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AUTHOR van den Broek, Paul  
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## ABSTRACT

Given the central role of television in most children's lives, it is important to understand its potential positive and negative effects on a variety of cognitive, academic, social, behavioral, and attitudinal outcomes. A study aims to explore the relation between early television viewing and later reading achievement. Motivating the research is the growing evidence that young children's attention to and comprehension of television is more sophisticated than previously thought. Although preschoolers have some difficulty understanding full-length adult programs, they are adept at making sense of televised segments produced specifically for their age group. Results of recent research suggest that there is considerable overlap between the comprehension processes that take place during reading and those in prereading television viewing. Present research uses a longitudinal design in which media habits, various kinds of television and text comprehension skills, and background variables for children at three time periods spaced two years apart are assessed. To date, 28 preschool four-year-olds and 95 first grade six-year-olds in the Minneapolis area have been tested. Participants view televised programs (episodes of "Rugrats") and then complete a range of comprehension tasks. In addition, they receive a series of comprehension and early literacy tests. Preliminary results reveal that although both groups perform better on the television memory and comprehension test than on the test of aural story memory and comprehension, individual differences are highly consistent across media. Performances on the memory and recall tasks were very strongly related. Once data collection is completed, other analyses will be conducted. (Contains 30 references.) (NKA)

# The Role of Television Viewing in the Development of Reading Comprehension

Paul van den Broek  
University of Minnesota

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## A. Introduction

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### 1. Problems and Objectives

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Television occupies a large portion of American children's time. Starting in preschool, children spend more time watching television than participating in any other activity except sleeping (D. Anderson, Field, P. Collins, Lorch, & Nathan, 1985; Huston, Wright, Rice, Kerkman, & St. Peters, 1987). Children also have extensive experience with television before they are exposed to many socializing agents, such as schools, peers, and religious institutions (Huston, Watkins, & Kunkel, 1989). Given the central role of this medium in most children's lives, it is important to understand its potential positive and negative effects on a variety of cognitive, academic, social, behavioral, and attitudinal outcomes.

The purpose of the current research is to explore the relation between early television viewing and later reading achievement. Motivating our research is the growing evidence that young children's attention to and comprehension of television is more sophisticated than previously thought (for an excellent review, see D. Anderson & P. Collins, 1988). Although preschoolers have some difficulty understanding full-length, adult program (W. Collins, Wellman, Keniston, & Westby, 1987; Leifer et al., 1971), they are much more adept at making sense of televised segments produced specifically for their age group (Lorch, Bellack, & Augsbach, 1987; van den Broek, Lorch, & Thurlow, 1996). Still unknown, however, is whether the cognitive skills and knowledge acquired in this early context support reading development in elementary school.

The results of recent research suggest that there is considerable overlap between the comprehension processes that take place during reading and those in prereading television viewing (van den Broek et al., 1996; van den Broek, 1997). Thus, it may very well be the case that children who learn these comprehension skills from television viewing before they are able to read come equipped, so to speak, with some very important tools when they later start to read. If so, this has important implications for education, by opening the door for early childhood education of some of these essential literacy skills. Our research is aimed at determining the relation between television viewing and later reading comprehension and at developing guidelines for the effective use of television as a medium for learning to

comprehend. To do so, we use a longitudinal design in which we assess media habits, various kinds of television and text comprehension skills (i.e., inference making, attention allocation), and background variables for children at three time periods spaced two years apart. Additional studies in the "off" years (i.e., the years in which no longitudinal data are collected) will explore the exact nature of any associations found and the factors that may increase the likelihood of positive transfer of skills and content across media. The questions we address are: (a) To what extent do television and reading comprehension involve common processes and content? (b) What is the exact relationship between television viewing skills and literacy? Are good television comprehenders also typically good readers? More importantly, do preschool comprehension skills that are developed in the context of television viewing relate to later reading achievement and, if so, exactly how? (c) What kinds of television programs and viewing environments best stimulate the development of comprehension and attention skills that apply to reading? Do these factors work equally well for children with differing levels of cognitive ability and coming from different socioeconomic backgrounds? What guidelines can be given to educators, parents, and producers to maximize the educational potential of television?

