The (Non-)Effects of Pragmatics on Children's Passives

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1. Introduction

Many studies have observed children to be delayed in their mastery of the English verbal passive. In particular, studies have found that children do not start succeeding on long passives (i.e. passives containing a 'by'-phrase) with actional verbs like *chase* as in (1) until about age 4 or 5 (Bever, 1970; Horgan, 1978; de Villiers & de Villiers, 1978). It has also been claimed that children are further delayed in their acquisition of long passives with non-actional verbs like *see* as in (2). Maratsos et al. (1998) found that children do not start succeeding on these passives until as late as age 7.

(1) John was chased by Mary.
(2) John was seen by Mary.

In stark contrast to this, there have been studies in the literature that have found early comprehension of long passives in English-speaking children. (Fox et al. 1995; O'Brien et al. 2006). Of particular interest to us, O'Brien, Grolla, & Lillo-Martin (2006) found that 3- and 4-year-old children had adult-like performance on both actional and non-actional long passives on a standard Truth Value Judgment Task (Crain & McKee, 1985) as long as the 'by'-phrase in the passive was informative. The goal of the present study is to replicate this finding as well as fill in an observed gap in O'Brien et al.'s data.

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 experiment designed as a near duplication of O'Brien et al.'s. Section 4 contains a general discussion of our findings, including future directions.

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

O'Brien, Grolla, & Lillo-Martin (2006) were interested in testing the effects of the informativeness of the 'by'-phrase in experimental contexts on children's comprehension of long passives. This interest stemmed from observations made by Crain & Fodor (1993) who noted that adults and children alike rarely produce long passives in natural speech. They further suggested that long passives are "marked" forms that need appropriate discourse situations in order to be felicitous. So O'Brien et al. hypothesized that children's poor performance on long actional and non-actional passives in previous studies may have resulted from the use of pragmatically infelicitous contexts in these experiments. Furthermore, they suggested that children's performance should improve when presented with contexts that motivate the use of the 'by'-phrase.

O'Brien et al. used a Truth-Value Judgment Task (Crain & McKee, 1985) to test whether 3- and 4-year-old children would succeed on long passives when they are presented in pragmatically appropriate contexts. 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. This contrast between the actual agent or experiencer and the potential agent or experiencer would motivate the use of the 'by'-phrase.

O'Brien et al. conducted two experiments. In Experiment 1, 11 4-year-old children were tested on stories that contained either an actional verb (*hug*, *chase*) or a non-actional verb (*see, like*). Importantly, all of the stories that these children saw contained an additional character that motivated the use of the 'by'-phrase. In Experiment 2, seven 3-year-old children were presented with test stories containing the same verbs as in Experiment 1. In a blocked presentation, these children saw a series of stories without an extra character before seeing a series of 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, <u>Bart was chased by the gorilla.</u>

In Experiment 1, where 4-year-olds were only presented with stories that contained two potential agents or experiencers, children performed significantly above chance on both actional and non-actional long passives. In Experiment 2, 3-year-old children performed at chance when the stories contained only one agent or experiencer but significantly above chance when the stories contained two potential agents or experiencers, regardless of whether the verb was actional or non-actional. The 3- and 4-year-old children's above-chance performance on long non-actional passives in stories that contained two potential agents or experiencers was interesting since these had been reported to be difficult for children that young (Maratsos et al., 1998; Fox et al., 1995).

O'Brien et al. (2006) concluded that young children are adult-like in their knowledge of English long passives but they require these passives to be presented in contexts that properly motivate the use of a *by*-phrase. But while this is a central finding for the 3-year-old children, it is unclear whether this finding holds for 4-year-old children since 4-year-old children were not tested on stories that only contained one agent or experiencer.

In the next section, we will describe an experiment that we conducted in order to fill this gap in O'Brien et al.'s data and to see whether we could replicate their central finding.

3. Experiment

This experiment was designed to be as similar to O'Brien et al. (2006) as possible. It aimed to test 4-year-old children on stories that either contained one or two potential agents or experiencers and see whether the addition of another potential agent or experiencer would improve children's performance on actional and non-actional long passives.

3.1. Subjects

20 preschool-aged children were tested (3;06-6;01, mean age=4;06). In order to be included in the data analysis, the child needed to answer at least three out of the four control items (i.e. at least 75%) correctly and not exhibit an obvious response bias (which was defined as giving the same answer, either "right" or "silly", at least 90% of the time).

