



Insighters  
Educational  
Consulting

**TWO VIEW OR NOT TWO VIEW:  
A REVIEW OF THE RESEARCH LITERATURE ON THE  
ADVISABILITY OF TELEVISION VIEWING FOR  
INFANTS & TODDLERS**

*Prepared by Faith Rogow, Ph.D., March 2007*

512 S. Plain Street Ithaca, NY 14850 607.277.TVEd (8833)

FaithRogow@earthlink.net

# TABLE OF CONTENTS

<b>Executive Summary.....</b>	<b>3</b>
<b>Introduction.....</b>	<b>4</b>
<b>Background.....</b>	<b>5</b>
The American Academy of Pediatrics “No TV” Policy.....	5
Reaction.....	6
<b>Defining the Problem.....</b>	<b>7-9</b>
Viewing Time.....	7
Identifying a Mechanism.....	7-8
What is the Difference Between Two and Three?.....	8-9
<b>Assessing the Explanations.....</b>	<b>10-22</b>
Displacement / Time.....	10-11
Social Interaction.....	11
Creative Play.....	11
Education.....	12-16
Evidence of Learning.....	12-13
Imitation.....	13
Attention & Comprehension.....	13-14
Language.....	14-15
Foreground vs. Background.....	15
Adult Interaction.....	15
Video Deficit.....	15
Reading.....	16
Imitation.....	16-17
Physical & Emotional Health.....	17-19
Eyesight.....	17
Sleep.....	18
Obesity.....	18-19
Autism.....	19
Attention Disorders.....	19
Violence.....	19-20
Brain Development.....	19
Addiction.....	20-21
Values.....	21
<b>Conclusion.....</b>	<b>22</b>
<b>Afterword.....</b>	<b>23</b>
<b>Appendix.....</b>	<b>24-28</b>
A: Problems with Recent Research on TV and Autism .....	24-26
B: Does TV Cause ADHD? An Assessment of Christakis et al.....	27-28
<b>Bibliography.....</b>	<b>29-31</b>

# **TWO VIEW OR NOT TWO VIEW:**

## **A REVIEW OF THE RESEARCH LITERATURE ON THE ADVISABILITY OF TELEVISION VIEWING FOR INFANTS & TODDLERS**

*Prepared by Faith Rogow, Ph.D., March 2007*

### **EXECUTIVE SUMMARY**

**In 1999, the American Academy of Pediatrics (AAP) declared that children younger than the age of two should not watch any television. The organization's policy was based on well-founded concerns about diminishing opportunities for creative play, hands-on experiences, and direct interaction with parents and caregivers. But the strategy to ban television rather than to promote selective use is a misplaced response not supported by available research.**

#### What the Research Says

Research on the effects of TV viewing on infants and toddlers is quite limited and outcomes are mixed, so conclusions should be treated as preliminary rather than definitive. At this point, two factors emerge as the key variables:

1. **CONTENT**, i.e., what is viewed

"The medium of television is neither harmful nor beneficial to children; rather, the content viewed determines television's effects." Moreover, "effects of television independent of content have not, for the most part, been demonstrated." (Schmidt & Anderson, 2007, p. 78, 65)

2. **VIEWING BEHAVIOR**, i.e., what is actually happening in the room while viewing

The presence of parents or caregivers who use the television as a spark for conversation, play, or interaction with their children significantly enhance the educational value of the viewing experience. The location of the television also seems to be a factor, with most researchers agreeing that a TV set in the bedroom of an infant or toddler is a poor choice.

Ironically, much opposition to television viewing for young children (including the AAP "no TV" policy) is not based on either of these variables, but rather, on time-based explanations. However, except in cases of heavy viewing (e.g., homes where the TV is on all day), viewing time is not significantly related to outcomes. The notion that a moderate amount of TV viewing displaces more beneficial activities is not supported by the research.

There is some evidence to suggest that television might be limited as an educational tool for children younger than 24 months. In particular, there is little demonstrated educational benefit for children younger than one. However, there is no credible research indicating that moderate viewing of well-designed, educational television causes any harm.

Widespread repetition of the AAP's "no TV under two" declaration does not magically render the policy effective. There is no evidence that turning off the television improves parenting skills in ways that would better meet the needs of our youngest children, nor is there evidence that the AAP's recommendation is succeeding in giving parents the message that they should spend more time directly interacting with their babies.

# INTRODUCTION

## The Challenge of Research

It is notoriously difficult to do research involving infants and toddlers. They can't fill out surveys, and even those who can speak can't use language precisely enough to communicate clearly with researchers. They are easily distracted, easily influenced, and their parents are not always quick to provide necessary permissions. And, of course, ethical concerns make it difficult to test for negative outcomes because no credible researcher would expose children to media they believed to be harmful.

It is also difficult to do research on the long-term impact of television. By the time a typical infant enters school it is nearly impossible to separate out the influence of a specific television program or genre from other variables. And tracking specific children over time in order to control for a significant number of variables is prohibitively expensive.

So it is not surprising that, compared with other issues related to children and television, for which there are often dozens (and sometimes hundreds) of separate studies, the research on TV and children under two is sparse. Of more than 2,000 studies on children and television conducted in the U.S. between 1949 and 2005, only a tiny fraction look at children under two, and the global picture is not much better. This lack of research is frequently noted by the few people writing about television for infants and toddlers (e.g., Anderson & Evans, 2001; Huston et al, 2007). One search for experimental trials of the effects of television viewing on infants and preschoolers found only twelve studies that fit the criteria, none of which looked at children younger than two (Thakkar, Garrison, & Christakis, 2006).

Adding to the ambiguity is the fact that the existing research examines very different questions, providing little replication or basis for consensus. It is often the case that for any particular claim about why viewing television might be a problem for children under two, only a single study exists, and many of the studies involved fewer than 50 children. It is unsound to draw generalized conclusions from a single study, especially a study involving a small number of subjects.

To compound the problem, some of the conclusions are contradictory. For example, "imitation" is posited as a cause for concern both because infants or toddlers might copy negative behaviors and also because very young children *don't* imitate things they see on screen consistently enough to make television a viable educational tool for this age group.

Experimental design can also present a challenge in that behavior in a lab setting might not reflect what actually happens at home. In particular, the need to separate individual variables for testing makes replication of natural viewing behavior impossible. For example, experimental design often singles out a series, testing for outcomes based on only that program. Unfortunately, that narrow focus does not provide any information about typical viewing, where lessons learned from any single program might be reinforced or undermined by other viewing (not to mention real-life) experiences.

Given the preliminary nature of current research, one might have reasonably expected that the AAP would hesitate to make a definitive pronouncement. It would be instructive to examine the financial and political underpinnings of the organization's opposition to TV, but exploration of those issues is beyond the scope of this review. Rather, this examination focuses on more measurable components related to the validity of the AAP's recommendation and the inherent implication that TV viewing harms children younger than two.

## BACKGROUND

At a minimum, the history of suspicion of new media technologies dates back to Plato, who lamented that the written word would lead to misinterpretation because (unlike speech) it was not interactive, it might inadvertently fall into the hands of uneducated people incapable of understanding, and it would ruin people's memories. (*Phaedrus* and *The Republic*). Since then nearly every form of new media has been met with dire warnings about its potential to destroy the fabric of society.

Today, the genuine upheavals generated by the shift from analog to digital media have been met with predictable alarmist rhetoric and well-founded, well-reasoned concern. Both ends of this spectrum, and much in between, are represented in the debate over the prudence of allowing children younger than two-years-old to watch television.

### The American Academy of Pediatrics "No TV" Policy

In 1999, the American Academy of Pediatrics (AAP) issued this recommendation to their members:

"Pediatricians should urge parents to avoid television viewing for children under the age of two years." (*Pediatrics*, Vol. 104 No. 2 August 1999, pp.341-343)

Not coincidentally, the *Teletubbies* was first broadcast in the United States in 1998. Concern over the success of the series was one motive for the AAP policy. However, public explanations of the policy did not mention the series by name and focused on children's unmet needs:

"Although certain television programs may be promoted to this age group, research on early brain development shows that babies and toddlers have a critical need for direct interactions with parents and other significant care givers (e.g., child care providers) for healthy brain growth and the development of appropriate social, emotional, and cognitive skills. Therefore, exposing such young children to television programs should be discouraged." (*Ibid*)

The middle portion of this statement describing the need for "direct interaction" was neither new nor disputed. It has long been consensus opinion that the first two years of life are especially important in the growth and development of a child's brain, and that during this time, children need positive interaction with other children and adults, including opportunities for touch, object manipulation, conversation, and open-ended play.

The rest of the statement was more problematic. Some child advocates mistook the reference to research on brain development as an indication that the policy was based on a body of research about infants and television. In fact, at the time, no more than a handful of research studies on TV's impact had included children younger than two.

Even more open to dispute was the link between the children's need for real-life interaction and television exposure. For the "therefore" to make sense, one must accept that television viewing significantly disrupts "direct interactions" and that turning off the television would likely increase the amount of positive adult-child interactions. There is almost no substantiation for the latter assumption. The first assumption is the crux of the debate and the impetus for much of the research reviewed here.

## Reaction

Some well-respected researchers have publicly supported the AAP's policy. Using their general knowledge of the field rather than results of any specific experimental trials they conducted, they accepted the AAP's premise that television would displace or disrupt the real-life experiences that are so important to the healthy development of children under two. As eminent Yale psychologist and research scientist, Dorothy Singer, put it, "Children need to be exposed to good language. Children this age should be exploring their world, awakening all their senses. You don't get that from watching TV." (*Current*, August 1998) MD, Victor Strasburger, took the argument one step further, labeling any effort to make media for children under two "immoral." (*Current*, August 1998)

The reaction, however, was far from monolithic. Not all child advocacy organizations have boarded the AAP's bandwagon. For example, neither the well respected Zero to Three nor the Talaris Institute have called for a ban on viewing.

