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A comparison between amount of television viewing time and attentional abilities

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**A COMPARISON BETWEEN AMOUNT OF TELEVISION VIEWING
TIME AND ATTENTIONAL ABILITIES**

**Thesis submitted to
The Graduate College of
Marshall University**

**In partial fulfillment of the
Requirements for the degree of
Educational Specialist in
School Psychology**

**by
Gwendolyn Lawrence Smith**

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Marshall University

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Abstract

The purpose of this study was to investigate the relationship between television viewing time and auditory attention with the effects of development examined. The study used 64 females and 29 males who were in regular and special education classes (i.e., 24 third graders, 32 fourth graders and 37 fifth graders). The researcher constructed two instruments to obtain data about TV viewing time. The Stanford Achievement Test - Ninth Edition (SAT9) Listening Subtest raw score was used as a measure of attention, while the SAT9 Total Basic Skills (TBS) raw score was used as a measure of overall achievement. Data about TV viewing time was gathered during a class period.

No gender differences were found on any variable so data were combined. Significant relationships were found between Grade 4 and SAT9 scores ($r=.29$, $p<.005$) and Grade 5 and SAT9 scores ($r=-.30$, $p<.005$). An Analysis of Variance (ANOVA) was performed. A significant difference between the three grade levels in scores on the SAT9 ($F=5.52$, $p<.005$) resulted. Tukey's post hoc analysis resulted in a significant difference between Grade 4 ($M=30.00$) and Grade 5 ($M=25.81$), which suggested a curvilinear relationship. A significant relationship between the SAT9 Listening Subtest Scores and the TBS Scores ($r=.50$, $p<.001$) was found.

The results of the study provide additional evidence that no relationship exists between the amount of television viewing and attentional abilities. Future studies should a) consider developmental level, gender, socioeconomic status, ethnicity and intelligence; b) control for confounding variables; c) employ a longitudinal design; and d) use interval scale for assigning TV viewing time.

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Introduction/Literature Review

As a result of the introduction of television into American homes, much research in recent years (Anderson, 1985) has been devoted to investigation of the effects of television viewing on many different aspects of childhood development. “Because many American children spend large amounts of time watching television, concerns have been raised about the effects of television viewing on social, educational, and psychological development” (p.5). Many believe that increased television viewing has had a detrimental effect on the attentional abilities of children.

In 1978, (Smith, 1978) ninety-seven percent of American homes had at least one television. By 1998, (Hepburn, 1998) fifty-four percent of children had a television set in their bedrooms. Children devote more time to television than to any other leisure activity. The average amount of time spent viewing (Steinberg, 1997) exceeds twenty-one hours a week according to Nielsen Media Research. By the age of eighteen, (McGinnis, 1991) a child will have spent more time watching television than doing anything else with the exception of sleeping and will have watched (Smith, 1978) an average of 15,000 hours by graduation from high school.

There are many factors (Hepburn, 1998) that influence amount of television viewing time. Families from lower socioeconomic status view more television whereas families whose caregivers have more formal education watch less television. Amount of time spent viewing is also affected by ethnic differences.

Journalists and educators making claims of the negative effects of television viewing have written many articles. However, (Anderson, 1985) many of these popular

press articles fail to provide evidence of systematic scientifically based research to support the claims. One author (Honig, 1983) used results of scientific research then followed with hypotheses based on opinions and assumptions in an attempt to support the material presented. Another article (Hepburn, 1998) described television and school as two competing learning systems but also lacked scientific research. Evans (1992) wrote that today's students learn differently due to shorter attention spans and a need for visual stimulation. Television viewing (McGinnis, 1991) has been described as a one-way experience in which the viewer takes in sensory material and gives back little or none. Children of today tend to be passive learners that process information uniquely as a result of television viewing according to Dunn (1994). They are visual learners that process information better when it is presented in visual and auditory modalities simultaneously. Smith (1978) calls television a built in babysitter and attributes a decline in academics to television viewing.

