ADRIANA G. BUS

STORYBOOK EXPOSURE: HEAVENLY BLISS AND VIRTUAL TUTORS

Many people are shocked by the suggestion that watching screen media is replacing the shared experience of reading by adults and children. Are they right and will the outcome of this be negative? To answer this question, I will discuss why children's exposure to storybooks up to the age of five is important, whether or not adult support is indispensable and the age range in which watching screen media can be effective in stimulating reading.

More than ten years ago I began to wonder whether reading books to preschool children is important in preparing them to become readers. At that time, opinions were divided. Some took the position that book reading promoted skills that were indispensable for becoming a reader. For instance, the Commission on Reading in the US (Commission on Reading, National Academy of Education, 1985) described book sharing "as the single most important activity for developing knowledge required for eventual success in reading." The empirical evidence, however, is less conclusive. Scarborough & Dobrich (1994) for instance, conducted a review of all 31 studies done between 1950 and 1994. They counted the number of significances and concluded that few studies revealed significant effects of book reading. Having found this, they wondered whether we should advise parents to read to their young children as the Commission on Reading had done. Is it true that even if it is not effective, it may not hurt to try? Scarborough & Dobrich wondered whether book reading makes sense when mothers report that preschool children enjoy being read to "not at all" or "not much." They argued that serving broccoli to a child who dislikes it will not make the child love broccoli. On the contrary, we run the risk that reading sessions will solidify the child's aversion to books.

ANOTHER VIEW OF BOOK READING

Since Scarborough's findings were inconsistent with the common view that book reading is an incentive for language and literacy, my colleagues and I (Bus, Van IJzendoorn & Pellegrini, 1995) decided to have another look at the 31 studies in Scarborough's review. We concluded that their approach may not do justice to the actual results of research into reading books. Most of the studies used small samples. This implies that effects have to be substantial to reveal a significant result. A meta-analytic approach is then preferable because it takes into account small, but positive, trends in small-scale studies (Rosenthal, 1991). Indeed, looking at studies of book reading from this perspective, we reached a different conclusion than that drawn by Scarborough. We found unequivocal support for parent-preschooler book reading as a tool to promote literate language. There were hardly any studies with negative results, which means that book reading has a positive effect on literacy measures. Synthesizing all the positive outcomes, I found that parent-child book reading explains about 8% of individual differences in language and literacy. According to statisticians, this amounts to a moderate to strong effect.

In this way, we gradually came to understand why exposure to books from an early age is so important to becoming a reader. Through books, children come into contact with a specific kind of language, also known as the written language register, or academic language. The order and combination of words in texts are governed by rather complex syntactic rules and written language includes more formal vocabulary than oral language. This is not only true for adult texts but also for picture storybooks for the very young. For instance, in a story for children between the ages of 3 and 6 about a bear who falls in love with a butterfly [Beer is op Vlinder by Annemarie van Haeringen], we find words like "desperate," "jealous," "in love," "dart," "blush," "chuckle," "broken-hearted" and many other words that children do not hear every day. Familiarity with such words is one of the best predictors of reading.

A SOUTH-AFRICAN EXPERIENCE

There is increasing empirical evidence that it is difficult to step into reading without some familiarity with academic language. As an explanation of why reading education in developing countries is unsuccessful, my best guess is that young children are not exposed to academic language in books. To test this hypothesis, I joined a South-African project aimed at promoting early literacy. Academic results in South Africa are poor. Official tests show that less than 40% of learners pass the literacy test at grade 3 level (Klop & Tuomi, 2007). Education through the medium of a second language, which is mostly English in South-Africa, is one problem, but cer-

tainly not the only one. Children fail even when they are instructed in their most familiar language which can be Afrikaans, Xhosa, or another indigenous language. When they start school they lack the complex language skills that are needed for academic success, and their language skills do not "catch up" despite formal education (Klop & Tuomi, 2007).

A few weeks ago, I visited Grade R classes in Manenberg, a poor neighbourhood of Cape Town, inhabited only by coloured people (the South-African term for people of mixed racial origin). Grade R classes are senior kindergarten classes comparable to the second year of kindergarten in the Netherlands. Grade R is meant to prepare 5-years-olds for learning to read in Grade 1. I was impressed by the efforts of the teachers. They do all the "right" things: teach letters, promote name writing, share books with children and enable children to read independently by providing books and magazines.

Despite all this, the children fail. I suspect that these reading problems are so persistent due to language deprivation: exposure to books starts too late and it is limited to school, and is therefore incidental. Many young children are therefore not exposed to books at all because fewer than half of all children aged 5 attend Grade R classes. In addition, higher grades fail to promote language development as part of reading education.