Several researchers have called the AAP's recommendation premature, saying that their concerns about infant viewing are "based more on conjecture than research." (Huston, et al, 2007, p. 43) Deborah Linebarger observed,

"the American Academy of Pediatrics' recommendation may be premature especially for those children who might not have access to other educational resources or activities." (*Literacy Today*, Sept 2004, Issue 40)

Others see the lack of research as a reason for caution, indicating that by letting children watch television without knowing much about the impact, we are, in effect, conducting a grand experiment on infants and toddlers (e.g., Krcmar & Grela, 2004). Daniel Anderson and Tiffany Pempek (2005) write that, "Evidence thus far indicates that the AAP recommendation is well taken, although considerably more research is needed."

Many of the loudest voices supporting the AAP's policy have been cultural critics or anti-television crusaders. Often presenting their views as uncontroverted fact, they have substantially expanded on the AAP's concerns about television. Typical is this 2006 excerpt from Susan Linn (Associate Director of The Media Center at Harvard's Judge Baker Children's Center and co-founder of Commercial Free Childhood):

"the more time babies spend in front of the TV, the less time they spend in one activity which we know is educational - creative play. Losing, or never acquiring, the ability to play may not sound like much until you realize that play is essential not just to learning, but to democracy. It's through playing that children learn skills essential to thriving in, and protecting, a democratic society. Critical thinking, initiative, curiosity, problem-solving and creativity are capacities that develop through play, as are the more ephemeral qualities of self-reflection, empathy, and the ability to find meaning in life." (January 25, 2007 CommonDreams.org)

While authors like Linn offer interesting ideas, they do not, themselves, conduct experiments or observational studies involving children nor have they published their findings in peer-reviewed journals.

In some cases it is apparent from sources cited that the social critics function as an echo chamber. They make their case seem well-documented by citing one another rather than addressing what the research does and does not say. Their efforts are, most certainly, well-intended advocacy on behalf of children, but their claims are opinion, not fact. Research reveals a more complex picture than these critics paint.

## DEFINING THE PROBLEM

### Viewing Time

Everyone agrees that babies and toddlers are watching television, videos, and DVDs, though it isn't always clear exactly how much time they are spending in front of the screen. A 2003 survey by the Kaiser Family Foundation found that about 30% of children aged birth to three have a television set in their bedroom, but because the commercial ratings services do not gather data on children younger than two, there has been little national data gathered on viewing patterns for infants and toddlers in the U.S.

One 1997 survey indicated that, on average, children two and younger watched about 1½ hours of television per day (Huston, Bickham, Lee, & Wright, 2007). Data gathered more recently by the Kaiser Family Foundation found the amount of time to be about the same, with TV averaging just under an hour a day and total average daily screen time at 1 hour 36 minutes (Rideout, 2006).

At least two earlier studies and one re-analysis of earlier data put the average screen time for American infants and toddlers at two hours a day, but changes in families and media since then warrant putting more credence into the more recent numbers, which seem to be holding constant at about 1.5 hours, even in the face of media proliferation.

Anderson and Pempek (2005) point out that the averages obscure huge variation in reporting, with one study finding 42% of parents saying their infant watched no television, while other parents reported babies watching 18 hours a day. They speculate that some parents report background viewing (cases where the TV is on, but not for the specific purpose of children watching) while others do not. As will be discussed later, there are reasons to believe that foreground and background television have different effects, so this distinction could be important.

Whichever figures you use, the debates are over what takes place during 90-120 minutes of a typical day – not an insignificant portion of a young child's waking hours, but also not enough to preclude other activities.

### Identifying a Mechanism

When researchers design a study, they start by forming a hypothesis about the mechanism(s) that might be responsible for a given outcome. So, to support or reject a conclusion like "children under two should not watch TV," researchers start by asking why TV might be a problem. It is important that even among people who agree that children under two should avoid TV, there is no consensus about possible mechanisms.

A review of the literature reveals more than ten different theories. According to people who have voiced support for or designed research to test AAP's "no TV" recommendation, TV viewing by infants and toddlers:

1. Undermines cognitive development and impedes the ability to learn
  - a) Because viewing displaces direct human interaction
  - b) Because viewing displaces intellectually valuable experiences like creative play
  - c) Because viewing changes the brain in harmful ways
  - d) Because children under two don't learn from TV
2. Undermines physical health & emotional well-being
  - a) Because viewing disrupts healthy sleep patterns
  - b) Because viewing can harm developing eyes
  - c) Because viewing leads to later health problems, including obesity, autism, and attention disorders
  - d) Because viewing violent media can lead to increased aggression and fear
3. Teaches inappropriate behavior or values
  - a) Because viewing leads children to imitate inappropriate behaviors or language
  - b) Because viewing teaches children to be materialistic and unthinking consumers
4. Will produce media addicted or media-dependent adults
  - a) Because viewing habituates children to viewing

It would be a mistake to view these explanations as cumulative evidence in support of the AAP's position. The number of different assertions is irrelevant if none of them are demonstrably true. In this case, a detailed review shows that several of the claims are not supported by the available evidence. Other explanations are contradictory and mutually exclusive. These will be fully explored in the "Assessing the Explanations" section below.

### What is the Difference Between Two and Three?

Understanding how infants and toddlers differ from older children is important in the context of this discussion primarily because conclusions about the older age group do not warrant a ban on television viewing. The research community generally agrees that, for children three and older:

- ♦ The effects of TV depend on what people watch (not on the medium itself)
- ♦ Educational television has a positive impact
- ♦ Entertainment television has a negative impact

(Schmidt & Anderson, 2007, p. 65; Anderson & Evans, 2001)

Even the AAP recommends *limited* viewing rather than *no* viewing for children three and up. So why a ban for children from birth to 24 months? When it comes to TV viewing, what, exactly, is so different about children younger than two?

There are varying schools of thought about how to describe or categorize stages of child development, but all acknowledge that in a child's early years, substantial changes take place every few months. The question here is, which specific changes would warrant a policy towards television that changes at 24 months?

There is surprisingly little written on this question. Some people have speculated that language abilities might be an important variable, but no one has tested that yet. Others have suggested that very young children are especially susceptible to negative impact from

media because their brains are in critical growth stages. However, increased plasticity is generally accepted as a condition from 0-5, not just from 0-2, so brain development does not provide a convincing answer.

Others have suggested that TV is a medium that relies on symbolic representation and that children younger than two are developmentally so limited in their ability to understand symbols that they cannot take advantage of the potential benefits of viewing (Troseth et al, 2006). This explanation has merit, but cannot account for clear demonstrations that, in fact, children as young as 12 months seem to make meaning from the screen.

For now, the field seems to be operating on an intuitive sense that infants' and toddlers' interactions with television are different than those of preschoolers' or older children, but much more work is needed to clarify just what those differences might be.

In the meantime, people should be wary about selective use of the age issue. Opposition to television for children under two is often accompanied by a litany of potential negative outcomes. Many of these outcomes (e.g., obesity, violence, low-self-esteem) have been well-researched for older children but never for children under two.

It seems logical to extend well-founded concerns about older children to their younger counterparts, but then it would also seem logical to similarly extend viewing recommendations, and the AAP's policy does not do that. Of course, no one would suggest that an infant should engage in the same viewing practices as an adolescent, but it would make sense to assume that a preschooler's viewing would look a lot like a toddler's, and it has been difficult to determine any coherent explanation for why the AAP's policy does not follow this logic.

## ASSESSING THE EXPLANATIONS

The questions explored in the research on television and children under two fall into seven categories:

- ◆ Displacement / Time
- ◆ Education
- ◆ Imitation
- ◆ Physical & Emotional Health
- ◆ Brain Development
- ◆ Addiction
- ◆ Values

This section reviews the findings for each of these categories.

### ◆ DISPLACEMENT / TIME

- TV undermines cognitive development and impedes the ability to learn
- ◆ Because viewing displaces direct human interaction
  - ◆ Because viewing displaces intellectually valuable experiences like creative play
  - ◆ Because children under two can't learn from TV
- TV undermines physical health
- ◆ Because viewing displaces physical activity

According to a press release explaining its policy, the AAP's recommendation against TV viewing for children under two is based primarily on the notion that television viewing displaces direct human interaction. They specifically claim that "Time spent with media often displaces involvement in creative, active, or social pursuits."

No one disputes the need of infants and toddlers for direct human interaction, including conversation, opportunities for hands-on exploration of the world, time for open-ended play, and physical activity. The question is whether or not television viewing displaces these activities.

Thus far, the results of research on the question of displacement is mixed, with some indication that entertainment, background, or adult-focused television might be disruptive. However, **the research provides no evidence that moderate viewing of educational programs displaces other valuable activities.**

### DISCUSSION

For older children, "the overall evidence for negative effect of displacement is weak." (Schmidt & Anderson, 2007). TV viewing tends to replace other similar activities rather than activities that are any more or less intellectually valuable.

A 2004 review of research by the Kaiser Family Foundation on "The Role of Media in Childhood Obesity," found a link between obesity and TV viewing, but nevertheless concluded that media use did not displace more vigorous physical activity. Several studies found that TV viewing displaces other sedentary activity rather than pre-empting exercise or participation in sports (Taveras, Field, Berkey, Rifas-Shiman, Frazer, Colditz, Gillman, 2007; Burdette &

Whitaker, 2005). One of the most recent studies found no relationship between viewing time and time spent in physically active play or reading time (Vandewater, Bickham, & Lee, 2006).

