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ABSTRACT

This paper discusses research on the effects of formal features of televisicn programs on children's attention, comprehensicn, and social behavior. Formal features are defined as visual and auditory evénts which are not primarily a part of the content or message. Three models of the influences of form and content are discussed: (1) the cbservational learning model which posits that children imitate form the way they do content; (2) the satiation-habituation model which predicts that behavior which contrasts with dominant formal features should result from viewing; and (3) the general arousal model which posits that form and content combine to form a net total arousal that activates whatever behavior is cued in the situation. It is proposed that younger children and cther inexperienced viewers respond directly to the most salient features of form and, to some extent, content as isolated attention getting features, whereas older children are more interested in content themes than in formal features. A sample of 19 commercial programs was examined for action, pace, variability, visual techniques and violent content. It was found that programs appealing to preschool children have shcrter segments and higher levels of actiон, pace, variability and special visual effects than programs designed for elementary school children. It is noted that the change in ccntent and fcrm of programs appealing to older children follows the develcpmental changes proposed in Piagetian and other developmental theories. (SB)

Modeling the Medium:

Effects of Formal Properties of Children's Television Programs

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Presented in Symposium on Cognitive Processing of Television: Perspectives on the Effects of Television on Children, at Biennial Meeting, Society for Research in Child Development, New Orleans, March, 1977.

This paper represents the early stages of our thinking and research on the effects of formal features of television programs on children's attention, comprehension, and social behavior. Formal features are defined as visual and auditory events which are not primarily a part of the content or message, but are consequences of production and editing techniques that can be used with almost any content. To provide a more concrete idea of the features being considered, a summary of the catetories we have developed appears in Table 1.

Table 1 about here

At a macroscopic level, three variables are being examined: the level of action, defined literally as the amount of movement by the characters; the pace or rate of change of scenes and characters; and the variability or number of different scenes and characters. At a more microscopic level, visual features including camera cuts, pans and trucks (where the camera appears to be moving across a scene), zooms, fades and dissolves, and special effects such as fast and slow motion and trick photography are examined. Auditory features include dialogue, non-speech vocalizations such as screams, animal sounds, and whistles; prominent music, sound effects, inanimate noises, laugh track, and narration.

I will return to a discussion of these variables in more detail, but I would first like to set the stage by describing some of the reasons for studying formal variables and by presenting the theoretical model which we are using. Finally, I will present our hypothesis about developmental change in children's processing of formal and content features.

Rationale for studying formal variables.

In the years since the Surgeon General's report, a substantial literature has accumulated demomstrating both the adverse effects of television violence and the potential of the medium for affecting children's learning and imitation of prosocial themes such as cooperation, helping, and task persistence (see Stein & Friedrich, 1975). In many instances, however, violent or prosocial content messages are correlated with formal features. For instance, it appears that violence is usually presented in high-action, fast-paced program sequences. Are agressive responses by children to such programs a function of the violent content, the formal characteristics, or both? Are action and pace more important in drawing and holding children's attention than violence per se?

Prosocial effects of television may also result partially from formal characteristics. In a field experiment some years ago, children who saw "Mr. Rogers' Neighborhood" showed increased task persistence in the classroom (Stein & Friedrich, 1972). The content messages emphasizing persistence in the programs were presented with relatively slow pace, low levels of action, and a tendency to return to consideration of past content according to a later program analysis by Wright and Shirley (1974). Furthermore, the increased persistence occurred earlier than the viewing of the particular programs in which persistence was emphasized most. Hence, it may be that the behavior changes in persistence resulted as much from slow pace and other stylistic properties of the program as from the content.

In addition to the obvious theoretical reasons for determining the separate and interaction effects of content and form, there are some important practical reasons for doing so. Producers of commercial television programs appear to equate action and violence; many of them hold a firm

belief that violence is necessary to gain and hold large audiences of children. If high levels of action and pace do not lead to the same increases in aggression that violent content does, but are associated with high levels of attention and interest, then we could encourage television producers to make nonviolent programs with formal characteristics that would draw audiences. If, on the other hand, aggressive behavior results from high action and pace in the absence of violent content, many programs that claim to be harmless or even beneficial to children will need to be scrutinized more carefully. At the moment, decisions about formal characteristics are left almost entirely to the descretion of writers, producers, editors, and others in the artistic and technical side of television production.