EMOTIONAL SUPPORT AS A MAIN INGREDIENT OF EARLY BOOK SHARING

Even when numerous books with attractive pictures are available at home and parents are willing to read to their child, not all children automatically turn into avid readers. Most young children do not show any interest in books until their parents have made attempts to elicit their interest (Bus & Van IJzendoorn, 1997). In preverbal infants there is a gradual shift from hitting pages and grabbing the book towards referencing. Children's increasing understanding of books emerges as a social act: they are learning through touching, laughing and looking at pictures *with* the parent. This explains why emotional support by parents is a main ingredient of early book sharing in children aged 3 and below. We discovered in a series of studies that we could predict the frequency and quality of book sharing at home by testing the emotional bond between parent and child (Bus, 2001).

We used a test that includes a brief separation of parent and child in a strange environment. The quality of the emotional bond is scored when parent and child are reunited. Most infants cry because they are separated from the parent, but secure children are easily comforted by the parent. Insecure infants respond differently. They do not allow the parent to comfort them and crawl away when the parent returns in the room or may even respond aggressively by hitting or pushing

the parent when he or she approaches the child. Reactions to the reunion with the parent, as indicators of the flexibility of the parent-child relationship, predict the frequency of book sharing at home (Bus & Van IJzendoorn, 1995). We tracked down mothers who admitted that they rarely read to their three-year-old and we compared these pairs with mother-child pairs who share books once or twice a day. The results were clear. Children with an insecure relationship with their parent were strongly overrepresented in the group which read infrequently, but they were a minority in a group which read frequently.

We also observed how parents read books to children between the ages of 0 and 3. In secure pairs, reading books lives up to the ideal Portrayed in the familiar Kodak pictures of a parent reading to his or her child. They are reminiscent of well-known depictions in religious art, showing a loving mother, Saint Anna, who leads her daughter, the Virgin Mary, in the first steps to reading (Figure 1). Book-reading sessions of insecure parent-child pairs are different and seem incapable of sparkling real interest in books in children (Bus, Belsky, Van IJzendoorn & Crnik, 1997). The children are much less attentive than the secure children and hardly refer to the book's contents by laughing, making sounds or pointing. Parental energy is mainly devoted to getting and keeping the infants' attention.

FIGURE 1 STATUE IN A NICHE OF A CHURCH IN VALLAURIS (GOLDEN VALLEY) IN SOUTH-FRANCE (COPYRIGHT PIETER KRONNENBERG).

YOUNG CHILDREN'S ACTIVITIES ARE SHIFTING FROM BOOKS TO SCREENS

As we entered a new technological era, young children's activities shifted from books to screens. More stories than ever are available through new media and this has led to new realities: children spend an increasing amount of time watching on-screen stories on their own and spend less time sharing books with their carer (Rideout, Vandewater & Wartella, 2003). Nowadays even the youngest are exposed to screen media. The 1999 American Academy of Pediatrics (AAP) advised against screen time for children aged 2 and younger, and I tend to agree with them. As my research shows, exploration of books at that age is *a fundamentally social act*. Success depends on emotional support by the parent.

However, should we also advise against screen time in the case of children aged 3 and above? I do not think so. A high-input style during book reading is not very common in older age groups. Most children above the age of 3 do not like parents to interrupt the story. My son used to say: "read, don't talk." Children of that age work out the meaning of unknown words on their own, without any help. This impression was confirmed by a recent synthesis of the literature made by Mol and colleagues (Mol, Bus, De Jong & Smeets, 2008). She collected all the experiments that test effects of parent-child interaction during reading and found that parents who were trained to be very responsive had a positive effect on outcome measures in the younger ages, but no longer in from the age of 4 onwards. On the basis of this line of reasoning, we may argue that children no longer depend on adult support to benefit from book reading and that independent encounters with on screen stories can add to literacy from age 4 onwards.

Many on-screen stories are animated cartoons. Unlike picture storybooks, they do not have narrative language, but social language, motion pictures, sound and music as their main sources of information. As these onscreen stories do not expose children to complex syntactic rules and lexical diversity, they have little potential as a means of preparing children for making the transition to reading. So let us ignore these cartoon-like stories, (over)abundantly available on television, and focus on the growing number of what Lou Reed once named talking books ("I wish I had a talking book…"). Though they are available through screen media, they all have the qualities of literate print stories. I would now like to turn briefly to the typical features of digitized picture storybooks.

