Development of Television Viewing Patterns in Early Childhood: A Longitudinal Investigation

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A 2-year longitudinal study of children from ages 3 to 5 and 5 to 7 investigated age changes and environmental influences on TV viewing. Viewing child-informative programs declined with age; viewing cartoons and comedies increased. No age changes occurred on other types of entertainment programs. With increasing age, children watched programs with increasing cognitive demands—less redundancy, longer temporal integration demands, and increasing complexity. Boys watched more cartoons and action-adventure programs than did girls. Cable subscription and changes in program availability over time also accounted for amount and type of viewing. Individual differences in TV viewing remained highly stable over 2 years. It was concluded that cognitive and developmental changes are less important determinants of TV use than are family patterns and external variables affecting the opportunity to view.

By the time American children are 18 years old, they have spent more time watching television than in any other activity except sleep. Moreover, their experiences with television begin long before exposure to school or in many cases, any socialization agent other than the family. Infants respond to the sights and sounds of television, and by the second year of life, they react to characters and events on television by imitation, pointing, verbal labeling, and selective attention (Hollenbeck & Slaby, 1979; Lemish & Ricc, 1986; Meltzoff, 1988).

As the television set is a ubiquitous part of most children's environments from birth onward, the preschool years are a likely period for socialization of television habits. The average 3- or 4-year-old spends 2–4 hours a day watching television (Comstock, Chaffee, Katzman, McCoombs, & Roberts, 1978; Friedrich & Stein, 1973; Singer & Singer, 1981). Home observations show that during the first few years of life, children become increasingly attentive to programs when they are in the vicinity of the television set (Anderson, Lorch, Field, Collins, & Nathan, 1986).

Less is known about the kinds of programming children watch than about the amount of time they spend watching. To understand the role of television in children's lives, it is at least as important to consider the nature of the programming they view as it is to measure the quantity of it. Just as reading Newsweek is not equivalent to reading a comic book, so watching "Sesame Street" is different from watching a soap opera.

The investigation reported here was a longitudinal assessment of the types as well as the amounts of children's early viewing experiences, tracing the course of home viewing from ages 3 to 7. It constitutes the most comprehensive assessment of early television viewing to date. Among the major questions addressed were the following: What developmental changes occur as a function of age or cognitive development? What individual attributes and/or environmental variables affect children's viewing patterns? How is viewing related to secular changes in television programming? How stable are individual differences in viewing patterns over time?

Individual Attributes Versus Environmental Influences

Recent theory and empirical study have emphasized the role of cognitive variables—children's ability to comprehend, draw inferences, and integrate the content—as influences on viewing (e.g., Bryant & Anderson, 1983). For example, Anderson and his colleagues have demonstrated that children lose interest in material that is incomprehensible and attend to material that is clearly within their range of comprehensibility (Anderson & Lorch, 1983).

Interest, goals for viewing, and motivations constitute another set of individual characteristics guiding viewing. Individuals watch television to satisfy a variety of needs or to gratify a wide range of interests (Rosengren, Wenner, & Palmgreen, 1985; Wright & Huston, 1983). For example, gender differences in viewing presumably reflect the influence of individuals' sex-typed interests and motivations. Boys watch a little more television than do girls during childhood (Singer & Singer, 1981), particularly such violent programs as cartoons and action adventures (Comstock et al., 1978; Huesmann & Eron, 1986). In laboratory observations, boys are often more attentive than...
girls to cartoons and to commercials with high rates of action, violence, and visual special effects (Alvarez, Huston, Wright, & Kerkman, 1988).

Individual preferences are only one basis for viewing decisions. Most young children use television in an environmental context in which parents and siblings select programs and parents regulate or encourage viewing. Broadcasters' decisions about programming and parents' decisions about subscribing to cable or buying a videoplayer determine what is available to view. Alternative activities affect television viewing choices (Pinon, Huston, & Wright, 1989). Television can readily be conceived as a default option for spending time, chosen when nothing else interferes or has strong appeal and rather automatically returned to when other activities end. One mundane illustration is the well-documented seasonal fluctuation in television viewing—people watch more in the winter than in the summer (Comstock et al., 1978).

**Development as a Function of Age and Secular Change**

Life-span developmental theory provides a broad framework for understanding development because it includes changes associated with age and those associated with secular events (Baltes & Schaie, 1973). Although psychologists typically think about development on ontogenetic change, sociologists such as Elder (1973) have demonstrated the usefulness of examining secular, historical changes as determinants of individual development.

**Age Changes**

The comprehensibility of program content is one important determinant of young children's attention to television in laboratory settings (Anderson & Smith, 1984; Field & Anderson, 1985). Clearly, what can be comprehended is a joint function of program content and the knowledge that the viewer brings to it. Thus, developmental change in knowledge is a major reason for expecting age-related changes in viewing. Such knowledge can be conceptualized as a set of schemata derived from regularities and redundancies in one's experiences (Anderson & Lorch, 1983; Collins, 1983; Huston & Wright, 1989). Schemata include expectations about situations that permit the person to anticipate and organize incoming information; they guide attention, influence memory, and generate inferences about content (Fiske & Taylor, 1984). Television programs that contain repeated characters and settings across episodes lend themselves to schema formation; the regular viewer approaches a new episode with considerable knowledge about the characters, likely actions, and probable events, together with their significance in context. Hence, program series with high redundancy across episodes are likely to be more comprehensible than those with low redundancy, particularly to young children who do not bring a large store of world knowledge to their television experience.

