
EDUCATING CHILDREN WITH TELEVISION: THE FORMS OF THE MEDIUM

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Parents are often told that their children would be better off if they turned off the television set. Many critics argue that television as a medium is harmful to children and adults alike. This argument implies that it is not just the content of television, but something about the medium itself that may induce laziness, passivity, hyperactivity, or many other ills. What distinguishes television from radio, books, and other media are the forms in which information is presented, not the content messages. In this chapter, we describe a program of research investigating the forms or formal features of television for children. We argue that children attend to and learn from television actively, and, that used optimally, television is particularly well suited to educate and inform them about a wide range of content areas. Parents can use television as a positive force for their children as well as taking an active role in protecting their children from harmful content.

THE MEDIUM OF TELEVISION

Formal features of television are relatively content-free attributes that are a result of production and editing. They include visual techniques (e.g.,

zooms and special effects), auditory features (e.g., sound effects and music), and more global dimensions of program pace, action, and variability of scenes.

We began to study television forms in the mid-1970s with two major goals. First, we were interested in identifying those forms that influence children's attention and comprehension of content, in part because such information seemed basic to optimal production of educational programming. Second, we were testing several hypotheses concerning the effects of the television medium on basic modes of cognitive processing. These hypotheses were derived from the initial ideas of McLuhan (1964) and later theoretical propositions by Salomon (1979) and others concerning the effects of television as a medium and specific production techniques on the fundamental modes of processing information.

One purpose of this chapter is to discuss the effects of formal features on children's intellectual activity with particular attention to forms used in educational television. We have chosen "Sesame Street" as a specific example of educational programming because it is the most widely viewed and most extensively studied children's educational program. It is also the most frequently attacked, perhaps in part because it is so successful in drawing child viewers. The most recent of these attacks is a highly emotional and poorly informed polemic by Jane Healy (1990), which is being published in popular book form. The themes of the critics have remained remarkably constant over the years; they center on the medium of television and the forms used to attract child audiences, not on the content. One of the most frequent assertions is that rapid pace and perceptually demanding forms lead to poor comprehension, little time for reflection, and reduced attention spans. A second major theme in these critiques is that television leads to intellectual passivity, either because it does not allow time for processing information or because it does not allow for repetition, imagination, or control by the viewer. A final common complaint is that television viewing occupies portions of children's time that would otherwise be devoted to leisure reading.

We present a different view in this chapter. Although each of these critiques probably has a germ of truth, they do not represent what really happens when children watch and learn from carefully designed educational programs like "Sesame Street." First, we show that educational programs for children, including "Sesame Street," use a combination of formal features that includes not only perceptually salient techniques but a judicious mix of forms and formats that are carefully designed to encourage learning and intellectual processing of content. The goal is not just to get and keep children's eyeballs on the screen, but to promote learning and comprehension. Their forms are quite different from advertisements, cartoons, and other commercial programs for children. Second, we sum-

marize a large literature on children's cognitive processing of television that demonstrates persuasively that children are active, selective viewers. Their attention patterns are guided by what they find interesting and comprehensible, not by flashing lights, bells, and whistles. The image of the zombie child being sucked into viewing against his or her will does not fit the data. Children are smarter than that. Third, we cite evidence that viewing television, especially educational programs made for children, does not interfere with and may facilitate leisure-time reading. Finally, we discuss ways in which parents and families can use television as an ally, not an enemy. Quality television can be a contributing part of a family environment that provides intellectual stimulation, emotional security, and prosocial values.

Forms of Educational Programs

When we began our research on formal features of children's television, we were guided by a theory of children's information getting that proposed a gradual shift from the process of exploration to the process of search as a person has increasing exposure to a stimulus. Exploration is a mode in which attention is disjointed and responsive to perceptually salient events (i.e., to rapid movement, loud sounds, changes in events). Search is a mode in which attention is guided by the viewer's goals and interests; it occurs more readily once the individual has become familiar with a stimulus. Then a person typically ignores the sensory intensity of the stimuli and instead attends to things that are relevant to his or her goals and interests (Wright & Vlietstra, 1975). Therefore, we initially classified formal features of television as those that are primarily perceptually salient in contrast to those that might encode interesting or useful information and thus encourage comprehension and reflection.