In onscreen picture storybooks, text and illustrations of the original book are preserved, but they also have additional features. There is, for instance, oral text that replaces print. This feature enables children to read stories without an adult being present. However, there is more. There is more to see in animated versions of picture storybooks than in print versions. Static illustrations have become motion

pictures and there is music and sound that matches the scenes. In one scene in the story about the bear and the butterfly, the bear wishes to tell the butterfly that he is in love with her, but he is too shy to do so, does not know how to tell her and stumbles over his words. The static picture of a bear with his head bowed depicts the situation rather well, but the scene in the animated version is even more powerful. We see how the bear hangs his head and it slowly turns red. Simultaneously there is audible, but incomprehensible, mumbling in the background and the way the bear moves his leg adds to the general impression of shyness. By now there are many wonderful living books on television (KRO and NOT/Teleac) and, more importantly, there are internet sites with picture storybooks for the very young. The number of books available in these digital libraries is small, but growing.

A main criticism is that attention-catching motion pictures distract attention from narrative language. On the one hand, non-verbal information may fill working memory and "use up" all the available space, not leaving room for words. On the other hand, rich visualizations may support language development. On a recent visit to the Comenius Museum in Prague, I learned that the educational pioneer Comenius (Jan Amos Komenský) was the first to use pictures to develop language skills. His book *Orbis Sensualium Pictus* (The world explained in pictures) is the mother of all children's picture books. The Orbis was intended as a visual textbook for learning Latin and other languages. It summarizes the world in 150 pictures. The objects in the pictures are numbered and accompanied by columns of labels and short sentences describing the numbered objects (see Figure 2). The book thus introduces about 2,000 words from astronomy, animals, plants, occupations and other domains concretized by the picture. Comenius argued that the verbal system thus draws on the rich knowledge base of the nonverbal system. Or in his own words: "Things are the body, words but the garment."

FIGURE 2 *ORBIS SENSUALIUM PICTUS* (THE WORLD EXPLAINED IN PICTURES) BY THE EDUCATIONAL PIONEER COMENIUS.

EMBEDDING LANGUAGE IN A REAL-LIFE CONTEXT

More than three centuries after the first publication of the Orbis in 1658, the Canadian psychologist Allan Paivio (1986) published empirical evidence of the basic idea of the Orbis, namely that language learning builds on the foundation of nonverbal representation. For instance, his experiments showed that recall of abstract words like *justice* can be improved by encouraging subjects to visualize words (e.g. imagine justice as a frocked judge). As a matter of fact, this step is reinforced by presenting an oral rendition of the narrative text simultaneously with motion images (and sounds) as happens in living books. By thus embedding words in a real-life context, new vocabulary and unknown language structures are concretized. We have done a series of experiments with living books in classrooms and, in line with Paivo's dual-coding model, all revealed impressive progress in language skills. Van der Kooy & Bus (2008), for instance, conducted an experiment with five-year-olds with poor emergent reading skills. For three months, once a week, the experimenter logged these children into one of the digital libraries on the Internet. The sessions lasted at most 15 minutes and during the sessions children "read" real literature without any help from the teacher or researcher. The children in the digital book reading group made more progress on the Peabody Picture Vocabulary Test (PPVT) than the control children who were equally poor in emergent reading skills. They spent the same amount of time in front of the computer screen, but playing games instead of watching storybooks. Despite this very moderate investment of time in onscreen books – not more than an additional two hours spread over three months – children benefited substantially from their visits to the internet site with picture storybooks.

Do motion pictures have an advantage above static pictures? Motion pictures in living books may enhance a detailed representation of events and thus create a better context for learning new vocabulary and language structures. The motion pictures may work like a spotlight on a stage that tells the audience where to look to understand what is happening and how characters respond to the events. Children derive nonverbal representations from what they see and hear, and the language they hear simultaneously may build on this foundation. To test this hypothesis, Verhallen & Bus (in press) compared the effects of static and living books on vocabulary gains. Two computer versions of the same book were presented to immigrant children from low-educated families – a group that mostly lags far behind in language skills. The spoken text and artwork were identical, but in one version the illustrations were static and in the other they were motion pictures. For instance, at one point in the story the witch turns her black cat green. The picture shows a witch waving her wand and we see how the cat turns from black to green. The experiment supports the prevalence of living books in immigrant pupils. With motion

pictures, book-bound vocabulary improves, but exposure to the static version does not promote statistically significant gains in the book vocabulary. The average gain in difficult words with motion pictures amounts to 13%, which is impressive, even compared to the outcomes of other studies in which a person mediates between book content and child (e.g. Biemiller & Boote, 2006).

