Interactive reading: A way to improve theory of mind and verbal communication in autistic children

Marie-Pierre Baron[1,2] & Hélène Makdissi[2]

[1]Université du Québec à Chicoutimi - [2]Université Laval

UQAC Université du Québec à Chicoutimi · Université Laval · The Clute Institute #IECVegas15

Fonds de recherche Société et culture Québec · Social Sciences and Humanities Research Council of Canada / Conseil de recherches en sciences humaines du Canada · Canada

Abstract: With theory of mind (TOM), children can attribute mental states to themselves and to others. During interactive reading, when children are questioned about the recurring components of a story, the theory of mind allows them to interpret the protagonists' mental states and link them causally with the recurring components, such as the protagonists' problems, emotions and' motivations. Difficulties experienced by autistic children in theory of mind (Baron-Cohen, Leslie and Frith, 1985) and in the comprehension and production of speech hinder their understanding of the story (Tager-Flushberg, 2000). The aim of this study is to describe the progress made in the attribution of protagonists' mental states and identification of recurring components of a story, in the context of interactive reading with an autistic child.

An experiment was conducted with an eleven-year-old autistic child who received daily dialogic reading interventions involving children's stories over a period of ten months. Three intermediate measurements were made during interactive reading sessions and were analyzed from two angles: (1) TOM, the identification of the protagonists' emotions, aims and motivations (Veneziano, 2010), and (2) the structuring of narrative recall.

The results show improvement in the child's verbal communication, specifically in the identification of the protagonists' mental states, such as emotions, aims and motivations, and the ability to link them causally with the recurring components of a story. This progress appears to have been supported by interactive reading interventions, when narrative recalls and intermediary measures are compared, which, from a developmental perspective on the construction of knowledge in children, linked the story's discourse with the child's so that the adult could intervene within the child's zone of proximal development.

Aim of the study

The aim of the study is to demonstrate that it is possible to do otherwise in the education of students with autism spectrum disorder.

This case of study demonstrate the importance and the extend of intensive interventions developed in intersubjectivity with a child when using complex subjects such as children's literature. The developmental progress of the child during the procedure will be described within two spheres of development: the structure of narrative discourse and the development of the theory of mind.

Specific goals:

- Describe and analyze the progress of the child while ensuring the development of narrative structure during interactive reading;
- Describe and analyze the progress of the child while ensuring the development of the theory of mind during interactive reading.

Theorical framework

The systemic representation of the autistic child's development

The **joint attention** development is complex for the autistic child (Baron-Cohen, 1989; Charman, 2003; Lemay, 2004; Rogers, & al., 2003). The autistic baby does not respond to following eye gaze and hardly responds to his name (Charman, 2003; Thommen & Gaddoux, 2011).Those two important skills have an important impact on the development of imitation and intentionality.

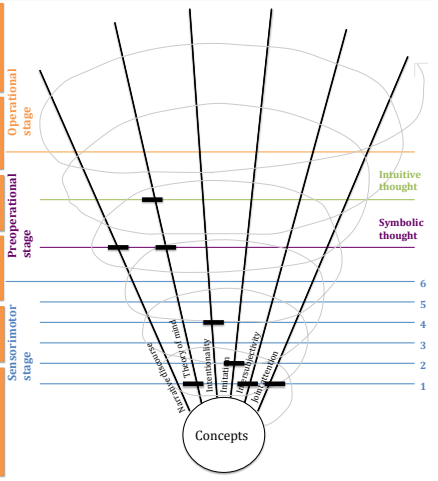
The **imitation** development suggests a relationship of intersubjectivity and joint attention between the autistic child and others (Charman, 2003; Nadel, 2005). The autistic child has trouble imitating facial expressions (Rogers, & al., 2003) and has a developmental delay in decontextualized imitation (Charman, 2003; Lemay, 2004; Nadel, 2005; Rogers, & al., 2003).

For the autistic child, **intentionality** remains an egocentric concept. Intentionality at a pre-linguistic level is hard to develop and it has consequences on the proto-declarative communication's development (Tomasello, 2008; Toth, & al., 2006).

The autistic child scarcely recognizes others' emotions (Baron-Cohen, 1989; Lemay, 2004) and is not capable of sharing his own emotions. The **intersubjectivity** relation provided by a dyadic relationship is difficult to establish because of the autistic child's lack of interest towards others.

Baron-Cohen (1989) talks about «mindblindness» for the autistic child **theory of mind's** development. They struggle with considering other's thoughts and predicting their behaviour.(Baron-Cohen, 1989; Baron-Cohen & al., 1985).