The difficulty level of a program also depends on the degree to which temporally separate events must be integrated (Collins, 1982, 1983). In a complex story, young children often do not connect a character's motive, shown in one part of a story, with the character's actions, shown in another part of the story. Hence, long stories are relatively difficult to understand. Temporal integration abilities develop gradually during the childhood years and depend on an expanding representational and mnemonic capability as well as a growing familiarity with the medium (Collins, 1983).

These two dimensions, redundancy and temporal integration requirements, plus program categories, were used in the present study as means of defining the cognitive difficulty of television programs. Viewing programs with greater cognitive demands was expected to increase with age. Because of the limited age range studied (3 to 7 years), none of the children were expected to shift to the most cognitively demanding programs.

Age changes may also result from age-correlated events. The most obvious candidate for this age group is school entry, which occurs at two identifiable points (half-day kindergarten and full-day primary school). Survey data show a slight decline in total television viewing around age 6 that is probably due to time spent in school (Comstock et al., 1978).

**Secular Change**

Secular or historical change in the availability of different types of programming and changes in the technology of television dissemination can produce developmental changes in viewing patterns. For example, over the period from 1981 to 1983, when the present data were collected, network stations reduced the amount of children's informative programming broadcast to less than 30 min per week (Kerkman, Kunkel, Huston, Wright, & Pinon, in press). Introduction of cable options in a community also changes the viewing environment dramatically, and the sudden proliferation of VCRs and video stores has multiplied options still more rapidly.

Psychologists are sometimes tempted to dismiss the effects of such variables on the grounds that they are mundane or obvious. On the contrary, there is considerable conceptual value in learning how large a role such variables play in viewing patterns. If changes in television habits over time are primarily a function of what is available to watch, then a model that assumes that individual development and preferences are the primary bases for viewing decisions comes into question.

In the present study, a longitudinal design permitting separation of age—based from historical or secular (time of measurement) changes—was selected (Nesselroade & Baltes, 1979). In the one existing longitudinal study of preschool children, measurements were collected four times in one year for two cohorts (3- and 4-year-olds). The changes over time were nonlinear and difficult to interpret, probably because secular effects were confounded with age changes (Singer & Singer, 1981).

**Stability of Individual Differences**

The longitudinal design also permitted assessment of the stability of individual differences, independently from mean changes. If the relative amounts of viewing over time remain stable, then early childhood may be an important time for the establishment of long-term patterns of television use. Lack of stability would suggest that viewing is subject to variables that change fairly rapidly, and might indicate a less important role for early childhood in acquiring habits of television use.
The few longitudinal studies available suggest some stability of television viewing. Singer and Singer (1981) found fairly high consistency of total viewing times, as well as viewing in most program categories over the course of one year. Other investigations of older children have reported moderate to high stabilities in the amount of violent viewing (Huesmann, 1982; Milavsky, Kessler, Stipp, & Rubens, 1982).

Continuities or developmental progressions (McCall, 1977) from one type of programming to another were also investigated in the present study. The major question addressed was whether early viewing of certain types of program (e.g., informative programs or cartoons) predicts later viewing of programs with similar form or content (e.g., humorous or violent programs).

In summary, the study reported here was a longitudinal investigation of young children's home television viewing patterns, emphasizing the types of programs viewed rather than total viewing time. Its design permits differential attribution of changes in viewing to age, cognitive demands of programs, and secular, environmental influences such as viewing opportunities and alternate means of television distribution. It contains an analysis of stabilities of children's television viewing over time by program categories and analyses of the developmental progressions from one type of program to another.

Method

Sample

The initial sample consisted of 326 children and their families in Topeka, Kansas. The children were within 3 months of their third (n = 160) or fifth (n = 166) birthdays at the beginning of the study. They were recruited through newspaper birth records, preschools, churches, mass media publicity, and posters placed in public buildings, laundromats, and grocery stores. The sample was predominantly White, and all but 18 families had both parents living in the home at the beginning of the study. Educational level of each parent was coded on a scale in which 1 = less than high school, 2 = high school graduate, 3 = some post-high-school training, 4 = bachelor's degree, 5 = some postgraduate training, and 6 = graduate o professionals. For fathers, the mean was 3.78 (SD = 1.40); for mothers, the mean was 3.35 (SD = 1.23).

Occupational status was rated on the Duncan scale, which has a range from 1 to 99 (Duncan, 1961). For fathers, the mean was 52.73 (SD = 23.90); for mothers, the mean was 52.18 (SD = 18.52). The sample represented a wide range of educational and occupational levels, but it was a volunteer sample in which White, intact, relatively stable families were overrepresented. (One necessary criterion for inclusion in the study was the intention to stay in Topeka for at least 2 years.)

An additional sample of 41 children in the two cohorts was recruited for a single diary collection at the end of the longitudinal study in order to test for the effects of repeated diary collection. The demographic characteristics of their families were similar to those of the main study sample (fathers' mean education = 3.70; mothers' mean education = 3.14; fathers' Duncan = 55.72; mothers' Duncan = 54.37).

