The Forms and Codes of Television:

Effects on Children's Attention, Comprehension,

and Social Behavior

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Introduction

When television swept the United States and other industrialized countries in the 1950s, much of the initial research was concerned with the effects of this new medium on the lives and minds of the citizenry, especially children. By the 1960s, research about television had turned to studies of the content presented rather than the medium itself. Yet the content of television is not unique to the medium. Violence, prosocial actions, stereotypes, and the like can be presented in print, still pictures, or oral descriptions. What is unique about television is the form in which information is presented. Television is a visual medium in which a stream of constantly changing images can be generated by techniques that are not replicated in real world experience. Camera cuts, pans across scenes, zooms in and out, slow and fast motion, and special effects of all kinds are used in unique ways--musical accompaniments, sound effects, unusual cries and noises, canned laughter, and faceless narrators. Finally, of course, television is a verbal medium. The verbal and linguistic codes of television are not unique. They are the language codes of the real world, but the ways in which language is used to convey content (rather than the content it conveys) is an important formal property of the television medium.

In the past few years, the attention of researchers studying television's influence on children has returned to the forms of the medium itself as distinct from the content presented with those forms. The purpose of this chapter is to review the recent research on television forms and child viewing, and to suggest some issues in need of resolution. Because most of the research on this topic is in the early stages of exploring new terrain, the unresolved issues outnumber the solid conclusions and many of the findings must be viewed as tentative.

Both theoretical and practical concerns have led to the study of television form. McLuhan's early suggestion that television contained fundamentally different representational codes than print remained a vague formulation, sometimes discounted by scholars because of its sensationalized treatment by pop journalists, until Salomon (1979) and Huston-Stein and Wright (Note 1) began to elaborate the implications of that notion for developmental theory. Salomon (1979) focused particularly on the influence of visual media codes on children's mental processing and mental skills. Huston-Stein and Wright (Note 1) attempted to place television forms (both visual and auditory) in the context of a broader theory of developmental change in patterns of attention and information processing.

The practical concerns of producing effective educational programming have been a second impetus for research on television form. Much of this work has been carried out in conjunction with the Children's Television Workshop productions, Sesame Street, and The Electric Company. The goal is to identify the program attributes or production techniques that are maximally effective in gaining and holding children's attention and in communicating information to them in ways they will understand and remember. The surge of educational programming for children on public television in the 1970s makes clear the need for knowledge about how to make programs that will interest and entertain children while at the same time communicating effectively to them.

A third reason for studying form has been increasing suspicion that many effects attributed to television content may be at least partially due to the forms in which the content is presented. We have argued earlier, for example, that some of the aggression-arousing effects of violent television may be a result of the high levels of "hype" typically accompanying violence as well as the violent content. Similarly, most of the research on the effects of prosocial television on very young children has used Mr. Rogers'

<u>Neighborhood</u>, a program notable for its slow pace, gentle style, and unusual language forms. It is possible that some of the positive effects of that program may be a function of its verbal and non-verbal formal properties.

One may question whether it is possible to distinguish crisply between content and form. They can be defined independently, but we freely acknowledge that in practice the forms of television and content messages co-occur in systematic ways. The relationship is probably analogous to that between grammar and meaning in verbal language. Among linguists there is a growing belief that the grammar of verbal language cannot be isolated from semantic meanings (e.g., Fillmore's case grammar (1968)). Nevertheless, there is real value in knowing the dimensions of the linguistic grammar with which meanings interact. A parallel case can be made for the relation between television form and content. Furthermore, to the degree that form and content are confounded in the real world, all studies of television content are subject to the criticism that their results may be partially a function of the forms in which that content was presented. Theory and research focusing on form independent of content may redress the imbalance so that their interactive effects can be better understood.

Representational Codes of Television

Verbal and non-verbal forms are the representational codes of television. Because children view television at a very early age, it is tempting to assume that these representational codes are simple and of little interest. However, television is a medium that can be processed at differing levels of complexity. There is a difference between superficial consumption of interesting audio-visual events and mental extraction of information from coded messages, a distinction clearly formulated by Salomon (1979). He used the term "literate viewing" to refer to "a process of information extraction by the active negotiation of the coding elements of the message" (p. 189). The notion of "literate

viewing" is closely related to the more informal term "media literacy". With age and viewing experience, children's attention to, and comprehension of, television program changes (e.g., Collins, 1979; Krull & Husson, 1979; Wright, Calvert, Huston-Stein, & Watkins, Note 2). It is presumed that these developmental changes reflect increasing facility with the coding conventions and the content depicted, i.e., the beginning TV viewer is not "media literate", but instead gradually acquires such competence as a function of experience with the medium and the attainment of certain minimal cognitive abilities.

Just because one can become a literate viewer at an early age and without conscious effort does not demonstrate that the task is necessarily simple. The representational codes of television range in complexity from literal visual depiction to the most abstract and arbitrary symbols, including verbal language and audio-visual metaphor. The child's task is not an easy one. The change from infants' sensory-motor awareness of alternations in patterns of visual and verbal stimuli (Hollenbeck & Slaby, 1979) to the literate viewing skills of elementary school-age children involves a major qualitative advance, accompanied by developmental growth in related perceptual and cognitive skills. Our understanding of how children manage to become media literate is dependent upon what we know about the task to be mastered. What are the representational codes presented in children's television programs?

Levels of representation

The simplest level of representation is literal visual and/or auditory portrayal of real-world information, e.g., a shot of a car moving on the highway. A child's ability to process this level is presumably dependent primarily on perceptual and cognitive skills used in interpreting real world stimuli. But even at this literal level, object recognition at unusual angles of viewing, lighting, and distance require perceptual generalization and constancies not yet fully developed in the youngest viewers.

On the second level of representation are media forms and conventions that do not have an exact real-world counterpart. Some of these, such as cuts and zooms, are analogs of perceptual experience. For example, a zoom-in is a perceptual analog of moving close to an object. Other media conventions are more distinct from real-world experience. Dissolves, slow motion, musical accompaniments, sound effects, and electronically generated visual special effects are relatively specific to film and television. These features provide a structure for the presentation of content in a manner analogous to syntax in language. A literate viewer must be able to decode the structural meanings of formal features. For example, fades and dissolves often indicate major transitions in time, place, or content; cuts are more often used for minor shifts from one character or viewing angle to another (Huston-Stein et al., Note 3). In children's programs, distinctive visual "markers" are used to separate programs from commercials; the literate viewer must understand their function. This understanding is not automatic. For example, five- and six-year-olds did not understand the meaning of separators between programs and commercials in one recent study (Palmer & McDowell, 1979).

Media codes can also serve as models for mental representation or mental skills. That is, the child can adopt the media forms as modes of representations in her own thinking. Salomon (1979) has demonstrated, for example, that children can learn to analyze a complex stimulus into small parts by observing camera zooms in and out. Apparently, the camera provided a model of the mental process of focusing on specific parts of the stimulus. Media codes can be internalized as forms of mental representation, as suggested by McLuhan (1964), so that people can think in moving pictures with flashbacks, fast and slow motion, changes from color to black and white, and other media conventions (Salomon, 1979).

The forms of television can also take on connotative meaning, either because of their repeated association with certain content themes or because of their metaphorical similarity to real-world objects and symbols. For example, rapid action, loud music, and sound effects are often associated with violence in children's programs (Huston-Stein et al., Note 3). Commercials for masculine sex-typed toys are made with high action, rapid cuts, and loud noise, whereas feminine sex-typed toys are advertised with fades, dissolves and soft music (Welch, Huston-Stein, Wright, & Plehal, 1979). The forms themselves may come to signal violence or sex-typing to children even when the content cues are minimal or nonexistent.