Our first step was to amass two samples of available programming and code them for formal features and violent content. For 1 week in November 1977 and another week in February 1978, we recorded all programs designed for children broadcast on the three commercial networks and on public television. One hundred thirty-seven programs were coded for the three types of formal features shown in Table 6.1 (Huston et al., 1981). Perceptually salient features included rapid action (characters moving faster than a walk), variability of scenes, pace (rate of change of scenes), music, noise (e.g., sound effects, animal sounds), visual tricks (e.g., special effects), and visual change (e.g., cuts). The other two groups of features were considered likely to aid comprehension and reflection. Dialogue has fairly obvious value because verbal representation should promote comprehension. Singing, long zooms, and moderate action (moving at the pace of

TABLE 6.1
 Frequencies of Formal Features in "Sesame Street" as Compared to Averages for All Educational Daytime and Saturday Morning Children's Programs

<i>Formal Feature</i>	<i>"Sesame Street"</i>	<i>Educational Daytime</i>	<i>Saturday Morning</i>
<i>Perceptually Salient</i>			
Rapid action	0.4	0.8	1.6
Variability	2.3	2.2	2.6
Pace	4.8	4.4	5.8
Music	2.8	3.1	4.3
Noise	3.9	3.0	4.9
Visual tricks	3.4	4.6	5.2
Visual change	6.6	6.9	7.4
<i>Dialogue and Narration</i>			
Nonhuman speech	3.1	1.0	1.6
Child speech	2.4	1.6	0.6
Adult speech	3.1	3.1	3.1
<i>Reflective Features</i>			
Singing	1.1	0.8	- .2
Long zooms	-.1	0.1	-.3
Moderate action	2.0	2.1	1.3

Note: Except for rapid action, moderate actions, and long zooms, numbers represent frequencies transformed into log (0.5) in order to normalize distributions.

a walk) were expected to promote rehearsal and reflection because they allow for repetition and time to process information. Because young children often represent information in images rather than abstract concepts, physical activity of moderate speed may provide them with visual images for encoding information.

In the overall analysis, Saturday morning commercial programs contained high levels of perceptually salient features and low levels of dialogue and reflective features. Educational programs were characterized by features involving reflection and by frequent child dialogue. A more detailed linguistic analysis of the dialogue was conducted by our colleague, Mabel Rice (1984). She found that "Sesame Street" and "Mr. Rogers' Neighborhood" both used language in ways that should enhance comprehension. For example, they often contained single words, repetitions, literal meanings, and pictures of the objects being referred to. By contrast, commercial TV cartoons contained complex language, nonliteral meanings, and few opportunities to match words with visual presentations.

Educational programs for children also contained some perceptually salient features, but the levels were generally lower than those in entertainment programming. The mean levels for three episodes of "Sesame Street" are shown in Table 6.1. Its features were similar to other educational

programs except that it contained more child and nonhuman dialogue (muppets were coded as nonhuman). These data show clearly that educational programs like "Sesame Street" are not carbon copies of the forms used in popular entertainment programs. They use some perceptually salient forms, but they also incorporate techniques and forms that would be expected to encourage comprehension and learning.

Recurrent formats are used planfully to encourage active processing and learning on several educational productions. For example, the song beginning "One of these things is not like the others . . ." signals a segment involving sorting and classification. A frequent viewer knows immediately the type of problem-solving task about to be presented and can prepare to think about similarities and differences rather than, say, numbers or body parts. Some formats are designed to elicit activity by omitting some of the elements and letting the viewer fill them in. For instance, in a segment from "Electric Company," street signs were shown while they were named in a catchy song; then the visuals and music were replayed without the words in the song, providing an invitation for the viewer to supply the words (Palmer, 1978).

Children's Attention and Comprehension

Having confirmed through the formal feature analyses that educational programs, including "Sesame Street," use a different combination of forms than commercial programs, we next needed to ask how these forms influence children's patterns of attention and learning. Do children attend to the most immediately and perceptually demanding forms? How do pace, levels of action, animation, and other formal features affect learning and comprehension?

We mentioned earlier that our work on this topic was originally based on a theory that attention patterns shift from exploration to search modes as a result of cognitive development and exposure to television. On the basis of this theory, we initially predicted a developmental shift in children's attention patterns. We expected preschool children with little viewing experience to attend to perceptually salient formal features, and we expected children to attend to informative formal features as they moved into middle childhood and/or became more experienced with television. The results of our research and those of several other investigators indicate clearly that this shift probably happens much younger and faster than we originally expected.

Even 3- and 4-year-old children attend to television forms that provide them with information about the program content rather than to those that

are merely perceptually salient.¹ Children do attend to programs with high levels of physical activity, or visual and auditory special effects. However, rapid pace (that is, frequent change of scene and character) alone does not hold attention (Wright et al., 1984). Moreover, children attend to children's and women's voices but lose interest when adult men talk. They attend to a simple story cartoon more when it contains narration than when it does not. By the time they reach kindergarten, a continuous story line holds their interest better than disconnected segments in a magazine format (Alwitt, Anderson, Lorch, & Levin, 1980; Huston & Wright, 1989).

