

The effect of joint reading on the tactile comprehension of a tact-illustrated book by early blind children

Anne Theurel¹, Enrica Polato², Paola Caldironi³, Josée Lanners⁴, Philippe Claudet⁵, Roberta Caldin² & Edouard Gentaz¹

¹Laboratoire de Psychologie et NeuroCognition (UMR CNRS 5105), Université Pierre Mendès-France, Grenoble.

²Scienze Pedagogiche, dell' Educazione e della Formazione, del Dipartimento di Scienze dell' Educazione dell' Università di Padova (Italie)

³ Director of the Robert Hollman Foundation of Padoue (Italy)

⁴ Director of the Robert Hollman Foundation of Cannero Riviera (Italy)

⁵ Directeur des Editions Les Doigts Qui Rêvent, France

Abstract

The objective of this study was to determine which verbal descriptions are used by the adult (parent or experimenter) to support the child during reading and to which extent these descriptions could make the tactile comprehension of a tactile illustrated book for blind children easier. We investigated the reading of a tactile illustrated book by seven young blind children in the company of either their mother or an experimenter. Analysis of the results show that on the one hand, mothers and experimenters do not use the same verbal descriptions during the reading and on the other hand, that these descriptions seem to have an impact on the quality of the tactile exploration used by the blind child. In particular, results show that descriptions of the main tactile features of the picture seem to induce the use of specific manual exploratory procedures by the child.

Mots clés: Tactile illustrated book, blind child, joint reading, haptique

1. Introduction

Since they are born, sighted children live in a world where pictures and books are plentiful in their family and scholastic environment. For the partially sighted or blind children, the situation is very different. They are not only deprived of natural visual stimuli which other children get every day, but young blind children are also deprived of all the pictures usually present in books because of the lack of equipment suited to their visually impairment. Yet, the tactile illustrated book is a tool that promotes the development of the blind child for at least two reasons. First, the vocabulary and the syntax of the story should be suitable to encourage the development of the child's language (Hatwell, 2003). Second, the tactile picture would reinforce the role of the text in the development of the blind child since it would further the understanding of the text (Stratton et Wright, 1991), and allow a better retention of the story (Pring et Rusted, 1985).

However, so that tactile pictures can have a beneficial effect, they must first of all be comprehensible for the child. Yet, blind people grasp their environment in another way from sighted people. Contrary to vision, haptique perception (tactilo-kinaesthetic) is sequential (Gentaz, 2009). The production of a representation by this sense is therefore slow and costly because it requires at the end of exploration a work of incorporation and synthesis to lead to a unified representation of the object (Loomis, Klatzky et Lederman, 1991 ; Revesz, 1950). Moreover, while mental pictures of sighted persons are constructed to a great extent based on their visual experience, those of the Blind are constructed from haptique and auditory information principally. Anderson and Olson (1981) show for instance that blind children define objects by referring, in most cases, to their tactile attributes. It seems therefore that representations acquired by blind children differ from those of sighted children. So, it is legitimate to wonder to which extent tactile pictures can be understood by the blind children. Besides, the understanding of tactile pictures requires an exploration from the child.

Yet, the first works on the manual exploration abilities of young children working without seeing (3-5 years) describe the use of explorations that are not very active, partial and often maladjusted to the task (Piaget et Inhelder, 1947). At 2-3 years, children just use the palm of the hand rather than the fingers and the only accomplished movements consist in practical actions on the object. At this age, children therefore still do not have the capacity to dissociate the motor function of the purely perceptual function of the hand (Hatwell, 1986). Between 4

