ACTIONALITY SPEAKS LOUDER THAN FELICITY: ENGLISH-SPEAKING CHILDREN'S COMPREHENSION OF PASSIVES

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1. Introduction

In many studies, English-speaking children do not seem to understand actional passives with a 'by'-phrase (henceforth, *long* passives) such as (1) until about age 4 or 5 (Bever 1970; Horgan 1978; de Villiers & de Villiers 1978). These studies use verbs with 'reversible' interpretation, meaning that the arguments used are equally plausible as subject or object. Furthermore, it has been claimed that children do not begin to understand non-actional long passives such as (2) until as late as age 7 (e.g., Maratsos et al. 1998). However, although many studies have found children to have delayed acquisition, others have found adult-like performance at an early age. It is this discrepancy in the literature regarding children's acquisition of the English reversible verbal passive that we investigate in the present research.

(1) The dog was hugged by Ernie.
(2) The dog was liked by Ernie.

The idea that children are delayed in their understanding of long passives is long-standing, leading some researchers to propose that young children lack an adult-like grammar for the verbal passive. For example, Borer & Wexler (1987, 1992) give an account whereby the ability to form A-chains, a necessary component of the verbal passive, is biologically inaccessible to young children.

Contrary to the studies finding delays, other studies have found early understanding of verbal passives. Fox & Grodzinsky (1998), for example, found that many of the children in their study (10 out of their 13 subjects, age 3;06-5;05 years) performed perfectly on short non-actional passives as well as on long actional *be*- and *get*-passives. Many of these same children (8 of the 10) had difficulty on non-actional passives if and only if the passive included a *by*-phrase. Furthermore, as will be discussed below, O'Brien, Grolla, & Lillo-Martin (2006) found adult-like performance on both long actional and long non-actional passives, under certain testing conditions, in both 3- and 4-year-old children.

The question leading to our study was why children showed adult-like performance on long passives in some studies, but not in others. In particular, we wanted to test the generalizability of O'Brien et al.'s (2006) results to a new, larger sample of children.

The paper is structured as follows: Section 2 will describe O'Brien et al.'s (2006) experiments and their results. Section 3 will describe the results from our first experiment testing the generalizability of O'Brien et al.'s results. Section 4 will describe a follow-up study. Section 5 contains a general discussion of our findings, including future directions.

2. O'Brien, Grolla, & Lillo-Martin (2006)

O'Brien, Grolla, & Lillo-Martin (2006) started from the observation by Crain & Fodor (1993) that long passives have a low frequency of occurrence in the speech of adults as well as (older) children. Crain & Fodor suggested that this low frequency may be due to long passives being "marked" forms that are appropriate only in certain discourse situations. O'Brien et al. hypothesized that children generally have difficulty with long actional and long non-actional passives precisely because the contexts in which they are presented in experiments are pragmatically inappropriate for the use of a *by*-phrase.

3- and 4-year-old children were tested to see whether their performance on long passive sentences would improve if the sentences were presented in contexts that made the *by*-phrase more pragmatically appropriate. For the authors, a story was deemed to be pragmatically appropriate for the *by*-phrase if, in addition to the character corresponding to the actual agent or experiencer, there was another character who could have been the agent or experiencer. The contrast between the potential and the actual agent/experiencer motivated the use of a *by*-phrase, because otherwise this information was unavailable to the listener. Note that this manipulation motivated the inclusion of a *by*-phrase, but may or

may not have been sufficient to motivate the use of the passive voice in the first place.

O'Brien et al. used a Truth-Value Judgment Task (Crain & McKee 1985) to see whether children would accept passive sentences as descriptions of stories acted out using toy props. So while one experimenter told a story to child and acted it out with toys, another experimenter delivered the test sentence while manipulating a puppet, "Gobu". The child was asked to indicate whether Gobu's utterance was an appropriate description of the story by either rewarding or correcting the puppet.

Each child saw stories that contained either an actional verb (*hug, chase*) or a non-actional verb (*see, like*).[1] O'Brien et al. tested the 3- and 4-year-olds separately. 4-year-old children (N=11) only received test stories that contained the additional character, whereas 3-year-olds (N=7) received some stories that did, and some stories that did not, have the extra character. Crucially, the presentation of the stories was blocked so that the three-year-olds always saw the stories without an extra character before the stories that included an extra character.