Schlosberg (1996) reports that the ability to pay attention is part of a more global concept of self-control that develops throughout early childhood and that excessive television and video-game playing are incompatible with the development of self-control. Massive television viewing might tax the limitations of a child that is already weak in brain functions like self-monitoring according to Holden (1992).

Research implementing experimental design (Anderson, 1985) conducted in 1977 found no relationship between total viewing and attentional abilities. A study conducted in 1978 did find a correlation between television viewing (especially violent programming) and impulsivity. Research also suggested that some programs might increase attentional skills for some subgroups. Another study (Neuman, 1980) found no

relationship between listening behavior and total amount of television viewing or between the content category of the programming and scores with the exception of news/documentaries. An inverse correlation was found to exist between gains in listening skills and amount of news/documentaries being watched. There was a relationship between listening and intelligence and, most strongly, age among preschoolers with the older, more intelligent children exhibiting greater gains.

One study (Brown, 1986) found that although ability to attend was not affected, young television viewers relied more on picture content when interpreting or making inferences about a story while listeners had to base inferences on auditory information.

An analysis of research literature (Anderson & Collins, 1988) concluded that there was little support provided for most of the common beliefs about the negative effects of television on children. Instead, research has shown positive as well as negative effects on attention. Television (Chen, 1994) can be an opportunity for learning, “but to make it so requires you to take a closer look at what the medium does well and what it does poorly” (p.13). Anderson (1985) states that research “should determine what aspects of television programming cause changes in attentional behaviors, and it should be determined whether there are enduring (long term) effects of television viewing on attentional abilities” (p.6).

A widely known and well-respected educator (Quisenberry & Klasek, 1977) developed a list of characteristics of children of television. The list included a short attention span. Long before television became popular, a college textbook of 1950 attributed variance of attention span to normal mental development. With increasing age, the child is able to concentrate over longer periods of time. Gold (1981) also reports that

the ability to focus attention and resist distraction increases with age. Lack of concentration (Chevallier & Mansour, 1993) associated with increased television viewing may better be explained as a result of sleep deprivation caused by extensive viewing rather than the content of the programming.

Inability to attend (Thompson et al., 1999) could result from a wide array of individual factors or a combination of factors. Much oral communication is either ignored, misunderstood, or quickly forgotten. Good listening skills are developmental and require conscious effort and continued practice. Ronald Lindsay, M. D., a developmental pediatrician at Cardinal Glennon Children's Hospital in St. Louis and the St. Louis University of Medicine, says that an attention span has to be developed just like one has to develop a reading ability or an ability to catch a ball. On the average, (Schlosberg, 1996) a child should be able to pay focused attention for one minute per each year of age. Geist (2000) also reports that attention can be learned, but states that children can be expected to pay attention to someone or something for about double their age in minutes.

Developmental studies (Klenberg et al., 2001) have provided convincing evidence that attentional and executive functions are developmental beginning in infancy and continuing through adolescence. Rapid changes in attentional tasks occur between the ages of eight and ten but become more gradual between the ages of ten and thirteen. On a subtest of auditory attention, the level of a twelve-year-old is attained at about ten years of age.

Another study (Pascaulcava et al., 1997) found that some differences in ability to focus attention may be due to differences in maturation rates, but found both genders

equally proficient at ignoring distracting auditory information.

Selective attention (Melara et al., 2002) involves being able to focus on desired stimuli while ignoring distracting stimuli. Endogenous attention is voluntary and goal directed while exogenous attention is stimulus driven and largely automatic. Secondary tasks (Green & McKeown, 2001) that load verbal memory will disrupt endogenous orienting; and research has shown that visual attention can stay on spatial orientation, but auditory attention is distracted by other frequencies.