## 2. Background

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In this review, I summarize research on television and reading comprehension. In doing so, I will focus on the possible causal relation between the two. One might expect positive transfer of skills and knowledge across media for two reasons. First, television programs and printed materials substantially overlap in content. This shared content includes story genres (e.g., mystery, western), narrative conventions (e.g., flashbacks, shifts in perspective), topics (e.g., stories about friendships, school, or imaginary worlds), and information (e.g., scientific and historical facts, general world knowledge). Given that content is crucial for correct inference-making (W. Collins, 1983; van den Broek, 1997), this commonality is likely to result in an overlap in comprehension. Second, television viewing and reading seem to require many of the same cognitive processes, although this association has not been empirically studied in depth. Possible shared processes include the ability to sequence events, to make inferences across time and space, to understand character motives and link them to actions and consequences, and to allocate attentional resources primarily to central instead of peripheral information. The comprehension of television and text, therefore, seem analogous in many ways (D. Anderson & P. Collins, 1988; Lorch & Sanchez, 1997; van den Broek et al., 1996).

Clearly, television viewing is not the sole context in which important cognitive precursors to literacy may develop. For instance, children may be exposed to narratives through parental bedtime reading and storytelling, particularly given that most parents have positive beliefs about the value of such activities (DeBaryshe, 1994). Television, however, may be an especially ideal medium in which to foster some of the skills and knowledge needed for later reading acquisition. For example, this medium involves minimal print, and the decision to view can be controlled entirely by the preschooler. Television is also partially a visual medium, and thus may tend to present information more concretely than do written and spoken text. This content difference across media seems to account for the fact that preschoolers frequently are better at recalling televised stories than audiotaped ones

(Gibbons, D. Anderson, Smith, Field, & Fischer, 1986). Early television experiences may be of special importance to young children with limited educational opportunities and resources, such as those from low-income families, from certain minority groups, and from families in which the parents have low levels of academic achievement and difficulties with reading. These subgroups typically have relied more heavily on television both for information about the world and for entertainment than their peers (Berry & Mitchell-Kernan, 1982; Greenberg, 1986; Medrich, 1979). Consequently, the viewing of television shows (particularly those specifically designed for a younger audience) may compensate to some extent for the lack of diverse educational experiences in these populations and may increase school readiness. Indeed, this is the rationale behind the development of many PBS children's programs, such as Sesame Street (Lesser, 1974).

The extant research on the relations between television viewing and the acquisition of reading skills typically has sought a negative association between these variables. Hypothesized reasons for a negative association included both direct and indirect mechanisms (D. Anderson & P. Collins, 1983). First, frequent television viewing was expected to impair many of the cognitive skills needed to comprehend text, including inference-making control over attentional resources and the ability to remain seated for significant periods of time. Under this hypothesis, the fast-paced nature of most children's programming leads young viewers to focus involuntarily on the rapid visual and auditory changes without actively reflecting on the content; it also is presumed to cause hyperactivity and overstimulation. These symptoms then interfere with reading acquisition and general school readiness. A second hypothesis was that because television is so attractive to children, it displaces activities of importance to literacy and general cognitive development, such as leisure-time book reading.

