Coherence and mental reference in French-speaking children's narratives: Comparing the effects of two intervention procedures.

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COHERENCE AND MENTAL REFERENCE IN FRENCH-SPEAKING CHILDREN'S NARRATIVES:
COMPARING THE EFFECTS OF TWO INTERVENTION PROCEDURES

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ABSTRACT

The present study compares the effects of two intervention procedures on children's ability to tell coherent stories, taking into account the causes of events and the internal states of the characters. Using an image-based story, one procedure investigated whether a verbal interaction between the child and a less competent peer (simulated by a hand puppet) (the PINT procedure) or a conversation focusing children's attention on the causes of the events (the CONV procedure), could promote more coherent and evaluative narratives in 6- to 8-year-old French-speaking children.

After the first monological narrative produced after having seen the images (NS1), the children produced a second narrative after one or the other intervention (NS2), and one week later, another narrative for the same story, to assess the stability of the possible gains obtained immediately after the procedure, and a narrative for an analogous story to assess whether improvements were generalizable. During the PINT intervention children told the peer-puppet two 'interactive' narratives (INTNS1 and INTNS2). Results confirm the positive effects of the CONV procedures obtained in previous studies. The PINT procedure used here did not produce the expected beneficial effects. It produced instead a 'depressor' effect on the narrative produced immediately after the procedure compared to the initial one. The results are explained in terms of the specific characteristics of the PINT procedure designed in this study.

KEY WORDS: Narratives – Theory of Mind discourse – Intervention procedures – Peer interaction – Socio-cognitive conflict

I. INTRODUCTION

This study compares the helpfulness of two intervention procedures in promoting children's narrative skills. As will be made clearer later, one procedure is based on a conversation in which an adult focuses the child's attention on the causes of the events of a story; the other is based on an interaction between the child and a less competent partner in which children are led to make their own understanding of the story clear for the partner.

Narratives are everyday activities through which meanings and common ground are built up among participants (Clark, 1996). They are a form of extended and displaced discourse (Hockett 1963; Lyons 1977) that talk about the *there and then*. Beyond the referential and descriptive components of a story, constituted by the characters and the chronological sequence of events, interesting narratives also contain an evaluative component that provides the causes of events and the reasons for behaviors, attributes internal states to the characters and highlights certain narrative elements relative to others (Labov & Waletzky 1967). Before 6-7 years, some children start to talk about evaluative elements, such as the characters' psychological states (e.g., Bokus 2004; Longobardi, Piras & Presaghi 2006), but it is not until 9 years that the majority of children talk spontaneously about the *frame of mind* of the characters, that is, their intentions and states of knowledge (e.g., Bamberg & Damrad-Frye 1991; Berman & Slobin 1994), and it is even later that children manage to talk about the different points of view of the characters (e.g., Aksu-Koç & Tekdemir 2004; Bamberg & Damrad-Frye 1991; Kuntay & Nakamura 2004; Veneziano & Hudelot 2009).

Some authors suggest that the scarcity of evaluative elements in younger children is due to the fact that their Theory of Mind (ToM) -- that is, the ability to take other people's mental states into account in order to predict and explain behaviors (e.g. Astington 2001; Astington, Harris & Olson 1988; Battistelli 2001; Flavell

2004; Symons 2004; Wellman & Bartsch, 1994) -- is still under construction. However, several studies have shown that when children tell their stories in a dialogical way they can talk about the causes of events and may refer to the internal states of the characters (e.g. Eaton, Collis & Lewis 1999; Shiro 2003). For example, Eaton *et al.* (1999) reported that 5-year-olds can produce as many causal relations as 9-year-olds when answering causal questions asked by the experimenter. However narratives produced in conversations are less demanding than monological, self-managed narratives. Monological narratives require cohesive discourse devices that enable the speaker to integrate prior to present utterances (e.g., Kail & Hickmann 1992; Karmiloff-Smith 1981). They also require the story to have an overall coherence, enhanced by providing causal links among events and taking into account the different points of view that characters may have about the same reality (e.g., Berman & Slobin 1994). Thus, in other studies, it was tested whether even monologically narrated stories could be improved. Silva, Strasser & Cain (2014) comparing two groups of preschoolers, one answering questions about the story of a wordless picture-book and then producing the narrative of the story, and the other producing the narrative before answering the questions, found that preschoolers who were asked the causal questions before telling the narrative produced more causal relations than the group of children who told their narrative first. In a series of studies, Veneziano and her collaborators (e.g., Veneziano 2010, in press; Veneziano & Hudelot 2006, 2009; Veneziano *et al.* 2011) found positive effects of causal-oriented questions asked in a conversational setting to children who served as their own controls in a pre-post design. Children's monological narratives were based on a set of five images making up the '*Stone Story*', a story of a misunderstanding between two characters (adapted by Veneziano & Hudelot, 2006 from Furnari 1980). The monological narratives told by the same children after the causal-oriented conversation contained more evaluative elements than the monological narratives told before the conversation. The Stone story is particularly interesting as it solicits children's abilities to take a mentalist attitude (Veneziano & Hudelot 2006, 2009) and to talk about the intentional and epistemic states of the characters. In the monological narratives told after the conversation with the adult, children's references to the evaluative component of the story increased, particularly in 6 to 9 year-olds: their narratives contained more causal explanations and took the characters' internal states more into account in order to explain behaviors and events than was the case of the narratives told before the causal-oriented conversation.