HOW CHILDREN EXPLORE PICTURES

Do children learn new vocabulary by matching words with pictures? For instance, when the story text tells that the witch rushed outside, tripped over the cat and fell into the rose bush, all the elements mentioned in the text are depicted in the accompanying illustration: the witch, the cat and a rose bush. The living book may facilitate a match between a word (e.g. a rosebush) and its depiction by zooming in on the rose bush, while the text tells about the witch falling into the rose bush, and may thus support learning the word "rosebush". This theory of how children benefit from pictures would fit with a finding in psycholinguistic research that eye movements are closely related to language processing (Pashler, 1998). When children listen to an instruction with the elements that are mentioned in the instruction in front of them, they quickly move their eyes to those elements that are successively mentioned and that are most closely related to the meaning of the words (Trueswell, Sekerina, Hill & Logrip, 1999). For instance, if a "(toy) frog," "a napkin," "box" and "frog on a napkin" are placed on a table", when the instruction is given "Put the frog that's on the napkin in the box", the child's eyes jump from the "frog" to the "frog on a napkin" to "the box". In other words, they follow the order of words mentioned in the instruction exactly. If the language is ambiguous and children misinterpret the meaning of a sentence, eye movements make misunderstandings visible. Take, for instance, the sentence: "Put the frog on the napkin in the box." "On the napkin" is usually first understood as a destination and children's eyes jump from the "frog" to the "napkin" instead of to the "frog on the napkin."

To test whether children follow a similar strategy when they listen to an oral rendition of the story text, we recorded eye movements while children listened to the oral text, and recorded which objects in the picture they fixate on successively (Verhallen & Bus, 2008). There is no support for the hypothesis that children actually fixate on elements in the order in which they are mentioned by the accompanying text. We discovered that children fixate on human figures more than 80% of the time. In particular they fixate on their faces, and only briefly, 20% of the time, on non-human figures. In other words, children do not scan the complete picture searching for elements mentioned in the text, but rather seem programmed to trace the human figures, probably because they assume that those parts of a pic-

ture are most informative about events in the story. They use the visual behaviour of human figures (and their facial expressions) as the main way of understanding what the story is about. The impressions derived from a selective scan of the picture are matched with the accompanying narrative language. We expect that eye fixations are similar when children watch motion pictures. However, children may learn more from exposure to living books because those books offer more guidance in deriving what is vital in a picture. There is evidence that people easily misunderstand the fragmentary information in static illustrations by focusing on eye-catching details that are irrelevant in the accompanying text (Nodelman, 1988). The result of this is that visual information does not offer relevant context clues to understanding the story language. Motion pictures, by contrast, may guide children as a spotlight on the stage, thus children from going astray due to eye-catching details in pictures. Living books may thus be more supportive than static illustrations in concretizing unfamiliar words and sentences in the accompanying text. However, new studies are needed to test this hypothesis.

CONCLUSIONS

To round off, what are our main findings? Websites with high quality storybooks support literacy development in children aged 4 and above. They enable kindergarten children to roam virtually around these digital libraries, select books, and read and reread their favorites, without adult support. Computer routines may thus help young children to become readers in the long term. We estimate that children's vocabulary, one of the best predictors of reading, expands by about 500 words per year if children visit a digital library less than an hour per week and the digital library includes a sufficient number of books to guarantee exposure to books for some time. For younger age groups, computer stories are less suitable. Young children need a sensitive parent to stimulate their interest and keep them focused on the contents of the story.

We also found that animated picture storybooks on internet sites might be an excellent way of promoting literacy of children at risk. Motion pictures, more so than static illustrations, enable these young learners to grapple with unknown vocabulary in picture storybooks and to "catch up" their language skills. There are numerous studies which report vocabulary gains as a result of book reading by teachers in classrooms. However, the gains they report are relatively small by comparison with the gains in our studies of living books. This is all the more surprising when we take into account that in the experiments with digitized storybooks children were sitting all alone at the computer screen, without a teacher to correct distractive behaviour and focus attention. Now that there is one computer for 6

pupils in each classroom and most Dutch schools have access to the internet (Kennisnet ict op school, 2007), schools should take advantage of new ways to promote literacy and make electronic books part of the curriculum.

SHORT BIOGRAPHY:

Adriana Bus is Professor of Education and Child Studies at Leiden University. She is a leading scholar on the impact of attachment theory on children's emergent literacy development, and on developmental changes in storybook reading among parents and children. Currently she is working on building an internet environment to promote rich literacy experiences for young children.

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