Design

The design was a combination of cross-sequential and cohort-sequential methods (Nesselroade & Baltes, 1979). It is summarized in Table 1. Two cohorts, 3 and 5 years old at the beginning of the study, were followed for a 2-year period. Within each of these groups, there were two subcohorts who began the study at different times: Children with birth-

Table 1

<table>
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<th>1982</th>
<th>1983</th>
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<tr>
<td>Spring</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Fall</td>
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<td>3</td>
</tr>
<tr>
<td>Jan.--Aug. 1978</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Sept. 1978</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Jan.--Aug. 1976</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Sept. 1976</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age of children</th>
<th>1981</th>
<th>1982</th>
<th>1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Fall</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Jan.--Aug. 1978</td>
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<td>4</td>
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<tr>
<td>Sept. 1978</td>
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</tr>
<tr>
<td>Sept. 1976</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Note. Figures in parentheses are waves.

days from February through August began the study in the spring of 1981; children with birthdays from September through the following February began in the fall of 1981. For clarity, these subcohorts are referred to as having spring and fall start times, respectively.

Viewing was measured from diaries maintained by the parents for 1 week in the spring and 1 week in the fall for 2 years (a total of five diaries). Viewing by all members of the household was recorded in 15-min intervals from 6:00 a.m. to 2:00 a.m. each day. If children were in regular day-care, their viewing was recorded by the caregiver. Spring and fall were sampled to avoid the extremes of heavy viewing in winter or light viewing in summer. Although each family kept a diary for only 1 week, each time of measurement lasted approximately 3 weeks, with families spread across them in order to reduce the effects of weather and historical incidents (e.g., the assassination of President Sadat of Egypt) on the viewing measure.

Parents were instructed to record as a viewer anyone who was present for more than one half of a 15-min interval in which the television was turned on. This definition was adopted to avoid the necessity for parental judgments of when the child was watching, but it undoubtedly resulted in some overestimation of true viewing. Anderson, Field, Collins, Lorch, and Nathan (1985) compared similar diaries with videotapes made in the home during viewing. Diaries slightly overestimated children's viewing time, but the correlation between the two methods at this age level was .84, indicating that such diaries are a valid method of assessing individual differences. In the present study, validity was also assessed indirectly by examining errors in the diaries (e.g., wrong program title for time and channel listed). Two children were eliminated because their diaries contained large numbers of errors.

A total of 271 subjects returned four (n = 27) or five (n = 244) diaries did, and were, therefore, considered to have sufficient data for analyses of viewing. To determine whether there was selective retention, t-tests were performed comparing the retained sample with those who were dropped on the following variables measured in an initial home visit: sex of child, starting season, parent education, parent occupational status, and

1 Although individual occupations receive different ratings on the Duncan, they can be understood from the following average ratings: professional and technical workers = 75; managers, officials, and proprietors = 57; clerical and sales workers = 47; craftsmen and foremen = 31; operatives and service workers = 18; laborers = 7.
maternal employment, family size, sibling composition, cable options, number of television sets, child's score on the Peabody Picture Vocabulary Test (PPVT-R; Dunn & Dunn, 1981), child's preschool attendance, and child's media preferences. There were no significant differences; therefore, the retained sample was comparable with the original sample.

Classification of Television Programs

Because the theoretical framework emphasized the categories of programming viewed, an extensive coding system was developed for categorizing available television programs (Center for Research on the Influence of Television on Children, 1983). Each program was classified on six dimensions. Four of these were similar to those used in other media research: (a) intended audience (child or general), (b) informative purpose (yes or no), (c) animation used (full, partial, none), and (d) program type (real world events and information, variety, comedy, drama, or action adventure). The other two dimensions were designed to index the cognitive processing demands of the program: (e) redundancy (or familiarity) was defined as the degree of repetition of scenes and characters from one episode to another. It was intended to assess the extent to which regular viewers could form schema for a program series that would supply an interpretive context for understanding later episodes. It was coded on a scale from most settings and characters are the same across episodes (1) to no continuing characters or settings (4). High scale scores thus represent more difficult programs to understand. Temporal integration demands (f) were defined by the average time span during which a continuous plot or theme endures. They were coded on a scale from 1 = less than five minutes (e.g., "Sesame Street," news) to 6 = multiple episodes (e.g., miniseries, soap opera).

All of the programs in the "TV Guide" and cable guides for the viewing weeks were coded on the basis of raters' knowledge of the series and descriptions in the television guides. Of the 5,007 titles in the list, the proportions that could be coded on each dimension were as follows: audience = 95.7%, purpose = 95.9%, animation = 95.1%, program type = 90.2%, temporal integration demands = 90.6%, and redundancy = 91.1%. The few programs that could not be coded on one or more dimensions were almost never viewed by our sample of families.

A total of 12 graduate students and PhD-level staff members served as coders over the 3 years. To establish intercoder agreement, pairs of individuals independently coded the television listings for 1 weekday and 1 weekend day. The percentage of programs coded identically was calculated. The average interrater agreements on each dimension were as follows: audience = 97%, purpose = 95%, animation = 58%, program type = 93%, temporal integration demands = 86%, and redundancy = 84%. When new coders were trained, their ratings were compared with those of an experienced coder until they reached the above levels of agreement.

Each program viewed by a child was assigned ratings on each dimension from the master file of coded programs. Any programs viewed that did not appear in the television guides (e.g., videotapes) were also coded whenever possible. Viewing could then be calculated as the amount of time (number of 15-min slots) the child viewed any program category, defined by a single dimension or a combination of dimensions.

If programs had been subdivided on all six dimensions simultaneously, there could have been as many as 1,440 cells, many of them empty because they contain no television programs or little viewing. For the present analyses, programs were separated by intended audience (child programs and general audience programs), then further subdivided in three different ways. The first subdivision, designating program type, was based on intended audience, informative purpose, animation, and program content. The second was based on redundancy and the third on temporal integration demands.