The force of this procedure is to direct children's attention to the causes of events by verbal means and, at the same time, to segment the story into component parts (the events about which the questions are asked), thus contributing to lowering the cognitive load of the task for the child.

Would similar results be obtained without using such directive focalization, using instead a procedure based on the interaction between the child and a less competent peer? Such a procedure builds on the children's spontaneous motivation to verbalize clearly and explicitly the underlying relations among the events of the story for the benefit of the less competent peer (Durling & Schick 1976).

We assumed that children's efforts to make the story understood by the less competent partner would lead them to argue in favor of their position and to produce a discourse less centered on their own point of view (e.g., Buchs & Butera 2004; Fernàndez *et al.* 2002), coordinating their point of view with that of the partner. Interaction among peers with asymmetric levels of knowledge, particularly if associated with a socio-cognitive conflict, may thus have positive effects on the more competent peer (Fernàndez *et al.* 2002**).** Feeling the need to

specify their point of view, expert peers can benefit from the verbal and cognitive work induced by the asymmetric interaction, consisting in reviewing the material, searching for the relevant information and clarifying examples, specifying and organizing it into a higher order cognitive structure for the less competent peer (Whitman & Fife 1988). When children's *verbal expression* has the function *of having the other understand* (Durling & Schick 1976), it might turn out to be at least as beneficial as focalizing children's attention on the causes of events, targeted by the conversational procedure.

The purpose of the present study is thus twofold: (a) to verify whether the two intervention procedures – the conversational procedure (CONV) and the peer interaction procedure (PINT) – indeed promote children's expression of the evaluative elements of their narratives and (b) to compare the effects of the two procedures to determine whether one is more effective than the other or whether both, having different strengths, would turn out to be equally, but differently, beneficial. The CONV procedure is beneficial because of its focalizing and segmenting features; the PINT procedure because of the spontaneously felt need to verbalize to improve the peer's understanding.

II. METHOD
Participants

Twenty-four French-speaking children, 16 girls and 8 boys, aged 6,4 to 8,3 years participated in the study. They were recruited from two primary schools in Paris. They all spoke French as their mother tongue and had not been reported to have any type of language or cognitive problem.

The two experimental groups

Twelve children from one primary school (aged 6;6 to 8;3) were assigned to the *peer interaction* group (see below under procedure). Twelve children from the other primary school participated in the 'conversational' group (see below under procedure). These children were selected from a larger study (Veneziano *et al.,* 2011) to match the 'peer interaction' group of subjects in three main measures: the coherence score obtained in the first narrative (see under 'data analysis') and in age and sex[1]. The final composition of the group was 7 girls and 5 boys with an age range between 6,4 and 8,2 years.

Material

The Stone Story

The *Stone Story* (adapted by Veneziano & Hudelot, 2006, from Furnari 1980) and used in earlier studies of narrative development (e.g., Veneziano & Hudelot 2009: Veneziano *et al.* 2009, 2011; Veneziano in press) consists of five wordless pictures that can be interpreted as the story of a misunderstanding between two

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[1] The match between subjects was performed first on the score of coherence and then, as close as possible, in age and sex.

characters (see Appendix 1). More specifically, the first picture sets the context where the two characters, referred to here as P1 and P2, greet each other from a distance (the 'greeting'). The second picture shows P1 accidentally stumbling on the stone, leading P1 to push P2 (the complicating event: "first push"). The third picture shows P2 pushing P1 (the elaboration of the complicating event: 'push back'). The fourth picture depicts P1 crying and pointing towards the stone ('the resolution attempt'). The fifth image shows P2 helping P1 to get up ('the resolution').

The Bicycle story

The *Bicycle story* was designed by Veneziano et al., 2011 with the support of the CFQCU[2] project. The story was designed so as to be analogous to the *Stone story*. It also consists of five pictures and, like the *Stone story*, it can be interpreted as a story of misunderstanding between two characters (see Appendix 2). This story was intended to determine whether the possible improvements obtained on the *Stone story* after the intervention procedures were generalized or not to a new story, having a similar structure but different content.

These stories, because they can be interpreted to involve a misunderstanding between two characters, were chosen to promote children's expression of the evaluative component of their narratives, including the expression of the characters' internal states and of their different points of view.

Procedure

All interviews were carried out individually in a quiet room located in the children's school and were audio and video recorded with a small camera installed on a mini tripod.

All children were first shown the five wordless pictures of the S*tone story*, presented one by one in the right sequence. Once the child was ready to tell the experimenter the story, the pictures were removed and the child narrated the story. This is the *first narrative* (that will be referred to as NS1), that is, the autonomously produced monological story told by the children. The pictures were removed before the first narrative in order to minimize children's attention to details and maximize their attention to the overall plot of the story. Otherwise, the conditions here were similar to those of most studies of picture-based narrative development.

Then, two different procedures were used for the two experimental groups.