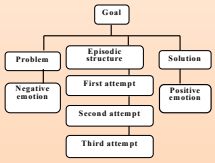
In the **narrative discourse** development, authors have observed that the autistic child has difficulties establishing causal relations between characters and their emotions (Diehl, Bennetto & Carter Young, 2006). Therefore, the maturation of a complex episodic structure is rare. Also, difficulties noticed in the joint attention development have a direct impact on the development of a triadic relationship between the child, the book and the adult.



Schema of narrative structuring

(Makdissi et Boisclair, 2008)

Children's organization and understanding of the narrative helps them build coherence. In order to develop the macrostructural coherence of the narrative, children must identify the recurring components in the narrative structure and identify the causal relations between these components.



Theory of mind: mental states

(Veneziano, 2010; Veneziano et Hudelot, 2006)

The theory of mind is the ability to understand and to depict mental states. It also display the capacity to assign them to others, despite his own and to draw conclusions from them. The theory of mind is also the ability to infer what the other thinks according to what happens to him and predict what he will do.

The theory of mind appears as a fundamental aspect of human communication. In fact, decoding makes a large part of the communication skills, including inferences and assumptions about the thoughts of others.

In reading context, the characters experience four types of internal states:

1- Physical state

2- Emotional state

3- Intentional state

4- Epistemic state

Interactive reading

(Kaderavek et Sulzby, 2000; Veneziano and Hudelot, 2006)

Interactive reading takes place in a social context based on dialogue.

This dialogue focuses the child's attention on the causes of certain narrative events in order to guide his/her understanding of the story.

The adult's questions help the child to focus on the macrostructure of the narrative, and to make causal and lexical inferences.

Method

(Bais & Martineau, 2006; Paillé & Mucchielli, 2012; Van der Maren, 2003)

Case of study

Participant:

- Autistic child
- Eleven years old (age of development of a three-year-old)
- First school in New-Brunswick, Canada
- Therapy received: ABA and TEACCH

Data collection:

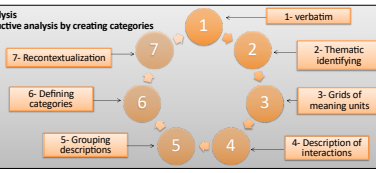
- Ten months of intervention from September 2011 to June 2012
- The child received daily interventions at home (Quebec, Canada)
- One interactive reading session has been done and recorded each day
  - Total of 105 videos

It includes 3 interactive readings selected for 3 times of analysis

- November 2011: "King has goat ears"
- April 2012: "Raoul Taffin pirate"
- June 2012: "Nez-Rouge on the trail of Leonard"

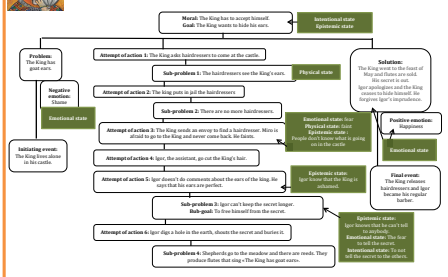
Analysis

Inductive analysis by creating categories

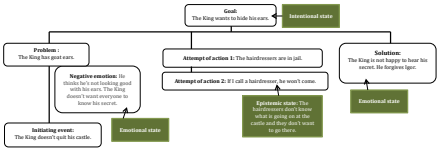


Analysis

Episodic structure of the book "King has goat ears"

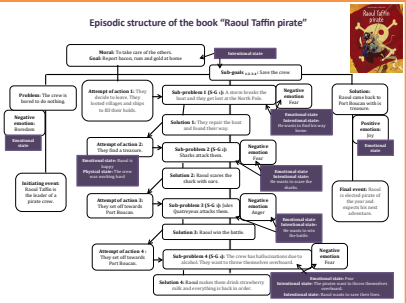


Episodic structure of the child comprehension : «King has goat ears»

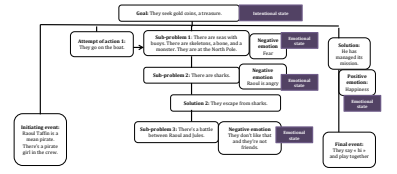


Jovanovic, Katarina. *Les oreilles du roi*. Ill. de Philippe Béha. Texte français de Sylvie Roberge. Montréal, Dominique et Compagnie, 2011, 32 pages, ISBN 978-2-89686-093-7.