<table>
<thead>
<tr>
<th>Age</th>
<th>M</th>
<th>SD</th>
<th>Age</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>19.2</td>
<td>9.87</td>
<td>5</td>
<td>19.2</td>
<td>10.85</td>
</tr>
<tr>
<td>3½</td>
<td>19.9</td>
<td>10.75</td>
<td>5½</td>
<td>19.0</td>
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<tr>
<td>4</td>
<td>19.6</td>
<td>10.02</td>
<td>6</td>
<td>17.7</td>
<td>10.50</td>
</tr>
<tr>
<td>4½</td>
<td>19.1</td>
<td>10.09</td>
<td>6½</td>
<td>15.9</td>
<td>10.32</td>
</tr>
<tr>
<td>5</td>
<td>20.8</td>
<td>10.93</td>
<td>7</td>
<td>15.5</td>
<td>9.48</td>
</tr>
</tbody>
</table>

Results

Total Viewing Time

Although viewing of particular program types was the major focus of the analyses, total viewing times are presented for comparison with other studies. The mean number of hours per week viewed by each cohort at each age is shown in Table 2. In general, it increases slightly from ages 3 to 5, then declines steadily from ages 5 to 7.

Program Type and Viewing

Eight program types were formed by calculating viewing frequencies in 22 mutually exclusive and exhaustive categories selected on theoretical grounds. These were further collapsed to 8 groups on the basis of content and form similarity to meet the criterion that more than one half of the children had nonzero viewing frequencies in any grouping.

The final eight categories included three types intended for child audiences: (a) informative (partial or no animation), (b) animated (noninformative), and (c) noninformative (with partial or no animation). There were five program types intended for general audiences: (d) informational (including news, sports, and documentaries), (e) comedy, (f) drama, (g) action adventure, and (h) miscellaneous (game, variety, and unclassified programs).

Distributions of viewing in most categories were positively skewed; therefore, square root transformations (of number of quarter hours + 1) were used in the final analyses after determining that they produced more normal distributions than logs or raw scores. For the 27 children with one missing diary, values were estimated using the BMDP least squares program for estimating missing data (Dixon et al., 1981). Approximately 2% (27 out of 1,355) of the values in the final data set consisted of such estimated data.

The design of the study permitted separation of age changes from those due to time of measurement. Analyses of variance were performed on viewing frequencies in each program category using sex (2), cohort (2), start time (2), and wave (5) as independent variables. The results of these analyses are summarized in Table 3. Age changes are indicated by main effects of cohort and wave or by an interaction of Cohort × Wave. Main effects and interactions involving start time indicate time of measurement effects. Orthogonal polynomials were used to evaluate the trends of changes over time.

Control group. Viewing diaries for Wave 5 were collected
### Table 3
Analyses of Variance of Eight Program Types: F Ratios

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Cohort</th>
<th>Sex</th>
<th>Cohort × Sex</th>
<th>Start Time × Sex</th>
<th>Wave</th>
<th>Cohort × Wave</th>
<th>Start Time × Wave</th>
<th>Cohort × Start Time × Wave</th>
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</thead>
<tbody>
<tr>
<td>df</td>
<td>(1, 263)</td>
<td>(1, 263)</td>
<td>(1, 263)</td>
<td>(4, 260)</td>
<td>(4, 260)</td>
<td>(4, 260)</td>
<td>(4, 260)</td>
<td></td>
</tr>
<tr>
<td>Child audience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informative</td>
<td>52.76***</td>
<td>0.43</td>
<td>0.22</td>
<td>0.03</td>
<td>39.13***</td>
<td>9.19***</td>
<td>2.01</td>
<td>3.73***</td>
</tr>
<tr>
<td>Animated</td>
<td>2.76</td>
<td>12.51***</td>
<td>1.43</td>
<td>0.72</td>
<td>6.87***</td>
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<td>Other</td>
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<td>2.53</td>
<td>0.00</td>
<td>0.02</td>
<td>23.51***</td>
<td>1.34</td>
<td>45.45***</td>
<td>0.36</td>
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<td>General audience</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informational</td>
<td>7.16**</td>
<td>6.25*</td>
<td>2.28</td>
<td>1.32</td>
<td>7.48***</td>
<td>0.37</td>
<td>4.54***</td>
<td>0.92</td>
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<tr>
<td>Comedy</td>
<td>1.65</td>
<td>1.86</td>
<td>0.45</td>
<td>4.96*</td>
<td>6.96abc</td>
<td>4.09abc</td>
<td>13.08***</td>
<td>1.21</td>
</tr>
<tr>
<td>Drama</td>
<td>2.51</td>
<td>0.09</td>
<td>1.28</td>
<td>2.59</td>
<td>5.53abc</td>
<td>1.13</td>
<td>0.86</td>
<td>1.58</td>
</tr>
<tr>
<td>Action adventure</td>
<td>2.36</td>
<td>22.07***</td>
<td>3.40</td>
<td>2.19</td>
<td>27.09abc</td>
<td>0.90</td>
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<td>0.68</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0.07</td>
<td>3.43</td>
<td>6.67**</td>
<td>6.67***</td>
<td>1.64</td>
<td>0.10</td>
<td>8.20***</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Note. There were no significant main effects of start time or interactions other than those shown.