and 7 years exploration becomes more active, first total then characterized by a systematic exploration of the contour of the shape at about 5-6 years (Zaporozhets, 1965). This development is very similar to that noticed among the blind children (Morrongiello and al., 1994). This improvement of the exploration is also noticed by Hatwell, Orliaguet and Brouty (1990) who found an increase in the speed of haptic treatment between 5 and 9 years partly due to, according to these authors, an improvement in the quality of exploratory strategies. Lederman and Klatzky (1987, 1993) identified among the adult's population several exploratory procedures, each more or less appropriate according to the properties of the object to be extracted. In this way, lateral motion is considered as optimum for the treatment of texture, static contact for the temperature, the contour following for detailed shape and enclosure for the evaluation of the total shape of an object. Before 7 years the children use strategies allowing them only to extract total information on the object and it is only later that they use specialized strategies allowing to extract appropriate information to identify a specific object. Berger and Hatwell (1995) carried out a study in which they ask sighted children of 5 and 9 years as well as adults to classify cubes varying according to 2 dimensions (hardness and texture). The children, and particularly those of 5 years, use overall strategies and not specialized as the procedure of envelopment, while the adults use more specialized and analytical procedures such as lateral motion. This inadequacy of the exploration of the sighted children is also found among the blind children. In this way, in a task of identification of common objects, Morrongiello and al. (1994) show no difference between blind and sighted children. Before 6 years, the children use total exploration and local exploration from 8 years of age.

This weak adaptation of exploratory strategies is expressed by very poor performances in the discrimination of tactile shapes (Berla; 1972, 1974). Although some authors show that the blind adults could understand tactile pictures to a certain extent (Heller, 1989; 2002; Kennedy, 1993), it appears obvious that young children will feel more difficulties in understanding them because of their poor capacity of exploration. Certain authors have even questioned on real usefulness to insert relief pictures in books for young blind children because these tactile pictures, which are often very hardly recognizable for the child, could not support him in the understanding and retention of the story (Lewi-Dumont, 1997). It appears therefore critical for

the editors of tactile illustrated books for young blind children to determine which are the factors that allow for easier comprehension of the tactile pictures.

Several authors have already defined the influence of certain factors on the quality of exploration and the identification performances of objects or of tactile pictures. For instance, D'Angiulli and al. (1998) improve the recognition performances of tactile pictures of children working without seeing by guiding their exploration and confirm this result in 2000 by showing that children guided in their exploration reach identical performances to those of guided adults. On the other hand, Alexander, Johnson and Schreiber (2002) show that semantic knowledge in a specific domain improves strategies of exploration in a task of comparison of objects belonging to this domain. In this way, in the study of these authors, the children with a high knowledge of the objects of the study use strategies consisting of searching directly the characteristic elements of the object by ignoring features that are not appropriate, contrary to the children with a poor knowledge of the objects. In the same manner Heller, Calcaterra and Burson (1996), show that giving information beforehand on the membership category of objects facilitates tactile identification by adults.

These studies, therefore, lead us to think that during the conception of books, pictures should not be considered as a separate entity, disconnected from information brought by the text. Information contained in the text should correspond directly with the tactile picture by guiding the exploration of the blind child. Besides, reading is not a solitary process but a privileged instant of interaction between the adult (family or school) and the child. During reading, the child and the adult participate jointly by soliciting mutually. If it was already shown that the joint reading, by the verbal interactions which it provokes, allows to develop the level of oral language of the child (Whitehurst, on 1988, on 1994), it also seems to us that joint reading could have an impact on the quality of tactile picture exploration set up by the blind child. The adult, by providing information from the text, could act as a support and as a guide to the child in his tactile comprehension of the book.

Nevertheless, during the accompaniment of a child in the discovery of a tactile illustrated book, the way to make reading seems to take two orientations: the first is more centered on the “psychoaffective” and the second is more centered on the “educative”. The parent should more choose the first orientation whereas the experimenter should more choose the second orientation. Analysis of the verbal descriptions used by the adults will allow ratifying this

hypothesis and we will see if verbal descriptions can have an effect on the tactile explorations of the blind children. This study aims at determine which are the verbal descriptions used by the adult to support the child during the reading of a tactile illustrated book and which are the impact of these descriptions on its tactile comprehension.

2. Méthod

2.1 Participants

7 early blind children (5 boys and 2 girls) without perception of light and without other disabilities, of 3,5 years on average and of Italian mother tongue participated in this research (Table 1).