Basil (1994b) describes three stages of selective attention for both auditory and visual modalities. The first stage is the attending stage, followed by decoding for understanding, and finally storing to memory. While resources are not limited at the attending stage, resource limitations may occur in the other stages. Assigning meaning to new information requires more than sensory processing, and there may not be enough resources available to store it to memory once it is processed (Basil, 1994a). An external task such as attending to the surrounding environment may affect available resources (Basil, 1944b). Results of studies (Cool & Yarbrough, 1994) are consistent with the theoretical conceptualization of attention as flexible and adaptable as opposed to passive and highly limited.

Another factor (McSporrán, 1997) that may affect auditory attention is the relationship between a speaker's speech and background noise, the speech-to-noise (S/N) ratio. Younger children need a better speech-to-noise ratio than adults and do not achieve adult levels of competence in noisy or reverberant conditions until the age of thirteen to fifteen years. Another contributing factor (Gordon-Langbein & Metzinger, 1999) could result from temporary hearing loss caused by middle ear infections, colds,

and allergies. A study in the Journal of the American Medical Association showed that 14.9% of children ages six to nineteen have some degree of hearing impairment.

Attentional states can affect availability for response and memory. Our perceptions (Driver, 1992) are not based on all the stimuli entering our senses, but rather on what aspects of the stimuli that we choose to attend. Listening skill performance (Woods et al., 2001) was found to be generally superior when attention was focused on a single frequency at two different locations than when it was focused on that frequency from a single location. Auditory stimuli (Green & McKeown, 2001) are processed at higher levels unlike visual stimuli that are first processed at the retina. Intentional attending processes produce a positive feedback loop. Any noise in the initial representation would be amplified, and the representation becomes less precise the longer it is maintained. Therefore, auditory traces can last as long as ten seconds. Additionally, (McDonald et al., 2001) research has found that the neural mechanisms underlying involuntary shifts of attention to auditory, visual, and tactile stimuli are closely related.

To summarize, much research in recent years has been devoted to the effects of television viewing on many different aspects of childhood development. Journalists and educators who believe television viewing is detrimental to children have authored many articles citing the negative effects. Many believe that increased television viewing has resulted in shortened attention spans. Many of these articles neglect to substantiate their claims with evidence of systematic empirical research (Anderson, 1985).

An analysis of research literature (Anderson & Collins, 1988) concluded that there is little support provided for most of the common beliefs about the negative effects of television on children's attention.

Several studies implementing experimental design (Anderson, 1985; Brown, 1986; Neuman, 1980) found no relationship between attentional abilities and total viewing time. Attention deficits could be the result of a variety of individual factors or a combination of factors. Listening skills can be affected by noise levels (McSporran, 1997), temporary hearing loss (Gordon-Langbein & Metzinger, 1999), and attentional states (Driver, 1992).

Research shows that ability to attend is a developmental process. Listening skills require conscious effort and practice (Thompson, Grandgenett & Grandgenett, 1999), and the ability to focus attention and resist distraction increases with age (Gold, 1981). Attention span (Scholsberg, 1996) has to be developed just like one has to develop reading ability or the ability to catch a ball.

Anderson (1985) states that “despite the public interest in the effects of television on attentional abilities, there are relatively few studies and experiments. Of the research that has been done, there is considerable variation in quality. It should also be kept in mind that there are many factors that can affect the attentional abilities in children; it is a difficult task to disentangle the effects of television from the many other influences in children lives.” (p.6)

Method

Problem Statement

A review of the literature provides mixed results on the effects of television viewing on attention. Most studies examining the influence of television viewing on attention fail to consider the effects of development on attention.

Purpose of the Study

The purpose of this study was to investigate the relationship between television viewing time and auditory attention with the effects of development examined. The hypothesis is that ability to attend auditorily will not be related to amount of television viewing time when the influence of development is examined. Age was expected to influence the relationship between television viewing time and attention.

