

The impact of television viewing on language development from birth to 30 months: A Critical Review of the Literature

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This critical review examines the impact of television viewing on language development from birth to 30 months. Study designs include: non-experimental survey research (1), retrospective case-control (1), longitudinal process-product design (1) and a systematic review (1). Overall, the literature reviewed provides variable evidence regarding the topic of interest. It is thought that viewing television can have both positive and negative effects on language development, depending on frequency of exposure and content of the material being viewed. This relationship is worthy of further, more rigorous experimental investigation.

Introduction

Infants and toddlers in today's society are living in environments that are saturated with television and electronic media. Recently, there has been an explosion of baby DVDs and television channels specifically marketed towards these very young children. Despite this increase, little research has investigated the impact television viewing has on this very young population (Anderson & Pempek, 2005).

The American Academy of Pediatrics (1999) recommends that children two years and under not be exposed to television, and children older than two years be limited to one to two hours of educational television per day. Regardless of these recommendations, a national survey revealed that 43 percent of all children under the age of two watch television every day, averaging two hours and five minutes each day (Rideout, Vandewater & Wartella, 2003). Furthermore, parents of these children conveyed that they believe television to be an important educational tool that is valuable to their children's development (Rideout et al., 2003). This finding is not surprising, since 76 of the 100 best-selling videos for infants at Amazon.com in 2005, claimed to have educational benefits (Garrison & Christakis, 2005).

Given the number of infants and toddlers who are exposed to television on a daily basis, it is essential that parents, educators, researchers and health professionals pay immediate attention to the potential effects television exposure can have on the development of these very young children. One particular area of interest that requires further exploration is the impact television viewing has on language development in infants and toddlers. Reviewing the research in this area will enable Speech-Language Pathologists (SLP) to advocate and bring awareness to parents, educators and other professionals regarding the risks and benefits of television related to language development. Additionally, this information will help parents to make

informed decisions based on evidence from research, for the betterment of their children.

Objectives

The primary objective of this paper is to provide a critical evaluation of existing literature on the impact of television viewing on language development in children from birth to 30 months of age. A secondary objective is to offer evidence-based recommendations regarding the use of television in this population and areas for future research.

Methods

Search Strategy

Computerized databases, including PsycINFO, PubMed, SCOPUS and CINAHL were searched using the following search strategy: ((television) OR (media)) AND (language) AND ((infants) OR (toddlers)). The search was limited to articles written in English.

Selection Criteria

Studies selected for inclusion in this critical review paper were required to investigate the impact of television viewing on language development in children from birth to 30 months of age. With the exception of age (birth-30 months), no limits were set on the demographics of research participants or outcome measures.

Data Collection

Results of the literature search yielded the following types of articles congruent with the aforementioned selection criteria: non-experimental survey research (1), retrospective case-control (1), longitudinal process-product design (1) and systematic review (1). Articles are discussed in chronological order.

Results

Systematic review. Authors of this systematic review, Anderson and Pempek (2005), discuss the American Academy of Pediatrics (AAP) (1999) recommendation that children under the age of two years not be exposed to television. This recommendation is discussed in comparison with current research available on television exposure, foreground and background television and the impact of television on language, attention and cognitive development. For the purpose of this critical review, the only section focused on is the impact of television on language.

Although the research studies discussed in this article are appropriate and relevant, the authors did not provide clear guidelines for article inclusion or exclusion, nor were search terms outlined. In addition, the studies examined by the authors related to language could have been discussed more specifically. In particular, discussions regarding the methods, procedures and subject selections were either vague or completely omitted. Additionally, the reliability and validity of results of each study could have been evaluated further. Although a comparison of results from study to study is present and a clinical bottom line is stated, their discussions and critical analyses remain vague.

On the other hand, this article is valuable because it maintains and strengthens the rationalization for more research to be conducted in this area, since there is only a small subset of literature that examines the impact of television on very young children. In addition, this article offers valuable suggestions on what type of research is needed in the future.

Overall, Anderson and Pempek (2005) suggest that although considerably more research is needed, evidence thus far supports the AAP recommendation that children under the age of two years not be exposed to television, given the negative association it has on language development. Given that relevant research studies have emerged since the time of this publication, it is thought that the recommendations of this paper are premature and are not supported by a sufficient amount of research.

Study #1. Linebarger and Walker (2005) conducted a longitudinal process-product design study to examine the relationships between vocabulary size and expressive language outcomes with specific television programs, broader content categories and frequency of television viewing among infants. Viewing data was reported by 51 parents of infants, every three months, beginning at six months of age through to 30 months of age. All participants and their families were recruited from 17 different child care centers in the state of Kansas.

