

# Effects of Television Preplay Formats on Children's Attention and Story Comprehension

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Children's visual attention to, and comprehension of, a television program was measured as a function of inserts called *preplays* that varied on two orthogonal dimensions: (1) Presence or absence of visual excerpts from the program, and (2) concrete or inferential story narration. Visual fixation was coded continuously for 64 pairs of same-sex children, in 1st through 4th grades, while they viewed the television program with one of four types of preplays. After viewing, each child answered items assessing his or her comprehension of the visually and verbally presented content. Children who viewed visual preplays attended longer than did children who viewed nonvisual preplays. Visual presentation predicted comprehension of content presented in a visual mode, whereas inferential narration predicted comprehension of implicit content presented in a verbal mode. The results suggest that information processing is modality specific: Visual presentation affects visual processing and abstract language affects verbal processing. The results do not support the hypothesis that visual presentations interfere with linguistic processing.

## INTRODUCTION

A growing debate about children's comprehension of television content involves the role of visually presented information, particularly in relation to verbal program content. On the one hand, visual presentations are said to increase children's comprehension of television content, particularly auditorily presented

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### **Effects of Language Comprehensibility**

One source of these discrepant views may be variations in the comprehensibility of the verbal and visual content. With visual content held constant, preschoolers attend longer when understandable language is presented on the auditory track than when difficult or incomprehensible language is presented (Anderson et al., 1981). Several theorists have proposed that language at moderate levels of difficulty is more worthy of attention than language that is either too easy or too difficult (Anderson et al., 1981; Rice, Huston, & Wright, 1982). Young children, therefore, should attend more to language that is concrete and easy to understand, whereas older children should attend more to language that is comparatively abstract and that offers new information beyond that which is obvious from other aspects of the program content.

For accurate comprehension of a televised story, attention is necessary, but not sufficient. (Huston & Wright, 1983; Lorch, Anderson, & Levin, 1979). Comprehension requires viewers to integrate explicitly presented central events and to infer implicitly presented content about character motives and feelings (Collins, 1983). Therefore, comprehensible language that emphasizes central story themes should be especially likely to promote comprehension as well as attention.

### **Effects of Linguistic Aids on Comprehension**

The effects of linguistic aids on comprehension have been demonstrated in studies of *verbal rehearsal*, in which adults summarize significant story content for children (Friedrich & Stein, 1975; Watkins et al., 1980). It has been found that verbal cues are particularly helpful because they present content that is implicit in the story (Collins, Sobol, & Westby, 1981). Typically, adults view a television program with children and verbally label the important content after it is presented. Verbal rehearsal is most influential for comprehension in the verbal mode (Collins et al., 1981; Stein & Friedrich, 1975).

An analogous effect might be realized by *prehearsal*, that is, by active forward processing that anticipates, rather than recapitulates, story content. Children with mature attentional systems may process specific information efficiently if they know beforehand that certain information will be presented (Flavell, 1977). Important events are anticipated through schemas, pre-existing cognitive structures that guide the comprehension process (Mandler, 1979). If forward prehearsal can guide children's initial selection and encoding of information by providing a story scheme, then the probability is increased that children will attend to and remember that particular visual and auditory content.

### **Modality-Specific Processing**

The impact of visual and verbal television presentations may be modality-specific; in other words, visual presentations may improve comprehension of visual

intended program message for a specific episode about divorce, titled "Mom or Pop". Consequently, this color-animated episode was selected for this study.

In the story, Flora, a new child in the school, was unfriendly and aloof. Fat Albert's friends teased her and made her cry. When the boys found out about her parents' divorce, they made her a present and put on a special show to make amends. After Flora became friends with the boys, her parents' conflict continued. Flora ran away from home, and the boys helped find her. The plot was resolved when her parents realized that their arguments made Flora unhappy.

### **Treatment Conditions**

The story was retained from the original program, but commercials and verbal summaries by Bill Cosby were deleted. The verbal summaries were deleted because previous research on a different episode of the series revealed that kindergartners who did not attend when Bill Cosby was narrating understood the important story content better than kindergartners who did attend when Bill Cosby was narrating (Calvert et al., 1982). The complexity of the language that Cosby used was considered a potential reason why young children did not understand the narration. Therefore, the type of narration became one dimension that was manipulated in the experimental inserts.

Preplays, which summarized central plot events, were inserted before three story sections. Preplays previewed story content with either verbal narration alone or verbal narration supplemented with visual excerpts from the cartoon. The four preplay conditions were (a) nonvisual, concrete narration; (b) nonvisual, inferential narration; (c) visual, concrete narration; and (d) visual, inferential narration. The total time of the program, plus preplays, ranged from 17 minutes, 47 seconds to 19 minutes, 49 seconds.