Empirical investigations of these hypotheses, however, have produced mixed findings. When concurrent levels of television viewing and reading achievement are compared for school aged children, a curvilinear pattern frequently emerges. For example, Williams, Haertel, Haertel, and Walberg (1982) reported a positive association between these variables for up to ten hours of viewing per week and a negative association thereafter. Neuman (1995) found a similar pattern when analyzing reading outcomes by state, with the positive association reversing after two to three hours of daily viewing. Studies examining whether preschool television viewing predicts later literacy skills, however, have sometimes reported a negative correlation (e.g., Burton, Calonico, & McSeveney, 1979), a positive correlation within limited subgroups (e.g., Singer & Singer, 1983), or no readily interpretable correlation patterns (e.g., R. Anderson, Wilson, & Fielding, 1986; Corteen & Williams, 1986). Furthermore, no direct evidence exists that television viewing impairs cognitive skills such as attention and task perseverance, or that it displaces leisure-time reading. Rather, the television comprehension of preschoolers is fairly sophisticated, and this activity typically supplants functionally equivalent activities, such as the use of radios, movies, and comic books (D. Anderson & P. Collins, 1998). In fact, in certain cases, television programs (e.g., Reading Rainbow, Storytime) may even encourage reading and book sales (Chen, 1994).

A major limitation of these earlier studies is their conceptualization of television viewing as a single entity. They generally only report the total number of hours viewed and fail to distinguish among specific kinds of programming. This distinction is essential. Positive transfer of cognitive processes and content from early television experiences to later reading activities may be evident only for viewers who primarily watch educational programming

oriented to their comprehension abilities (rather than commercial fare). Support for this hypothesis comes from a massive longitudinal study by P. Collins, Wright, D. Anderson, and colleagues (1997) who investigated how the kinds of programs that preschoolers view relate to their academic achievement in adolescence. These researchers found that preschool children (particularly boys) with higher consumption of educational programming such as Sesame Street eventually receive higher grades in high school, and more often read books for fun compared to their peers.

Despite these encouraging results, many questions remain. First, the study did not focus on reading per se, used rather gross measures of academic achievement (e.g., grades), and provided no measures of television comprehension. A detailed assessment of children's ability to process both television and text at various ages is needed in order to clarify the specific contributions that one medium may make toward the other. Such analyses may reveal that only certain processes and content typically transfer, whereas others do not. Second, it is important to more carefully examine possible contextual variables that may account for the positive correlations found by P. Collins and her colleagues. Although the authors did control for such factors as socioeconomic background, location, intelligence, and parental education, other factors may play an important causal role. These additional factors include parental attitudes towards education and the number of books and other instructional materials found in the home.

## **B. The Current Project**

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In the past decade, considerable attention has been devoted to investigations of the cognitive processes that are involved in reading comprehension and the development of these processes. This research has shown that the child's ability to construct a coherent representation of the text and its meaning in his/her mind is a central component of successful reading (e.g., Casteel, 1993; van den Broek, 1988; van den Broek, 1990; Kintsch, 1988). The success in building such a representation reflects a very complex process (which has become seemingly effortless in proficient readers). The reader needs to process the text itself (the words, syntax, etc.), needs to connect the information in the text to his/her background knowledge and likewise to information presented earlier in the text, and has to monitor his/her goals and expectations in reading. To complicate matters, the reader has to do all this with attentional capacities that are notoriously limited.

At the same time, methods for the study of these processes have been developed, which subsequently have become standard tools for researchers in a wide range of fields in the United States and abroad (e.g., Trabasso, Secco, & van den Broek, 1984; van den Broek, 1990). The application of these methods has allowed a level of description of comprehension that was hitherto impossible. Researchers have now begun to apply these same methods to children's television viewing. Results show a remarkable similarity between the detailed processes in which 4- and 5-year-old children engage while watching television and those in which older (elementary, junior high school students, and even adults) engage while reading (e.g., van en Broek et al., 1996).



The current research consists of two components. In one component, the effects of television viewing on the development of literacy and reading comprehension skills are studied longitudinally. The second component is the experimental investigation, in separate studies, of the comprehension processes involved in television viewing, and their overlap with those processes that have been identified as crucially important in successful reading. In this report, we present a description of the longitudinal study to date.

The aim of the longitudinal study is to determine the relation between TV viewing skills and literacy. The central questions are whether effective television viewers also tend to be good readers, and whether preschool comprehension skills that are developed in the context of television viewing relate to later reading achievement. Insofar as the answer to these questions is affirmative, the further aim is to identify exactly which components of television viewing transfer to later reading, and the implications of this transfer for selection and production of television programs for educational settings.

