane, marmotta – granchio, elefante – ippopotamo, mucca – maiale, delfino – elefante, ragno – stella marina*.

Verbs used were: *leccare, lavare, spingere, grattare, solleticare, buttare (giù), trainare, spruzzare, baciare, spazzolare, pizzicare, schiacciare, colpire, bagnare, asciugare.*

All sentences used are reported in Appendix B.

3.2.4 Design.

Children were tested once, in between curricular activities, in a separate and quiet room with the experimenter; general encouragement was given throughout the experimental session regardless of accuracy in picture selection. If the child seemed distracted or confused, the experiment would repeat the passive sentence only. No time limit was set for the child to choose one or the other picture, the session lasted about 20 minutes per child, lexical warm up included.

A score sheet containing sentences to be read, and indications regarding the disposition of the drawings on the table was used throughout the experimental session; I immediately reported the answers on the score sheet and double checked their correctness as soon as the session was finished.

The aim was to test children's comprehension of long and fully reversible passive sentences from a very young age and check for any developmental pattern across subjects. The difficulty of the task was also taken into consideration and an analysis meaning to exclude any difficulty due to any specific item or attentional drop was conducted.

3.3 The priming test.

3.3.1 Introduction.

Since comprehension and production don't always go hand in hand (Valian and Bencini, 2008; Volpato et al., 2016; Manetti, 2013) I decided to test children also via a priming test that will be analysed as an elicited imitation and production task. Considering that results in the comprehension study do not correlate positively with children's speech fluency a second test seemed especially necessary.

Shimpi et al. (2007) argue that, when working with very young children, processing and memory load might influence test's outcomes; testing two groups of children aged 2;5 to 3;5 and 3;5 to 4;5, they found that younger children showed much stronger priming effects when they would alternate in stimuli description with the experimenter then when they were primed with a block of sentences before being given stimuli to be described. The reason for asking children to repeat the prime sentence in the present study was not specifically to increase priming effects but to test their ability to reconstruct, retrieve and reproduce the underlying syntactic structure of a passive sentence.

An elicited imitation task can be used to investigate each subject's grammar or language knowledge: in order to repeat the sentence correctly children must attend to, listen to, understand, analyse and represent the stimulus sentence and then reconstruct it to produce the response.

Repetition of a complex sentence is not a rote or passive copy of the stimulus, rather a reconstruction and it provides evidence as to the

underlying system the subject is using: the aim was to check if repetitions matched or not with the stimuli, and especially to analyse potential errors and deviant patterns.

Advantages in using this task, especially with such young children, lie in the possibility to test a sentence structure that may otherwise never appear in spontaneous speech and in the fact of it being a natural and innate process in children who have a tendency to repeat sentences they hear anyways.

Prime sentences were used in order to bias children in the production of passive sentences when they were asked to describe or tell what happened in the video they were shown; as it's been explained thoroughly in the previous chapter, priming effects can occur only if the child is able to recognize and represent abstractly the underlying syntactic structure of the prime sentence.

Bencini and Valian (2008), in line with previous findings reported by Leonard et al (2000), Hartsuiker & Kolk (1998) and Flett (2006), found that less skilled or inexpert speakers are more sensitive to priming effects, probably because they have a less varied range of structures to choose from when deciding how to convey a message.

The main aim was thus to investigate children's abstract representation of passive sentences especially analysing deviant patterns or errors, as they may shed some light on the process behind more complex sentence acquisition

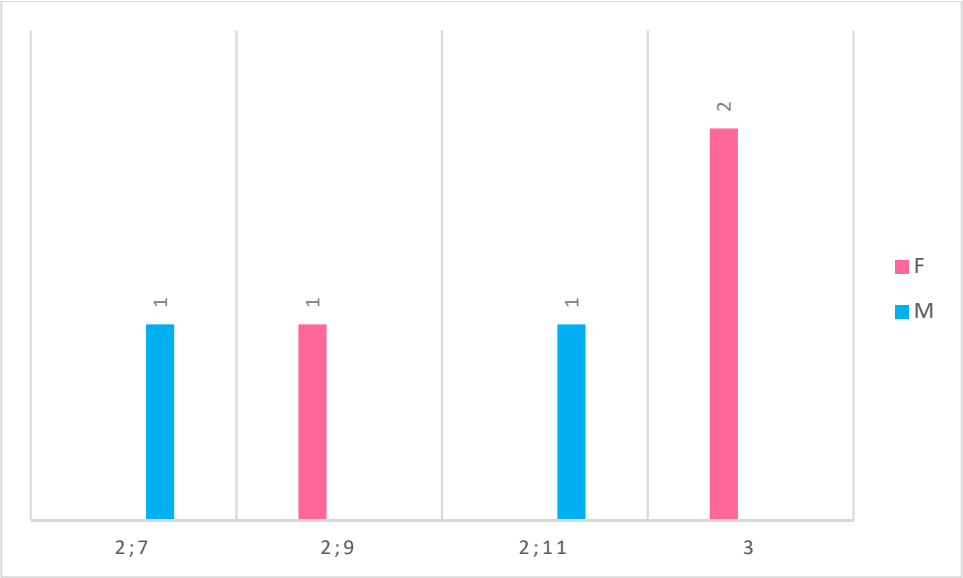
.

3.3.2 Participants.

A smaller group, selected from the children who took part in the comprehension task, participated in the test. As it's been anticipated in the previous section, children were selected after observing their speech fluency and it was decided to test only children who actually showed to be able to engage in a conversation.

Five children were selected: two boys and three girls, age ranged from 2;7 to 3 years (MA= 2;10), the younger subject being a boy and the two older subjects being girls.

Figure 4. Overview of subject's age and gender distribution.



3.3.3 Materials.

This task was not preceded by a lexical warm-up as it was built to fit vocabulary knowledge observed in children: prior to test submission,

I observed children's natural speech and consulted the teachers in order to choose which verbs and characters to use in the production test.

The task was created using either very common verbs or verbs related to activities children would do themselves daily at home or in the school; characters used were chosen among popular cartoon characters, characters of the songs sang at school, animals and common nouns; some less frequent words or verbs were used in the prime sentences while target videos always showed everyday life actions and objects or characters.

Even though verbs selected were mostly actional, meaning that they could be easily depicted, teachers suggested using videos or props for this task as, being children so young, still images might not be clear enough for them to infer what action was being performed; Volpato et al. (2013) argue that children's performance in their comprehension study might have been influenced by a difficulty specifically related to image interpretation. I then decided not to use props to avoid children getting distracted or picking props up to play; a selection of videos was either downloaded or filmed especially for this task.

The test was comprised of 24 stimuli in total.

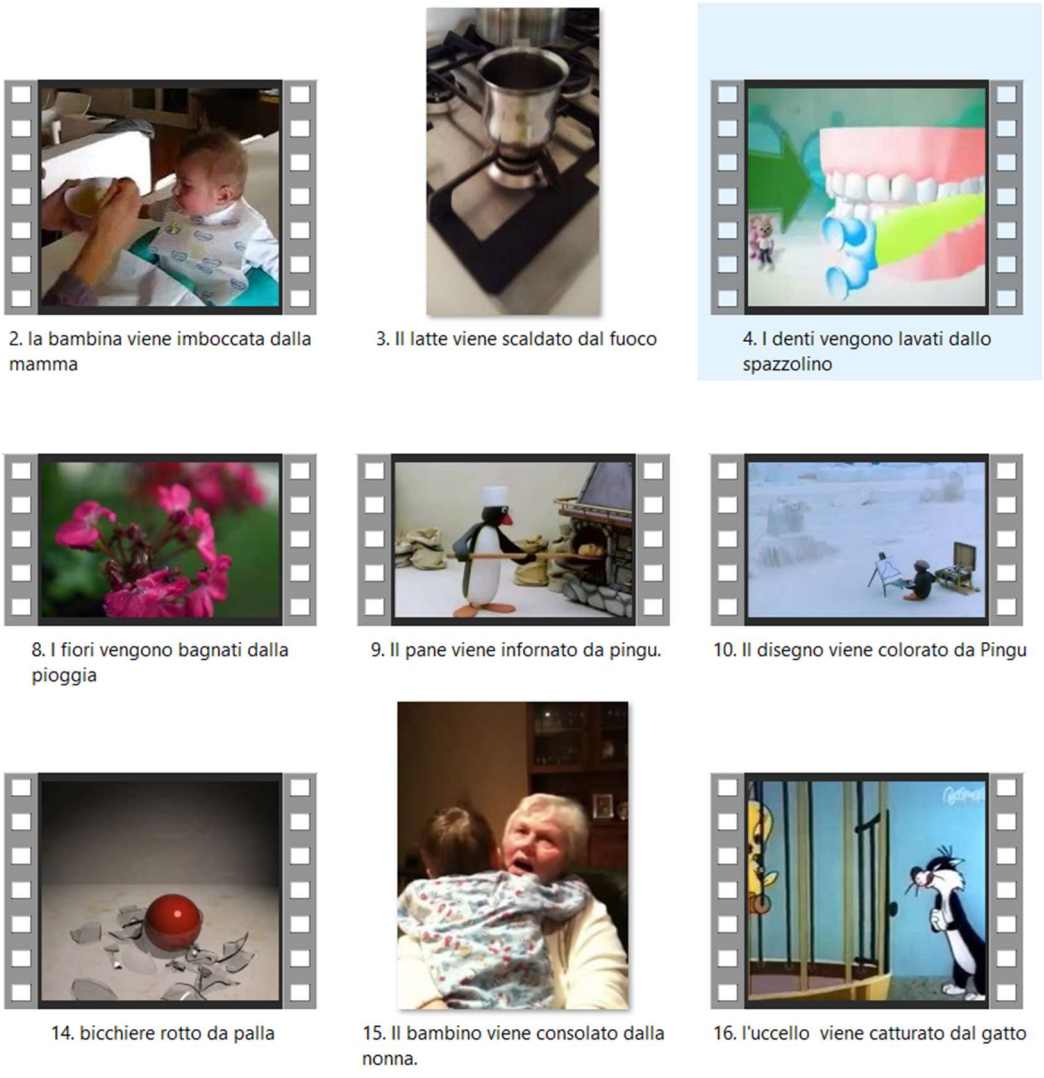
Verb used in prime sentences were: *sgridare, scaldare, inseguire, cancellare, infornare, fotografare, asciugare, consolare, staccare, tagliare, bere* e *illuminare*; target verbs were: *imboccare, lavare, vestire, bagnare, colorare, svegliare, rompere, catturare, pulire, sollevare, raccogliere* e *spegnere*.

Characters appearing in the prime senteces were: *Topotip – mamma, latte – fuoco, gazzella – leopardo, disegno – gomma, pane – Pingu, cane – signore, mani – asciugamano, bambino – nonna, foto –*

maestra, mela – coltello, acqua – signore, casa – sole; characters appearing in the target sentences were: *bambino – mamma (X2), denti – spazzolino, fiori – pioggia, disegno – Pingu, signore – cane, bicchiere – palla, Tweety – Silvestro, tavolo – maestra, terra – ruspa, fragole – signori, fuoco – macchinine.*

Animacy feature was also manipulated: 5 sentences had -animate characters pairs, 4 had +animate characters pairs, and 3 had animacy feature mismatch (animate agent and inanimate patient).