Subjects

Subjects consisted of 93 third, fourth and fifth grade students enrolled in a rural elementary school in southern West Virginia. There were 29 males and 63 females in the study, and all subjects were Caucasian. The students in this school are overall low socioeconomic status. There were two classrooms of each grade level. Third grade consisted of 24 subjects, fourth grade consisted of 32 subjects, and fifth grade consisted of 37 subjects. The participants included subjects from both regular education and special education.

Instruments

A letter explaining the study containing a parental permission signature line

(Appendix A) was composed to explain the study and obtain permission. An Estimated Amount of Television Viewing Time Survey Form (Appendix B) and an Estimated Range of Weekly Television Viewing Time Form (Appendix C) were used to assist students in determining an estimate of weekly television viewing time. The Estimated Amount of Television Viewing Time Survey Form was constructed in a manner to help students determine an average daily amount since this amount might vary. After determining an average daily amount, the students were asked to find an average weekly estimated range dependent upon their daily viewing habits. The Estimated Range of Weekly Television Viewing Time Form was developed to correspond with average daily amounts. Students viewing mostly 0 to 1 hour daily would choose the 0-7 hours weekly estimate. Students with more than 1 to 2 hours would choose 8-14 hours. If daily amounts varied, students chose the range they felt most closely represented weekly viewing amounts.

The measure of attention used was the raw score on the Stanford Achievement Test - Ninth Edition (SAT9) Listening Subtest. This test consists of two parts. On questions 1 through 10, the students are read a sentence containing a word that has multiple meanings. They are to choose from four different meanings how the word was used in that sentence. Their student booklets contain the four answer choices for each question but not the question. The remainder of the test consists of paragraphs that are read to the students by the test proctor. They may take notes as the information is presented. Following each selection, they are asked questions about that selection. Again, the paragraphs are not contained in the student booklets; but the answer choices are supplied.

Kuder-Richardson procedures were performed (Stanford Achievement Test Series – Ninth Edition Technical Data Report, 1997) to provide a measure of internal consistency. The corresponding coefficients for the third, fourth, and fifth grade Listening Subtest are given ($r=0.79, 0.82, 0.81$). An alternate-forms measure of reliability was also given ($r=0.77, 0.73, 0.79$). The validity of the test is determined by the extent that the test correlates with the goals of instruction. At the time of the collection of data, the West Virginia Instructional Goals and Objectives (IGOs) and those of this elementary school were aligned with the objectives of the SAT9.

As a measure of overall achievement, the SAT9 Total Basic Skills raw score was used. The Total Basic Skills score is comprised of scores from language arts and mathematics subtests.

The SAT9 scores were obtained from the subjects' school records. Demographic data was obtained from classroom attendance rosters.

Procedures

A letter explaining the study and parental permission forms were taken home and returned by students in grades three through five. The school counselor presented a developmental guidance lesson on leisure time activities in the classrooms of these grade levels. An Estimated Amount of Television Viewing Time Survey Form was placed on the overhead projector, and students were asked to estimate amounts of television viewing time for each day of the week. Then an overhead transparency containing ranges of estimated viewing time was used for students to calculate an estimate of weekly television viewing time. Results of the calculations were orally reported to the counselor and recorded on a data sheet. Three female students from one of the fifth grade

classrooms were in the clinic for a routine screening during this activity. Results also could not be obtained from students that were not in attendance the day the activity was presented. The viewing range results of the students that had returned permission slips granting permission to use achievement evaluation data were then recorded on a data sheet with demographic information and SAT9 Listening Subtest and Total Basic Skills scores.

Results

Initially, data were subjected to analyses to assess whether gender differences existed in the independent and dependent variables. T-tests were performed using the Listening Subtest and Total Basic Skills scores (see Table 1) as dependent variables. As can be seen, no gender differences were present. Table 2 provides the results of the Chi Square Analyses on the nominal variables of grade level and television viewing time. Again, no differences between the genders were found. Because no gender differences were present, the data for both genders were combined for further analyses.

