Does training with beat gestures favour children's narrative discourse abilities?

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Abstract

There is consensus evidence that gestures and prosody are important precursors of children’s early language abilities and development. Previous literature has investigated the beneficial role of beat gestures in the recall of information by preschoolers (Igualada, Esteve-Gibert, & Prieto, under review; Austin & Sweller, 2014). However, to our knowledge, little is known about whether the use of beat gestures can promote children’s later linguistic abilities and specifically whether training with beat gestures can boost children’s narrative skills in a narrative discourse.

Forty-seven five and six-year-old children, three of whom were excluded from the analysis, participated in a between-subject training study with a pretest and posttest design (i.e. children were presented with two wordless cartoons in each test). They were exposed to a training phase which contained a total of six stories, presented under two between-subject experimental conditions: 1) No-Beat condition, e.g., narratives performed with prosodic prominence and no beat gestures in target positions; and 2) Beat condition, e.g., narratives performed with prosodic prominence and beat gestures in target positions within the story. Results demonstrated that children who undertook the Beat training condition showed a higher gain in the quality of their posttest narratives of wordless cartoons; that is, better narrative structure scores, better fluency scores, and more co-speech gestures performance. Therefore, there is evidence that a short training with beat gestures has positive effects on the development of children’s narrative discourse abilities.

Keywords: prosodic prominence, beat gestures, linguistic abilities, children’s narrative discourse abilities, between-subject training study, pretest and posttest design.
1. INTRODUCTION

Gesturing is an integral part of human communication and speakers of all ages often gesture when they talk. In adult speech, co-speech gestures\(^1\) have been demonstrated to be meaningfully integrated from a semantic, pragmatic and temporal (i.e. phonological) point of view (e.g. Kendon, 1980; McNeill, 1992; Levinson & Holler, 2014; Kelly, Ozyurek, & Maris, 2010). There is convincing evidence that prosody and gestures are significant precursors of language development and communication, as they play a role in language processing (i.e. production and comprehension), learning, and beyond. As an example, regarding the information-packaging hypothesis (Kita, 2000), gestures have been shown to facilitate the selection and organisation of visuo-spatial information (e.g. to describe a set of action or a range of objects) into units that are congruent with the sequential order of the speech.

Infants start using gestures to communicate prior to using language, and there is continuity in development between the children’s use of gestures and their linguistic development. The use of non-verbal communication by infants and toddlers facilitates the development of oral language, as the combination of a gesture and a word (e.g. point at a cake saying the word “cake” or saying the word “mommy” or the verb “eat”) predicts the onset of two-word utterances (Bavin, 2014; Goldin-Meadow & Butcher, 2003; Iverson & Goldin-Meadow, 2005; Özçalıskan & Goldin-Meadow, 2005). Additionally, gesture-speech combinations in which children point at an object while saying the word “mommy” allow infants to express sentence-like information before they convey this idea in speech (e.g. “mommy puppy”). Both children’s speech and gestures improve with age, and likewise gestures precede and signal oncoming changes in speech, as they expand their communicative repertoire through gesture-speech combinations (Özçalıskan & Goldin-Meadow, 2005).

\(^1\) McNeill (1992) classified gestures into iconic (or representational), metaphoric, deictic (or pointing), and beat gestures. Iconic gestures maintain a close relationship to the semantic content of the segments of speech they accompany, as they depict properties of an object, action or scene; thus, their meaning is given by context (e.g. “he [bends it way back]” the hand appears to grip something and pull it back from front to own shoulder). Although metaphoric gestures are similar to the iconic, they refer to an abstract concept (e.g. a cupped hand accompanying a question, “I wanted to ask you something”). Deictic gestures are used to indicate an object, event or location, and are performed with the pointing finger (e.g. pointing a pencil when you are saying, “Can I borrow your pencil, please?”). Beat gestures are simple rhythmic (e.g. rapid flicks of the fingers or hand) non-representational (i.e. non-referential) gestures that are associated with prominent prosodic positions in natural discourse, and they do not reflect contextual meaning.
There is also a good deal of evidence that gestures, in general, can have a positive effect on adults and children’s recall of information. In a comparative study by Thompson (1995), between young and old adult participants listening to spoken-language sentences which varied in meaningfulness and speech rate, in three conditions (e.g. speech alone, with visible speech, with both visible speech and iconic gestures), results showed that memory is enhanced when subjects observe a speaker who gesture. Iconic gestures and beat gestures have also been demonstrated to have a positive effect on adults when remembering information in a contrastive discourse (e.g., Kelly, Ozyurek, & Maris, 2010; Kushch & Prieto, 2016; So, Chen-Hui, & Wei-Shan 2012). Furthermore, as So, Chen-Hui, & Wei-Shan (2012) noted, iconic gestures enhance memory recall in adults and in four- and five-year-old children. In this study, both adults and children were similarly tested, as they were presented with three different lists of verbs in three conditions (i.e. iconic gesture, beat gesture and no gesture) and they were asked to recall as many words as they could remember. However, only adults had a better memory when they encoded words with gestures which were not semantically meaningful (i.e. beat gestures). However, in contrast with So, Chen-Hui, & Wei-Shan 2012’s results, a recent study by Igualada, Esteve-Gibert, & Prieto, (under review), in which children were asked to retell to the elephant the list of to-do things that was presented by an audio-visual recording in two conditions (e.g. Beat and No-Beat conditions), has found that beat gestures help three- to five-year-old children to recall significant information when gestures single out an element (i.e. target word) in a pragmatically adequate discourse context. Therefore, this study found out that children recalled the target word better when it was perceived together with a beat gesture.

Other studies have also consistently demonstrated that gesturing may benefit the comprehension of syntactic and semantic structures. For example, the study by Theakston, Coates, & Holler (2014) showed that the use of abstract representational co-speech gestures which, on the one hand, highlighted the roles the participants play in the verb event (e.g. study 1), and, on the other hand, emphasised only the two participants of the action (e.g. study 2) facilitated the comprehension of complex linguistic structures2 by three- and four-year-old children. Moreover, So & Lim (2012)’s study revealed that four-year-old Chinese and English children were sensitive to their caregivers’ referential gestures and to the information status of referents when they

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2 In the comprehension of the object-cleft construction, OCC (e.g. It was the [object] frog that the [subject] man pushed) (Theakston, Coates, & Holler, 2014).
were asked to identify objects, and that they depended more specifically on referential gestures so as to identify new and not given referents. Regarding caregivers’ use of gestures accompanying questions, Chinese speakers produced significantly more gestures than English speakers; but both performed more gestures in their questions when asking about new referents (not given referents), and their gesturing was sensitive to the information status of referents as well.