The third level of representation consists of symbolic forms not unique to the medium. Such forms may be nonlinguistic (e.g., a red stop light) or linguistic. It is also possible for verbal language to encode forms at the other two levels. For example, dialogue can encode the literal representation of reality (the first level), as when a speaker describes on-screen objects or events, or dialogue can encode the conventional significance of a production feature (the second level) as when a fade is accompanied by the line "Once upon a time, long, long ago...". In this sense of double encoding, it is possible for the first two levels to be nested in the linguistic codes. Such piggy-backing of representational means could aid the child in understanding the message, and also by association facilitate his mastery of the codes themselves.

It is apparent that the second and third levels of representational codes found in children's television programs not only have different surface characteristics but also are derived from different sources or experiences. The second level of representation, specific knowledge, is probably acquired largely as a function of experience with the medium. That is not the case with the

third level, where symbols are shared by the wider culture. By definition, these codes have currency outside the medium of television, and can be learned without ever viewing television. They also have a different utility in the world, leading to slightly different reasons for investigating them. The media specific codes are important insofar as they reveal what is involved in a child's processing of televised information. The verbal language of television is of special interest insofar as it contributes to a child's processing of televised messages and other media codes, and also, perhaps more importantly, as it serves to facilitate a child's mastery of the general linguistic code.

While the representational functions of the linguistic system have been exhaustively described by linguists in a long research tradition, the production codes of television have only recently come to the attention of behavioral scientists. The first step in understanding these codes and their functions is to develop descriptive taxonomies for formal features and to describe the ways in which they are used in television productions.

Most descriptions of formal features have been developed for the purpose of studying television's influence on children. This is not to imply that formal features are without relevance for adults, or that studies conducted with adult subjects are without implications for understanding children's television viewing experiences. Instead, a general discussion of how formal features may influence adult viewers is beyond the scope of this discussion; only those studies immediately pertinent to child-directed issues and investigations will be presented here. Readers interested in the effects of television forms on adult audiences may wish to refer to television and film broadcasting and production publications, where issues of form are often discussed in regard to editing techniques. For example, Messaris, Eckman and

Gumpert (1979) argue that editing techniques (the sequence and composition of visual shots) influenced how adult audiences perceived the nature of the interchanges between Carter and Ford during the televised 1976 presidential debates.

Descriptive analyses of television forms

Although several investigators have identified sets of formal features or program attributes for study in relation to children's attention (e.g., Anderson & Levin, 1976) or comprehension (e.g., Salomon, 1979), two groups have attempted descriptions of the occurrence and co-occurrence of formal features in existing television programs. One such analysis of adult programs was based on the information theory construct, entropy (Watt & Krull, 1974). Entropy or form complexity was operationally defined by the variability of sets, characters, and speakers and by the "unpredictability" with which each set, character, or speaker might appear next. Operationally, the entropy measure included the number of different sets, characters, and speakers and the amount of time during which each of these appeared in the program. These investigators coded a sample of adult programs and demonstrated by factor analysis that the formal features of the programs could be clustered in two major groupings: "dynamism" (roughly the rate of change in scenes and characters) and "unfamiliarity" (roughly the variability or number of different scenes and characters). In a later study, these investigators found that form complexity was correlated with violent content in prime time programs (Watt & Krull, 1976). Wartella and Ettema (1974) used the same coding system on a set of commercials designed for children and adults, but found that the two factors emerging were visual and auditory features respectively.

Formal features of children's television programs have been analyzed in our work (Huston-Stein et al., Note 3) to determine what features co-occur, what features characterize animated as opposed to live programs, how formal

features differ as a function of target audience or production goals, and what features are correlated with violent and humorous content. Five major clusters of features emerged from two analyses of children's programs selected from Saturday morning network broadcasts, prime time network stations, and daytime educational programming (primarily P.B.S.): 1) action (physical activity of characters) was associated with non-human dialogue and non-verbal auditory techniques such as music and sound effects; 2) variability of scenes (number of different scenes) was associated with "visual tricks" such as special effects, fades, and dissolves; 3) tempo (rate of familiar scene and character change) was associated with "visual change" techniques such as cuts and pans; 4) singing and long zooms tended to co-occur in a pattern suggesting reflection or recapitulation of content themes; and 5) human dialogue stood alone.

Variability and tempo are similar in some respects to the factors identified by Watt and Krull (1974), but the differences between the prime time adult programs used in their analysis and the children's programs used in ours makes it unlikely that the same feature categories will emerge or prove useful in analysis. The first three clusters, action, variability, and tempo, were more common in animated than in live programming. The latter two, reflection and human dialogue, occurred more frequently in live than in animated programs.

Correlations of formal features with two types of content, violence and humor, were examined. Violence was frequent in animated programs, and, within those, was positively associated with action and related features such as sound effects, loud music, and variability. Low violence occurred in programs with reflective formal features and human dialogue. Among animated programs, those with humor had especially high rates of variability and tempo (including visual special effects) and relatively low rates of action and dialogue.

When the programs were subdivided according to broadcast time, an indi-

cator of both target audience and program goals, different patterns of feature packaging were evident. Saturday morning programs, most of which are animated, had high levels of action, variability, and tempo, and relatively low rates of reflection and human dialogue. That is, Saturday morning cartoons rely heavily on perceptually salient features that can be best characterized by the popular term, "hype." Although daytime educational programs contained moderate rates of some of these perceptually salient features, they were lower than Saturday morning shows on rapid action, music, noise, variability, tempo, and related visual features. Furthermore, daytime educational programming contained features that were relatively rare in Saturday morning shows. Specifically, they made frequent use of "reflective" features" — singing and long zooms — that are used to preview and review, to recapitulate and integrate themes, and to remind the viewer of the larger context and significance of the major events portrayed. They also contained high rates of dialogue, particularly by child speakers (a feature that we will later note is especially likely to hold children's attention). Finally, the level of action or movements by characters in daytime educational programming was predominantly moderate (e.g. at the pace of a walk) rather than rapid (e.g. running, flying). Other data recently collected in our laboratory suggest that such moderate levels of action may be particularly well-suited to communicate information effectively to young children.

These findings are important in light of the frequent criticisms of Sesame Street and Electric Company for emulating the "hype" of commercial programming (e.g. see Singer, 1980). In one analysis of Sesame Street and Electric Company, both programs contained higher rates of "attention getting" devices and humor than two other educational programs, Mr. Rodger' Neighborhood and Captain Kangaroo (Bryant, Hezel, & Zillmann, 1979). Nevertheless,

in our analysis, three episodes of Sesame Street had patterns of formal features like those described for educational programs in general. While they contained moderate levels of salient features, they had considerably lower levels than Saturday morning programs, and they contained other "educational" features such as child dialogue and reflection. In Electric Company, the rates of non-verbal auditory features and variability were closer, though not equivalent, to those of Saturday morning, but high rates of reflection and human dialogue also occurred. In addition, a detailed analysis of the language used in Electric Company (described below) indicated that it contains many devices for simplifying language and facilitating children's understanding of content that are not typically found in commercial programs. On the whole, therefore, it is simplistic and inaccurate to characterize these successful educational programs as extreme on dimensions of pace, action, or sensory bombardment. They use these features in moderation (by comparison to commercial children's programs) and they contain other features which appear well-designed to facilitate not only attention, but comprehension of the content presented.