In the *peer interaction group* (PINT), the experimenter, using a hand puppet, played the role of a young child (by the name of Robert) who had not seen the images and did not know the story. Robert (playing the role of the less competent peer) told the child that he wanted to know the story really well because, afterwards, he was to tell it to the teacher who would grade him on it. The pictures were then placed again in front of the child, hiding them from the view of the hand puppet, and the child told the first 'interactive' story to Robert. This story will be referred to as INTNS1. After the child's narrative, the peer-puppet told a standardized story that was a simple descriptive version of the story: "There are two kids who say hello to each other; then they push each other and

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[2] CFQCU stands for Conseil Franco-Québécois de Coopération universitaire - Interuniversity cooperation between France and Quebec - attributed to Edy Veneziano, principal investigator for France, and Hélène Makdissi, principal investigator for Quebec.

then they make it up'. After his narrative, the peer-puppet asked the child whether there was anything he should change or add to his story or whether that was good enough to obtain a good grade from the teacher. If the child had something to add or change, he could tell the entire story or just mention the specific aspects that he thought Robert had forgotten or misinterpreted (that will be referred to as INTNS2), otherwise he could just say that it was ok like that. The hand puppet was then removed.

In the *conversation group* (CONV), the experimenter, after placing the images again in front of the child, asked him questions on the causes of the four main events of the story: "how come that" or "why" 1. P1 pushes P2 (both P1 and P2 were named in the same way as the child had done in his first narrative); 2. P2 pushes P1; 3. P1 shows the stone; and 4. P2 helps P1 to get up. If the children did not answer immediately, the experimenter did not provide the answers but encouraged them to provide an answer by saying, for example for why P1 pushes P2: 'is it normal for a child to come and push you?' If the children did not answer after those further questions, the experimenter moved to ask the question about the next event.

After the intervention, PINT or CONV, in both groups, children were then asked to tell the story once again. This is the '*second narrative*' that will be referred to as NS2. As was the case for the first narrative, here the children told their story without having the pictures in front of them.

One week later, the children from both groups were seen again and were asked to tell the *Stone story* following the same procedure as that used for the first narrative. This was intended to check whether the changes possibly obtained after the intervention procedure were stable. This *third narrative* will be referred to as NS3. The children were then presented with the images of the *Bicycle story* according to the same procedure as that used for the *Stone story,* and were asked to narrate this story. This narrative was meant to determine whether the possible gains obtained on the Stone story were generalizable. This fourth narrative will be referred to as NB for Bicycle Narrative.

Data analysis

All the narratives were transcribed *verbatim* and were scored by trained coders according to a detailed coding manual specifying operational definitions, criteria and attested examples. Narratives were scored for: 1. Explanations; 2. Internal states of the characters; 3. Attribution of False belief to P2; and 4. Expression of the clarification of the misunderstanding between the characters. A score of overall coherence[1] that took into account the structural organization of the story, the causal relations and the mental states of the characters at the same tine was also calculated.

<u>Explanation of events</u>

An event was considered explained when a) a causal marker was present (e.g., *parce que* 'because', *donc* 'therefore', *pour* 'in order to, so as to', *à cause de* 'because of');
b) the relation was presented retroactively, from the event to its cause (e.g., *il l'a repoussé, il était très fâché* 'he pushed him back, he was very angry').

If the relation was presented proactively (from the cause to the event), and no causal marker was present, other elements were needed, such as c) the antecedent or the consequent in the causal relation had to be an internal state or, more generally, a non-perceptible aspect introduced by the child; or d) the events mentioned were inherently linked to each other (for example, *il trébuche et pousse la fille* 'he stumbles and pushes the girl') (for more details, see Veneziano & Hudelot, 2009). In the present study, for each narrative, we provide two measures: the total number of explanations as well as the number of explanations of the four key events: pushing, pushing back, showing the stone and picking up the partner.

References to the characters' internal states

We looked for references to the following internal states of the characters: a) physical/perceptual (e.g., *il n'a pas vu qu'il y avait une pierre* 'he didn't see that there was a stone'; *il s'est fait mal* 'he hurt himself'); b) emotional states (e.g., *il était triste* 'he was sad'); c) intentional states referring to the characters' intentions or absence of intention (e.g., *il voulait pas le pousser* 'he didn't mean to push him'); and d) epistemic states, referring to the state of knowledge, belief or understanding of the characters (e.g., *il croyait qu'il l'avait fait exprès* 'he believed he had done it on purpose'; *il a compris pourquoi il l'avait poussé* 'he understood why he pushed him').

In this study, for each narrative, we provide three measures: the total number of references to the internal states of the characters, the total number of intentional states, and the total number of epistemic states mentioned.

The expression of False belief

We considered that children attributed a false belief when they expressed the unintentional and/or the physical cause of the first push (e. g., *il trébuche parce qu'il y avait un caillou* 'he stumbles because there was a pebble') AND attributed to P2 the belief that the first push was intentional (e.g., *l'autre croit qu'il a fait exprès* 'the other one believes he did it on purpose').

The Rectification of the False Belief

Children express rectification of the False Belief, and hence the resolution of the misunderstanding between the two characters, when they let P1 explain the reason for the first push (e.g., *et il dit qu'il l'a poussé sans faire exprès* 'and he says that he didn't push him on purpose'), and P2 understands (e.g., *et l'autre comprend* 'and the other one understands').