Table 1: Characteristics of the population having participated into the experience

Subject	Gender	Age (month)	Cause of the deficiency
1	M	37	Leber's amaurosis
2	M	45	Right Anophtalmia Left Microphthalmia
3	F	36	Right Anophtalmia Left Microphthalmia
4	M	42	Microphthalmia Optic nerve atrophy
5	M	45	Premature
6	F	34	Retinopathy
7	M	44	Norrie syndrome

2.2 Matérials

The tactile illustrated book analysed in this study was produced by “Les Doigts Qui Rêvent”, a publishing company specialized in the conception and production of books suited to visually

impaired from a prototype conceived by the BiTiB group¹. The book is titled « *Emy Touchatou goes to the beddy-byes* » and tells the story of a little girl, tired, who is searching her blanket in order to sleep. Every double page of the book contains the text on the left page and tactile picture on the right page. The text is written in large print and in Braille and describes the tactile picture in the context of the story of the doll Emy which the child can manipulate in the book. Tactile pictures on every page represent blankets of different textures (Figure 1). Every page corresponds to a format 15cm x 15cm, appropriate to the perceptual tactile field of the children of this age. Blankets on every page measure 8,5cm x 8,5cm. They are sewed so as to form a pocket where the child can insert the doll.

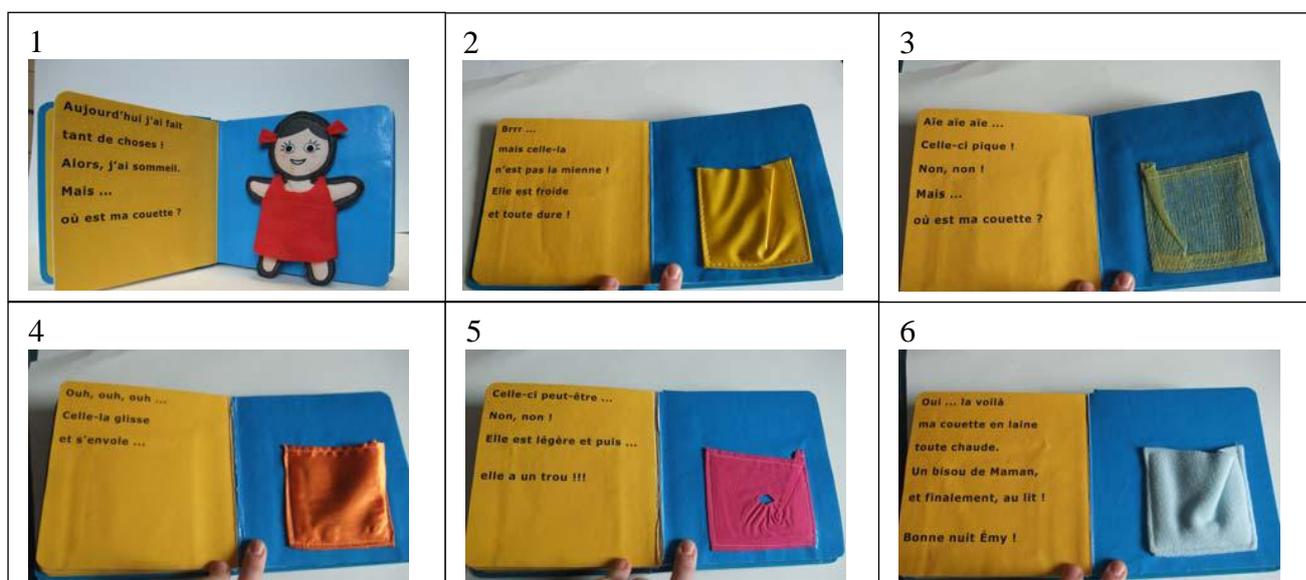


Figure 1 : Text and tactile pictures of the tactile illustrated book: Tactile Pictures: doll with serigraph cotton face, back in polar and Velcro, dress in lycra and padding in cotton and polypropylene (1), vinyl (2), hessian (3), satin (4), textile cotton (5), polar (6).

2.3 Procédure

¹ BiTiB ((Blind Infant's Tactile Illustrated Books) : research group initiated and directed by Les Doigts Qui Rêvent (2007) with practical professionals from France, Quebec, Italy, Nederland, Czech Republic and the universities of Dijon (LEAD, Annie Vinter), Grenoble (LPNC, Edouard Gentaz), Padua (Science de l'Education, Roberta Caldin et Enrica Polato)

The child is then settled down on the adult's laps, sat at a table with the book in front of him. During a first session, an experimenter is reading the book to the child a first time then the mother of the child starts again the reading of the book. Before the reading of the book, the adult has as instructions to introduce the book to the child with a sentence of type « here is a book, I am going to read it to you, he tells the story of Emy ». The adult must open the album and introduce two pages at the same time (the left page with the story and the right page with the tactile picture). He must let the child explore the album as his please and in case the child does not explore the book, the adult must put down the hand of the child on picture to initiate contact with this one. We also ask the adult to read slowly the story and to articulate well. The following day, the experimenter and the mother of the child make a second reading following the same instructions (session 2). In short, each child performs therefore two sessions in which he makes every time two reading with the adult, one with an experimenter and another one with his/her mother. The different readings are filmed and recorded in order to be analyzed by the searchers.

