THE ACQUISITION OF ACTIONAL PASSIVES IN CATALAN

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1. OBJECTIVE

In this work we discuss an experiment designed to assess Catalan children's knowledge of active sentences, as well as short and long passives. In a picture-aided comprehension task we tested 82 Catalan children ranging from 3;1 to 5;1. The core objective of this experiment was to evaluate the two predominant theories that seek to explain the late development of passives in children's grammar. That is, to see if the difficulty with passives arises from the fact that A(rgument-chains) are not represented in the grammar of the developing child until roughly after 5 years of age (Borer and Wexler 1987, Wexler 2004) or is related to properties of the *by*-phrase (Fox and Grodzinsky, 1998).

2. BACKGROUND

Children's difficulty with passives is well known across different languages: English (Maratsos et al., 1985, Borer and Wexler, 1987), (Mandarin) Chinese (Chang, 1986), Spanish (Pierce, 1992), Dutch (Verrips, 1996), Japanese (Sugisaki, 1999), (Brazilian) Portuguese (Gabriel, 2001), Greek (Terzi & Wexler, 2002), Russian (Babyonshev & Brun, 2003), German (Bartke, 2004) and Serbian (Djurkovic, 2005). Maratsos et al. (1985) showed that 4-year-old children understand passive sentences which contain "actional verbs" (1), whereas they fail in comprehension tasks for sentences with "nonactional" passives (2).

(1) The boy was *kissed/kicked/held* by the girl.

(2) The boy was *loved/seen/remembered* by the girl.

"Non-actional verbs" or "psych verbs" are those that cause or provoke a change or transition from one mental state to another mental state (*frighten*), or express the state after a mental process has taken place (*fear*). In the latter case the focus is not on the process but on the mental state achieved by the Experiencer after the transition. Another way to distinguish between actional and non-actional verbs is that actional verbs are verbs with Agent subjects, whereas non-actional verbs are essentially verbs with Experiencer subjects, or Cause subjects.

(3) Psych verbs:

	Stimulus			Experiencer
	↓			↓
a.	Lion	frightens		monkey.
	Experiencer			Cause
	↓			↓
b.	Monkey	fears		lion.

The reason why children have been shown to have difficulties comprehending passives is an open question. There are two competing accounts for this late development. One is Borer and Wexler's 1987 A-Chain Delay Hypothesis (ACDH), which states that children cannot handle A-chains (Argument chains), that is, movement from object to subject position, until they have reached a certain degree of maturation. By maturation Borer and Wexler mean, in general, that certain linguistic abilities simply grow over time, in contrast to learning, in which specific evidence is used by the child to create a grammar. In their theory the child can change his or her grammar without going through a correction process

based on new data. The child reinterprets the earlier principles in accordance with the new abilities.

One of Borer and Wexler's findings is that the passive forms that are misunderstood in the early grammar are precisely those passive forms that are never homophonous with adjectival passives in the adult grammar. The properties of verbal and adjectival passives were first described in a seminal paper by Wasow (1977). Wasow suggested that verbal passives are the result of a syntactic transformation, while adjectival passives are built in the lexicon. It is usually assumed that in a verbal passive the object cannot get case from the participle, so it needs to move to subject position (Baker et al., 1989). In the case of adjectival passives, the participle is transformed into an adjective, and this change of category explains most of the properties related to this structure (Levin and Rappaport, 1986).

An example of a verbal passive is *John was **hit** (by the postman)* as opposed to an adjectival passive like *John was **scared**.* One of the standard tests for adjectival character of the passive is the ability to insert "very".

(4) a. **John was very hit by the postman.*

b. John was very scared.

We can see more examples of non-actional verbs (5a, 5b) and actional verbs (6a, 6b):

(5) a. The doll was seen (by Mary).

b. *The doll was liked (by Mary).*

(6) a. The doll was combed (by Mary).

b. *The doll was torn (by Mary).*

Non-actional verbs rarely make good adjectives:

(7) a. *the seen doll

b. *the combed doll*

Also constructions that are unambiguously adjectival and not verbal do not admit very easily *by*-phrases:

(8) a. the uninhabited island (by the British)

b. *the torn doll (*by Peter)*

Borer and Wexler claim that, in the early grammar, the operation that generates adjectival passives has been acquired, but not the operation that generates verbal passives. Since the passive constructions in (5) cannot be generated by this adjectival passive operation, they are missing from the early grammar. Horgan's data (1975) strongly indicate that in early grammar children *produce* adjectival passives. So in the absence of a certain grammatical apparatus, which matures later, an adjectival analysis of passive sentences is all that is available to the child. While ACDH accounts for children's general difficulties with verbal

passives, Borer and Wexler hypothesized that children analyse what for adults are verbal passives as (homophonous) adjectival passives, with the latter not containing the crucial A-chain. Once maturation occurs, the derivation of verbal passives becomes possible. Reaching a certain age 'triggers' the availability of a set of principles of adult competence that were hitherto unavailable to the child. Triggering is to be strictly contrasted with learning. The child learns nothing.

According to Borer and Wexler's A-chain Delay hypothesis, children fail with nonactional passives because of the inability to form A-chains, but they succeed with actional passives because they adopt an alternative structure that does not involve an A-chain, that is they interpret these sentences as adjectival passives. According to Borer and Wexler, the ability to form A-chains is innate and subject to biological maturation. Furthermore, they note that in children's spontaneous speech nontruncated passives (those with a *by*-phrase) are rare, which is consistent with the ungrammaticality of the *by*-phrase with an adjectival passive.

The alternative account of the children's delay in passives is Fox and Grodzinsky's (1998) Theta Transmission account. They claim that the children's difficulty has nothing to do with A-chains but with theta transmission. Children cannot transmit the external theta-role to the *by*-phrase in the passives, and they come to interpret the *by*-phrase by default Agent assignment.

In generative grammar a theta role or θ-role is the formal device for representing argument structure (the number and type of noun phrases)

required by a particular verb. Theta roles are the names of the participant roles associated with a predicate: the predicate may be a verb, an adjective, a preposition, or a noun. The participant is usually said to be an argument of the predicate. If the participant is causing something to happen or is in some way responsible for something happening or has conscious control over something happening, the participant is called an Agent, as *Bill* in (9).

(9) Bill built a house.

The Experiencer is someone/thing who experiences some state. Thus, in (10), *Jack* is the Experiencer.

(10) Jack fell asleep.

The Patient or Theme is whatever is acted on. Thus, *house* in (9) is the patient.

Then the question is: what causes the difficulty, an A-chain or theta transmission? Do we expect long (nontruncated) passives to be more difficult to comprehend than short (truncated) passives?

Earlier studies on children's passives report that short passives (passives lacking the *by*-phrase) are produced and comprehended better than long passives (Horgan, 1978) because adjectival passives do not allow the *by*-phrase. Due to the complete elimination of the subject theta role it follows from this property that children are good at short actional

passives, but poor at long actional passives. This is accounted for by Borer and Wexler (1987) under their A-chain Maturation hypothesis.

However, Fox and Grodzinsky (1998) argue against this hypothesis on the basis of a result of an experiment. They found that children have problems with non-actional passives only when the *by*-phrase is present. That is, in their experiment children had no problem with sentences like (11a)–(11c), but had difficulty only with sentences like (11d).

(11) a. The little boy is pushed. OK

b. The little boy is pushed by the big boy. OK

c. The little boy is seen. OK

d. The little boy is seen by the big boy. Not OK

In the experiment they conducted they meant to demonstrate that the problem children have with passives disappears once the *by*-phrases are eliminated. The experiment had two components. The first component tested the validity of the results of Borer and Wexler, namely, that although children have no problem in interpreting actional non-truncated *be*- or *get*-passives (12) - (13) (and certainly do well on actives –both actional (14) and nonactional (15)), they have difficulty with nonactional *be*-passives (16).

(12) The rock star is being chased by the koala bear.

(13) The boy is getting touched by the magician.

(14) The mouse is touching the little girl.

(15) The pizza baker sees the buffalo.

(16) The boy is seen by the horse.

The second component directly tested the hypothesis that children have a problem with the *by*-phrase. The *by*-phrases were eliminated from the nonactional *be*-passives (17) to see whether the problem disappeared. Two actional verbs were used, *touch* and *chase*, and two nonactional verbs, *hear* and *see*. Actional verbs each appeared in a full (nontruncated) *be*-passive, a full *get*-passive, and an active control. Nonactional verbs appeared in full passives, truncated passives, and active controls.

(17) The bear is seen.

While Borer & Wexler claim that *get*-passives are similar to adjectival passives and lack an A-chain, Fox and Grodzinsky's claim is that *get*-passives include the same kind of A-chain that exists in a regular passive construction.

Each sentence type was paired either with a story in which the sentence was true or with one in which it was false (match (M) and mismatch (MM), respectively), for a total of 24 sentence/story pairs. The MM sentence/story pairs were all cases in which the sentence described the reversal of the main event that took place in the story. For example, when the main event in the story was one in which John was chased by Bill, the MM sentence was *Bill is chased by John*.

Thirteen children from 3;6 to 5;5 years old participated in the experiment. One experimenter manipulated the toys for the staged events and narrated the accompanying story; a second experimenter took the role of a puppet, who uttered the M (match) or MM (mismatch) sentence that either correctly or incorrectly described the staged event. The child judged whether or not the puppet's utterance correctly described the event. If the answer was 'yes', the child 'rewarded' the puppet; if the answer was 'no'. the child 'punished' the puppet. That is, children answered correctly when they rewarded matches and punished mismatches. If the child 'punished' the puppet (i.e., said that the puppet was wrong), then he or she was asked, 'What really happened?' This enabled the experimenters to ensure that the child was rejecting the sentence for relevant reasons.

The results showed that children performed at 100% on actives and actional passives (12)-(15). With the nonactional nontruncated passive (16) the performance was at chance (46.1%) and the nonactional truncated passive (17) performance was well above chance (86.5%). These results argue against the Maturation Hypothesis, because they indicate that the children's problem lies not with A-chains but with the *by*-phrase.

Because it combined data from children who were at different stages of linguistic development, the authors made a more fine-grained analysis and divided the children into three groups.

- Group 1: 2 children, ages 4;1 and 4;9. They showed adult performance in all sentences.

