Children (5 - 7 years), having high and low activity levels, were allowed to vary the rate of presentation of cartoons. When viewing for entertainment, they preferred rates which were opposite to their activity levels; when viewing in an educational situation, they preferred rates which tended to match their activity levels.

Les enfants (de 5 à 7 ans) ayant des niveaux d'activité élevés et bas, on leur permettait de varier la quantité proportionnelle de représentation de dessins animés. Lorsqu'ils regardaient des émissions de divertissement, ils préféraient des quantités proportionnelles opposées à leur niveau d'activité respectif; quand ils regardaient des émissions éducatives, ils préféraient des quantités proportionnelles qui avaient tendance à s'harmoniser avec leur niveau d'activité respectif.

Audiences of television and movies control their exposure to presentations which vary in amount of material per unit time in two ways. First, viewers may prefer and select television programs and movies which have a particular rate of presentation. For example, Fouts (1977)
found that children with higher activity levels prefer watching crime and adventure programs more than children with lower activity levels. Boys also prefer more action per unit time than girls. Physical attributes of television production such as animation, repetition and lively music, which incorporate more material per unit time, have been shown to increase children's attention (Anderson & Levin, 1976; Anderson, Alwitt, Lorch and Levin, 1979). The popularity of action movies such as Star Wars and Raiders of the Lost Ark likely reflects the movie goers' appetite for more action per unit time.

A second method is that viewers may physically control the rate of presentation by altering the time period in which it is presented. This can be accomplished independent of the actual production. For example, for years, children have had toy movie projectors which allow them to watch cartoons presented at any speed they wish by cranking the handle at the rate they desire. Movie projectors with a slow-motion and/or fast-forward feature and videodisc permit the operator to alter the amount of material presented per unit time. Both children and adults are increasingly speeding up television programs and movies through use of the visual-search mechanism on home videocassette recorders. An examination of these examples indicates that viewers have shifted in their type of control of speed of presentation, from choosing programs which coincide with their preferences for rate of presentation to actually altering a program's rate of presentation. This parallels the technological changes which have occurred in the communications industry.
Time-alteration of visual presentation refers to changing the amount of material presented per unit time such that the rate at which the material is presented is judged as faster (time-compression) or slower (time-extension) than the normal or expected rate of presentation. Time-alteration can be accomplished by three methods: (a) presenting a greater or lesser amount of material in a specified period of time, e.g., by increasing the amount of information; (b) presenting the same amount of material but decreasing or increasing the period of time in which it is presented, e.g., by speeding up the action; and (c) using a combination of these two techniques, i.e., changing the amount of material presented and changing the period of time for presentation. In the present study, children were allowed to control their own rate of presentation through the second time-alteration method, i.e., changing the period of time of exposure without changing the amount of material.

The purpose of this study was to determine whether children do vary their time-alteration of visual materials (cartoon) and to assess the influence of two variables on their self-controlled time-alteration (time-compression and time-extension). The first variable was the activity level of children. It was hypothesized that if children prefer television programs which match their own behavioral styles (Fouts, 1977), children with higher activity levels would time-compress the materials more than children having lower activity levels (who would time-extend). The second variable was the viewing situation: children were assessed under an "educational" instructional set (i.e., they were told that they would be tested for
recall after viewing) and under an "entertainment" instructional set (i.e., they were told to just enjoy the cartoon). It was hypothesized that the "educational" situation would amplify the time-alteration preferences of the children, i.e., higher and lower active children would time-compress more and time-extend more, respectively. This was based on the assumption that children would use rates of presentation to optimize their interest and attention in order to learn. This prediction is contrary to traditional educational approaches which would predict that children would time-extend so as to afford themselves more time to rehearse the materials, thus facilitating learning (e.g., Atkinson & Shiffrin, 1968; Bandura, 1969; Kintsch, 1970).