3. Results

Analysis of the verbal descriptions shows that the adults use either a tactile vocabulary, or comparisons with the personal tactile experience of the child (eg: « it is as the hedgehog at home » for the coverage in hessian). We consider as tactile vocabulary all words which refer either to the tactile qualities of textures (soft, hard, cold...), or to the specific names of textures (Velcro, wool...). We therefore noted the number of times these two types of descriptions are used besides the text by each adult during reading. Results show that the experimenter does not use the same descriptions as the mother to translate picture to the child. Picture is more often described to the child with a tactile vocabulary by the experimenter than by the mother of the child. Moreover, we notice no difference as for the number of descriptions with comparisons with the personal experience of the child between the different adults.

Analysis of the manual exploratory procedures used by the child with each adult shows that the children use only a single exploratory procedure per tactile picture and that they use at all 5 distinct exploratory procedures: lateral motion, static contact, pinch, grasp, scratching. The lateral motion, which consists of a dynamic movement on the surface of the picture by

displacement of one or several fingers, is the most often procedure used by the children. On average on the book, 75 % of used procedures are lateral motions. The children use therefore in the majority a procedure appropriate to the treatment of texture. On the other hand, we point out that 33,4 % of the procedures of static contact are noticed in page 2, 75 % of the procedures of scratching are noticed in page 3, 42,8 % of the procedures of pinch are noticed in page 4 and 42,8 % of the procedures of grasp are noticed in page 6 (Figure 2). Some procedures seem therefore specific and appropriate to the treatment of certain textures. In this way, static contact (the hand is put down on picture) is often used to detect the thermal properties and seems to us appropriate to picture in page 2 (vinyl) described by the text as hard and cold. Scratching is very appropriate to the picture in page 3 (hessian) described as prickly by the text. The pinch consisting in grasping and in slipping the blanket between the thumb and the index seem to us appropriate to picture in page 4 described as slippery by the text. The grasp consisting in catching an object between the palm and fingers seems to us be suitable for the page 6 where the child must insert the doll in the blanket. We therefore considered the lateral motion as an “overall” procedure although it is appropriate to the treatment of texture, and we considered procedures of static contact, pinch, grasp and scratching as "specific" procedures. We noted for every adult the number of overall exploratory procedures just as the number of specific exploratory procedures used by the child in total on the book.