Score of Overall Coherence

The score of overall coherence reflects the extent to which the evaluative aspects mentioned above are present in the narrative. It also takes into account the overall temporal and structural organization of the children's stories. It is composed of eight sub-scores whose overall value ranges from a minimum of 0 to a maximum of 20 points. These sub-scores are attributed as follows:

1. *The initial setting* (maximum score: 1 pt): It is attributed when children mention the initial setting of the story (the characters see each other, say hello, walk in the park,...):

Example: *Il y a deux petits garçons qui se disent bonjour,*

'There are two little boys who say hello to each other'

2. *The explanation of the first push* (maximum score: 3 pts): 2 points were attributed when the children mentioned the physical (the stone) or the unintentional cause of the push:

Example: *et #le premier il pousse sans faire exprès mh l'autre petit garçon,*

'and the first one pushes without doing it on purpose mh the other little

boy'

One additional point was attributed if the child mentioned both the physical and the unintentional reasons for pushing.

Only 1 point was attributed when the child provided other causes for the push:

Example: *après elle a fait mal à la fille car elle a voulu s'approcher,*

'then she hurt the girl because she wanted to get closer'

3. *The expression of the False belief* (maximum score: 3 pts): 3 points were given when children attributed to P2 the belief that P1 pushed him intentionally, using the word *croire*, 'to believe', while expressing at the same time the physical and/or unintentional cause of the first push:

Example: *le garçon à la salopette pousse l'autre garçon à cause de la pierre;*

le garçon il croit qu'il a fait exprès de le pousser

'The boy with the overalls pushes the other boy because of the stone;

the boy thinks he pushed him on purpose'

2 points were assigned when, in the same conditions as above, children did not use the word "*croire*" 'think':

Example: *le petit garçon il avait trébuché et il avait poussé l'autre*

et l'autre n'avait pas vu que c'était à cause de la pierre

'the little boy stumbled and pushed the other one and the other

one hadn't seen that it was because of the stone'.

Finally, 1 point was attributed when the children expressed only one of the two elements mentioned above: either P2's belief that P1 had pushed him on purpose (e.g., *l'autre croit qu'il a fait exprès*, 'the other believes that he did it on purpose'), or his ignorance about the real cause of the push.

4. *The explanation of the second push* (maximum score: 2 pts): 2 points were attributed when children give the (false) belief of P2 as the cause of his pushing P1 back:

Example: *après mh# après l'autre il pousse l'autre garçon parce qu'il croit qu'il a*

fait exprès,

'then mh then the other one pushes the other boy because he believes that he did

it on purpose'

1 point was given when children mention any other cause for pushing back:

Example: *et il était fâché alors après l'autre il a poussé l'autre,*

'and he was angry so afterwards the other one pushed the other one'

5. _The reason for showing the stone_ (maximum score: 2 pts): 2 points were attributed when children mention that the stone is the unintentional or physical cause of the first push:

Example: _et il lui a expliqué que c'était le caillou qui l'avait fait trébucher,_

'and he explained to him that it was the pebble that made him stumble'

1 point was assigned when children provided any other reason for showing the stone:

Example: _il montre la pierre parce qu'il s'est fait mal_

'he shows the stone because he hurt himself'

6. _Rectification of the false belief_ (maximum score: 3 pts): 3 points were assigned when children who had previously expressed the false belief of P2, have P1 explain to P2 that the first push was not intentional and mention that P2 understands the accidental nature of P1's push:

Exemple: _après lui avec sa salopette bleu y voulait dire que il avait trébuché au début donc il l'avait pas fait exprès_

'then the boy in the blue overalls he wanted to say that he stumbled

at the beginning so he hadn't done it on purpose'

Two points were attributed when children, who had previously expressed the false belief of P2, EITHER had P1 explain the first push OR mentioned that P2 understands.

Example: _après il explique que c'était le caillou qui l'avait fait tomber_

'then he explains to him that it was the pebble that made him fall'

Finally, 1 point was given when children have P1 and/or P2 apologize without the prior explanation of the first push by P1.

7. _The reconciliation of the characters_ (maximum score: 3 pts): 3 points were attributed when children explained why P2 helps P1 to get up or why they become friends again as a result of P2 understanding:

Example: _et après il l'aide à se lever parce qu'il a compris_

'and then he helps him to get up because he understood'

2 points were attributed when children explained the reconciliation between the two characters with any other reason:

Example: _il l'a relevé parce qu'il s'était fait mal_

'he picked him up because he had hurt himself'

Only 1 point was attributed if children simply referred to the reconciliation of the two characters:

Example: _et après il l'a relevé_

'and then he pulled him up'

8. _The narrative structure_ (maximum score: 3 pts): 1 point was attributed when all the components of the story structure were present in the correct temporal ordering: the setting, the complication (the first push and the second push), the attempt at resolution (any of the following: P1 crying, falling, showing the stone, talking about the first push) and the resolution (P2 helping P1, or the characters becoming friends).

Two additional points were attributed if all the five key evaluative elements were mentioned: the physical or the unintentional cause of the first push; the psychological cause of the second push; the expression of the false belief; the resolution of the misunderstanding, and the explanation of the reconciliation of the characters.

Only 1 point was attributed if 3 to 4 of these elements were mentioned.