All preplays were presented on the television screen by a female narrator in a gypsy costume who could foresee future cartoon events in her crystal ball. In nonvisual conditions, only the narrator was shown as she described future story events. In visual conditions, excerpts from the story were shown inside a bubble insert which appeared beside the narrator. As she described the content, the narrator pointed to the visual sequences inside the bubble (e.g., Flora's parents are shown rushing out the door). Dialogue, music, and sound effects from the program were not present in any of the preplays. In concrete narration conditions, central character actions were described in simple, concrete language (e.g., "Flora's parents go out and look for Flora"). In inferential narration conditions, thematic content was embellished and integrated by stating implicit relations among the story events (e.g., "Flora's parents go out and look for Flora because they are worried about her").

### **Procedure**

Same-sex pairs of children were taken from their classrooms to a mobile laboratory where they were seated opposite one another at a table. Across the room

tures. Picture sequence scores were calculated by adding the two parts, resulting in a maximum score of 20.

**Multiple-Choice Recognition Scores.** The multiple-choice test was designed to measure children's comprehension of program content while controlling for possible age differences in verbal abilities. Following procedures adapted from Collins (1983), three adults identified and placed central and incidental story events in an open-ended questionnaire. Next, 18 adults viewed the program, rated the questions as central or incidental to the plot, and answered the questions. Central content was defined as plot-essential information, and incidental content was defined as information peripheral to the plot. Items with a minimum centrality rating of 70% were retained. Central questions were classified as either explicitly presented facts or as implicitly presented inferences about character feelings and motives. Incidental questions contained visual information and a few verbal jokes.

To construct multiple-choice alternatives, one incorrect verbal response was taken from answers to the open-ended questionnaires. A visual referent was supplied for each question by including a photograph taken at a relevant program point. There were 13 implicit, 8 explicit, and 21 incidental items. An example of an implicit item was, "What happened to Flora's parents? (A) They decided to be friends; or (B) They decided to get married again." An explicit item was, "Why did Flora cry on her birthday? (A) Because her parents were arguing; or (B) Because the gang was teasing her." An incidental item was, "Why did Rudy laugh when Flora was reading? (A) The story was funny; or (B) She tickled his foot."

The 42 recognition items each of which consisted of a picture, a question, and two response options, were arranged in two books. The order of book presentation was counterbalanced across children.

## RESULTS

### Visual Attention

Duration of visual attention was defined as the percent of time that a pair of children looked at the television screen during the preplays or the program. Duration of attention to the preplays and to the program were submitted, in turn, to analysis of variance of grade (4)  $\times$  sex (2)  $\times$  visual-nonvisual presentation (2)  $\times$  narration complexity (2). The unit of analysis was pairs of children because children who view together influence one another's attentional patterns. For instance, one child may ask another to look at her picture or to look at the television program. Because of the dependency of attention scores, pairs have typically been used as the unit of analyses for visual attention (e.g., Calvert et al., 1982; Wright et al., 1984).

segment sequencing tasks than children who viewed nonvisual preplays,  $F(1,32) = 4.86, p < .05$ . The means appear in Table 1. Fourth graders ( $M = 15.79$ ) performed better than first graders ( $M = 13.56$ ),  $F(3,32) = 4.82, p < .01$ . Narration complexity had no effect on segment sequencing.

Whole program sequencing was submitted to analysis of variance of grade (4)  $\times$  sex (2)  $\times$  visual-nonvisual presentation (2)  $\times$  narration complexity (2). Duncan's text was used for all follow-up tests.

For whole program sequencing, preplay treatment effects were qualified by gender. There was a significant sex  $\times$  visual-nonvisual interaction,  $F(1,32) = 4.64, p < .05$ . As seen in Table 1, boys who had seen visual preplays performed better than those who had seen nonvisual preplays; there was little difference for girls in visual and nonvisual conditions.

There was also an interaction of sex  $\times$  narration complexity,  $F(1,32) = 4.39, p < .05$ . Boys performed better after concrete preplays than after inferential preplays; again, there was little difference for girls in concrete and inferential conditions. The means appear in Table 1.

Main effects of grade and sex occurred for whole program sequencing. Fourth ( $M = 18.10$ ), 3rd ( $M = 17.50$ ), and second graders ( $M = 17.53$ ) performed better than 1st graders ( $M = 14.85$ ),  $F(3,32) = 6.78, p < .001$ . Girls ( $M = 17.74$ ) performed better than boys ( $M = 16.52$ ),  $F(1,32) = 4.39, p < .05$ .