Figure 5. Preview of videos used in the priming task; titles were read by the experimenter as prime sentences.



3.3.4 Procedure.

The priming test was administered two to four weeks after the comprehension one. Children were tested in a separate, quiet room and sessions lasted about ten minutes each. Children were shown 24 short videos and they were invited to play a game with the experimenter; videos were shown on a laptop screen, some were silent and some had some music playing in the back-ground, only one had a dialogue containing names of the characters but it was used as a prime rather than as a target in order to avoid children repeating dialogue sentences rather than describing the video.

The child and the experimenter in the description of videos: I described one video first, then asked the child to repeat the sentence and then showed a new video to the child.

All sessions began with the video to be used as a prime: I described the video to each child with the same sentence which could be read in the top part of the screen; this also assured each video to be described consistently across sessions.

In order to elicit the sentence, children were asked to tell what happened in the video ("Raccontami cosa è successo/ cosa hai visto"). If the child failed to immediately describe the video, I suggested that we watch the video one more time, and if no description was provided after a second viewing, I asked the child to name the characters or objects in the video. No patient-oriented questions were asked in order to avoid bias on passive sentence production by other means but the prime sentence. Only one child failed to give a description of a video which has been scored as "other", a total of 59 descriptions were elicited.

All sessions were audio-recorded and subsequently transcribed. Transcriptions can be found in appendix C.

3.3.5 Design.

Children were all primed with full Venire-passives: animacy features on the arguments were manipulated; each prime sentence was characterized by either matched or mismatched ±animate features and the immediately subsequent target videos mirrored the prime sentence animacy features.

Prime sentences were scored as Verbatim if the child correctly repeated each item in the sentence, independently of pronunciation mistakes, or as 2NP+Verb stem if they correctly repeated at least both NPs and verb stem (independently of auxiliary or Past Participle morphology's correct repetition). An analysis of rates of repetition of each item was also conducted in order to check for any specific difficulty with one of the sentence constituents.

Target production were scored passive, active or other: only full passives with correct thematic role assignment were scored as passive. Both animacy features and lexical priming effects were analysed, as well as comparison between error types in repeated sentences and spontaneously produced descriptions.

Each subject's performance is also analysed and commented in comparison with results in the comprehension task.

3.4 Results

3.4.1 Comprehension test results.

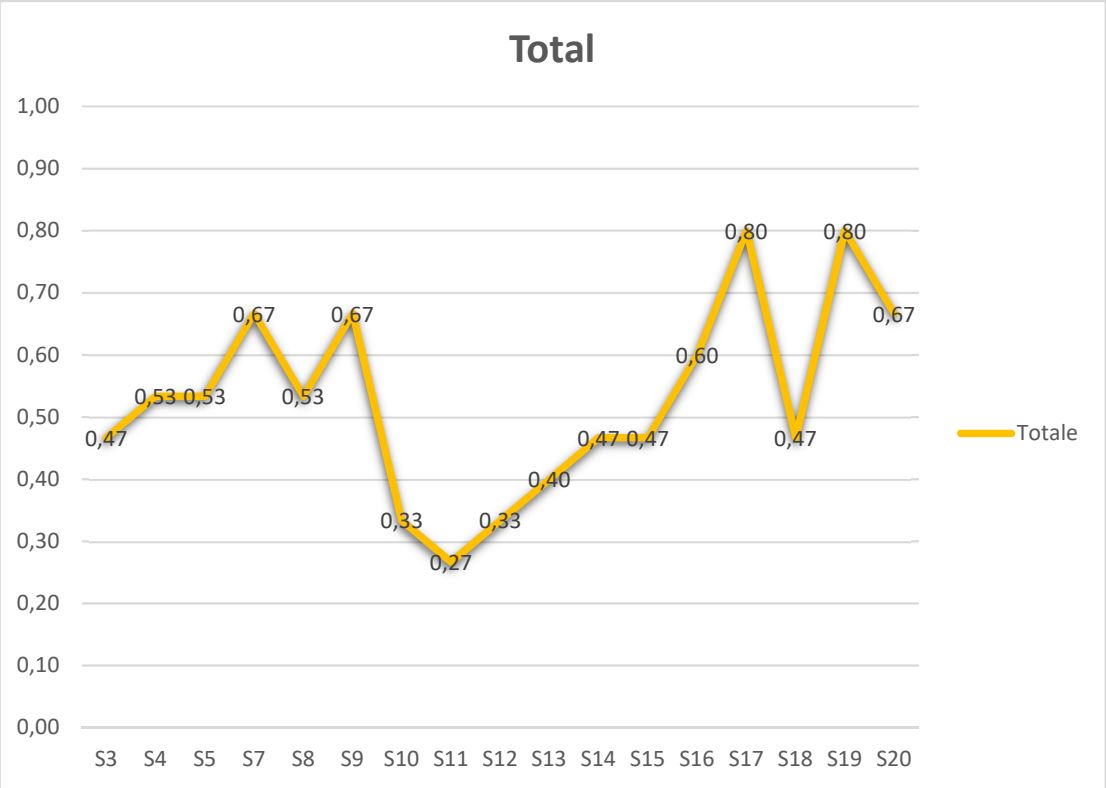
In the comprehension test children were asked to select the picture matching the experimenter description: an error in this task corresponds to inexact thematic role assignment to predicate arguments.

Answers were scored as 1 if correct and 0 if the wrong picture was selected.

Table 1. Shows average of correct answer for age of participants.

AGE	AVERAGE
1;11	0,47
2	0,53
2;1	0,53
2;3	0,67
2;6	0,51
2;8	0,30
2;9	0,40
2;10	0,58
2;11	0,63
3;0	0,67
TOTAL	0,53

Figure 6. Average of correct answers per subject: subjects are distributed according on their age from the younger on the left to the older on the right.



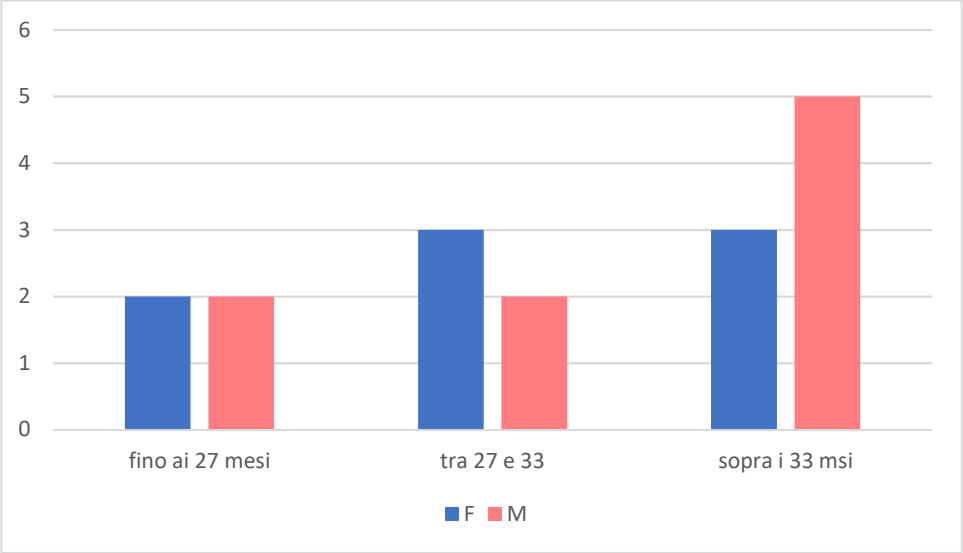
Very few children show high accuracy rates in this task: subjects were asked to judge whether the statement they heard accurately described one or the other drawing. This requires a complex cognitive computation to be made as it doesn't only ask for sentence interpretation but also for the interpretation to be matched to a precise drawing. This task requires grammatical, pragmatic and semantic judgements to be made in a rather short time.

Although the younger children can't be said to fully master passive sentences, it is interesting to notice that a trend emerges in the middle-aged children who have the lowest accuracy rats.

Results have been analysed checking for dependence between average correct answers and children's age in months: 20 subjects have been divided in ten age groups; a significant difference has been found χ^2 (9) = 18,56; p< 0.05. Children aged less than 27 months have a particularly poor performance, while children older than 34 months have the highest accuracy rates.

Noticing that some of the middle-aged children had the lowest results, children have been further divided in three groups, depending on age: G1 (children aged up to 27 months), G2 (children aged between 27 and 33 months) and G3 (children aged more than 33 months).

Figure 7. Overview of children's distribution per Age-Group and gender.



A chi-square test of independence was calculated checking for dependence of average correct answer and age group: no significant difference has been found in the three groups (χ^2 (2) = 4,26; p = 0,12).

Two orders were set for the presentation of the items in order to exclude variables due to attention decrease; order 1 goes from sentence 1 to 15 while order 2 starts from sentence 9. No significant difference is observed in the average of correct answers given in the two conditions, as table 2 shows.

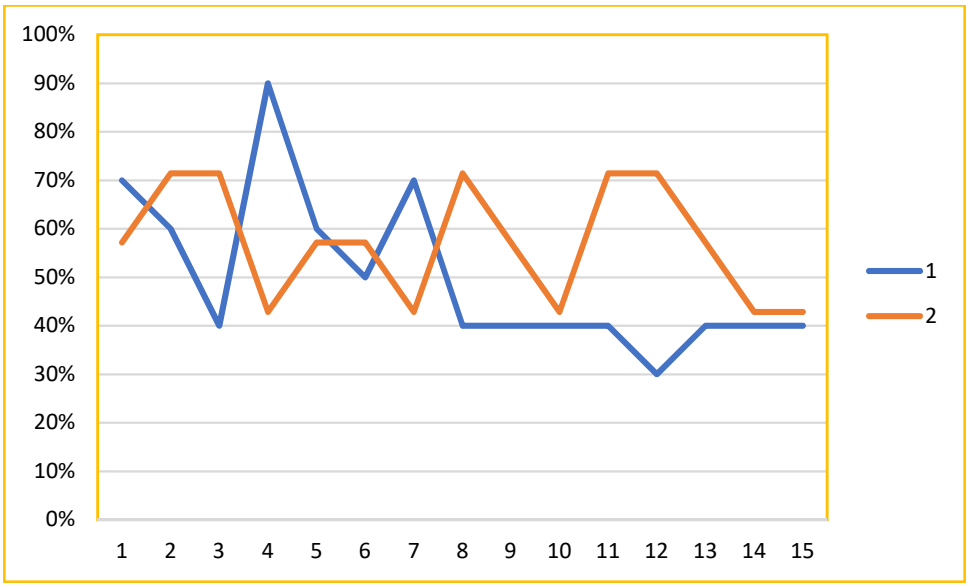
A chi-square test of independence checking for interactions between order of presentation and accuracy of response has been calculated but no significant difference has been found (χ^2 (1) = 0,95; p = 0.33).

Table 2. Mean percentage (%) of correct answers given in response to each item depending on the two possible orders of presentation.

ITEM#	1	2
1	70%	57%
2	60%	71%
3	40%	71%
4	90%	43%
5	60%	57%
6	50%	57%
7	70%	43%
8	40%	71%
9	40%	57%
10	40%	43%
11	40%	71%
12	30%	71%
13	40%	57%
14	40%	43%
15	40%	43%
Total	**50%**	**57%**

Figure 8 shows that children tended to be more accurate in judging the first stimuli, while making more errors towards the end of the experimental session.