The findings concerning forms in children's programs can also be viewed from the perspective of media literacy and its antecedents. Recall that Saturday morning cartoons were characterized by high levels of action, variability and tempo. These clusters consist of perceptually salient events, such as physical activity, music, sound effects, scene changes, and visual special effects. The conspicuous nature of these features may allow the forms themselves to become the message. That is, the child may pay more attention to how the information is conveyed than to what the message is, especially when the plot lines are thin to begin with. Unnoticed in the entertainment value of the features is the tutorial nature of the experience.

The child is receiving explicit cues about how messages are communicated on television. In this case the relationship between form and content is the opposite of the usual assumption. That is, the forms overpower the content (from the young viewer's perspective) whereas the problem is usually regarded as a matter of the content controlling the form (from the producer's perspective).

Linguistic Codes

So far dialogue has been discussed as a single feature. However, the coding systems inherent in verbal language clearly constitute another component of the forms of television. In television programs, verbal language is a code within a code. Descriptive studies of the language of children's television can provide information for two purposes: 1) knowing the nature of television's linguistic codes and how they interact with other forms of communication in children's programs is a critical part of any attempt to understand how children process televised information; and 2) analysis of television's linguistic codes may show how they are adjusted in different programs to different levels of linguistic competence in the viewer, and therefore how they may, under certain conditions, play an important role in furthering language acquisition itself.

In a pilot study of the linguistic structure of children's programming in relation to formal feature use, Rice (Note 5) analyzed 25 categories of linguistic coding in six sampled programs. The programs represented animated stories with high, low, and no dialogue (respectively`: Fat Albert, Bugs Bunny, and Road Runner); a live program representing situation comedy (Gilligan's Island); and educational programs differing in age of intended audience and format (Mr. Rogers and The Electric Company). Three sets of linguistic descriptors were scored: 1) Communication flow consisted of mea-

sures of length, variability, rate, and repetition of utterances; 2) <u>language structure</u> contained measures of grammatical completeness, descriptive qualifiers, and stressed single words; 3) meaning/content variables included focusing (i.e., giving selective prominence to a particular linguistic constituent), nonliteral meanings, explicit instructions, novel words, and immediacy of reference.

Distinctive patterns of language usage were evident in the two educational programs. <u>Mr. Rogers</u>, the educational program for preschoolers, presented a moderate pattern of verbal communication: a moderate amount of dialogue, without the use of nonliteral meanings or novel words, combined with moderate amounts of focusing and some use of stressed single words. <u>The Electric Company</u>, the educational program designed for early school-age children, used the most dialogue of all the shows sampled, and incorporated a number of techniques for drawing attention and interest to dialogue (e.g., focusing, stressed single words, novel words, non-literal meanings) while at the same time adjusting for easier comprehension of grammatical forms (e.g., short comments, partial grammatical units, low variability in length) and content (e.g., reference to immediately present events).[1] Both educational programs used techniques that are likely to facilitate children's comprehension of language (stressed single words, focusing), but the program for older children also used a more complex pattern of verbal presentation designed to challenge the more linguistically competent school-age viewer.

Unlike the educational programs, the commercial programs containing dialogue showed little evidence that language codes were explicitly adjusted to the level of the child viewer. <u>Bugs Bunny</u> and <u>Fat Albert</u> contained frequent nonliteral meanings and little focusing. <u>Gilligan's Island</u> was particularly high in descriptive qualifiers and removed or nonreferential content. Although

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[1] While it is widely recognized that the purpose of <u>The Electric Company</u> is to enhance children's reading skills, the fact that it does so by means of intensive verbal presentation is generally overlooked.

Fat Albert and The Electric Company both presented complex linguistic patterns, they differed in the amount of adjustment to facilitate the viewer's ease of processing. Gilligan's Island was the most unique, i.e., it did not share any distinctive language features with other shows.

Comparison of the linguistic features with the formal production features of the six program samples revealed that the shows with low amounts of dialogue (Bugs Bunny and Road Runner) were high in action, pace, cuts, fades, zooms, visual special effects, vocalizations, sound effects, and music. All of these production features are perceptually salient ones that attract and hold visual attention in young viewers. The two verbally complex shows (The Electric Company and Fat Albert) each contained some distinctive uses of salient formal features: Fat Albert had very high pace, frequent cuts, pans, and background music; The Electric Company had a high number of vocalizations. Mr. Rogers and Gilligan's Island demonstrated lower rates of nonlinguistic formal features.

In summary, among programs designed for the youngest viewers, Road Runner and Bugs Bunny relied very little (or not al all) on verbal coding and heavily on perceptually salient production features to get their message across, while Mr. Rogers used less perceptual salience in combination with simple, uncluttered, comprehensible verbal messages. In programs intended for older viewers, the patterns of verbal and formal features were more complex. Fat Albert combined verbal complexity with perceptually salient visual events; The Electric Company used more moderate amounts of perceptual salience along with some adjustments in the language patterns to support children's linguistic processing; and Gilligan's Island was the most distinctive in its reliance on verbal messages without interesting patterns of salient formal feature use.

Such findings suggest a continuum of difficulty of representational coding

in this range of children's programs. We would expect linguistic coding to be more difficult for young viewers than the perceptually salient visual and auditory nonverbal codes. The packaging of cartoons such as <u>Bugs Bunny</u> and <u>Road Runner</u> seems well suited to young children of limited media or linguistic competence. Similarly, the simple, comprehensible speech in <u>Mr. Rogers</u> is well suited to a preschool audience. More complex packaging in shows aimed at an older audience requires considerable linguistic sophistication and comprehension of distinctive uses of formal features. In some cases, the codes are judiciously mixed in packages of information-presentation well suited to the communicative competencies of the intended audience. A moderate level of complexity may be important to maintain interest among older, relatively sophisticated viewers.

Just as the conventional meanings of production features can be suggested by exaggerated, perceptually salient presentations used to convey redundant content, so there is evidence of adjustments of the linguistic and production codes that are designed to draw attention to and clarify language forms themselves. For example, the frequent focussing operations and stressed single words on <u>Mr. Rogers</u> and <u>The Electric Company</u> serve to draw attention to the language codes. Furthermore, in these two programs, the meanings of the linguistic forms are often explicitly depicted. Frequently the content is a visual representation of the verbal meaning, sometimes highlighted by attention-maintaining visual production techniques, such as cuts to a closer focus or different perspective. At least some children's programs appear to combine language adjustments with selective and supportive use of nonlinguistic salient features, at first to supplement, and later to challenge the emerging cognitive competencies of the child viewer.

The language of commercials aimed at children warrants explicit attention from researchers insofar as the intent goes beyond the communication of

messages to the selling of products. Presumably, the effectiveness of com-

mercials is dependent upon the nature of the linguistic codes presented

(i.e., their basic understandability), their referential accuracy, and their

use within the social context. Bloome and Ripich (1979) analyzed the social

message units of commercials, and how the messages related to plot or social

context and/or the product. They found that many of the product-tied refer-

ences were ambiguous in regard to certain features of products, such as the

use of flavorings. Also, there was evidence of a subtle shift within com-

mercials from using language in a social context to using language to pro-

mote products. Language served to establish the social occasion and then

lead the child to a product and its role in enhancing the social occasion.

