Children's Passive: A View from the *By*-Phrase

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This article argues that children's difficulty with passive constructions is related to properties of the *by*-phrase. Specifically, we argue that children are in full control of all aspects of the passive construction except for the ability to transmit the external θ-role of the predicate to the *by*-phrase; we thus reject Borer and Wexler's (1987) claim regarding the maturation of A-chains. Our conclusion is dictated by the results of an experiment we conducted, and supported by data already present in the literature.

Keywords: A-chains, acquisition, *by*-phrase, external θ-role, maturation, passive, θ-transmission

The development of the passive construction has long been the focus of considerable interest, both theoretical and experimental. The prevailing view has changed over the years. Until recently it was assumed that children are incapable of handling passive sentences up to age 5. This assumption was proven to be incorrect by Maratsos et al. (1985). These authors showed that although 4-year-old children fail in comprehension tasks involving ''nonactional'' passives, they are able to understand passive sentences that contain ''actional'' verbs.

This finding prompted Borer and Wexler (1987) to develop a novel account of children's passive, which they call the Maturation Hypothesis: they suggest that children do not represent the structure of passive sentences properly at the relevant age, that they fail with nonactional passives because they are unable to form A-chains, and that they succeed with actional passives because they interpret these sentences as adjectival passives. The ability to form A-chains, Borer and Wexler argue, is innate and matures biologically. They also note that there are very few

examples of nontruncated passives (i.e., with a *by*-phrase) in children's spontaneous speech. This is consistent with the claim that the interpretation children assign to passive participles is adjectival, since adjectival passives are presumed to be ungrammatical with a *by*-phrase.

We present three types of arguments against the maturation of A-chains:

- *Type 1:* a demonstration that children perform successfully on constructions containing A-chains;
- *Type 2:* a demonstration that children fail on constructions that do not contain A-chains, but still have important features of the passive;
- *Type 3:* direct empirical evidence that children's difficulty with the passive (to the extent that it exists) results from a specific problem that has nothing to do with A-chains.

Of these, we find type 3 the most compelling. It consists of the results of an experiment we conducted. These results provide the basis for an alternative account of children's performance on passive constructions, one that points to the thematic properties of the *by*-phrase in children's grammar as the source of the deficiency. Specifically, we argue that children cannot transmit the external θ-role of the VP to the *by*-phrase. We also make some suggestions regarding the source of this difficulty.

The article is organized as follows. In section 1 we discuss the status of the Maturation Hypothesis in light of the VP-Internal Subject Hypothesis. As we make clear, the former needs to be weakened. In section 2 we show that no version of A-chain maturation can explain children's success on *get*-passives. Once properties of *get*-passives are examined, it turns out that *get*-passive constructions contain A-chains of a form reminiscent of those in passives. This is an argument of type 1. In section 3 we discuss experimental results obtained by Pierce (1992) regarding the acquisition of passives in Spanish. These data indicate that children err on passives even when the sentences do not seem to contain A-chains. This is an argument of type 2. In section 4 we present the results of our experiment, which directly illustrates children's ability to represent A-chains. The data also show that the problems children have with nonactional passives stem from a deficiency in the mechanism that makes the interpretation of certain *by*-phrases possible. This is an argument of type 3. Finally, in section 5 we present an account of our findings.

1 VP-Internal Subjects: A Relaxation of the Maturation Hypothesis

Consider Borer and Wexler's (1987) claim that children cannot form A-chains, in light of the VP-Internal Subject Hypothesis (henceforth ISH; Kitagawa 1986, Kuroda 1988, and Koopman and Sportiche 1991). If subjects are generated within the VP, then any English sentence with a subject preceding an auxiliary necessarily involves an A-chain. If we accept the ISH, a quick look at the spontaneous speech of 4-year-olds leads us to reject the claim that all A-chains are absent at the relevant stage of language development.[1] However, as Borer and Wexler (1992: 165, n.13) point out, this problem can be dealt with by relaxing the Maturation Hypothesis.

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[1] This does not conflict with Pierce's (1989) claim that children often leave subjects within VP at S-Structure: Pierce looked at the speech of children around the age of 2, and we are discussing 4-year-olds. Furthermore, Stromswold (1996) argues that Pierce's conclusion was unwarranted and that even 2-year-olds raise the subject overtly to [Spec, IP].

A Relaxed Maturation Hypothesis (RMH)—our attempt to make Borer and Wexler's (somewhat sketchy) proposal as precise as we can—would claim that the only kind of A-chain that is problematic for the child is one that relates two potential θ-positions. The RMH arguably preserves the spirit of the Maturation Hypothesis, which was originally suggested to single out A-chains as unique, and distinct from other chains (e.g., Ā-chains) precisely in this respect. In the *LGB* framework (Chomsky 1981), which Borer and Wexler were assuming, A-positions are exactly that—potential θ-positions. Once one accepts the ISH, the definition of an A-position is more problematic (see Chomsky and Lasnik 1993). However, one can argue that there is still room for a natural class of *LGB*-type A-positions. If so, then Borer and Wexler's idea could apply to chains that belong to this natural class. In other words, it could be claimed that children have a problem only with chains relating two potential θ-positions (the RMH).

Under the RMH, the ISH is no longer a problem. Although a regular active sentence involves an A-chain, this A-chain is not problematic for the child, since it does not relate two potential θ-positions: it is a two-membered chain with a head in a position to which a θ-role is never assigned. Further, it can perhaps be claimed that a passive sentence involves movement from the complement of V to the external suppressed position, forming a problematic A-chain.[2]

If the RMH is to avoid vacuity, there must be a way of telling whether an A-chain relates two potential θ-positions. Although Borer and Wexler do not spell out how this should be done, we will make what seems to us to be their implicit assumption: namely, that whenever NP-movement can proceed through [Spec, VP], it must. Therefore, all NP-movement from positions lower than [Spec, VP] will involve movement through this specifier, and if the relevant verb is a θ-role assigner, the A-chain will relate two potential θ-positions. In other words, the RMH predicts that all A-chains with a tail in the complement or within the complement of a θ-role assigner are problematic for children.