Taken from O'Brien et al. (2006), a sample story containing two potential agents/experiencers is shown in (3).

(3) Long Actional Passive with 2 Potential Agents
(Matched Sample Story)
Exp1: Bart, the gorilla, and the cheetah were relaxing in the jungle one day, when Bart found a bunch of bananas.
Bart: Hey, cool! Look what I found!
Gorilla: Would you mind sharing some of those with me?
Bart: No way, dude, these are mine, all mine! Hee, hee. If you want some, you're gonna have to chase me.
Cheetah: I could chase him, but I'm not all that fond of bananas.
Gorilla: Well bananas are my favorite, so watch out Bart, here I come!!!! (Gorilla chases Bart)
Exp1: Gobu, can you tell me something about the story?
Gobu: Well, let's see. In that story, Bart was chased by the gorilla.

O'Brien et al. found that when 3- and 4-year-old children were presented with stories that contained two potential agents/experiencers, they were significantly above chance for both types of long passives, even though long non-actional passives had been reported to be difficult for children that young (Maratsos et al. 1998; Fox et al. 1995). Additionally,

when the 3-year-olds were shown stories with only one potential agent/experiencer, they performed at chance on long actional and long non-actional passives.

The authors interpreted their results as evidence that young children actually have adult-like comprehension of English long passives, as long as the sentences are presented in contexts that properly motivate the use of a *by*-phrase.

In Experiment 1 we tested the generalizability of O'Brien et al.'s (2006) findings to a new, larger sample of children. Specifically, we checked whether performance improved when the children were presented with stories that featured two potential agents/experiencers. In contrast to the earlier study, however, Experiment 1 intermixed test items with long and short passives.

3. Experiment 1

In this study, a different mode of presentation was used, as described below; otherwise, the study shared with O'Brien et al. (2006) the general approach of contrasting stories with or without an extra character as a potential agent/experiencer. 3- and 4-year-olds were tested to see whether the presence of the additional character improved their performance on long passives. Children were also presented with short passives in order to check whether the new methodology would replicate previous findings that children often perform better on passives without a *by*-phrase (Horgan 1978; Fox et al. 1995).

3.1. Subjects & Procedure

25 monolingual English-acquiring children were tested (3;00-5;03, mean age=4;03) using a modified version of the Truth Value Judgment Task (henceforth laptop-TVJT) (Crain and McKee 1985). Instead of having two experimenters act out the stories with toys and manipulating a puppet, the materials were presented through a laptop.[2] A child would watch previously recorded videos of the stories. After each story, a puppet, named "Oscar", would come on the screen as part of the video, but portrayed to the child as via "webcam", and deliver the test sentence. After each test sentence, children were asked to indicate whether the puppet was "right" or "silly" by stamping a report card.

In order to be included in the data analysis, the child had to have answered correctly to at least three out of the four control items (i.e., scoring at least 75% correct), and not exhibit a bias towards either answer

(i.e., a child who gave the same answer to 90% or more of the test items was removed from further analysis).

3.2. Materials

The stories that were created were generally similar in plot but varied in the number of characters: either there was only a single potential agent/experiencer, in addition to the patient/theme (henceforth a "2-Character Story"), or there were two (henceforth a "3-Character Story"). Similar to O'Brien et al. (2006), two actional and two non-actional verbs were tested: *hug, chase, see,* and *like* respectively. For each verb, three stories were created: a Long Passive in a 3-Character Story, a Long Passive in a 2-Character Story, and a Short Passive in a 2-Character Story.

Whether the test sentence matched the story was counterbalanced. After two initial active controls, the stories were presented in an intermixed and pseudo-randomized order so as to discourage children from developing a bias towards any particular pattern of answers.

In total, each child watched 16 stories on the laptop: four active controls and 12 test items. Four sample stories are given in (4-7).

(4) Long Non-actional Passive in a 2-Character Story
(Mismatched Sample)
Narrator: This is a story about Santa and a lion. The lion is mean and grumpy. He doesn't like anyone. But I wonder if there's anyone that likes the lion. Here's Santa. I wonder if Santa likes the lion.
Santa: I know that the lion doesn't like me but he has such nice hair and a nice long tail. So yes, I like the lion very much!
Experimenter: Oscar, can you tell me something about the story?
Oscar: Santa was liked by the lion.