It has also been shown that gestures in general can have a relevant role in narrative discourse development. In a longitudinal study by Demir, Levine, & Goldin-Meadow (2015), five-year-old children who expressed character viewpoint by gestures in narrative production improved their narrative structure\(^3\) in speech across ages, in contrast to those ones who did not produce character viewpoint gestures at the same age. Additionally, both children with early brain injury who had difficulty in structuring narrative and typically developing children got benefit from audio-visual gesture elicitation; that is, they were likely to produce well-structured narrative retellings when the storyteller performed story-relevant gestures while speaking (Demir, Fisher, Goldin-Meadow, & Levine, 2014). It is important to note that narratives are typically used as an ecologically valid measure of a child’s language, and that many studies have used this measure as a control in children’s language pathologies (e.g. Demir, Fisher, Goldin-Meadow, & Levine, 2014; Demir, Rowe, Heller, Goldin-Meadow, & Levine, 2015; Duinmeijer, De Jong, & Schepers, 2012; Demir, Levine, & Goldin-Meadow, 2010).

Nevertheless, as far as we know, the studies on the high-level effects of gestures on semantic and syntactic comprehension, as well as narrative abilities, have exclusively involved representational or metaphorical gestures. To our knowledge, little is known about the potential precursor effects of beat gestures on the acquisition of children’s later narrative skills and whether the use of these gestures could benefit narrative discourse production development. It is important to note that beat gestures have been typically associated with focus marking, rhythmic marking, and discourse structure marking (see Shattuck-Hufnagel et al. 2016's study). Thus, we hypothesise that beat gestures might serve as a marking function related to prosodic abilities which make them to promote discourse narrative abilities.

Taking into account that gestures promote benefits on children’s early language development and function as a predictor of later language abilities, the goal of this study

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\(^3\) Early syntactic skill, initial level of narrative structure and the production of observer-viewpoint gestures have been controlled in this study.
is to examine beat gesture’s impact on children’s narrative discourse abilities. Many studies of children’s language development have demonstrated that the basic narrative abilities emerge during the pre-school years and that keep improving over the years. Infants start to create narratives from the age of three, but they need their caregivers’ support in order to face this challenge (Peterson & McCabe, 1996). Narratives require the integration of many different linguistic skills. For instance, there are many abilities involved in a coherent and cohesive narration, and acquiring them requires a lot of time, approximately until the age of twelve (Berman & Slobin, 1994; Berman, 1998; Karmiloff-Smith, 1986). Moreover, it has been demonstrated that early acquired narrative abilities (providing e.g. well-structured narrative, narrative contextual information, own comments about the narrative events, etc.) are predictive of later literacy development, reading comprehension and school academic performance and success (Demir & Küntay, 2014; e.g. Griffin, Hemphill, Camp, & Wolf, 2004).

One of the essential features in discourse narrative development is the expression of the relationship between discourse units; that is to say, to convey the causal and temporal relationships. Significant changes are observed in narrative cohesion ⁴ (i.e. sentence-level structure or microstructure), which refers to the relationship between discourse units through the use of specific linguistic elements. As Demir & Küntay (2014) noted, five-year-old children link their utterances using discourse markers, which are not as complex as those markers used by older children. Moreover, it has also been shown that the use of sequential conjunctions or discourse markers (e.g. then, after, that…) to connect the narrative utterances achieves higher levels of frequency among five- to seven-years-old. Moreover, according to Demir and Küntay (2014), major changes in children’s narrative discourse coherence and structure (i.e. story-level structure or macrostructure) occur around five- to six-years of age. At about five-years-old, children can create stories more reliably involving the main components of a story line, as well as they can refer to the story goals. In contrast to this, four-year-old children can narrate by combining more than two events together, but the narratives are short and the events are often out of sequence.

⁴ Discourse markers are “sequentially dependent elements which bracket units of talk (...) sometimes these units are sentences, but sometimes they are propositions, speech acts or tone units (...). Markers occur at the boundaries of units as different as tone groups, sentences, actions, verses, and so on (...). The analysis of discourse markers is part of the more general analysis of discourse coherence - how speakers and hearers jointly integrate forms, meanings, and actions to make overall sense out of what is said.” [and, because, but, I mean, now, oh, or, so, then, well, y’know] (Schiffrin, 1987).
The literature on the acquisition of beat gestures in narrative discourse is very scarce and has primarily focused on how children gesture with beats while they are narrating. For example, Shattuck-Hufnagel et al. (2016)’s study showed that, during narrative and explanation discourses, nine five- to seven-year-old typically developing Australian English children produced beats with a well-defined stroke phase that resembled those performed by adults, as well as these beats were highly related to the organization of speech. The study contained two tasks: a narrative (story-retelling) task and an explanation (planning) task. In the narrative task, children were asked to watch a two-minute movie clip and to narrate the story to the mother, who had been distracted. At the end, the mother had to complete a picture-puzzle based on the video. In the explanation task, both the mother, who had to elicit information from her child, and the child were encouraged to plan a “fantasy” family holiday trip to any destination with the money that they were supposed to win from the lottery. The results demonstrated that children produced more beat gestures (i.e. non-referential gestures) in the narrative task. This study had an additional value showing that children, as young as six-years-old, can use non-referential gestures with a well-defined stroke phase and additional phases in their linguistic repertoire.

The goal of the current study is to examine the effectiveness of observing beat gestures performed in a short narrative discourse training study with five- and six-year-old children. A between-subject training paradigm with a pretest and an immediate posttest design is performed. We ask whether training with beat gestures could contribute to improve children’s speech planning and narrative skills in a narrative discourse production task. We hypothesise that a short training with narratives produced with beat gestures will be more effective than a short training with narratives produced without beat gestures on favouring children’s posttest narratives of wordless cartoons. Such a finding would support the theory that training with beat gestures has immediate positive effects on children’s narrative skills.
2. METHODS

2.1 Participants

Forty-seven (N=47; 25 boys and 22 girls; 24 of five years old and 23 of six years old) children aged between five and six years from the Girona area (Catalunya) participated in the study. All of them were typically developing children neither with no prior history nor with family history of communication disorders. Three participants were excluded from the analysis (N=3; 2 girls, aged of 5;11, 6;1, and 1 boy, 6;4). One child had to be excluded because she did not produce any utterance at all during the experimental procedure; the other child had to be excluded due to technical recording problems during the pretest part; and the third one was not analysed because he had seen the same two stories in both the pretest and the posttest parts. Thus, data from the remaining forty-four participants were analysed in this study (M=5.94; SD=0.57).

