EasyChair Preprint

№ 3844

Do kindergarten make similar inferences compared to older children while listening to fictional stories? The relevance of distinguishing elaborative and predictive inferences.

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July 12, 2020

Do kindergarten make similar inferences compared to older children while listening to fictional stories? The relevance of distinguishing elaborative and predictive inferences.

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Author Note

The authors declare that there are no conflicts of interest with respect to this preprint.

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[†] Adil Yakhloufi contributed to the statistical analysis of the study that's why we decided to add him as a co-author in the pre-print.

Abstract

In this study, we examine whether Kindergarten, grade 1 and 2 children can make two sorts of optional inferences, namely present elaborative and predictive inferences, when listening to a fictional story. To explore children's ability to produce these two types of inferences, 142 children were invited to listen to fictional stories and answered to online inferential questions. Two main results were obtained. First, optional inferences can be generated while listening fictional stories, even by kindergarten, Second, children from grade 1 and 2 produce more predictive inference compared to elaborative one, while kindergarten exhibit a reverse pattern.

Keywords: predictive inferences, elaborative inferences, fictional stories, preschoolers.

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During school a child devotes a large part of his or her time to reading. Children are expected to read for pleasure but also for learning purposes. However, they do not all seem to be equal in this skill. It is now well admitted that young children's story comprehension skills are predictive of their future comprehension abilities (Creissen & Blanc, 2017; Kendeou et al., 2005), urging researchers to studying those skills with preschoolers. One of the major processes underlying the understanding of a story with a greatest impact is the ability to make inferences. Usually, inferences correspond to the comprehension of implicit information embedded in a text, based on the combination of personal knowledge and narrative or textual elements (Cain et al., 2001; Campion & Rossi, 1999; van den Broek, 1997; Zwaan et al., 1995). Because the inference making process contributes to reach deep comprehension of a story, it is of importance to study its development at early age.

When individuals read or listen to a story, they make inferences necessary for the comprehension process. However, there seems to exist different levels of importance in the type of inference produced. Indeed, some inferences appear to be essential for comprehension, such as inferences drawn to maintain coherence, while others remained less necessary: predictive and elaborative inferences (Allbritton, 2004; Barreyro et al., 2012; Campion, 2004; Campion & Rossi, 1999; Peracchi & O'Brien, 2004). Predictive inferences correspond to the anticipation of future events and consequences. Elaborative inferences, on the other hand, correspond to the link drawn between personal knowledge and events present in the narrative that do not bring particularly important elements to the mental representation of the story. However, while the inferences necessary for comprehension appear to be produced automatically during the course

of story comprehension, optional inferences are less automatic and less frequent (Campion & Rossi, 1999). Previous works conducted with children demonstrate that, during shared-reading, children have inferential skills required to elaborate predictive inferences (de Koning et al., 2008; Desmarais et al., 2012). These works underlined the necessity to further investigate children's inference skills with a list of questions to answer: Without the help provided by shared reading with an adult, do children produce optional inferences? Do kindergarten children have similar ability to produce optional inferences like children in Grade 1 and Grade 2? How the ability to produce elaborative and predictive inferences evolves between this three years critical period?

The present study aims to study the inferential skills children exhibit from Kindergarten to Grade 2 while listening to fictional stories. The inference making ability of preschoolers (i.e., 5 year olds) is examined and compared to that one of children in Grade 1 and Grade 2, especially when inferences are optional for story comprehension (i.e., elaborative and predictive). The main hypothesis is that optional inferences can be made at an early age (i.e., prereaders) but not so easily according to the nature of optional inferences. We argue that inferences related to the future (i.e., predictive inferences) could be more complicated than those related to the present (i.e., elaborative inferences) for younger children, this pattern being expected to evolve with age. In other words, if preschoolers are supposed to more easily infer elaborative content related to the current situation described in the story rather than infer predictive content, this difference between elaborative and predictive inferences is expected to disappear with age (i.e., children in Grade 1 and Grade 2).