- Group 2: 8 children, whose ages ranged from 3;6 to 5;5 (mean 4;75). They performed perfectly on actional *be*-and *get*-passives, nonactional actives and nonactional truncated passives. However, as Fox and Grodzinsky's hypothesis predicts, they performed poorly on the nonactional nontruncated passives (40.6%).
- Group 3: 3 children, ages 4;3, 4;6 and 4;9. They performed just like the children in group 2 but they also had difficulty with the nonactional truncated *be*-passives (41.6%), a performance which cannot be attributed to the *by*-phrase.

If we focus on group 2, the largest one, consisting of 8 children, there is a clear-cut argument that their problem with the passives is actually related to the interpretation of the *by*-phrase.

See the following table for the results:

Table 1:

Group 2, total responses per condition (8 children X 2 sentences per condition)

Condition 1: Nonactional *be*-passives (nontruncated)

	REWARD	PUNISH
MATCH	5	11
MISMATCH	8	8

40.6% correct

Condition 2: Nonactional *be*-passives (truncated)

	REWARD	PUNISH
MATCH	16	0
MISMATCH	0	16

100% correct

Fox and Grodzinsky's hypothesis is that because both long and short passives involve an A-chain, children's poor performance on long passives of nonactional verbs is not to be attributed to an A-chain, because if it were there should be no difference between long and short passives in nonactional predicates. Children have difficulty in transmitting the external theta role to the *by*-phrase. With actional predicates, the preposition *by* itself can assign an affector role (Agent, Instrument, Possessor, etc.) to the following DP as in *a book by John*. However, with nonactional predicates, the affector role is not compatible with the theta role assigned by the predicate. This semantic mismatch explains the poor performance on long passives of nonactional phrases. In other words, Fox and Grodzinsky hypothesize that children are unable to deduce the thematic role of the *by*-phrase by means of thematic transmission. The *by*-phrase nevertheless comes to have a thematic role. It is assigned by the preposition itself. While the preposition *by* in passives is semantically vacuous, the thematic-role of the complement of the *by*-phrase is determined by the verb, not the preposition, as was first noted by Jaeggli (1986).

(18) a. Sophocles was kicked by *Euripides*. (Agent)

b. The package was sent by *Sophocles*. (Source)

c. The letter was received by *Euripides*. (Goal)

d. Sophocles is feared by *all students*. (Experiencer)

Elsewhere in the grammar *by* is semantically contentful. English has a temporal-*by* (We arrived *by 5 PM*) and a locative-*by* (Mary ate *by her locker*). Furthermore, English has an agent/affector-*by*, as seen in simple nominals (the book *by Stendhal*, meaning that Stendhal wrote the book), and derived nominals (the city's destruction *by the foreign army*), where the *by*-phrases are only allowed in those derived nominals based on actional verbs. Fox and Grodzinsky assume English-speaking children know that English has a preposition *by* that assigns an agent-like theta-role independent of theta transmission. When interpreting full passives, children will analyse the preposition *by* as being the semantically contentful agent-*by* that appears in nominals with *by*-phrases. This agent-*by* would thus be (coincidentally) compatible with full actional passives, wherein the *by*-phrase would receive an agent theta-role from the verb in the adult grammar, but is incompatible with full psychological passives, where the *by*-phrase should receive an Experiencer theta-role from the verb, but instead receives an agent theta role directly from the preposition. It is this clash of thematic roles that creates the problems with full psychological passives. Children fail in interpreting passives only when the process of theta-transmission is mandatory – only in passives with *by*-phrases that are not affectors. The clash results in a poor performance in full psychological passives.

Hirsch & Wexler (2006b) sought evidence for Fox and Grodzinsky's *by*-phrase theory using natural speech, both in child-produced and child-directed utterances. They searched the input to and output of 1051 English-speaking children in the CHILDES corpus for all sentences

containing the preposition *by*. The result was that no child in the corpus produces even a single nominal *by*-phrase, nor does any child hear even a single such nominal *by*-phrase. There are no examples of agent-*by* in either child-produced or child-directed speech. Thus, there is no evidence from corpus research to suggest children know *by* may assign an agent theta-role independent of theta-transmission.

In an experiment conducted by Hirsch & Wexler (2006b) 30 children, with ten children in every one-year interval from three to five years (age range: 3;0 - 5;10), were tested on their comprehension of nominal *by*-phrases and nominal *about*-phrases (the latter are abundant in the corpus). The authors designed scenarios that pitted knowledge of *by*-phrases against that of *about*-phrases. Each scenario involved two characters who each told a story about the other character. A third character is asked to comment on one of the stories, the child then reports whether the character is right or wrong. In half of the stories, it comments on the story *by* one character (*by*-trials), and the other half *about* one of the characters (*about*-trials). Half of the responses are true, and half of the responses are false.

The results indicated that, until at least five years of age, children do not understand that *by*-phrases in nominals reflect agents/creators, rather they take such *by*-phrases to designate the subject matter of the noun to which they are adjoined, i.e. to interpret them as *about*-phrases. These data clearly show that children cannot be using knowledge gained from nominal *by*-phrases to determine the semantic properties of semantically contentful *by*. Hirsch & Wexler conclude that the only

semantically contentful *by* (other than locative-*by* and temporal-*by*) children know is that of theme-*by*.

Table 2: Percentage of correct answers in the true and false *by*- and *about*-trials.

Condition	3 year-olds	4 year-olds	5 year-olds	Total
About-T	94.4%	90.0%	95.5%	92.8%
About-F	92.6%	88.1%	90.0%	89.9%
About	93.5%	89.1%	92.5%	91.4%
By-T	34.4%	35.0%	35.0%	34.8%
By-F	18.3%	31.7%	21.7%	23.9%
By	26.6%	33.3%	28.3%	29.4%

In other experiments Gordon & Chafetz (1990), Hirsch & Wexler (2004a), Hirsch & Wexler (2006b) have shown that truncated psychological passives are comprehended at chance level, and even for actional passives there is no comprehension advantage for the truncated form over the full form. So the results of Fox and Grodzinsky were not replicated. At any rate, Hirsch & Wexler argue that the acquisition of psychological passives is genetically determined and that, prior to this maturational event, actional passives are comprehended using an adjectival strategy. Their evidence that (psychological) passive acquisition is subject to maturational growth comes from three different sources:

- Evidence for the universality of passive delay.

- Behavioural genetics research.
- The sudden and uniform onset in comprehension of psychological passives across children that occurs around 6;5 years.

Babyonyshev, Ganger, Pesetsky & Wexler (2001) and Wexler (2004) reformulate the initial ACDH in view of some developments in syntactic theory (the VP-internal subject hypothesis of Koopman & Sportiche, 1991) and some findings in acquisition (mostly the acquisition of raising). These later formulations retain the prediction that passives will be poorly understood by children but actives will not. For the purposes of this dissertation we will refer to the ACDH only. See Gavarró & Cabré-Sans (2009) for work on the more recent reformulations in the acquisition of Catalan unaccusatives.

3. PASSIVES IN IBERIAN ROMANCE: BACKGROUND

Up to now there has not been any experimental research on the acquisition of actional passives in Catalan. However, there exists some research for Spanish, namely Pierce's work (1992), which is described below.

3.1. Spanish passive

Spanish has two forms of passive (see Mendikoetxea, 1999). The

periphrastic (19a), containing the auxiliary verb *ser* 'to be' and the passive participle, and the reflexive (19b) or morphological passive, which contains the clitic *se* and the finite verb form. The latter is the most common form of passive in colloquial Spanish.

(19) a. Este libro fue escrito en México.
'This book was written in México.'

b. Este libro se escribió en México.
This book one wrote in México
'This book was written in México.'

Furthermore, side to side with (19), structures with the subject occurring to the right of the verb are also acceptable.

(20) a. Fue escrito este libro en México.
Was written this book in México
'This book was written in México.'

b. Se escribió este libro en México.
One wrote this book in México
'This book was written in México.'

The Spanish passives in (19) contain a trace in postverbal (object) position that forms an A-chain with the DP in sentence-initial position.

Other examples of sentences with the reflexive passive are:

(21) a. Se rompieron las ventanas.

One broke the windows

'The windows were broken.'

b. Las ventanas se rompieron.

The windows one broke

‘The windows were broken.'

As we mentioned in the introduction, there is research work on the acquisition of Spanish passive conducted by Pierce. Pierce carried out 2 experiments. In the first experiment 18 children aged between 3;7 to 5;9 acquiring Spanish as their first language were tested on their comprehension of full periphrastic passives (containing *by*-phrases) compared to that of actives. The presence of a *by*-phrase in all passive items was thought to override an adjectival interpretation. The results were analysed by age groups (six children per group of 4, 5 and 6 year-olds).

In the theory adopted by Pierce the assumption is that passives like (19a), (19b) and (21b) contain A-chains whereas (20a), (20b) and (21a) don’t. In (20), the postverbal subject may be assigned nominative case directly (i.e. via government) in postverbal position, without formation of an A-chain (Borer, 1986; Jaeggli, 1986).

One prediction Pierce made was that, in accordance with the A-chain Maturation Hypothesis, and the claim that postverbal subjects in the periphrastic passive do not form an A-chain with an empty position, the younger children would have more difficulty comprehending the passive in S-V order than the passive in V-S order. Pierce found that children do not

find periphrastic passives with postverbal subjects easier to comprehend. In fact, they found them more difficult. See the results in table 3.

Table 3: Percentages of correct responses: Experiment 1

	Active		*Passive*			
			S-V		*V-S*	
	S-V	*V-S*	*AC*	*NAC*	*AC*	*NAC*
Group 1	66.7	58.4	66.7	50.0	41.7	66.7
Group 2	79.2	58.4	83.4	33.4	41.7	50.0
Group 3	91.7	54.2	83.4	66.7	75.0	66.7
Total	79.2	57.0	77.8	50.0	52.8	61.0

Note: AC =agreement cue; NAC = no agreement cue [1]

However, according to Burzio (1986) and Belletti (1982) these postverbal subjects could form an A-chain. Under this assumption there would be no differential patterns of development. The results are also compatible with the hypothesis that A-chains mature at around 5 years of age. (In any event, the sample was too small to be considered evidence for or against the theory of A-chain maturation.)