2 Evidence against the RMH: Intact A-Chains in Children's *Get*-Passives

The Maturation Hypothesis has already been challenged on empirical grounds. Crain has demonstrated (Crain, Thornton, and Murasugi 1987, Crain and Fodor 1989, Crain 1991) that 4- and even 3-year-olds produce some passive sentences with a *by*-phrase. He invented an experimental task in which children produced sentences such as ''Which boy got pushed by the girl?''[3] However, Kenneth Wexler (personal communication) has observed that these passives are restricted to *get*-

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[2] Note that although the proposed relaxation of the Maturation Hypothesis might preserve its spirit, it faces a potential problem. It crucially relies on analyzing the passive as involving movement first from object position to [Spec, VP], and only then to [Spec, IP]. To uphold this analysis, one would have to specify why direct movement to [Spec, IP] is not at least possible.

[3] Crain has developed an experimental design by which passives can be elicited. The idea is to present the child with a task for which the use of the passive would be pragmatically preferable. The child is shown a situation in which two identical characters (say, boys) take part. One of the boys is being affected by a third character (say, he is being pushed by a girl). The child is requested to ask a puppet which boy is being pushed. This ensures that the boy is the topic of discourse and that a sentence with the boy as subject would be preferable. The result is that the children come up with questions like ''Which boy got pushed by the girl?''

passives, which are arguably similar to adjectival passives and thus lack an A-chain of the relevant type. As a result, Wexler claims, the RMH can still be maintained.

In this section we show that the data regarding children's ability to form *get*-passives argue against the RMH, despite Wexler's observation. We show that although the participles in *get*- and *be*-passives might be different, *get*-passives do have an A-chain in their representation. To do this, we first provide evidence for an NP-trace following *get*, namely, for a structure like (1).

(1) John got [t pushed by Mary].

(In doing so, we follow Haegeman (1985), who has argued that *get*-passives involve cyclic NP-movement with a structure similar to (1) in the relevant sense).[4,5] We then argue that the resulting A-chain relates two potential θ-positions. The RMH thus predicts *get*-passives to be problematic for children, contrary to Crain's demonstration.

Our arguments for (1) are based on the behavior of *get* on two well-known tests for raising. One checks the distribution of idiom chunks, and the other, that of expletives. First, (2) shows that *get* can separate idiom chunks; this means that the subject of the matrix sentence receives its θ-role only within the embedded clause, indicating that NP-movement must have taken place.[6]

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[4] Haegeman, in fact, proposes the following structure:

(i) John got [t pushed t′ by Mary].

For our purposes, it will suffice to show that *t* exists. We will therefore present arguments to this effect and will remain agnostic with respect to the status of *t′*. In Fox and Grodzinsky 1992, though, we claim that *get* selects for an adjectival passive. We support our view with different types of arguments, which we will not present here. Nonetheless, one advantage of our analysis over Haegeman's, which will be clear from the later discussion (section 5.3), is that it explains why the external argument in *get*-passives is totally suppressed. In adjectival passives the external argument is clearly suppressed (for discussion, see Pesetsky 1995); thus, if *get* can select only for an adjectival passive, the suppression of the external argument follows.

[5] Haegeman's argument for the existence of *t* (in example (i) of footnote 4) is based on the observation that in many environments *get* participates in what seems to be a transitive ergative alternation. This is illustrated in (i)–(v).

(i) a. John got his feet wet.
    b. His feet got wet.
(ii) a. John got the motion in.
     b. The motion got in.
(iii) a. John got the book on the table.
      b. The book got on the table.
(iv) a. John got his girlfriend invited to all the meetings.
     b. His girlfriend got invited to all the meetings.
(v) a. John got his students to work on another topic.
    b. His students got to work on another topic.

These alternations lead Haegeman to assume the existence of a lexical process absorbing the external θ-role and the internal Case (in accordance with Burzio's Generalization). This process has *get* in the (a) sentences of (i)–(v) as its input and *get* in the (b) sentences as its output. If such a process takes place, it has syntactic consequences: NP-movement must occur and a trace must exist in post-*get* position.

[6] This footnote is due to comments offered by two *LI* reviewers. One reviewer points out that splitting idiom chunks is more restricted in *get*-passives than in *be*-passives.

(i) a.   No expense was spared.
    b. ??No expense got spared.
(ii) a.   Advantage was taken of John.
     b. ??Advantage got taken of John.

(2) a. Tabs always get kept on foreigners in the U.S.A.
    b. In the end, advantage always gets taken of John.
    c. No expense gets spared when Rich Eddie is in town.

Second, the distribution of expletives in (3) shows that the surface subject position of *get* can be occupied by an expletive. This position is therefore not a θ-position; when it is occupied by an argument, the argument receives its θ-role elsewhere, namely, in the subject position of the embedded clause.[7]

(3) a. There (finally) got to be a lot of room in this house.
    b. (After we left the faucet on for an hour) there (finally) got to be enough water to take a bath.

The grammaticality of (2)–(3), then, can only be explained if the S-Structure subject of *get* is base-generated elsewhere. These sentences thus provide conclusive evidence for Haegeman's claims that *get* is an unaccusative (raising) verb and that a *get*-passive involves NP-movement in its derivation and an A-chain in its representation.[8]

Given the existence of an A-chain in *get*-passives, what would the RMH predict regarding children's performance on this construction? That is, does this A-chain relate two potential θ-positions, and is it therefore of the type that is claimed to have not yet matured in 4- and 5-year-olds? As noted earlier, this question reduces to whether *get,* like unaccusatives and passive participles, is a θ-role assigner, or whether, like auxiliaries, it is not (since under the RMH all and only A-chains that cross a θ-role assigner are subject to maturation). A test for auxiliary verbs, which is linked to the claim that they do not assign θ-roles, is that they can raise in English to a functional category in overt syntax (see, e.g., Pollock 1989, Chomsky 1991, 1993). To see that *get* cannot partake in such overt V-raising, it will suffice to look at the contrasts in (4)–(5), noted by Haegeman.

However, this does not affect the analysis of *get* as a raising verb. As another reviewer remarks, the grammaticality of (2b) and (2c) indicates that the problem in (ib) and (iib) has to do with the aspectual properties of *get* and is irrelevant to its argument structure. *Get* seems to have special aspectual properties that we do not fully understand; for some reason it prefers a generic interpretation, and when it is episodic, it tends to be telic (e.g., *The table was/*got wiped for an hour*).

  [7] Note that this argument is based on the assumption that the relationship between the (a) and the (b) sentences in (i)–(v) of footnote 5 is uniform. The argument demonstrates that (vb) has a trace in post-*get* position. Under the uniformity assumption, such a trace exists in all of the (b) sentences, and in particular in the *get*-passive, (ivb).

  [8] It is important to note that these tests totally undermine any analysis of *get* as a control verb. Such an analysis was suggested to us as a way of maintaining Borer and Wexler's Maturation Hypothesis.