All monological narratives were coded, namely, the first and second narratives produced in the first interview and the third and fourth narratives produced one week later (NS1, NS2, NS3 and NB). For the peer interaction group (PINT) also the two narratives produced during the intervention (INTNS1 and INTNS2) were scored. If the children accepted the simplified version of the Stone story provided by the puppet without changing or adding elements, the INTNS2 narrative was attributed the score of the puppet's story, that is, a global coherence score of 2 points; otherwise, the modifications or the additional elements provided were scored and added to the basic value of the puppet's story.

Statistical analyses

The comparisons between narratives were performed with Student's t-test for paired samples when the measures were at least in an interval scale (total number of explanations, number of explanations of key events, total number of internal states and number of intentional and epistemic states), and with the non parametric Wilcoxon matched-pairs signed ranks test when the measures were in an ordinal scale (scores of false belief and rectification of false belief, and scores of overall coherence). The tests were performed to assess whether the measures of the narratives produced after the intervention procedure (NS2, NS3 and NB) were better than those of the first monological narrative (NS1). Since we expected NS2, NS3 and NB to be better than NS1, and thus had directional hypotheses, one-tailed probabilities were applied.

Moreover, for the PINT group we also looked at the change between the first monological narrative (NS1) and the two interactive narratives (INTNS1 and INTNS2), as well as the change between the first (INTNS1) and the second interactive narrative (INTNS2). Since we did not have directional hypotheses for these comparisons, two-tailed probabilities were applied.

The same two tests were applied accordingly to compare the narratives produced by the two groups, PINT and CONV. We applied the test for paired samples given that the subjects of the PINT group were matched one to one to the subjects of the CONV group. Since our hypotheses were not directional, two-tailed probabilities were applied here as well.

When reporting test results, if nothing is specified, the probabilities mentioned below are given for one-tailed values. When the values are for two-tailed probabilities, this will be mentioned.

The analysis was performed on all subjects for the narratives produced during the first interview (NS2 for the two groups; INTNS1 and INTNS2 for the PINT group). For the narratives obtained during the second interview (NS3 and NB) the analyses were performed on 11 out of the 12 subjects in each group because one of the participants in the PINT group was absent during that session and his match in the CONV group was thus also excluded from the analysis, both in the comparison across and within groups.

III. RESULTS

In this section we present results concerning the different measures described in the previous section, namely, the total number of explanations produced, the number of key events (first push, pushing back, showing the stone and the final reconciliation) that are explained, the total number of internal states attributed to the characters, with particular attention to the number of intentional and epistemic states, the scores obtained for the expression of the false belief and of the rectification of the false belief (ranging from 0 to 3 for each individual narrative), and the score of overall coherence (ranging from 0 to 20) that takes into account both the narrative structure and the evaluative aspects of the story.

1 Number of explanations

Table 1 presents results for the total number of explanations and the number of explanations of the four key events produced by the children, per group and per narrative. As a reminder, NS1 was the first monological narrative children tell after having simply seen the images; the second narrative, NS2, was the narrative told after one or the other of the two intervention procedures; the third narrative, NS3, was produced one week later to assess the stability of the changes, and the bicycle narrative, NB, also produced one week later, was intended to check whether the gains obtained were generalizable.

Insert TABLE 1 about here

See Document Tables RIPLA BVS

1.1. The PINT group: The t-test for paired samples applied to the total number of explanations produced by this group, presented in the top panel of Table 1, did not show any significant changes between the first and the subsequent narratives (see the right hand part of the top panel of Table 1, first line).

Nor did the number of explanations of the four key events change significantly between the first and the subsequent narratives (see the right hand part of the top panel of Table 1, second line).

1.2. The CONV group: The t-test for paired samples applied to the total number of explanations for the children of the CONV group, presented in the middle panel of Table 1, significantly increased between the first and the second narrative (t(11)=2.20, p<.025), the first and the third narrative (t(10)=2.59, p<.025), and between the first and the bicycle narratives (t(10)=3.32, p<.005) (see the right hand part of the middle panel of Table 1, first line).

Likewise, the t-test for paired samples applied to the explanations of the key-events significantly increased between the first and the second narrative (t(11)=4.10, p<.001) and between the first and the bicycle narratives (t(10)=2.32, p<.025). The difference between the first and the third narrative went in the right direction but did not reach the critical level of significance (t(10)= 1.79; p < .10, one tailed) (see the right hand part of the middle panel of Table 1, second line).

1.3. Comparison between PINT and CONV groups: Results of the t-test for paired samples, presented in the lower panel of Table 1, show that the CONV group provided significantly more total explanations and more explanations of key events than the PINT group in the second narrative (respectively: t(11)=2.26, p<.05 and t(11)=2.45, p<.05, two-tailed). Also in the third narrative the CONV group produced more explanations than the PINT group but the difference did not reach the critical level of significance (t(10)=2.05, p<.10, two-tailed) (see the right hand part of the lower panel of Table 1).

2 Number of Internal States

Table 2 presents the data relative to the total number of internal states, and to the number of intentional and of epistemic states, per group and per narrative.

Insert TABLE 2 about here

See Document Tables RIPLA BVS

2.1. The PINT group: The t-test for paired samples applied to the total references to the characters' internal states produced by the children of the PINT group, presented in the top panel of Table 2, increased significantly between the first and the bicycle narratives ($t(10)=2.52$, $p<.025$). The comparison between the first and the second, and between the first and the third narratives went in the right direction without however reaching the critical value of significance ($t(11)=1.48$, $p<.10$, and $t(10)=1.49$, $p<.10$, respectively) (see the right hand part of the top panel of Table 2, first line).