Figure 8. Linear graphic showing percentage of correct answers for each stimulus in the two order conditions; order 1 (Item 1 to 15) is represented by the blue line while order 2 (Item 9 to 8) is represented by the orange line.

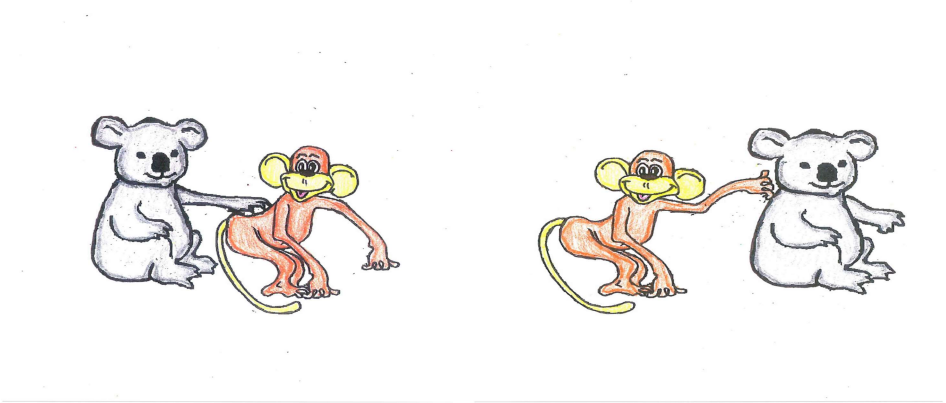


Overall, accuracy rates were consistent across stimuli and none of them proved to pose specific difficulties to children; the highest accuracy rates are registered for Item 4, which is reported in figure 9.

The following two possible descriptions were randomly given across sessions:

a) La scimmia viene grattata dal koala.
b) Il koala viene grattato dalla scimmia.

Figure 9: Item 4. Drawings were disposed on the table in a semi-randomized way across sessions in order to exclude children preference for one or the other depending on position of the papers on the table.



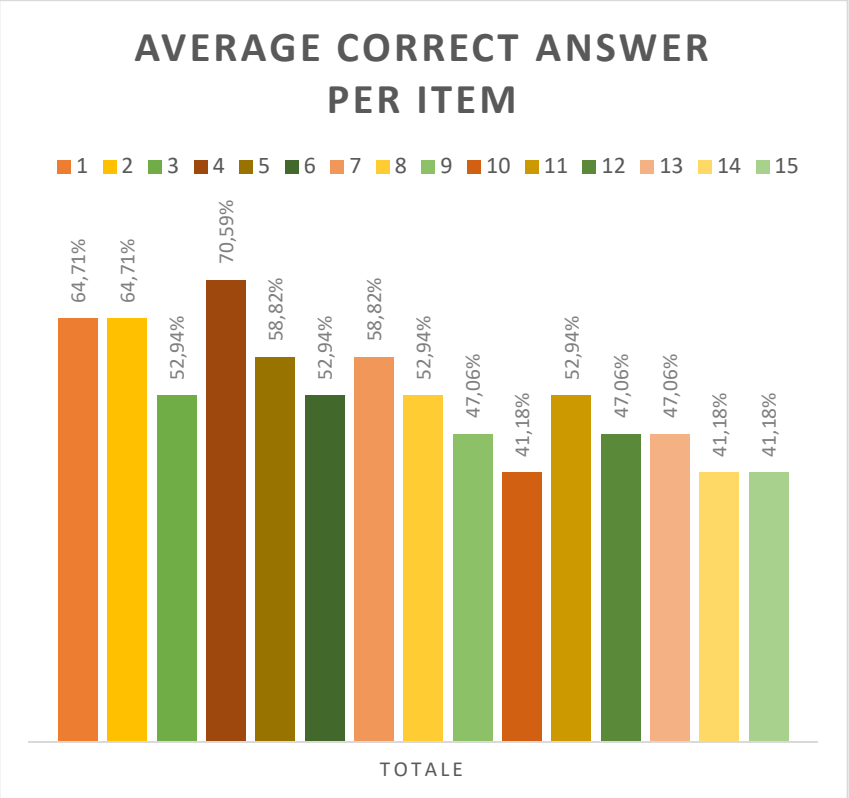
Lowest accuracy rates were found for Item 10, 14 and 15 reported here in both possible versions:

10. Il cane viene spazzolato dal gatto./Il gatto viene spazzolato dal cane.

14. L'elefante viene bagnato dal delfino./ Il delfino viene bagnato dall'elefante.

15. Il ragno viene asciugato dalla stella marina./ La stella marina viene asciugata dal ragno.

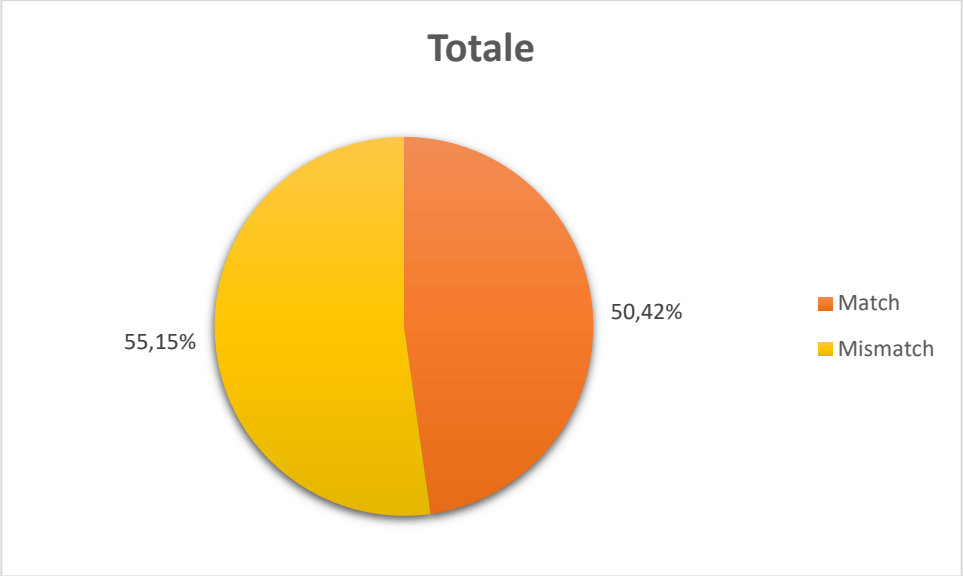
Figure 10: Percentage of correct answers per Item, independently of order of presentation.



A chi-test of independence between item and average of correct answers has been calculated, but no significant difference has been found χ^2 (14) = 7,2; p= 1.

Italian passives are characterized by gender agreement between subject (i.e. the patient) and past participle morphology on the verb, this means that, depending on characters depicted, sentences might present gender feature match or mismatched conditions between agent and patient. Noticing that the sentence with highest accuracy rates also presented mismatched conditions on gender features, the experimenter decided to analyse answers in order to check if children took advantage of verb morphology across sentences.

Figure 11. Pie chart showing percentage of correct answers depending on gender features matching and mismatching between characters depicted.



Results show that answers are almost equally distributed: children were only 5% more accurate when characters in the sentence had mismatched gender features, thus showing that children this young do not make a strategic use of gender agreement between verb and subject when selecting the right picture.

3.4.2 Repetition scoring and results.

Each child was primed with 12 to-be-repeated full passive sentences, producing a total of 60 sentences, as at least some part of each sentence was repeated by every child.

Answers were scored to check presence of each constituent singularly, number of correct repetition of the two NPs and verb stem and number of verbatim repetition (in which every constituent was repeated, regardless of phonemic imperfections).

A transcription of the repetitions is given in Appendix C.

Table 3. Percentage of Verbatim and 2NPs+ Verb stem repetition for each subject.

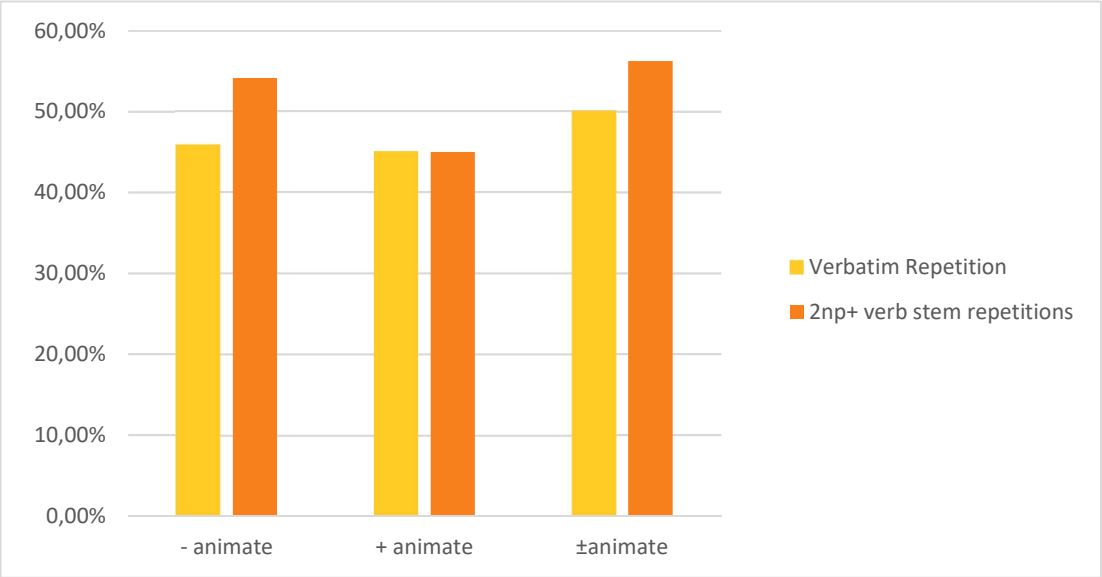
Subject	Verbatim	2np+ verb stem
S10	66,67%	66,67%
S12	58,33%	75,00%
S14	0,00%	0,00%
S19	100,00%	100,00%
S20	8,33%	16,67%
Total	**46,67%**	**51,67%**

Even if children sample is quite small, there's great variance in accuracy rates among them: we witness both ceiling effect and 0% accuracy in two subjects who are only one-month apart age-wise; the second-to-last subject in accuracy rates is actually the older one and she's also the only subject who, in repeating the sentence, completely transforms it in an active sentence (while keeping thematic roles assignation correct).

a) *Target:* L'acqua viene bevuta dal signore.
   Repetition: Beve l'acqua.

On average, less the half of the sentences were repeated correctly, independently of animacy features, as figure 12 shows.

Figure 12. Percentage of verbatim and 2NP+Verb Stem repetitions depending on animacy features of characters.