  As an *LI* reviewer points out, it is not inconceivable that *get* is ambiguous and has both a raising and a control analysis. We agree. However, it is just as conceivable that *be* is both a raising and a control verb and that therefore evidence regarding *be*-passives is irrelevant to the status of the Maturation Hypothesis. In either case, the claim of lexical ambiguity would require evidence.

  One could also suggest that children misanalyze *get* as a control verb and that therefore the Maturation Hypothesis could be maintained. Once again, this suggestion has an analogue with *be* and, again, both would require independent evidence.

(4) a. Was/*Got John killed?
    b. John was/*got not killed.

(5) a. Did John get/*be killed?
    b. John did not get/*be killed.

Thus, even if one wishes to relax the Maturation Hypothesis in view of VP-internal subjects, *get*-passives will still present an empirical problem: children produce *get*-passives, which include the same kind of A-chain that exists in a regular passive construction. This constitutes an argument of type 1 against the Maturation Hypothesis.[9,10]

3 Evidence against the RMH: Comprehension Problems in Postverbal Passives in Spanish

On the basis of syntactic features of the *get*-passive, we have argued that Crain's experiments do in fact demonstrate that children can handle A-chains. In this section we review the results of an experiment reported by Pierce (1992), which, in our view, indicate that children's problems with passives are related to something other than NP-movement. This constitutes a type 2 argument against the RMH.

Pierce compared children's comprehension of passives with pre- and postverbal subjects in Spanish. Whereas the preverbal passive in (6a) involves an A-chain, the postverbal passive in (6b) probably does not (at least not at S-Structure). The results of the experiment unambiguously demonstrate that the postverbal passives are in no way easier for children to comprehend than their preverbal counterparts. Children's performance in a comprehension task was around chance on both.

(6) a. Maria fue peinada por Juan.
       Maria was combed by Juan
    b. Fue peinade Maria por Juan.
       was combed Maria by Juan

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[9] One might claim that children, unlike adults, treat *get* as an auxiliary verb. However, this claim has three disadvantages. First, it seems pretty far from what should be the null hypothesis in the study of language acquisition (see footnote 8). Second, it might actually work against the Maturation Hypothesis. If children are treating *get* as *be,* no evidence remains for the Maturation Hypothesis. Children form *get*-passives very early on. If *get* is analyzed as *be,* these *get*-passives are probably analyzed as *be*-passives with the necessary A-chains. Third, the claim predicts that 4- to 5-year-old children will form questions and negations as in (i). As far as we know, such constructions have never been reported.

(i) a. Got John killed?
    b. John got not killed.

[10] Hoekstra (1990) points out another potential argument (of type 1), namely, that children are capable of producing unaccusative constructions, which presumably contain A-chains (see also Snyder, Hyams, and Crisma 1995). We do not focus on this argument because the status of the A-chain in children's unaccusatives is controversial (see Babyonyshev et al. 1995).

In our view the most straightforward conclusion is that children's problem in (6a) is unrelated to NP-movement. Rather, it is related to some other feature of the passive, which the experiment described in section 4 singles out.[11]

4 Experimental Evidence against the RMH: Children's Comprehension of Passives with and without a *By*-Phrase

So far we have provided two arguments against the Maturation Hypothesis; yet we have not proposed an alternative. In this section we discuss an experiment that paves the way for such an alternative by providing direct empirical evidence for the claim that children's difficulty with the passive results from a specific problem connected to *by*-phrases (Fox, Grodzinsky, and Crain 1995). Specifically, the experiment demonstrates that the problem children have with the passive disappears once the *by*-phrases are eliminated. This shows that the difficulty has nothing to do with NP-movement (an argument of type 3), which exists independently of the presence or absence of *by*-phrases. Rather, it is somehow linked to the mechanisms of the grammar that allow for the interpretation of the *by*-phrase.

4.1 The Experiment

The experiment had two components. The first component tested the validity of the data assumed by Borer and Wexler, namely, that although children have no problem in interpreting actional nontruncated *be*- or *get*-passives (7)–(8) (and certainly do well on actives—both actional (9) and nonactional (10)), they have difficulty with nonactional *be*-passives (11). 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 (12) to see whether the problem disappeared. Throughout, 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.[12]

(7) The rock star is being chased by the koala bear.
(8) The boy is getting touched by the magician.
(9) The mouse is touching the little girl.
(10) The pizza baker sees the buffalo.
(11) The boy is seen by the horse.
(12) The bear is seen.

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[11] Note that it is possible to claim that, contrary to surface appearances, (6b) involves some form of NP-movement (either at LF (Chomsky 1993) or at S-Structure, followed by an operation that would undo the overt effects (Belletti 1982)). Although we cannot rule out these possible analyses, we think it is important to note that the RMH *crucially* relies on them.

[12] We used the progressive in items like (7)–(9) because it seemed to be the most appropriate semantic description of the scenes the child was watching. For perception verbs (10)–(12), however, the use of the progressive is unnatural, and we therefore avoided it in both the active and the passive forms.

All sentences were semantically reversible (i.e., could be grammatical if the arguments were reversed) and contained only animate arguments. 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.''

An example sentence/story pair begins when a koala bear finds an abandoned egg. He says, ''Here is an egg. But there is no one to hatch it. How will it stay warm? I know. I will keep it warm.'' The koala bear hugs the egg. Then, in walks the rock star. He says, ''I have a show in ten minutes. I need a drum. Where can I find a drum? Here, the koala bear is holding a drum. I'll take that.'' The rock star grabs the egg from the koala bear. The bear protests, ''Don't take that, I need to keep it warm.'' At this point the rock star starts running away with the egg and yells back, ''It's not an egg. It is a drum, and I need it. Sorry.'' The koala bear screams, ''I won't let you go. I will chase you until I get the egg back.'' And he starts chasing the rock star.

Match (M)
Puppet: I know what's happening. The rock star is being chased by the koala bear.

Mismatch (MM)
Puppet: I know what's happening. The koala bear is being chased by the rock star.