Method

Participants

Fifty Kindergarten children (Mage=5.95; SD=0.27), 60 children from Grade 1 (Mage=6.91; SD=0.29) and 32 children in Grade 2 (Mage=8.01; SD=0.31) were recruited from different schools. Their native language is French and all of them live in Occitanie, France.

Materials

In order to evaluate the children's inferential level, we selected 3 fictional stories from children's literature, within the same series of stories. With the help of a school teacher, we chose each story according to the difficulty of the vocabulary used, its length and its narrative structure so that all these characteristics would be adapted to the school level. We selected the story entitled *Pitikok and the cold forest* (i.e., *Pitikok et la forêt enrhumée*) for the Kindergarten children, the story entitled *The day my brother will come* (i.e., *Le jour où mon frère viendra*) for Grade 1 children and the story entitled *One hen all, all hen one* (i.e., *Un poule tous, tous poule un*) for Grade 2 children. In addition, the original illustrations included in each textbook were used during the presentation of the story.

In order to measure children's inferential abilities, we used a pictures decision task. This task consisted of choosing one drawing over the four ones: (1) an inferential drawing which represents the situation related to the inference, (2 and 3) two distractive drawings which represent a situation related to the present situation (i.e., distractive 1) or related to the story in general (i.e., distractive 2), (4) and an unrelated drawing (not linked to the story or the present situation).

For each story, we selected two types of inferences that were tested during the listening phase: elaborative ones that allow to understand the current situation and predictive ones that allow to anticipate the next situation. The four drawings were different for each question.

Procedure

To carry out this study, children were invited to participate in small groups. The experiment lasted approximately 40 minutes. First, they were informed they have to listen to a story, and while listening to this story, illustrations were shown individually. They were also told that they would have to be particularly attentive because, during the listening, the experimenter would stop the narration many times to ask questions. The children knew that there would be two types of questions: "Which image do you think corresponds to what is happening now in the story?" vs." Which image do you think corresponds to what's going to happen next in the story?" (i.e., respectively, elaborative vs. predictive). The children then listened to the story and looked at the illustrations.

Each time the experimenter stopped the stories to enable children to perform the pictures decision task, four drawings were presented on a paper sheet. Children were asked to circle the drawing that best answered the question (i.e., predictive or elaborative one), without help. Once everyone had finished choosing one drawing, the story continued until the next inference was made. A total of 10 answer sheets of paper were given to children in Kindergarten (i.e., 5 sheets of paper for the elaborative questions and 5 for the predictive questions), and 12 to children in Grade 1 and Grade 2 (i.e., 6 for the elaborative questions and 6 for the predictive questions). The order of presentation of the drawings on the paper sheet was random.