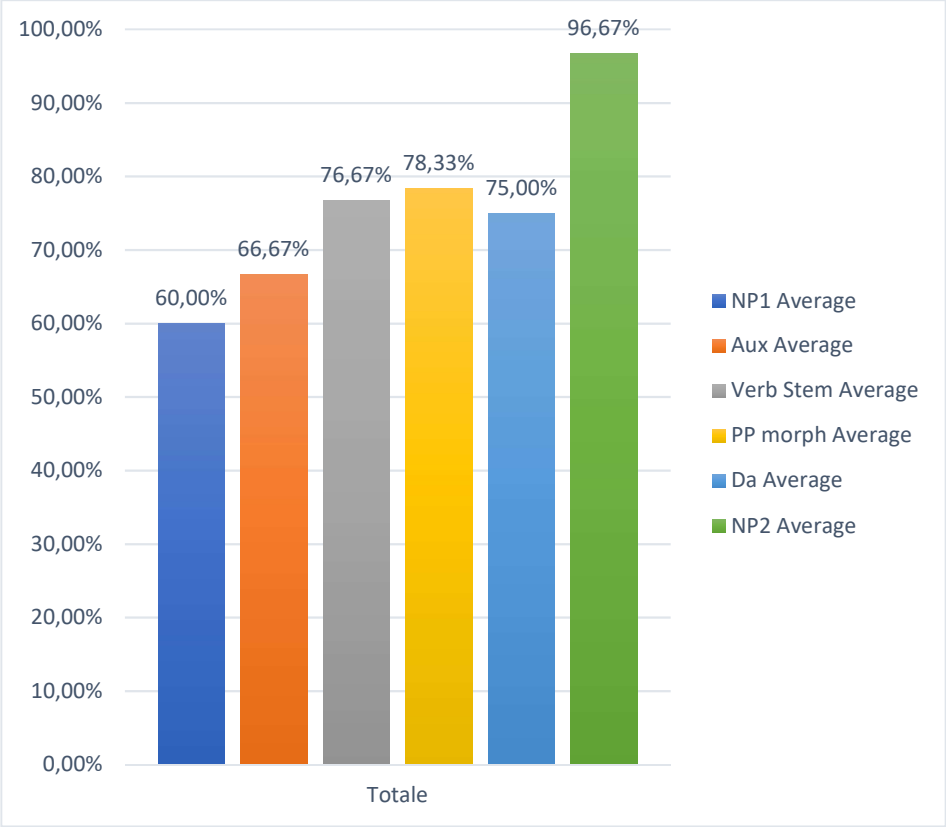


An analyses of accuracy rates for the repetition of each item shows that, notwithstanding the fact that the test utilised words that children did use in everyday life, a memory effect can be observed. The emerging pattern shows that children almost reached ceiling effect on the second NP repetition, but had the most difficulties repeating the first NP.

Chi-square tests comparing repetition of every item between subjects have been calculated. Significant interactions were found for all items but "da" and "2nd NP":

- Subject * NP1: χ^2 (4) = 38,47; p< .05
- Subject * Aux: χ^2 (4) = 28,50; p< .05
- Subject * Verb stem: χ^2 (4) = 16,53; p< .05
- Subject * PP morph: χ^2 (4) = 23,18; p < .05
- Subject * Da: χ^2 (4) = 8,88; p= 0.06
- Subject * 2NP: χ^2 (4) = 8,27; p= 0.08

Figure 13. Average of correct repetition for each minimal unity composing passive sentences.



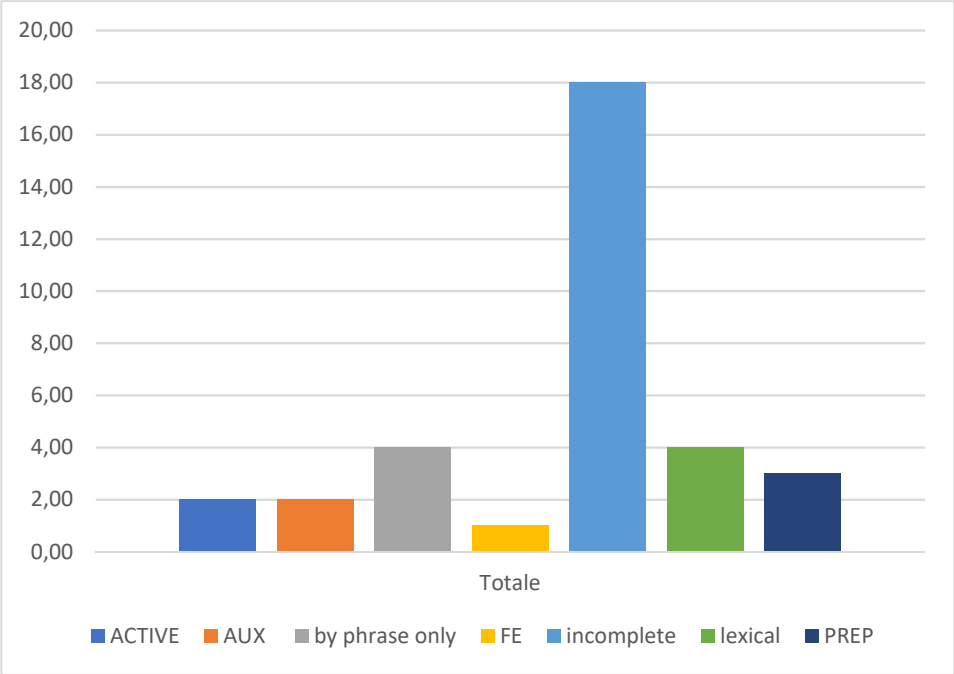
Consequently, the most frequent error type is the production of an incomplete sentence, while all other error types are marginal and have an almost equal distribution suggesting that none of the constituent can be considered to pose specific problems.

Errors have been scored as active if the sentences underwent a complete structural change, AUX if the wrong auxiliary was selected, by-phrase only if subjects repeated only the by phrase, FE (free expression) if children said something unrelated to the prime, incomplete if at least one of the minimal unites of the sentence wasn't repeated, lexical if children made a lexical substitution, and prep in they selected the wrong preposition.

An example of each error type is given accordingly:

b) Beve l'acqua.
c) Topo Tip ha gridato dalla mamma.
d) Dal sole.
e) C'è la tigre.
f) Vee bevuta da signoe.
g) Fonno viene tattato da Pingu.
h) La mela viene tagliata a coltello.

Figure 14. Total count of error types across subjects.



Only once the auxiliary "venire" has been substituted with auxiliary "essere" by S20; this hasn't been counted as an error per se but the sentence repeated was incomplete.

i) È tagliata dal coltello.

The incomplete error type emerges especially in S14 whose sentences almost never go higher than VP level: most of the repetition include only the by phrase, and some of them include the verb stem but only one includes Aux (which is phonetically imperfect anyways).

j) *Target:* L'acqua viene bevuta dal signore.
Repetition: Vee bevuta da signoe.

S20 also gives a high rate of incomplete responses, but most of them include Aux as table 4 shows.

k) *Target:* Il disegno viene cancellato dalla gomma.
Repetition: Viene fuori dalla gomma.

WE checked for dependence of error types and subjects: a significant difference has been found (χ^2 (40) = 106,53; p< .05), confirming that great variability can be found even in the small group of subjects tested here.

Table 4. Percentage of correct repetition of each element of the sentence by S14 and S20, who have had the less accurate performance.

Soggetti	NP1	Aux	Verb stem	PP morph	Da	NP2
S14	8,33%	8,33%	66,67%	66,67%	66,67%	100,00%
S20	16,67%	58,33%	50,00%	33,33%	75,00%	83,33%
Totale complessivo	**12,50%**	**33,33%**	**58,33%**	**50,00%**	**70,83%**	**91,67%**

Chi-square tests analysing animacy features' influence on both verbatim and 2NP+ verb stem repetitions have been carried out, but no

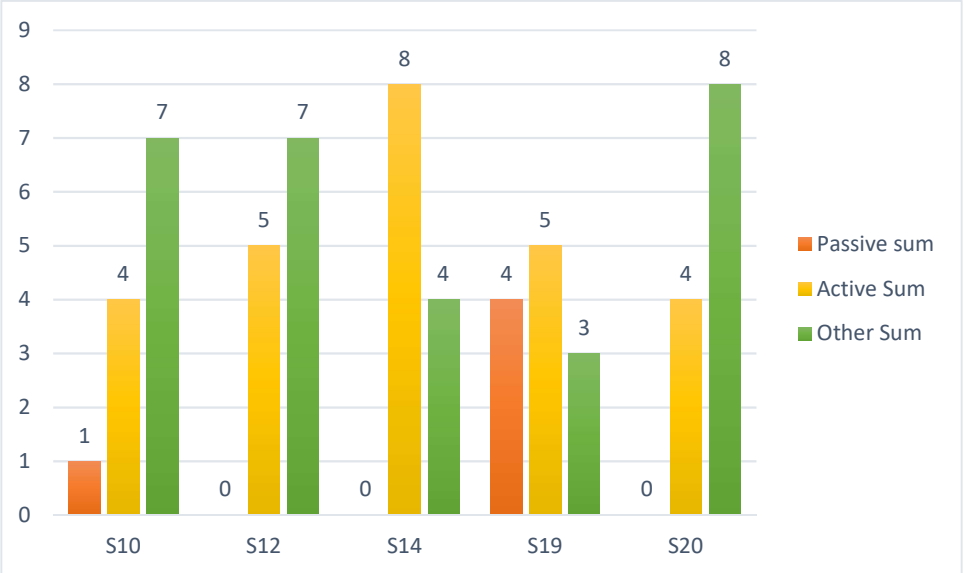
significant interaction has been found either for verbatim (χ^2 (2)= 0,1; p< .05) or for 2NP+ verb stem (χ^2 (2)= 0,5; p< .05).

3.4.3 Production scoring and results.

Figure 15 shows number of *passive*, *active* and *other* sentence distribution in each subject.

In order for a sentence to be scored as passive it had to include: *patient in subject position, Aux* (venire or essere)*, PastPart of the main Verb, agent* expressed by means of an *adjunct Prepositional Phrase* headed by the preposition *"da"*; lexical or pronunciation inaccuracy was not scored as an error, considering the very young age.

Figure 15. Total of production types for each subject.