A review of the literature by Comstock & Paik (1991) affirmed that "The principle that television use does not displace personally or socially important activities is so robust that it may be considered an axiom." (p.74)

So, it would be a departure from the behavior documented for older children if television displaced important activities for children under two. As recently as 2001, there were virtually no studies examining whether or not TV viewing by infants and toddlers displaced other important activities.

### Social Interaction

Television viewing as a social, rather than solitary, experience appears to be fairly common. One survey of 300 parents of children 23-months-old and younger found that co-viewing occurred nearly half the time the television or a videotape was on (Weber & Singer, 2004). The results of a 2003 Kaiser Family Foundation study indicated that nearly 2/3 of parents report that when their young child was watching television, he or she was watching with someone else (Rideout, Vandewater & Wartella, 2003). In other observations, play and social activity continues when toddlers are in the presence of background television (Anderson & Evans, 2001; Barr et al, 2006 citing Schmitt, 2001).

That pattern of co-viewing is contradicted by a 2006 study found that the more a child watched TV, the less they interacted socially with parents and siblings (Vandewater, Bickham, & Lee, 2006). This negative correlation cannot tell if children were watching more television because parents or siblings were unavailable or whether children were choosing viewing over time with family members, but it does render the picture of television and social interaction a bit fuzzy.

Some research has also shown that television can be used as a prompt for conversation (Lemish & Rice, 1986; Barr et al, 2006). These results would indicate that even if displacement was occurring, there is nothing about the medium of television that makes displacement of human interaction inevitable.

### Creative Play

In research involving preschoolers, content determines whether TV viewing encourages or discourages imagination and creative play (Thakkar et al, 2006), but that may not be the case for infants and toddlers. Vandewater et al (2006) found a negative correlation for viewing and time spent in creative play.

One study investigated a possibility that combines both content and time variables. Anderson & Pempek (2005) looked at the difference between background television - when the set is on but is not the primary focus of a child's attention - and foreground television, where viewing is intentional and the program is specifically targeted for infants or toddlers. They conclude that exposure to large amounts of "background" TV may distract both parent and child, thus disrupting play and adult-child interactions.

This study provides strong evidence that children would benefit from parents turning off background TV, but because it does not address "foreground" television, it does not provide evidence to support an outright ban of all types of TV for children younger than two.

### Conclusion

The research on displacement does not provide any substantial evidence that parents or caregivers who turn off the TV set would increase the time they spend directly interacting with their children. For example, an eight year study in South Africa found that decreases in television viewing do not result in parallel increases in levels of any designated educational activities. (Mutz, Roberts, & van Vuuren, 1993).

In fact, given the lack of evidence for displacement, it would be surprising if a "no TV" policy resulted in increased adult-child interaction. The recommendation provides no information about what children need, nor any coaching for parents on how they might meet those needs. Even TV Turnoff Week's "More Reading, Less TV" initiative - which is entirely based on the notion that television displaces a more valuable activity (in this case, reading) - requires specific direction and support from teachers to achieve its goals of getting kids to read more. In other words, without other concurrent changes, simply turning off the television does not necessarily benefit children under two.

## ◆ EDUCATION

TV undermines cognitive development and impedes the ability to learn

- ◆ Because children under two don't learn from TV.

Whether or not the viewing experience can be educationally or cognitively beneficial for children younger than two is, by far, the most common topic in the available research literature on television for very young children.

The research leaves little doubt that infants and toddlers are making meaning from what they watch and can learn from seeing things on screen, though comprehension probably does not begin until age one (Richards & Cronise, 2000). There is also convincing evidence of what Anderson & Pempek have called a "video deficit," i.e., **infants and toddlers do not learn as well from television as from equivalent real-life experiences.**

In addition, **the research is overwhelmingly clear that outcomes are more influenced by content than by any other variable.** Yet, blanket statements opposing television, rather than urging gatekeepers to select specific programs or program types, persist.

Unfortunately, no one has yet published an experimental trial investigating whether or not children from birth to 24 months learn the specific things that such programs might teach. Marketing campaigns for products like *Baby Einstein* implying proven educational benefit are misleading.

More research is needed to determine what kinds of content or program design might best aid cognitive development for infants and toddlers. Ironically, acceptance of the AAP recommendation that children under two never watch TV makes it unlikely that producers will find the non-commercial support they need to create age-appropriate, educational content for children younger than 24 months.

## DISCUSSION

### Evidence of Learning

For older children, there is overwhelming evidence that "Television that is designed to teach does so, with long term positive consequences" (Schmidt & Anderson, 2007). Dozens of researchers have confirmed that whether and what older children learn depends primarily on the content they view, with those who tune in to education programs, especially at a young age, performing better academically than those who watch entertainment fare (e.g., Wright et al, 2001). As one review of the literature concluded, "Television viewing, when it displaces intellectually rich experiences, has a deleterious effect on children's achievement, but it is beneficial to children when it provides such experiences." (Comstock & Paik, 1991). In other words, there is nothing about the medium of television, itself, that enhances or impairs cognitive function or the ability to learn. It depends on what you watch.

One study has found that this is not the case for infants and toddlers. In an analysis of national data, Zimmerman and Christakis (2005) found that children who watch TV before age three score worse on tests of letter and number recognition upon entering school than those who do not watch.

However, the differences found between viewers and non-viewers are "modest" and there are significant problems with methodology of this study, not the least of which is that there is no specific hypothesis presented about what might cause the correlation between time spent viewing and poor test performance. Furthermore, the only significant variable cited in

the study, i.e., time spent viewing, has been rejected as a significant variable by most other researchers in the field except in circumstances of heavy viewing (e.g., Schmidt & Anderson 2007).

In contrast to the Zimmerman and Christakis conclusion, several studies have documented that very young children do learn from TV. For example, in Mumme & Fernald's 2003 experiment, one-year-olds used negative social cues from an actor on screen to later avoid the object that sparked the actor's reaction.

Perone & Oakes (2006) used video of objects and sounds to test whether or not babies understood various levels of object function (e.g., that dropping an item causes a certain sound). They found that children between the ages of 10 and 18 months did learn function, with performance improving as children grew older.

Finally, in a large and influential study of *Sesame Street* that included two-year-olds, Wright et al (2001), concluded that "For very young children, viewing informative programming designed for children was associated with subsequent letter-word skills, number skills, receptive vocabulary, and school readiness. Individual differences in these skills were fairly stable through the preschool years, suggesting that early effects of viewing can be lasting."

Wright et al emphasized the importance of content, writing that the relation "of television viewed to early academic skills depend primarily on the content of the programs viewed." In addition, they found that the relationship between educational viewing and school readiness was strongest for viewing at age 2 and 3. This could suggest that early viewing actually contributes to, rather than detracts from educational achievement, though it could also be that viewing prior to 24 months has a different impact than viewing after 24 months.

Finally, Wright et al suggested that socioeconomic status might be an important variable, with television interfering with achievement among more advantaged children, but contributing "to knowledge or language ability for less advantaged children, possibly because of the differences in alternative opportunities for learning that are available in their homes and neighborhoods."

### Imitation

There is evidence that infants and toddlers imitate things that they see on screen, even a day after viewing, indicating that they learned to apply what they saw (Meltzoff 1988). However, the imitation seems limited to simple, single-step tasks (Barr & Haynes).

There is also evidence that children imitate words from TV, and learn to apply them (e.g., Krcmar & Grela; Lemish & Rice). In most instances of documented imitation, children learn from TV, but not as well as they learn from live sources (Wells 1985, cited by Lemish & Rice).

### Attention & Comprehension

There is a considerable amount of research indicating that television can hold the attention of infants and toddlers. Kobayashi (1989) found that by 12 months, nearly all infants attend to the TV screen, a behavior which begins at 4-5 months. Richards & Cronise (2000) found that prior to age one, children look at the screen but don't appear to distinguish between nonsense or ordered content, indicating that prior to their first birthday, children may look at the screen but are probably not making meaning from what they see. Barr et al (2006) add that very young children attend to different things at different stages of development.

Researchers have also documented that attention increases with age (Kobayashi, 1989; Anderson et al, 1981 & 1986). The common explanation is that children watch more as they are able to comprehend more (Huston et al, 2007; Kobayashi; Anderson & Lorch, 1983; Richards & Cronise, 2000). Research on *Sesame Street* found that "cognitive meaningfulness of television is an important driver of attention in children as young as 24 months." (Anderson et al, 1981)

This theory is critically important because it means that if children pay sustained attention to the screen only when they are able to comprehend or make meaning from what they are watching, then attention provides evidence of comprehension. For children aged 12-24 months, there is a lot of evidence of attention.

TV programs made specifically for infants and toddlers can garner high levels of sustained attention (Barr et al, 2006). Götz (1999), and Lemish (1999), and Howard & Roberts (2002) have documented such sustained attention and interaction (e.g., pointing and

dancing) with *Teletubbies*. And several studies indicate that the attention of both 18-month and 24-month-old children wanes when presented with material less comprehensible or nonsensical and returns when normal, age-appropriate programs reappear (Frankenfield et al as reported in Anderson & Pempek, 2005; Anderson & Pempek, 2005; Valkenburg and Vroone, 2004; Huston et al, 2007).

However, Anderson & Pempek (2005) are not convinced that attention from children younger than two indicates that children are actually learning, despite their own conclusion that children they have observed "are processing TV beyond a primitive orienting and perceptual level." They speculate that infants or toddlers might be drawn to movement, novelty, or familiarity, noting that Barr et al (2003) found that 12-15 month olds paid much more attention to a familiar video than an unfamiliar one.