(5) Long Non-actional Passive in a 3-Character Story
(Matched Sample)
Narrator: This is a story about Snow White, a dwarf, and a cow. The cow doesn't like a lot of people. But I wonder if anyone likes the cow? Here's Snow White. I wonder if Snow White likes the cow?
Snow White: No way! I don't like the cow because he has such silly spots!

Narrator: Okay, well here's the dwarf. I wonder if the dwarf likes the cow?
Dwarf: I know that the cow doesn't like me but I like the cow. I like his spots and his horns very much. I like you, cow!
Experimenter: Oscar, can you tell me something about the story?
Oscar: The cow was liked by the dwarf.[3]

(6) Short Actional Passive in a 2-Character Story
(Mismatched Sample)
Narrator: This is a story about Lisa and Fancy Lady. Lisa and Fancy Lady are playing one day.
Lisa: Fancy Lady, let's play a chase game. I dare you to chase me around that trashcan.
Fancy Lady: But Lisa, I wanted to play with my box by the house!
Lisa: Come on, Fancy Lady. You can play with your box after you chase me.
Fancy Lady: Okay, I'm going to chase you now, Lisa!
Experimenter: Oscar, can you tell me something about the story?
Oscar: Fancy Lady was chased.

(7) Short Actional Passive in a 2-Character Story
(Matched Sample)
Narrator: This is a story about a giraffe and Daisy Duck. The giraffe is a lonely creature.
Giraffe: [*Sigh*] I am so lonely!
Narrator: Oh, here's Daisy Duck. The giraffe is always nice to Daisy Duck.
Daisy Duck: Giraffe, why are you alone? Maybe I can give you a hug. Yes, I'm going to give you a hug because you are always so nice to me!
Experimenter: Oscar, can you tell me something about the story?
Oscar: The giraffe was hugged.[4]

3.3. Results

The percentage of accurate responses across conditions with both the long and short passives is presented in Figure 1. Children's performance

on short passives was significantly above chance (by one-sample *t*-test, two-tailed $p < .05$). Children were not significantly better than chance on long non-actional passives, regardless of story type. Children were significantly above chance on long actional passives (by one-sample *t*-test, two-tailed $p < .05$) when presented with stories that only had one potential agent/experiencer, but their performance was only marginally better than chance on these passives when presented with stories that had two potential agents/experiencers (by one-sample *t*-test, two-tailed $p < .05$). A summary of children's accuracy as compared to chance is reported in Table 1.

Actionality had a marginal effect on children's performance on long passives when 2- and 3-character stories were collapsed ($W = 71$, two-tailed $p = .0688$). The pragmatic appropriateness of the *by*-phrase, however, had no effect on their performance (Wilcoxon Signed-Rank Test, $W = -37$, two-tailed $p = .298$).

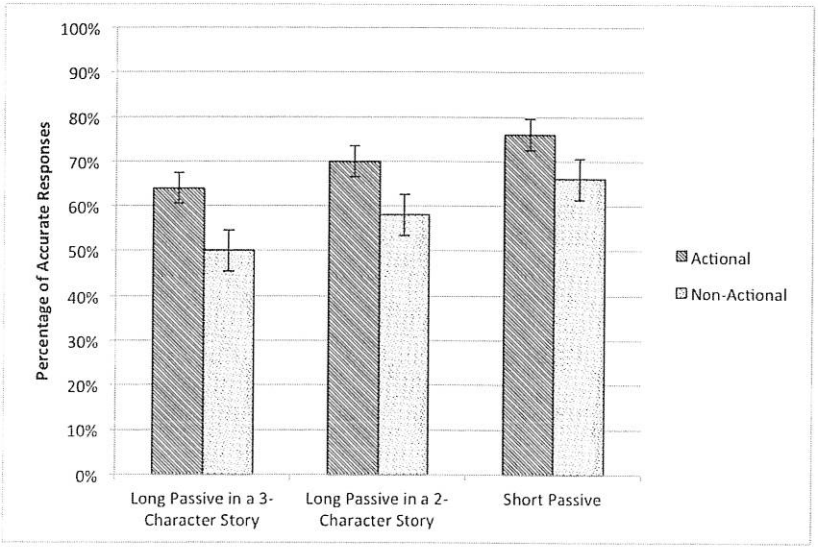

Figure 1: Comprehension of passives by 3- and 4-year-olds
(Error bars indicate standard error)