An analogous problem besets the producers of noncommercial, public, educational programs for children. By policy, they are committed to the airing of the best possible educational and prosocial material; yet, their effectiveness in attracting and holding a child audience depends for the most part on their ability to compete with the programs produced by the commercial networks. Therefore, it would also be helpful to know what formal features serve to maintain interest and can be applied to educational programs at the production level without reducing (and perhaps even enhancing) their social and educational effectiveness. The formative research at Children's Television Workshop is one of the only efforts to specify formal features for this purpose (Lesser, 1974).

A model for the effects of form and content.

Because formal variables have not been considered extensively in psychological research, no comprehensive theory is available with which to conceptualize their effects. Therefore, we began our efforts by constructing

a model illustrating hypotheses based on three theories--observational learning, general arousal and habituation-satiation. The model appears in Figure 1. It is organized in a sequence from left to right under the

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Figure 1 about here

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general headings, T.V. Program Feature, Attention, Comprehension, and Behavior. The top half of the figure refers to the effects of formal features; the bottom half refers to parallel effects of content properties. Boxes with dashed lines indicate hypothetical processes, and the letters in the right-hand margin refer to alternative behavioral outcomes hypothesized under the assumptions of the three theories. Habituation-satiation hypotheses are indicated by the letter B: observational learning by A; and general arousal by C. We now consider only the top half of the figure, the portion concerned with formal features.

The habituation-satiation theory (roughly analogous to catharsis theory in the content domain) would predict that behavior contrasting with dominant formal features should result from viewing. It is possible, for example, that short-term satiation with high levels of action or pace could lead to a compensatory response, such as quiet behavior. Alternatively, attention to a low variability program could habituate, and subsequent behavior could show short attention spans and high rates of change among activities. We know of little or no data to support this hypothesis at present.

Observational learning processes are presented in the next row (designated A). We propose that observational learning of form can occur in the same way it occurs for content. The work of Salomon (1974; 1976)

in Jerusalem is consistent with this hypothesis. He proposes that the actions of the camera or the format of a program constitute models of mental operations which children can imitate. For example, camera zooms literally model the process of analyzing a complex stimulus by focusing on one part of it. In Salomon's studies, exposure of children to various formats has resulted in changes in related information processing skills.

Observational learning of formal properties might also result in behavioral modeling. Children could imitate high action levels, rapid changes in activity, and the like. One effort to test this notion by comparing slow and fast paced segments of "Sesame Street" produced negative results (Anderson, Levin, & Pugzles, 1976). However, in some experimental studies of aggression, children who observed non-aggressive, but highly active models showed increased levels of activity, but not increased aggression (Bandura, Ross, & Ross, 1963; Christy, Gelfand, & Hartmann, 1971). We are currently conducting a study which examines social behavior following viewing of real programs that are high or low in violence and high or low in action, in an attempt to separate the influences of action from those of violence.

The general arousal hypothesis, shown in the row labeled C, results in a prediction that form and content have similar effects. The net total arousal from both sources activates whatever behavior is cued in the situation. Watt and Krull conducted some studies with adults and adolescents testing this hypothesis. They found some evidence that physiological arousal results from complexity of format in television programs (Watt & Krull, 1975) and that formal complexity is associated with aggressive behavior for adolescents (Krull & Watt, 1973).

While each line of reasoning makes differential predictions of behavioral consequences, and more than one process may be involved, it is likely that these effects will be dependent on cognitive developmental change in children and on their growing familiarity with the medium itself. Therefore, we now turn to a hypothesis concerning developmental change in children's responses to formal features.

A developmental hypothesis.

It has often been suggested that children focus on different components of television programs than adults do. For instance, Greenberg (1965) found that the criteria by which children evaluate television programs are quite different than those used by program producers. There is also a developmental pattern in recall of program content; younger children recall a higher proportion of "incidental" as opposed to "central" content (by adult definitions) than older children. Perhaps what is central to the young child is simply different than what is central to an older child or an adult. What, then, is important to young children in television programs?

Our hypothesis is that younger children and less experienced viewers respond directly to the most salient features of form and, to some extent, content, as isolated attention-getting events of interest in their own right. Older and more experienced viewers are more interested in the content and its meaning (i.e., the story or message). Accordingly, they attend less to salient formal features and more to content. They use selected formal features to develop a structural framework with which to organize and integrate their comprehension of content meaning. Therefore, we hypothesize that formal features are relatively more important influences on the attention and inherent interest of younger children than of older children, and that content themes are correspondingly less important to younger than to older children.