While a number of people have rightly pointed out that a preference for familiarity does not equal comprehension and that just because an infant pays attention or enjoys themselves does not mean they are learning. However, it is also possible that comprehension increases with familiarity because familiarity is, in part, achieved through repetition and repetition tends to increase comprehension in situations where the information presented is new but developmentally appropriate. So even if children are attracted to the familiar, the attention documented by these researchers could be evidence for comprehension, and ultimately, for learning.

Overall, the research indicates that children ages 1-2 are making meaning from what they watch. The tricky part is measuring exactly what meaning they are making and whether such meaning corresponds to the particular things a program is attempting to teach. Research has not yet successfully addressed that question.

### Language

There is ample evidence that young children pick up language from television, especially if viewing is used as an opportunity for parent-child conversations, with children turning to the adult to ask questions or share observations or reactions. (Lemish & Rice, 1986). In tests measuring use of language in naturalistic play settings, several programs were positively associated with language development, including *Dora the Explorer*, *Blue's Clues*, *Arthur*, *Dragon Tales* and *Clifford* (Linebarger & Walker, 2005).

The Linebarger & Walker study is particularly noteworthy because it is one of the few to actually use specific programs targeted at very young children. It tracked two facets of language - vocabulary size and degree of expression (frequency of utterances). While the series listed above scored positively on both measures and *Teletubbies* scored negatively on both measures, the research produced mixed results for *Sesame Street* and *Barney and Friends*, with scores positive or neutral on one measure and negative on the other.

Because of this study's importance and because the initial findings on *Sesame Street* contradicted earlier research, there has been a good deal of speculation on exactly what factors produced these mixed results. All explanations focus on differences in content. Several make logical sense and would seem to have merit, but none of them are free of inconsistency, so none are completely convincing.

For example, the traditional narrative structure of *Arthur*, *Dragon Tales*, and *Clifford* might support language acquisition, but the same results were found for *Dora the Explorer* and *Blue's Clues*, which do not tell stories in traditional ways. In contrast, *Dora the Explorer* and *Blue's Clues* use direct invitation to invite interactive problem-solving, but *Arthur* and *Clifford* do not. *Sesame Street* was not intended for children under three, so that might account for its negative results, but neither was *Arthur*, which generated a positive outcome.

In another interesting twist, researchers found that with repetition, *Sesame Street* was also associated with a higher rate of vocabulary growth, so repetition might be a key to children's ability to learn from the screen. Fortunately, with the availability of DVDs, videotape, and digital video recording, repetition of programs is increasingly routine.

It is important to note that Linebarger and Walker were measuring rates of growth. The results do not provide evidence that any television series impeded language development, only that some programs produced a greater rate of language development than others.

It could simply be that children with more quickly developing language skills are more drawn to the story-based or language-intensive programs, or that the relatively small, homogenous sample size (51 Caucasian middle- to upper middle-class families) produced results unique to that group but not generalizable to the greater population. Whatever the

reason, the Linebarger & Walker study demonstrates that children will repeat words that they hear in TV programs, and that television has the potential to aid in language development if the content and program design meet children's needs.

A study by Krcmar & Grela (2004) confirms the ability to learn vocabulary in children aged 22-24 months. Researchers introduced children to a nonsense word – "dak" – as a label for a novel object (i.e., something that the children had never seen before), using a live adult, an adult on a TV screen, and the word dubbed into an episode of *Teletubbies*. They found that children were equally attentive in all three situations, but children younger than 22 months were significantly more likely to learn the word from the live adult than from *Teletubbies*. However, after 22 months, children learned well from all situations.

Ironically, this study has been cited as proof that *Teletubbies* is not educational. However, given that the original target audience for *Teletubbies* was two-year-olds and two-year-olds learned the target word, Krcmar's & Grela's research proves the exact opposite. A developmentally appropriate and carefully designed program for two-year-olds (in this case, *Teletubbies*) can, indeed, be educational.

### Foreground vs. Background

Very little research on television and young children distinguishes between exposure to background television – that is, programs to which a child is not paying active attention or for whom the content was not produced – and foreground television, that is, programs intended for infants and toddlers to watch. But this distinction might be critical in terms of the impact of television on infants and toddlers.

Though it is possible that background media could indirectly teach a child to shut out external distractions and concentrate more focus on what they are doing, it is more likely that background television presents inappropriate content and distraction (Anderson & Evans, 2001). Anderson & Pempek (2005) found a 22% reduction in parent-child interaction, shorter play episodes, and less focused attention to a toy or object during object play when TV was on in the background.

### Adult Interaction

Nearly all researchers agree that active adult presence is an important mediator of whether or not children under two learn from TV. Adults who interact with children and serve as a bridge to the content on screen by repeating words, dancing or singing along, asking questions, and responding to the questions and reactions of children significantly enhance the educational value of the viewing experience (Thakkar et al 2006; Barr et al, 2006; Kobayashi, 1989; Troseth et al, 2006). Relevant props to help children process what they are seeing while they are watching, might also enhance the learning (Barr et al, 2006).

Troseth et al (2006) provides one of the best explanations for why adult interaction is so important. They proposed that infants rely on social cues (e.g., eye gaze, gesture, emotional displays) to learn. Video can provide such cues, but in a limited way. For example, children exposed to video of an adult reacting negatively to a toy later avoid that toy when presented with it in real life (Mumme & Fernald 2003). However, results do not hold true in situations where the adult models a positive reaction, and Troseth et al suggest that the learning of negative social cues is short term.

More often, television does not provide emotional cues because it does not have the capacity to be interactive. The television set cannot provide immediate response to children's own actions, e.g., when a child smiles, characters don't necessarily smile back.

According to Troseth et al, the fact that television does not supply emotional cues renders it ineffective as an educational tool for children under two. This may be an overstatement given evidence from research on other factors, and the fact that even in Troseth's sample, some children (27%) did learn from video.

### Video Deficit

Anderson & Pempek (2005) coined the phrase "video deficit" to describe a pattern identified in multiple research studies in which very young children did not learn as well from television as from equivalent live situations (Troseth et al, 2006; Carew, 1980; Anderson & Pempek, 2005; Barr et al, 2006). Krcmar & Grela (2004) conclude from their study of language acquisition that "Initial language seems to be learned best from social interaction, and not from television." They go on to say that because language development is such an essential part of

early childhood, "television is best reserved for children who have reached their second birthday."

This is not to say that children do not learn from video. Indeed, there is much evidence to the contrary. In some situations, it seems to depend on what children are expected to learn. Anderson & Pempek (2005) indicate that with repetition, learning from video can even match live experience. Krcmar & Grela's own evidence indicated vocabulary acquisition from TV by 22-24-month-olds. Nevertheless, there is strong evidence in support of the existence of a "video deficit" for children 0-24 months. That deficit seems to disappear by age three.

Despite this clear evidence, no one has yet been able to explain exactly why seeing something on a screen is different than watching it live, though research has indicated that it is not an issue of dimensionality (2-D vs. 3-D) (Troseth et al, 2006).

It is also important to note that acknowledging a video deficit in no way implies that educational television is harmful. There might be significant cause for concern if educational television viewing was replacing real-life experiences, but as demonstrated in the previous section, the evidence for such displacement is weak.

### Reading

Almost no research has directly addressed the relationship between early TV viewing and later reading preferences or skills. For older children, research suggests that the most important variable is whether the child is viewing educational or entertainment programs, with educational television linked to more time spent reading and entertainment fare negatively associated with reading (Wright & Huston, 1995; Schmidt & Anderson, 2007).

## ◆ IMITATION

TV teaches inappropriate behavior or values

- ◆ Because viewing leads children to imitate inappropriate behaviors or language.

More than a few researchers have documented instances of children under two imitating actions they have seen or words they have heard on TV (e.g., Meltzoff, Kobayashi, Lemish & Rice, Barr & Hayne). **There is no question that infants and toddlers will sometimes copy things from a screen.**

Not nearly as clear is whether or not the possibility of imitation warrants keeping children away from television until they are at least 24 months old. Though a ban on television would prevent children from copying things that might be harmful or undesirable, it would also prevent them from imitating positive models. Therefore, ensuring high quality content would seem to be a better choice than an outright ban on TV viewing for children younger than two.

## DISCUSSION

While the possibility for imitation is clearly documented, there is much less known about why children copy some behaviors (or characters or words) and not others. Research has revealed several variables, including:

- ♦ the complexity of the task - with simple tasks more likely to be imitated than multi-step tasks (Barr & Hayne, 1999)
- ♦ opportunity - for example, to taste a certain food the child must have that food made available to them
- ♦ ability - children can only copy actions of which they are physically and developmentally capable

The existence of variables demonstrates that imitation is not automatic. In no case did 100% of children copy what they saw, nor did subjects always imitate everything that was presented to them. So even if children see TV content that is inappropriate, there is no evidence that they will necessarily copy it. More research is needed to provide information that producers, parents, caregivers, and policy makers can use to better encourage imitation of positive models and prevent imitation of negative content.

It would also be helpful to have research on whether or not a child will copy a peer or an older child. Thus far, research has focused on whether or not a child will copy an adult.

## ◆ PHYSICAL & EMOTIONAL HEALTH

TV undermines physical health & emotional well-being

- ♦ Because viewing disrupts healthy sleep patterns
- ♦ Because viewing can harm to developing eyes
- ♦ Because viewing leads to later health problems, including obesity, autism, and attention disorders
- ♦ Because viewing violent media can lead to increased aggression and fear

Claims about physical and emotional harm from television have become media staples. The fear generated by dire headlines declaring that television causes everything from ADHD to the death of reading might sell papers, but it does not accurately reflect what research has actually demonstrated, which, because of the small number of studies, is not much.