[1] The passive conditions contained an additional, nested Agreement factor: agreement cue (AC) versus non agreement cue (NAC). Only two of the verbs in the passive (*fue peinado* 'was combed' and *fue lavado* 'was washed') coocurred with the DP pair marked by a gender distinction (i.e., Juan and Maria). Because passive participles are marked for agreement with the subject in Spanish, the marking on the participle in these cases (e.g., *lavado* vs *lavada*) serves as a cue to the subject of the passive sentences. It was thought that the presence of an agreement cue on the participle might have a facilitating effect on performance. The results show, see table 3, that agreement cue (AC) passives in V-S order elicited poorer performance at all ages tested than passives in S-V order. Subjects performed best on those passives containing both explicit agreement and the subject in preverbal position.

In the second experiment 45 children aged from 3 to 6 were tested on their knowledge of the morphological passive by means of an elicited production task. Three age groups were made: Group 1, of children aged 3 to 4 (13 children), Group 2, of children aged 4 to 5 (17 children), and Group 3, of children aged 5 to 6 (15 children). Pierce's hypothesis was again that structures with a postverbal argument position (a) should be produced more readily by young children than equivalent sentences in which the DP argument has been proposed (b)

(22) a. V-S Se cerraron las puertas.
One closed the doors
'The doors were closed.'

b. S-V Las puertas se cerraron.
The doors one closed
'The doors were closed.'

The expectation was in Pierce's view supported: see table 4. Also the developmental improvement observed, with half of the 5 to 6-year-old subjects performing well on S-V passives, confirms the assumption that A-chains become accessible during language development only after a period of delay.

Table 4: Percentages of correct responses: Experiment 2

Active					
S-V		*V-S*		*Passive*	
Intr	*Refl*	*Intr*	*Refl*	*S-V*	*V-S*

Group 1	73.1	65.4	65.4	57.7	34.6	42.3
Group 2	76.5	64.7	85.3	73.5	41.2	69.1
Group 3	70.0	70.0	83.3	83.3	50.0	80.0
Total	73.2	66.7	78.0	71.5	41.9	63.8

Note: Intr = single intransitive; Refl = (active) reflexive

The difference between S V and V S could be interpreted as the result of discourse constraints: postverbal subjects are focused (see Solà 1992) and depending on the context of elicitation focused subjects may have been more appropriate. In the case of Pierce's second experiment, the child was presented with a pair of pictures which represented two parallel events involving different characters or objects. The experimenter described one of the pictures using an intransitive, reflexive, or passive sentence; and instructed the child to describe the other picture in the same way or using the same words. It is quite likely that this context encourages a postverbal subject. An example of a pair in the passive could be:

(23) a. S-V Las cortinas se colgaron.
The curtains one hung
'The curtains were hung.'

b. V-S Se colgaron los cuadros.
One hung the pictures
'The pictures were hung.'

We do not know if the question that the children were asked in Pierce's experiment 2 was a narrow Focus question, the preferred answer of which is one with a postverbal subject; or it was a broad Focus question, the preferred answer of which is one with preverbal subject.

To sum up, Pierce argued that the passive was acquired late precisely because (at least some) passives involved A-chains, although an important factor was the low frequency in the input.

3.2. Passives in Catalan

The passive voice is one of the ways that verbs have to modify the relationship between the arguments and the predicate through morphological means. Bartra (2002) writes that in Catalan there are (a) the passive with *ser* 'to be', called periphrastic passive; (b) the stative passive or resultative passive and (c) the pronominal construction with an unspecified subject. All the examples in this section are taken from Bartra (2002) unless stated otherwise.

3.2.1 Periphrastic passive

The periphrastic passive presents a number of syntactic and semantic restrictions. It is formed with *ser* 'to be' as auxiliary and the past participle of the verb in the passive voice. The agent is introduced by the preposition *per* 'by'.

(24) Els testimonis seran interrogats per la policia.

‘The witnesses will be questioned by the police.’

In (25) we can see an example of agentive nominal with the preposition *de* 'of'.

(25) El rei va entrar seguit del seu delfí.
The king PAST enter followed of the his dauphin
'The king entered followed by his dauphin.'

We know that in English the agentive *by*-phrase also occurs as a postmodifier to signify authorship (Quirk *et al*, 1980):

(26) a. A picture *by* Degas
‘Una pintura de Degas’
b. A novel *by* Tolstoi
‘Una novel.la de Tolstoi’

In Catalan, as we can see in example (27a) (from Badia, 2002), the preposition *de* ‘of’ can denote a relationship of ownership: *Joan owns the book*, as well as one of authorship: *Joan has written the book*. The preposition *per* ‘by’, found in passives, does not have this role, but introduces a GOAL (27b).

(27) a. El llibre d’en Joan
‘Joan’s book’ or ‘The book by Joan’

b. El llibre per en Joan

*with the meaning ‘Joan’s book’ or ‘the book by Joan’

‘the book for Joan’

We can find full passives (with the *by* phrase) or truncated passives (without the *by* phrase). Truncated passives are more common since one of the main purposes of passivization is to suppress the agent (the argument that in an active sentence would be the grammatical subject). A passive sentence – with or without a complement Agent – admits modification with an Agent-orientated adverb as shown in (28).

(28) La casa va ser cremada deliberadament (pel propietari).

The house PAST be burnt deliberately (by the owner)

‘The house was burnt deliberately (by the owner).'

Secondly, passive sentences admit complementation with a subordinate purpose clause.

(29) La casa va ser cremada per cobrar l’assegurança.

The house PAST be burnt for get the insurance

’The house was burnt to get an insurance compensation.'

The past participle endows passive value even if there is not a full passive with the auxiliary *ser* (*la casa cremada* ‘the burnt house’). The complement agent is optional except for creation verbs (*build, design,*

paint, etc) which require the presence of an agent. Given the relative polisemy of the preposition *per*, which besides its meaning of Agent has among others the semantic values of Means, Cause or Instrument, and even Experiencer, there may be ambiguity among the different meanings of the preposition. It is not possible to obtain a well-formed passive with any transitive verb.

There are restrictions in passivization depending on the type of verbal action (Aktionsart or lexical aspect) and the verbal aspect of the different verb tenses. Telic predicates, which normally take a definite complement, are easier to be constructed in passive than atelic predicates. Verbs which denote atelic activities like contact verbs *empènyer* ‘push’; *tocar* ‘touch’, *abraçar* ‘hug’ are not common in passive.

Verbal tenses like the present and the imperfect which can imply a habitual aspect value give rise to an atelic interpretation of the predicate. Consequently, only a few predicates admit the periphrastic passive in present and imperfect.

(30) *El tresor era trobat dins d'una cova.
The treasure PAST be found in of a cave
'The treasure was found in a cave.'

3.2.2 Stative passive

This construction involves the past participle of a transitive verb and the verb *estar* 'to be’ as the auxiliary. It does not have a dynamic value, it is not focused on the final stage of the process but on the resulting

situation after the process has finished. It is considered that a sentence with a past participle and an inanimate subject can take the verb *estar* ‘to be' if it focuses on the result of the process and if it has a merely descriptive meaning *ser* is preferable.

(31) a. La porta està oberta.
'The door is open.'
(There has been a process by which the door has been opened).

b. La porta és oberta.
'The door is open.'
(Description of the state at a given moment).

Psychological verbs like *espantar* 'frighten', *preocupar-se* 'worry', with an Experimenter argument, have a causative transitive interpretation and may also be found in the stative passive.

(32) a. Estic preocupat.
Am worried
‘I’m worried.'

b. La meva mare està espantada.
The my mother is frightened
‘My mother is frightened.'

Predicates that denote contact between two entities do not admit the stative passive:

(33) a. *Aquest nen està besat.
'This boy is kissed.'

b. *Aquesta taula està empesa.
'This table is pushed.'

3.2.3 Pronominal constructions with an unspecified subject

A pronominal verb is a verb with a clitic pronoun which does not establish any anaphoric relationship with any other phrase in the context and appears in complementary distribution with the subject of the transitive. With transitive verbs, instead of the verb in the passive voice, the pronominal form is often used:

(34) Aquesta tela es ven molt bé.
This fabric one sells very well
'This fabric sells very well.'

4. THE EXPERIMENT

This experiment originated in a project entitled COST ACTION A33, Crosslinguistically Robust Stages of Children's Linguistic Performance, a project that conducts a European comparative study of child language acquisition which focuses primarily on 5-year-old children. We took part in

the passive working group and we enlarged the study with the addition of 4-year-old and 3-year-old children. Such an experiment for the Catalan language had not been carried out before.

A total of 82 children from 3 different primary schools in Sabadell (CEIP La Creu Alta, CEIP Pau Casals, CEIP Joanot Alisanda) took part in the experiment. 41 boys and 41 girls aged between 3;1 and 5;11. 40 of these children were tested on their comprehension of truncated (short) passive sentences and 42 on their comprehension of non-truncated (long) passives. All of them were tested on their comprehension of active sentences as well.

The children were pooled following two criteria: age and language. Because this was meant to be a developmental study children whose ages ranges between 3;1 and 5;11 years were chosen. As controls 3 adult native speakers of Catalan took the test as well.

As for their age the breakdown of the number of children is as follows:

Table 5. Age range, number of children and mean age

Age range	Number of children	Mean age
3-3;11	13 children	3;6
4-4;11	28 children	4;6
5-5;11	41 children	5;5

All of them were acquiring Catalan as their first language and spoke Catalan at home at least to one parent.

4.1 Task, materials and procedure

The task consisted of three parts:

- Part I: Paper picture game for identifying characters.
- Part II: Power point pre-recorded game for identifying characters and actions.
- Part III: Power point pre-recorded game for comprehending active and passive constructions.

Part I

Before starting the test the children got familiarised with the characters they were going to encounter in the experimental items in part III. The characters were described (grandfather, father, the elder brother and the younger brother), and then the children were asked to point at a particular member of the family, the grandfather, for instance, and the same went for the rest of the characters. The same procedure was followed with the female characters.

Part II

When the children could demonstrate that they knew the characters, we proceeded to the next stage. In this they saw 6 different pictures where two of the male characters they had identified before were performing some action, e.g. the elder brother tickling the younger brother, and they heard the corresponding question: Qui fa pessigolles a qui? '*Who*

is tickling whom?' to which they had to respond and in this way demonstrate that they could distinguish the character who was acting as a subject or object of the action. In their answers they could mention both; only the subject; only the object; or another subject; and they could include or not the corresponding verbs in their answers .For every sentence there were a pair of pictures and a character played the role of subject in one picture and the role of object in the other picture.