The Influence of Television Forms on Children's Mental Processes

When children watch television they can just sit passively and stare

at the set if they choose, but a growing body of empirical evidence suggests

that this is not the usual level of response. Instead children are more

likely to become involved in the viewing experience, to work at extracting

information from coded messages, to respond cognitively, affectively, and

socially to program content. They are mentally and socially active viewers

(Wright, Watkins, & Huston-Stein, Note 4; Singer, 1980). At least some (if

not most) of their mental responses are influenced by how the information

is packaged, i.e., the media-specific and general representational codes

employed. The ones for which there is empirical evidence will be discussed

here: children's visual attention while viewing, and their understanding

of television forms, program events, and relationships among characters.

Formal features and attention

Visual attention to television forms. A number of studies using dif-

ferent types of programs have found that certain production features or pro-

gram attributes attract and hold children's visual attention while viewing

television (Anderson, Alwitt, Lorch, & Levin, in press; Anderson & Levin, 1976; Anderson, Levin, & Lorch, 1977; Wartella & Ettema, 1974; Wright et al., Note 2; Rubinstein, Liebert, Neale, & Poulos, Note 6). Even though different systems of scoring production features have been used, there is consistency in the findings. First, auditory features, such as lively music, sound effects, children's voices (but not adult dialogue), peculiar voices, non-speech vocalizations, and frequent changes of speaker attract and hold children's attention. Second, conventional visual features, such as cuts, zooms, and pans have less influence, but visual special effects do attract children's attention. Third, in most studies, high levels of physical activity or action elicit and maintain children's attention. Fourth, changes in scene, characters, themes, or auditory events are especially effective in eliciting attention, though they are less important for maintaining it once the child is looking. Features that lose children's attention include long complex speeches, long zooms, song and dance, men's voices, and live animals (Anderson & Levin, 1976; Anderson et al., in press; Susman, 1978; Rubinstein et al., Note 6; Bernstein, Note 7).

Auditory attention

The finding that auditory events, action, and change elicit and hold children's visual attention while visual features have less influence serves to remind us that audition and vision interact in a complex manner during information processing. While there is considerable evidence describing visual attention, little information is available describing auditory attention (or the interaction of the two modalities) while viewing television. Any general conceptual model of how children attend to television (including the factors that are proposed as controlling attention) must take into account both visual and auditory attention. The measurement of auditory

attention while maintaining a naturalistic viewing situation has been a challenging experimental problem. Looking behavior can be recorded directly in a reliable and unobtrusive manner; listening is a private mental event that is not amenable to direct unobtrusive measurement. A number of techniques for directly measuring auditory attention are currently being explored in several laboratories, including our own.

Pending satisfactory direct measures, auditory attention can be inferred by testing comprehension of material presented in the auditory modality or material presented when the child was not looking at the television. Repeated findings that children receive and understand fairly complex messages from exposure to Mr. Rogers' Neighborhood, despite low rates of visual attention, have led to speculation that children were often listening even when they were not looking (Stein & Friedrich, 1972; Tower, Singer, Singer, & Biggs, 1979). Obviously, auditory attention can facilitate comprehension only for material that is presented in an auditory modality, usually speech. Studies in our laboratory, involving microanalysis of short time intervals within a program, indicate close connections among visual presentation of content, visual attending, and recall. Similar precision in specifying the mode through which content is presented would be required to infer that auditory attention mediated comprehension.

Auditory attention can also be inferred by observing visual attention to the screen (or lack thereof) and by observing what children talk about while viewing. If they are talking about things unrelated to the television content shown, they are probably not listening. Even if they are looking at the set, their attention may be only at the level of monitoring instead of active processing. On the other hand, when auditory features such as foreground music and children's speech recruit visual attention for children

who are looking away from the screen that is evidence that some form of auditory processing is taking.

It is clear that attention to television involves more than looking or not looking. Not only is there another modality involved, that of auditory processing, there is also the matter of different levels of attending. Current research has focused on visual attending primarily because it is amenable to measurement and yields unambiguous data. As our experimental tools become more sophisticated, we will be able to clarify which forms influence which kinds of attention, under what contextual circumstances.

Form and content interactions. One of the original reasons for our interest in television form was the hypothesis that formal features in children's television were more important determinants of attention than violent content. The relative contributions of form and violent content are difficult to disentangle because conventions of production lead to correlations of certain forms with violence. Violence in children's programs is usually portrayed with high levels of action and salient auditory and visual features (Huston-Stein et al., Note 3). Yet formal features can be separated conceptually and operationally from violent content. In one study of preschoolers, programs were selected to be high in both action and violence, high in action and low in violence, or low in both action and violence. (We were unable at that time to find a low action-high violence program to complete the design; the empty cell has since been filled in a study currently in progress). Children's total attention differed as a function of action, not violence. That is, they were as attentive to high action without violence as they were when it accompanied violence, and less attentive to low action (Huston-Stein, Fox, Greer, Watkins, and Whitaker, in press).

A more molecular analysis was performed for these three programs and for four other cartoons by dividing each program into 15-second intervals and correlating attention with formal features and violent content. Multiple regressions were performed to determine which features were the best predictors of attention in each program. Violence did not enter any of the seven multiple regressions as a predictor that contributed significant variance independently of formal features, but considerably more data on different programs and different age groups are needed to establish the generality of this null conclusion (Huston-Stein, Note 9).

Form, content, and viewership ratings. The relation of form and content to children's interest in television programs has also been studied by analyzing feature occurrence rates in nationally broadcast television programs in relation to national audience ratings for different ages, sexes, and regions of the country. For a sample of 34 Saturday morning programs, high action and violent content were predictors of viewership for preschool children. Each made an independent contribution. Among children from 6 to 11, variability and tempo were the best predictors of viewership (Wright et al., Note 10). In a similar analysis of general adult audience ratings in relation to violent content of prime time adventure programs, violence accounted for a miniscule and non-significant portion of the variance in viewership (Diener & DeFour, 1978).

How formal features influence attention

Salience and informativeness. Basic research on young children's attention indicates that perceptual salience of the stimulus environment is one determinant of attention. The attributes of a stimulus that make it salient include intensity, movement, contrast, change, novelty, unexpectedness, and incongruity (Berlyne, 1960). Many of the production features that attract

and hold young children's attention fit these criteria defining perceptual salience. We have proposed a developmental model hypothesizing that perceptual salience is a particularly important determinant of attention for very young viewers and/or for viewers with little media experience (Huston-Stein & Wright, 1979; Note 1).

The theory guiding our work was derived from the more general theoretical work of Wright and Vlietstra (1975) concerning developmental change from "exploration" to "search" in children's modes of information-getting. Exploration as a mode of response is governed by the most salient features of the stimulus environment. It involves short duration, discontinuous, and impulsive responding to whatever features of the environment are perceptually dominant from moment to moment. Habituation to the salient features of a particular stimulus environment occurs as one becomes more familiar with it. Application of this model to television experience leads to the hypothesis that, among the youngest and least experienced viewers, the viewing experience consists in the consumption of perceptually salient events as entertainment in their own right. The child's attention is controlled primarily by feature salience. Until the powerful effects of salience have partially habituated, the child will be essentially a passive consumer of audio-visual thrills, and will not engage in deeper levels of processing (Wright & Vlietstra, 1975).