These patterns led us to propose the "feature signal hypothesis" (Huston & Wright, 1983; Wright & Huston, 1983). Children appear to guide their attention actively to content that is interesting and comprehensible. They use formal features as signals to help them decide whether particular content is worth attending to. Such formal features as animation, children's voices, and visual special effects tell a child at a glance (or a listen) that the program content is intended for children and thus elicit greater interest. Adult men's voices, by contrast, signify a program intended for adults. A laugh track signals that a program is a comedy. As children gain experience with television, they learn the codes represented by different formal features, and they use that knowledge to make attentional choices.

Forms that signal child-appropriate content not only elicit visual attention; they induce children to learn the content. In one study performed in our laboratory, for instance, public service announcements about nutrition were produced in two parallel versions. The content of the two versions was identical, but the forms were different. One version was made with animation, lively music, and child voices—features designed to signal child-appropriate content. The other version was made with "adult" formal features—live photography, serious music, and adult male voices. Five-year-old children attended more to the version with child features than to the adult version and learned more of the nutritional messages presented (Campbell, Wright, & Huston, 1987).

Television forms can also be used to help children to process the information presented in a program. For instance, formal features can highlight particularly important aspects of a message. Just as a spotlight on a stage guides the gaze of an audience, judicious use of sound effects, character action, camera techniques, and visual special effects can guide the attention of the child viewer. This principle has been refined in some types of educational production. For example, "Electric Company" contains segments showing two profiles facing one another and mouthing phonemes

¹Attention in the studies cited here is almost always defined as looking at the television screen, but comprehension of content is often measured after viewing as well to determine whether the televised material was understood.

that form words. The profiles rather than full faces were chosen because careful studies of eye movements demonstrated that, when full faces were used, children looked at the faces rather than the phonemes. Once the faces were deemphasized by making them black, featureless profiles, children looked at the letters that were the "central" content of the segments (Palmer, 1978).

Television forms can also help children to form mental representations. Young children encode visual concrete information more readily than verbal abstract content. When content is shown with a concrete visual referent, or when a theme is demonstrated in physical action as well as verbal, young children understand it better. For instance, in an episode of "Fat Albert and the Cosby Kids," some elements of the plot were portrayed in actions; others were primarily verbal. Preschool and kindergarten-age children understood the themes shown with action better than those that were presented primarily in dialogue (Calvert, Huston, Watkins, & Wright, 1982).

Moving from the laboratory to home viewing, there is ample evidence that "Sesame Street" and other educational programs are effective teachers. The combination of forms used in "Sesame Street" is especially successful, not only for drawing and holding a child audience but for transmitting information and knowledge. The early evaluations of the program demonstrated that viewing led to improvements in letter and number skills, understanding of concepts, and the like (Ball & Bogatz, 1970). In the early 1980s, we conducted a 2-year longitudinal study of media use by children ages 3 to 5 and 5 to 7. We collected information about all programs watched by the children and their families, and we tested the children at the beginning and end of the 2-year period (Huston, Wright, Rice, Kerkman, & St. Peters, 1990).

The findings indicated that the more time children spent watching "Sesame Street" between ages 3 and 5, the more their vocabulary scores improved over time. Even when other factors contributing to vocabulary (e.g., parent's education, preschool experience, birth order) were controlled, "Sesame Street" viewing made an independent contribution to improvement in vocabulary (Rice, Huston, Truglio, & Wright, 1990). Although "Sesame Street" is not specifically designed to teach vocabulary, language is presented in ways that should promote comprehension. There were not comparable benefits of viewing from age 5 to 7; that age group is beyond the target audience of the program.

Television can also transmit prosocial values and behavior to young children (Stein & Friedrich, 1975). In one of the early studies, Friedrich and I (ACH) showed children at preschool several episodes of "Mr. Rogers' Neighborhood." When compared to groups shown other types of programs, they were more cooperative, helpful, and verbally expressive with their

peers, and they were more likely to persist at tasks and activities (Friedrich & Stein, 1973). Other investigations demonstrated that 3- and 4-year-old children who watched "Mr. Rogers" were more imaginative than control groups (Singer & Singer, 1981).

Educational Uses of Television in the Family

The evidence for positive effects of carefully designed television indicates that television can be an ally, not an enemy, for parents. Parents can use television programs for their children's benefit just as they use books and toys. In our longitudinal study, we asked parents about what they encouraged their children to view and what they prohibited. Many parents said they encouraged their children to watch educational programs and children's specials, particularly at times of day when the parents could not spend quality time with their children (e.g., during meal preparation). Critics often condemn parents for using television as a babysitter, but no parent can spend every waking moment in active interaction with a child. The real question seems to be whether it is a good or a bad babysitter. It can be either.