Information and data was collected through direct observations, parent interviews and various standardized assessments, at specific times during the course of this study. Measures included cognitive development (Bayley Scale of Infant Development – 2), vocabulary development (MacArthur Communicative Development Inventory), expressive language production (Early Childhood Indicator) and child and family characteristics (demographic information, detailed television viewing logs, Home Observation for Measurement of the Environment Inventory). Hierarchical linear modeling techniques were used to examine the relationships between television exposure and the child's vocabulary knowledge and expressive language skills. In the first step, analyses were conducted to examine each child's language growth over time. In the second step, analyses investigated whether or not the individual differences in language growth over time, varied because of different factors. These factors included frequency of television viewing, broad content categories and specific television programs. Parents' education levels, child's home environment and child's current cognitive functioning at the time of each assessment were controlled for statistically. Given the small sample size, compromise power analysis was carried out to examine adjusted critical t values and alpha levels. The alpha level used was 0.19.

The authors concluded that content and program type can have both negative and positive effects on vocabulary size and expressive language scores at 30 months of age. More specifically, viewing of specific shows such as *Dora the Explorer*, *Blue's Clues*, *Arthur*, *Clifford* and *Dragon Tales*, at 30 months, resulted in greater vocabularies and higher expressive language scores. On the other hand, watching *Teletubbies* was related to fewer vocabulary words and smaller expressive language scores. Similarly, *Sesame Street* was associated with smaller expressive language scores and *Barney and Friends* was related to fewer vocabulary words, yet higher expressive language scores.

Although these results are quite compelling, limitations in the study design do exist. Given the correlational nature of the design, causality cannot be determined. Additionally, since the researchers were working with a small sample size, they opted to carry out a compromise power analysis. This type of power analysis is controversial as it increases the probability of a Type I error occurring.

Alternatively, researchers included a variety of measures which were well defined and described in detail. The authors provided rationale for including each measure, and used reliable and valid standardized assessments to evaluate each area.

Overall, researchers were able to conclude that viewing television before the age of 30 months is

associated with both positive and negative effects on language development. This relationship is dependent on content and program type. It is felt that given the design of the study and the analyses carried out, as well as the strengths and limitations present, these results can be interpreted with a good degree of confidence. Therefore, it is recommended these findings be considered when determining the content of television programs that are exposed to infants.

Study #2. Zimmerman, Christakis and Meltzoff (2007) examined the relationship between media exposure and language development by surveying parents of children from two to 24 months of age. The sample was selected based on the following criteria: parent(s) had to speak English fluently and have a working telephone number. In addition, only one child per household was eligible and children with significant disabilities were excluded. The final cross-sectional sample of children consisted of 385 infants (8-16 months) and 345 toddlers (17-24 months).

The survey instrument included questions regarding the following independent variables: parent-child demographics, parent-child interactions and the child's frequency of viewing several content types of television and DVDs/videos. Parents were also asked to complete level one (infants) or level two (toddlers) of the short form of the MacArthur-Bates Communicative Development Inventory (CDI). Multivariate regression was used to determine how the independent variables may explain or predict variability in the measure of interest (normed CDI scores). Separate regressions were performed for the infant and toddler samples.

Results of the analyses indicated that viewing baby DVDs/videos accounted for a significant amount of variability in CDI scores in infants. More specifically, for each hour per day of viewing baby DVDs/videos, this sample of infants CDI scores reflected a 16.99 point decrease. This difference corresponds to approximately six to eight words less on the CDI, for each hour per day of viewing baby DVDs/videos. Interestingly, no association was found among toddlers between any type of media exposure and CDI scores.

Although more research is required to determine why this association exists, this article has its strengths. First, the CDI instrument used to measure language development has excellent internal and test-retest reliability. This means that the data collected from the CDI provides reliable and valid information on each child's communicative development. In addition, including a variety of independent variables in the regression analyses was important to evaluate which variables best predicted CDI scores.

Despite these strengths, this study is not without limitations. The first reflects the non-experimental design of the study. Given that there was no experimental manipulation, causality cannot be

determined. Additionally, the sample selected was not representative of the general population, since the sample selected had relatively higher income and educational levels. Lastly, media viewing was defined as and measured based on content and frequency of television viewing, in combination. It would be beneficial to look at each factor in isolation, to explore independent associations with language development.

Overall, the results of this study indicate that a negative association exists between content and frequency of television exposure and language development in infants (8-16 months). It is felt that given the design of the study and the analyses carried out, as well as the strengths and limitations present, these results can be interpreted with a moderate degree of confidence. That is, the results should be taken into consideration when attempting to answer the proposed research question.

Study #3. Chonchaiya and Pruksananona (2008) conducted a retrospective case-control study to investigate the impact of television viewing on language development, as well as identify individual risk factors for language delay. The case group consisted of 56 new patients with language delay at a developmental clinic, whereas the control group consisted of 110 typically developing children who were randomly selected from a 'well childcare clinic'. Participants in this study were between 15 and 48 months of age.