Consummatory stimulus-controlled exploration gives way in familiar contexts to perceptual search, a kind of information-getting in which the activity is instrumental, rather than consummatory, active rather than passive, and guided by the child's desire to abstract information, rather than just entertainment, from perceived events. The child's progress from perceptual exploration to perceptual search is believed to be as much or more a function of familiarization through experience and habituation as it is a

consequence of cognitive maturation, though of course, the two are usually confounded. Thus the older and more experienced viewers are more interested in the content of a program and its meaning and less responsive to salient formal features. When older children do attend to formal features, they may use them as syntactic markers to develop a structural framework in which to organize and integrate their comprehension of content menaing (Wright et al., Note 2).

Singer (1980) has also proposed that high rates of salient audio-visual events on television absorb children's attention, not only because theey are perceptually interesting, but because they are affectively involving. His theory does not, however, contain the proposition that developmental shifts will occur as consequences of cognitive development and familiarity with the medium. Instead, he seems to imply that extensive exposure to salient features in the medium will inhibit other forms of interest (e.g. in books and verbal media) and will leave the child focused on the absorbing stimulus features of the moving picture on the screen.

Studies comparing attention patterns of preschool children (4-6) with those of children in middle childhood (8-10) have supported the hypothesis that younger children are more attentive to salient formal features than are older children (Wartella & Ettema, 1974; Wright et al., Note 2). In our studies, preschool children attended to high levels of action and audio-visual "tricks," (visual special effects, sound effects, and unfamiliar scenes), but elementary school children were not differentially attentive to these features. Contrary to prediction, however, older children were more attentive than younger ones to programs with rapid pace (i.e., frequent scene and character changes). These studies support the hypothesis that young children's attention is affected by the perceptual salience of television formal features.

There is less support at present for the complementary hypothesis that older children's attention is guided more by the informativeness of features, perhaps because informativeness depends on the program context and the child's level of processing. When children try to follow a plot or engage in a logical search for meaning, they probably attend to features that provide cues about time sequences, locations, characters, and events in the program. Studies by Krull and Husson (1979), in fact, suggest that older children may attend to form cues that signal content and form changes during the upcoming one or two minutes. Preschool children did not show these anticipatory patterns of attention to formal cues. Media literate children may learn temporal associations so they can anticipate what will occur in a program. Older children also attend differentially to informative action and signals associated with scene changes, bit changes, and changes to and from commercials.

Comprehensibility. A somewhat different perspective on the relationship between attention and features is proposed by Anderson and his associates, who link attention with the comprehensibility of program content (e.g. Anderson, Note 8). They suggest that formal features such as animation or children's voices may serve as signals that content is designed for children and is therefore likely to be comprehensible. Children may attend to such features, not because of the inherent qualities of the features, but because their media experience leads them to expect meaningful and understandable program content. The fundamental determinant of attention, according to this formulation, is the comprehensibility of the content. Two sets of data are used to support this hypothesis. In one study (Lorch, Anderson, & Levin, 1979), children's attention to Sesame Street was manipulated experimentally by varying the availability of toys and distractions during viewing. Despite the fact that the non-distraction treatment produced very high levels

of attention, it did not produce improved comprehension. Within the distracted

group, however, the children who attended more comprehended more of the con-

tent. This finding was interpreted as demonstrating that comprehensibility

guided attention rather than attention determining comprehension. In a

subsequent study (Anderson, Note 8), children attended less to a television

program in which the speech was incomprehensible because it was backwards

or in a foreign language than to a program with understandable speech. Al-

though the influence of comprehensibility on attention has been tested thus

far only by varying language features of programs, the hypothesis suggests

that the comprehensibility of non-linguistic formal features should affect

attention through a similar mechanism.

This line of research provides important evidence that very young

children are actively processing content when they watch television rather

than merely passively consuming audio-video thrills. It does not, however,

establish that feature salience and other non-content aspects of television

programs are unimportant influences on children's attention. In the studies

varying comprehensibility, feature salience has been held constant (and fairly

high). If salience were low, would comprehensibility alone hold children's

attention? Again, the relatively low rates of attention usually found for

Mr. Rogers' Neighborhood suggest not, despite its outstanding comprehensi-

bility. Second, the full range of comprehensibility has not been systemati-

cally explored. It is clear that complex, incomprehensible material loses

children's attention in comparison to moderately easy, comprehensible mater-

ial, but one cannot extrapolate that finding to conclude that very easy ma-

terial would produce more attention than moderately difficult, but still

comprehensible content. In fact, the model to be proposed here suggests

that both extremes of comprehensibility will be less likely to maintain

attention than material in the middle range. Moreover the model explicitly

cautions against trying to define moderate comprehensibility as a stimulus

feature without taking into account both the cognitive level and the viewing

experience of the child.

An integrative model of attention and development.

These seemingly divergent explanations of the determinants of attention

can be integrated in the framework of one established·model for attention

and interest as a function of familiarity and complexity (Hunt, 1961).