* Linear trend significant at \( p < .05 \).  
** Quadratic trend significant at \( p < .01 \).  
*** Cubic trend significant at \( p < .001 \).  
**** Quartic trend significant at \( p < .001 \).

from the control group to determine the effects of repeated diary keeping. Analyses of variance of Wave 5 frequencies were performed using sex (2), cohort (2), start time (2), and group (2) (longitudinal or control) as independent variables. There were scattered differences between the longitudinal and control samples, but they did not fall in any discernible pattern. The only main effect of group occurred for adult informational programs, \( F(1, 302) = 6.49, p < .05 \). The longitudinal sample reported more viewing (\( M = 1.11 \)) than did the control group (\( M = 0.58 \)). Of 24 two- and three-way interactions involving group, 4 were significant at \( p < .05 \). As at least 1 of these probably occurred by chance, and the means did not fall in any consistent patterns, they were not interpreted. The results suggest no systematic effects of repeated diary keeping.

### Individual Attributes and Viewing Different Program Categories

**Sex differences.** Boys watched more than girls in four program categories: cartoons (boys = 4.22, girls = 3.20), adult audience informational (boys = 1.56, girls = 1.17), action adventure (boys = 1.48, girls = 0.89), and miscellaneous (Cohort 1, boys = 0.84, girls = 0.90; Cohort 2, boys = 1.14, girls = 0.68). There were main effects of gender for the first three categories and an interaction of Sex × Cohort for miscellaneous programs (see Table 3).

**Age changes.** Age-related changes occurred on four program types: child informative, child animated, general audience informative, and comedy. The means are presented in Figure 1. Viewing child informative programs increased to a peak at ages 3½ and 4, then declined to a low point at age 7. The significant main effects of cohort, wave, and the interaction of Cohort × Wave indicate a developmental change independent of time of measurement (Table 3). The trend analysis produced a significant linear trend for the Cohort × Wave interaction, \( F(1, 263) = 36.13, p < .001 \), indicating that the slopes of the linear age changes for the two cohorts were significantly different.

Children also watched fewer adult informational programs as they got older. There was a significant main effect of cohort and a main effect of wave. The change over waves followed a linear pattern, \( F(1, 263) = 28.25, p < .001 \).

Cartoon viewing, by contrast, increased from ages 3 to 5 and leveled off from ages 5 to 7. There was a significant main effect of wave and an interaction of Cohort × Wave. The linear effect was significant for the interaction, \( F(1, 263) = 18.55, p < .001 \), indicating different linear slopes for the two cohorts.

Older children watched comedies designed for general audiences more than did younger children. There was a significant main effect of wave and a significant interaction of Cohort × Wave. The linear component was significant for the interaction, \( F(1, 263) = 14.23, p < .001 \). Viewing increased slightly between ages 3 and 5 and peaked around age 5½, with a subsequent drop (see Figure 1).

### Cognitive Demands of Programs and Viewing

One reason for age changes in viewing could be increasing ability to understand cognitively demanding content and form. Programs designed for child audiences are probably less demanding than those aimed at general audiences. Child informative programs contain more easily comprehended language than cartoons and other child programs that often have complex language, adult humor, and intricate story lines (Hodge & Tripp, 1986; Rice, 1984).

The cognitive demands of different program types were indexed by two additional dimensions: nonredundancy of content and temporal integration demands. Other factors being

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2 These means and those subsequently reported in the text are the equivalents in hours per week of the means generated in the analysis of variance of square root transformations. The conversion back to hours is intended to provide the reader with an interpretable metric. These means are not, of course, identical to the means of the original raw scores.
were clearly more redundant (average level was 1 = **highly redundant**) and less temporally demanding (average duration = 16-30 min) than dramas and action adventure series (average redundancy was 2 = **some recurring characters and settings**; average duration = >60 min). \(^3\)

For each analysis, programs were first classified as child or adult audience, but they were not further subdivided by program type because many children had zero viewing frequencies in at least one of the smaller cells. The average redundancy of the child audience and general audience programs viewed by each child were computed as follows. Each 15-min interval of viewing was assigned a value of 1 to 4 on the basis of the redundancy rating of the program broadcast. The sum of the ratings for all of the intervals viewed was divided by the number of intervals viewed to obtain the average redundancy level of the programs viewed—a measure that is independent of viewing frequency. Subjects with zero viewing in child or general audience programs for any wave were excluded leaving 250 and 248 subjects for child and general audience program analyses, respectively. Analyses of variance of sex (2) x cohort (2) x start time (2) x wave (5) were performed on these scores.

**Age changes in redundancy of programs viewed.** For child audience programs, there were significant main effects of cohort, \(F(1, 242) = 5.64, p < .05\), and wave, \(F(4, 239) = 2.71, p < .05\). The means are shown in Figure 2. As predicted, the older cohort watched programs that were less redundant than those viewed by the younger cohort. There was a slight increase with age (wave) modified by a dip at the fourth time of measurement. Consequently, there was a significant cubic trend in the main effect of wave, \(F(1, 239) = 9.07, p < .01\).

The mean redundancy scores for general audience programs, divided by gender, are also shown in Figure 2. There was a significant main effect of wave, \(F(4, 238) = 3.37, p < .01\), and significant interactions of Sex x Cohort, \(F(1, 241) = 7.94, p < .01\), and Sex x Cohort x Wave, \(F(4, 238) = 2.58, p < .05\). None of the orthogonal polynomials was significant. Inspection of Figure 2 indicates that older boys watched more nonredundant programs than did younger boys; older girls were not much different from younger girls.