It is important to note that O'Brien et al. (2006) had a different inclusion criterion from the one we applied: O'Brien and colleagues only included the participants who passed the active controls and answered more than 50% of the test items correctly. It is possible that applying the

same inclusion criterion to our sample would render our results more similar to theirs. When we did so it led to the exclusion of three additional participants, and this changed the results slightly. Children performed significantly above chance on all actional passives, regardless of length, and on the short non-actional passives. But as in the original sample, children performed at chance on the long non-actional passives, regardless of story type. Table 2 shows this new group's accuracy, across conditions, as compared to chance by one-sample *t*-test.

Interestingly, there was no longer a main effect of actionality (W = 39, two-tailed p = .177). Furthermore, there was still no effect of story type (W = -16, two-tailed p = .542). Figure 2 shows the percentages of accurate responses from this new sample.

Table 1: Comparisons to Chance, for Experiment 1

TYPE	Percent Correct	*t*	*df*	*p*
Actional, long, 2-Char	70%	3.10	24	<.01
Actional, long, 3-Char	64%	1.90	24	.0696
Actional, short	76%	5.10	24	<.001
Non-actional, long, 2-Char	58%	1.07	24	.294
Non-actional, long, 3-Char	50%	0	24	1
Non-actional, short	66%	2.32	24	.0293

Table 2: Results of Experiment 1 (Modified Sample)

TYPE	Percent Correct	*t*	*df*	*p*
Actional, long, 2-Char	72%	3.17	21	<.01
Actional, long, 3-Char	70%	2.881	21	<.01
Actional, short	75%	4.583	21	<.0001
Non-actional, long, 2-Char	64%	1.82	21	.083
Non-actional, long, 3-Char	57%	.720	21	.480
Non-actional, short	70%	2.881	21	<.01

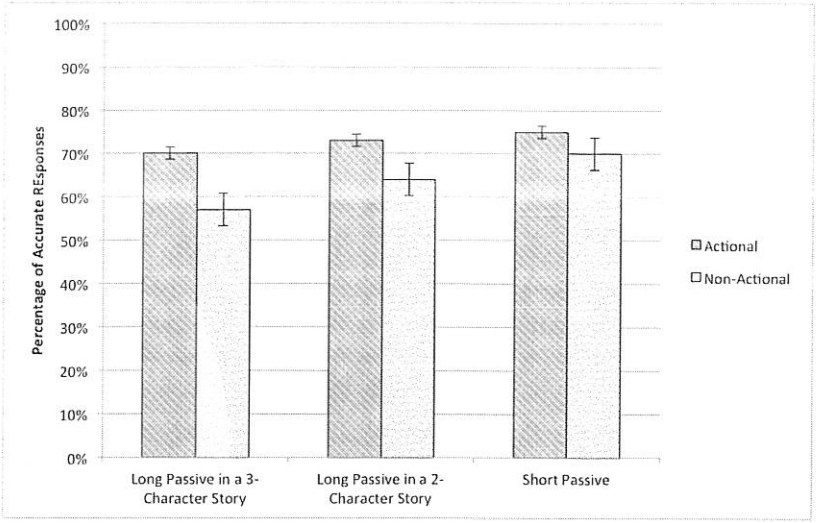

Figure 2: Comprehension of passives by 3- and 4-year-olds (Modified Sample, Error bars indicate standard error)

3.4. Discussion

While children generally had better performance on short passives than on long passives, regardless of verb type, as expected from Horgan (1978) and Fox et al. (1995), the results for long actional and long non-actional passives were more unexpected.[5] The results of Experiment 1 were different from those of O'Brien et al. (2006): children performed similarly on 3-character stories and 2-character stories.

It is important to note that the materials and design of this experiment were not identical to those of O'Brien et al. (2006). Experiment 1 presented young children with short as well as long passives, and intermixed the test items instead of blocking them. It is conceivable that these differences made the task harder for children and thus led us to obtain different results. We therefore conducted a follow-up study in which the task was modified so as to resemble more closely that of O'Brien et al. (2006).