That model is illustrated in Figure 1. The abscissa is a compound of famil-

Insert Figure 1 about here

iarity and complexity of both form and content. On the left end are highly

familiar and oft-repeated bits, like the standard introductions and closings

of familiar program series, whose informative content is minimal, and whose

formal features have become habituated and no longer elicit attention among

habitual viewers. The joint processes of habituation and familiarization

(Wright, Note 11) serve continually to depress attention on the left side

of the inverted U-shaped function. By contrast, the forms and content at

the high end of the abscissa are unfamiliar, complex, and incomprehensible

to the child viewer. They too elicit little interest and attention because

the child is incapable of understanding their meaning and their relation

to other parts of the program. Their decoding requires comprehension of codes

the child has not yet acquired and logical integration for which the child

is not yet cognitively ready. They also often make reference to outside

information and contextual knowledge that only adult viewers possess. Thus

attention on the right side of the curve is also low, due to incomprehensi-

bility. But cognitive development and the child's growing store of background

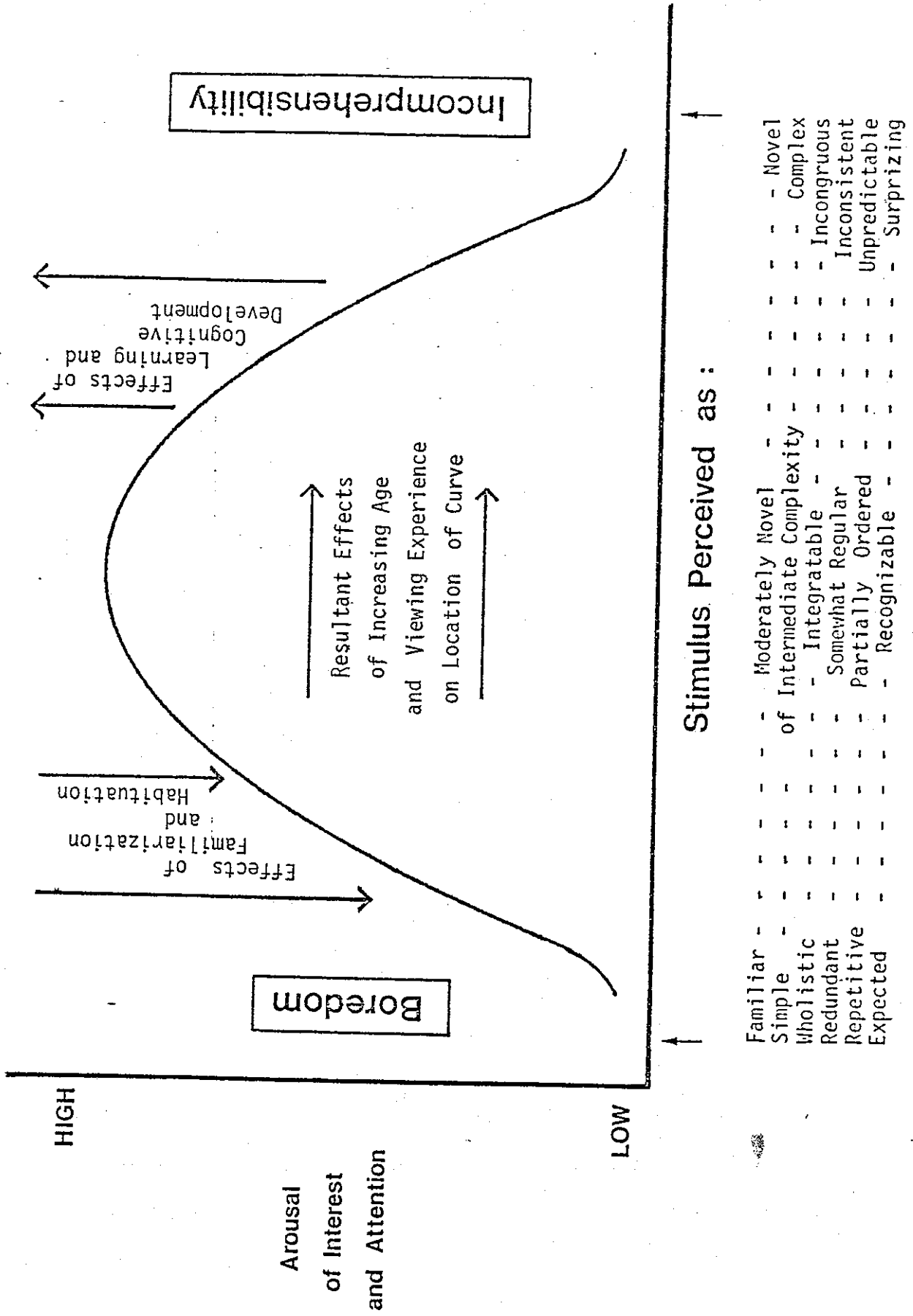information will, over time, tend to raise attention on the right, just as

Figure 1. Theoretical Model

familiarization and habituation tend to reduce it on the left. The result

is a developmental migration of the curve describing a child's attention from

left to right as a function of cognitive development and viewing experience.

What was interesting for its perceptual salience or simple content becomes

boring by its redundancy, and what was incomprehensible or formally complex,

and therefore ignored, gradually becomes meaningful and informative in the

decoding process, and therefore of greater interest. If the abscissa is

defined in terms of the form and content of a televised stimulus, the loca-

tion of the curve for a particular child along that gradient is a function

of cognitive level (on the right) and viewing history (on the left).

How formal features influence comprehension

As children attend to television, their immediate task is how to inter-

pret the information they receive, what to make of the messages. The medium's

representational codes influence this process of comprehension in a number

of ways. The media-specific codes themselves require some interpretation,

as do the general representational codes, such as language. The coding sys-

tems also interact with content in ways that can enhance or interfere with

how easily the content can be understood.

Media specific codes and mental skills. Recall our opening remarks

about how television does not literally present events as we perceive them

in the real world. Instead, the representational codes package messages

in a manner that requires mental transformations in order to interpret them.

The linkage between forms and mental processes can be quite specific and

intimate. Salomon (1979) proposed that some production features may be

viewed as representing certain mental skills or mental operations. For

example, zooming in and out literally portrays the mental operation of re-

lating parts to a whole. Camera cuts that make the image jump from one

part of a physical space to another, or from one view of an object to another, correspond to the mental operations of coordinating spaces and taking different perspectives.

Salomon (1979) distinguishes two different ways in which production features can function in relationship to mental processes, at two different levels of interpretative difficulty: one is the function of "supplanting" the skill. That is, the camera essentially performs the operation for the viewer; presumably the viewer can learn the skill from watching through the eye of the camera. A zoom-in is an example of a camera operation that supplants the skill of analyzing a complex array into subparts or isolating one small part at a time. The second function of media codes is to "call upon" an already existing skill in the viewer. For example, a cut to close-up shot presumes that the viewer can already relate small parts to a larger whole: it does not perform the operation as a zoom does.

Data on both Israeli and American children support the hypothesis that the understanding of and ability to use common media codes increase with age and, in some cases, with media experience. Younger and less experienced viewers benefit more from media formats or formal features that supplant the intellectual skills to which they relate. Older and more experienced viewers understand recurring formats that call upon related mental skills better than do younger and less experienced viewers (Salomon, 1979; Palmer, Note 12). For example, children who were skilled at visual analysis performed better when shown a "cut to close up" format than when shown zooms (Salomon, 1974).

Salomon (1979, pp. 235-238) argues that the relationship between media codes and children's mental processing is not just a one-way process of using mental skills to interpret media codes. Instead, the influence is reciprocal —experience with media codes actually cultivates the existing mental skills to which they relate; the media codes can become part of children's mental

schemata, resulting in their ability to think in terms of such codes as
zooms and camera cuts. Salomon cautions, however, that the media-specific
codes are not the only messages to affect cognition, and not all of televi-
sion's codes function in this capacity. He suggests that those codes that
are most unique to television and have a wide potential field of reference
are those most likely to contribute to viewers' mental schemata.

The supplanting function of media form was tested in our laboratory in
two studies designed to teach conservation of number by showing children
animated television sequences demonstrating that the number of objects was
independent of their spatial configuration. Pairs of white and black squares
separated into designs, danced around one another, and played games; then
they returned to their original arrangement with a narrator's reminder that
there were still the same number of blacks and whites. Training improved
conservation on a televised posttest of number conservation, but did not
generalize to a live test, in the first study. In the second, training
influenced performance on both televised and live post-tests (Butt & Wright,
Note 13).

Language codes. There are several aspects of verbal language that have
relevance for how children comprehend the messages of television. The first
is how children comprehend the verbal dialogue itself. This question has
yet to be the subject of explicit empirical investigation (beyond a few
observations of how children interpret disclaimer phrases in commercials).
However, without reason to believe otherwise, we can presume that children
interpret televised verbal information according to the same linguistic
processing strategies and constraints that they draw upon in the presence
of live speakers. In other words, insofar as the general representational
codes of television are like their real-world counterparts, children prob-
ably interpret them in much the same way as they do in other social contexts.

The second aspect of verbal language with relevance for comprehension is the fact that, unlike the media-specific representational codes, viewers can produce the general codes themselves to communicate their reactions to and understandings of television. Viewers can process the messages of television and then respond in some of the same codes; indeed, they can literally imitate and rehearse the verbal messages if they choose to do so.

In one study, we explored what children talk about when they watch television as a function of the amount of dialogue present in the programs. Preschool and third grade children watched four shows that differed in the amount of dialogue (one show with none, two with moderate amounts, and one with a high frequency of dialogue). The children watched in pairs and they were free to pursue other play activities. Their comments while viewing were transcribed and coded for content categories. The children made the most comments about the television program when viewing the program with no dia- logue. This trend was more pronounced among the third-graders than the pre- schoolers. Furthermore, the television-related comments fell in a distinc- tive pattern: more descriptions of actions and events, more emotional/ self-referenced comments (e.g., "I like this part"), more questions about program content, and more statements of knowledge of recurrent program themes for the no-dialogue program than for any of the other three. There were very few directly imitative responses (Rice, Note 15).