The children were recruited from four different schools located in the Girona area. The parents were informed about the main aim of the experiment and gave their consent by signing a participation form. Moreover, in order to ensure that the children were predominantly exposed to the Catalan language on a daily basis, caregivers were administered a language exposure questionnaire (Bosch & Sebastián-Gallés, 2001). The results of the questionnaires showed that the forty-four children’s Catalan language of exposure to Catalan is about 90% (M=90.50; SD=9.06).

2.2 Materials

The experiment consisted of a between-subject training paradigm with a pretest and immediate posttest design. The training items were presented in two conditions (e.g. No-Beat and Beat conditions), and the pretest and posttest outcomes were compared so as to assess children’s narratives.

The pretest and posttest experimental materials contained four different wordless cartoons (approximate length: 41-50 s) about a small mouse (Die Sendung mit der

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5 Twenty-four children in Escola Casa Nostra in Banyoles (Girona), eleven in Escola Pública Joan Bruguera in Girona, seven in Escola Bora Gran in Serinyà (Girona) and five in Escola Can Puig in Banyoles.

6 Twenty-one out of forty-four children were tested in No-Beat condition, and twenty-three in Beat condition. In the No-Beat condition, twelve of them were five years old, and the other nine were six years old. In the Beat condition, eleven were five years old and twelve were six years old.
and his friends, which is unfamiliar to children. Two stories were displayed in each part. Two of these cartoons had only a single main character; whereas the other two had two characters. Furthermore, eight different cards were produced with cartoon pictures to be used as positive feedback (see Procedure subsection).

The training materials consisted of a set of six different audio-visually recorded stories (approximate length: 17.92-32.76 s), which were performed by two Catalan female storytellers. Each story was about one animal that lived on a farm. All the stories had at least one goal, an initiating event (the problem), an attempt to achieve the goal, and an outcome (e.g. Demir, Fisher, Goldin-Meadow, & Levine, 2014). Moreover, each story was defined by a series of causally connected events which were accompanied by similar discourse markers and had similar goal-based story structures (see Appendix A). Discourse markers and target words were controlled in all the stories, as 90% of them are included in the Spanish version of MacArthur-Bates Communicative Development Inventories (CDIs) for children aged 16-30 months (López-Ornat et al., 2005).

2.2.1. Audio-visual narrative recordings: selecting placement and form of natural beat gestures

The final audio-visual stimuli were recorded after extensive piloting to ensure the ecological validity of the materials, and that the types of beat gestures and prosodic patterns used were natural. In the Beat condition, the placement and form of the beat gestures were accurately planned. To do this, two pre-school teachers (N=2, female) performed an expressive reading of five stories using child-directed speech. These acted readings showed that beat gestures were typically associated with target words that emphasised the goal information, as well as with all types of discourse markers such as metadiscursive (e.g. *hi havia una vegada* “once upon a time”, *de cop i volta* “suddenly”, *finalment* “in the end”…), temporal (*abans que* “before”, *fins que* “until”…), contrastive (*però* “but”…) and causal (*perquè* “because”, *ja que* “because/since”…), consecutive (*per tant* “therefore”, *d’aquesta manera* “like this”…)

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7 The cartoons used in this study (http://www.wdrmaus.de) were used in studies such as Demir, Fisher, Goldin-Meadow, & Levine (2014) and Alibali, Evans, Hostetter, Ryan, & Mainela-Arnold (2009).
8 CDIs include Spanish language inventories in which parents report information about children’s early language abilities development in vocabulary comprehension, production, gesture use and grammar.
9 The five story readings were also used to modify the six final stories, so as to achieve a natural-speech reading.
and conditional connectors (si no “if not”).\textsuperscript{10} Regarding the forms and locations of the beat gestures, results from the total number of beat gestures naturally performed in the readings showed that 42.47\% of the beats were outward open-palm gesture and were performed mostly on discourse markers and target words (e.g. 12 discourse markers and 19 target words) and the 6.85\% of the beats were with an open inward palm gesture performed on target words (5 target words); see Figure 1 for an illustration of these two types of beat gestures. The other percentage of beat gestures was performed by other palm orientation, trajectory movement, or hand shape, as well as by eyebrows movements.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{On the left side of the picture, an example of the most typically performed beats on discourse markers with an outward open-palm gesture is shown. On the right side of the picture, an example of the beat performed on target words with an inward open-palm gesture is shown. These types of gestures appeared in the readings and were used in the final video stimuli.}
\end{figure}

\subsection*{2.2.2. Recordings of experimental materials}

For the final video materials, six stories were expressively read by the two storytellers, in two different conditions, namely No-Beat and Beat, for a total of 24 stories (see Appendix A for a script of the six stories and Figure 2 for an illustration of the video in the No-Beat and Beat conditions). The audio-visual recordings were made in a TV set by a teleprompter device in Universitat Pompeu Fabra and edited by the video-editing programme AVID. In the No-Beat condition, the storytellers were asked to use child-directed speech and to not produce any beat gestures (see Figure 2, top panel). In the Beat condition, they were also asked to use child-directed speech, but to produce beat gestures. In this condition, a number of target words and discourse connectors were highlighted and, following the results reported in 2.2.1, the storytellers were asked to produce an outward open-palm gesture over discourse connectors (see

\textsuperscript{10}The classification and analysis of discourse markers performed in this experiment were based on Portolés (1998).
Figure 2, bottom left panel) and an inward open-palm gesture over target words (see Figure 2, bottom right panel).

![Image of hand gestures](image)

*Figure 2. On the top of the panel, an example of the video stimuli in the No-Beat condition is shown. Examples of the video stimuli in the Beat condition are shown below. On the left side, the beat gesture consisted of an outward open-palm gesture. On the right side, the beat gesture was performed with an inward open-palm gesture. Both hand movements were associated with a head nod, eyes opening and eyebrow rising.*

2.3 Procedure

The study used a between-subject pretest and posttest design (see Figure 3 to see the overall experimental procedure). The experiment was organized in the following way: first a pre-training test, which involved two wordless cartoons, was conducted. It was followed by the training (six videotaped stories) and the post-training test with two wordless cartoons. The participants were tested in a quiet classroom at their school and the whole session lasted approximately 20-25 minutes. The children were videotaped in all phases of the task with consent of the families (see Figure 4 for the experimental setup).