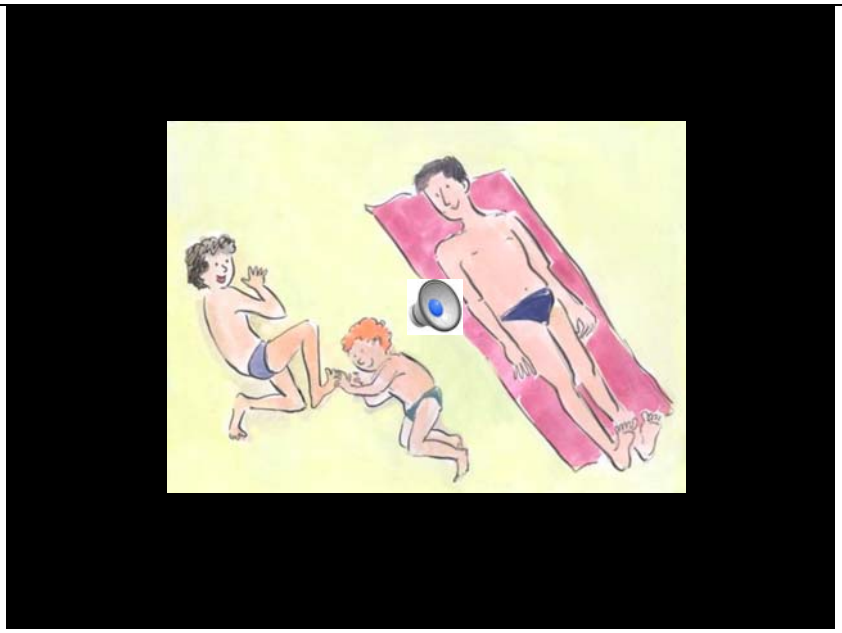


Figure 1. PowerPoint for Part II

Recorded sentence: Qui fa pessigolles a qui? '*Who is tickling whom*?'

Table 6. Answer sheet layout for each sentence

Given Sentence	**Answer**			
1-Qui fa pessigolles a qui? '*Who is tickling whom*?'	Both	Subject	Object	Other
	With verbs?			YES/NO

When they had completed the male part they did the female part, which was similar only with female characters (grandmother, mother, elder daughter and younger daughter) and different actions from the ones in the male part. If a child couldn't do well on either part he or she could not continue the test. Once the children had been trained in this recognition activity the actual test started. (For a complete list of items see appendix A).

Part III

The test was a picture-matching task in which the children heard sentences in the active or passive (either short or long passives) while they looked at four pictures related to the sentence and they had to choose what picture was the one the sentence described. The sentences belonged to the category of periphrastic passive. We discarded the pronominal constructions because they are homophones of a reflexive.

(35) a. Es banyen els nens.
One washes the children
'The children are washed.'

b. Es banyen els nens.
REFL wash the children
'The children wash themselves.'

The sentences were semantically reversible, so that interpretation rested solely on grammatical knowledge[2].

There were always three characters on each picture. One picture showed the correct subject performing the action (correct answer), another picture showed the theoretical object performing the action (reverse answer), a third picture showed another character different from the two characters involved in the action (other person answer), and on the fourth picture none of the characters were performing any action at all (no action answer). To show this in a clearer way we can look at Figure 2. As we can see there are four pictures. When the children hear the recorded sentence: El germà petit és abraçat per l'avi '*The little brother is hugged by Grandpa'*, they choose the picture that they think is being described by the sentence. In this example the 'correct answer' corresponds to the top-right picture, the 'reverse answer' corresponds to the top-left picture, the 'other person answer' corresponds to the bottom-left picture and the 'no action' answer picture corresponds to the bottom-right picture.

[2] In a semantically reversible sentence, the subject and object of the sentence can be reversed and still produce a meaningful sentence. For example, *the dog was bitten by the fox*. The reverse, *the fox was bitten by the dog* is a perfectly possible action. Another sentence, *the apple was bitten by the postman* is syntactically correct and is also semantically legal, but it is considered to be semantically irreversible: a sentence like *the postman was bitten by the apple* is out. It is not in correspondence with a probable world image. According to the world image of the child, an apple would not bite a man.

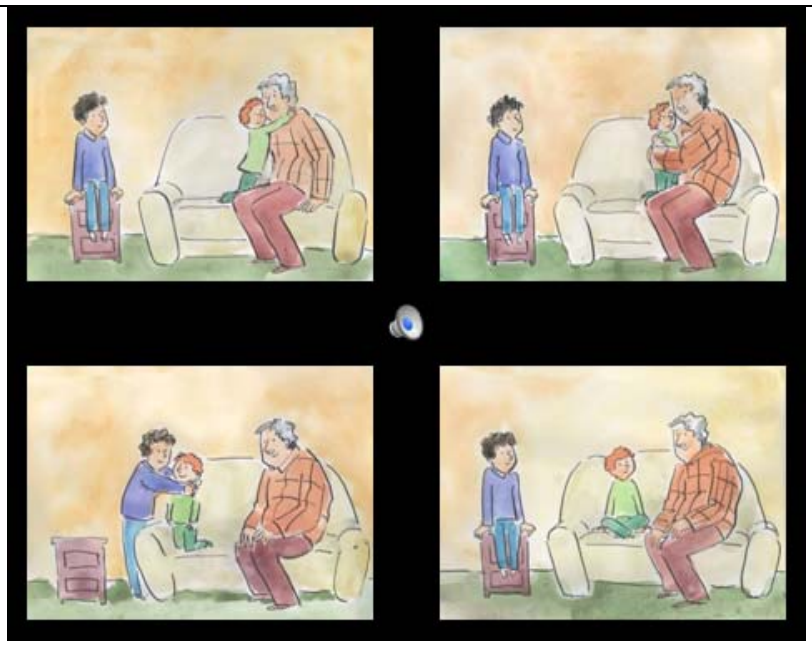


Figure 2. PowerPoint for Part III

Recorded sentence: El germà petit és abraçat per l'avi.

'The little boy is hugged by Grandpa.'

Table 7. Answer sheet layout for example

Test sentences	**Position of pictures**	
El germà petit és abraçat per l'avi. '*The little boy is hugged by Grandpa*.'	1 Reverse	2 Correct
	3 Other subject	4 No action

Each test item was presented at most twice. The children were not corrected for wrong responses. Each child heard the sentences with the male characters and the female characters in the same session. This

comprised 22 sentences with male characters and 22 sentences with female characters, of which in each part there were 11 questions in the active and its 11 passive counterparts in random order. (For a complete list of items see appendix B).

In the experiment there were three types of sentences: 22 active sentences (36a), 22 short (truncated) passive sentences (36b), and 22 long (nontruncated) passive sentences (36c).

(36) a. El germà petit abraça l'avi.
The brother little hugs the grandpa
'The little brother is hugging grandpa. '

b. L'avi és abraçat.
The grandpa is hugged
'Grandpa is hugged.'

c. El germà petit és abraçat per l'avi.
The brother little is hugged by the grandpa.
'The little brother is hugged by grandpa.'

All the children were tested on active sentences; however, they were tested either on short passives or long passives. Out of the 82 children, 40 were tested on short passives and 42 were tested on long passives. The test took about 20 minutes per child on average, and was run individually in a quiet room in the school.

It is important to emphasize that even though no single methodology is perfect, experiments like ours which include picture

selection are reasonably sensitive measures of children's linguistic competence (Crain, Thornton and Murasugi, 2009, Lillo-Martin and Snyder, 2009).

4.2 Predictions

In accordance to Borer and Wexler's A-chain Maturation Hypothesis, long passives should get poor results because of the difficulty of children to represent A-chains. Also, the older the children, the better the results should be since according to this hypothesis A-chains are subject to maturation. As for short passives, they are expected to get better results than long passives because of the availability of an adjectival reading.

Under the assumption of Fox and Grodzinsky's hypothesis, the problem lies with the *by*-phrase. When interpreting full passives in English, children will analyse the preposition *by* as being the semantically contentful agent-*by* that appears in nominals with *by*-phrases. This agent-*by* would thus be (coincidentally) compatible with full actional passives, wherein the *by*-phrase would receive an agent theta-role from the verb in the adult grammar. Therefore there should not be any problems with long actional passive sentences. In Catalan the preposition *per* does not assign an affector theta role in nominals, but it can in verbal passive environments, as in English. If *per* assigns an AGENT theta role to its complement in the grammar of Catalan speaking children, then we expect the same results as in English, and because all the sentences in the experiment contain actional verbs, children should not have any difficulty

with non-truncated actional passives. However, if children do not have an agentive interpretation for *per* in Catalan (but rather, for example, a GOAL interpretation, as in nominals), this may in turn lead to failure on all nontruncated passives. In any event, because the problem lies with the *by/per*-phrase, there should be no problem with short (truncated) passives, where no *by/per*-phrase is present.

4. 3 Results

As expected control adults gave correct answers for the total (100%) number of questions asked in all parts of the test. And the children offered a quite varied range of answers.

The gender variable did not have any effect in the results, that is, there is no significant difference between the female gender part and the male gender part as far as the results are concerned.

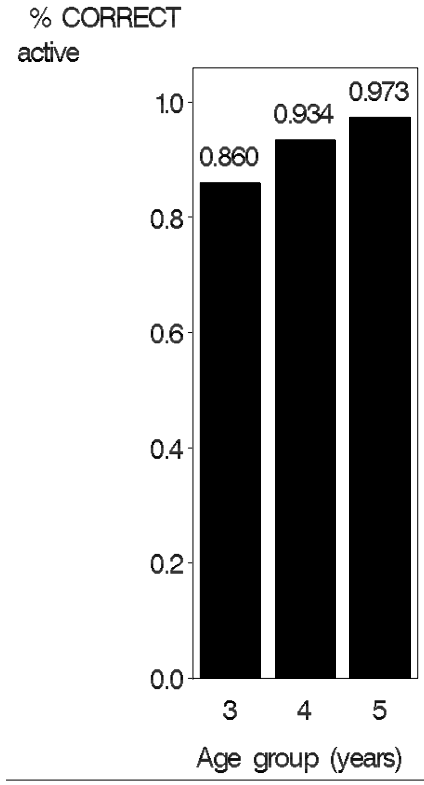
In the case of active sentences, 12 three-year-old children out of 13 answered all the sentences; 87% of the 13 children gave correct answers. 27 four-year-old children out of 28 answered all the sentences, 93% of the 28 children gave correct answers. All five-year-old children answered all the sentences, and 97% gave correct answers. See table 8.