## **1. Method**

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### **Participants**

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To date, we have tested 28 preschool, four-year-old children (out of a targeted 120) and 95 (out of a targeted 120) first grade, six-year-old children. All have been recruited in the Twin Cities area in Minneapolis, MN, through local schools and through a University of Minnesota "pool" of parents of preschool children, who have indicated willingness to participate in university studies. The purposes of this phase are threefold: (1) to investigate the extent to which attention and comprehension for televised materials and written materials share common features and/or differ; (2) to investigate (within individuals) whether television comprehension scores are related to performance on other indicators of early literacy (e.g., vocabulary, story comprehension assessed outside of TV viewing, etc.); (3) to provide a basis for the longitudinal study of the possible relation between pre-reading TV-program comprehension and later reading comprehension.

### **Facilities and Procedure**

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All testing takes place in a specially designed room in the psychology building at the University of Minnesota. The room contains a viewing/testing area with television, videoplayer and -camera, and table and chair for the child, and an area for the parents or caregiver to sit and fill out the questionnaire (see below). The room is decorated as a small living room. A second, attended, room is available for "sibbiting" (taking care and entertaining of siblings). Sessions last approximately one hour.

Participants view televised programs (see van den Broek, Lorch, & Thurlow, 1996, for methods and materials) and then complete a range of comprehension tasks (free recall and question-answering aimed at different levels of inference-making) and early-literacy tests. The television programs are episodes of the television series *Rugrats*. This series was selected

for several reasons. First, our aim is to determine whether regular, popular television programs elicit comprehension processes similar to those that are important in reading, rather than to establish whether specifically designed (and typically less popular) programs do. Second, Rugrats is very popular with a wide age range of children, thus enabling us to test children of different ages with the same instrument. Third, structural analysis has shown that Rugrats episodes allow inferences and comprehension at different levels of complexity and thus are very suitable for determining changes in individuals' comprehension.

In addition, the participants receive a series of comprehension and early-literacy tests. Listed in order of administration (with approximate test duration in parentheses) they are:

1. Rugrats Familiarity Task (5 minutes). Purpose: To determine how familiar children are with the show Rugrats. Brief description: Children are asked to name the 5 principal Rugrats characters and then match the Rugrats parents with their kids.
2. Picture Peabody Vocabulary Task (10-20 minutes). Purpose: To measure receptive vocabulary skills. Brief description: Children are shown four pictures and are asked to select the one that best exemplifies a given word.
3. Sequencing Memory Task (5-10 minutes). Purpose: To assess nonverbal short-term memory for sequences. Brief description: Experimenter touches a sequence of colored squares and child must reproduce them in the exact order.
4. Aural Comprehension Tasks--Free Recall/Probed Recall (15 minutes). Purpose: To assess comprehension of stories read to the child. Brief description: Participant hears a story on audiotape with accompanying pictures and is asked, first, to reproduce the story and, second, to answer seven comprehension questions about the content.
5. Dibels Test (5-10 minutes). Purpose: To measure phoneme awareness skills. Brief description: Participant is asked to select a picture that begins with a certain sound and, on every fourth item, to give the beginning sound of the word.
6. WRMT-R Letter Identification Task (5-10 minutes). Purpose: To measure alphabet recognition. Brief description: Participant is asked to provide the name of print and cursive letters on a page.
7. WRMT-R Word Identification Task (1-15 minutes). Purpose: To measure decoding skills. Brief description: Participant is presented with a page with single words and is asked to read each word aloud.
8. TV Comprehension Tasks--Free Recall and Probe Question (15-20 minutes). Purpose: To measure the children's comprehension and memory for the television episode. Brief description: Participants watch a 10 minute Rugrats episode, after which they are asked to recall the story and answer 8 comprehension questions about the program content.