METHOD

Forty-six children (age range 5 - 7 years) were obtained through a newspaper advertisement requesting participants for a toy study. There were 24 males (8 in each of the three age groups of 5, 6, and 7) and 22 females (8 were 5-year-olds and there were 7 each in the other two groups). A Fisher-Price toy movie projector was used to assess children's preferences for rate of presentation. The movie projector was made of white plastic (approximately 51 x 20 x 41 cm) with a 15 x 10 cm viewing screen built into the front of the projector. A red handle on the right side of the projector, designed to advance the film in a movie cartridge frame-by-frame, enabled a child to vary the rate of presentation by turning the handle at any speed desired while he or she watched the screen. There were four Fisher-Price color movie
cartridges (for example, "On My Way to Sesame Street" and "Lonesome Ghosts," with the main themes of the respective cartridges being the teaching of the alphabet and numbers, and Goofy, Donald Duck and Mickey Mouse trying to get rid of ghosts in an old house). The number of rotations of the projector handle required to view the four cartridges were 79, 77, 68, and 69.

Upon arrival at the laboratory, the mother was asked to complete a modified version (Routh et al., 1974) of the Werry - Weiss - Peters Activity Scale (Werry, 1968) while her child was being tested in an adjacent room. This 22 - item activity scale asks parents to rate their children's behavior in several situations (e.g., at meals, during play). Previous research (e.g., Routh, et al., 1974; Fouts and Flessati, 1983) has provided age norms, validity and findings which relate activity level to a variety of child behaviors, e.g., television watching, parent - child interaction, compliance. The child was escorted by a female experimenter to the experimental room and seated in front of the movie projector which was attached to the top of a table. After developing rapport with the child, the experimenter pointed to the projector and demonstrated how it worked using a "practice" movie, by turning the handle slowly, at an average speed and at a fast speed. She then invited the child to turn the handle and asked him or her to turn it at various speeds, slow to fast. After the child was comfortable with turning the handle at different speeds, the experimenter replaced the "practice" movie with the child's first movie and gave the following instructions: (a) "You can turn the handle at whatever speed you want," and (b) "Stop turning
the handle when I say, 'Stop' at the end of the movie."

Each child was then assigned to one of two orders of viewing situations: the Entertainment situation followed by the Educational situation, or the Educational situation followed by the Entertainment situation. Half of the children (12 boys, 11 girls) were assigned to each order with approximately equal numbers of the three age groups assigned to each order. Different movies were randomly assigned across the two viewing situations across children. In the Entertainment situation, children were told, "I want to see how much you like the movie," in order to induce a learning motivation. In the Educational situation, they were told, "After the movie, I'll ask you some questions to see how much you learned." The experimenter sat to the side and behind the child while he or she was viewing the movie. When the child was told to stop at the end of the first movie, the experimenter asked the child how much he or she liked the movie as well as a few questions about its contents. The latter was done in order to treat all children alike regardless of viewing situation, to confirm the learning motivation for those who viewed under the Educational instruction, and to prepare those who were going to be in the Educational situation for the movie. The experimenter then placed a different movie into the projector and delivered the instruction for the second viewing situation, followed by an identical procedure as with the first movie.

At the moment a child was seated, another experimenter began video-taping the child through two one-way mirrors. One camera was
focused on the handle of the projector, so that the onset of turning the handle, the number of revolutions and the offset of turning the handle could be subsequently scored. To facilitate this scoring, a time generator connected to the videotape recorder continuously imprinted the exact time in seconds in a corner of the screen. The second camera was focused on the projector screen. This allowed a determination of what a child was viewing while turning the handle.

Since the movies varied in the number of revolutions of the handle to complete viewing, the videotapes were scored for the number of seconds to complete every five revolutions or 60 frames. Each videotape was scored by a trained observer. This observer had been trained to score videotape for the number of seconds per 60 frames for pilot subjects until inter-observer agreement with another observer was 95% for four consecutive pilot subjects. While scoring the videotapes of the actual subjects, the scorer was unaware of the classification of children with respect to their activity levels.