4.2 The Subjects and the Task

Thirteen children (3.6–5.5 years old), all native speakers of English, participated in the experiment. Their comprehension of passive constructions was tested using the truth value judgment method (Crain and McKee 1985), which takes the guise of a game. One experimenter manipulates the toys for the staged events and narrates the accompanying story; a second experimenter takes the role of a puppet, who utters the M or MM sentence that either correctly or incorrectly describes the staged event. The child judges whether or not the puppet's utterance correctly describes the event. If the answer is ''yes,'' the child ''rewards'' the puppet; if the answer is ''no,'' the child ''punishes'' the puppet. If the child ''punishes'' the puppet (i.e., says the puppet was wrong), then he or she is asked, ''What really happened?'' This enables the experimenters to ensure that the child is rejecting the sentence for relevant reasons. The advantage of this task is that the child is not aware of being tested; it is the puppet who is judged to be right or wrong, not the child. Experimenters familiar with the children tested each child individually during four sessions of 20 minutes each. Four to eight stories were presented at each session, in quasi random order.[13]

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[13] Order was random within each session. The sessions themselves were divided up according to certain conditions: the first and second sessions introduced actional nontruncated *get-* and *be*-passives, respectively; the third session introduced nonactional nontruncated passives; and the fourth session introduced their truncated counterparts. All passive sentences in the experiment had active controls.

4.3 Results

Looking at the performance of the whole group, we find that on the four conditions presented in (7)–(10), all children performed at 100%, demonstrating adultlike behavior. This demonstrates children's ability on actives and actional passives. However, performance was split on two conditions: the nonactional nontruncated passive (11), on which performance was at chance (46.1%), and the nonactional truncated passive (12), on which performance, though not perfect, was well above chance (86.5%). These results argue against the Maturation Hypothesis, because they indicate that children's problem lies not with A-chains but with the *by*-phrase. We believe, however, that this analysis is not sufficiently fine-grained, as it combines data from children who are at different stages of linguistic development.

   We thus divided the children into three groups: 2 children who demonstrated adult performance (group 1); 8 children who were remarkable in complying with the hypothesis that children's problem with interpreting passives is directly linked to the interpretation of the *by*-phrase (group 2); and 3 children whose data are problematic. We discuss each group in turn.

4.3.1 Group 1   The 2 children in group 1, ages 4.1 and 4.9, showed adult performance, rewarding the puppet in all M cases and punishing him in all MM cases. When asked verbally ''What really happened?'', they both responded correctly, showing that they understood the puppet's utterances and rejected them for the relevant reasons. In addition, they both occasionally produced the correct passives when explaining what really happened. These children obviously know everything there is to know about the passive. Therefore, they have no bearing on our theoretical claims, yet they demonstrate that this experiment yields the right results for a child whose language is fully matured.

4.3.2 Group 2   The 8 children in group 2, whose ages ranged from 3.6 to 5.5 (mean 4.75), performed exactly as our hypothesis predicted. On the actional *get-* and *be*-passives, they all performed perfectly, punishing the puppet in all the MM cases and rewarding him in all the M cases. On the nonactional nontruncated passives, these children performed poorly. On the nonactional actives, they performed perfectly, and, surprisingly enough, they also performed perfectly on the nonactional truncated passives. The performance of the group 2 children in the critical conditions—nonactional nontruncated and truncated passives—is summarized in table 1.[14,15]

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[14] In this article we present only a group analysis of the children's performance. In the cases in which the group performance is perfect, the individual performance is trivially derived. In the case in which the group performance is at chance, the individual data reveal little, because there were not enough sentences per condition. There were four sentences per child per condition. There is no reason to expect that four sentences will yield chance performance. What is crucial, though, is that each child in this group failed on at least one of the four nonactional nontruncated passives he or she was presented with, and that they all stated that they did not understand what the puppet said. This behavior contrasted minimally with the children's behavior in all the conditions in which they did well. In those conditions the children were very sure of themselves, could specify the reason for punishing the puppet, and produced the right kind of passive sentences. For individual performances, see Fox, Grodzinsky, and Crain 1995.

[15] In the experiment we observed some contrast between children's performance with *hear* (25% correct responses) and their performance with *see* (55%). This contrast is not significant for our hypothesis, since for both *hear* and *see* we can conclude that the children have a problem with the nontruncated *be*-passives. Nonetheless, it might be possible to explain the contrast between *hear* and *see*. It is possible that some children can interpret *see* as an actional verb, similar

Table 1
Group 2, total responses per condition (8 children $\times$ 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

The group 2 children show the same performance pattern as the children in Maratsos et al.'s (1985) experiment. The additional item tested in our experiment is presented as condition 2. Once the *by*-phrase is eliminated from the nonactional passives, children's performance turns out to be perfect. This result strongly supports our hypothesis, as it demonstrates that the problem with nonactional passives is specifically linked to the *by*-phrase.[16]

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to *look*. Even in adult language such an interpretation seems available. *See* sometimes means something like 'look successfully'. Thus, we think that there is a meaning of *see* under which the following contrast holds:

   (i)   John heard but didn't listen.

  (ii) #John saw but didn't look.

Note, however, that children's performance on *see* is at chance. The majority of children thus treat *see* as a nonactional verb, just as adults normally do.

    [16] It is interesting to consider an anecdote from the experiment, which supports the claim that the children's problem lies with the *by*-phrase.

    As mentioned, when the children punished the puppet, they were always asked to say what really happened. In the case of nonactional truncated passives (condition 2), they usually correctly reversed the truncated passive. Sometimes, however, they tried to add a *by*-phrase (probably because in the course of all these sessions they came to expect that a *by*-phrase would follow a passive). However, the children were not very successful in adding the *by*-phrase. In one striking case the child and the puppet had the following dialogue:

    Puppet   The little girl was seen.
    Child   No.
    Puppet   What really happened?
    Child   The gorilla was seen . . . The gorilla was seen by . . . The gorilla was seen by . . . by, by the gorilla.
               The gorilla was seen by the gorilla.
    Puppet   Was the gorilla seen by the gorilla?
    Child   Yes.

This shows that the child knows how to interpret the truncated passive, but doesn't know what interpretation to give to the *by*-phrase. It also undermines a possible objection to our hypothesis discussed in section 5.4, according to which the child should be able to infer the meaning of the *by*-phrase on the basis of the interpretation of the truncated passive.

Table 2
Group 3, total responses per condition (3 children $\times$ 2 sentences per condition)

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

	Reward	Punish
Match	1	5
Mismatch	4	2

25% correct

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

	Reward	Punish
Match	1	5
Mismatch	2	4

41.6% correct

4.3.3 Group 3   The data from the 3 children in group 3, ages 4.3, 4.6, and 4.9, are problematic for the hypothesis. These children performed just like the children in group 2 with respect to actional *get*-passives, actional *be*-passives, and nonactional nontruncated *be*-passives. However, they performed unlike the children in group 2 in that they also had difficulty with the nonactional truncated *be*-passives. The data are presented in table 2.