For intentional states, it was only for the bicycle narrative that the children produced a higher number of intentional states than they did in the first narrative, but this increase did not reach the critical value of significance ($t(10)=1.40$, $p<.10$, one tailed). No improvements in epistemic states were observed in any of the subsequent narratives (see the right hand part of the top panel of Table 2, second and third lines).

2.2. The CONV group: The t-test for paired samples applied to the total number of internal states produced by the children of the CONV group, presented in the middle panel of Table 2, increased significantly between the first and the second narrative ($t(11)=2.60$, $p<.025$), as well as between the first and the third narrative ($t(10)=2.06$, $p<.05$), while no significant change was found between the first and the bicycle narrative (see the right hand part of the middle panel of Table 2, first line).

For intentional states, in the second and third narratives children produced a higher number of intentional states than they did in the first one, but this increase did not reach the critical value of significance ($t(11)=1.39$, $p<.10$ and $t(10)=1.49$, $p<.10$, respectively). Compared to the first narrative, children produced more epistemic states in the second ($t(11)=1.82$, $p<.05$), third ($t(10)=2.28$, $p<.025$), and bicycle narratives ($t(10)=1.94$, $p<.05$) (see the right hand part of the middle panel of Table 2).

2.3. Comparison between PINT and CONV groups: Results of the t-test for paired samples, presented in the lower panel of Table 2, show that children of the CONV group mentioned more internal states than children of the PINT group, in the second ($t(11)=2.48$, $p<.05$, two-tailed) and in the third narratives the difference went in the same direction without reaching however the critical level of significance ($t(10)=1.91$, $p<.10$, two-tailed). No significant differences were found in the other two narratives (see the lower panel of Table 2, first line).

For intentional states, no significant differences were found between the two groups (see the lower panel of Table 2, second line).

Children of the CONV group produced significantly more epistemic states than children in the PINT in all subsequent narratives, but the differences did not reach the critical level of significance (for NS2: $t(11)=1.82$, $p<.10$; NS3: $t(10)=2.21$, $p<.10$; NB: $t(10)=1.94$, $p<.10$, all p values two-tailed) (see the lower panel of Table 2, third line).

3. Scores of False Belief and of the Rectification of False Belief

Table 3 presents the data relative to the scores of False Belief and of the Rectification of False Belief, per group and per narrative.

Insert TABLE 3 about here

See Document Tables RIPLA BVS

3.1. The PINT group: The Wilcoxon matched-pairs signed ranks test applied to the scores of False Belief, presented in the top panel of Table 3, did not show any significant changes between the first and the subsequent narratives (see the right hand part of the top panel of Table 3, first line). The same results were obtained for the score of the Rectification of the false belief (see the right hand part of the top panel of Table 3, second line). However, two children who had not expressed the false belief at any level at all, expressed it at the highest level at least once in the subsequent narratives and one child progressed in the expression of the Rectification of the false belief.

3.2. The CONV group: Also in this group, the Wilcoxon matched-pairs signed ranks test did not show significant changes in the scores of False belief, presented in the middle panel of Table 3, between the first and the subsequent narratives (see the right hand part of the middle panel of Table 3, first line). The same results were obtained for the score of the Rectification of the false belief (see the right hand part of the middle panel of Table 3, second line). Nonetheless, 5 of the eleven children who did not express the false belief at all during the first narrative, did so at one of the two higher levels in at least one of the subsequent narratives, and two children did the same for the Rectification of the false belief.

3.3. Comparison between PINT and CONV groups: Results of the Wilcoxon matched-pairs signed ranks test, presented in the lower panel of Table 3, showed no significant differences between the children in the CONV and in the PINT groups in the scores of False Belief in any of the narratives (see the lower panel of Table 3, first line). The same results were obtained for the score of the Rectification of the false belief (see the lower panel of Table 3, second line).

4. Scores of Overall Coherence

Results relative to the scores of overall coherence, per group and per narrative, are presented in Table 4.

-- Insert TABLE 4 about here –

See Document Tables RIPLA BVS

4.1. The PINT group: The Wilcoxon matched-pairs signed ranks test applied to the scores of overall coherence, presented for this group in the top panel of Table 4, did not show any significant changes between the first and the subsequent narratives (see the right hand part of the top panel of Table 4). However some children improved the evaluative aspects of their narratives after intervention. In other cases the overall coherence of the narrative after intervention was rather lower than that of the first narrative, as in the following example:

Child: NAT4 6;9[3]

NS1 (score of coherence: 8 pts)

>   There is one who stumbles and has caused the other to fall #[4] the other one pushed him and so the
>   other one fell and then he cried # and then he explained that it was the stone that had made him
>   stumble and then they become friends again

NS2 (score of coherence: 5 pts)

>   There were two boys who were friends # then there is one who # who stumbles # and mh then the
>   other one # he who has # has # he had held himself on the other one # the other one has almost
>   fallen # he has thrown him down # then # then he cried ## he told him a story ## they become
>   friends again

4.2. The CONV group: Results of the Wilcoxon signed ranks test for related samples show that he score of overall coherence increased significantly between the first and the second narrative (T = 9.5, N=12; p <.025), and between the first and the third narrative (T= 6.5; N=9; p < .05), while the change between the first narrative and the bicycle story was not significant (see the right hand part of the middle panel of Table 4). Here is the example of one of the children in this group where the overall coherence of the story increased considerably between the first and the second narrative:

Child : MAN 6.6

NS1 (score of coherence: 5 pts)

>   Well there are two boys #they say good morning to each other # as there was a brick the other one *is*
>   fallen [mistake on the auxiliary in French] # and and as he stumbled # his friend *is* fallen # and then
>   it is his friend who pushed him and he hurt himself and then they become friends.