The most obvious interpretation of these findings—that children lis- ten when there is dialogue and talk when there is no dialogue—does not completely account for the results. The total amount of talking was highest in the no-dialogue show, but second highest in the high-dialogue show. Children talked to one another extensively during a program with frequent dialogue, but they more often talked about topics that were irrelevant to

the program. In the program without dialogue, the absence of dialogue, as well as the fact that the program was familiar and repetitive, appeared to stimulate children to talk about the program. Whether or not similar effects would occur for programs that were less repetitive or familiar is not yet clear, but in a program that is interesting, familiar, and simple to understand, it appears that the absence of dialogue may elicit comments about aspects of a program that are of interest to children.

Verbal mediation of content. Another aspect of verbal language with relevance for television-viewing is that it can be used to mediate and direct more general mental processes, such as attention, comprehension, and recall. Verbal labels and explanations have been used in a number of experiments to clarify children's understanding of program content. In one study, preschool children imitated sharing from a television program more when the program included verbal labeling of the characters' behavior than when the behavior was not labeled (Susman, Note 16). In another investigation, verbal explanations of program themes inserted in a cartoon with a moderately complex plot were relatively ineffective in improving comprehension, but the same explanations provided by an adult viewing with the child aided comprehension considerably. In particular, children who received the adult explanations recalled the temporal order of events in the program and were able to make inferences about implicit content better than controls. Incidentally, they also attended more to the program. Temporal integration and inferential processing of televised information are skills that are difficult for third graders, yet even four- to six-year-olds were able to do them better than chance after the adult explanations (Watkins, Calvert, Huston-Stein, & Wright, in press). Other studies have demonstrated similar benefits for kindergarten-aged children from verbal labeling of central program themes (Friedrich & Stein, 1975).

In summary, the verbal representational codes are important in our understanding of how children comprehand television because the codes are used at both ends of the communication process, and to direct closely related mental processes: television uses verbal codes to transmit messages that must be processed and understood by children; children, in turn, use their own verbal codes to communicate their reactions to and comprehension of program messages; judicious manipulation of verbal messages can enhance children's understanding of certain program content.

Television form and plot-relevant content. Many television programs are narratives; that is, they tell a story consisting of interrelated events. The content of such stories can be distinguished as plot-relevant (central content) or irrelevant to the plot (incidental content). Developmental changes in comprehension of such content have been explored in some detail (Collins, 1979; Collins, this volume). Through second grade, children have limited and fragmented comprehension of story material fifth graders do better, and eighth graders comprehend most of the story. In particular, younger children tend to recall material that is incidental and irrelevant to the plot whereas older children appear better able to select central content messages. Younger children also have difficulty in integrating facets of the story that are separated in time (e.g., connecting an action with its motives and consequences), and they have difficulty inferring content that is implicit in the story, but is not explicitly shown. All of these findings are based on children's responses to adult prime time dramas (Collins, 1979; Collins, this volume). The specific ages at which changes in comprehension occur may be slightly different for other types of programs such as those made for children, but the direction of developmental trends is probably the same.

While developmental differences in children's understanding of television content undoubtedly reflect cognitive developmental changes, they may also vary depending on the form in which content is communicated. In general, children understand information presented visually, so that character actions can be observed, better than they understand information presented in verbal form without accompanying visual cues. In addition, high action and other perceptually salient features maintain children's attention better than dialogue and narration, so children may retain the content presented with salient features better than content conveyed primarily through dialogue. Obviously, the combination of visual and verbal cues is likely to be most effective (Friedlander, Whetstone, & Scott, 1974).

In one study (Calvert, Watkins, Wright, & Huston-Stein, Note 17), children's recall of a televised story was measured for four types of content: central and incidental presented with formal features that were either high or low in perceptual salience. High salience features generally included visual features and moderately high action; low salience features included adult and child dialogue. Central content questions often involved inferences; incidental content usually consisted of isolated factual events. Children remembered central, theme-relevant content better when it was presented with highly salient formal features than when it was presented with low salience techniques. Young children (kindergarten age) benefited from attention to such salient features more than older children (third and fourth graders).

Some parallels appear in a study of commercials in which visual cues and words in the form of slogans or labels actually conflicted with the more abstract verbal message. Visual cues and word slogans suggested that the advertised products contained fruit although the "higher level" abstract verbal message indicated no fruit content. Children from kindergarted through sixth grade accepted the false message conveyed by the visual and associative word cues. Apparently they did not understand the abstract

implied message that there was no real fruit in the products (Ross, Campbell, Huston-Stein, & Wright, in press).

Salomon's work (1979) also indicates that children understand content messages better when they understand the formats used to present the content. For instance, children who were good at relating parts to a whole, and who could, therefore, understand a close-up format, learned more content from a film using cuts to close-ups than did children who were less skilled in understanding that format.

These findings suggest that associating content with certain media codes may increase comprehension of the content if the production feature is familiar and understood by the child, and if it focuses attention on central rather than incidental content. If the child does not understand the code represented by the feature or if the feature focuses attention away from the central content, it may interfere with comprehension. These conclusions may apply to the verbal codes of television as well as to media-specific production features.

To conclude this section on how children's comprehension of television is influenced by the representational codes, we can offer some general observations: The child viewer has the job of making sense of the medium at several different levels; the codes themselves, the immediate content, and more abstract interrelationships relevant to story lines. The representational codes are implicated at each of these levels. Children learn to interpret the media-specific codes as a function of age and viewing experience. Furthermore, certain media codes may come to be incorporated in children's general mental schemata. The general representational code of verbal language has a two-fold relevance for increasing our understanding of how children comprehend television: 1) we need to be aware of the particular interpretative demands presented by the verbal dialogue as a lin-

guistic code; and 2) children's own verbal comments while viewing can provide further clues about how they comprehend television's messages. The psychological dimensions of television codes can be used to enhance children's comprehension of plot-relevant content: the association of attention-getting features or codes that are also readily understood with content central to the story should contribute positively to children's ability to understand the plot.

<div align="center">The Influence of Television Forms on Social Behavior</div>

The initial questions we raised about the effects of formal features on social and task-related behavior implied that form and content might have separable effects on children's behavior. Because certain formal features are correlated with content in existing television fare (e.g., action and noise with violence or slow pace with prosocial behavior), previous findings concerning the effects of violent or prosocial television content could have been partially due to the form rather than the content of those programs (Huston-Stein & Wright, Note 1).

If form and content have somewhat different effects, some important practical implications for commercial and educational television could result. If salient formal features are primarily responsible for drawing child viewers to cartoons and other commercial programs, but violent content is the main cause of aggressive behavior, then commercial producers might reduce violence in children's programs and substitute non-violent content presented with salient features. Conversely, prosocial and educational programs might increase their audiences by the use of certain salient formal features without compromising their content.