As a comparison of condition 1 with condition 2 shows, the performance of the 3 children in group 3 does not improve in any significant way when the *by*-phrase is eliminated from the nonactional passives. Therefore, contrary to our hypothesis, these children have some problem with the passives tested in condition 2, which is not related to the *by*-phrase.

4.4 The Results and Maturation

We focus on group 2—the largest one, consisting of 8 children. The children of group 1—the ''adults''—are irrelevant for testing our hypothesis and will henceforth be ignored; nor do the data from the children in group 3 bear upon the debate regarding maturation, as we will show.

Looking at the performance of the 8 children in group 2, we have a clear-cut argument that their problem with passives is actually related to the interpretation of the *by*-phrase, and nothing else: they did well on *be*-passive and *get*-passive constructions. They made mistakes only on nonactional passives with *by*-phrases, and crucially, they made none once the *by*-phrase had been eliminated. Thus, the problem cannot be a general problem with the passive (or with A-chains), because that would not explain the children's performance on most passives, and crucially, it would not explain why the presence or absence of the *by*-phrase made a difference. This leads us to reject all previous accounts of Maratsos et al.'s (1985) results, because they cannot account for this contrast (see, e.g., Berwick and Weinberg 1984, Pinker, Lebeaux, and Frost 1987, Lebeaux 1988, all of which relate children's problem to some thematic restriction on early passives; see also Borer and Wexler 1987).

Next, consider the results from group 3, the 3 children who also erred on the nonactional truncated passive. Theirs appears to be a different problem, perhaps an additional one. The important point is that whatever this problem may be, it is orthogonal to the debate about the maturation of A-chains. This is so because these children perform well on actional passives, and on *get*-passives, which (as we have shown) must be analyzed as containing an A-chain. The source of their errors should be sought elsewhere. We could, though, imagine that their performance points to flaws in our experiment. We could easily conceive of methodological problems that would explain their ''disobedience,'' although these problems all remain speculative. For example, it is possible that these children have a problem with the irregular passive morphology that is used with the particular nonagentive verbs chosen for the experiment (*see → seen, hear → heard*). Alternatively, it is possible that the children have some Piagetian problem in determining who sees or hears whom. To be more precise, they might have a problem in conceiving of a situation in which one character sees/hears the other but not vice versa (egocentricity).[17]

Be this as it may, it is critical to emphasize that the 8 children in group 2 show that the problem with a nonagentive *by*-phrase is a real one. That is to say, it is clear that there are children whose performance on passives *must* be explained by assuming that they have a problem with nonagentive *by*-phrases and with nothing else. This is clearly so because the only difference between the truncated and nontruncated nonactional passive is the presence or absence of the *by*-phrase.

These were all, in our view, sufficient reasons for focusing on group 2 and abstracting away from group 3. It is important to understand, however, that even if we decide not to make this abstraction, there is still one necessary conclusion to be drawn from our experiment: at least some of the children have a problem with nonactional passives resulting from the *by*-phrase. Thus, the experiment shows that Maratsos et al.'s (1985) results cannot be interpreted, as in previous accounts, by means of identifying a general problem with the passive that is not linked to the *by*-phrase. Maratsos et al. do not show that the children's problem arises when the *by*-phrase is absent, whereas our experiment gives, at the very least, good reason to believe that it doesn't.[18]

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[17] An obvious objection to this generalization is that the children did well on the active control. This is the time to ''confess'' to a problem with the methodology of the experiment. The problem is related specifically to the active control. In acting out the stories, it was very hard to convey a situation in which one character sees another without being seen. It is of course possible, for example, to have one character hiding and the other blindfolded. In fact, we used such techniques. The problem was that even the most advanced children (say, those in group 1) found it difficult to infer who was seeing whom and, more importantly in the present context, who wasn't. For this reason, we decided to end the stories with a statement like ''A is seeing B but B isn't seeing A.'' This probably allows the child to get the right answer without understanding the situation. In a sense, this renders our active control for the nonactional passives meaningless. However, this problem affects only the analysis of the data from group 3. For group 2 we can use the truncated passives as controls.

[18] Note that this argument cannot be reversed. That is to say, there is no way to claim that the 3 children in group 3 are the important ones and the 8 children in group 2 should be dismissed by some methodological consideration. The reason is that the data from the two groups differ not only quantitatively but also qualitatively. The data from group 2 lead us to an explanation, whereas the data from group 3 do not. Further, we can think of methodological problems with the experimental results pertaining to group 3 but not with those pertaining to group 2.

5 The Account

In the previous sections we have presented three arguments against an account of the development of the passive based on the maturation of A-chains. In this section we suggest an alternative account. The data that must be accounted for are (a) that children have a problem only with nonactional passives, and (b) that this problem shows up only when a *by*-phrase is present. The obvious question to ask is what is missing from the child's grammar (or its implementation) to yield this very specific problem. The most straightforward way to deal with this question is to search for a mechanism in the adult grammar that is crucial for the analysis of the constructions that children have problems with. If such a mechanism exists, the most plausible conclusion would be that the ''missing piece'' for the child is crucial for the use of the mechanism in the relevant constructions. Such a conclusion could serve as a partial answer to the question. A complete answer would require determining exactly what the ''missing piece'' is. We begin this section with a partial answer and conclude with two speculations about what the complete answer might be.

What mechanism is necessary for interpreting nonactional passives when the *by*-phrase is present and is not necessary in all other cases? An answer can be found in various accounts of the interpretation of *by*-phrases in passive constructions. It is well established that for the interpretation of some nontruncated passives, there must be a mechanism (which we may call *θ-transmission*) that transfers the external (compositional) θ-role of a predicate to the *by*-phrase. However, it has been argued by Rappaport (1983), Jaeggli (1986), and Grimshaw (1990) that θ-transmission is not necessary for all nontruncated passives. There is one θ-role (''agent'' or ''affector'') that can be assigned directly by the preposition *by* without invoking θ-transmission. Only if a different θ-role is required does θ-transmission need to be invoked. Suppose that the ''missing piece'' is necessary for making use of θ-transmission in passive constructions. It would follow that children will have problems with nonactional passives when the *by*-phrase is present, but not with actional passives or with nonactional truncated passives. Only in nonactional nontruncated passives is θ-transmission necessary for achieving the adult interpretation. This observation yields a partial answer to the question we have been asking.