3.2. Procedure

Children were tested using the traditional version of the Truth Value Judgment Task (Crain & McKee, 1985). For each story, one experimenter told the story to the child and acted it out with toys, while another experimenter delivered the test sentence while manipulating a puppet, "Gobu". The child was then asked to indicate whether Gobu's utterance was an appropriate description of the story by indicating on a report card whether Gobu was "right" or being "silly". Each

child received two visits: a training and an experimental session. The training session familiarized children with watching stories acted out with toys and judging a puppet's description of the story. The sentences uttered by the puppet were all in the active voice and did not involve any of the crucial verbs used in the experimental session. During training, corrective feedback was given whenever a child produced an incorrect response. Children were also encouraged to give justifications for their responses. The experimental session involved the same procedure as the training session but children were not given corrective feedback, only positive feedback, regardless of their answer.

3.3. Materials

The same stories used in the O'Brien et al. (2006) study were used in this experiment, with slight modifications to the characters depending on the toys available.[1] Since the present study focused on children's performance on long passives, only the stories used by O'Brien et al. containing long passives were included.

For the training session, each child watched eight stories. After each story, they were asked to judge a puppet's active-voice sentence. (Recall that none of the active sentences contained a verb that was used in the experimental session.)

For the experimental session, two actional and two non-actional verbs were used to create the test sentences: *see*, *like*, *chase*, and *hug*. For each of the two non-actional verbs, four passive sentences were tested: two long passives in a story containing only one agent or experiencer (henceforth '2-Character Story') and two long passives in a story containing two potential agents or experiencers (henceforth '3-Character Story'). For each of the two actional verbs, two passive sentences were tested: one long passive in a 2-Character Story and one long passive in a 3-Character Story.[2] Four active sentences served as controls. In total, children saw 16 stories (4 active controls and 12 test items).[3]

The test items were presented in a block ordering such that children always saw all of the long passives in a 2-Character Story before they saw the long passives in a 3-Character Story. Within the block, the test items were presented in pseudo-randomized order. The active sentences appeared at the beginning, end, and middle of the session to break up the blocks. Two sample stories (one from each block) are shown in (4) and (5).

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[1] Many thanks to O'Brien et al. for kindly sharing their experimental materials with us.

[2] Note that there were twice as many non-actional test items as there were actional items.

[3] See appendix for a list of sentences used in the experiment.

(4) Long Non-actional Passive with 1 Potential Agent/Experiencer (Matched Sample Story)

Exp1: This is a story about a boy and Santa. The boy took a plate of cookies left for Santa and hid behind a wall so Santa would not see him.

Boy: Hehe, Santa won't see me behind this wall, and I can have these treats all for myself.

Exp1: But what the boy forgot though is that Santa has super vision. That's how he can see who is naughty and who is nice. He can see through anything, even a wall. So, right away, Santa can see the boy.

Santa: Aha! I can see you, boy. I see you!

Exp1: Gobu, can you tell me something about the story?

Gobu: Well, I know! The boy was seen by Santa.

(5) Long Non-actional Passive with 2 Potential Agents/Experiencers (Matched Sample Story)

Exp1: This is a story about Oscar the Grouch, a Parrot, and Fancy Lady. Oscar doesn't like anyone because he is a grouch. I wonder if anybody likes him. Here's Fancy Lady, does the Fancy Lady like Oscar?

Fancy Lady: No, I don't like Oscar because he lives in a garbage can and is stinky.

**Exp1**: What about you, Parrot? Do you like Oscar?

Parrot: I don't mind that Oscar lives in a garbage can. I like him anyway. I like you, Oscar!

Exp1: Gobu, can you tell me something about the story?