To examine the relationship between the explanatory variables (grade level and television viewing time) and dependent variable (SAT9), biserial correlation coefficients were computed. A significant relationship was found between Grade 4 and SAT9 Scores ($r=.29$, $p<.005$) and Grade 5 and SAT9 Scores ($r=-.30$, $p<.005$). No other significant relationships were found between the explanatory variables and SAT9 Scores. The significant and divergent relationship found between Grade 4 and Grade 5

Table 1

Comparison of the Stanford Achievement Test - Ninth Edition Listening Subtest and Total Basic Skills Scores by Gender

Subtest(s)	Males ^a		Females ^b		t-value
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Listening	28.41	4.69	27.58	5.76	.74
Total Basic Skills	138.96	25.51	147.00	28.43	-1.34

^an=29 ^bn=64

Table 2

Comparison of Males and Females on the Nominal Variables

Variables	Males	Females	χ^2
TV			2.06
Television Viewing Time 0-7	8	17	
Television Viewing Time 8-14	5	17	
Television Viewing Time 15-21	7	15	
Television Viewing Time 22-28	5	4	
Television Viewing Time 29-35	4	4	
GR			.45
Grade 3	7	17	
Grade 4	9	23	
Grade 5	13	24	

and the SAT9 Scores suggested the presence of a curvilinear relationship.

An Analysis of Variance (ANOVA) was performed to examine the differences between the grade levels and SAT9. There was a significant difference between the three grade levels in scores on the SAT9 ($F=5.52$, $p<.005$). Tukey's post hoc analysis indicated that there was a significant difference between Grade 4 ($M=30.00$) and Grade 5 ($M=25.81$). It should be noted that although it was expected that grade level and SAT9 scores would have a linear relationship, a curvilinear relationship was found. Since the correlation between the fourth and fifth grade Listening Subtest ($r=.77$) leaves some of the variance unexplained, some of the appearance of the fifth grade scores may be due to test error caused by using different forms. This is further supported by the data that there were no significant differences when an ANOVA was calculated using scaled scores.

A Pearson correlation was performed between the Listening Subtest scores and the Total Basic Skills scores. No significant relationships were found. As expected, there was a significant relationship between the SAT9 Listening Subtest scores and the Total Basic Skills scores ($r=.50$, $p<.001$).

To examine whether the three grades differed in overall achievement, the scores on the Total Basic Skills were compared using an ANOVA. No significant differences were found between the three grade levels in overall achievement ($F=.11$). Therefore, the data did not support that differences in achievement abilities between the three groups influenced their attention scores.

Examining the hypothesis that there will be no relationship between television viewing time and attention with grade level examined, using a multiple regression analysis was planned. The violation of curvilinearity was present, however. Means to deal with the presence of curvilinearity have been suggested by Cohen and Cohen (1983). The study did not meet the requirements for further analyses to occur. Specifically, too

many variables were included in the model, given the number of subjects who participated.

In an effort to determine possible interaction effects of the demographic variables and television viewing on attention, an ANOVA was calculated. There were no significant interaction effects.

Discussion

Although television viewing has been thought to result in shortened attention spans, (Anderson, 1985) there has been little scientific support for this viewpoint. Several previous studies (Anderson, 1985; Brown, 1986; Neuman, 1980) found no relationship between television viewing and ability to attend. Neuman (1980) found that both age and level of intelligence influence attention.

One goal of this study was to investigate the relationship between television viewing time and attentional abilities, specifically auditory attention. As expected, there was no significant difference between the amount of television viewing and ability to attend.

Another important aspect of the study was to examine the influence that development exerts on attentional abilities. As expected, the mean score for fourth graders on the listening task was higher, although not significant, than the scores of third graders. Fifth graders had the lowest mean score of the three groups, and their scores were significantly lower than those of the fourth graders. Because of the influence of development, fifth graders should have better listening abilities than third or fourth graders. Because of the curvilinear relationship in this particular sample, the influence of development on attention could not be used as a means to control for the effects when examining the relationship between TV viewing time and attentional abilities.