Most of this section is devoted to presenting this partial answer in detail. We begin by identifying two properties of θ-transmission. The identification of these properties serves as the basis for two arguments that θ-transmission is necessary only when a *by*-phrase is nonagentive. After presenting the arguments, we discuss how the conclusion provides the first step toward understanding what the child's ''missing piece'' might be. Finally, we present our speculation about the underlying mechanisms.

5.1 Two Properties of θ-Transmission

Since the first generative grammar studies, it has been known that the *by*-phrase in a passive construction receives the external θ-role of the VP. This is demonstrated by the passive sentences in (13) (from Jaeggli 1986:599). In these sentences the interpretation of the *by*-phrases is not limited to a single θ-role. Rather, the θ-role is determined by the choice of the verb and is identified as its external argument.

(13) a. Bill was killed by Mary.   (agent)
    b. The package was sent by John.   (source)
    c. The letter was received by Bill.   (goal)
    d. That professor is feared by all students.   (experiencer)

This observation has led many to conclude that *by* does not assign the θ-role to its complement. Rather, the θ-role is assigned by the verb and thus can vary with the verb. Given this, it is tempting to suggest that there exists a mechanism, θ-transmission, that transfers the θ-role from the logical subject position to the position of the *by*-phrase. This suggestion is supported by Marantz's (1984) observation that the interpretation of the *by*-phrase is compositionally determined by the verb and its logical object, as the sentences in (14) demonstrate.

(14) a. The ball was thrown by the pitcher.
    b. The party was thrown by the department.
    c. Support was thrown behind the candidate by the CIA.

The precise nature of θ-transmission has been a topic of much debate (see, e.g., Baker, Johnson, and Roberts 1989, Grimshaw 1990, Lasnik 1988). For the purposes of this article, it will suffice to note two properties of θ-transmission, consistent with all approaches. The first property has already been noted: θ-transmission is thematically unlimited; the *by*-phrase can bear any θ-role (as long as it is the one assigned to the external argument of the predicate in question). The second property, somewhat more controversial, is related to the observation that the external argument of the passive has some implicit realization, even when it is not realized by a *by*-phrase. Consider passive sentences such as (15a), due to Manzini (1983). The logical subject of such passive sentences (in contrast to the logical subject of middle constructions such as (15b)) can control into a purpose clause even though it is not overtly realized by a *by*-phrase. Similarly, the nonovert logical subject in passive constructions such as (16a), due to Jackendoff (1972), can serve as an implicit argument of an *agent-oriented adverb.*

(15) a.   The price was decreased [PRO to help the poor].
    b.   *The price decreased [PRO to help the poor].

(16) a.   The price was decreased willingly.
    b.   *The price decreased willingly.

It seems plausible that the availability of θ-transmission is related to the implicit presence of the external argument (for the most explicit suggestion along this line, see Baker, Johnson, and Roberts 1989). In particular, it seems plausible that θ-transmission involves the transmission of a θ-role that is never completely suppressed—that θ-transmission is literally θ-transmission. Our two assumptions are repeated in (17).

(17) a. θ-transmission is thematically unlimited.
    b. θ-transmission involves the transmission of a θ-role that is otherwise realized by an implicit argument.

5.2 *Affector* By-*Phrases Can Receive a θ-Role without θ-Transmission*

The observation that the interpretation of the *by*-phrase is not limited to a single θ-role and is determined by the thematic properties of the predicate indicates the existence of a mechanism that assigns the external θ-role of the VP to the *by*-phrase. Ideally, this would be the only way for a θ-role to be assigned to the oblique object. The evidence, however, suggests otherwise. As argued by Rappaport (1983), Jaeggli (1986), and Grimshaw (1990), there are reasons to believe that in certain circumstances the θ-role that *by* assigns to its complement is determined not by the predicate but by the semantic properties of the preposition *by* itself. We would thus expect that in cases where the special mechanism for θ-transmission is for some reason unavailable, *by* would be responsible for assigning the θ-role. In such cases the role of the complement to this preposition would be determined independently of the properties of the verb, most likely, limited to a single θ-role determined by the semantics of *by*. Our account of children's performance on nonactional passives will be based on this. First, however, we must outline the properties of *by* as an independent θ-role assigner.

The argument that *by* is an independent θ-role assigner is based on the observation that *by*-phrases in verbal passives are different from *by*-phrases in nominals. Whereas verbal *by*-phrases receive the θ-role of the external argument, nominal *by*-phrases are thematically limited; they can only be interpreted as agents (18), instruments (19), or creators/possessors (20). In other words, the object of *by* must be the *affector*. Critically, nominal *by*-phrases cannot be assigned any other θ-role (21). To put this another way, (18)–(20) show that an affector *by*-phrase is licensed both in verbal passives and in nominals. By contrast, (21) shows that a nonaffector *by*-phrase is licensed in verbal passives, but, crucially, not in nominals. ((18b) is from Grimshaw 1990:137, (80b), and (21a–c) are from Jaeggli 1986:606, (43)–(44), (46), cited from Jackendoff 1977.)

(18) a. The refugees were imprisoned by the government.
     b. the imprisonment of refugees by the government

(19) a. The city was destroyed by lightning.
     b. the destruction of the city by lightning

(20) a. a book/article/painting by John
     b. CK1 by Calvin Klein

(21) a. i. The package was received by John.
       ii. the receipt of the package (*by John)
     b. i. Harry was feared by John.
       ii. the fear of Harry (*by John)
     c. i. Mary was respected by John.
       ii. the respect for Mary (*by John)

Suppose we attempt to account for these facts through θ-transmission and the properties of the preposition *by.* The grammaticality contrast between the nominals in (18)–(20) and those in

(21) is explained through two assumptions: that θ-transmission cannot take place in nominals,[19] and that *by* has certain semantic properties that allow it to assign an affector θ-role to its complement. The facts then follow. In all the nominals, θ-transmission is blocked. The examples in (18)–(20) are grammatical because an affector role is assigned directly to the oblique objects. In (21), however, where an affector role is inconsistent with the semantic requirements of the predicate, such assignment is not possible; it creates an incoherent thematic representation, resulting in unacceptability. The difference between verbal passives and passive nominals with respect to the *by*-phrase is that whereas in the former the *by*-phrase can be interpreted through θ-transmission, with no thematic restrictions, in the latter θ-transmission is not an option. The only way to interpret the *by*-phrase is through independent θ-role assignment by the preposition *by,* and the only role that can be assigned is affector. In fact, the nominals in (20) further underscore this point. Specifically, although the *by*-phrase is definitely not interpreted by θ-transmission (since there is no suppressed θ-role to transmit), an interpretation is nevertheless possible. This shows decisively that *by*-phrases can be interpreted independently of the availability of θ-transmission.