Currently there is no credible research linking early TV viewing to conditions like autism or ADHD. Research on obesity has found a link between viewing and weight, but not due to a lack of physical activity. Instead, the research findings suggest that children would be better off if they did not have television sets in their bedrooms. Also, parents should pay close attention to what their children watch - content, not viewing time, determines impact.

There is only one study related to sleep, and none looking at children under two and violence. Because of the dearth of relevant research, recommendations about viewing should be made with caution, but **at this point there is no reason to think that moderate viewing of educational programs is harmful to children's physical or emotional well-being.**

## DISCUSSION

### Eyesight

Though baby boomers might remember admonishments to move back from the screen, there is no evidence that average amounts of television viewing harms eyesight (Kobayashi, 1989).

### Sleep

In a survey of national data, Thompson & Christakis (2005) found an association between television viewing and irregular naptime and bedtime schedules. This would seem to be more of a media management or parenting skills issue than anything having to do with the medium of television.

### Obesity

The research related to obesity, almost none of which involved children under two, reveals a somewhat contradictory picture. Explanations related to viewing time or displacement are discounted, but content (e.g., advertising for junk food) and eating while viewing might have an impact ("The Role of Media in Childhood Obesity", Kaiser Family Foundation, 2003).

Vandewater & Huang, 2006 (cited in Barr et al, 2006) found that when parental obesity is taken into account, television viewing hours do not significantly relate to increased odds of children being overweight. In this case, the existence of a correlation between TV use and obesity might be because obese parents watch a lot of TV, but it is parents' obesity and eating patterns that influence children's weight, not television.

In a study that included, but was not restricted to children under two, Burdette and Whitaker (2005) found that TV viewing time was not related in any way to time spent playing outdoors nor to body-mass index (BMI), i.e., those who watched more were not any more or less likely to show symptoms of obesity as measured by BMI.

In contrast, Dennison, Erb, & Jenkins (2002) found that increased viewing time did correlate with increased obesity, though it is instructive that the most significant variable was whether or not children had a TV set in the bedroom. This would suggest that advocates should advise parents to remove TV sets from children's bedrooms, but it does not provide strong support for a ban on viewing.

### Autism

In 2006, Cornell economist Michael Waldman (along with School of Management colleague, Sean Nicholson, and their research assistant, Nodire Adilov) conducted a study purporting to prove that recent increases in autism were caused by increases in television viewing by children age 0-3. The selection and analysis of data was so flawed (see Appendix A) and the claim deemed so off base that medical experts and autism advocacy groups have completely dismissed it. There is no reason to believe that TV viewing leads to autism.

### Attention Disorders

Though almost no research exists on the relationship between early television viewing and attention disorders, the issue has received an incredible amount of publicity. This publicity is the result of a single, significantly flawed study.

Using data analysis of national statistics (not experimental trial) Dimitri Christakis et al (2004) identified a link between viewing television at ages 1 and 3 and the development of ADHD by age 7, claiming that for every additional 15 minutes per day of television viewed, the likelihood of ADHD increased. The methods and critiques of this study are discussed in detail in Appendix B. Because its findings have not been replicated, and, in fact, have been contradicted by at least two other studies (Stevens & Muslow, 2006 and Obel et al, 2004), the Christakis findings should not be taken as strong evidence that any link exists between TV viewing and attention disorders.

### Violence

As Anderson & Pempek (2005) point out, the concern about children witnessing media violence is near the top of the parental concern list, but there have been no studies on the impact of media violence for children 0-24 months. The closest available review is for preschoolers (3-5 year olds) which found that, "There is minimal experimental evidence that television viewing increases children's display of aggression." (Thakkar et al, 2006)

These results stand in contrast to an overwhelming amount of research with older children indicating a clear correlation between media violence and an increased propensity for aggression. There is also some evidence that viewing of violence can evoke fear and lasting trauma (see, for example, the work of Joanne Cantor).

Because much of the other research on TV for children under two emphasizes the importance of content, it is reasonable to believe that violent content might affect children differently than soothing or pro-social content, and that the effect might be negative.

## BRAIN DEVELOPMENT

TV undermines cognitive development and impedes the ability to learn

- Because viewing changes the brain in harmful ways.

Despite assertions that early television viewing is “hard-wiring dependence on media before babies get a chance to grow and develop,” (Susan Linn, *Washington Post*, 22 February 2007) a review of the literature commissioned by Zero to Three concludes that **“The research tells us nothing about the influence of screen media on early brain development.”** (Barr et al, 2006).

## DISCUSSION

The concern about television and brain development is probably best summarized by Jane Healy,

“Neuroscience increasingly confirms the power of environmental experiences in shaping the developing brain because of the plasticity of its neuronal connectivity. Thus, repeated exposure to any stimulus in a children’s environment may forcibly impact mental and emotional growth by either setting up particular circuitry (“habits of mind”) or depriving the brain of other experiences.” (*Pediatrics*, April 2004, p.917)

The brains of children from birth to age 5 are notable for their plasticity and extraordinary growth rate of vital neural connections. Input at this stage lays a foundation for learning capacity and more. So it would be irresponsible for adults to ignore input experienced from television.

However, it does not necessarily follow that very young children should be kept from television viewing. While Healy is concerned that a stimulus might “deprive the brain of other experiences,” research indicates that television does not displace important experiences. And given that television content could be positive, it could function to provide beneficial input for growing brains. Moreover, if the brain remains extraordinarily plastic until age five, why would limited viewing of television be permitted for children over three but not for children under two?

It might be that assumptions about negative impact on brain development are based on the outdated idea that children are vulnerable and passive victims of powerful screen media. However, according to researchers, “The early models of television effects, which implied a passive child being manipulated by the media environment, long ago gave way to models of a child who uses, processes, and makes decisions about the media information that is available.” (Huston et al, 2007, p. 48)

Those who describe television’s influence as one-way, from screen to child, are wrong. The notion that sustained attention is evidence that children are somehow mesmerized by the TV set, i.e., that their brains are being numbed or turned off, is directly contradicted by extensive evidence that attention is driven by the ability to comprehend.

Comprehension is intrinsically a two-way process. For comprehension to occur, children must bring their own prior knowledge to the viewing experience and use it to make sense of what they see. It is an active process. So attention to television in no way implies that the brain is not receiving beneficial stimulus. There is simply no evidence to support the notion that moderate amounts of TV viewing re-wires brains in harmful ways.

## ADDICTION

- TV viewing will produce media addicted or media-dependent adults
- ♦ Because viewing habituates children to viewing

There have been no studies linking TV viewing prior to a child's second birthday to compulsion or time spent viewing later in life. Nothing about early viewing prevents the establishment of healthy viewing habits and **research does not support age as a primary variable in predicting or establishing viewing habits.**

## DISCUSSION

### Predictors of Viewing

Research has revealed very specific predictors of amounts of viewing, none of which include whether or not a child begins viewing prior to age two. Some demonstrated predictors include:

- ♦ cognitive abilities (people don't watch what they don't understand, so for young children, viewing time tends to increase as cognitive abilities increase)
- ♦ activities outside the home (e.g., children's viewing time decreases when they enter school; preschoolers who stay at home watch more than those who attend day care)
- ♦ social factors (e.g., parents' education level, economic status, cultural background).

(Huston et al, 2007; Anderson & Pempek, 2005; Certain & Kahn, 2002)

One study did link viewing time for infants and toddlers with later viewing patterns, finding that those who viewed more as very young children also viewed more than their peers as they aged (Certain & Kahn, 2002). However, the study does not provide evidence that early viewing causes later viewing patterns that would not have occurred had viewing started at a later age. Also of note in this study is that for children younger than one, significant TV time is not an issue at all. They found that a whopping 83% of children under 11 months watched no TV. Between 12 and 23 months, 52% did not watch.

### Documenting Addiction

The assertion that there is addiction to TV is controversial. It is undeniable that Americans watch a lot of television, but simply engaging in a behavior does not equate to addiction. For example, a factory worker on the job 10-12 hours a day is spending a lot of time working, but we wouldn't necessarily label them as "addicted" to work.

Communication researchers Robert Kubey and Mihaly Csikszentmihalyi (2002) have suggested that, for some people, TV viewing fits the definition of addiction in that they spend more time viewing than they intend and have made unsuccessful attempts to reduce viewing. However, they provide no reliable numbers for how many people might fit this category nor do they suggest specific testable factors that might produce the "addiction." They further acknowledge that "addiction" is an "imprecise" term and never suggest that it includes the kinds of physical or chemical changes in the brain associated with addiction to substances. Moreover, they never examine the age of first viewing as a variable, so even if one accepts their assertion that television addiction exists, their work provides no evidence that such addiction is in any way associated with TV viewing by children under two.

The idea that early viewing might lead to TV addiction seems, in part, to be based on depictions of television as "the plug-in drug" (Marie Winn) and an image of children mesmerized in front of the screen. The research evidence, however, does not paint a picture of children "glued to the set."

Television programs certainly use motion, editing, and unusual sounds to attract and keep children's attention, but dozens of observational studies indicate that in normal viewing, young children's attention is sporadic and often active (Götz, 1999; Anderson et al, 1981; Kobayashi, 1989; Anderson & Pempek, 2005).

## ◆ VALUES

TV teaches inappropriate behavior or values

- ◆ Because viewing teaches children to be materialistic and unthinking consumers

Critic Susan Linn claims that "screen-saturated children will grow into screen-dependent adults without the will or capacity to question what they're being sold" (January 25, 2007, CommonDreams.org), but no research exists that backs up this claim. **To date, there have been no studies examining the relationship between TV viewing by children under two and their ultimate value system, including consumer behavior or values governing materialism.**

## DISCUSSION

Presumably concerns about consumerism are based on both formal and informal observations that even very young children recognize logos and voice desire for specific brands. Constant repetition of commercial messages indicating that children are valued according to what they own or that parents demonstrate love according to what they purchase for children might, indeed, be detrimental influences on children's ideas about the world.