Table 8. Results for active sentences and age groups

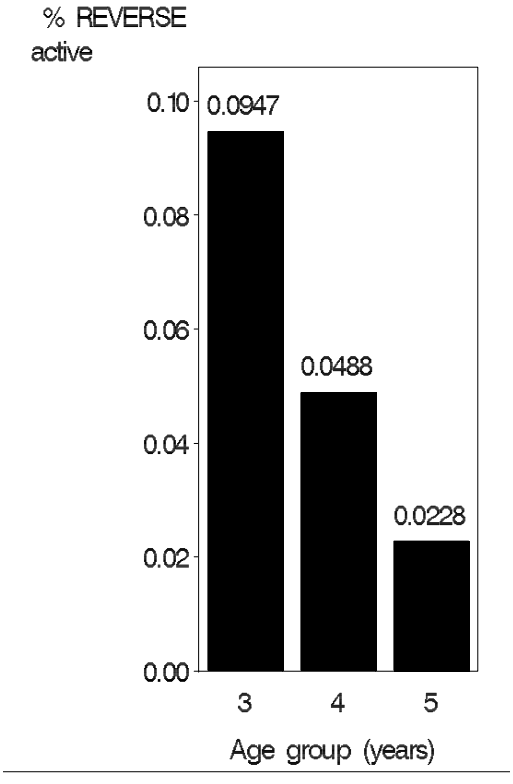
	3-year- olds	**4-year-olds**	**5-year-olds**
% correct	87%	93%	97%
% reverse	9%	5%	2%
% other subject	3%	1%	0%
% no action	1%	1%	0%

Age does not play a significant role in the case of the active sentences. The results on table 8 show that all age groups performed quite similarly.

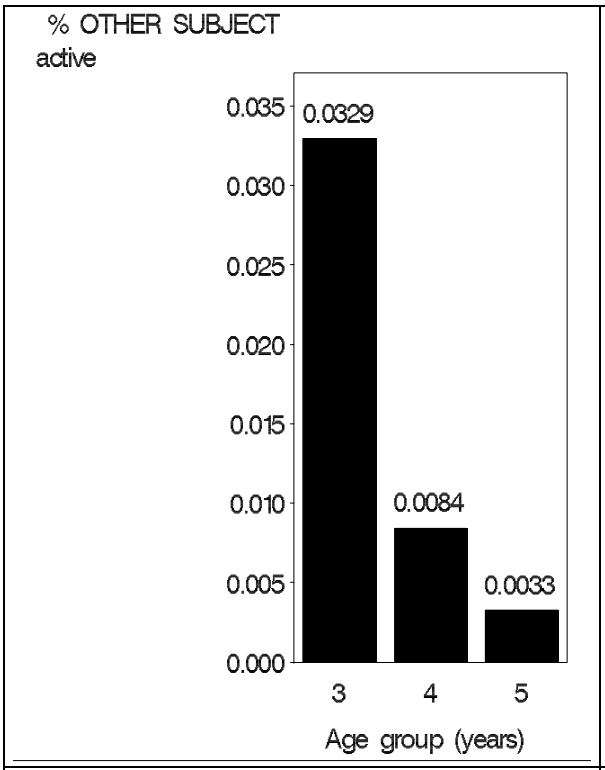
This is represented in graphs 1-4



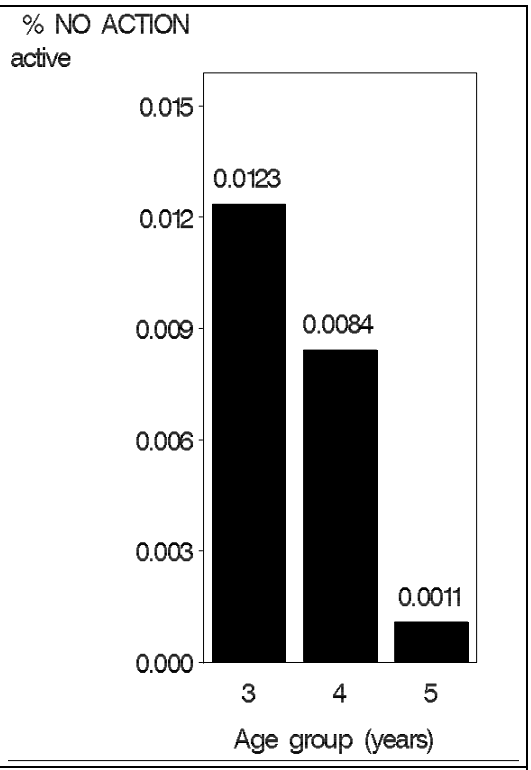
Graph 1 Percentage of correct answers for active sentences according to age group



Graph 2 Percentage of reverse answers for active sentences according to age group



Graph 3 Percentage of other subject answers for active sentences according to age group



Graph 4 Percentage of no action answers for active sentences according to age group

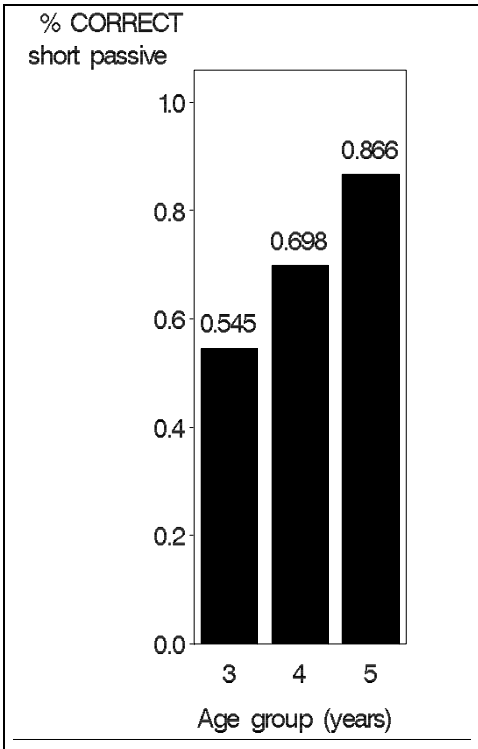
In the case of short passive sentences only 4 three-year-old children out of 13 answered all the sentences, 55 % of the 13 children gave correct answers. 11 four-year-old children out of 14 answered all the sentences, 70 % of the 14 children gave correct answers. 16 five-year-old children out of 20 answered all the sentences, 87% of the 20 children gave correct answers. As we can see on table 9, the percentage of correct answers increased with age.

Table 9. Results for short passive sentences and age groups

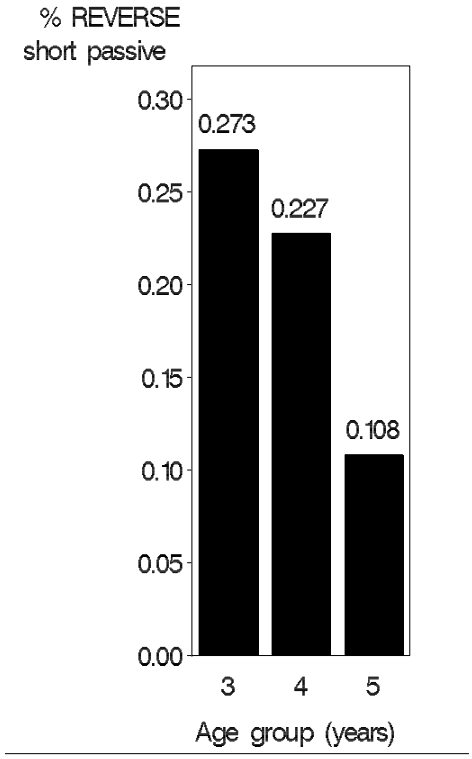
	3-year- olds	4-year-olds	5-year-olds
% correct	55%	70%	87%
% reverse	27%	23%	11%
% other subject	15%	5%	2%
% no action	3%	3%	1%

Regarding error type, reverse answers were predominant (with 27%, 23% and 11% of answers for 3-, 4- and 5-year-olds, respectively).

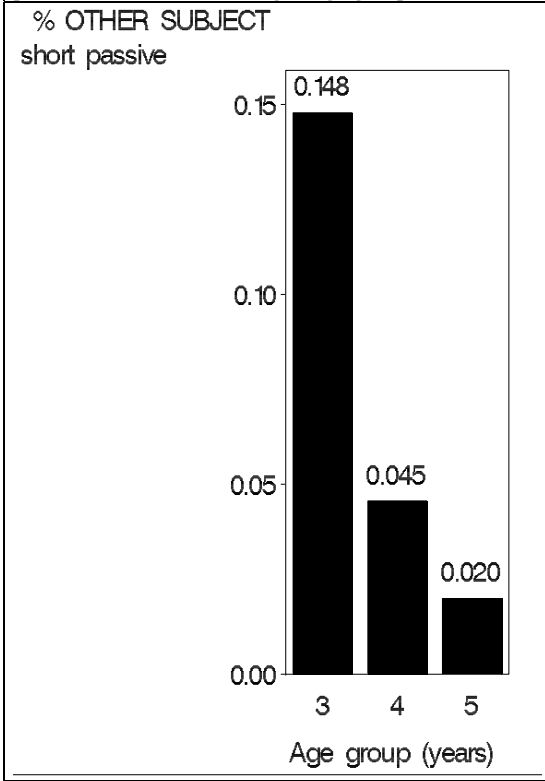
This is represented in graphs 5-8.