5.3 Further Evidence

We have shown that in nominals a *by*-phrase can receive an affector θ-role without the process of θ-transmission. From this we have concluded that the complement of *by* can *always* receive an affector θ-role without θ-transmission and that an affector *by*-phrase in a verbal passive is therefore ambiguous. This conclusion is the natural one to make; if there is a way for *by* to assign an affector role to its complement in nominals, there is no reason to believe that it will not be able to do so in verbal passives. Nevertheless, the conclusion is not necessary. Though highly speculative, it is conceivable that the assignment of an agentive role by *by* somehow depends on a nominal environment. In this section we present direct arguments that our conclusion, although not strictly necessary, in fact holds; *by* can assign an affector θ-role to its complement in verbal environments as well as nominal ones.

   The argument in the case of nominals (presented in section 5.2) was based on the first property attributed to θ-transmission, namely, that it is thematically unrestricted (17a). The argument in the case of verbal passives will be based on the second property, namely, that θ-transmission involves the transmission of a θ-role that is otherwise realized by an implicit argument (17b). Given this property, *get*-passive constructions will demonstrate that, in verbal environments as well, a *by*-phrase can be interpreted independently of θ-transmission. In these constructions, as we will show, a *by*-phrase is licensed although there is no implicit external argument.

   Consider the difference between *be*- and *get*-passives, exemplified in (22)–(26).[20]

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[19] This assumption receives a natural explanation in Jaeggli 1986. The basic idea is that the availability of θ-transmission is crucially linked to the existence of a passive morphology. Nominals lack the passive morphology, and therefore θ-transmission is impossible. For an alternative explanation, see Grimshaw 1990.

[20] The *be*-passives in (22)–(25) are taken from Baker 1988. The contrast in (26) is cited in Lasnik and Fiengo 1974.

(22) a. The ship was sunk [PRO to collect insurance money].
    b. *The ship got sunk [PRO to collect insurance money].
    c. The ship got sunk [for John to collect insurance money].

(23) a. It was decided [PRO to leave].
    b. *It (finally) got decided [PRO to leave].
    c. It (finally) got decided [that John should leave].

(24) a. The food was served kneeling.
    b. *The food (finally) got served kneeling.

(25) a. Food should never be served only for oneself.
    b. *Food should never get served only for oneself.

(26) a. The book was torn on purpose.
    b. *The book got torn on purpose.

In (22a) PRO is controlled by the external argument of a *be*-passive. Under the assumption that such control depends on the presence of a controller, we conclude that in *be*-passives the external argument of the VP is not suppressed and has some grammatical realization. (22b) shows that such control is impossible in *get*-passives. (22c) demonstrates that *get*-passives can license purpose clauses and that the problem with (22b) is related specifically to control. (23a) shows that the external argument of a VP in a *be*-passive can also control a PRO in the complement of V. (23b) shows that such control is impossible with a *get*-passive. (23c) demonstrates that the problem does not lie with the construction in general but is specifically related to the presence of PRO. In (24a) the agent of the event exerts control into the subject of *kneeling*. Again, as (24b) shows, such control is impossible with a *get*-passive. (25) demonstrates that the external argument of the VP can serve as an antecedent for an anaphor in a *be*- but not in a *get*-passive, and (26), that *on purpose* can be predicated of the external argument in a *be*- but not in a *get*-passive.

    The contrasts in (22)–(26) all lead to the same conclusion: in *get*-passives, unlike in *be*-passives, the external argument of the VP has no implicit realization. Therefore, *get*-passives, unlike *be*-passives, contain no syntactic item that can control PRO, bind a reflexive, or be predicated of by *on purpose.*

    Nevertheless, *get*-passives can license *by*-phrases, as shown by the sentences in (27). Given the assumption that θ-transmission depends on the existence of an implicit external argument, we must conclude that *by*-phrases can be licensed in *get*-passives independently of θ-transmission. In other words, *by* in a *get*-passive (just as in a nominal) assigns a θ-role to its complement independently of θ-transmission.[21,22]

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[21] We would like to show that the θ-role that *by* assigns is limited in *get*-passives in the same way that it is in nominals. In other words, we would like to show that the *by*-phrase in a *get*-passive must be an affector. Unfortunately, it is impossible to show this. Although the *get*-passives in (i) are just as bad as the nominals in (21), their unacceptability is probably independent of the *by*-phrase. There seems to be an independent condition that rules out nonagentive *get*-passives, thus not allowing the thematic properties of the *by*-phrase to be revealed.

(27) a. John got pushed by Mary.
     b. John got killed by Mary.

5.4 The Children's Problem

We begin by summarizing our main observations. We have shown that children both produce and comprehend constructions involving A-chains: nontruncated *get*-passives, actional nontruncated *be*-passives, and nonactional truncated *be*-passives. These results cannot be explained by the Maturation Hypothesis regarding A-chains, whether strong or relaxed. We have also observed that children fail in comprehension tasks involving nontruncated nonactional passives. These results lead us to focus on the *by*-phrase of nonactional passives. In sections 5.1–5.3 we have isolated a property that can help to distinguish these *by*-phrases from the *by*-phrases associated with actional verbs. We have shown that nonaffector *by*-phrases can be interpreted only through θ-transmission whereas affector *by*-phrases can also be interpreted independently of this process. A *by*-phrase associated with a nonactional verb cannot be interpreted with an affector θ-role; therefore, it must be interpreted by θ-transmission. We are led to conclude that children fail in interpreting passives only when the process of θ-transmission is mandatory—only in passives with *by*-phrases that are not affectors. On the other hand, children have no problem with actional *be*-passives or with *get*-passives, because in both constructions direct θ-role assignment can obviate the need for the grammatical process.

We would like to assume, then, that in interpreting passive constructions children cannot appeal to the process that transmits the external θ-role to the *by*-phrase, and we would like to conclude that this is the reason for their difficulty with nonagentive passives. Yet this conclusion may seem unwarranted. One might argue that incomplete representations do not guarantee poor performance. More specifically, one might claim that although children cannot interpret the *by*-phrase, their ability to interpret the subject should be sufficient for them to get at the correct interpretation (either by ignoring the *by*-phrase or by inferring its θ-role). However, this is not a necessary conclusion. Moreover, the experimental data from nonagentive passives clearly disconfirm it, showing that children cannot disregard the *by*-phrase or overcome their deficiency. These data show that children fail in interpreting nontruncated nonagentive passives although their interpretation of the truncated ones is perfect. (See Grodzinsky 1990 for a similar argument in a different context.)[23]

(i) a. *The package got received by John.
    b. *Harry got feared by John.
    c. *Mary got respected by John.