**Age changes in temporal integration demands of programs viewed.** The second method of assessing program difficulty was classification based on the length of the average content unit. The average temporal integration levels of child audience and general audience programs viewed by each child were computed following the same procedure as that used for redundancy. Each 15-min interval was assigned a value of 1 to 6 on the basis of the temporal integration demand of the program viewed. For each wave, the sum was divided by the total number of intervals viewed to obtain an average level. The average tem-

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\(^3\) It would appear that differences among program types in redundancy or temporal integration could be established by calculating mean levels for each category. However, if each program title is weighted equally, then movies and specials are seriously overweighted in comparison with series. The other alternative would involve weighting each by the amount of time it was broadcast per week, but that process also introduces some distortions because some broadcast times are much more accessible than others. Therefore, typical levels for series were considered more representative than overall means.
the cohort sequential component of the design for separating age change from secular changes. The parallel curves for the spring and fall start times associated with time of measurement are evident in Figure 1. The time of measurement effects appear to reflect two types of influences: age-related events and secular changes in television programming.

Age-related events. For child informative programs, the significant interaction of Cohort × Start Time × Wave indicates that children in the two start times followed different developmental patterns within each cohort. The parietic trend for the interaction was significant, \( F(1, 263) = 14.65, \ p < .001 \). The differences for the two start times in Cohort 2 are probably due to the fact that they entered school at different ages. The spring-start-time children were eligible for kindergarten in the fall of 1981 and for first grade in the fall of 1982. The fall-start-time children, who were 6 months younger, began school one year later because of the September-1 school cutoff. Drops in viewing were associated with school entry points, as indicated on Figure 1.

In Cohort 1, children in the two start times were equally likely to be in preschool at age 3, but significantly more spring-group children were in preschool or child care by age 5, \( r(121) = .18, \ p < .05 \). As preschool attendance was negatively associated with viewing child informative programs (Pinon et al., 1989), it may account for the lower frequencies of the spring group.

Program Availability

Changes in viewing that occurred at similar times of measurement for both cohorts and both start time groups may be due to changes in what is available to view. The effects of program availability on viewing were tested in two ways: (a) Families with different levels of cable service were compared and (b) changes in availability over time were compared with changes in mean levels of viewing.

Cable subscription. Families had one of three levels of cable service: (a) Broadcast only received three network affiliates and a public broadcasting station (PBS) affiliate, (b) basic cable supplied six network affiliates, two PBS affiliates, two commercial independent channels, and four special interest cable channels, and (c) pay movie received basic cable plus home box office (HBO), Cinemax, and/or Disney (in the sixth time of measurement only). Differences among these levels of cable service were evaluated in analyses of variance of viewing in the eight program types using cable subscription level (3), sex (2), cohort (2), start time (2) and wave (5) as independent variables.

Cable subscribers viewed relatively low amounts of child informative programming, \( F(2, 247) = 5.64, \ p < .05 \). The means were as follows: broadcast = 3.39, cable = 2.50, and movie = 2.42. Cable subscribers viewed more cartoons, \( F(2, 247) = 11.20, \ p < .001 \), and comedies, \( F(2, 247) = 4.50, \ p < .05 \). The means for cartoons were as follows: broadcast = 3.08, cable = 3.77, and movie = 4.55; the means for comedies were as follows: broadcast = 2.61, cable = 2.86, and movie = 3.45.

These overall patterns were modified by interactions of Cable × Start Time for cartoons, \( F(2, 247) = 3.30, \ p < .05 \), and comedies, \( F(2, 247) = 4.57, \ p < .05 \). For cartoons, the spring-start-time means were as follows: broadcast = 3.55, cable = 3.24, and movie = 4.68; the fall-start-time means were broad-

Figure 2. Mean scores for redundancy and temporal integration demand of programs viewed at different age levels.
cast = 2.66, cable = 4.31, and movie = 4.42. For comedies, spring-start-time means were broadcast = 2.95, cable = 2.34, and movie = 3.53; fall-start-time means were broadcast = 2.31, cable = 3.55, and movie = 3.42.

The Disney channel was added to the cable system in fall 1983. Families of 16 children in the fall start time subscribed. The effects on viewing were evaluated in analyses of variance for fall-start-time children of Disney subscription (2) x cohort (2) x waves 1-4 versus 5 (2). The interaction of Disney x Wave was significant for child noninformative programs, F(1, 66) = 83.06, p < .001, the program category that was increased most by Disney. Waves 1-4 means for children with and without Disney were 0.73 and 0.61, respectively; in Wave 5, means were 3.71 and 0.35, respectively. Children with Disney increased the amount of child noninformative programming viewed; those without it declined slightly.

Temporal changes in availability. To determine changes in availability over time, all programs broadcast from 6:00 a.m. to 10:00 p.m. during the six 2-week periods in which viewing data were collected (spring and fall in 1981, 1982, and 1983) were tabulated according to the eight program types. Availability was defined as the total number of hours during which at least one program of a given type was broadcast. This index was chosen instead of the total number of hours because stations often broadcast similar programs simultaneously (e.g., Saturday morning cartoons). If 20 hr of programming occurs during a 5-hr period, the true availability is 5 hr. Program availability was calculated for each of the three levels of cable subscription: broadcast only, basic cable, and pay movies. The availability indices are shown in Figure 3.