To get a measure of their memory skills, children were administered a *span memory task* before the experiment. Each child was instructed to repeat the sequence verbally, either in the order each item was presented or in a backward order (Bunting, Cowan, & Saults, 2006; Wilde, Strauss, & Tulsky, 2004). Following Igualada, Esteve-Gibert, & Prieto (under review), and Henry, Messer, Luger-Klein, & Crane’s (2012)
procedure, memory span was measured in terms of the maximum number of words from the list that the child could recall. The test started with a list of one item, which was followed by a list of two, a list of three, and so on. This procedure continued until the child no longer succeeded in recalling all the words in the list. Once the maximum list length was reached, the child was told four lists of this length but consisting of different words. This number of words was regarded as the child’s memory span if all the items were recalled in at least three out of the four lists. The memory span threshold thus measured was what determined the length of the list in the subsequent word recall task. If the child’s memory span was equal to two words, children were presented with three-word lists in the word recall task. All words used in the span memory task appear in the *Spanish-language MacArthur–Bates Communicative Development Inventories* (CDIs) of 16-30 months (López-Ornat et al., 2005).

![Figure 3. Overall experimental procedure.](image)

11 According to Duinmeijer, De Jong & Scheper (2012), children’s narrative performances are correlated with cognitive skills such as attention and memory.
Experimental setup. The child sat in front of a computer and was provided with the videos. The experimenter sat near the child. During the procedure, the experimenter did not watch the videos. After each video display, the child stood up in front of the experimenter, who was also near the camera.

2.3.1 Pretest and posttest

The experimental procedure was the same for both the pre- and immediate posttest. The experimenter sat in front of each participant next to the video camera and explained the task to children (see Appendix B to see the experimenter’s script of the experiment). The children were asked to watch two different wordless cartoons wearing headphones (see Figure 5 for examples). The cartoon with the single character (e.g. 1 & 3) was always shown before the more complex cartoon with the two characters (e.g. 2 & 4). After each clip, each child was asked to retell the story to the experimenter, who pretended not to watch the video previously. The children who did not respond were prompted with a question like “Em pots explicar la història?” (“Can you tell me the story?”). The task was presented as a game, as the experimenter had to choose the picture that was related to the narration after the child had retold the story. The retelling continued as the experimenter was asking “I, què més?” (“Anything else?”), and the child indicated that he or she had finished. Moreover, the experimenter gave positive feedback after the child retold the story, such as “M’agrada molt com expliques la història, així puc endevinar quin dibuix és!” (“I like the way you told the story so much! So I can easily guess which picture it is!”).
2.3.2 Training

The children were asked to watch six videos with two different narrators telling a story in only one condition (i.e. No-Beat or Beat) through headphones. All the stories were the same for each child, but told in a different order and by a different speaker. For each condition, a total of eight counterbalanced orders were planned (see Table 1). First, half of the stories corresponded to each of the two speakers, and different stories were selected in each of the orders. The pre- and post-training videos were also shown in two different orders (e.g. 1&2 and 3&4; or 3&4 and 1&2).

Table 1. Counterbalanced orders for each condition. S symbol (“story”) is followed by the number of the story (a total of 6 stories in the training part).

<table>
<thead>
<tr>
<th></th>
<th>Pretest 1&amp;2</th>
<th>Speaker 1 S1, S2, S3 + Speaker 2 S4, S5, S6</th>
<th>Posttest 3&amp;4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pretest 3&amp;4</td>
<td>Speaker 1 S1, S2, S3 + Speaker 2 S4, S5, S6</td>
<td>Posttest 1&amp;2</td>
</tr>
<tr>
<td>2</td>
<td>Pretest 1&amp;2</td>
<td>Speaker 2 S4, S5, S6 + Speaker 1 S1, S2, S3</td>
<td>Posttest 3&amp;4</td>
</tr>
<tr>
<td>3</td>
<td>Pretest 3&amp;4</td>
<td>Speaker 2 S4, S5, S6 + Speaker 1 S1, S2, S3</td>
<td>Posttest 1&amp;2</td>
</tr>
<tr>
<td>4</td>
<td>Pretest 1&amp;2</td>
<td>Speaker 1 S4, S5, S6 + Speaker 2 S1, S2, S3</td>
<td>Posttest 3&amp;4</td>
</tr>
<tr>
<td>5</td>
<td>Pretest 3&amp;4</td>
<td>Speaker 1 S4, S5, S6 + Speaker 2 S1, S2, S3</td>
<td>Posttest 1&amp;2</td>
</tr>
<tr>
<td>6</td>
<td>Pretest 1&amp;2</td>
<td>Speaker 2 S1, S2, S3 + Speaker 1 S4, S5, S6</td>
<td>Posttest 3&amp;4</td>
</tr>
<tr>
<td>7</td>
<td>Pretest 3&amp;4</td>
<td>Speaker 2 S1, S2, S3 + Speaker 1 S4, S5, S6</td>
<td>Posttest 1&amp;2</td>
</tr>
<tr>
<td>8</td>
<td>Pretest 3&amp;4</td>
<td>Speaker 2 S1, S2, S3 + Speaker 1 S4, S5, S6</td>
<td>Posttest 1&amp;2</td>
</tr>
</tbody>
</table>

2.4 Speech and gesture coding system

Each videotaped child’s narrative in the pre- and posttest parts was analysed. A total of 176 narratives were submitted to analysis (4 narratives x 44 children). The following speech- and gesture-coding scheme was adopted to test a variety of aspects related to the quality of the children's narratives.
2.4.1 Narrative structure scores

To obtain a measure of overall narrative structure, we slightly modified Demir, Fisher, Goldin-Meadow, & Levine (2014)'s coding system, which is reproduced below:

(0) A narrative with no structure does not even contain a descriptive sequence;

(1) A descriptive sequence is a narrative that includes the physical and personality characteristics of an animate protagonist with no mention of a sequence of actions;

(2) An action sequence is a narrative with actions described in a temporal order (actions follow one another in time) but in which the actions are not causally organized;

(3) A reactive sequence contains actions that are causally organized but does not include the protagonist’s goal, the intention of the protagonist to act to achieve a specific end;

(4) An incomplete goal-based narrative contains a goal statement and/or an attempt but no outcome following the goal;

(5) A complete goal-based narrative with one episode includes not only temporal and causal structure but also a goal of the protagonist, an attempt to achieve the goal, and an outcome of these attempts;

And (6) a complete goal-based narrative with multiple episodes includes multiple goal–attempt–outcome sequences.