However, the assertion that these beliefs are being internalized during the act of TV viewing is based on several very shaky assumptions:

1. That children under two are actually watching commercials. With an ever increasing array of commercial-free program blocks and DVDs for children 0-5, there is no reason to automatically assume that infants and toddlers who view are watching commercials.
2. That children under two understand the materialistic values being communicated. Given that preschoolers often don't understand the selling intent of commercials, this is unlikely.
3. That values communicated in media would override values communicated by parents or caregivers who presumably don't want their children to become mindless consumers.

It is certainly possible for children to associate a favorite character with pleasure and to assume that anything associated with that character would also produce pleasure. It is also common for children to work through things they have seen on TV by playing with character-toys from their favorite programs. So the things that a child sees on TV might very well influence their requests to parents and caregivers. However, given the finding by researchers that children learn better from live people than from video, the influence of adult behaviors and values is a much more likely and compelling explanation for attitudes towards materialism than is TV viewing.

## CONCLUSION

Like the children it studies, the body of research on television and children under two is small and in a nascent stage of development. At this point, conclusions should be drawn with a great deal of caution.

Nevertheless, there do seem to be some clear preliminary findings:

1. In moderation, television viewing is not displacing more valuable educational experiences.
2. When it comes to the effects of TV viewing, content is king. What children watch matters – a lot. As Schmidt and Anderson put it, “the medium is not the message; the message is the message.” (2007, p.78).
3. Infants and toddlers can learn from television. They make meaning from what they watch and pay more attention to things they comprehend than things beyond their comprehension, indicating that the process of viewing is active, not passive.
4. Infants and toddlers learn more from television when adults are present, engaged, and focused on helping the child connect information on screen to real life.
5. Young children learn better from human interaction and multi-sensory interaction with the real world than they do from television. This does not mean that a moderate amount of viewing is harmful, only that claims about early viewing as an effective way to build traditional cognitive skills should be treated with skepticism.
6. Children’s capacity to learn from the television increases with age. It is unlikely that there is significant educational benefit to viewing prior to age one.
7. In moderation, television viewing does not re-wire children’s brains in negative ways.
8. Educational, age-appropriate television does not harm children’s physical health or emotional well-being.

The displacement justification for the AAP’s “no TV under two” policy is not supported by the evidence in available research. The research does suggest that viewing should be done in moderation, that the content should be carefully selected, and that adults should be present and active.

## AFTERWORD

### Who Benefits?

If the basis for the AAP's "no TV under two" policy is not substantiated by the evidence, why do so many people continue to cite it as "gospel"? When shaky, preliminary, or limited data is used to make definitive or broad assertions, it is especially important to ask who benefits from making these assertions. Of course, attributing motives to individuals or organizations is, at best, speculation and should be avoided. However, there are structural issues that inform the debates about television and children and these are worth a brief mention.

Given its ultimate goal to encourage more interaction between parents and children, the AAP could have said, "play more peek-a-boo with your child" instead of "no TV", but "peek-a-boo" does not make for very compelling headlines. Drama, anxiety, and outright fear sell. So diverse media, from newspapers to talk shows to blogs, continue to repeat dire warnings about television, sometimes even distorting the research that is the subject of their reporting. The motive is profit, and that motive sometimes overrides accuracy or in-depth investigation of claims about TV and kids. Therefore, policy should never be based on media reporting of research.

In addition, blaming TV takes lots of people off the hook. It minimizes other possible factors influencing child welfare, including suburban lifestyles that require hours each day in a car (which for babies & toddlers means strapped into a car seat and not moving), unsafe neighborhoods that prevent outdoor play, parenting styles, lack of a living wage, the frequency of divorce and single-parent households, and more. It is much easier to say "keep the kids away from the TV" than to address difficult societal issues.

### So What?

So what if the reasons given for the AAP's "no TV under two" recommendation are not supported by research? Wouldn't it be prudent to decrease families' use of television anyway? Perhaps. But it is just as likely that the AAP's recommendation will backfire.

When recommendations imply that exposure or time, not content, is what matters, many parents feel like they have two choices. Either turn the set off entirely, a strategy that very few parents are likely to do (and that is counter to the goals of media literacy because you can't teach someone to be literate without exposing them to what you want them to be able to "read" and "write"), or leave the set on and don't worry about the content because it doesn't matter. After all, if the harm is caused just by having the set on, why bother finding (or learning how to find) age-appropriate educational programs?

Parents do not need to be scared into introducing healthy practices into their homes. The vast majority of parents want to do good things for their children. What they need is accurate information, workable strategies, and alternative media content that is good for their kids. The AAP policy provides none of those things.

In addition, calls to ban television create significant obstacles for producers interesting in making non-commercial, developmentally appropriate, educational television for infants and toddlers. It is certainly much less expensive to produce entertainment, so if content doesn't matter, why should anyone fund educational programs?

No doubt the AAP and other critics have children's best interests at heart, but a "no TV" recommendation is not the best way to serve those interests.

Television is an indisputably powerful medium, and we should all be concerned about its considerable presence in our society. When it comes to children under two, that concern would be served best by demanding high quality programs and by teaching parents and care providers how to discern developmentally appropriate, educational content from unsubstantiated marketing hype or content designed for older viewers.

## **APPENDIX A: Problems with Recent Research on TV and Autism**

Cornell economist Michael Waldman's 2006 article, "Does Television Cause Autism" has garnered much media attention and continues to be cited by TV opponents as proof that TV viewing is a major cause of the recent rise in autism. Waldman statistically links the growth of cable TV with a presumed increase in viewing and a correlated increase in autism. However, the methodology employed is highly flawed. Below are a few of the weaknesses that make the conclusions of this study unreliable:

1. The study's "empirical methodology assumes that autistic children spent their first three years of life in the same county where they reside when they are recorded in our data set," i.e., when the child is 8-years-old. Given the mobility of American families today, that is an unwarranted assumption. If that particular assumption proves not to be true, then nearly all of the data correlating increased autism with increases in cable penetration are invalid.
2. The conclusion is, in part, based on the assumption that the introduction of cable increased the amount of time that children aged 0-3 spent in front of the screen, but the authors provide no concrete evidence that this is the case. They do provide lots of speculation, much of which is very weak:
  - a. *They assume that young children watched more because cable provided more programs targeted at children.* Except for Nickelodeon, which was founded in 1979, cable did not, in fact, provide more children's programs. Disney first offered a channel in 1983, but other channels are much more recent – many founded after the time period under review (which ended in 1989). Specific programs criticized by the authors, like *Teletubbies*, weren't available until the 1990s or later.

In the time period under review, the only program specifically made for very young children would have been *Mister Rogers' Neighborhood*, and that was available without cable. This is significant because it suggests that if viewing rates did, indeed, rise, children aged 0-3 were likely watching things that were not developmentally appropriate. So the evidence presented by the authors cannot substantiate any conclusions about the possible impact of viewing developmentally appropriate television. The fact that the authors attack *current* programs designed for young children that did not exist at the time period studies weakens their credibility.

In addition, the authors did no investigation to find out which channels were included in the packages that households actually bought. That is, they assume that every cable household subscribed to a package that included Nickelodeon. That assumption is ludicrous. Even today, when Nickelodeon is the undisputed frontrunner of children's cable channels, the service does not have 100% carriage in cable-receiving households.
  - b. There is no attempt to determine what other consistent factors accompanied the introduction of cable besides increased viewing. The authors control for variables like race/ethnicity, educational level, gender, etc., but they don't look for specific variables related to cable. For example, what if the materials used in the physical cable turn out to be toxic? There is no evidence that this was the case, but researchers making the claims in this study would need to eliminate such possibilities.
  - c. The authors look at California regional centers serving people with disabilities and their families. From their examination of data from 2005, the rate of autism for those born in 1980 was 38% higher than those born in 1970. But in 2005, we are looking at adults, and no one has tried to determine whether or not these specific people actually watched TV from birth to age three. If the authors are correct about the link between cable, viewing time, and autism, then those clients with autism who were born in 1980 would have to have been in families who were early adopters of cable. Given the expense involved, and the added medical expenditures in caring for a child with a disability, this may not be likely.

2. The authors acknowledge that the growth of VCRs paralleled the growth of cable, but completely ignore how this fact weakens their argument. Keep in mind that the researchers found a correlation between cable penetration and an increase in cases of autism and suggest that the mechanism producing the increase in autism was an increase in viewing.

However, the presence of a VCR could certainly increase screen time, but there is no statistical correlation between the presence of VCRs and increased autism rates. Had the authors wanted to, they probably could have applied their methods to analyzing VCRs, because in early years VCRs were expensive and therefore much more likely to be present in wealthy homes. A survey of wealthy counties might have provided statistically valuable evidence, but the authors chose not to examine this variable.

3. Other than anti-television ideology, there is no clear reason given for why the authors focus in on television as a factor rather than on other changes that might affect families with young children. They discount other researchers who have pointed to things like increases in air pollution. In fact, there are dozens of other innovations that became increasingly common during the time period in question: artificial sweeteners, new synthetic fibers, disposable diapers, cordless phones, etc. While there is no specific evidence suggesting that these mundane items are in any way linked to autism, they are at least reasonable variables, which raises the question, of all the changes that happened between 1972-1989, why focus on television?

5. The authors also use precipitation rates as a way to track increased viewing. No one argues with the general conclusion that people who are home more watch more. The question is whether snow or rain leads infants and toddlers to be home more. It might, but there is no way to document that behavior from the statistics used in this study because precipitation was measured by amount rather than by time.