In a more recent investigation of 2- and 4-year-olds from low-income families, we have collected extensive information about the parents' backgrounds and about the kinds of intellectual stimulation and emotional support provided at home. Children who frequently watch informational programs designed for a child audience have parents who also provide them with stimulating toys and activities and who are attentive and affectionate to them. Children who frequently watch cartoons and other "pure" entertainment programs come from homes with lower levels of stimulation and affection (Murphy, Talley, Huston, & Wright, 1991).

Parents can use television actively in interactions with their children. One set of investigators in our lab at CRITC called television a talking picture book (Lemish & Rice, 1986). They observed children ranging from 6 months to 3 years in their homes as they watched "Sesame Street" and other programs. Children watched television while they played, had their diapers changed, and while they ate. From early in the second year of life, children talked to their mothers about the characters, objects, and content of the program much as they do when they look at picture books. They labeled objects on the program (e.g., "kitty," "balloon"). They asked questions such as "What's that?" "What happened to the monkey?" "Where Ernie go?" They also repeated slogans: "Diet Pepsi, one less calorie," "Sesame Street is brought to you today by the letter B." Mothers also talked to their children about the objects and events on the screen just as they talk about pictures and events in books when they read to children.

For children in the age range from 3 to 5, watching programs like "Sesame Street" with an adult can add to enjoyment and learning. Israeli children whose mothers were asked to watch "Sesame Street" with them learned even more than those who watched without maternal intervention (Salomon, 1977). Laboratory experiments have also demonstrated that an adult co-viewer who discusses and explains the content of a program helps children to understand central program themes and to make appropriate inferences about implied events in stories (Collins, Sobol, & Westby, 1981; Watkins, Calvert, Huston-Stein, & Wright, 1980).

Television can be a positive part of family life if it is carefully designed and selected. With home video players and tapes in the majority of households with children, parents have considerably more choice of programs than they did when broadcast television was the only option. However, many parents do not exercise much selectivity or control over their children's viewing (Wright, St. Peters, & Huston, 1990). Educating parents to use television to their children's advantage rather than admonishing them to turn it off might lead parents to be more active in guiding their children's television use.

Most of the examples demonstrating the positive influences of television are based on preschool children, largely because there are fewer quality programs for school-age children and adolescents. When such programs are available, they can lead to positive outcomes. One example is "De Grassi Junior High," a program discussed in detail in another chapter in this book (Singer & Singer).

Parents can be educated to become active in influencing the production and distribution of quality programs for children of all ages. The Children's Television Education Act, passed in 1990, requires television stations to meet the educational and informational needs of children. The act can provide an impetus for better programming, but parents and other citizen groups need to make clear to broadcasters their interest in such programming.

CONCLUSION

We began by addressing some common assertions about television in general and "Sesame Street" in particular. Critics persistently argue that rapid pace and perceptually demanding television forms gain children's attention but interfere with deep processing and comprehension. They sometimes make the more sweeping generalization that television as a medium inherently produces passive mental responses. We dispute these beliefs with three kinds of evidence. First, the formal features used by

"Sesame Street" and other educational programs for children are not all perceptually salient, and they are distinctly different from the features commonly used in advertising and commercial programs for children. Informative programs for children, including "Sesame Street," contain moderate levels of some perceptually salient features including animation, visual, and auditory special effects. They also contain a considerable amount of speech that is carefully tailored to the comprehension abilities of their target audience, as well as some nonverbal features that are apt to stimulate reflection and thought.

Second, a large body of evidence demonstrates clearly that children's attention to television is actively guided by their interests and their ability to understand the content. Mere bells and whistles do not hold them very long. Instead, they attend to formal features that signal content that is interesting, funny, or comprehensible, and they turn away from features that signal content that is incomprehensible or uninteresting. Formal features can stimulate active processing and learning from television as well as draw children's eyes to the set. The forms used in "Sesame Street" are successful, not only in attracting a child audience but in teaching the curriculum of language, concepts, and skills that the program presents.

Third, television can be a positive force in family life as well as a negative influence. Well-designed programs for children can be selected by parents for their children's benefit just as books and toys are selected. Parents can use programs like "Sesame Street" as occasions for conversation, teaching, and pleasant interaction with their children. Parents can offer explanations and answer questions during viewing in order to help children learn and understand the messages being conveyed. They can use television as an occasion to discuss values and opinions. Television as a medium is neither good nor bad for family life; its influence depends on what kind of television is viewed and how it is used during interactions among family members.

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