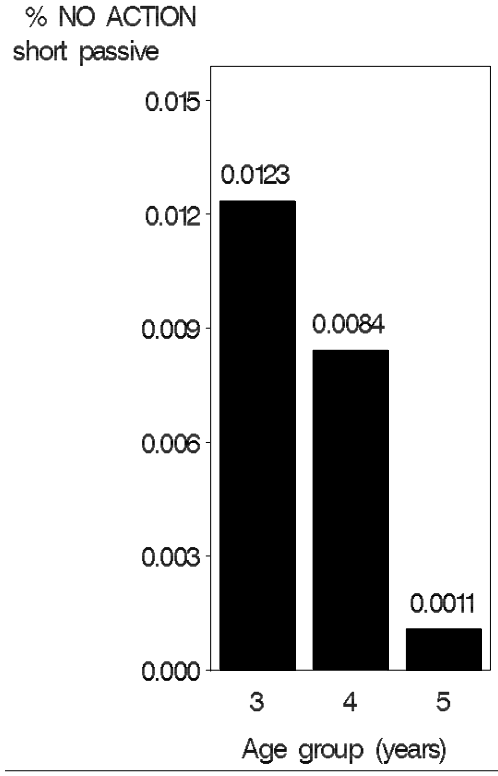
Graph 5 Percentage of correct answers for short passive sentences according to age group



Graph 6 Percentage of reverse answers for short passive sentences according to age group



Graph 7 Percentage of other subject answers for short passive sentences according to age group



Graph 8 Percentage of no action answers for short passive sentences according to age group

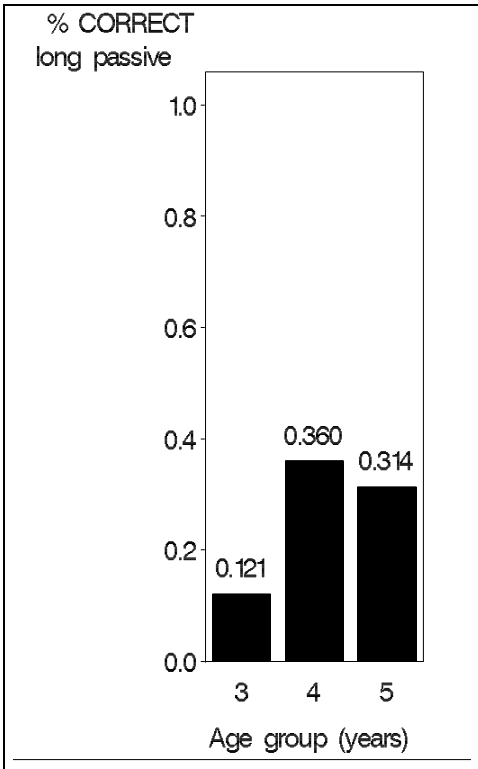
In the case of long passives, 6 three-year-old children out of 13 answered all the sentences, 12% of the 13 children gave correct answers. 12 four-year-old children out of 14 answered all the sentences, 36 % of the 14 children gave correct answers. All five-year-old children answered the sentences, 31 % of whom gave correct answers. We can see that the percentage of correct answers dropped a little in the case of five-year-olds when we compare their results with four-year-olds. See table 10.

Table 10. Results for long passive sentences and age groups

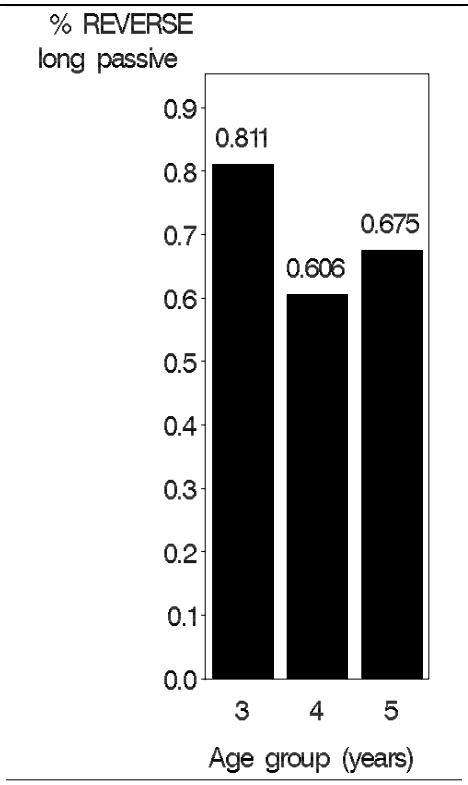
	3-year- olds	4-year-olds	5-year-olds
% correct	12%	36%	31%
% reverse	81%	61%	68%
% other subject	5%	3%	0%
% no action	2%	1%	1%

It's worth mentioning that in the case of long passives there was a high percentage of reverse answers: 81 %, 61% and 68% for three-, four-, and five-year-olds, respectively.

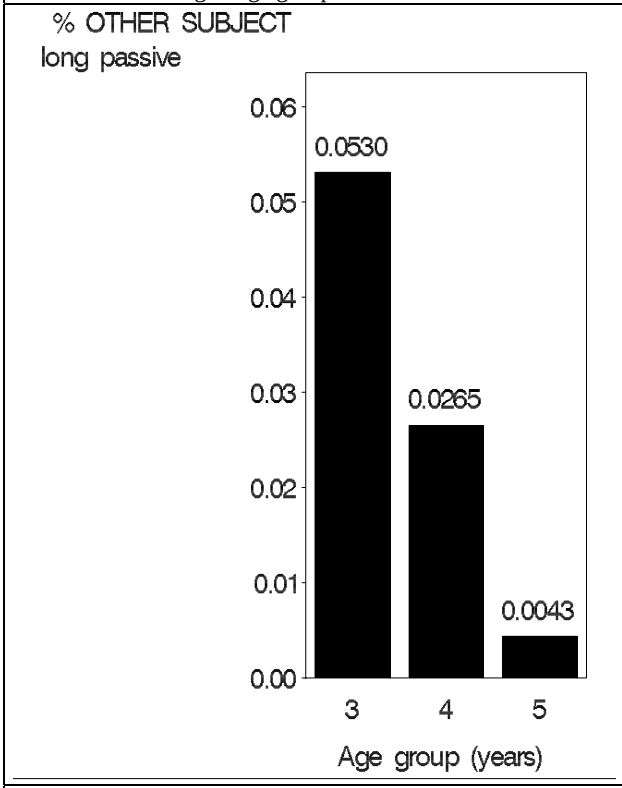
The results are represented in graphs 9-12.



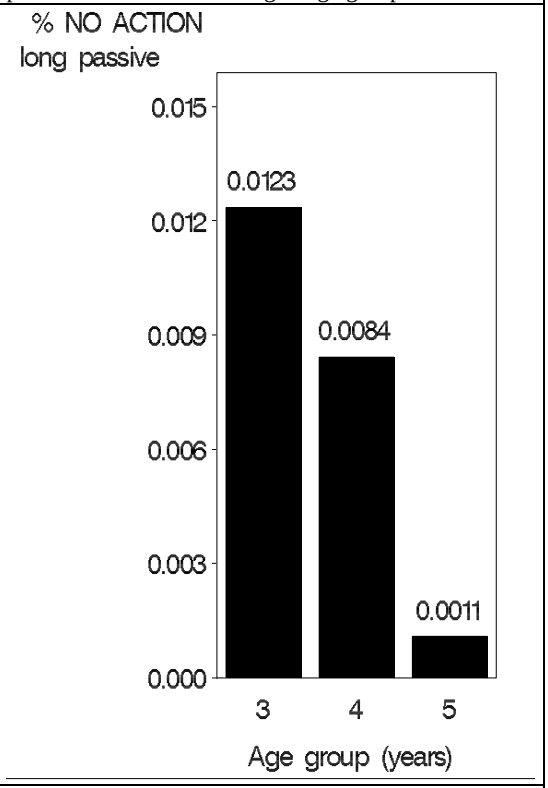
Graph 9 Percentage of correct answers for long passive sentences according to age group



Graph 10 Percentage of reverse answers for short passive sentences according to age group



Graph 11 Percentage of other subject answers for short passive sentences according to age group



Graph 12 Percentage of no action answers for short passive sentences according to age group

There is a statistically significant difference between active and passive sentences (Chi-square 49.93, p-value <.0001); see table 11. The odds ratio for a correct sentence in the active versus the passive is 13, that is, it is 13 times more likely for children to produce a correct answer in the active than it is for them to produce a correct answer in the passive.

Table 11. Contrast estimate results active versus passive

Label	Estimate	Standard Error	Alpha	Confidence Limits		Chi-Square	Pr > ChiSq
active versus passive	2.6245	0.2345	0.05	2.1650	3.0841	125.31	<.0001
Exp (active versus passive)	**13.7982**	3.2350	0.05	8.7147	21.8468		

When we compare the active type of sentence with long and short passives, there is a statistically significant difference among active, short passive and long passive sentences (Chi-square 50.08, p-value <.0001) As we can see on table 12, children are 4.9602 times more likely to produce a correct answer in the active than in the short passive. When we compare active and long passives the likelihood increases considerably up to 34.6880 times more likely for a correct answer in an active sentence.

Table 12. Contrast Estimate Results active versus long and short passives

Label	Estimate	Standard Error	Alpha	Confidence Limits		Chi-Square	Pr > ChiSq
active versus short passive	1.6014	0.2547	0.05	1.1022	2.1006	39.53	<.0001

Exp (active versus short passive)	**4.9602**	1.2633	0.05	3.0109	8.1714		
active versus long passive	3.5464	0.2649	0.05	3.0272	4.0656	179.24	<.0001
Exp (active versus long passive)	**34.6880**	9.1885	0.05	20.6398	58.2980		

When we compare short passives with long passives there is a statistically significant difference between short passive and long passive sentences (Chi-square 37.02, p-value <.0001) The odds ratio indicates that children are 7 times more likely to produce a correct answer in the short passive than they are to produce a correct answer in the long passive. See table 13.

Table 13. Contrast Estimate Results short passive versus long passive

Label	**Estimate**	**Standard Error**	**Alpha**	**Confidence Limits**		**Chi-Square**	**Pr > ChiSq**
short passive versus long passive	1.9450	0.2751	0.05	1.4058	2.4841	49.99	<.0001
Exp (short passive versus long passive)	6.9933	1.9238	0.05	4.0788	11.9906		

4.4 Effects of age

4.4.1 Analysis according to sentence type and age in years

When we consider age, there are statistically significant differences between active and passive sentences and the different ages. However, no differences are found within age groups. In each case the performance

was homogeneous. All children perform better in their comprehension of active sentences than in that of passive sentences. How much better? In the 3-year-old group the odds ratio of obtaining a correct answer for an active sentence is 9 times as high as that for a passive sentence. In the 4-year-old group it is 12 times as high and in the 5-year-old group the likelihood increases up to 28 times. See table 14.