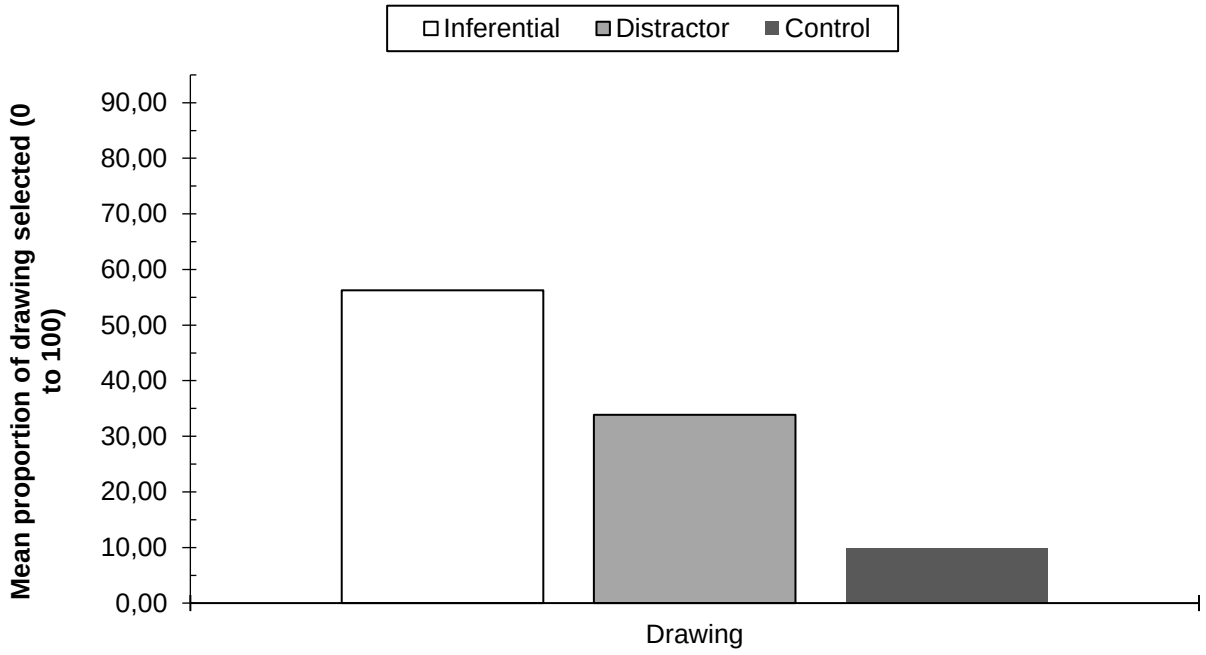
Results

To analyze our data, we first examined the proportion of drawing chosen over the three categories (i.e., inferential drawing, distractive drawing and control drawing) by each child to compare Kindergarten and Grade 1 and 2.

Our main results revealed that, regardless of the grade level, the majority of children was able to choose the inferential item (i.e., the drawing representing the expected inference) to answer the questions (Figure 1), independently of the type of inferences tested (i.e., elaborative or predictive), $F(2, 562) = 280.09$, $p < .001$.

Figure 1

Proportion of drawing selected, regardless of school grade and type of inferences.



Second, we analyzed results according to the type of inference (i.e., elaborative vs. predictive)[‡]. We conducted a series of generalized linear mixed model analysis, according to a binomial distribution for count variable. This distribution could be applied as the data were converted into proportions (i.e., the dependent variable is included in [0; 1]). To conduct this analyze we considered the inferential drawing chosen as success and distractive and controls drawings chosen were then compiled together as an error. We found that, for Kindergarten