All the stories used in the present experiment had at least one goal, an initiating event, an episode (attempt to achieve the goal), and an outcome. In the present study, we first considered an episode as an attempt to achieve the story goal. Therefore, given that not all of our six training stories had more than one goal-attempt-outcome sequences, and that some children could retell the stories in more detail, we modified Demir, Fisher, Goldin-Meadow, & Levine’s (2014) 6 rating in accordance to our data. Our 6 adopted rating indicates that the story retelling contains all the main story items (i.e. goal-attempt-outcome sequence), but also takes other necessary items into account in order to be a more detailed and well-structured narrative. Thus, this rating primarily focuses more on the story detail, whether the participant tells the story with a lot of narrative detailed elements or not. Moreover, when the child did not remember anything about the story, the narrative was rated with number 0.
2.4.2 Fluency scores

Fluency scores were assigned to each narrative following Alibali, Evans, Hostetter, Ryan, & Mainela-Arnold (2009)’s coding. To rate the degree of prosodic fluency, the authors took into consideration the presence of filled pauses (e.g. “um”, “uh”), the repetition of immediate words (e.g. “it was, it was raining”), repairs (e.g. “he was in the beach, in the mountain”), and fresh starts (e.g. “and then this, then…”).

Therefore, in this study we adopted a rating of prosodic fluency from 0 (none) to 5 (excellent), by assessing the number of each child’s speech disfluencies. The maximum 5 rating was given when the child did not make any or at most one disfluency. A rating 4 was considered when the child had from 1 to 2 disfluencies in his or her speech; a rating 3 when there were 2 or 3 disfluencies; a rating 2 with 3 or 4 disfluencies; and a rating 1 when the child had 4 or 5 disfluencies. The minimum 0 rating was given when the child produced more than 5 disfluencies or he or she did not remember anything about the story.

2.4.3 Gesture performance

The analysis of pre- and post-training child narratives also included gesture codification. All meaningful communicative gestures produced during narrative production were transcribed following McNeill (1992)’s classification, into iconic, metaphorical, deictic (or pointing) and beat gestures, as follows (see also footnote 12):

a. Iconic: hand movement that bears a close relationship to the semantic content of speech, as the gesture imitates concrete actions or objects. An example extracted from our corpus can be seen in Figure 6, e.g. “he picked12 it (an apple)”, in which the participant raises his hand as he was picking the fruit from the tree.

b. Metaphoric: similar to iconic, but the hand movement depicts abstract contents, e.g. a hand movement accompanying the utterance “and he found a solution”.

c. Deictic or pointing: pointing movements that point to concrete entities, e.g., a child raises his index finger that points to a location in space while saying

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12 In all the following examples, words accompanied by a gesture and prosodic prominence are highlighted in bold.
“there was that mouse” (see Figure 7, to see an example extracted from our corpus).

d. Beats: intentional rhythmic hand movements (e.g. rapid flicks of the fingers or hand) that do not present a discernible meaning but have a well-associated stroke with a prominent prosodic position in natural discourse, e.g. one opened hand move outward or forward away from the body and then stop while saying “and then, they find an enormous shell” (see Figure 8 to see an example extracted from our corpus).

Figure 6. Example of iconic gesture, while saying “la va agafar (la poma)”/”he picked it (an apple)”.

Figure 7. Example of deictic or pointing gesture, while saying “hi havia aquell ratoli”/”there was that mouse”.
Figure 8. Example of beat gesture, while saying “i després, es troben una petxina gegant”/”and then, they find an enormous shell”.
3. RESULTS

The results section is divided in three different subsections, which correspond to the three scores obtained from the data analysis, namely, narrative structure scores, fluency scores, and gesture performance. Three Generalized Linear Mixed Models (GLMM) (LMM; West, Welch, & Galecki, 2007) were run using SPSS Statistics 23.0 (SPSS Inc., Chicago IL) with three dependent variables.

3.1 Narrative structure scores

In order to assess the results of the potential Beat training condition effect on children’s narrative structure abilities, we run a GLMM with the overall narrative structure ratings as a dependent variable, Training Condition (two levels: No-Beat and Beat) and Test (two levels: pretest and posttest) and all their possible interactions as fixed factors; and Subject and Item (i.e. the four stories used in pretest and posttest) as random factors. Pairwise comparisons post hoc tests were carried out for the significant main effects and interactions.

The results of the GLMM analysis showed a main effect of Condition ($F(1, 172)=8.041, p<.01$), with greater narrative structure performances in the Beat Condition ($p<.01$) than in the No-Beat Condition, and Test ($F(1, 172)=19.691, p<.001$), showing better narrative structure performances in the posttest ($p<.001$) than in the pretest.

A significant interaction between Condition and Test was found ($F(1, 172)=4.705, p<.05$), indicating that narrative performances differed depending on the condition and on the test. Interestingly, post hoc analyses revealed that while Beat and No-Beat Conditions did not significantly differ in the pretest part ($p=.467$), they did so in the posttest, with greater narrative scores in the Beat Condition ($p<.001$) than in the No-Beat Condition. By contrast, considering the differences of Test in relation to the Condition, post hoc analyses revealed significant differences between the posttest and the pretest in the Beat Condition, with better narrative performances in the posttest part ($p<.001$) than in the pretest part. Crucially, no significant differences between pretest and posttest were found in the No-Beat Condition ($p=.119$). Therefore, the results show that participants who undertook the Beat training condition obtained higher narrative structure scores in the posttest than in the pretest part.

Figure 9 shows the mean overall narrative structure scores (from 0 to 6),
separated by Training Condition (e.g. No-Beat and Beat) and by Test (e.g. pretest and posttest). The graph shows how the posttest narrative structure scores in the Beat Condition outperformed those in the No-Beat Condition.

![Graph showing narrative structure scores](image)

**Figure 9.** Mean overall narrative structure scores from 0 to 6, separated by Training Condition (e.g. No-Beat and Beat) and by Test (e.g. pretest and posttest). Error bars represent confidence intervals.

### 3.2 Fluency scores

To check for the potential effects of the Beat training condition on children’s narrative discourse fluency, a GLMM was conducted with the overall fluency ratings as a dependent variable, Training Condition (two levels: No-Beat and Beat), Test (two levels: pretest and posttest) and all their possible interactions as fixed factors; and Subject and Item (e.g. the four stories used in pretest and posttest) as random factors. Pairwise comparisons post hoc tests were carried out for the significant main effects and interactions.