**Gobu**: Well, let's see. In that story, Oscar was liked by the parrot.

3.4. Results

Children were significantly better on actional than non-actional passives ($W = 79$, two-tailed $p = .0139$) by a Wilcoxon signed-rank test. However, story type did not have an effect on children's performance: ($W = 23$, two-tailed $p = .25$). Figure 1 shows children's accuracy across conditions with both actional and non-actional passives. Children's performance on actional passives was significantly better than chance (by one-sample t-test, two-tailed $p < .05$). Furthermore, even in the 3-character stories, the results showed an effect of actionality ($W = 92$, two-tailed $p = .0093$). Children's accuracy on non-actional items was not significantly better than chance (by one-sample t-test, two-tailed $p > .05$).
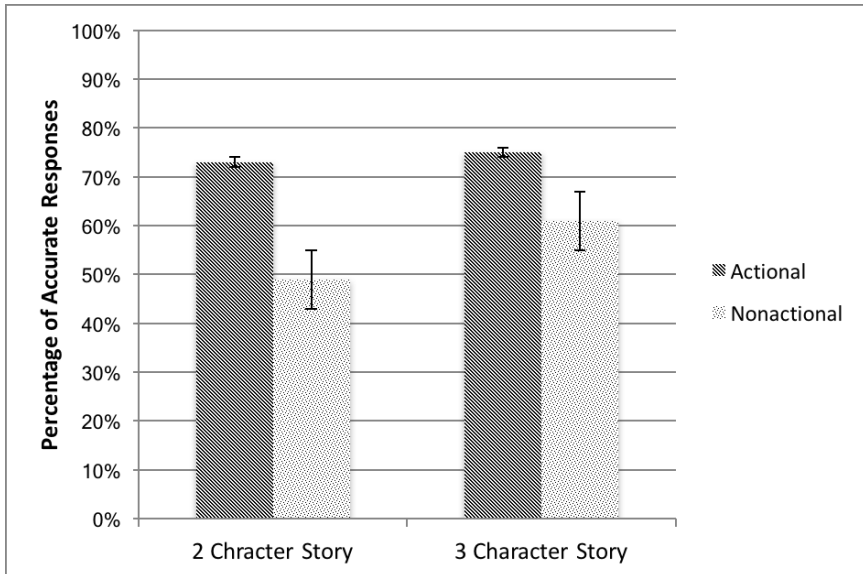
Figure 1. The percentage of accurate response by condition (N=20). Error bars indicate standard error.

Children's accuracy was also plotted by age in months as shown in Figure 2. Best-fit quadratic curves were fitted to the actional and non-actional data, showing children approaching ceiling performance for the actional items but not for the non-actional items.

A power analysis was conducted to assess whether our experiment had enough power to detect the predicted effect. Based on the group means and the one-sample t-scores from O'Brien et al.'s (2006) study, we calculated a minimum sample-size for detecting, with (1-beta) = 90% power, a contrast between 2- and 3-character stories. According to this analysis, even for purposes of a *group* comparison (viz. a between-subjects t-test), a sample of just 6 subjects should have been sufficient to obtain significance (i.e. 2-tailed alpha < .05) based on O'Brien et al.'s numbers. And of course this is far fewer than the 20 subjects in our study. Furthermore, for detecting a contrast within the non-actional items, a minimum sample of just 11 subjects should have been sufficient to obtain a significant contrast. This is still considerably fewer than our 20 subjects.
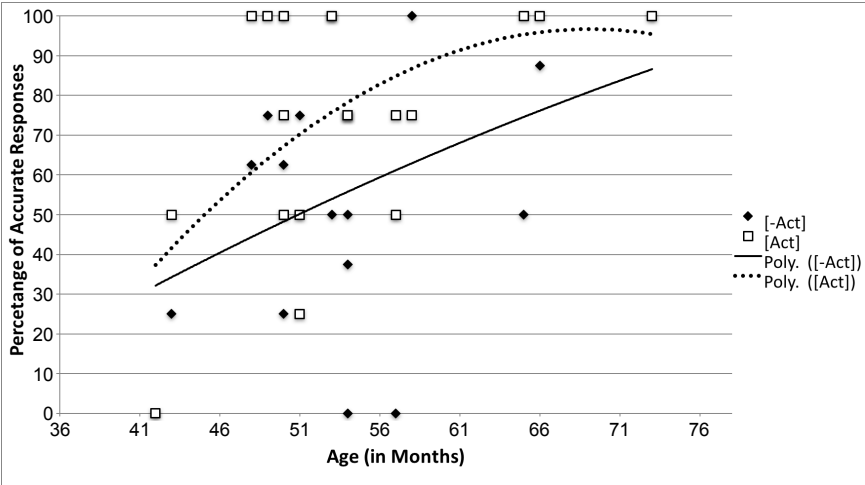
Figure 2. The percentage of accurate responses (all passives) plotted by age (in months). Plot includes best-fit quadratic curves for actional and non-actional passives.