Table 14. Contrast Estimate Results for type of phrase and age in years

Label	Estimate
Exp (active versus passive at three years)	8.9764
Exp (active versus passive at four years)	12.4204
Exp (active versus passive at five years)	28.6798

4.4.2 Type of passive sentence and age in years

When we consider type of passive and age, there are statistically significant differences among age groups but within every age group all groups perform better at short passives. As for interactions, on table 15 we can find that in the 3-year-old group the odds ratio of obtaining a correct answer for a short passive sentence is 9 times as high as that for a long passive sentence. In the 4-year-old group it is 3.6 times as high and in the 5-year-old group the likelihood increases up to 11.5 times.

Table 15. Contrast estimate results type of passive and age

Label	Estimate
Exp (short passive versus long passive at three years)	8.8000
Exp (short passive versus long passive at four years)	3.6524
Exp (short passive versus long passive at five years)	11.5556

From these statistics it is clear that age (or maturation) is an important factor in the comprehension of actional passives. Also, it is clear that children are much better at short passives than at long passives, and this occurs in all age groups: for short passives, answers are correct in 55%, 70% and 87% of cases for 3, 4 and 5-year-olds, respectively. For long passives the percentages are 12%, 36% and 34% for 3, 4 and 5-year-olds, respectively. There is a huge difference.

If we make a more exhaustive analysis of some individual subjects I think that some issues stand out of their own right. 3 five-year-old children and 3 four-year-old children opted for the option No Action in the short passive *El pare és afaitat* 'Daddy is shaved'. It seems that they may have understood *El pare està afeitat* 'Daddy is clean-shaven'. That would be an adjectival interpretation of the sentence. Also, 3 four-year-old children and 2 three-year-old children opted for the same option No Action in the short passive *L'àvia és pentinada* 'Grandmother is combed' as if they had understood *L'àvia està pentinada* 'Grandmother has been combed'. Again an adjectival reading.

We do not have data of pronominal passives to compare with Pierce's results, but we do have data of the periphrastic non-truncated (long) form of the passive to compare with that of Pierce. We have chosen non-agreement cue passives in S-V order, which is the feature that adjusts to the kind of sentences used in our experiment (agreement was not a cue in our experiment, since characters were always matched for gender and number). We summarize the comparison in the following table.

Table 16. Comparison between our experiment and Pierce's of long passive sentences

	3-year-olds	4-year-olds	5-year-olds
Our experiment	12%	36%	31%
Pierce's experiment	50%	33.4%	66.7%

In Pierce's experiment if we consider passives with preverbal subjects, we can observe that non-agreement cue sentences were comprehended at chance level by the 3-year-old group. Surprisingly, this group was better than the four-year-old group, and five-year-olds performed better than in our experiment. These results could be attributed to the small sample. (We must add that our sample was much larger, especially in 4-and 5-year-old groups).

5. CONCLUSION

As found for other languages our study of the interpretation of actional passives in Catalan demonstrates delay in the acquisition of passives when compared to actives. Under the standard assumption that 75% correct answers indicate an adult-like grammar, children know actives at the earliest stage, and short passives only at 5. Five-year-olds still performed quite badly in long passives.

The presence of the *by*-phrase is of obvious importance for the acquisition of passives. Children did not perform well at long (non-truncated) actional passive sentences. However, it is necessary to point out that whereas in English an affector *by*-phrase is licensed both in verbal passives and in nominals (Fox & Grodzinsky, 1998), in Catalan the preposition *per* is used in the verbal passive but not in the nominals to introduce an AGENT. For one thing, a nominal *per*-phrase is thematically limited; it cannot be interpreteted as creator/possesor as *by* is. That children may have assigned a GOAL theta role to the complement of *per* may account for the poor results obtained in the non-truncated passives, and would still be in accordance with Fox and Grodzinsky's expectations. Fox and Grodzinsky's prediction that truncated passives should be interpreted correctly 100% of the time is however falsified. On the other hand, it is clear that there is a substantial difference in the results when we compare the children's performance at short and long passive sentences. The different behaviour of children with respect to long and short passives, the latter having an adjectival reading, also argues in favour of Borer &

Wexler (1987) who associate late appearance of verbal passives with the late maturation of A-chains. Also, a further prediction of Borer and Wexler's account is that passives should cease to be problematic after the age of 6, as a result of maturation – a topic for future research.

On the other hand, the Theta-role Transmission Deficit account, Fox & Grodzinsky (1998), holds that children do poorly at non-actional passives because they involve the process of the (suppressed) theta-role transmission, in addition to the A-chain. Children perform better at passives of actional verbs, because the agent theta-role of the verb is assigned directly by the preposition *by*, hence no theta-role transmission takes place. They perform worse at passives of non-actional verbs, because theta-role transmission is presumably beyond the children's computational abilities. Children are predicted to do better at passives of non-actional verbs without a *by*-phrase precisely because no theta-role transmission is involved. Because in our experiment only actional verbs were used, in future research it would be interesting to see the results of an analogous experiment this time including non-actional verbs. Specifically it would be interesting to see if children do worse at passives of non-actional verbs, and also if children perform better at passives of non-actional verbs without a *by*-phrase, in which no theta-role transmission is involved.

Earlier on we reported that there are restrictions according to the type of verbal action (Aktionsart or lexical aspect) and the verbal aspect of the different verb tenses. Telic predicates, which normally take a definite complement, are easier to be constructed in passive than atelic

predicates. Verbs which denote atelic activities like contact verbs *empènyer* ‘push’; *toca*r ‘touch’, *abraçar* ‘hug’ are not common in passive. It would also be interesting to learn whether the event-structure of the verbs makes a difference when it comes to understanding a passive sentence. That is, if children will perform well on the passive counterpart of a predicate that has a result state in its event structure (accomplishment and achievement predicates) or does not have a result state (activity or state predicates). This could be due to the correlation between event-structural properties of predicates and the possibility of predicates for being interpreted as adjectives. The point is that there should be a distinction based on event structures, which includes division among actional predicates.

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APPENDIX A

Complete list of the sentences used on part II of the experiment.

Female part

Table I. Subject and object sentences (Female part)

Qui dibuixa a qui?	Who is drawing whom?
Qui embruta a qui?	Who is dirtying whom?
Qui acaricia a qui?	Who is stroking whom?
Qui dibuixa a qui?	Who is drawing whom?
Qui embruta a qui?	Who is dirtying whom?
Qui acaricia a qui?	Who is stroking whom?

Male part

Table II. Subject and object sentences (Female part)

Qui fa pessigolles a qui?	Who is tickling whom?
Qui pica aqui?	Who is hitting whom?
Qui mossega a qui?	Who is biting whom?
Qui fa pessigolles a qui?	Who is tickling whom?
Qui pica a qui?	Who is hitting whom?
Qui mossega a qui?	Who is biting whom?

APPENDIX B

Complete list of the sentences used on part III of the experiment.

Short passive (Female part)

Table III. Short passive sentences (Female part)

Active	La germana petita empeny la germana gran.	The little sister is pushing the big sister.
Active	La germana petita ausculta la germana gran.	The little sister is examining the big sister.
Passive	La mare és besada.	Mom is kissed.
Passive	L'àvia és alimentada.	Grandma is fed.
Active	La germana gran renta la mare.	The big sister is washing Mom.
Passive	La germana gran és perseguida.	The big sister is chased.
Passive	La germana petita és rascada.	The little sister is scratched.
Active	L'àvia pentina a la mare.	Grandma is combing Mom.
Active	La germana gran dibuixa la mare.	The big sister is drawing Mom.
Passive	La germana petita és embrutada.	The little sister is dirtied.
Active	L'àvia acaricia la germana petita.	Grandma is stroking the little sister.
Passive	La germana pentita és empentada.	The little sister is pushed.
Passive	La germana petita és auscultada.	The little sister is examined.

Active	La mare besa la germana petita.	Mom is kissing the little sister.
Active	L'àvia alimenta la germana. petita.	Grandma is feeding the little sister.
Passive	La germana gran és rentada.	The big sister is washed.
Active	La germana gran persegueix la germana petita.	The big sister is chasing the little sister.
Active	La germana petita rasca la germana gran.	The little sister is scratching the big sister.
Passive	L'àvia és pentinada.	Grandma is combed.
Passive	La germana gran és dibuixada.	The big sister is drawn.
Active	La germana petita embruta la germana gran.	The little sister is dirtying the big sister.
Passive	L'àvia és acariciada.	Grandma is stroked

Short passive (Male part)

Table IV. Short passive sentences (Male part)

Active	L'avi abraça el germà petit.	Grandpa hugs the little brother.
Active	El pare eixuga el germà. gran.	Papa dries the big brother.
Passive	El pare és tapat.	Papa is covered.
Active	El germà petit porta a coll el germà gran.	The little brother is carrying the big brother.
Passive	El germà gran és tibat.	The big brother is pulled.
Active	El pare afaita l'avi.	Papa is shaving Grandpa.

Passive	El germà gran és fotografiat.	The big brother is photographed.
Passive	El pare és pintat.	Papa is face-painted.
Active	El germà gran fa pesigolles al germà petit.	The big brother is tickling the little brother.
Passive	El germà petit és picat.	The little brother is hit.
Active	El germà petit mossega al germà gran.	The little brother is biting the big brother.
Passive	L'avi és abraçat.	Grandpa is hugged.
Passive	El pare és eixugat.	Papa is dried.
Active	El pare tapa el germà petit.	Papa is covering the little brother.
Passive	El germà petit és portat a coll.	The little brother is carried.
Active	El germà gran tiba el pare.	The big brother is pulling Papa.
Passive	El pare és afaitat.	Papa is shaved.
Active	El germà gran fotografia l'avi.	The big brother is photographing Grandpa.
Active	El pare pinta el germà petit.	Papa is face-painting the little brother.
Passive	El germà gran és pessigollejat.	The big brother is tickled.
Active	El germà petit pica el germà gran.	The little brother is hitting the big brother.
Passive	El germà petit és mossegat.	The little brother is bitten.