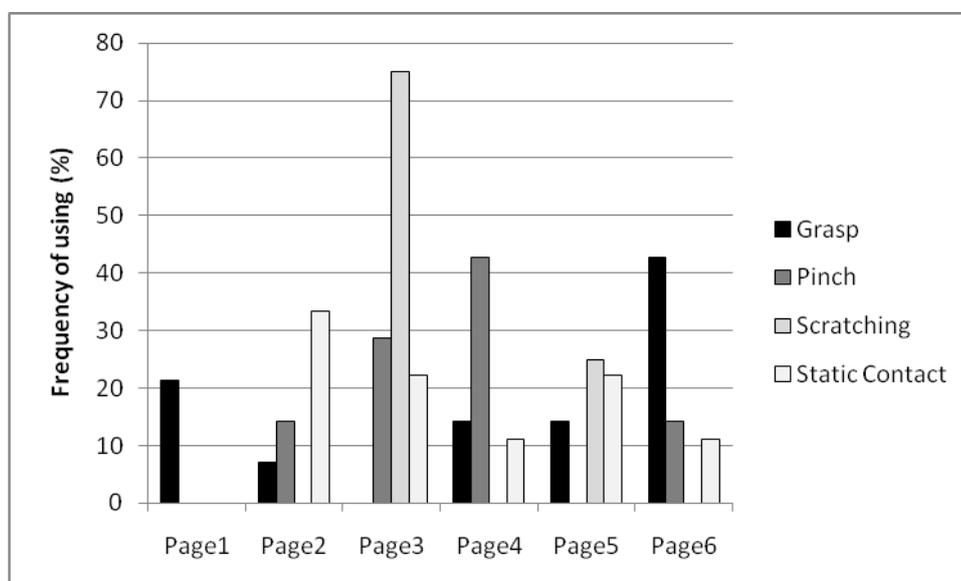


Figure 2: Frequency of specific procedures using according to the explored pages

Finally, results show that the children are inclined not to use specific and overall procedures in identical quantity depending on they are with the experimenter or their mother (Figure 3). Together with the experimenter, the children are inclined to more often use specific procedures than in the presence of their mother. It seems therefore that descriptions of picture by a tactile vocabulary lead to the use of specific procedures by the child. In other words, if the child does not use the same type of exploratory procedures with both adults, this difference would be due to the fact that the experimenter uses more tactile descriptions than the mother to explain picture to the child.

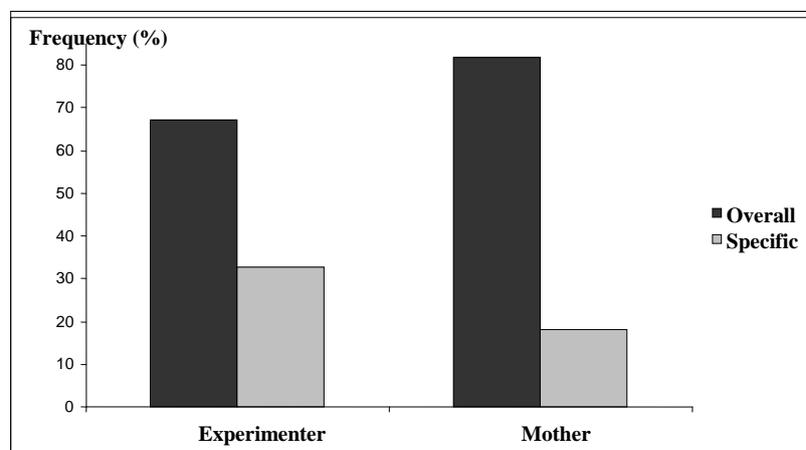


Figure 3: Frequency of specific and overall procedures using according to the mediator (experimenter, mother).

4. Discussion

The objective of this study was to determine in which extent the joint reading with an adult could make easier the tactile apprehension of tactile illustrated book by young blind children. Concerning the part of the adult in the quality of the exploration of the child, results show that the children use more often specific exploratory procedures in the presence of the

experimenter (32, 8 %) than in the presence of their mother (18,2 %). This difference could depend on the fact that the adults do not use the same descriptions to "translate" picture to their child. Results show that the experimenter uses tactile qualifiers (harsh, soft) in more important number than the mother. The use of tactile descriptions seems therefore to guide the exploration of the child. The use of specific procedures by the child could therefore be induced from tactile descriptions used by the adult. There seems to be a link between the tactile qualifiers and the type of procedure chosen by the child. So, we notice that for the blanket qualified as prickly (hessian), the children often use the scratching procedure. In the same way, for the blanket qualified as cold, the children use static contact (used to determine the thermal properties of an object). It seems therefore that the tactile qualifiers could start the use of specific exploratory procedures by the child. It could therefore be interesting to extend this link between vocabulary and perception of textures into the perception of 2D objects. Berlà and Butterfield (1977) noticed an improvement of performances in a task of form recognition among children from 6 to 17 years old who had followed a training centered on the critical part (or characteristic features) of the object to be explored. It would therefore be interesting to determine in which extent the read text, by putting the emphasis on the characteristic features of an object (for instance, the handle for a cup), could induce the use of analytical exploratory strategies.

To conclude, from what we noticed in this study, certain behaviors seem to be encouraged by the adult during reading. Although certain authors (Magee and Kennedy, 1980) show the interest of tactile accompaniment (guide the child's hands on the picture), we believe that the use of verbal descriptions of tactile pictures is useful to guide the child in its haptique exploration. Besides, they would allow to the child to acquire certain autonomy in reading.

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