Assessment procedures were carried out by developmental pediatricians. This consisted of clinical history taking, a physical examination, measures of head circumference and hearing level, as well as observations of child's play, language, cognitive ability, sociability, repetitive hyperactive behavior and joint attention. A pediatrician also administered the Denver-II to assess expressive language abilities. A separate researcher conducted an interview with the parents of participating children, and asked questions regarding the child, parental/family/home environment, child disciplinary patterns and television/time characteristics. This information was analyzed using Analysis of Variance (ANOVA) and chi-square distribution. The authors did not state why these particular methods of analyses were used, nor did they specify the variables used in each analysis. There was no indication which dependent variables were considered categorical and therefore used in the chi-square distribution analysis. Similarly, the variables used in the ANOVA were not specified. Given this lack of clarity, the results of this study are considered to be equivocal. It is, therefore, not recommended that the results be taken into consideration when deciding how best to answer the research question targeted in this paper.

Nevertheless, results of the analyses reported by the authors indicated that children in the case group started watching television earlier (7.22 months of age) than the control group (11.92 months of age). In

addition, the case group was found to spend more time watching television (3.05 hours per day) than the control group (1.85 hours per day). The authors suggest that these results indicate that there is a relationship between early onset and high frequency of television viewing and language delay, as children who started watching television at less than 12 months of age and watched greater than two hours per day, were six times more likely to have language delays.

These results must be interpreted with great caution as there are several limitations that exist in the design of this study. The first concern relates to subject selection of the control group, who were said to have been selected from a 'well childcare clinic' that they attended weekly. Since this type of clinic is not described in detail, it brings up questions regarding the suitability of this set of participants as a control group. Additional concerns relate to the vague descriptions of the methodology and assessment procedures. Although descriptions of general areas of assessment are listed, the authors failed to describe why and how each area was evaluated. A further limitation involves use of the Denver-II assessment tool. Since it is considered to have a low to moderate sensitivity and specificity level, children with language delay may not have been identified accurately using this instrument. Finally, given that this design is retrospective in nature, Chonchaiya and Pruksananona (2008) question the accuracy of information obtained from the parents, given limitations in human recall. It is important to mention that the article was somewhat difficult to interpret because of the presence of grammar errors and unusual wording. Given this limitation, it is difficult to interpret the results of this study with great confidence.

On the other hand, this study is valuable because it brings awareness to parents and professionals on the potentially harmful effects of television viewing in infancy. This study also highlights the importance of continuing research to fill in the gaps in our knowledge.

Overall, the authors report that a negative association between early onset and high frequency of television viewing and language delay exists. These results are equivocal and it is, therefore, suggested that the results be interpreted with great caution, given the limitations discussed.

Discussion

Overall, the examined research provides variable evidence regarding the impact of television viewing on language development in children from birth to 30 months of age. More specifically, researchers have identified both positive and negative associations between viewing television and language development in this population.

Despite limitations discussed with each article, all of the literature reviewed suggests that there is a

negative association between television viewing and language development in this population; however there appears to be other factors influencing this relationship. Other factors that were identified include frequency of exposure and content of television material being viewed (Chonchaiya & Pruksananonda, 2008; Linebarger & Walker, 2005; Zimmerman et al., 2007). More specifically, baby DVD/videos, Sesame Street, Teletubbies and Barney and Friends were found to be negatively associated with language development in this very young population (Linebarger & Walker, 2005; Zimmerman et al., 2007). Linebarger & Walker (2005) speculate that language and vocabulary development may be inhibited because of specific features present in these specific programs and content types. For example, it may be that these particular television shows contain poor language models (e.g. baby talk), little dialogue or a loose narrative structure (Zimmerman et al., 2007; Linebarger & Walker, 2005). Linebarger & Walker (2005) also hypothesize that having many modes of input (e.g. visual stimulation, language, music) may be too difficult for this young population to comprehend.

On the other hand, results of Linebarger and Walker's (2005) investigation suggest that television viewing can have a positive impact on language development. That is, the impact, whether positive or negative, is dependent on television content. Authors Linebarger and Walker (2005) further suggest that, "when specific language-promoting or language-inhibiting strategies are used with infants and toddlers in a televised format, it would be expected that these strategies would promote or inhibit communication in the same ways they have been found to in face-to-face interactions" (p. 642).

Conclusion

At present, a concrete statement regarding the impact of television viewing on language development in this population can not be made, due to the limited research directed at this question. It is thought that viewing television can have both positive and negative effects on language development, depending on frequency of exposure and content of the material being viewed.

Recommendations

1. Funding for further research would enable us to make firmer statements about the risks and benefits associated with viewing television.

- A. A large-scale randomized trial needs to be carried out, in which some families are actively discouraged from allowing their children to watch any television or specific television content.
- B. A longitudinal prospective study would be helpful to see if the effects of television

viewing on language development observed at a young age carry over or dissipate with age.

- C. Analysis of the content of specific television programs and movies must be investigated to determine particular features that are inhibiting or promoting language development.

2. Advertisers, creators and manufacturers of infant television programs and DVD/videos must recognize their responsibility to create viewing material that promotes language development.

3. Parents and health professionals must acknowledge the power of media exposure on infants and toddlers. They must recognize the possible risks and benefits associated with viewing television and set limitations on the frequency of exposure and content of television being viewed.

4. SLP's must educate parents on language promoting strategies and encourage them to use these strategies and avoid replacing face-to-face interactions with time spent in front of the television.

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