RESULTS

Initially, an Age (5, 6, 7 years) x Sex (M, F) analysis of variance was conducted on the scores obtained from the Werry-Weiss-Peters Activity Scale. There were no significant effects of age or sex or their interaction (p > .20). Since there were no effects of age and sex, children were divided into two levels of activity (High Active and Low Active), regardless of their ages or sex, by using a median split of their activity scores. The mean number of seconds per 60 frames for each movie was converted to mean frames per second for each
movie, and a 2 x 2 analysis of variance was conducted with Activity Level and Viewing Situation being between-and within-subject factors, respectively. No main effects were significant. A significant Activity Level x Viewing Situation interaction was found \( [F(1/44) = 4.27] \). Figure One graphically presents the interaction. In the absence of knowing what an "average" rate of presentation was for the cartoons, and for illustrative purposes, the "average" rate was defined as the average frames per second the children preferred, collapsing over all children and both viewing situations, the "average" rate was 1.46 frames per second. Thus, in Figure One, the rates above the dotted line ("average" rate) represent time-compression, with those below representing time-extension. Tests for simple effects within the interaction revealed the following:

(a) In the Entertainment situation, the high active children preferred significantly slower rates than low active children \( (p < .05) \). In Figure One, this is observed as high and low active children time-extending and compressing, respectively.

(b) Low active children preferred a significantly slower rate in the Educational than Entertainment viewing situation \( (p < .02) \). In Figure One, this is observed as a shift in preference from time-compression to time-extension between the two situations.

(c) High active children preferred a somewhat faster rate in the Educational than Entertainment situation \( (.10 > p > .05) \). In Figure One, this is observed as a shift in preference from time-extension to time-compression.
FIGURE ONE

Average frames per second

- LOW ACTIVE CHILDREN
- HIGH ACTIVE CHILDREN

VIEWING SITUATION

ENTERTAINMENT

EDUCATIONAL
between the Entertainment and Educational situations. The preference of high and low active children to time-compress and extend in the Educational situation was in the predicted direction but nonsignificant.

DISCUSSION

The results indicate that children's self-controlled time-alteration differs with respect to the individual difference variable of activity level and the environmental variable of viewing situation. Contrary to the hypothesis, high and low active children preferred time-extension and time-compression, respectively, while viewing for entertainment. One possible explanation is that when a child can actively control the presentation rate of a program, he or she may choose novelty, i.e., high active children who observe high-action programs and their own high behavioral rates may enjoy the novelty of slowing the visual stimulation by engaging in time-extension, with the reverse applying to a low active child. This explanation is consistent with the view that entertainment television is basically escapist. In this case, a child can escape from everyday behavior and usual television watching experience. As predicted, when the children believed they were to be tested (Educational Situation), their presentation rates tended to match their behavioral rates, thus using time-alteration to optimize their interest and attention. It is interesting to note that although educators assume that slowing the rate of presentation optimizes learning, the children in this study demonstrated no overall preference for time-extension when attempting to learn.
The assessment of the time-alteration preferences of different children in different situations has several implications and applications. First, children are increasingly exposed to time-altered materials, either through their selection of them or their actual control of the rate of presentation. Understanding their preferences is necessary in understanding audience segmentation and any impacts time-alteration may have. Second, the viewing situation may influence the preference for and/or susceptibility to time-altered materials. The two situations in this study, in some respects, parallel television in entertainment versus educational settings. Third, self-controlled time-alteration, if it is found to be sensitive to individual preferences and viewing situations, may be used as an assessment tool in the communications industry to determine the production value of time-altered contents and to develop more sophisticated technology which capitalizes on individual preferences.

The monitoring of self-controlled time-alteration by viewing audiences may prove to be a valuable method for determining viewer preferences for time-compression/extension of portions of programs, movies and even commercials. It is recommended that such assessment employ sophisticated means for audiences to control the time-alteration to fit their preferences. The present study used an apparatus familiar to children. However, it had the limitations of requiring physical effort and coordination proportional to the degree of time-compression. A simple switch (e.g., rheostat knob) connected to a projector, VCR, or videodisc, which permits variation in time extension
compression from the "normal" rate would be ideal. Research is planned which assesses the sensitivity of such assessment in developing highly attractive programs for television.

REFERENCES


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