[22] An *LI* reviewer suggests an explanation for the fact that in *get*-passives θ-transmission seems to be unavailable. The basic idea is that θ-transmission is in principle available. The participle *can* in principle transmit its external θ-role to the *by*-phrase. However, the *by*-phrase in *get*-passives tends to be attached too far away to receive the transmitted θ-role (it is attached to *get* rather than to the participle). This suggestion, if correct, does not affect our conclusion that *by* can assign certain θ-roles independent of θ-transmission.

[23] We argue that children cannot disregard a *by*-phrase in a passive, despite the unavailability of normal θ-transmission mechanisms. Similarly, Grodzinsky argues that aphasics cannot disregard the subject of a passive despite disruptions to chains that prevent the internal θ-role from being transmitted to the subject.

We are led to conclude that an inability to interpret the *by*-phrase in nonagentive passives is the reason for the observed poor performance. We suggest that because children cannot assign the compositional θ-role to the *by*-phrase through θ-transmission, *by* must assign an affector θ-role to its complement. However, such a role is inconsistent with the thematic structure of the nonactional predicate and the resulting thematic representation is therefore incoherent. This incoherence makes semantic interpretation impossible. Indeed, the children performed at chance, and in many cases they explicitly commented that they did not know what the test sentence meant.

This conclusion leads us to predict that children should have no problem in interpreting passive nominals of all kinds. Testing children's comprehension of these constructions may prove very difficult, yet if it is possible, their performance should be adultlike, because the interpretation of *by*-phrases in nominals is independent of θ-transmission. In addition, this account allows us to explain the data presented by Demuth (1989). Demuth shows that the spontaneous speech of Sesotho-speaking children around the age of 3 includes nontruncated passives. This presents a problem for the Maturation Hypothesis. As Demuth notes, Sesotho passives exhibit no ambiguity between a stative-adjectival and an eventive reading. Thus, there is no way for a maturationalist to claim that the child's passives are actually adjectival. On the other hand, Demuth's data present no problem for our account. All of the children's utterances that she reports are actional passives. There are no nonactional nontruncated passives, thus no evidence for compositional θ-role assignment to the *by*-phrase.[24]

We have managed to zero in on the locus of children's problem with passive constructions. In other words, we have provided a partial answer to our question. Of course, we would like to be able to give a complete answer; that is, we would like to be able to determine exactly what is missing from the child's system. At this point, we can only speculate. In principle, there are two possibilities: either the problem relates to the operation that transfers the subject's θ-role to

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[24] At this point there is one fact that our account fails to capture. Specifically, Spanish poses a problem for our account, although not the same kind of problem that it poses for the RMH. Namely, whereas Borer and Wexler's (1997) account incorrectly predicts children's performance to differ on passives with pre- and postverbal subjects in Spanish (see section 3), ours cannot handle Pierce's (1992) finding that Spanish-speaking children fail in comprehending nontruncated passives even when the predicate is actional (this was pointed out to us by an *LI* reviewer).

If this result is reliable, it is—to the best of our knowledge—the first indication of a clear crosslinguistic difference in the acquisition of the passive. As far as we can see, an explanation of such a crosslinguistic difference would have to rely on some property that distinguishes the relevant languages. A plausible candidate for the distinguishing property might come from a lexical direction. Suppose that *by* in Spanish differed from its English counterparts in that it could not assign a θ-role independently of θ-transmission. If this were the case, Spanish-speaking children would not be able to assign a θ-role to any *by*-phrase, and this inability might in turn lead to failure on all nontruncated passives.

Preliminary evidence that this is the case can be found in an observation reported by Grimshaw (1990:56, attributed to Esther Torrego (personal communication)) that nominals such as those in (ia) are ungrammatical in Spanish, (ib). This would be expected if the preposition *by* in Spanish (*por*) could not assign an affector θ-role to its complement. *By* in English is ambiguous between a semantically contentful preposition that can assign a θ-role on its own and a semantically empty preposition the maximal projection of which is interpreted by θ-transmission. The Spanish *por* is unambiguous and must be interpreted through θ-transmission. The semantically contentful preposition in Spanish has a different phonological realization, *de* (ic).

(i) a. a book by Chomsky
    b. *un libro por Chomsky
    c. un libro de Chomsky

the *by*-phrase (with θ-transmission) or it relates to the application of this operation in the particular environment of a passive construction.

We are aware of no conclusive empirical evidence that could distinguish the two options. The first option might seem more general. However, it seems to us that the second might turn out to be a consequence of a broader and more interesting generalization. It may be that θ-transmission is not problematic in itself. Rather, it is problematic only when it adds up to something that requires a heavy parsing load. Assume that θ-transmission involves a dependency similar to the one that is created through movement. If this is the case, it is conceivable that children cannot handle certain syntactic representations containing more than one dependency. More specifically, it is possible that when a representation contains a double dependency, the processing load might exceed the children's capacity. This appears to be too strong, however: children can handle object extractions (which, assuming the ISH, involve a double dependency). It seems that we would need to distinguish different types of double dependencies. It is possible that children have problems only with crossing dependencies.[25]

This would distinguish object extractions, which involve nesting, from passives, which involve crossing—the passive morphology that is the antecedent of the *by*-phrase intervenes between the trace and its antecedent. It might also turn out that the double dependencies that are hard for children include the double dependencies that are created in sentences involving multiple quantification. Several investigators have looked at children's comprehension of such structures (Philip 1991, 1992, Crain et al. 1996). Although the results are inconclusive, children do appear to have problems in this area.[26]

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[25] Note that this proposal, in contrast to the previous alternative, would depend on an analysis of postverbal passives in Spanish that assumes LF movement and a crossing dependency at this level.

[26] Crain et al. (1996) have attempted to show that the problems Philip has observed result from experimental design flaws. Although we believe that in some cases Crain et al. are right, the children in their own studies still had problems in interpreting certain types of quantificational structures (e.g., certain structures involving universal quantifiers in object position; see their section 9.4). Moreover, their ''plausible denial'' account of children's failures does not explain the minimal pair of results in Philip's studies, in which children failed in comprehension on structures containing an object quantifier, yet at the same time succeeded when the quantifier was replaced by an incorporated noun, with roughly the same interpretation. (See Crain et al. 1996:118–119.)

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