As a first step toward testing this hypothesis we examined a sample of 19 commercial programs to determine whether programs aimed at and preferred by younger children differed in formal features from those designed for and preferred by older children. All programs were broadcast on Saturday morning or after school during the 1976-77 season. They were divided into three categories. Category 1 were cartoons lasting 6-11 minutes with a relatively simple plot (e.g. "Road Runner," "Bugs Bunny"). It appears that preschool children are the primary audience for this category of cartoon. All of these programs are broadcast before 9:00 in the morning in the midwest (a time when everyone else is asleep). With the exception of "Popeye", all the main characters are animals. Survey data collected by Lyle and Hoffman (1972b) seven years ago indicated that these "Mickey Mouse-type cartoons" were frequent favorites for children between 3 and 5.

Category 2 also consists of animated programs, but they are longer (18-24 minutes) and they have more complex plots (e.g., "Scooby Doo," "Tarzan"). They are broadcast between 9:00 and 11:30 on Saturday or after school, and most of the main characters are human in each series. It appears that these programs are designed for an older audience than those in Category 1, probably elementary school children. Lyle and Hoffman's (1972a) data indicate that this type of cartoon was a frequent favorite for first- and sixth-graders.

Category 3 consists of live programs that are in other respects similar to Category 2 (e.g. "McDuff the Talking Dog," "Shazam"). They average 16-24 minutes in length; they have moderately complex plots; they are broadcast between 9:00 and 11:30 on Saturday or after school; and the characters are primarily human. This category provides a comparison of formal properties between live and animated formats. There are no live programs that appear comparable in other respects to Category 1 programs.

The mean rates of occurrence of formal features for each category of program appear in Table 2. In general, the short cartoons are higher on

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Table 2 about here

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most of the formal features studied than the longer programs. They have higher levels of action and higher pace as indicated by rates of scene and character change. The proportion of new to familiar scenes is also higher indicating a higher variability and less continuity within the program. Some visual techniques, such as fades and dissolves and special

effects occur more frequently in short cartoons, but camera cuts are less frequent. The auditory features of these programs have not yet been completely scored, but our hunch is that they will be higher in special sound effects, prominent music, and other auditory features except dialogue.

Violent content of four types was also scored: physical attack, verbal aggression, object agression, and threatening behavior. The mean aggression scores for each type of program are shown in Table 2. Although short cartoons average about double the frequency of aggression that occurs in the other categories, the difference is not significant because of the high variability within program categories. Hence, programs aimed at different age groups differ more in formal characteristics than in violent content.

Parenthetically, it is interesting that there are relatively small differences between animated and live formats when the length and plot complexity of the programs are similar.

The hypothesis that formal features are more important than content for younger viewers, and that the reverse is the case for older viewers gains indirect support from these preliminary data. Programs designed for and preferred by preschool children not only have shorter segments, but also have higher levels of action, pace, variability, and special visual effects than those designed for elementary school children.

The theoretical and research literature in cognitive development also provides encouragement for our developmental hypothesis. The shift from predominantly figurative to predominantly operative knowing that Piagetian

theory describes as characteristic of the development of concrete operations is compatible with the hypothesis.

. . . A other approach emphasizes experience and familiarization, as well as cognitive change: Wright and Vlietstra (1975) proposed a distinction between exploration and search in children's information-getting behavior, and a developmental trend from the former to the latter as a function of experience. 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. The search mode, on the other hand, is characterized by deliberate, systematic responding to any stimulus features, regardless of salience, that are informative and relevant to the child's purpose or goal. It involves longer and more coherent and reflective strategies of information-getting.

Just as younger children or any children in relatively unfamiliar situations are most responsive to novel and salient stimulus features, so young or inexperienced viewers may attend and respond primarily to formal, attention-getting features of television programs, like action, pace, and variability. Analogously, as children gain familiarity and sophistication with the medium, they are more likely to attend to events on the basis of their informativeness, relevance, or utility in the interpretation and comprehension of content. According to the exploration-search model, then, such older and/or more experienced viewers should use formal features as segmental and sequential guideposts, not so much of interest in their own right as they are useful in determining the meaning

of the story or message. They might, for instance, use fades and dissolves as indicators of the passage of time or a major change of setting. Search behavior is said to result not only from increasing cognitive maturity, but also from familiarity with the situation resulting in generalized habituation of attention to salient features. Thus, if children who are older or who have many hours of television viewing experience have advanced to the search mode, one would expect their attention to formal features to be limited to those which best serve as syntactic markers for the interpretation of the meaning of the content.