While the child is participating in this series of tests, the parent/caregiver fills out an extensive questionnaire. The questionnaire contains questions on:

- demographic information
- child's school/educational experiences

- child's out-of-school activities
- family educational experiences
- child's use and enjoyment of print
- child's first exposure to reading
- parent's use and enjoyment of print
- books/media present in the home
- parental beliefs about the importance of reading
- parental recognition of children's books and their authors
- child's use and enjoyment of television
- child's familiarity with Rugrats
- parent's use and enjoyment of television
- family regulation of the child's television viewing
- parental attitudes about television
- parental recognition of children's television shows.

If a parent does not complete the questionnaire during the session they receive a stamped and addressed envelope to allow completion at home.

## 2. Results and Discussion

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The results reported here should be considered preliminary. One reason is that the data set is very rich and hence analysis entails a wide array of research questions and comparisons. Furthermore, data collection for the first year was continuing at the time of this writing (anticipated completion February, 2000). Nevertheless, several important patterns are emerging.

First, although both groups of children perform better on the television memory and comprehension test than on the test of aural story memory and comprehension, individual differences are highly consistent across media. The correlation between recall for the TV story and that for the aural story is .81. This indicates that children that are good (poor) at comprehending and remembering materials presented via TV also are good (poor) at comprehending and remembering materials presented aurally.

Second, PPVT vocabulary scores are not related to memory scores. The correlation is .06. This is surprising because the PPVT often is taken as an indicator of intelligence and hence might be expected to be strongly related to comprehension/memory. The current result suggests that comprehension processes are rather separate from low-level processes/skills such as vocabulary.



Third, performances on the memory and recall tasks were very strongly related, with a correlation of .97. This indicates that memory and comprehension, at least for these materials, are indeed intertwined skills.

Together, these results suggest that children's comprehension and memory abilities--the hallmarks of meaningful reading--are not contingent upon their vocabulary skills (it should be noted that none of the tested children had specific reading difficulties; it may be that vocabulary is more strongly related to reading proficiency in low-performing children) and, most importantly, that comprehension and memory skills are constant across media by which children encounter information. If the latter finding holds up for the entire data--and if it will be found to be related to later reading comprehension--then this would be very encouraging vis-à-vis the possibility to foster the development of comprehension skills in the domain of television viewing well before children are exposed to reading instruction and practice and, besides, in a domain that is inherently interesting and does not require decoding skills. This is an important implication because it means that while children are developing decoding skills they can already be developing comprehension skills.

### 3. Next Steps

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Once the data collection set is completed, other analyses will be conducted. These will include analyses of the relation between early-literacy skills (as measured by the subtests) and comprehension and memory, both for the two age groups together and in comparisons between age groups. Equally important, a more fine-grained analysis of the recall and comprehension protocols will be performed so as to distinguish between different levels of comprehension. For example, do some children systematically make more advanced inferences about the materials than do others? If so, what characteristics do these children have? Finally, the parental questionnaires will be analyzed to explore the possible role of environmental factors in the children's comprehension skills.

These results are of both theoretical and practical importance. Little is known about the cognitive processes that take place during preschool children's comprehension, nor about the extent to which such skills, acquired outside of the school situation (e.g., in TV settings) generalize to later reading comprehension development. In addition, as mentioned above, the preliminary results provide the basis for comparisons in later stages of the longitudinal study. Likewise, the results in this first year will be the foundation for smaller, more focused investigations in the "off" (i.e., non-longitudinal) years.

As mentioned above, preschool and elementary school children spend more of their waking hours watching television than in any other activity. By laying out the ways in which these experiences may prepare children for reading comprehension, and the ways in which one can actively select and use TV programs, this project will have considerable benefits for educators, parents, as well as anyone concerned with having children attain proficient reading levels. The byproducts of this study are expected to include workshops for educators and parents on the potential impact of TV viewing on the development of reading comprehension, and specific guidelines for the optimal selection and production of television programs for educational benefits.

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