NS2 (score of coherence: 14 pts)

>   There's a boy in blue overalls # there's one who has purple trousers and his purple shirt # then they
>   say good morning to each other # then the boy with the blue overalls without doing it on purpose
>   pushed him # and the one with his his purple trousers and his purple shirt he believed that he did it
>   on purpose # so with his purple trousers his purple shirt he pushed him # and he tries to explain to
>   him that he had stumbled # then he hurt himself # then they become friends.

4.3. Comparison between PINT and CONV groups: Results of the Wilcoxon matched-pairs signed ranks test applied to the scores of overall coherence, presented in the lower panel of Table 4, show that, in the second narrative, the coherence score of children of the CONV group was significantly higher than that obtained by the children in the PINT group (T=6.5; N= 12; p < .01, two-tailed) (see the lower panel of Table 4). The comparisons for the two narratives produced one week later, NS3 and NB, were not significantly different.

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[3] age in years ; months
[4] # means that there is a short silence

To assess the immediate effect of the interaction with the less competent peer, represented by the hand puppet, we also compared the first narrative (NS1) to the first and the second interactive narratives (INTNS1 and INTNS2) produced by the children of the PINT group, as well as the two interactive narratives among themselves.

Insert TABLES 5a and 5b about here

See Document Tables RIPLA BVS

Results of the t-test for paired samples applied to the measures of explanations and internal states are presented in table 5a, and results of the Wilcoxon matched-pairs signed ranks test applied to the scores of false belief, rectification of false belief and overall coherence are presented in Table 5b. As can be seen in these tables, no significant differences were found in any of the comparisons, meaning that the interactive narratives did not outperform the first spontaneous narrative in any of the evaluative aspects measured here.

IV. DISCUSSION

One of the hypotheses of this study was that the peer interaction procedure (PINT) would lead children to reorganize their own understanding of the story and to improve the quality of their narratives to an extent similar to that obtained through the CONV procedure, but that the underlying process would be different in the two procedures. The PINT procedure was intended to help children produce a more explicit verbalization of their understanding of the story for the benefit of the peer. The CONV procedure was intended to direct children's attention to the causes of events while segmenting the story into smaller units.

Our results did not support this hypothesis. Particularly in the second narrative, there were differences between the two groups and these were in favor of the CONV group. Narratives produced by children in this condition had significantly higher coherence scores and contained more explanations and internal states.

As for individual children's results, in their second narrative (NS2), children in the CONV group significantly improved the overall coherence of the story and, with it, the number of explanations and of internal states. Contrary to what they had done in their first narrative (NS1), several children also expressed the false belief of one of the characters. One week later, these children told narratives (NS3 and NB) that maintained most of the improvements observed in their NS2, showing stability and generalizability of the immediate gains. These results confirm the findings of earlier studies, attesting the efficacy of an intervention that focuses children's attention on the causes of the key events of the story, considered one at a time (e.g., Veneziano 2010, in press; Veneziano & Hudelot 2006, 2009; Veneziano *et al.*, 2009, 2011).

Instead, in the PINT group, only the total number of internal states tended to increase between the first and the second narrative. No other changes were observed, either for this comparison, or for the comparison with the narratives produced during the interaction with the peer-puppet. The two narratives told one week later restored the scores obtained in the first narrative (NS1), showing even an improvement in the attribution of intentional states in the bicycle narrative.

Thus, the second narrative (NS2) produced immediately after the PINT procedure was the least elaborate narrative that these children produced. This result is not in line with our expectations, as we predicted that this method could produce similar, if not better, results than those obtained with the conversational procedure. How can one explain this result?

We suggest that one of the answers is that the simplified version of the *Stone story* told by the less competent peer-puppet had a 'depressor' effect on the children. Indeed results show that INTNS1 (the first interactive story produced to the intention of the less competent peer-puppet), and INTNS2 (the second interactive narrative produced by the children after hearing the minimal story told by the peer-puppet), contained fewer evaluative elements than NS1 (the initial narrative). According to the 'depressor' hypothesis, when producing the first interactive narrative (INTNS1) children adjusted to the supposedly lower level of the peer-puppet. The children's anticipatory adjustment was reinforced by the minimal story provided by the peer-puppet and hence remained in force for the second interactive narrative (INTNS2). Moreover, this phenomenon of adjustment was enhanced here by 'modeling', namely by the minimal story told by the peer-puppet. Earlier studies with children of this age observed in situations similar to the present one, showed that modeling does indeed have an influence on the narratives told by children after hearing a well-constructed 'model' version of the *Stone story* told by the experimenter (Veneziano *et al.*, 2009).