Program availability over the six times of measurement was compared with mean viewing levels for the six categories in which there were significant interactions of Start Time x Wave (Table 3). The parallels can be examined visually by comparing Figures 1 and 3. Spearman rank order correlations were calculated between mean viewing frequency and mean availability for six times of measurement (i.e., each n = 6). Such correlations have meaning only in instances in which there were temporal changes in availability.

As all of the viewers had access to the programs available without cable, mean viewing for the whole sample was entered in correlations with broadcast availability. Temporal changes in availability were not related to changes in viewing for any of the program categories aimed at child audiences nor for general audience informational programs. For action adventure programs, broadcast availability was correlated with mean viewing for all subjects, r(6) = 0.83, p < .05. For comedy, the correlation of availability with all subjects’ viewing was r(6) = 0.63, ns; although viewing dropped at Time 4 when programming dropped, viewing increased at Time 5 when programming remained low. For miscellaneous variety programs, the correlation of viewing with availability was r(6) = 0.77, ns, suggesting some correspondence, although the correlation with such a small number of data points did not reach statistical significance.

Changes in cable availability were tested in rank order correlations with mean viewing by cable subscribers. The correlation for action adventure was r(6) = 1.00, p < .01, but correlations for other categories were near zero.6 Hence, viewing of adult entertainment programs varied in some cases with changes in availability, but such changes did not predict viewing for other program types.

Individual Differences

Stability over time. Stability of viewing was evaluated by correlations of total viewing and viewing within each program type.

*Because different families had different pay movie channels, correlations were not computed with movie availability.
over the five waves. The correlations are shown in Table 4. In both cohorts, the total time spent viewing television was consistent over 2 years. Moreover, the time spent viewing each program category remained stable over time (except child noninformative programming, which had low frequencies). By their third birthdays, children's total television viewing time was set in patterns that remained quite stable over a 2-year period.

**Progressions over time.** If children move from less demanding to more cognitively demanding programming with age, then early viewing of easy programming might predict later viewing of more complex programs. Moreover, children might shift from child audience programs to general audience programs with similar content. Developmental progressions were tested for four pairs of categories preselected because they represented different levels of cognitive difficulty and similar content (e.g., humor or violence): child informative to child entertainment programs (cartoons + noninformative), child informative to comedies, child entertainment to comedies, and child entertainment to action adventure. For these tests, early viewing was calculated as the sum of Waves 1 + 2 (Time 1); late viewing was the sum of Waves 4 + 5 (Time 2). Viewing at two waves was summed to increase stability and remove individual variation due to season.

For each pair of program categories, two multiple regressions were performed—one to test the predicted progression and one to test the reverse sequence for comparison. For example, child informative viewing was expected to be followed by child entertainment viewing. Therefore, Time-2 child entertainment viewing was regressed on Time-1 child informative viewing (entering Time-1 child entertainment viewing first to control for initial individual differences). The reverse sequence was tested by regressing Time-2 child informative viewing on Time-1 child entertainment, controlling for Time-1 child informative. This procedure has the same logic as cross-lag correlation but includes statistical controls for stability of variables.

The progression from child informative to child entertainment was supported by the results, shown in Table 5. Early child informative viewing predicts later viewing of child entertainment, as predicted. Conversely, early viewing of child entertainment is negatively related to later child informative viewing for the period between 3 and 5 years of age. A similar pattern occurred for the analysis testing the progression from child informative to adult comedy viewing, but only for the younger cohort.

Viewing child entertainment was associated with later action adventure viewing, especially between ages 5 and 7; a positive association in the reverse direction was considerably weaker and appeared only for the older cohort. Child entertainment viewing also predicted comedy for the older cohort. These results for individuals are consistent with the hypothesized developmental progression from easier to more complex content and shifts across program categories with similar content.

Although these correlational patterns are statistically independent of mean age changes, they support the developmental changes discussed earlier. Not only is there a mean shift with age from viewing child informative programs to viewing cartoons and comedies, but individuals who are high viewers of child informative programs early become high viewers of cartoons and comedy programs later. The regressions also suggest a sequence from viewing children's entertainment to viewing general audience entertainment—action adventure and comedy—that was not apparent in the mean changes in viewing.
Table 5
Regressions Testing Developmental Progressions Across Viewing Categories

<table>
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<tr>
<th>Dependent variable/predictor</th>
<th>Cohort 1</th>
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<th></th>
<th>Cohort 2</th>
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<td>$R^2$</td>
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<td>.25</td>
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Note. T = time.
* $p < .05$. ** $p < .01$.

Discussion

Children develop stable patterns of television use early in life. By their third birthdays, the average children in the sample watched between 2 and 3 hr of television a day; they were experienced viewers. Averages tell only part of the story, however; variation among individuals was extremely high. The range of total hours viewed in 1 week was from 0 to 75.75 hr. Moreover, individual differences in viewing were quite stable over time.

Because watching was defined as presence in the room, it could signify active, concentrated attention, or passive, shallow exposure. Videotapes of home viewing (Andersen et al., 1986) showed that children between the ages of 3 and 7 attend visually to the television set 50%—70% of the time that they are in the room. Attention probably varies considerably with the type of program being shown. The results of the present study support our initial assumption that viewing signifies different levels of active engagement and has different determinants depending on the type of programs. For example, sex-typed interests apparently influenced viewing. Boys watched more program types that contained masculine sex-typed content—cartoons, action adventure, and adult informational (that included sports)—than did girls. Sex differences were absent in most other program categories.