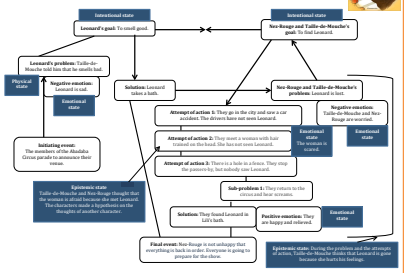
Episodic structure of the book "Raoul Taffin pirate"



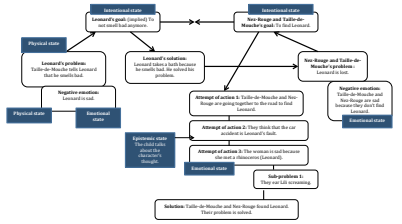
Episodic structure of the child comprehension: «Raoul Taffin pirate»



Episodic structure of the book "Nez-Rouge on the trail of Leonard"



Episodic structure of the child comprehension: «Nez-Rouge on the trail of Leonard»



Devernois, Elsa. *Nez rouge sur la piste de Léonard*. Ill. de Savine Pied. Paris, Père Castor Flammarion, 1999, 27 pages, ISBN 2081632837.

Moncomble, Gérard. *Raoul Taffin pirate*. Ill. de Frédéric Pillot. Toulouse, Éditions Milan, 2001, 22 pages ISBN 745904345.

Results

Child's participation during interactive reading

Books	Questions the child does not answers	Questions the child answers	Spontaneous interactions
King has goat ears	28,5%	43%	19%
Raoul Taffin Pirate	20%	47%	23%
Nez-Rouge on the trail of Leonard	11%	56%	33%

Narrative structure
Questions that the child answers

Books	I.E.	Prob.	- E.	Goal	A. A.	S.-Prob.	S.-E.	S.-goal	S.-Sol.	Sol.	+ E.	F.E.
King has goat ears	7%	33%	7%	20%	20%					13%		
Raoul Taffin Pirate	8%			21%	8%	29%	5%	8%	13 %	8%		
Nez-Rouge on the trail of Leonard		24%	10%	24%	14%	4,5%				19%		4,5 %

Narrative structure
Questions that the child does not answers

Books	I.E.	Prob.	- E.	Goal	A. A.	S.-Prob.	S.-E.	S.-goal	S.-Sol.	Sol.	+ E.	F.E.
King has goat ears		86%	14%									
Raoul Taffin Pirate					33,3%	33,3%	33,3%					
Nez-Rouge on the trail of Leonard	33,3 %				33,3%	33,3%						

Narrative structure
Spontaneous interactions

Books	I.E.	Prob.	- E.	Goal	A. A.	S.-Prob.	S.-E.	S.-goal	S.-Sol.	Sol.	+ E.	F.E.
King has goat ears		60%			20%					20%		
Raoul Taffin Pirate	11%			8%	11%	34%	11%		11 %		11 %	11%
Nez-Rouge on the trail of Leonard	43%	14%	29%	14%								

Theory of mind
Questions that the child answers

Questions	Physical state	Emotional state	Intentional state	Epistemic state
King has goat ears	24%	36%	36%	14%
Raoul Taffin Pirate	6,5%	26,5%	67%	
Nez-Rouge on the trail of Leonard	25%	33,5%	33,5%	8%

Theory of mind
Questions that the child does not answers

Questions	Physical state	Emotional state	Intentional state	Epistemic state
King has goat ears	29%	71%		
Raoul Taffin Pirate	25%	25%	50%	
Nez-Rouge on the trail of Leonard			100%	

Theory of mind
Spontaneous interactions

Questions	Physical state	Emotional state	Intentional state	Epistemic state
King has goat ears	40%	40%		20%
Raoul Taffin Pirate		75%	25%	
Nez-Rouge on the trail of Leonard	40%	40%	20%	

Conclusions

Evolution of the child

Over the time:

- There are less unanswered questions by the child;
- The child answers more questions;
- There are more spontaneous interactions.

We noticed more commitment on the part of the child during interactive reading

Narrative structure

Questions most answered:

- King has goat ears: questions about the problem
- Raoul Taffin pirate: questions about the sub-problem
- Nez-Rouge on the trail of Leonard: questions about the problem and the goal

Questions less answered:

- King has goat ears: questions about the problem
- Raoul Taffin pirate: questions about the problem, the attempts of action, and the sub-problems
- Nez-Rouge on the trail of Leonard: questions about the initiating event, the goal, and the attempts of actions

Spontaneous interactions:

- King has goat ears: interactions about the problem
- Raoul Taffin pirate: interactions about the sub-problems
- Nez-Rouge on the trail of Leonard: interactions about the initiating event

The child's spontaneous interactions are related to recurring components questioned by the adult. It is possible to think that the child is doing deferred imitation.