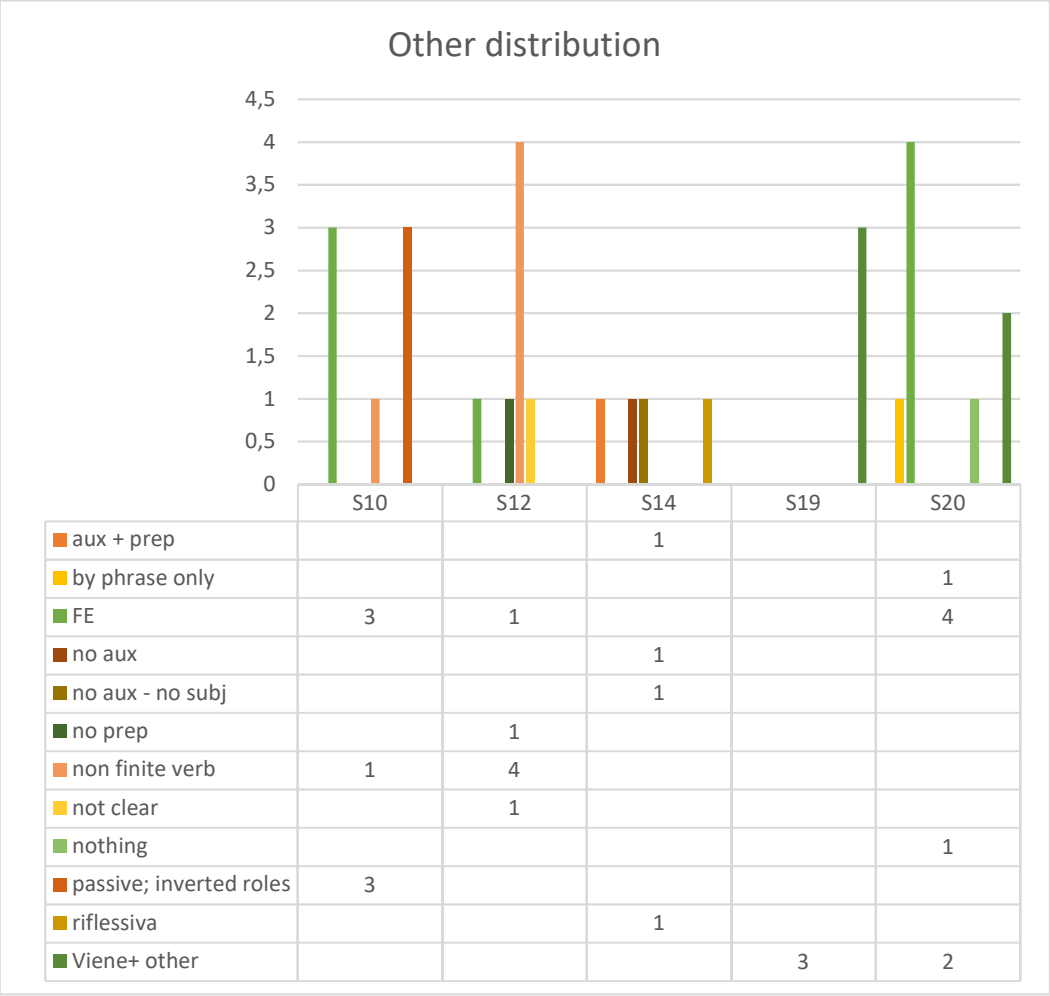


Sentences described as other also include: *passives with inverted roles, by-phrase only, non-finite verb instances, reflexive, Viene+other*

type errors, sentences lacking or using an incorrect Auxiliary or Preposition, Free expressions.

A transcription of sentences produced by the children teste is given in Appendix C.

Figure 16. Total of error type sentences produced by each subject.



	S10	S12	S14	S19	S20
aux + prep			1		
by phrase only					1
FE	3	1			4
no aux			1		
no aux - no subj			1		
no prep		1			
non finite verb	1	4			
not clear		1			
nothing					1
passive; inverted roles	3				
riflessiva			1		
Viene+ other				3	2

As the graphic shows, subject 10 (who is the youngest in the group of children who managed to complete this task, being only 2;7 years old) was the only one to produce passive sentences with role inversion.

l) *Target:* Il signore viene svegliato dal cane.
Production: Il lupo viene veiato dai papà.

Subject 19, who is 3 years old, and showed consistently high accuracy rates in all tasks, produced 4 full passive sentences, 5 actives

and 3 others, all of which were sentences including auxiliary *venire* but other errors which stopped her from producing a passive sentence.

m) *Target:* Tweety viene catturato da Silvestro.
Production: Il gatto viene paura da Tweety.

Subject 12 showed a tendency to produce descriptions using non-finite verbs, an error that was observed only once across the group of other children, S10 who uses a gerundive form:

n) *Target:* Il bambino viene vestito dalla mamma.
Production: Mettere la maglietta.

Children also passivised novel verbs or non-passivisable ones (i.e. intransitive verbs):

o) *Target:* Il fuoco viene spento dale macchinine.
Production: La casa viene issedita acqua.
p) *Target:* Il bicchiere viene rotto dalla palla.
Production: Il bicchiere viene cascato dalla biglia.

As I already explained earlier in the text, 3 pairs of videos including a mismatch of animate features between agent (+animate) and patient (-animate) were used in 3 corresponding pairs of prime + target sentences: they have been thought of almost as filler sentences, as this mismatch has been reported in literature to help children passive sentence comprehension and production.

Interestingly one of the passive sentences produced by S20 after repeating a ±animate prime, resulted in a -animate sentence:

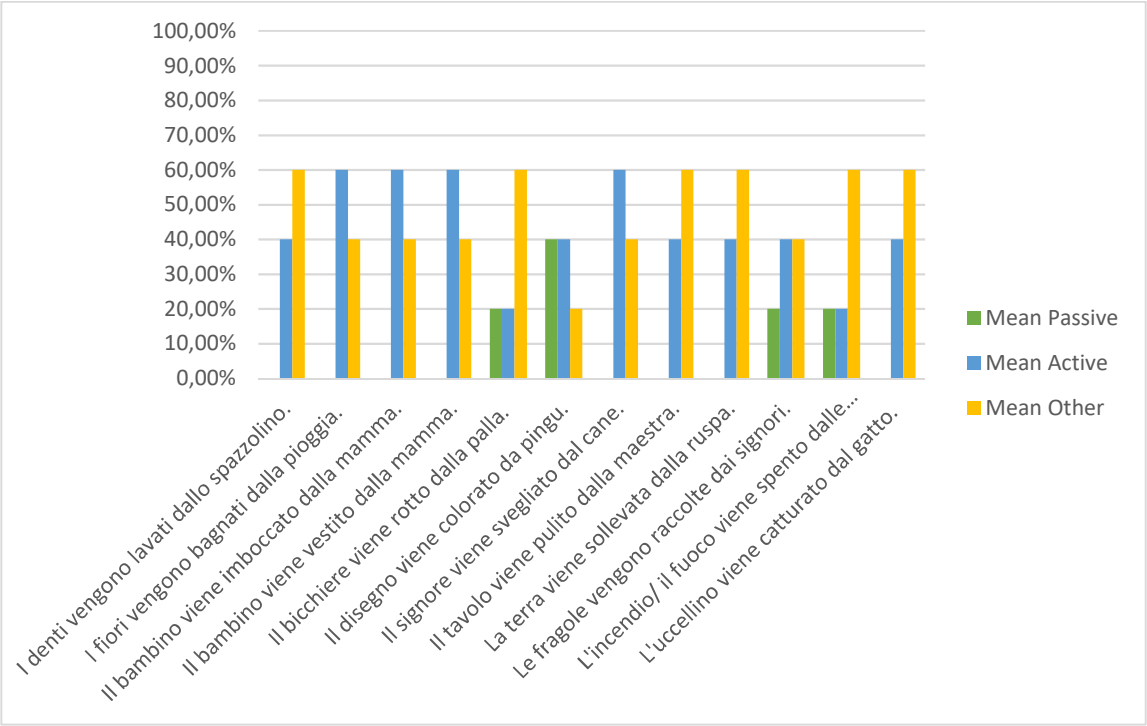
q) *Prime:* Il pane viene infornato da Pingu.
Target: Il disegno viene colorato da Pingu.

Production: Il foglio viene disegnato dai colori.

A chi-square test of independence checking for interactions between animacy features and passive sentence production has been carried out: no significant difference has been found (χ^2 (2) = 4,46; p= 0.11).

An analysis of children's productions shows that none of the sentences seems biased to the production of a passive, active or other type of response, as figure 16 shows.

Figure 17. Percentage of type of sentence produced for each of the target Items.



A chi-square test of independence for response type (passive, active and other) and subject has been calculated: a significant difference has been found among subjects (χ^2 (8) = 17,32; p< .05); no significant

difference has been found comparing response type and age: $\chi^2(6) = 7{,}07$; $p = 0.40$).

3.5 Discussion.

The comprehension test was submitted to all participants as it did not require the child to produce an articulate answer but only to choose the picture corresponding to the experimenter's description. All children showed understanding of the task from the first stimulus which allows to exclude results' unreliability due to other confounding variables relying on the task itself.

Results reported in table 2 and figure 6 show that a U-shaped pattern can be observed in accuracy rates depending on age although variability due to each subject's performance must be taken in consideration. The lack of significance which has been found analysing children performance dividing them in three groups based on age, can be ascribed to the fact that children in G2 have very sea-sawing performance and statistical results are too dependent on each child's performance in such a small group.

Nonetheless, some of the children in G2 have the lowest accuracy rates and it is worth noticing that a U-shaped pattern of acquisition has been observed in literature both in atypical and typical language acquisition (Levy et. Al 2009). English children use of past forms of irregular verbs: children first go through a stage where irregular forms are used correctly and then tend to over-generalize the -ed morpheme rule making more mistakes. Linguistic experience might play a role in this process as it contemporarily strengthens both regular formation of

past tense and irregular instances: as a consequence, two hypotheses compete in the mind of the learner who occasionally makes mistakes. Eventually correct forms are fixed and children avoid incorrect forms of irregular verbs.

Interestingly, we can't say that there's a fixed age for this phenomenon to stop, showing how much variability is to be observed in children speech (Siegler, 2004). All things considered, our experimental group is not large enough for the experimenter to claim for a definite U-shaped pattern of acquisition of passive sentences in Italian children, and maybe, a longitudinal study would be better suited for this conclusion to be drawn. Yet, the difference is quite substantial, especially considering that the same children who had low accuracy rates in the comprehension study where among the few who had an MLU value high enough to participate in the priming task. Volpato et al. (2013) divided children taking part in their study in four groups depending on their age (mean age varied from 3;9 to 5;11): they found that, while G1 performance (the younger group) only marginally differed from G3's performance, G2's performance significantly differed from both G3 and G4's performances, meaning that children aged between 4;0 and 4;8 actually had lower accuracy rates than younger subjects even if no significant difference between G1 and G2 was found.

Italian passive sentences trigger gender agreement between subject and Past Participle morphology on the verb, a variable which could not be taken into account in the original English version of the test. This means that when agent and patient were characterized by mismatching gender features children might have used this cue to correctly assign thematic roles. Results show that average of correct answers was almost equally distributed in the two conditions, suggesting

that children did not take advantage of gender agreement cues. Adani et al. (2014) report that number dissimilarities facilitate comprehension of relative clauses in children affected by SLI, while gender dissimilarities don't; an expanded version of this test might be useful to further analyse this variable.

The priming test has been presented and analysed as a repetition and production test as the repetition test alone might give insights in children's proficiency.

The repetition test shows that only one children, S19, has a consistently high performance across tests, reaching ceiling effect in the repetition task. The other four child taking part in the second test actually had quite low results in the comprehension test, independently of their ability to produce long sentences and engage in dialogues in everyday life.

S10 and S12 respectively gave 5 and 8 correct answers in the comprehension test, while S14 and S20 gave 6 and 10 correct answers in the comprehension test.

S10 performance in the second test is particularly at odds with performance in the first task: he had a 66,7% accuracy rate of verbatim repetitions, and was the only subject, other than S19, to produce passive sentences.

S12 on the other hand, produced 58,3% verbatim repetitions and 75% 2NP+verb stem repetitions but never produced a passive sentence when asked to describe the videos, showing no priming effect. The most frequent error committed by this subject concerns the proposition, which is either omitted or substituted.

S12 and S20, as already discussed show very low repetition accuracy and produced no passive sentences. S12 performance can be considered consistent across tasks showing that this child has not yet acquired full competence of passive sentences; he produced 0% verbatim and 2NP+ verb stem repetition, his most frequent error being omission of one or more elements of the sentence resulting in repetition of the by-phrase only. This suggests that memory constraints might have also had an influence on this subject's performance.