Long passive (Female part)

Table V. Long passive sentences (Female part)

Active	La germana gran empeny la germana petita.	The big sister is pushing the little sister.
Active	La germana gran ausculta la germana petita.	The big sister is examining the little sister.
Passive	La germana petita és besada per la mare.	The little sister is kissed by Mom.
Passive	La germana petita és alimentada per l'àvia.	The little sister is fed by Grandma.
Active	La mare renta la germana gran.	Mom is washing the big sister.
Passive	La mare és perseguida per la germana gran.	Mom is chased by the big sister.
Passive	La germana gran és rascada per la germana petita.	The big sister is scratched by the little sister.
Active	La mare pentina l'àvia.	Mom is combing Grandma.
Active	La mare dibuixa la germana gran.	Mom is drawing a picture of the big sister.
Passive	La germana gran és embrutada per la germana petita.	The big sister is dirtied by the little sister.
Active	La germana petita acaricia l'àvia.	The little sister is stroking Grandma.
Passive	La germana gran és empentada per la germana petita.	The big sister is pused by the little sister.
Passive	La germana gran és	The big sister is examined

	auscultada per la germana petita.	by the little sister.
Active	La germana petita besa la mare.	The little sister is kissing Mom.
Active	La germana petita alimenta l'àvia.	The little sister is feeding Grandma.
Passive	La mare és rentada per la germana gran.	Mom is washed by the big sister.
Active	La mare persegueix la germana gran.	Mom is chasing the big sister.
Active	La germana gran rasca la germana petita.	The big sister is scratching the little sister.
Passive	La mare és pentinada per l'àvia.	Mom is combed by Grandma.
Passive	La mare és dibuixada per la germana gran.	Mom is drawn by the big sister.
Active	La germana gran embruta la germana petita.	The big sister is dirtying the little sister.
Passive	La germana petita és acariciada per l'àvia.	The little sister is stroked by Grandma.

Long passive (Male part)

Table VI. Long passive sentences (Male part)

Active	El germà petit abraça l'avi.	The little brother is hugging Grandpa.
Active	El germà gran eixuga el pare.	The big brother is drying Papa.
Passive	El germà petit és tapat pel	The little brother is covered

	pare.	by Papa.
Active	El germà gran porta a coll el germà petit.	The big brother is carrying the little brother.
Passive	El pare és tibat pel germà gran.	Papa is pulled by the big brother.
Active	L'avi afaita el pare.	Grandpa is shaving Papa.
Passive	L'avi és fotografiat pel germà gran.	Grandpa is photograped by the big brother.
Passive	El germà petit és pintat pel pare.	The little brother is face-painted by Papa.
Active	El germà petit fa pessigolles al germà gran.	The little brother is tickling the big brother.
Active	El germà gran és picat pel germà petit.	The big brother is hit by the little brother.
Active	El germà gran mossega el germà petit.	The big brother is biting the little brother.
Passive	El germà petit és abraçat per l'avi.	The little brother is hugged by Grandpa.
Passive	El germà gran és eixugat pel pare.	The big brother is dried by Papa.
Active	El germà petit tapa el pare.	The little brother is covering Papa.
Passive	El germà gran és portat pel germà petit.	The big brother is carried by the little brother.
Active	El pare tiba el germà gran.	Papa is pulling the big brother.
Passive	L'avi és afaitat pel pare.	Grandpa is shaved by Papa.
Active	L'avi fotografia el germà gran.	Grandpa is photographing the big brother.
Active	El germà petit pinta el pare.	The little brother is face-

		painting Papa.
Passive	El germà petit és pessigollejat pel germà gran.	The little brother is tickled by the big brother.
Active	El germà gran pica el germà petit.	The big brother is hitting the little brother.
Passive	El germà gran és mossegat pel germà petit.	The big brother is bitten by the little brother.

APPENDIX C

Table VII. Codes and meanings of the statistic variables used in the following tables

totalcorrect	total of sentences with the **correct** answer
percentcorrect	percentage of sentences with the **correct** answer
totalreverse	total of sentences with the **reverse** answer
percentreverse	percentage of sentences with the **reverse** answer
totalother	total of sentences with the **other person** answer
percentother	percentage of sentences with the **other person** answer
totalnoaction	total of sentences with the **no action** answer
percentnoaction	percentage of sentences with **no action** answer

Active sentences

age (years)=3

Table VIII. Results active sentences at 3 years

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	12	19.17	2.79	14.00	22.00
percentcorrect	12	0.87	0.13	0.64	1.00
totalreverse	12	1.92	2.35	0.00	6.00
percentreverse	12	0.09	0.11	0.00	0.27
totalother	12	0.67	0.65	0.00	2.00
percentother	12	0.03	0.03	0.00	0.09
totalnoaction	12	0.25	0.62	0.00	2.00
percentnoaction	12	0.01	0.03	0.00	0.09

age (years)=4

Table IX. Results active sentences at 4 years

Variable	N	Mean	Std Dev	Minimum	Maximum

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	27	20.56	2.06	13.00	22.00
percentcorrect	27	0.93	0.09	0.59	1.00
totalreverse	27	1.07	1.75	0.00	8.00
percentreverse	27	0.05	0.08	0.00	0.36
totalother	27	0.19	0.48	0.00	2.00
percentother	27	0.01	0.02	0.00	0.09
totalnoaction	27	0.19	0.40	0.00	1.00
percentnoaction	27	0.01	0.02	0.00	0.05

age (years)=5

Table X. Results active sentences at 5 years

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	41	21.39	0.89	18.00	22.00
percentcorrect	41	**0.97**	0.04	0.82	1.00
totalreverse	41	0.51	0.87	0.00	4.00
percentreverse	41	0.02	0.04	0.00	0.18
totalother	41	0.07	0.35	0.00	2.00
percentother	41	0.00	0.02	0.00	0.09
totalnoaction	41	0.02	0.16	0.00	1.00
percentnoaction	41	0.00	0.01	0.00	0.05

Short passive sentences

age (years)=3

Table XI. Results short passive sentences at 3 years

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	4	12.00	2.16	9.00	14.00
percentcorrect	4	0.55	0.10	0.41	0.64
totalreverse	4	6.00	2.16	4.00	9.00
percentreverse	4	0.27	0.10	0.18	0.41
totalother	4	3.25	1.71	1.00	5.00
percentother	4	0.15	0.08	0.05	0.23
totalnoaction	4	0.75	0.50	0.00	1.00
percentnoaction	4	0.03	0.02	0.00	0.05

age (years)=4

Table XII. Results short passive sentences at 4 years

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	11	15.36	6.33	1.00	21.00
percentcorrect	11	0.70	0.29	0.05	0.95
totalreverse	11	5.00	6.24	1.00	21.00
percentreverse	11	0.23	0.28	0.05	0.95
totalother	11	1.00	1.26	0.00	4.00
percentother	11	0.05	0.06	0.00	0.18
totalnoaction	11	0.64	0.81	0.00	2.00
percentnoaction	11	0.03	0.04	0.00	0.09

age (years)=5

Table XIII. Results short passive sentences at 5 years

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	16	19.06	4.58	7.00	22.00
percentcorrect	16	0.87	0.21	0.32	1.00
totalreverse	16	2.38	4.44	0.00	15.00
percentreverse	16	0.11	0.20	0.00	0.68
totalother	16	0.44	0.73	0.00	2.00
percentother	16	0.02	0.03	0.00	0.09
totalnoaction	16	0.13	0.34	0.00	1.00
percentnoaction	16	0.01	0.02	0.00	0.05

Long passive sentences

age (years)=3

Table XIV. Results long passive sentences at 3 years

Variable	N	Mean	Std Dev	Minimum	Maximum

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	6	2.67	1.51	1.00	5.00
percentcorrect	6	0.12	0.07	0.05	0.23
totalreverse	6	17.83	3.19	14.00	21.00
percentreverse	6	0.81	0.14	0.64	0.95
totalother	6	1.17	1.60	0.00	4.00
percentother	6	0.05	0.07	0.00	0.18
totalnoaction	6	0.33	0.52	0.00	1.00
percentnoaction	6	0.02	0.02	0.00	0.05

age (years)=4

Table XV. Results long passive sentences at 4 years

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	12	7.92	6.23	1.00	20.00
percentcorrect	12	0.36	0.28	0.05	0.91
totalreverse	12	13.33	6.58	2.00	21.00
percentreverse	12	0.61	0.30	0.09	0.95
totalother	12	0.58	0.67	0.00	2.00
percentother	12	0.03	0.03	0.00	0.09
totalnoaction	12	0.17	0.58	0.00	2.00
percentnoaction	12	0.01	0.03	0.00	0.09

age (years)=5

Table XVI. Results long passive sentences at 5 years

Variable	N	Mean	Std Dev	Minimum	Maximum
totalcorrect	21	6.90	6.05	0.00	22.00
percentcorrect	21	0.31	0.27	0.00	1.00
totalreverse	21	14.86	6.04	0.00	22.00
percentreverse	21	0.68	0.27	0.00	1.00
totalother	21	0.10	0.30	0.00	1.00
percentother	21	0.00	0.01	0.00	0.05
totalnoaction	21	0.14	0.36	0.00	1.00
percentnoaction	21	0.01	0.02	0.00	0.05

Table XVII. Contrast estimate results between type of passive and groups of age

Contrast Estimate Results							
Label	Estimate	Std Error	Alpha	Confidence Limits		Chi-Square	Pr > ChiSq
Short passive versus long passive	1.9724	0.2286	0.05	1.5244	2.4205	74.46	<.0001
Exp (short passive versus long passive)	7.1881	1.6431	0.05	4.5924	11.2510		
three versus five years	-1.1478	0.2621	0.05	-1.6615	-0.6341	19.18	<.0001
Exp (three versus five years)	0.3173	0.0832	0.05	0.1899	0.5304		
three versus four years	-0.8953	0.2676	0.05	-1.4198	-0.3708	11.19	0.0008
Exp (three versus four years)	0.4085	0.1093	0.05	0.2418	0.6902		
four versus five years	-0.2525	0.3080	0.05	-0.8561	0.3510	0.67	0.4122
Exp (four versus five years)	0.7768	0.2392	0.05	0.4248	1.4205		
Short passive versus long passive at three years	2.1748	0.3016	0.05	1.5837	2.7658	52.01	<.0001
Exp (short passive versus long passive at three years)	8.8000	2.6537	0.05	4.8730	15.8917		
Short passive versus long passive at four years	1.2954	0.4422	0.05	0.4288	2.1620	8.58	0.0034
Exp (short passive versus long passive at four years)	3.6524	1.6149	0.05	1.5353	8.6884		
Short passive versus long passive at five years	2.4472	0.4288	0.05	1.6068	3.2875	32.58	<.0001
Exp (short passive versus long passive at five years)	11.5556	4.9545	0.05	4.9869	26.7762		