Theory of mind

Questions most answered:

- King has goat ears: questions about the emotional and the intentional state
- Raoul Taffin pirate: questions about the intentional state
- Nez-Rouge on the trail of Leonard: questions about the emotional and the intentional state

Questions less answered:

- King has goat ears: questions about the emotional state
- Raoul Taffin pirate: questions about the intentional state
- Nez-Rouge on the trail of Leonard: questions about the intentional state

Spontaneous interactions:

- King has goat ears: questions about the physical and the emotional state
- Raoul Taffin pirate: questions about the emotional state
- Nez-Rouge on the trail of Leonard: questions about the physical and the emotional state

We note, at the second and the third interactive reading session that the child starts to speak spontaneously about the intentional state, even if it is difficult for him to answer to questions about his state of mind. The child is possibly doing deferred imitation.

The emotional state is the mental state the most discussed and answered by the child.

References

- Baron-Cohen, S. (1989). The Autistic Child's Theory of Mind: a Case of Specific Developmental Delay. *Journal of child psychology and psychiatry, 30*(2), 285–298.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). The autistic child have a "theory of mind"? *Cognition, 21*, 37–46.
- Bais, M., & Martineau, S. (2006). L'analyse inductive générale : description d'une démarche visant à donner un sens à des données brutes. *Recherches qualitatives, 26*, 1–16.
- Charman, T. (2003). Why is joint attention a pivotal skill in autism? Philosophical transactions of the Royal Society of London. *Series B, Biological sciences, 358*(1430), 315–24. doi:10.1098/rstb.2002.1199
- Diehl, J. J., Bennetto, L., & Young, E. C. (2006). Story recall and narrative coherence of high-functioning children with autism spectrum disorders. *Journal of abnormal child psychology, 34*(1), 87–102. doi:10.1007/s10802-005-9003-x
- Kaderavek, J. N. & Sulzby, E. (2000). Narrative production by children with and without specific language impairment: oral narratives and emergent readings. *Journal of speech, language, and hearing research, 43*(1), 34–49.
- Lemay, M. (2004). *Construire aujourd'hui*. Paris: Odile Jacob.
- Makdissi, H., & Boisclair, A. (2008). L'organisation discursive du rappel de récit chez l'enfant d'âge préscolaire. *Archives de psychologie, 72*, 51-79.
- Nadel, J. (2005). Imitation et autisme. *Autism*, 341–356.
- Paillé, P., & Mucchielli, A. (2012). *L'analyse qualitative en sciences humaines et sociales* (3rd ed.). Paris: Armand Colin.
- Rogers, S. J., Hepburn, S. L., Stackhouse, T., & Wehner, E. (2003). Imitation performance in toddlers with autism and those with other developmental disorders. Journal of child psychology and psychiatry, and allied disciplines, 44(5), 763–81. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12831120
- Tager-Flushberg, H. (2000). Language and Understanding Minds: Connections in Autism. In S. Baron-Cohen, H. Tager-Flushberg, & D. J. Cohen (Eds.), *Understanding other minds: Perspectives from autism and developmental cognitive neuroscience*. Oxford: Oxford University Press.
- Toth, K., Munson, J., Meltzoff, A. N., & Dawson, G. (2006). Early predictors of communication development in young children with autism spectrum disorder: joint attention, imitation, and toy play. *Journal of autism and developmental disorders, 36*(8), 993–1005. doi:10.1007/s10803-006-0137-7
- Thommen, E., & Gaddour, N. (2011). De l'intention sociale à la théorie de l'esprit : aspects du développement typique et atypique. *Enfance*, No 1, 49-68.
- Tomasello, M. (2008). *Origins of human communication*. Cambridge: MIT Press.
- Van der Maren, J.-M. (2003). *La recherche appliquée en pédagogie. Des modèles pour l'enseignement*. Bruxelles: de Boeck.
- Veneziano, E. (2010). Peut-on aider l'enfant à mieux raconter? Les effets de deux méthodes d'intervention: Conversation sur les causes et modèle écrit. In N. Makdissi, A. Boisclair et P. Sirois (Eds.), *La littératie au préscolaire. Une fenêtre ouverte vers la scolarisation*. Québec: Presses de l'Université du Québec.
- Veneziano, E., & Hudelot, C. (2006). Processus discursifs dans le développement de la cohérence narrative. In J. M. Hoc et Y. Corson (Eds.), *Actes du congrès 2007 de la Société Française de Psychologie* (pp. 121-128.).