That measure is fuzzy. An all-day drizzle could keep a child inside all day but not seem like much precipitation. Or it could absolutely pour for two hours and be fine the rest of the day, which might not alter a child's viewing patterns at all. Nor can precipitation account for time that children spent indoors because they prefer an air conditioned home to sunny, hot, or humid conditions outdoors.

The authors' evidence demonstrates that children who live in places where it rains or snows spend more time indoors on days when the weather is bad than when it is nice. But they do not prove that such children spend more or less time indoors than other kids.

6. Research cited to back up conclusions is unconvincing at best and misleading at worst. The authors rely heavily on Christakis, et al., which is, itself, weak (see Appendix B). The authors also cite negative conclusions about television by Anderson and Pempek, but ignore neutral or positive assertions. Finally, they cite Zwaigenbaum but reverse the cause. Zwaigenbaum says that having autism causes children to disengage from visual stimulus more slowly. These authors turn that around to say that slow disengagement from an appealing TV screen causes autism.

This kind of selective use of research should give rise to a great deal of skepticism. At worst it is purposeful. At best, it reflects authors who are economists and not really familiar with the breadth of research in other fields (like developmental psychology).

7. This study lacks any speculation about a mechanism, i.e., they have no explanation for how is it that TV viewing could possible cause autism. At one point the authors offhandedly seem to suggest it might have something to do with the motion of images on a two-dimensional screen, but that is a content-based explanation and they did not look at content. If those who were watching were looking at *Mister Rogers' Neighborhood*, fast-paced motion or quick editing would not have been present.

Because there is no suggestion of a possible mechanism, the authors cannot account for autism in children who did not watch TV. And even by their own estimates, increased TV viewing would account for less than half of the increased number of children with autism. So what accounts for the rest?

The authors begin by noting that over past 30 years, there has been a thirty-fold increase in autism. Their footnote points out that the increase happened in many countries around the world. Yet, they make no attempt to document whether or not these countries had similar growth of cable.

8. Some of the reasoning used by the authors is laughable. For example:
  - a. They note that autism was first identified by researchers in 1943/44 "so although it is not necessarily the case, it seems reasonable to think that prevalence of the condition was very low both during and prior to this time period." This is ridiculous reasoning. We did not recognize or understand germs until Louis Pasteur came along. Does that mean they didn't exist or make people sick?
  - b. The authors look to the Amish, who don't have TV and don't have high rates of autism. While that may be an interesting observation, the Amish don't wear nylon panty hose either. So could nylon cause autism? More seriously, the Amish intermarry at high rates, protecting a limited gene pool. They eat a very different diet than many other Americans, have significantly different sleep patterns, exposure to noise and light, etc. – all of which are at least as plausible if not more plausible explanations than the TV conclusion.

9. It is important to ask why this theory is being proposed by economists rather than by medical researchers or developmental psychologists. The authors acknowledge that the medical community has not supported their assertion that TV viewing causes autism. Given their history of opposition to TV, you would expect medical organizations like AAP to wholeheartedly embrace any viable theory that cast television as a problem, but they don't embrace this research.

It isn't that other researchers have not considered a possible link between television and autism, but perhaps because other environmental factors (like the cold mother) have been proven to be wrong, or because the most recent evidence points to physically identifiable conditions in the brain, it would be very difficult to imagine a way that video screens could possibly cause the kinds of physical symptoms that medical researchers have identified in autistic children.

10. The study's reliance on ATUS (American Time Use Survey by the Bureau of Labor Statistics) is an odd choice for research looking at viewing rates in the 1970s, 80s, and 90s. , ATUS did not start gathering data until 2003. In addition, ATUS measures self-reported adult behavior. It does not track children's behavior at all. The authors narrowed their focus to adults with young children in the household, but ATUS data provides no indication of what children were doing in relation to the screen (or anything else).

11. The authors selectively report data. For example, Oregon tracked only counties that reported high rates of autism. The authors note that all those counties had high precipitation. But that does not mean that all counties with high precipitation had high autism rates. If there were counties with high precipitation rates but low autism rates, their theory would be rendered invalid.

12. The authors found a positive relationship between autism and precipitation in Oregon and Washington, but not in California (p. 27). They dismiss this with speculation that other variables must be present in California that throw off the data. But then they go on to pool the data of the three states and claim that the pooled numbers support their theory. That pooling completely obscures the fact that they got two positive results and one negative result – which is much less convincing than they lead readers to believe. Combining the three into one does not change the negative result into a positive.

While no one can definitively say that there is no link between TV viewing and autism, this single study, which is not backed up by a body of other research and which is not peer reviewed, in no way provides convincing evidence that TV viewing causes autism.

## **APPENDIX B:**

### **Does TV Cause ADHD? An Assessment of Christakis et al**

#### The Study

Using the 1979 National Longitudinal Survey of Youth, Christakis and his team identified seven-year-olds whose mothers reported their children as having attention problems. Using the same data set, they examined the amount of average daily television viewing time reported by mothers for children at ages one and three. They found that the amount of television viewed at these ages reliably predicted the existence of ADHD at age seven. They also found that every 15 minutes of increased time predicted an increase in the likelihood that children would develop attentional disorders.

#### The Problems

There are significant reasons not to accept the Christakis study as convincing proof of a link between TV viewing and attentional disorders, including:

##### Cause and Effect

At best, what this study found was a correlation. Even the researchers acknowledge that "they cannot infer causal inferences from these associations." In other words, "attentional problems might lead to television viewing rather vice versa."

So instead of demonstrating that television is a problem, this evidence could be used to argue that TV is a solution. It might be that children with attentional disorders are drawn to television because it effectively communicates to them, or parents of hyperactive children use television because it is an effective calming tool.

##### Time as Mechanism

This study provides a time-based correlation between viewing and ADHD. However, nearly all research on preschoolers concludes that content, not time, is the key variable when it comes to effects. Even Christakis' own review of experimental trials involving preschoolers found that "any effect that television programs may have on self-regulation may be because of their content rather than their pacing" and "television content is more important than viewing time" (Thakkar et al 2006). No explanation is ever offered on why this study should be weighted more than the dozens suggesting that time is not a significant variable.

##### Content

In attempting to offer a logical and plausible mechanism to explain why TV viewing might lead to attention problems, these researchers point to pacing, noting that the "rapidly changing images, scenery and events" can be "over-stimulating yet extremely interesting." This is a content based explanation.

However, the study did not examine content in any way. They only measured viewing time. They have no way of knowing whether or not the programs viewed were rapidly paced or not. So the mechanism they propose undermines their own conclusions about time being the salient variable.

Moreover, the data collected was from the 1970s, long before there existed any TV programs designed for children under two. So the study says nothing about what might happen as the result of viewing developmentally appropriate programs.

Even if one fully accepts the study's results, the conclusion cannot be generalized to all TV, but rather, would apply only to television that was "fast-paced." In yet another problem with the study, "fast-paced" is never defined. Clearly, current series specifically designed for young children, like *Teletubbies* or *Dora the Explorer*, are not fast-paced. Even *Sesame Street*, which has been labeled fast-paced by critics, is not in fact rapid. Its fastest segments change scenes about 7 times in 30 seconds (compared to a typical commercial on MTV, which might include 29 edits in 30 seconds).

## Replication

If these results are accurate, we would expect that they would be replicated in other research, but in fact, two other studies directly challenge Christakis' findings (Stevens & Muslow and Obel et al). Among other things, these researchers question the validity of Christakis' definition of ADHD as well as the validity of statistical analysis techniques employed. Additional critiques have been pointed out by readers of *Pediatrics* magazine, and are available at: <http://pediatrics.aappublications.org/cgi/eletters/113/4/708#827>

Not only have the Christakis results not been replicated; they are seemingly contradicted by earlier research which found that viewing well-designed, age-appropriate educational programs can increase attention (e.g., Daniel Anderson's research on *Mister Rogers' Neighborhood*).

Endorsements of the study's conclusions come primarily from cultural critics, not researchers. For example, Christakis' *Pediatrics* article cites Jane Healy's *Endangered Minds* as providing evidence that backs up its own conclusions. Citing Healy as a source is misleading, because though she [very selectively] reviews the work of others, she has never conducted her own research on the topic nor published the results of research in a peer-reviewed journal.

## Parental Reporting

This study's data analysis is heavily dependent on accurate parental reporting of attentional disorders. Christakis et al did not locate 7-year-olds who had been clinically diagnosed with ADHD and then examine how much TV they had viewed as toddlers. Rather, they relied on mothers' interpretations of their children's behavior.

Unfortunately, many adults have unreasonable developmental expectations of children being able to sit still or pay attention to things they find boring ("What Grown-Ups Understand About Child Development," Zero to Three & Civitas, 2000). So use of self-reporting as the exclusive source of information about something as complex as attentional disorders is unreliable.

Moreover, many educators, parenting specialists, and psychologists believe that ADHD is significantly over-diagnosed (see, for example, the work of Dr. Frank Lawlis). So the fact that Christakis' numbers of children with attention deficits matched current estimates of children who are being medicated for ADHD (about 10% of children in the U.S. according to the study) is suspect rather than proof that this research method is reliable.

Given all these problems, it is inappropriate to make assertions with any degree of confidence about a relationship between early TV viewing and attention disorders.