S20, the older subject in the group, surprisingly shows very low and deviant patterns in the repetition task: she is the only subject who transform passive sentences in active ones in the repetition test, she never gives a verbatim repetition and her most frequent error is omission of one or more elements of the sentence. Interestingly, her performance in the comprehension test is among the best ones, even if lower than expected considering her age and speech fluency.

The comparison of performance across subjects and across tests suggests that only after reaching a very high level of proficiency children perform well and consistently in both comprehension and elicited imitation or production tasks. Valian and Bencini (2008), who tested older children and a larger sample than this, also report inconsistency in performance across tasks.

Overall subjects did not show full competence in passive sentences, the only two subjects producing full passives being S10 and S19; interestingly their first production of a passive sentence is given as an answer to the fourth video, showing that priming does not need long to occur.

Variables that might have influenced this type of response in both subjects are either mismatch in animacy features between agent and

patient (but this hypothesis was discarded with considering that S20 production actually does not mirror this animacy match condition) or the fact that in both videos the agent was represented by the cartoon character Pingu. This is also debatable as another sentence with the same characteristics (animacy mismatch and same agent character) did not result in production of passive sentences in either subject; evidence thus suggests that when passive sentences are produced priming can be considered syntax dependent.

Considering the small number of children tested, especially in the second task, results in this study cannot be considered to be significant evidence of acquisition patterns of passive sentences in Italian children but can be nonetheless helpful to shed light onto language acquisition.

Although only two children produced passive sentences, those two showed priming effects, especially if we consider that the younger subject produced, in addition to a correct passive sentence, 3 passive sentences with reversed roles and S19 produced 4 perfectly formed passive sentences and three sentences that are clear attempts to produce a passive sentence but end up being unsuccessful.

S10's performance is particularly interesting as it's characterized by the thematic role inversion of the verb arguments resulting not only in the selection of the wrong picture in the comprehension task but also in the priming task, both in repetition and in production of ill-formed sentences.

I will first analyse the three answers given when the child was asked to describe the video, reporting the target answer as well.

r) *Target* Il papà viene svegliato dal cane.
Production Il lupo viene veiato da i papà.

s) *Target* Le fragole vengono raccolte dal signore.
Production Il signoe viene laccaduto dae fragole.

t) *Target* Il fuoco viene spento dalle macchinine.
Production Uno dei pompiei viene pegnato dal fuoco.

This specific task can give us insights in the process followed by the children to get from creation of the message in the mind of the speaker to actual phonological, surface production.

Notwithstanding the fact that the child did understand what was happening in the video and was able to create an adult-like syntactic structure, he did not manage to correctly assign thematic roles to the verb arguments.

Friedmann, Novogrodsky (2006) created a special task for Hebrew-speaking children with SLI aiming to discover the exact origin of difficulty in their production and comprehension of relative sentences. Hebrew orthography usually doesn't represent vowels resulting in numerous heterophonic homographs which can correspond either to nouns or verbs. Taking advantage of this peculiarity, the authors asked children both to read and paraphrase the sentences they read: these sentences were created using homographs which were to be read as verbs. If the children tested read the sentences correctly, that meant that they were able to create a trace of the moved element and the corresponding syntactic structure. If the same children who read the sentence correctly had trouble paraphrasing the sentences, that meant that the locus of the problem was in the thematic role assignment to the moved element.

The authors found that the AD children had high levels of proficiency in the reading task, but encountered many difficulties when asked to explain the sentences, giving evidence supporting the

hypothesis that even though a trace of the moved element was created, it could not be assigned the correct thematic role.

The same hypothesis may be valid for the kind of error found here; this also suggests that the priming effect observed is not lexically based but purely syntactic: the child is able to recognize the underlying structure of the priming sentence, creates a trace for the moved element but fails to assign it the correct thematic role.

Bencini (2017) argues against the consensus model analysing speakers' mistakes which claims that production of a sentence is composed of multiple levels involving separate processes for semantic + syntactic and phonological selection, and crucially that structure formation strongly depends on previous lexical choices. The revised model proposes that a more direct mapping from message to grammatical encoding is responsible for the sentence production process and that structural processes do not depend completely upon lexical retrieval.

This hypothesis can be further corroborated by the mistakes S10 makes in the Production task.

An interesting phenomenon observed in the same child comes from the repetition task; I Will now report two examples:

a) *Target* Topo Tip viene sgridato dalla mamma.
   Repetition Topo Tip ha sgridato alla mamma.
b) *Target* Il latte viene scaldato dal fuoco.
   Repetition Il latte ha scaldato il fuoco.

As we can see, when asked to repeat the passive sentence, the child leaves the arguments in their original positions but adapts the passive syntactic structure to an active one (the auxiliary "venire" is substituted by "avere", the preposition "da" is transformed in "a" or omitted), giving

once again rise to a thematic role inversion. In these instances, the child does not have to create the message from zero, lexical items are already given to him and he repeats basic semantic units correctly; the problem arises when the abstract syntactic structure is created. The child knows which noun is to be repeated first, but he assigns it the wrong thematic role and accordingly adapts the syntax. If we consider a mistake to be a deviation from the speaker's intended message, then I think it's debatable whether these sentences can be considered to be mistakes. I argue that the child interpretation of the sentence uttered by the experimenter reflects the role reversal we observe in his repetition, hence its sentence is not correct as far as the task is concerned but might be correct if we consider it as a mean to convey his intended message.

Some weaknesses and limits, and consequent suggestions to ameliorate the tests can be pointed out: first of all, a larger, more varied sample of subjects should be tested to have a clearer and more significant picture of Italian children acquisition of full passives. Using eye-tracking and act-out techniques for data collection, especially with children as young or even younger than the ones tested here would also be interesting.

As far as the priming task is concerned, more variables might have been taken into account when designing the task: a balanced amount of stimuli containing verb with ±actional features could be used, match and mismatch of number features on nouns might also be manipulated to check for children's ability to recognize and utilise those features at their advantage; possible differences in use of venire or essere-passives in both comprehension and production tests might be investigated and an elicited production task using patient-oriented questions could provide a fuller picture. Of course, testing these many variables would take a

considerable time which means that tasks should be segmented in order to avoid tiredness or attentional drops invalidating tests' reliability.

Conclusions

The aim of the study was to investigate 2 to 3-year-old children's proficiency with passive sentences and gather evidence for early syntactic representation of sentences; this was done by administration of two tests: a comprehension (sentence to picture matching) test and a production test, which has been analysed as if composed of two tasks, an elicited imitation one and a primed production task.

Analyses of both competencies has proven to be particularly important in the group of children tested here as results in the two tasks do not necessarily correlate positively; speech fluency in the group tested was also subject to strong variability and did not correlate with performance in the tests.

The results suggest that children younger than 3-year-old have above chance comprehension of passive sentences and can produce full verbal passives following prior exposure to passive primes, reaching almost ceiling results after 2;9 years and, depending on subject, satisfactory results are reached even before that age.

The priming test, in line with results from both Italian and other languages, confute Borer and Wexler's maturational hypothesis: the youngest children tested, aged 2;6, produced one adult-like passive sentence and three passives with inverted roles (which, in Manetti's (2012) experiment, have been scored as passive nonetheless), and S19 (age 3) produced four adult-like passive sentences.

These results also suggest that children younger than three have early syntactic representations that can be successfully primed, providing evidence for innate linguistic knowledge, independent from input. This means that they do not necessarily rely on word order to assign thematic roles to the Verb's arguments and have abstract representation of the underlying syntactic structure of sentences.

Furthermore, gender on verb's arguments have been analysed as variables potentially influencing accuracy rates in the comprehension task as Italian passive have the peculiarity to trigger gender agreement between Subject and Past Participle morpheme on the Verb. In line with previous findings on relative sentences comprehension (Adani et al. 2014), children in this study did not made a strategic use of gender features when choosing the picture matching the sentence.

In order to exclude conceptual priming or bias on children's repetitions and productions, animacy feature match or mismatch has been analysed as an independent variable in the two tasks but no significant influence has been found confirming that when priming occurs, even in children as young as 2;6-year-old, its origins can be considered purely syntactic.

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Appendix A

Università Ca'Foscari Venezia

Dipartimento di Studi Linguistici e Culturali Comparati

Università Ca' Foscari di Venezia

Dipartimento di studi linguistici e culturali comparati

MODULO DI CONSENSO PER LA PARTECIPAZIONE AL PROGETTO DI RICERCA SULLO SVILUPPO DEL LINGUAGGIO.

Titolo del progetto: "Inneità e acquisizione del linguaggio".

Principale ricercatrice: Isabel Cucca, Dott.ssa in Mediazione Linguistica e culturale, studentessa di Scienze del Linguaggio, curriculum "Linguistica per la sordità e i disturbi del linguaggio".

Luogo di svolgimento della ricerca: La raccolta del materiale per la ricerca avverrà interamente all'interno dello spazio sperimentale per l'infanzia "Giocare Sognando".

Introduzione/scopo della ricerca: Lo scopo principale della ricerca è quello di indagare l'acquisizione di alcune strutture sintattiche da parte dei bambini di età compresa tra i 18 e i 40 mesi d'età. Lo scopo non è quello di comparare individualmente ogni bambino ma di raccogliere dati in maniera generale sul tipo di frasi da loro prodotte, gli elementi eventualmente omessi nelle loro produzioni, la relazione tra produzione e comprensione di frasi. In nessun modo i test sono volti a fornire una diagnosi di eventuali disturbi dell'acquisizione del linguaggio.

Al solo fine di avere una più ampia comprensione di questi processi vi verrà fornito un piccolo questionario riguardante le lingue/dialetti parlati in casa e l'età del bambino.

Eventuali rischi/benefici: Il progetto non espone il bambino a nessun rischio; il progetto non promette nessun beneficio se non quello di stimolare il bambino a parlare o esporlo a strutture sintattiche poco comuni nel linguaggio quotidiano perché più complicate.

Modalità: Le attività verranno svolte da ciascun bambino singolarmente e prevedono l'utilizzo di disegni/pupazzi/giochi che i bambini dovranno descrivere, indicare o maneggiare (es. mettere un adesivo sull'immagine corretta). Durante l'attività sarà sempre presente la ricercatrice e, eventualmente, una delle educatrici.

Qualora il bambino dovesse mostrarsi annoiato/infastidito/poco interessato la sessione sarà interrotta.

Raccolta dei dati: Potrà avvenire o attraverso l'annotazione dei risultati su un foglio (nel caso si tratti di un semplice test giusto/sbagliato) o attraverso la registrazione **audio** delle frasi prodotte e successiva trascrizione delle stesse. A ogni bambino verrà assegnata arbitrariamente una sigla identificativa e in nessun caso nella stesura della tesi sarà presente il nome del bambino; prenderò nota di età, sesso e lingue parlate in casa.

Alternative: L'unica alternativa è quella di non prendere parte al progetto, questo significa che siete liberi di non prendere parte al progetto. Se il bambino dovesse mostrarsi infastidito o voi doveste avere qualsiasi ripensamento il bambino potrà abbandonare il progetto in qualsiasi momento, anche dopo aver firmato il consenso.

Considerazioni economiche: Non ci sarà alcun costo per te nella partecipazione a questo progetto.

Contatti: Per qualsiasi dubbio o domanda contattare la ricercatrice al numero 3459454295 o via mail all'indirizzo 860828@stud.unive.it .