The results of the GLMM analysis revealed a main effect of Training Condition ($F(1, 172)=21.288, p<.001$), with more fluent narratives in the Beat Condition ($p<.001$) than in the No-Beat Condition, and a main effect of Test ($F(1, 172)=4.494, p<.05$),
showing that narratives were performed with more fluency in the posttest ($p<.05$) than in the pretest. However, no significant interaction was found between Condition and Test ($F(1, 172)=3.006, p=.085$). Thus, the results showed that participants who were assigned to the Beat training condition produced posttest stories with higher fluency scores than pretest stories. Even though the interaction between the two independent factors was not significant, we can report that crucially a significant difference was obtained between the fluency scores in the pretest and the posttest only in the Beat Condition, but not in the No-Beat Condition ($p=.790$), showing better scores in the posttest ($p<.01$) than in the pretest. Significant differences between the Beat and No-Beat Conditions were also found in relation to the Test, with greater fluency scores in the Beat Condition, than in No-Beat Condition, both in the pretest ($p<.01$) and in the posttest ($p<.001$).

Figure 10 shows the mean fluency scores from 0 to 5, separated by Training Condition (e.g. No-Beat and Beat) and by Test (e.g. pretest and posttest). The graph shows how the posttest fluency scores in the Beat Condition outperformed those in the No-Beat Condition.

![Figure 10. Mean fluency scores from 0 to 5, separated by Training Condition (e.g. No-Beat and Beat) and by Test (e.g. pretest and posttest). Error bars represent confidence intervals.](image)
3.3 Gesture performance

The relationship between the number of gestures children performed in their narratives and the training condition was tested using a GLMM analysis with the overall children’s number of gestures as a dependent variable; and Training Condition (two levels: No-Beat and Beat), Test (two levels: pretest and posttest) and the interaction between Condition and Test as fixed factors. Again, Subject and Item (i.e. the four stories used in pretest and posttest) were classified as random factors. Pairwise comparisons post hoc tests were carried out for the significant main effects and interactions.

The statistical analysis revealed no significant main effects of Training Condition ($F(1,94)=.445; p=.507$) and Test ($F(1,94)=3.251; p=.075$), but a statistically significant interaction between Condition and Test ($F(1, 94)=4.583, p<.05$), indicating that the number of gestures produced by children differed depending on the condition and on the test. Post hoc analyses revealed a significant effect of Test only of the Beat Condition, with higher number of gestures in the posttest ($p<.01$) than in the pretest. Crucially, pretest and posttest gesture performance did not significantly differ in the No-Beat Condition ($p=.826$). On the other hand, according to the differences of Conditions in relation to the Test, post hoc analyses indicated that there were no significant differences in gesture performance between the narratives in the No-Beat and Beat Conditions nor in the pretest ($p=.178$) nor in the posttest ($p=.843$). Thus, the results showed that only those participants undertaking the Beat training condition produced significantly more gestures in the posttest than in the pretest part.

Figure 11 shows the mean numbers of number of gestures performed, separated by Training Condition (e.g. No-Beat and Beat) and by Test (e.g. pretest and posttest). The graph shows how the number of gestures performed in the posttest part in the Beat Condition outperformed those in the No-Beat Condition.

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13 In this analysis, we included all gestures children performed in their narratives. 66,67% out of 354 gestures were iconic; the 0,56% were metaphoric; the 0,85% were deictic; and the 31,92 were beats.
Figure 11. Mean numbers of gesture performance, separated by Training Condition (e.g. No-Beat and Beat) and by Test (e.g. pretest and posttest). Error bars represent confidence intervals.
4. DISCUSSION AND CONCLUSIONS

Previous research has demonstrated that gestures and prosody promote benefits on children’s early language development and that predict later language abilities. It is also important to mention that other studies have found that co-speech gestures have an important role in children’s narrative discourse development (e.g. Demir, Levine, & Goldin-Meadow, 2015; Demir, Fisher, Goldin-Meadow, & Levine, 2014). However, as far as we know, little research has been devoted to the effects of observing narratives with beat gestures on the improvement of children’s narrative skills. Our goal was to examine whether a short training with beat gestures could favour children’s narrative abilities in a narrative discourse production task. Through a between-subject training study with a pretest and immediate posttest design, we found that children who were assigned to the Beat training condition had positive changes on their quality of their posttest narratives, showing better narrative discourse ability scores.

The results from the analysis performed on the overall narrative structure scores based on Demir, Fisher, Goldin-Meadow, & Levine (2014) indicated that participants who undertook the Beat training condition were more likely to produce significantly better posttest narrative discourses than those in the pretest part. The results also demonstrated a significant interaction between Condition and Test, showing in post hoc analyses that Beat and No-Beat Conditions differ significantly in the posttest, but not in the pretest, with higher narrative scores in the Beat Condition than in the No-Beat Condition. More interestingly, significant differences between the pretest and the posttest in the Beat Condition but not in the No-Beat Condition were also found, demonstrating greater narrative performances of Beat training condition in the posttest than in the pretest part. This is clear evidence that beat gestures helped those children undertaking the Beat condition to perform narratives with better structure scores. The current study shows that adding beat gestures in narrative child-directed speech retellings has a positive impact on children’s narrative structure scores through the performance of more detailed, well-organised, and more complete goal-based narratives with temporal and causal structure.

Whereas the first analysis showed the main aim of this research, the second analysis focused on the narrative discourse fluency scores. Children’s narratives analysed in this study were found to be significantly more fluent in the Beat Condition, but not in the No-Beat Condition; and in the posttest, but not in the pretest part. In this
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case, there was not a significant interaction between Condition and Test; however, post hoc analyses showed statistically significant differences between the pretest and posttest parts only in the Beat Condition, but not in the No-Beat Condition, obtaining better fluency scores in the posttest than in the pretest part. Moreover, Beat and No-Beat Conditions were also found to be significantly different in the Test, as narratives were produced with more fluency in the Beat Condition, but not in the No-Beat Condition, both in the pretest and in the posttest parts. Our data thus suggest that training with beat gestures can influence children by retelling stories with more fluency during the posttest part.

What is also important to note is the number of gestures children produced during their narrative discourses. The data analysis provided evidence that gestures play an important role in language processing at language development. Results presented only a significant main effect on the interaction between Condition and Test, showing differences only between the Test in the Beat Condition, but not in the No-Beat Condition, nor between the No-Beat and Beat Conditions in the Test, showing higher number of gestures in the posttest than in the pretest. Such results show that a short training with beat gestures benefits children to perform more co-speech gestures during their posttest narratives.