[‡] Only fixed effects will be presented in this preprint

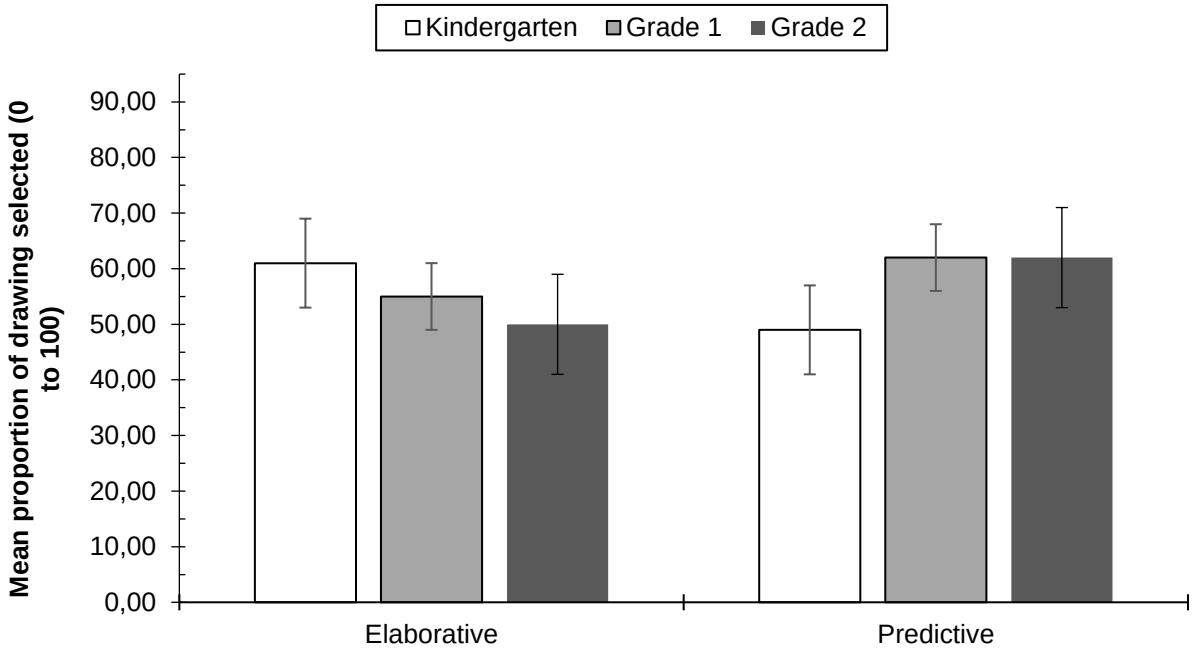
children, predictive inferences result in less inferential image selection than elaborative inferences, *estimate* = - 0.51, $p < .01$. More precisely, there is a 61% chance that Kindergarten children will select an inferential image, rather than a distractor or control one, 95% CI [0.53; 0.69], when exposed to an elaborative inference. This percentage drops to 49% when children were exposed to predictive inference, 95% CI [0.41; 0.57].

On the contrary, children from Grade 1 and Grade 2 perform better for predictive inferences than elaborative. For G1 and G2 children, predictive inference results in more inferential image selection than elaborative inferences, respectively, *estimate* = 0.27, $p < .05$; *estimate* = 0.49, $p < .005$. Precisely, there is a 55% chance that G1 children will select an inferential image, rather than a distractor or control one, 95% CI [0.49; 0.61], when exposed to an elaborative inference. For G2, there is a 50% chance that children choose an inferential image, rather than a distractor or control, 95% CI [0.42; 0.59]. These percentage increase to 61% for G1 and 62% for G2 when children were exposed to predictive inference, respectively, 95% CI [0.56; 0.67], 95% CI [0.53; 0.71].

In sum, Kindergarten children perform better when they are exposed to an elaborative inference than a predictive one, as opposed to Grade 1 and Grade 2 children who perform better when it is about a predictive than an elaborative inference (Figure 2).

Figure 2

Proportion of chance (and CI) that a child selects the inferential drawing rather than the distracting or control one if it is an elaborative or predictive inference, according to grade level.



Discussion

In this study, we first showed that pre-readers can produce elaborative and predictive inferences, even within shared-reading contexts (deKoning et al., 2008 ; Desmarais et al., 2012). Indeed, the recognition of the inferential drawing as an appropriate drawing to the course of the story emphasizes that the children have well integrated these inferences into their mental representations, thus allowing them to select the expected drawing. Furthermore, recognition of an inference indicates that children have the personal knowledge and experience to make that inference (van den Broek, 1997). Thus, by the age of 5, children appear to have the knowledge and experience to recognize an elaborative and predictive inference.

We also demonstrated that pre-reader and reader children do not perform in the same way based on the kind of the expected optional inference. One possible interpretation would be that kindergarten children have more difficulty anticipating the immediate future when making inferences compared to older children. A second hypothesis would be that, as children get older, they search for more difficulty in their comprehension process. In fact, older children find easier to understand a fictional story than younger ones (Boisclair et al., 2004). We hypothesize that, when listening to a story, these children, having already understood the present situation, would try to anticipate the outcome of the story. In order to do this, at the very moment of listening, children would pay less attention to the clues allowing them to produce inferences needed to understand the present situation, than to those allowing them to what will happen next. Thus, children in Grade 1 and Grade 2 would be spontaneously more interested in the process of making a prediction about the upcoming situation than fully understand the present situation.

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