Riservatezza – INFORMATIVA AL TRATTAMENTO DEI DATI PERSONALI

Dando il consenso a partecipare a questo lavoro di ricerca, come già esposto, ti sarà anche richiesto di fornire dati personali del bambino. Il nome, le informazioni personali e le registrazioni audio saranno conservati dai referenti del progetto e non saranno usati senza il tuo permesso. Le registrazioni o i dati registrati in formato cartaceo saranno tenuti in un luogo riservato o in un computer protetto da password. Inoltre saranno usati solo da persone che lavorano all'analisi dei dati per questo progetto e per presentarne i risultati in ambito accademico e di ricerca. I dati raccolti in questo studio potrebbero essere utilizzati in futuro per uno studio differente.

Rispetto ai dati personali ogni interessato può esercitare i diritti previsti dall'art. 7 del D.Lgs. 196/2003 ed in particolare può richiedere di avere accesso a tali dati, di aggiornarli, correggerli, ecc.

- Quando è nato il bambino?

_____

- Il bambino ha sempre vissuto in Italia? Quali sono le lingue/dialetti parlate a casa?

_____

Il/la sottoscritto/a dichiara di aver letto e capito le soprascritte informazioni, aver ricevuto risposte soddisfacenti alle sue domande e acconsente volontariamente a far partecipare il proprio figlio a questo studio.

Sono stato informato/a, prima di partecipare al suddetto studio, del mio diritto di interrompere la partecipazione del bambino allo studio in qualsiasi momento, senza fornire alcuna motivazione, senza alcuna penalizzazione e ottenendo il non utilizzo dei miei dati.

Il sottoscritto/a _____ (nome e cognome) nato/a a _____ il _____ autorizza la partecipazione del proprio figlio _____ (nome e cognome) al progetto di ricerca sopra descritto e autorizza la ricercatrice a audio-registrare e trascrivere le produzioni linguistiche del bambino durante lo svolgimento del progetto.

Firma _____

Appendix B

1. Il serpente viene leccato dalla rana. / La rana viene leccata dal serpente.
2. Il bambino viene lavato dall'orso. / L'orso viene lavato dal bambino.
3. Il bambino viene spinto dalla bambina. / La bambina viene spinta dal bambino.
4. La scimmia viene grattata dal koala. / IL koala viene grattato dalla scimmia.
5. Lo scoiattolo viene solleticato dal polpo. / Il polpo viene solleticato dallo scoiattolo.
6. Topolino viene buttato giù da Paperino. / Paperino viene buttato giù da Topolino.
7. La zebra viene trainata dal cavallo. / Il cavallo viene trainato dalla zebra.
8. La puzzola viene spruzzata dal topo. / Il topo viene spruzzato dalla puzzola.
9. Il bambino viene baciato dalla bambina. / La bambina viene baciata dal bambino.
10. Il cane viene spazzolato dal gatto. / Il gatto viene spazzolato dal cane.
11. La marmotta viene pizzicata dal granchio. / Il granchio viene pizzicato dalla marmotta.
12. L'elefante viene schiacciato dall'ippopotamo. / L'ippopotamo viene schiacciato dall'elefante.
13. Il maiale viene colpito dal toro. / Il toro viene colpito dal maiale.
14. L'elefante viene bagnato dal delfino. / Il delfino viene bagnato dall'elefante.

15. Il ragno viene asciugato dalla stella marina. / La stella marina viene asciugata dal ragno.

Subject	Age	Item#	Order	Answer
S3	1;11	1	1	1
S3	1;11	2	1	0
S3	1;11	3	1	1
S3	1;11	4	1	1
S3	1;11	5	1	1
S3	1;11	6	1	1
S3	1;11	7	1	0
S3	1;11	8	1	0
S3	1;11	9	1	0
S3	1;11	10	1	0
S3	1;11	11	1	1
S3	1;11	12	1	0
S3	1;11	13	1	1
S3	1;11	14	1	0
S3	1;11	15	1	0
S4	2,00	1	2	1
S4	2,00	2	2	0
S4	2,00	3	2	1
S4	2,00	4	2	0
S4	2,00	5	2	1
S4	2,00	6	2	0
S4	2,00	7	2	0
S4	2,00	8	2	0
S4	2,00	9	2	1
S4	2,00	10	2	0
S4	2,00	11	2	1
S4	2,00	12	2	1
S4	2,00	13	2	1
S4	2,00	14	2	0
S4	2,00	15	2	1
S5	2;1	1	2	0
S5	2;1	2	2	0
S5	2;1	3	2	1
S5	2;1	4	2	1
S5	2;1	5	2	1
S5	2;1	6	2	1
S5	2;1	7	2	1
S5	2;1	8	2	1
S5	2;1	9	2	0
S5	2;1	10	2	0
S5	2;1	11	2	0
S5	2;1	12	2	1
S5	2;1	13	2	0

S5	2;1	14	2	1
S5	2;1	15	2	0
S7	2;3	1	2	1
S7	2;3	2	2	1
S7	2;3	3	2	1
S7	2;3	4	2	1
S7	2;3	5	2	1
S7	2;3	6	2	0
S7	2;3	7	2	1
S7	2;3	8	2	1
S7	2;3	9	2	0
S7	2;3	10	2	1
S7	2;3	11	2	1
S7	2;3	12	2	0
S7	2;3	13	2	0
S7	2;3	14	2	0
S7	2;3	15	2	1
S8	2;6	1	2	1
S8	2;6	2	2	1
S8	2;6	3	2	0
S8	2;6	4	2	0
S8	2;6	5	2	1
S8	2;6	6	2	1
S8	2;6	7	2	0
S8	2;6	8	2	1
S8	2;6	9	2	1
S8	2;6	10	2	0
S8	2;6	11	2	1
S8	2;6	12	2	0
S8	2;6	13	2	0
S8	2;6	14	2	1
S8	2;6	15	2	0
S9	2;6	1	1	1
S9	2;6	2	1	1
S9	2;6	3	1	1
S9	2;6	4	1	1
S9	2;6	5	1	0
S9	2;6	6	1	1
S9	2;6	7	1	1
S9	2;6	8	1	1
S9	2;6	9	1	1
S9	2;6	10	1	0
S9	2;6	11	1	1
S9	2;6	12	1	0
S9	2;6	13	1	1
S9	2;6	14	1	0
S9	2;6	15	1	0
S10	2;7	9	1	0
S10	2;7	10	1	0
S10	2;7	11	1	0
S10	2;7	12	1	0

S10	2;7	13	1	0
S10	2;7	14	1	0
S10	2;7	15	1	1
S10	2;7	1	1	0
S10	2;7	2	1	1
S10	2;7	3	1	0
S10	2;7	4	1	1
S10	2;7	5	1	1
S10	2;7	6	1	0
S10	2;7	7	1	1
S10	2;7	8	1	0
S11	2;9	9	1	0
S11	2;9	10	1	0
S11	2;9	11	1	0
S11	2;9	12	1	0
S11	2;9	13	1	0
S11	2;9	14	1	0
S11	2;9	15	1	0
S11	2;9	1	1	1
S11	2;9	2	1	0
S11	2;9	3	1	0
S11	2;9	4	1	0
S11	2;9	5	1	1
S11	2;9	6	1	1
S11	2;9	7	1	0
S11	2;9	8	1	1
S12	2;9	9	1	0
S12	2;9	10	1	0
S12	2;9	11	1	0
S12	2;9	12	1	0
S12	2;9	13	1	0
S12	2;9	14	1	1
S12	2;9	15	1	0
S12	2;9	1	1	0
S12	2;9	2	1	1
S12	2;9	3	1	0
S12	2;9	4	1	1
S12	2;9	5	1	0
S12	2;9	6	1	1
S12	2;9	7	1	1
S12	2;9	8	1	0
S13	2;10	1	1	0
S13	2;10	2	1	0
S13	2;10	3	1	0
S13	2;10	4	1	1
S13	2;10	5	1	1
S13	2;10	6	1	0
S13	2;10	7	1	1
S13	2;10	8	1	0
S13	2;10	9	1	1
S13	2;10	10	1	1

S13	2;10	11	1	0
S13	2;10	12	1	1
S13	2;10	13	1	0
S13	2;10	14	1	0
S13	2;10	15	1	0
S14	2;10	1	2	0
S14	2;10	2	2	1
S14	2;10	3	2	1
S14	2;10	4	2	0
S14	2;10	5	2	0
S14	2;10	6	2	0
S14	2;10	7	2	0
S14	2;10	8	2	1
S14	2;10	9	2	0
S14	2;10	10	2	0
S14	2;10	11	2	1
S14	2;10	12	2	1
S14	2;10	13	2	1
S14	2;10	14	2	0
S14	2;10	15	2	1
S15	2;10	1	2	0
S15	2;10	2	2	1
S15	2;10	3	2	0
S15	2;10	4	2	0
S15	2;10	5	2	0
S15	2;10	6	2	1
S15	2;10	7	2	1
S15	2;10	8	2	0
S15	2;10	9	2	1
S15	2;10	10	2	1
S15	2;10	11	2	0
S15	2;10	12	2	1
S15	2;10	13	2	1
S15	2;10	14	2	0
S15	2;10	15	2	0
S16	2;11	1	1	1
S16	2;11	2	1	0
S16	2;11	3	1	1
S16	2;11	4	1	1
S16	2;11	5	1	1
S16	2;11	6	1	0
S16	2;11	7	1	1
S16	2;11	8	1	0
S16	2;11	9	1	1
S16	2;11	10	1	0
S16	2;11	11	1	0
S16	2;11	12	1	1
S16	2;11	13	1	0
S16	2;11	14	1	1
S16	2;11	15	1	1
S17	2;11	1	2	1

S17	2;11	2	2	1
S17	2;11	3	2	1
S17	2;11	4	2	1
S17	2;11	5	2	0
S17	2;11	6	2	1
S17	2;11	7	2	0
S17	2;11	8	2	1
S17	2;11	9	2	1
S17	2;11	10	2	1
S17	2;11	11	2	1
S17	2;11	12	2	1
S17	2;11	13	2	1
S17	2;11	14	2	1
S17	2;11	15	2	0
S18	3;0	1	1	1
S18	3;0	2	1	1
S18	3;0	3	1	0
S18	3;0	4	1	1
S18	3;0	5	1	0
S18	3;0	6	1	0
S18	3;0	7	1	0
S18	3;0	8	1	1
S18	3;0	9	1	0
S18	3;0	10	1	1
S18	3;0	11	1	1
S18	3;0	12	1	1
S18	3;0	13	1	0
S18	3;0	14	1	0
S18	3;0	15	1	0
S19	3;0	1	1	1
S19	3;0	2	1	1
S19	3;0	3	1	1
S19	3;0	4	1	1
S19	3;0	5	1	0
S19	3;0	6	1	1
S19	3;0	7	1	1
S19	3;0	8	1	0
S19	3;0	9	1	1
S19	3;0	10	1	1
S19	3;0	11	1	1
S19	3;0	12	1	0
S19	3;0	13	1	1
S19	3;0	14	1	1
S19	3;0	15	1	1
S20	3;0	1	1	1
S20	3;0	2	1	1
S20	3;0	3	1	0
S20	3;0	4	1	1
S20	3;0	5	1	1
S20	3;0	6	1	0
S20	3;0	7	1	1