Importantly, to our knowledge, our study is the first one to demonstrate that a short training with narratives produced with beat gestures can have an immediate positive effect on children’s narrative skills. We have shown that children in the Beat training condition positively affected children’s narrative posttest discourses. In conjunction with previous research (e.g. Shattuck-Hufnagel et al., 2016; Demir, Levine, & Goldin-Meadow, 2015; Demir, Fisher, Goldin-Meadow, & Levine, 2014), in this study, Beat training condition was characterised by having beat gestures associated to prosodic prominence in child-directed speech. An important effect has been observed in narrative structure scores, narrative fluency scores, and children’s gesture performance. Including beat gestures in a story thus leads to a better narrative retelling scores. Our results lend support to the hypothesis that beat gestures are associated with focus marking, rhythmic marking, and discourse structure marking (Shattuck-Hufnagel et al., 2016) and that these markers help to build up discourse narrative skills.

In sum, the results of this study provide relevant information about the positive effects of beat gestures on children’s narrative skills. Our findings have important implications for the role of beat gestures in children’s narrative development and for
narrative skills as well, and could be used in further investigations. While immediate effects of the Beat training condition have been demonstrated in the present study, it remains to be seen whether these effects can be sustained in both typically and not typically developing children; that is to say, to promote such a training with beat gestures in children’s pathologies, which have similarly been investigated by previous research (e.g. Demir, Fisher, Goldin-Meadow, & Levine, 2014; Demir, Rowe, Heller, Goldin-Meadow, & Levine, 2015; Duinmeijer, De Jong, & Scheper, 2012; Demir, Levine, & Goldin-Meadow, 2010). Another interesting question for future research is to see whether a longitudinal training with beat gestures could establish and strongly favour children’s narrative discourse abilities. On the whole, the results obtained in the current study are very encouraging, in that a short between-subjects narrative training with beat gestures may be able to show reliable gains on children’s narrative abilities.
REFERENCES


Appendix A: Script of the training stories

1st story
HI HAVIA UNA VEGADA, un ÀNEC que caminava cap a l’escola. DE COP I VOLTA, va començar a PLOURE, i l’ànec no tenia PARAIGUA. AL FINAL, va buscar una SOLUCIÓ: va posar-se la caputxa al CAP per protegir-se de la pluja.

“ONCE UPON A TIME, there was a DUCK that was walking to school. SUDDENLY, it started to RAIN, and the duck did not have an UMBRELLA. IN THE END, he looked for a SOLUTION: he put his hood on his HEAD to protect himself from the rain.”

2nd story
VET AQUÍ UNA VEGADA, un CONILL que va anar d’excursió a la muntanya. TOT D’UN PLEGAT, va veure VAQUES que s’acostaven cap a ell i es va espantar. FINALMENT, va trobar una SOLUCIÓ: va amagar-se QUIET darrere un arbre FINS QUE les vaques van marxar.

“ONCE UPON A TIME, there was a RABBIT that went to a trip to the mountain. SUDDENLY, he saw the COWS getting closer to him and he was scared. IN THE END, he found a SOLUTION: he hid STILL behind a tree UNTIL the cows left.”

3rd story
UNA VEGADA, hi havia un CAVALL que tenia molta gana. TOT D’UNA, va adonar-se que no hi havia GALETES a l’armari, PERQUÈ se les havia menjades totes. AL FINAL, va pensar una SOLUCIÓ: va fer galetes al FORN.

“ONCE UPON A TIME, there was a HORSE that was hungry. SUDDENLY, he realised that there were no BISCUITS in the cupboard, BECAUSE he had eaten them all. IN THE END, he thought of a SOLUTION: he made biscuits in the OVEN.”

4th story
VET AQUÍ UNA VEGADA, una GALLINA que tenia son. DE SOBTE, es va adormir al SOFÀ, PERÒ el DESPERTADOR la va fer aixecar. No es recordava que el seu
ANIVERSARI era l’endemà i que havia de comprar ESPELMES per poder-lo celebrar. FINALMENT, va trobar una SOLUCIÓ: va comprar espelmes GEGANTS i, PER TANT, va poder celebrar el seu aniversari.

“ONCE UPON A TIME, there was a HEN that was sleepy. SUDDENLY, he fell asleep in the SOFA, BUT the ALARM CLOCK woke her up. She did not remember that the following day was her BIRTHDAY and that she had to buy CANDLES to celebrate it. IN THE END, she found a SOLUTION: she bought ENORMOUS candles and, THEREFORE, she could celebrate her birthday.”

5th story

UNA VEGADA, hi havia un PORC que jugava a futbol al parc. TOT D’UNA, va adonar-se que era TARD i que havia de tornar a CASA, perquè, SI NO, la MARE s’enfadaria. AL FINAL, va pensar una SOLUCIÓ: va agafar un camí MÉS CURT per arribar a casa i, AIXÍ, no va arribar tard i la mare no es va enfadar.

“ONCE UPON A TIME, there was a PIG that was playing football in the park. SUDDENLY, he realised that he was LATE and that he had to go back HOME, because, IF NOT, his MOTHER would get angry. IN THE END, he thought of a SOLUTION: he took the SHORTER way to get home and, LIKE THAT, he did not arrive late and his mother did not get angry.”

6th story

HI HAVIA UNA VEGADA, un GAT que passava l’estiu a casa dels avis. DE COP I VOLTA, va recordar-se que havia de fer els DEURES, ja que, SI NO, els AVIS no l’esperarien per anar a la platja. FINALMENT, va buscar una SOLUCIÓ: va fer els deures ABANS QUE els avis arribessin i, D’AQUESTA MANERA, va poder anar a la PLATJA.

“ONCE UPON A TIME, there was a CAT that was staying at his grandparents’ house in summer. SUDDENLY, he remembered that he had to do his HOMEWORK, because, IF NOT, his GRANPARENTS would not wait for him to go to the beach. IN THE END, he looked for a SOLUTION: he did the homework BEFORE his grandparents arrived and, LIKE THIS, he could go to the BEACH.”
Appendix B: Experimenter’s script of the experiment

A) INTRODUCTION

La tasca es duu a terme entre el participant i l’experimentador. Els dos estan drets a la sala. (“The task is performed between the participant and the experiment. Both are stand up in the room”).