The theoretical issues examined in our research derived from a comparison of two basic models: observational learning and arousal. Specific and separate effects of form and content can be predicted from observational

learning theory. According to that model, viewers should imitate particular types of television content—aggressive content should lead to aggressive behavior and prosocial behavior. Children might also imitate formal features—high action might lead to increased motoric activity; high pace might lead to rapid shifting from one activity to another. Arousal theory leads to contrasting predictions (Zillman, Hoyt, & Day, 1974). That model suggests that either salient formal features or "exciting" content can lead to a state of generalized arousal; the specific behaviors manifested as a result will depend on the immediate environmental cues and the predispositions of the child. Increases in either aggressive or prosocial behavior could occur if there were appropriate environmental cues. The principal difference between observational learning theory and arousal theory is that the latter leads to a prediction that both form and content of television can stimulate behavior that is quite different from what has been observed in the program, whereas the former predicts that viewers will imitate whatever was presented. Arousal theory has received some support in studies of adults. Both nonaggressive content designed to induce arousal (e.g., erotic content) and formal feature complexity or salience have been demonstrated to induce physiological arousal and aggressive behavior when the stimulus situation provides cues for aggression (Bryant & Zillmann, 1979; Watt & Krull, 1976; Zillmann et al., 1974).

Two studies in our laboratory also provide support for the notion that salient formal features can instigate aggressive behavior in children, even in the absence of violent content. In the first study, animated children's programs containing different levels of action and violence constituted the treatment conditions. There were three programs: high action/high violence, High action/low violence, and low action/low violence. A control group saw

no television (Huston-Stein et al., in press). In the second study, advertisements with different levels of salient formal features—action, pace, visual special effects—were shown in the commercial breaks of a non-aggressive program. There was vertually no aggression in the program or any of the commercials (Greer, Potts, Huston-Stein, & Wright, Note 18). Pairs of preschool children were observed in a play situation containing a variety of toys before and after viewing the experimental programs.

In both studies, high levels of salient formal features stimulated aggressive behavior, despite the diverse content and formats of the programs and commercials. When cartoons were shown, children tended to be more aggressive after high action programs than after low action or no television at all. Violent content did not add to the level of aggression found after high action alone. When advertisements were shown, highly salient formal features without violent content led to higher levels of aggression than low salience features. These findings provide support for the notion that arousing form can lead to increased aggression even without the modeling of violent content, just as it aroused more attention with or without violence. An alternative interpretation is that children have learned to associate salient formal features with violent content through experience with the medium, so that they respond to salience as though it contained violence even without explicit content cues. In either case, the results to date fail to provide producers of children's television with a way of attracting viewers that avoids the adverse effects of violent programming. High hype seems to have some of these adverse effects, too.

The hypothesis that children will imitate formal features—high action or rapid shifts from one thing to another—has received little support from our work or that of other people. In the two studies described above, there

were no differences in motor activity level as a function of program form

or content, though the measure may have been restricted by the fact that

children were observed in a small room. Negative findings also appeared

in an experiment comparing Sesame Street programs with rapid vs. slow pace

(i.e., short, frequently changing bits vs. long, infrequently changing

bits). There were no differences in impulsivity or task persistence as a

function of program pace (Anderson, Levin, & Lorch, 1977). However, in a

field study of Israeli children who were less experienced with television

than are American children, those who watched Sesame Street regularly did

show less perseverance on a routine task than a control group of non-viewers

(Salomon, 1972).

It appears that no simple causal segregation has yet been or will be

easily achieved between the effects of television form and content on

young children's social behavior. Both form and content can influence arousal.

Arousal both enhances attention to

the program and enhances the likelihood that its form, its content, and other

situational cues present at the time of viewing will be responded to by the

child viewer. Separating arousal attributable to formal complexity from

arousal attributable to exciting content is another difficult research task

that lies ahead.

While arousal may be nondifferential in its effects with regard to its

source (from form or from content), it is possible that form-derived arousal

has more immediate effects and on younger children than content-derived

arousal. There may be a tendency, for example, for high pace, action, and

variability to produce immediate arousal, leading to enhanced attention to

the program because that is the behavior most strongly cued in the immediate

environment. Such arousal can also affect post-viewing behavior both di-

rectly and through an increased opportunity for content to contribute addi-

tional arousal. Content more often requires interpretive processing over time, where the arousing properties of salient form may tend to be perceptually given, and hence both more immediate in time and more effective with young children than content-based arousal. These temporal relationships need to be studied not only because they will inform our search for post-viewing effects, but also because they modify the initial understanding of attention with which we began. One hopes that producers of commercial and educational programs for children could depart from the stereotyped formats and begin to break up the expected correlations between level of action, excitement, or humor achieved and amount of violence, aggression, or hostility shown. Then it would be possible to determine whether certain forms are inherently arousing or whether they produce effects primarily because of their learned association with particular kinds of content.

<div align="center">Concluding Remarks</div>

It is clear that the empirical study of the forms of television, its representational codes, is in the very early stages of investigation. A little is known; some is suspected; much remains to be learned. Each of the topics discussed in this paper needs further investigation. The ultimate goal is to determine how children perceive, interpret, and assimilate the forms of television as an integral part of their viewing experience, how they come to acquire this knowledge, and what impact it has upon their general mental processing. Among the immediate issues is the nature of the relationships among children's viewing history, general cognitive development and the manner in which they respond to television's representational codes. Studies with an ontological perspective are needed, that trace the interaction of children's experiences with television, their general experiential/cognitive growth, and the influence of television's forms on a

variety of psychological parameters.

Another important question is how children may incorporate or generalize television forms to their own mental or social development. To the extent that the forms can be imitated or are similar to possible performance modes, children could, in effect, learn to use the forms themselves. We have already touched on several possibilities: Salomon's claim that visual media formats (e.g., cuts, zooms) acquire representational status in children's thought processes; the verbal language of television may, in some circumstances, serve to introduce children to certain linguistic knowledge; action of characters or shifts of activities may elicit similar responses in the social/motoric behaviors of child viewers. It may well be that some kinds of skills are readily generalized from television to children's repretoires whereas other skills are mediated by interfering mechanisms (such as arousal, in the case of social/motoric behaviors). Carefully designed experimental studies are needed to determine the extent of these possibilities.

More specifically, though there is fairly strong evidence that certain media-specific codes attract and hold visual attention, we need to know more about auditory attention, how linguistic features influence attention, and the nature of the interaction among forms, content, attention, and developmental change (including both intellectual change and accumulated viewing experience). The interaction between what the television provides and what the child brings to the viewing situation needs to be explored more thoroughly. Still another set of major questions revolves around the ways in which formal features of television affect children's comprehension of content. To the extent that such effects occur, are they a function of attention-eliciting and maintaining functions of formal features or do they

reflect the fact that certain formal features are themselves representational codes that children can readily understand? A related issue is raised by critics who suggest that salient, high-paced formats may in fact detract from comprehension. It seems overly simple to argue that particular television forms are either "good" or "bad" for comprehension. Instead, the research task is to analyze under what circumstances, in what combinations, and for what types of children particular features enhance or detract from comprehension.

The investigation of television form promises to contribute information that will allow greater specificity in our conceptions of how children process the medium of television. In particular, it will be possible to separate effects attributable to form from those associated with content, and to clarify the interaction of the two aspects of television. Closely related to this possibility is another; the study of television codes leads directly to inferences about particular processing abilities of children; the match between televised information and children's mental processes is very close in the case of certain television forms. Furthermore, as we learn more about the representational codes of television, how children come to understand them and use them to comprehend content, we will also be learning about the general principles of symbol formation, a knowledge with relevance for many aspects of child development. Finally, if, as seems entirely possible, future generations of Americans will do much of their information processing via interactive electronic audio-visual dis-plays and will receive most of their entertainment and much of their educa-tion via television, then the development of "media literacy" may become almost as important as that of basic reading skill, whether or not we are ready to acknowledge it.

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