However, while the interaction with the peer-puppet seems to have depressed the narrative content and the linguistic expression of children's second monological narratives (see NAT4 6;9, page 12), the PINT procedure also brought to light, and possibly promoted, children's socio-cognitive competencies. It can in fact be assumed that INTNS1 and INTNS2 were purposefully 'depressed', in order to adjust the narratives to the cognitive level of the less competent peer, so helping him to understand some basic aspects of the story. These efforts at adjustment, reinforced by the simplified story told by the peer partner, ended up depressing also the second monological narrative. The fact that the narratives produced one week later by these same children were similar to the first narrative and showed even slight improvements in the expression of the characters' intentional states supports this interpretation.

We may wonder whether children in the PINT condition perceived the peer-puppet as the interlocutor in the interaction or whether they considered the adult – who manipulated the puppet – as the real interlocutor. If the latter were the case, children might have considered the story told by the puppet as emanating in fact from the adult and, as such, they would have been led to accept it as it was, with no changes needed. This seems however an unlikely possibility. In fact, during the interviews, children never addressed the adult holding the hand puppet, but always directly the puppet itself. It is thus reasonable to suppose that the simpler narratives produced by the children of the PINT procedure are most likely the result of the adjustments viewed as necessary for communicating effectively with a less competent partner.

From this exploratory study, we can conclude that, compared to the PINT procedure used here, the CONV procedure is more effective in promoting improvements in children's monological narratives. This does not mean, however, that the interaction with a less competent peer, if better designed, cannot be helpful in promoting children's narrative skills.

In the socio-cognitive approach (e.g., Doise & Mugny 1984), it is the contraposition between the participants' perspectives, together with the ensuing necessity to find a compromise, that are the leading features in promoting cognitive progress. The interaction with the peer-puppet proposed here did not succeed in soliciting these important features, possibly because the peer puppet did not interact as a young child would have done, or because the peer puppet did not have a specific point of view to defend, or because the task did not require the partners to reach a compromise.

Future studies should aim at staging a greater confrontation between the child and the peer-puppet. This could be obtained by having the puppet respond to the story produced by the child by offering his own different interpretations, something that could stimulate a real discussion between the partners. In this way, instead of adjusting to the level of the story produced here by the puppet, children could be better stimulated to attain, as in the conversational procedure, higher levels of both narrative content and linguistic expression.

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APPENDIX 1
The Stone Story
(adapted from Furnari 1980 by Veneziano & Hudelot, 2006()
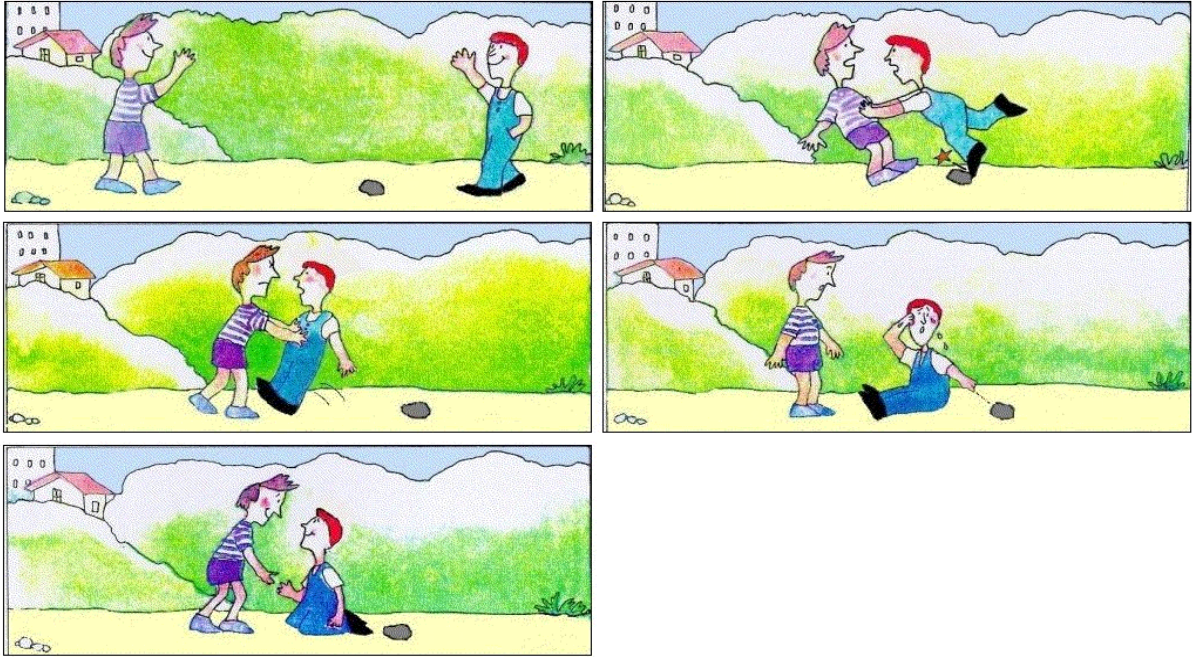
APPENDIX 2
The Bicycle Story
(designed by Veneziano et al., 2011 with the support of the CFQCU project)