“Hola! Com et dius? Jo sóc l’Ingrid. Mira, ara farem un joc que t’agradarà molt. T’agrada les pel·lícules? I els dibuixos animats? Doncs ara veurem dibuixos animats.” (“Hello! What is your name? I am Ingrid. Now, we are going to play a game that you will enjoy a lot. Do you like films? And cartoons? So, now we are going to watch cartoons.”).

B) PRETEST

“Ara veuràs uns dibuixos animats (el participant porta auriculars) i farem un joc molt divertit i ens ho passarem molt bé. Primer veuràs uns dibuixos i després m’hauràs d’explicar la història que has vist, perquè jo no els veuré. M’hauràs d’explicar la història molt bé, però, perquè jo tindré dos dibuixos (cada dibuix està imprès en color) i hauré de triar quin és el dibuix de la història que m’expliques. A veure si trio el dibuix bé!” (“Now, you are going to watch cartoons (the participant wears headphones) and we are going to play a game which is so much fun and which you will enjoy a lot. Firstly, you will watch a cartoon, and then you will have to tell me the story you have watched, because I am not going to watch it. You will have to tell me the story really well, as I should guess which is the picture of the story (each picture is printed in colour), between two I have. Let’s see if I choose the picture well!”)

En cas que el participant no expliqui la història, l’experimentador li fa una pregunta: (“In case the participant does not tell the story, the experimenter asks him a question:”)

-“Em pots explicar la història?” (“Can you tell me the story?”)

Quan el participant ha acabat, l’experimentador li pregunta: “I, què més?”. La tasca s’acaba quan el participant indica que ja ha acabat. (“When the experimenter has finished, the experimenter asks him: “Anything else?”. The task finishes when the participant indicates that is done.”)

Una vegada el participant ha explicat la història, l’experimentador tria el dibuix correcte i li dona una retroacció, com ara: “M’agrada molt com expliques la història, així puc endevinar quin dibuix és!” (“Once the participant has retold the story, the experimenter chooses the
correct picture and gives him a feedback, such as: “I like the way you told the story so much! So I can easily guess which picture it is!”

Es repeteix una vegada la mateixa tasca, però amb una segona història. (“The same task is repeated once again, but with a second story.”)

C) TRAINING

“I ara, jo t’explicaré una història. Mira, hi havia una vegada, fa molt de temps, una granja on hi vivien molts animals (es presenta la fotografia de la granja). T’agraden els animals? Com que la granja era tan gran, hi havia dues grangeres que cuidaven i donaven de menjar cada dia a tots aquests animals. T’agradaria ser granger, a tu?” (“Now, I will explain you a story. Once upon a time, a long time ago, there was a farm where a lot of animals lived (the picture of the farm is presented). Do you like animals? As the farm was so big, there were two farmers looking after them and feeding them day by day. Would you like to be a farmer?”)

“Mira quants animals (es presenten els animals en conjunt). Saps una cosa? Cadascun d’aquests animals va tenir un problema, però al final tots van poder trobar una solució i, per tant, no va passar res dolent i tots estaven molts contents.” (“Look how many animals (the animals are presented together). You know, each of these animals had a problem, but at the end all of them could find a solution. Therefore, nothing bad happened and all of them were very happy.”)

“Aquestes són les dues grangeres que cuiden els animals de la granja (es presenten les imatges de les dues grangeres). Les grangeres t’explicaran què va passar a cada animal i has d’estar molt atent, d’acord?” (“These are the two farmers that look after the animals of the farm (pictures with the two farmers are presented). The farmers will explain you what happened to each animal, and you should listen to them very attentively, ok?”)

**Story 1, 2, 3, 4, 5 & 6: No-Beat condition/Beat condition**

“Comencem. Ara la grangera Anna/la grangera Clara t’explicarà la primera història.” (“Let’s start. Now, the farmer Anna/the farmer Clara will explain you the first story.”)

Els participants, en la condició No-Beat, veuen la història explicada sense gestos rítmics; mentre que, els participants, en la condició Beat, veuen la mateixa història, però explicada amb gestos rítmics. El participant porta auriculares. (“In the No-Beat condition, participant will watch the story told without beat gestures; whereas, in the Beat condition, participants watch the same story, but told with beat gestures. The participant wears headphones.”)
Es repeteix el mateix procediment per a cadascuna de les sis històries, tant en la condició No-Beat, com en la condició Beat. (“The same procedure is repeated for each of the six stories, in the No-Beat and the Beat condition”).

**D) POSTTEST**

“Recordes les històries que has vist al principi de tot? Doncs ara tornarem a jugar al mateix joc, d’acord? Oi que era molt divertit?” (“Do you remember the stories you have watched at the beginning? Now, we are going to play the same game, ok? It was very funny, isn’t it?”)

“Ara veuràs uns dibuixos animats (el participant porta auriculars). Primer veuràs uns dibuixos i després m’hauràs d’explicar la història que has vist, perquè jo no els veuré. M’hauràs d’explicar la història molt bé, però, perquè jo tindré dos dibuixos (cada dibuix està imprès en color) i hauré de triar quin és el dibuix de la història que m’expliques. A veure si trio el dibuix bé!” (“Now, you are going to watch cartoons (the participant wears headphones) and we are going to play a game which is so much fun and which you will enjoy a lot. Firstly, you will watch a cartoon, and then you will have to tell me the story you have watched, because I am not going to watch it. You will have to tell me the story really well, as I should guess which is the picture of the story (each picture is printed in colour), between two I have. Let’s see if I choose the picture well!”)

En cas que el participant no expliqui la història, l’experimentador li fa una pregunta: (“In case the participant does not tell the story, the experimenter asks him a question:”)

-“Em pots explicar la història?” (“Can you tell me the story?”)

Quan el participant ha acabat, l’experimentador li pregunta: “I, què més?”. La tasca s’acaba quan el participant indica que ja ha acabat. (“When the experimenter has finished, the experimenter asks him: “Anything else?”. The task finishes when the participant indicates that is done.”)

Una vegada el participant ha explicat la història, l’experimentador tria el dibuix correcte i li dona una retroacció, com ara: “M’agrada molt com expliques la història, així puc endevinar quin dibuix és!” (“Once the participant has retold the story, the experimenter chooses the correct picture and gives him a feedback, such as: “I like the way you told the story so much! So I can easily guess which picture it is!”)

Es repeteix una vegada la mateixa tasca, però amb una segona història. (“The same task is repeated once again, but with a second story.”)