Although age and experience are correlated, they can be empirically separated. Viewing history with age partialed out would be a measure of familiarization which could be stratified by type of program as well. Age with viewing history controlled should reveal differences more dependent on level of processing than on familiarity with the medium. For example, logical integration of content depends both on familiarization necessary to liberate attention from salient features and on development of the cognitive structures necessary to interpolate and extrapolate so as to fill in what is logically necessary to the message or story even if it is never shown on the screen.

A concrete example of the difference is as follows: the most salient auditory features of children's television programs are probably the non-speech vocalizations and sound effects, but the most informative auditory feature is the dialogue or narration. A child who responds primarily to stimulus salience will attend most closely to non-verbal auditory effects; a child who is attempting to follow a plot will attend

closely to dialogue. We have some very preliminary pilot data suggesting that preschoolers' attention to television programs increases during non-verbal auditory effects and declines during dialogue, but this hypothesis has yet to be properly tested.

Our hypothesis is also consistent with Collins' work (1973; 1975) demonstrating developmental changes in children's ability to connect temporally separated parts of a plot, to understand motives underlying behavior, and to understand consequences for behavior. For the preschool child, content and plot probably have limited drawing power simply because of cognitive limitations, whereas formal features are highly salient and interesting and require little cognitive processing for meaning or temporal integration.

In conclusion, there is good reason to extend our theoretical and practical concern with the effects of children's television beyond content to the domain of form. It is not just what is communicated in the content message, but how that message is assembled and packaged that is important, especially for young children. Increasing our knowledge concerning the effects of formal features of children's television may extend the domain of policy to consideration of such features in evaluating the benefits or harm resulting from television programs. At least as important, it can provide more extensive information than is now available about ways in which prosocial and educational programs can be made maximally appealing and interesting to children of different ages.

Footnotes

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References

Anderson, D.R., Levin, S.R., & Pugzles, E. The effects of T.V. program pacing on the behavior of preschool children. Unpublished manuscript, Dept. of Psychology, University of Massachusetts, Amherst, Mass., 1976.

Bandura, A., Ross, D., & Ross, S.A. Imitation of film-mediated aggressive models. Journal of Abnormal and Social Psychology, 1963, 66, 3-11.

Christy, P.R., Gelfand, D.M., & Hartmann, D.P. Effects of competition-induced frustration on two classes of modeled behavior. Developmental Psychology, 1971, 5, 105-111.

Collins, W.A. Effect of temporal separation between motivation, aggression, and consequences: A developmental study. Developmental Psychology, 1973, 8, 215-221.

Collins, W.A. The developing child as viewer. Journal of Communication, 1975, 25, 35-44.

Greenberg, B.G. Television for children: dimensions of communicator and audience perceptions. AV Communication Review, 1965, 13, 385-396.

Krull, R. & Watt, J.H. Television viewing and aggression: An examination of three models. Paper presented at the International Communication Association Meeting, Montreal, April, 1973.

Lesser, G.S. Children and television: Lessons from Sesame Street. New York: Random House, 1974.

Lyle, J. & Hoffman, H.R. Children's use of television and other media. In E.A. Rubinstein, G.A. Comstock, & J.P. Murray (Eds.), Television and social behavior. Vol. 4. Television in day-to-day life: Patterns of use. Washington: Government Printing Office, 1972, Pp. 129-256. (a)

Lyle, J. & Hoffman, H.R. Exploration in patterns of television viewing by preschool-age children. In E.A. Rubinstein, G.A. Comstock, & J.P. Murray (Eds.), Television and social behavior. Vol. 4. Television in day-to-day life: Patterns of use. Washington: Government Printing Office, 1972. Pp. 257-273. (b)

Salomon, G. Internalization of filmic schematic operations in relation to individual differences. Journal of Educational Psychology, 1974, 66, 499-511.

Salomon, G. Cognitive skill learning across cultures. Journal of Communication, 1976, 26, 138-144.

Stein, A.H. & Friedrich, L.K. Television content and young children's behavior. In J.P. Murray, E.A. Rubinstein, & G.A. Comstock (Eds.), Television and social behavior. Vol. 2. Television and social learning. Washington: Government Printing Office, 1972. Pp. 202-317.

Stein, A.H. & Friedrich, L.K. The impact of television on children and youth. In E.M. Hetherington, J.W. Hagen, R. Kron, & A.H. Stein (Eds.), Review of child development research. Vol. 5. Chicago: University of Chicago Press, 1975. Pp. 183-256.