Despite mean changes in viewing as a function of age and time of measurement, individual differences remained quite stable over time. Not only was the total time spent viewing television stable, but viewing within most program categories remained stable over a 2-year period. Stability between ages 3 and 5 was generally as high as that between ages 5 and 7. These consistencies probably reflect the influence of family environments in which adults and older siblings have stable habits of television use to which children are exposed early in life. Whatever the reasons, the finding is important. It demonstrates that early childhood is an important period for acquisition of television viewing patterns and that such patterns have long-term implications for children’s development.

Cognitive developmental changes were expected to account for some age changes in viewing patterns. The age-based changes in viewing were consistent with an a priori ordering of programs for cognitive demands using the criteria of intended audience, program type, redundancy, and temporal integration requirements. Both mean viewing frequencies and intradividual analyses of developmental progressions indicated shifts from child informative programs to other child entertainment and situation comedies. Most of the available child informative programs are designed for preschool levels of comprehension; cartoons and comedies contain more sophisticated language and humor. With age, children moved from child audience programs with high redundancy and low temporal integration demands to less redundant and more temporally demanding programs.

Developmental changes also occurred across programs with similar content, but different cognitive demands. Many children’s entertainment and informative programs are humorous; their viewers become comedy viewers at a later age. Many child entertainment programs are violent adventure stories; their viewers become heavy viewers of action adventure by age 7.
Nonetheless, age-based developmental changes were not as pronounced as cognitive theories might predict, and even those age changes observed could be partially due to age-correlated events rather than to cognitive development. It is unlikely that children reach a peak of comprehension for children's informative programs by age 4 or an asymptote for cartoons and comedies around age 5. There were drops in viewing child informative programs (which are broadcast on weekdays) at school entry points. It is possible that the effects of increasing cognitive capacities (which might maintain child informative viewing and increase cartoon and comedy viewing) are canceled by age-correlated reductions in time available for television.

Recent theory and research in the laboratory have emphasized that children are active users of television—they adjust their attention on the basis of their interests and ability to comprehend the program content. We propose that, although most viewing is active, passive exposure does occur. Children make active choices to view child audience programs and the least demanding type of adult audience programs (comedy) because these fall within their range of understanding during the age period from 3 to 7. As their comprehension abilities develop, they actively select programs that fit those abilities. Hence, there are age changes in viewing. When cable supplies more variety, children actively select more programming in the program categories within their comprehension levels—namely, cartoons and comedies.

For many adult programs, however, young children's "viewing" remains largely passive because such programming falls outside their range of comprehension and interest, even at age 7. Factors external to the child, such as parental choices and program availability, appear to play the major role in determining children's exposure to most adult audience programming. For these programs, there were few age-based changes in viewing, and viewing trends were generally unrelated to program redundancy or temporal integration requirements. Changes in such viewing, when they occurred, were a function of the amount broadcast. Analyses of this data set, reported elsewhere, indicate that most of children's viewing of adult audience programs occurred with parents, and that program choices were heavily influenced by parents (St. Peters, Flit, Wright, Huston, & Eakins, 1989).

Signs of active choices are not entirely absent during general audience programming, however. The decline with age in viewing adult informational programs suggests that children increasingly leave the room during programs that are beyond their levels of comprehension and interest. Sex differences in viewing several general audience program categories with masculine sex-typed content also suggest some active selection even for fairly cognitively demanding programs.

Psychologists' emphasis on cognitive and individual determinants of television use may have led us to underestimate the importance of social forces both inside and outside the home on children's television viewing experiences. Most television viewing occurs with family members; it is not simply a matter of individual choices by a young child. What is viewed also depends on what is available at what times; hence, it is subject to the influence of events and family time schedules, as well to decisions by broadcasters, cable companies, and parents about what kinds of programming to supply.

The importance of these external influences is apparent from the relations of program availability to children's viewing. Changes in programs broadcast over the 3 years of the study accounted for changes in viewing some types of adult entertainment programs. Cable subscription was related to viewing children's programs and comedies. Similarly, the Disney channel led to increased viewing of nonanimated entertainment programs. When a greater number and variety of programs within children's range of comprehensibility and interest are available, viewing increases. However, child informative viewing actually decreased with cable. Because the second PBS station essentially duplicated programs available without cable, there was not much increase in variety of child informative programming.

Children whose families also received pay movie channels (primarily HBO) viewed even more cartoons and comedies than those with regular cable, despite the fact that the movie channels did not substantially increase availability of these programs. Hence, the viewing patterns associated with cable subscription reflect differences in family orientation as well as the effects of program availability.

The media environment in the average American family has changed considerably since the early 1980s when these data were collected. The majority of families now own videotape players, and most cable systems supply a much larger number of channels than our children had. Although such changes probably affect children's television use, the basic developmental and environmental variables affecting program selection and exposure identified in this study are likely to continue to operate. The present data also provide a valuable baseline for future research investigating the effects of new technology and increased variety on children's media use.

Finally, a note on longitudinal design is in order. The design used in the present study met minimal requirements for allowing separation of the effects of age, cohort, and time of measurement (cf. Nelson-Raabe & Bales, 1979). The power to distinguish age changes from temporal changes was critical in interpreting the findings. The results support the role of cognitive development and individual interests in the development of children's viewing patterns and make clear the importance of temporal and social influences within and outside the family.

References


Received June 23, 1987
Revision received October 25, 1989
Accepted November 16, 1989