4. Experiment 2

One notable difference between our Experiment 1 and the studies conducted by O'Brien et al. (2006) was that we intermixed the test items

in a pseudo-random order. Focusing on children's performance on long passives, Experiment 2 aimed to test whether blocking the test items of Experiment 1 would yield different results.

4.1. Methods

19 children were tested (3;05-5;02, mean age=4;03) using the laptop-TVJT methodology described in Section 3.1. The materials were slightly modified in this version to correspond more closely to the methods used by O'Brien et al. (2006).[6] Instead of intermixing short and long passives, children were only presented with long actional and non-actional passives. Crucially, these long passives were presented in a blocked order: all the stories with only a single potential agent/experiencer (i.e. "2-Character Story") were presented prior to the stories with two potential agents/experiencers (i.e. "3-Character Story").

For each of the four verbs (*see, like, chase,* and *hug*), two passive sentences were presented (one long passive in a 2-Character Story and one long passive in a 3-Character Story). Due to the new focus on long passives, the short passives used in Experiment 1 were eliminated, leading to an overall reduction in total test items. In addition, two training items in the active voice were added at the beginning of the experiment in order to help children get better acquainted with the methodology. Children were presented with 14 stories in all (2 training, 4 active controls, 8 test items).

Children were included and analyzed based on the same criteria as outlined in Section 3.1.

4.2. Results

Figure 3 shows the results of a single-sample *t*-test for each of the experimental conditions. Children's performance was not significantly better than chance in any of these conditions. There was no effect of story type (W = -6, two-tailed p = .873) by the Wilcoxon Signed-Rank Test. Furthermore, the marginal effect of actionality found in Experiment 1 was absent (W = 33, two-tailed p = .308). Figure 3 shows children's accuracy on long passives, across conditions.

Table 3: Results of Experiment 2

TYPE	Percent Correct	*t*	*df*	*p*
Actional, long, 2-Char	61%	1.29	18	.215
Actional, long, 3-Char	55%	.698	18	.494
Non-actional, long, 2-Char	50%	0	18	.50
Non-actional, long, 3-Char	53%	.294	18	.772

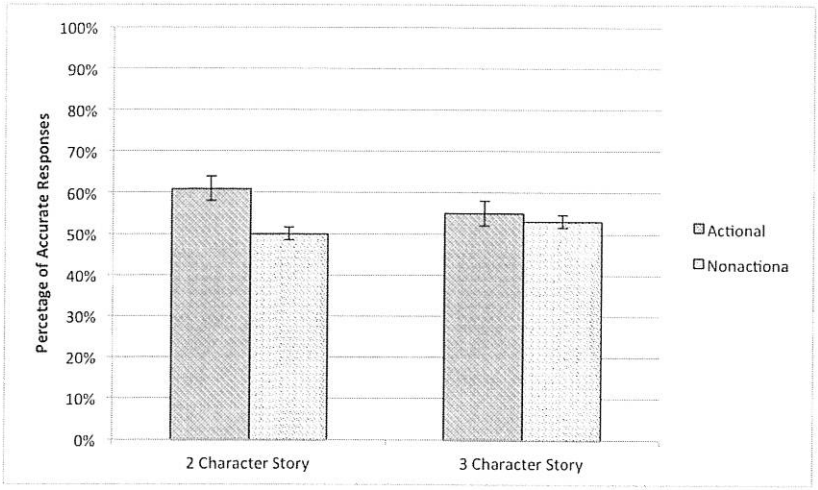

Figure 3: Comprehension of long passives by 3- and 4-year-olds
(Error bars indicate standard error)

4.3. Discussion

Blocking of the test items did not lead to improved performance. There was no effect of story type, and there was no longer the marginal effect of actionality seen in Experiment 1. It is not clear why this is the case but it is possible that the laptop-TVJT methodology was somehow unsuitable for this study. It would be interesting to test within subjects to see whether children perform differently on a laptop-TVJT and a traditional TVJT when it comes to understanding passive constructions. It is unclear at the moment whether the laptop-TVJT utilized in Experiment 1 and Experiment 2 had a negative impact on children's performance. So while we did not find a similar pattern to O'Brien et al.'s results in

Experiment 1 or 2, it is still possible that their results would replicate if the experimental method were entirely identical to theirs.