**Multiple-Choice Recognition Scores.** The recognition scores for implicit, explicit, and incidental responses were submitted, in turn, to analysis of variance of grade (4)  $\times$  sex (2)  $\times$  visual-nonvisual presentation (2)  $\times$  narration complexity (2).

Visual preplays had no effect on any of the multiple-choice scores. There were no significant main effects or interactions of visual-nonvisual presentation.

As expected, children who heard inferential narration recognized more implicit content than those who heard concrete narration,  $F(1,32) = 4.88, p < .05$ , see Table 1. Narration complexity had no effect on recognition of explicit or incidental content.

Main effects of grade occurred for all three recognition scores: Implicit content,  $F(3,32) = 7.26, p < .001$ ; explicit content,  $F(3,32) = 3.99, p < .05$ ; and incidental content,  $F(3,32) = 13.71, p < .0001$ . Fourth ( $M = 12.10$ ) and third graders ( $M = 11.50$ ) recognized more implicit content than 1st graders ( $M = 10.28$ ). Second graders ( $M = 7.38$ ) recognized more explicit content than 1st graders ( $M = 6.70$ ). Fourth graders ( $M = 18.13$ ) recognized more incidental content than did 3rd ( $M = 16.40$ ), 2nd ( $M = 16.38$ ), and 1st graders ( $M = 14.98$ ).

For implicit content, the interaction of sex  $\times$  grade was significant,  $F(3,32) = 2.82, p < .05$ . At the first grade level, girls ( $M = 11.13$ ) recognized more implicit content than boys ( $M = 9.50$ ). Girls ( $M = 7.49$ ) also recognized more explicit content than boys ( $M = 7.19$ ),  $F(1,32) = 4.57, p < .05$ .

effects on comprehension appear to be mediated by visual attention to the visual preplays.

Visual attention to preplays was not a good predictor of multiple-choice recognition scores, that is, measures presented in the verbal mode. The only case in which visual attention was a significant predictor was for incidental content. As expected, verbal presentation was a significant predictor of inferential content.

## DISCUSSION

The primary purpose of this study was to test the effects of visual and verbal television presentation on modality-specific learning. Visual attention was expected to serve as a mediator for comprehension of visually presented content. Experimental inserts (i.e., preplays) allowed the program to remain constant for all children while examining visual versus auditory comprehension. In visual preplays, action sequences from the story were presented beside a narrator. In nonvisual preplays, only the narrator was shown. The narration was either concrete or inferential.

As expected, children who viewed visual preplays attended longer than children who viewed nonvisual preplays. Because attention to the program did not differ, but attention to the preplays did, visual and verbal effects on comprehension could be linked to the experimental manipulations. Children who viewed visual preplays performed better on the segment sequencing task, a visual comprehension task, than did children who viewed nonvisual preplays. Boys who viewed visual preplays sequenced events from the whole program better than did boys who viewed nonvisual preplays. Finally, attention to visual preplays predicted comprehension of both the segment sequencing and whole program sequencing tasks, that is, comprehension in the visual modality.

In contrast, verbal presentation affected comprehension of information presented in the verbal mode. Specifically, children who heard inferential narration recognized more implicit content than those who heard concrete narration. Verbal presentation also predicted comprehension of implicit content. Visual attention did not predict comprehension of either the explicit or the implicit recognition scores.

The results support the hypothesis that information processing is modality-specific (Meringoff et al., 1983). That is, information presented in a visual mode affected comprehension of visually presented material, and information presented in a verbal mode affected comprehension of verbally presented material. Because effects of visual presentation occurred across middle childhood, a visual superiority effect (Hayes & Birnbaum, 1980) was not found. There were no age differences for visual over nonvisual presentation, nor did visual presentation interfere with verbal comprehension. Instead, implicit and explicit comprehension were unrelated to either visual presentation or visual attention.

adequate control, the intervention procedures could conceivably even interfere with children's sequencing and recognition skills.

A second limitation is the use of only a single television program, which limits the generalizability of the findings. Another problem was that the production quality of the preplay inserts was not comparable to the original broadcast material, nor were we able to use the original narrator of the program series. Ideally, several programs of broadcast quality, which vary the presence versus absence of preplays, should be tested, especially with the use of original narrators like Bill Cosby. Such an analysis would answer questions regarding whether there are any practical benefits of preplays for children's comprehension of television programs.

The implications of this research are that children's television programs should use character actions and inferential language to emphasize key program points. Action is both attention-getting and memorable for children. Verbal narration can be used to integrate content and provide information that children do not spontaneously produce. Visual and auditory tracks do not interfere with one another when they are not in competition. Instead, character action affects comprehension of visually presented content whereas language affects comprehension of verbally presented content. Under typical viewing circumstances, visual presentation is more likely to complement than to disrupt children's comprehension of televised messages.

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