Watt, J.H. & Krull, R. Arousal model components in television programming: Form activity and violent content. Paper presented to the International Communication Association Meeting, Chicago, April, 1975.

Wright, J.C. & Shirley, K. Matching communication pace with children's cognitive styles. In D. Hearn (Ed.), Values, feelings, and morals: Part I: Research and perspectives. Washington: American Association of Elementary-Kindergarten-Nursery Educators, 1974, Pp. 54-69.

Wright , J.C. & Vlietstra, A.G. The development of selective attention: From perceptual exploration to logical search. In H.W. Reese (Ed.), Advances in child development and behavior. Vol. 10. New York: Academic Press, 1975, Pp. 196-239.

Table 1

Summary Taxonomy of Formal Features of Children's Television Programs

Category	Definition
Macro Level	
Action	Large motor movement and locomotion, such as walking, running, jumping, flying, falling, or riding in vehicles.
Visual Pace	Change of scene or set (unfamiliar or previously shown).
	Change of Character: entrances or exits of one or more characters.
Auditory Pace	Change of speakers in dialogue.
Variability	Proportion of scenes or characters that are new or not previously seen in this program.
Micro Level - Visual	
Cuts	Instantaneous shifts between cameras.
Pans & trucks	Apparent movement of camera, vertical or horizontal.
Zooms	In (toward) and out (away from).
Fades and Dissolves	Blank screen to picture, picture to blank, or one picture to another.
Special effects	Visual effects such as use of distorting prisms or filters, camera tilt, special lenses, freeze, fast or slow motion, negative film, superimposition, instant appearance & disappearance, trick photography.
Micro Level - Audio	
Dialogue	Change of speakers. Start, stop, duration.
Non-human Vocalizations	Animals, other human-like characters.
Music	Start, stop, duration of prominent music.
Sound effects	Filters, echo chambers, prominent sounds of action, explosions, impacts, engine and brake noises, etc.
Laugh track	Sound of laughter from unseen audience.
Narration	Verbal narrative or explanation by voice of person not shown.

Table 2

Mean Levels of Formal Variables for Three Categories of Children's Programs @

Feature	Short Cartoons	Long Cartoons	Live Programs	F	df
Action	2.63	2.35	2.16	3.56*	2,16
Pace					
Scene changes	.60	.40	.28	13.62****	2,16
Character Changes	.71	.42	.37	4.88**	2,16
Variability: Proportion of scenes that are unfamiliar	.75	.45	.40	7.79***	2,14
Visual Techniques					
Cuts	1.95	3.34	3.02	10.82***	2,15
Pans	.52	.43	.31	2.59	2,15
Zooms	.22	.29	.15	2.07	2,15
Fades & Dissolves	.32	.13	.06	22.42****	2,15
Special Effects	.28	.10	.07	2.42	2,15
Violent Content	.32	.17	.19	1.47	2,16

@ Note: All means represent rate of occurrence per 15-sec. interval

* $.05 < p < .10$
** $p < .05$
*** $p < .01$
**** $p < .001$

Figure Caption

Figure 1. General Model for influence of form and content.

Notes: a) Top half of figure refers to formal features; bottom to content.

b) Letters on right-hand margin refer to alternative theoretical processes:

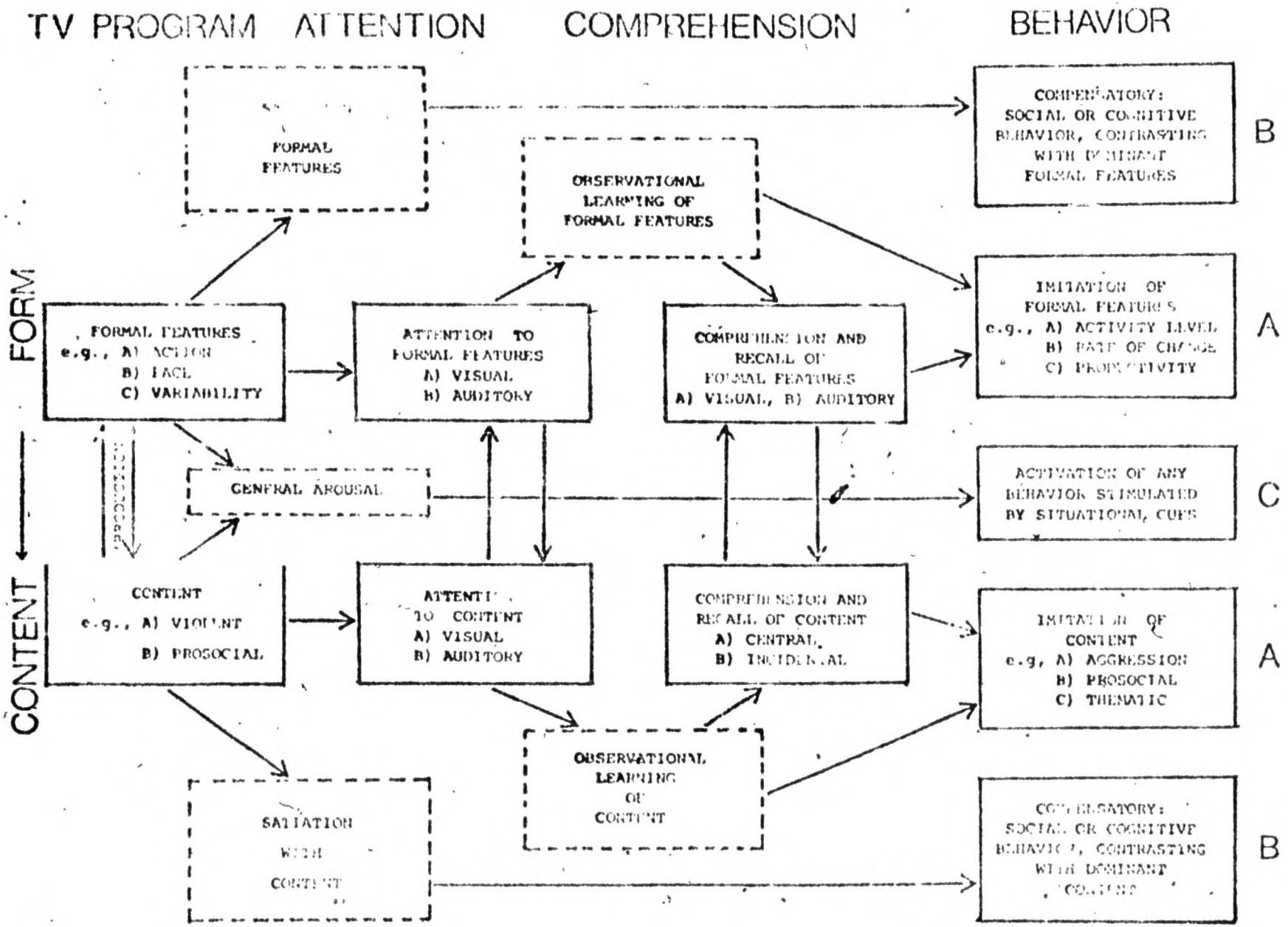
A = observational learning (direct imitation)

B = Satiation-habituation (compensatory contrast)

C = General arousal (nonspecific activation)

c) Note that observational learning model permits imitative behavior either with or without comprehension-recall of formal features or content.

d) Hypothetical/unobservable processes are identified by dashed lines.


TV PROGRAM
ATTENTION
COMPREHENSION
BEHAVIOR
FORM
CONTENT
FORMAL FEATURES
ORIENTING
FORMAL FEATURES
e.g., A) ACTION
B) FACE
C) VARIABILITY
ATTENTION TO FORMAL FEATURES
A) VISUAL
B) AUDITORY
OBSERVATIONAL LEARNING OF FORMAL FEATURES
COMPREHENSION AND RECALL OF FORMAL FEATURES
A) VISUAL, B) AUDITORY
COMPENSATORY: SOCIAL OR COGNITIVE BEHAVIOR, CONTRASTING WITH DOMINANT FORMAL FEATURES
B
IMITATION OF FORMAL FEATURES
e.g., A) ACTIVITY LEVEL
B) RATE OF CHANGE
C) PROSOCIALITY
A
GENERAL AROUSAL
ACTIVATION OF ANY BEHAVIOR STIMULATED BY SITUATIONAL CUES
C
CONTENT
e.g., A) VIOLENT
B) PROSOCIAL
ATTENTION TO CONTENT
A) VISUAL
B) AUDITORY
COMPREHENSION AND RECALL OF CONTENT
A) CENTRAL
B) INCIDENTAL
IMITATION OF CONTENT
e.g, A) AGGRESSION
B) PROSOCIAL
C) THEMATIC
A
OBSERVATIONAL LEARNING OF CONTENT
SATIATION WITH CONTENT
COMPENSATORY: SOCIAL OR COGNITIVE BEHAVIOR, CONTRASTING WITH DOMINANT CONTENT
B