5. Conclusions

We conducted two experiments that tested the generalizability of O'Brien et al.'s (2006) findings. But while O'Brien et al. found adult-like performance in young children on long actional and non-actional passives, our results were different. In Experiment 1 we found no improvement in children's performance when a second candidate for the agent / experiencer role was introduced. We did find a marginal effect of verb type, however, in which children performed better on the passives of actional verbs than non-actional verbs.

In Experiment 2, we sought to reduce potential difficulties in Experiment 1 by eliminating the short passives, and by blocking the test items. These modifications did not improve children's performance. In fact, it seems that children performed worse than they had when the items were intermixed. It is unclear why children performed so poorly on this task and why their performance was not significantly better than chance on the actional passives, as it had been in Experiment 1. For this reason, we will focus on the results from Experiment 1 for the remainder of the discussion.

Our results were substantially different from those of O'Brien et al. One possible explanation is that a laptop-TVJT is not appropriate for testing children's knowledge of passives. O'Brien et al. (2006) conducted a traditional Truth-Value Judgment Task, in which children were presented with stories acted out in front of them using toy props. It is possible that this difference yielded different results. We are now conducting a study to test whether a traditional version of the Truth-Value Judgment Task yields results more like those of O'Brien et al.

Another possible explanation is that O'Brien et al.'s (2006) findings are not generalizable, perhaps because their study happened to include high-performing children not representative of the larger population. In this case, it is possible that children are not in general influenced by the presence of another potential agent/experiencer. Or, it could be that other factors override this in most studies, such as the discourse motivation for the use of passive versus active sentences in the first place.

Aside from the question of generalizing the results of O'Brien et al., the results from this study show, along with previous research, that children do seem to be influenced by the presence of a *by*-phrase. This is evidenced by children's significantly better-than-chance performance on

short non-actional passives, and their worse performance on long non-actional passives, in Experiment 1. Children also seem to be influenced by the type of verb that is used in the passive. We found a marginal effect of verb type in Experiment 1, where children were better at actional passives than non-actional passives. Differences in performance on actional vs. non-actional passives have also been found in other studies (Hirsh & Wexler, 2006; Maratsos et al., 1987). This suggests that any viable account of the acquisition of the English verbal passive must account for this asymmetry.

Our study adds to the large body of research that has been conducted on English-speaking children's knowledge of the passive. We hope to continue this line of research and gain a better understanding of the differences between our own results and those of O'Brien et al. (2006).

Notes

[1] In the O'Brien et al. (2006) study, the 4-year-olds were also tested with the verb *hear* but this verb was found to be more difficult for children than any of the other verbs. Because there have been other reports in the literature of children's general difficulty with this verb, the verb *hear* was taken out from subsequent analysis (Maratsos et al. 1985; Fox et al. 1995). When 3-year-olds were tested, the verb *like* was used for the second non-actional verb.

[2] This modification was not expected to affect performance given that a within-subjects experiment conducted by Conroy (2008) (not on passives) found no difference between live and laptop presentation of a TVJT.

[3] The mismatch response would be "The dwarf was liked by the cow."

[4] Several people, including an anonymous reviewer, have reported that they do not think the test sentences for the Short Passive condition sound felicitous. This is because there is no manipulation serving to motivate the use of passive rather than active voice (following O'Brien et al.). However, these materials have been tested on undergraduate students at the University of Connecticut, and the majority gave the expected answers.

[5] We found good performance on short non-actional passives as compared to long non-actional passives. It is important to note that there have been a few studies that also found a difference between short and long non-actional passives, such as O'Brien et al. (2006) and Fox et al. (1995). Other studies have found poor performance on non-actional passives, regardless of length (Maratsos et al. 1987; Gordon & Chafetz 1990; Hirsh & Wexler 2004).

[6] Specifically, we are modeling our materials on Experiment 2 of O'Brien et al. (2006). This is because their Experiment 1 tested both short and long passives, and only used 3-Character Stories. It is Experiment 2 where children were presented with blocked test items.

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