S20	3;0	8	1	1
S20	3;0	9	1	0
S20	3;0	10	1	1
S20	3;0	11	1	0
S20	3;0	12	1	0
S20	3;0	13	1	1
S20	3;0	14	1	1
S20	3;0	15	1	1

Appendix C

Subject	età	Sesso	Item	Prime	Ripetizione	Target Video	Produzione
S10	2;7	M	1	Topo Tip viene sgridato dalla mamma.	Topo tip ha gridato alla mamma	Il bambino viene imboccato dalla mamma.	i fratellini arrabbiando
S10	2;7	M	2	Il latte viene scaldato dal fuoco.	Il latte ha scaldato il fuoco	I denti vengono lavati dallo spazzolino.	qualcosa sui denti
S10	2;7	M	3	La gazzella viene inseguita dal leopardo.	Dal Leopaddo	Il bambino viene vestito dalla mamma.	alessandro, gli dà tutto la mamma
S10	2;7	M	4	Il disegno viene cancellato dalla gomma.	Il disegno viene cancellato dalla gomma	I fiori vengono bagnati dalla pioggia.	i fiori le bolle
S10	2;7	M	5	Il pane viene infornato da Pingu.	Il fonno viene cato da pingu	Il disegno viene colorato da pingu.	te raccondi quando il ritratto viene congelato da Pingu
S10	2;7	M	6	Il cane viene fotografato dal signore.	Cane viene graffato dal signore	Il signore viene svegliato dal cane.	il lupo viene veiato dai papà
S10	2;7	M	7	Le mani vengono asciugate dall'asciugamano.	Le mani vengono sciugate dal ciugamano	Il bicchiere viene rotto dalla palla.	una palla gicicia ma rompe tutti i bicchieri
S10	2;7	M	8	Il bambino viene consolato dalla nonna.	Il bambino viene congelato dalla nonna	L'uccellino viene catturato dal gatto.	è sivvestro vede atto a tweety
S10	2;7	M	9	Le foto vengono staccate dalla maestra.	Le foto vengono staccate dalla maestra	Il tavolo viene pulito dalla maestra.	cos'è successo allebbatto?
S10	2;7	M	10	La mela viene tagliata dal coltello.	La mela viene tagliata dal coltello	La terra viene sollevata dalla ruspa.	quello cavatore fanno dei bravissimi lavoretti

S10	2;7	M	11	L'acqua viene bevuta dal signore.	la lacqua viene bevuta dal signore	Le fragole vengono raccolte dai signori.	signore viene laccaduto dae fragole
S10	2;7	M	12	La casa viene illuminata dal sole	La casetta viene illuminata dal sole.	L'incendio/ il fuoco viene spento dalle macchinine.	è uno dei pompieri viene pegnato dal fuoco.
S12	2;9	F	1	Topo Tip viene sgridato dalla mamma.	Topo tip vieene gridato daa mamma	Il bambino viene imboccato dalla mamma.	mangia la pappa
S12	2;9	F	2	Il latte viene scaldato dal fuoco.	Il latte vieene caddato dal fuoco	I denti vengono lavati dallo spazzolino.	lavae i denti
S12	2;9	F	3	La gazzella viene inseguita dal leopardo.	La gazzella vee sezzita leopaddo	Il bambino viene vestito dalla mamma.	mettere la maglietta
S12	2;9	F	4	Il disegno viene cancellato dalla gomma.	Il disegno viene cancellato dalla gomma	I fiori vengono bagnati dalla pioggia.	Fiorellini faceva la bolla
S12	2;9	F	5	Il pane viene infornato da Pingu.	Fonno fonno viene viene tattato da pingu.	Il disegno viene colorato da pingu.	pitturare
S12	2;9	F	6	Il cane viene fotografato dal signore.	Cane veee tottotato signoe	Il signore viene svegliato dal cane.	fa il solleticio
S12	2;9	F	7	Le mani vengono asciugate dall'asciugamano.	E mani vengono sciugate suasciugamano	Il bicchiere viene rotto dalla palla.	rotto
S12	2;9	F	8	Il bambino viene consolato dalla nonna.	Il babbino viene cossolato della nonna	L'uccellino viene catturato dal gatto.	isseme ha pottato via
S12	2;9	F	9	Le foto vengono staccate dalla maestra.	La foto viene teccato da metra	Il tavolo viene pulito dalla maestra.	meane tavoo
S12	2;9	F	10	La mela viene tagliata dal coltello.	La mela viene tagliata a cotello	La terra viene sollevata dalla ruspa.	le ruspe

S12	2;9	F	11	L'acqua viene bevuta dal signore.	L'acqua viene beuta da signoe.	Le fragole vengono raccolte dai signori.	signoe alsa i fiorellini
S12	2;9	F	12	La casa viene illuminata dal sole	La casa vieee lata dal sole.	L'incendio/ il fuoco viene spento dalle macchinine.	la casa viene issedita acqua.
S14	2;11	M	1	Topo Tip viene sgridato dalla mamma.	Sgidato daa mamma	Il bambino viene imboccato dalla mamma.	mangianno
S14	2;11	M	2	Il latte viene scaldato dal fuoco.	A coco… dal coco	I denti vengono lavati dallo spazzolino.	guadda con la bocca
S14	2;11	M	3	La gazzella viene inseguita dal leopardo.	Seguita leopado	Il bambino viene vestito dalla mamma.	si vettano
S14	2;11	M	4	Il disegno viene cancellato dalla gomma.	Gomba	I fiori vengono bagnati dalla pioggia.	cade le gocce i fioi
S14	2;11	M	5	Il pane viene infornato da Pingu.	Fommato da pinguo	Il disegno viene colorato da pingu.	pittura
S14	2;11	M	6	Il cane viene fotografato dal signore.	Fafavato tignoe.	Il signore viene svegliato dal cane.	qui domme il signore
S14	2;11	M	7	Le mani vengono asciugate dall'asciugamano.	Ammano sciugate ammano	Il bicchiere viene rotto dalla palla.	si rompe il bicchiere
S14	2;11	M	8	Il bambino viene consolato dalla nonna.	Colato dalla nonna	L'uccellino viene catturato dal gatto.	Tweety mangiato da gatto
S14	2;11	M	9	Le foto vengono staccate dalla maestra.	Taccate daa maetta	Il tavolo viene pulito dalla maestra.	pulato dalla maetta
S14	2;11	M	10	La mela viene tagliata dal coltello.	Colte taa coltello	La terra viene sollevata dalla ruspa.	prendono la montagna e poi mettono là il trattore

S14	2;11	M	11	L'acqua viene bevuta dal signore.	Ee bevuta da signoe	Le fragole vengono raccolte dai signori.	Queste sono fagoe raccolgono
S14	2;11	M	12	La casa viene illuminata dal sole	Dal sole. Sole.	L'incendio/ il fuoco viene spento dalle macchinine.	I fuoco ha pento nell'acqua
S19	3;0	F	1	Topo Tip viene sgridato dalla mamma.	Topo tip vienenne sgidato dalla mamma	Il bambino viene imboccato dalla mamma.	La mamma da' mangare il bambino
S19	3;0	F	2	Il latte viene scaldato dal fuoco.	Il latte viene ldato dal fuoco	I denti vengono lavati dallo spazzolino.	Lava i denti
S19	3;0	F	3	La gazzella viene inseguita dal leopardo.	La gazzella viene inseguita dal leopado	Il bambino viene vestito dalla mamma.	Qua cambia pannolino al bimbo
S19	3;0	F	4	Il disegno viene cancellato dalla gomma.	Il disegno viene cancellato dalla gomma	I fiori vengono bagnati dalla pioggia.	Cade l'acqua
S19	3;0	F	5	Il pane viene infornato da Pingu.	Il pane viene iffonnato da il pingo	Il disegno viene colorato da pingu.	Il foglio viene disegnato dai colori
S19	3;0	F	6	Il cane viene fotografato dal signore.	Il cane che viene sfsfogafato dal signore	Il signore viene svegliato dal cane.	Il cane che viene ba..che viene.. Che viene dal cane che dà fastidio
S19	3;0	F	7	Le mani vengono asciugate dall'asciugamano.	Le mani venno asciugate dalla mano	Il bicchiere viene rotto dalla palla.	Il bicchiere viene cascato dalla billia
S19	3;0	F	8	Il bambino viene consolato dalla nonna.	Il bambino viene consolato dalla nonna	L'uccellino viene catturato dal gatto.	Il gatto viene paura da tweety
S19	3;0	F	9	Le foto vengono staccate dalla maestra.	Le foto viene tascattata dalla maestra	Il tavolo viene pulito dalla maestra.	Tu che pulisci il tavolo!
S19	3;0	F	10	La mela viene tagliata dal coltello.	La mela viene tagliata da coltello	La terra viene sollevata dalla ruspa.	Le macchine viene lavorare con la sabbia

S19	3;0	F	11	L'acqua viene bevuta dal signore.	L'acqua viene bevuta dal signore	Le fragole vengono raccolte dai signori.	Le fagole viene raccatte dal signore
S19	3;0	F	12	La casa viene illuminata dal sole	La casa viene illuminata dassole	L'incendio/ il fuoco viene spento dalle macchinine.	Il fuoco viene spento da camion
S20	3;0	F	1	Topo Tip viene sgridato dalla mamma.	Tip veene viene dalla mamma	Il bambino viene imboccato dalla mamma.	/
S20	3;0	F	2	Il latte viene scaldato dal fuoco.	Coco..tate cadato dal fuoco.	I denti vengono lavati dallo spazzolino.	I denti!
S20	3;0	F	3	La gazzella viene inseguita dal leopardo.	C'è la tigre	Il bambino viene vestito dalla mamma.	Viene col vetito dalla mamma
S20	3;0	F	4	Il disegno viene cancellato dalla gomma.	Viene fuori dalla gomma	I fiori vengono bagnati dalla pioggia.	I fiori
S20	3;0	F	5	Il pane viene infornato da Pingu.	Viene fuori da il pingu	Il disegno viene colorato da pingu.	Fa i colori come me
S20	3;0	F	6	Il cane viene fotografato dal signore.	viene dal signore di ripete	Il signore viene svegliato dal cane.	Il cane raffa il signore
S20	3;0	F	7	Le mani vengono asciugate dall'asciugamano.	Daasciugamano.	Il bicchiere viene rotto dalla palla.	Rotto
S20	3;0	F	8	Il bambino viene consolato dalla nonna.	Vee cossolato dalla nonna	L'uccellino viene catturato dal gatto.	Il gattino viene quello
S20	3;0	F	9	Le foto vengono staccate dalla maestra.	Vie..tacca le foto dalla maestra.	Il tavolo viene pulito dalla maestra.	la maestra pulisce il tavolo
S20	3;0	F	10	La mela viene tagliata dal coltello.	È tagliata dal coltello	La terra viene sollevata dalla ruspa.	viene dalla roba raccoiere quetto

S20	3;0	F	11	L'acqua viene bevuta dal signore.	Beve l'acqua!	Le fragole vengono raccolte dai signori.	Dai signoi
S20	3;0	F	12	La casa viene illuminata dal sole	Luminata dal sole!	L'incendio/ il fuoco viene spento dalle macchinine.	la polizia fa nino nino..lava tutto la casa.