Noise level has been shown to have a detrimental effect on attention (McSporran, 1997). The researcher wanted to determine whether the amount of students in the classroom (i.e., increased noise level) had negatively affected attentional abilities, and

thus resulted in fifth graders having the lowest scores on the SAT9. Efforts to discern the unique effects of class size on SAT9 scores could not be determined, however, because as class grade increased so did class size.

The results may have been affected by the use of different forms between grade levels since there were no significant differences when scaled scores were used.

The results of this study provide additional support to the literature that no relationship exists between the amount of television viewing and attentional abilities. There are a variety of instruments used in research to measure attention however. It should be noted that regardless of the instruments used, no correlations were found between total amount of television viewing time and attentional abilities.

Future studies need to consider the influence of development and gender on the ability to attend. An instrument that uses the same form for all subjects should be used to reduce unexplained variance. Studies may want to include subjects from preschool to high school. Longitudinal studies would also be useful to examine the effects of development on television viewing time. A control for class size needs to be utilized to prevent this from being a confounding variable. The use of an interval scale for assigning TV viewing times may increase the power of future statistical tests examining the relationship between TV viewing time and attention. Ethnic differences and socioeconomic status (Hepburn, 1998) have been found to influence television viewing time. The present investigation was unable to consider the effects of this due to the homogeneity of the subjects (i.e., all subjects were Caucasian and generally low socioeconomic status). The present study found a significant relationship between overall achievement and attentional abilities. As such, the influence of intelligence on

attentional abilities should be examined in future studies investigating the relationship between attention and TV viewing.

APPENDIX A

Dear Parent/Guardian,

A member of our faculty is pursuing a masters degree which requires the completion of a research project. She is interested in comparing the relationship between the average amount of weekly time spent viewing television with listening ability. We are requesting your permission to use information provided by your child on his/her television viewing habits as well as scores from the Listening Subtest and Total Basic Skills of the Stanford Achievement Test - Ninth Edition. Since the counselor is the test coordinator at this site and is provided the results of the SAT9, she would give that information to the teacher. Your child's name would only be used as a means of identification until all the data is compiled, then the information would be transferred to another sheet with only numbers for identification. At no point will the students' names be used within the results of the study. Your assistance in the completion of this project would be greatly appreciated.

Clendenin Elementary Administrative Staff

_____I give permission for my child's information to be used as part of this study.

Student's name_____ Parent Signature_____

APPENDIX B

Estimated Amount of Television Viewing Time

Estimated amount of time spent watching TV:

MONDAY: __0-1 hrs __1+-2 hrs __2+-3 hrs __3+-4 hrs __4+-5 hrs

TUESDAY: __0-1 hrs __1+-2 hrs __2+-3 hrs __3+-4 hrs __4+-5 hrs

WEDNESDAY: __0-1 hrs __1+-2 hrs __2+-3 hrs __3+-4 hrs __4+-5 hrs

THURSDAY: __0-1 hrs __1+-2 hrs __2+-3 hrs __3+-4 hrs __4+-5 hrs

FRIDAY: __0-1 hrs __1+-2 hrs __2+-3 hrs __3+-4 hrs __4+-5 hrs

SATURDAY: __0-1 hrs __1+-2 hrs __2+-3 hrs __3+-4 hrs __4+-5 hrs

__5+-6 hr __6+-7 hrs __7+-8 hrs

SUNDAY: __0-1 hrs __1+-2 hrs __2+-3 hrs __3+-4 hrs __4+-5 hrs

__5+-6 hrs __6+-7 hrs __7+-8 hrs

APPENDIX C

Estimated Range of Weekly Television Viewing Time

Using your estimated daily amounts of time spent watching TV, estimate the number of hours watched weekly:

0-7 hours weekly

8-14 hours weekly

15-21 hours weekly

22-28 hours weekly

29-35 hours weekly

36-42 hours weekly

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