## BIBLIOGRAPHY

- Anderson, Daniel R., Elizabeth Lorch, Diane Erikson Field, Jeanne Sanders (1981) "The Effect of Television Program Comprehensibility on Preschool Children's Visual Attention to Television" *Child Development*, 52 (1), 151-157
- Anderson, Daniel A., Elizabeth Lorch, Patricia Collins, Diane Erikson Field, John G. Nathan (1986) "Television Viewing at Home: Age Trends in Visual Attention and Time with TV" *Child Development*, 57 ( ), 1024-1033
- Anderson, Daniel R. and Marie K. Evans (2001 October/November) "Peril and Potential of Media for Infants and Toddlers" *Zero to Three*
- Anderson, Daniel R. and Tiffany A. Pempek (2005) "Television and Very Young Children" *American Behavioral Scientist*, 48(5), 505-522
- Barr, Rachel and Harlene Hayne (1999) "Developmental Changes in Imitation from Television during Infancy" *Child Development*, 70(5), 1067-1081
- Barr, Rachel, Daniel Anderson, and Deborah Linebarger (2006 May) "What the Research Tells Us About the Impact of Media on Young Children" *Zero to Three*
- Burdette, Hillary L. and Robert C. Whitaker (2005) "A National Study of Neighborhood Safety, Outdoor Play, Television Viewing, and Obesity in Preschool Children" *Pediatrics*, 116(3), 657-662
- Callaghan, Tara C., Philippe Rochat, Tanya MacGillivray, and Crystal MacLellan (2004) "Modeling Referential Actions in 6- to 18-Month-Old Infants: A Precursor to Symbolic Understanding," *Child Development*, 75(6), 1733-1744
- Certain, Laura K. and Robert S. Kahn (2002) "Prevalence, Correlates, and Trajectory of Television Viewing Among Infants and Toddlers" *Pediatrics*, 109(4), 634-642
- Carew, Jean (1980) "Experience and the Development of Intelligence in Young Children at Home and at Day Care" *Monographs for the Society for Research in Child Development*, 45 (6-7) 1-115
- Christakis, Dimitri A., Frederick J. Zimmerman, David L. DiGiuseppe, and Carolyn A. McCarty "Early Television Exposure and Subsequent Attentional Problems in Children" *Pediatrics* 113(4), 708-713
- Comstock, George and Haejung Paik (1991) *Television and the American Child*. San Diego, CA: Academic Press
- Courage, Mary L., Greg D. Reynolds and John E. Richards (2006) "Infants' Attention to Patterned Stimuli: Developmental Change From 3 to 12 Months of Age" *Child Development*, 77(3) 680-695
- Dennison, Barbara A., Tara Erb and Paul Jenkins (2002) "Television Viewing and Television in Bedroom Associated with Overweight Risk Among Low-Income Preschool Children" *Pediatrics* 109(6), 1028-1035
- Götz, Maya (1999 ) "Children are Enchanted, Parents Concerned" *IZI* (special English edition, 12/1999/2)
- Gram, Malene (2002) "Terrible Teletubbies?: Analysis of the British Debate in the Spring and Summer 1997 on a Recent Children's Television Programme" *European Studies*, Series of Occasional Papers, No. 33
- Höller, Claudia and Sabine Müller (1999 ) "Eh-Oh - It's Teletubby Time" *IZI* (special English edition, 12/1999/2)
- Howard, Sue and Susan Roberts (2002) "Winning Hearts and Minds: Television and the Very Young Child" *Contemporary Issues in Early Childhood*, 3(3), 315-337
- Huston, Aletha, David Bickham, June H. Lee, John C. Wright (2007) "From Attention to Comprehension: How Children Watch and Learn from Television" in *Children and Television: Fifty Years of Research*, Norma Pecora, John P. Murray, and Ellen Ann Wartella, eds., Mahwah, NJ: Lawrence Erlbaum, pp. 41-63
- Kobayashi, Noboru (1989) "Infants in the Age of Television: Studies in Japan" presented at International Institute of Communications Annual Conference, 1989. Available at [www.childresearch.net](http://www.childresearch.net)

- Krcmar, Marina (2004 June) "Teletubbies Teaches First Words?" *Literacy Today*, 39
- Kubey, Robert and Mihaly Csikzentmihalyi (2002 February) "Television Addiction is No Mere Metaphor" *Scientific American*
- Legerstee, Maria and Jean Varghese (2001) "The Role of Maternal Affect Mirroring on Social Expectancies in Three-Month-Old Infants" *Child Development*, 72(5), 1301-1313
- Lemish, Dafna and Mabel L. Rice (1986) "Television as a Talking Picture Book: A Prop for Language Acquisition" *Journal of Child Language*, 13, 251-274
- Linebarger, Deborah (2004 September) "Young Children, Language and Television" *Literacy Today*, Vol. 40
- Linebarger, Deborah L. and Dale Walker (2005 January) "Infants and Toddlers Television Viewing and Language Outcomes" *American Behavioral Scientist*, 48(5), 624-645
- Linn, Susan and Alvin Poussaint (1999) "The Trouble with Teletubbies" in *The American Prospect*, 10(44)
- Linn, Susan (2004) *Consuming Kids: Protecting Our Children from the Onslaught of Marketing & Advertising*, New York, NY: Anchor Books
- Meltzoff, Andrew N. (1988) "Imitation of Televised Models by Infants" *Child Development*, 59, 1221-1229
- Mumme, Donna L. and Anne Fernald (2003) "The Infant as Onlooker: Learning From Emotional Reactions Observed in a Television Scenario" *Child Development*, 74(1), 221-237
- Mutz Diana C., Donald F. Roberts and D.P. van Vuuren (1993) "Reconsidering the Displacement Hypothesis: Television's Influence on Children's Time Use" *Communication Research*, 20(1) 51-75
- Obel, Carsten, Tine Brink Henriksen, Søren Dalsgaard, Karen Markussen Linnet, Elisabeth Skajaa, Per Hove Thomsen and Jørrn Olsen (2004) "Does Children's Watching of Television Cause Attention Problems? Restesting the Hypothesis in a Danish Cohort" *Pediatrics*, 114, 1372-1373
- Pecora, Norma, John P. Murray, and Ellen Ann Wartella, eds. (2007) *Children and Television: Fifty Years of Research*, Mahwah, NJ: Lawrence Erlbaum
- Perone, Sammy and Lisa M. Oakes (2006) "It Clicks When It Is Rolled and It Squeaks When It Is Squeezed: What 10-Month-Old Infants Learn About Object Function" *Child Development*, 77(6), 1608-1622
- Rideout, Vicky, Elizabeth Vandewater, and Ellen Wartella (2003 Fall) "Zero to Six: Electronic Media in the Lives of Infants, Toddlers, and Preschoolers" Menlo Park, CA: The Henry J. Kaiser Family Foundation
- Rideout, Vicky (2006 May) "The Media Family: Electronic Media in the Lives of Infants, Toddlers, Preschoolers, and Their Parents," Kaiser Family Foundation
- Richards, John E. and Kim Cronise (2000) "Extended Visual Fixation in the Early Preschool Years: Look Duration, Heart Rate Changes, and Attentional Inertia" *Child Development*, 71(3), 602-620
- Schmidt, Marie Evans and Daniel R. Anderson (2007) "The Impact of Television on Cognitive Development and Educational Achievement" in *Children and Television: Fifty Years of Research*, Norma Pecora, John P. Murray, and Ellen Ann Wartella, eds., Mahwah, NJ: Lawrence Erlbaum, pp. 65-84
- Stevens, Tara and Miriam Muslow (2006) "There is No Meaningful Relationship Between Television Exposure and Symptoms of Attention-Deficit/Hyperactivity Disorder" *Pediatrics* 117(3) 665-672
- Taveras, Elsie M., Alison Field, Catherine Berkey, Sheryl Rifas-Shiman, A. Lindsay Frazier, Graham Colditz, Matthew Gillman (2007 February) "Longitudinal Relationship Between Television Viewing and Leisure-Time Physical Activity During Adolescence" *Pediatrics* 119(2), e314-e319
- Thakkar, Rupin R., Michelle M. Garrison, and Dimitri Christakis (2006) "A Systematic Review for the Effects of Television Viewing by Infants and Preschoolers" *Pediatrics* 118(5) 2025-2031
- Troseth, Georgene L., Megan M. Saylor, and Allison H. Archer (2006) "Young Children's Use of Video as a Source of Socially Relevant Information" *Child Development*, 77(3), 786-799

Valkenburg, Patti M. and Marjolein Vroone, (2004) "Developmental Changes in Infants' and Toddlers' Attention to Television Entertainment" *Communication Research*, 31(3), 288-311

Vandewater, Eliabeth A., Bickham, David. S., and Lee, June H. (2006) "Time Well Spent? Relating Television Use to Children's Free Time Activities" *Pediatrics*, 117, e181-e190.

Weber, D.S. and Dorothy Singer (2004 September) "The Media Habits of Infants and Toddlers: Findings from a Parent Survey" *Zero to Three*, 25(1), 30-36

Wright, John C. and Aletha Huston (1995) "Effects of Educational TV Viewing of Lower Income Preschoolers on Academic Skills, School Readiness, and School Adjustment One to Three Years Later" Lawrence, KS: Center for Research on the Influences of Television on Children

Wright, John C., Aletha Huston, Kimberlee Murphy, Michelle St. Peters, Marites Piñon, Ronda Scantlin, and Jennifer Kotler (2001 October) "The Relations of Early Television Viewing to School Readiness and Vocabulary of Children from Low-Income Families: The Early Window Project" *Child Development*, 72(5), 1347-1366

Zimmerman, Frederick J. and Dimitri Christakis (2005) "Children's Television Viewing and Cognitive Outcomes" *Archives of Pediatrics & Adolescent Medicine*, 125(7), 619-625

This document is a piece of independent scholarship produced in conjunction with consulting work that the author has done for Ragdoll, Inc., the makers of *Teletubbies*. No person at Ragdoll exerted any editorial control or had anything to do with the content of this document. The views expressed in this document are solely those of the author.