3.5. Discussion

O'Brien et al.'s findings were not replicated: as seen in Figure 1, the 20 four-year-old children performed at chance on non-actional passives even when the story included a third character, and there was no statistically reliable difference in performance on the non-actionals in the 2- vs. 3-Character conditions. Also, O'Brien et al.'s account seemingly provides no explanation for children's significantly better performance on the actional than on the non-actional items, especially in the case of 3-character stories. Regarding this, it has been reported in the literature that children as young as four years of age perform above chance with long actional passives in studies that only present them with 2-character stories (Bever, 1970; Horgan, 1978; de Villiers and de Villiers, 1978; a.o.). So it may not be surprising that children were significantly above chance with long actional passives in this experiment. But in O'Brien et al.'s (2006) study, there was no effect of actionality since children – even 3-year-olds – were performing at ceiling on both actional and non-actional test items when presented with 3-character stories. This was not the case in the present study; there was a statistically reliable difference between children's performance on actional vs. non-actional test items, regardless of story type.

Furthermore, on a strict reading, O'Brien et al.'s (2006) pragmatic account seems unable to explain why children in the full sample performed at chance with long non-actional passives despite being presented with stories that motivated the use of a by-phrase.

4. Conclusions & Future Directions

We conducted an experiment in order to test a pragmatic account proposed by O'Brien et al. (2006) for why young children have trouble with long passives. Specifically, we tested whether children's performance improves when they are presented with a context that motivates the use of a by-phrase. Unfortunately we were unable to replicate O'Brien et al.'s findings. The addition of an extra potential agent/experiencer to the context did not have a beneficial effect on children's performance. In contrast, we did find a strong effect of verb: children performed better on the passives of actional than non-actional verbs. This result aligns with previous findings in the literature (e.g. Maratsos et al. 1985).

An important next step in this project is to conduct a follow-up study looking at 3-year-olds, using the exact same methods and materials employed here. It will be important to see how these younger children do when presented with 3-character stories. If their performance on long actional and non-actional passives still does not improve when the context includes an additional candidate for the role of agent or experiencer, then O'Brien et al.'s (2006) findings are very likely to have been a fluke.[4]

Note that the lack of an appropriate context for the use of a passive sentence in the first place might still be an important issue that needs to be addressed in any study testing young children's master of the passive. For example, some studies have found that children generally perform better on passives when the experimental materials took pains to establish the derived subject as a topic of discussion in the discourse (Pinker et al., 1987; Marchman et al., 1991). It will be important in future studies to create materials that control for this directly.

Additionally, Snyder & Hyams (2015) have recently suggested that children's performance on both long actional and non-actional passives could be improved if the derived subject of the passive bears a discourse-related feature such as [+Topic]. A modification of the current task is presently being conducted to test this hypothesis.

And lastly, one possible explanation for why O'Brien et al.'s (2006) results did not match the results found here is that O'Brien et al.'s sample of children may have simply been too small. O'Brien et al. included 11 4-year-olds and seven 3-year-olds in their analyses while the experiment discussed in this paper had 20 children. OGL's findings may simply reflect accidental characteristics of their smaller sample.

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[4] It may still be the case that children need appropriate contexts that motivate the use of the by-phrase or the use of a passive at all which O'Brien et al. (2006) has argued for. But the authors' way of creating these contexts did not improve young children's performance on long passives in this study.

Appendix

List of test sentences used the experiment

<u>Training Session</u>
Minnie Mouse lived in the blue house.
Woody found a puppy behind the trashcan.
Bert picked up the strawberry.
Snow White bought some watermelon.
The boy's favorite color was red.
Wonder Woman hid behind the bed.
Mickey Mouse ate some pears.
Reptar loved cake.

<u>Experimental Session</u>
Booboo likes the giraffe.
Spiderman was seen by Jasmine.
The frog was chased by the dinosaur.
The little girl was liked by the boy.
Sally was hugged by Grover.
The zebra was liked by the tiger.
The boy was seen by Santa.
Penny hugged the cow.
The bird saw the Genie.
Captain America was liked by the dinosaur.
Mommy was seen by the Prince.
Bugs Bunny was chased by Yogi Bear.
Minnie Mouse was seen by Patrick.
Oscar was liked by the parrot.
Spongebob was hugged by the sheep.
The dog chased the Dwarf.

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