Childhood Development and Media Use: A Literature Review of the Effects of Media on Children's Physical and Psychosocial Development

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Childhood Development and Media Use: A Literature Review of the Effects of Media Technologies on Children’s Physical and Psychosocial Development

Abstract

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Television, computers, and video games are among the most widely used media activities, which engage children and adolescents for increasing amounts of time. There is a sharp increase in both the time spent and the numbers of children who use media over the past 10 years. Parents, educators, and health care providers must understand the effects that media has on childhood development and learn ways to moderate negative effects and maximize positive effects. This literature review seeks to identify the physical and psychosocial effects that media has on children and the variables of media use, which are important Variables that effect media use by children, such as age, gender, time, and content of media, are teased out of the literature to identify those that lead to health consequences. The three theoretical frameworks chosen for the paper are Social Learning Theory (SLT), Message Interpretation Process Model (MIP), and Displacement Theory (DT). The article offers recommendations to parents and health care
providers (HCP) for children’s media use. Suggestions are based on policy statements by the
American Academy of Pediatrics (AAP) and the Kaiser Family Foundation (KFF).

*Words:* children and media, screen time and effects on child development, aggression and media,
computers and development, physical factors, psychosocial factors, cognitive development and
computers, media technologies and children.
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Introduction

For the purposes of this review, media refers to both old and new media. The *Collins English Dictionary* (2010) defines media as communication, such as magazines and TV, that reaches large numbers of people. These means of communication can be thought of as old types of media. New types of media are defined by Flew (2007) as those forms of communication that possess the qualities of being digitalized, compressible, interactive, manipulated, networkable and dense. Some examples of new media are the Internet, computers, video games, and DVD’s.

In the 1920’s researchers began to ask how does media influence the behaviors of children? Children are defined as boys and girls between the ages or 2 and 18 years old. There is continued interest in this question, especially as it influences children’s development, with many of the questions unanswered owing to the explosion of media venues. With hundreds of cable and satellite TV channels, millions of DVDs, video games, cellular phones, and computers, media appears endless. It enters into most aspects of daily life with DVDs, TVs and computers central components in most family environments.

The *Kaiser Family Foundation* (KFF) surveys reveal that 99% of families with children own televisions, 97% own video players, 80% own video game systems, 86% own a computer, 82% have cable or satellite TV, 74% have internet access, and 60% have instant messaging software (KFF, 2003, 2005). The average household has 2.9 video players, 3.5 TVs, and 1.5 computers (KFF, 2005). Not only does media engage the vast majority of families, it saturates school and public environments as well. Use of media continues to grow among children in developed countries beginning at a young age (Brandtzeag, Endestad, Heim, Kaare & Torgesen, 2004b). The KFF (2006) report that in 2005 children age eight and above spent an average of 6.43 hours with media each day. de Haan and Huysman (2004) report that sleep is the only other
activity that children spend more time at than using media.

Traditional dogma posits that media “poses a danger and a threat to children” and “induces personal isolation... where children are alone... in their own private space, thus reducing their psychosocial experiences” (Heim, Brandtzaeg, Karre, Endestad, & Torgersen, 2007, p. 426). Media usage, such as TV viewing, often occurs alone in a sedentary manner. The media effects that correlate with negative health outcomes, such as obesity, aggression, and poor school performance, are a few of the health outcomes of most concern. However, as researchers gain greater insight into the consequences of media on health, evidence suggests that there may also be beneficial health effects (de Haan & Huysman, 2004). It is reasonable to assume that there are measurable effects of media usage on childhood development, though many of those effects are yet to be documented.

Assuming there are measurable effects, this paper seeks to delineate some of the variables that contribute to both the physical and psychosocial health consequences of media on children. The variables considered are the psychosocial health outcomes include time spent with media, age, gender, parental oversight, content, and context. While the variables are not exhaustive, they may provide greater understanding of the roles these factors play in the health effects of media usage. The psychosocial health outcomes identified in the literature are depression, isolation, aggression, scholastic performance, relationships, and delinquency. It appears that the time spent with media is the most important variable related to health consequences and media use. Reports in the literature include the metabolic abnormalities such as HTN, obesity, CAD, increased adiposity, and metabolic syndrome (MS).

The physical health consequences include a cluster of consequences related to metabolism and vision. These consequences include metabolic abnormalities such as
hypertension, obesity, coronary artery disease, increased adiposity and metabolic syndrome. These health effects are largely due to a sedentary life and lack of exercise.

Organizations who promote health behaviors of children, such as the *American Academy of Pediatrics*, conduct ongoing research into the health effects of media use on children. These organizations continue to report on their findings and routinely provide recommendations to parents, health care providers, and educators as to the perspicacious use of media in the home and schools. Parents have the responsibility their children to impart appropriate behavior and socialization, while ensuring that their home environment provides the opportunity for their children to fully develop emotionally and academically. Parents are arguably the most important regulators of media use by children.

Educators bear the responsibility to provide the best tools for education so that every child may attain their full academic potential. In the age when media is beginning to replace traditional teaching methods, educators must become well versed and proactive in efforts to support well designed, evidence driven media programming in education. The responsibility of health care providers is to promote positive health outcomes for children. It is up to the Primary Care Providers to become versed in the health outcomes of media on children and incorporate teaching of these concepts to families. Primary Care Providers also bear the responsibility to affect programming, school, and community policy about media use.

**Theoretical Framework**

There is no one single theoretical model that can be applied to explain the current state of knowledge. Therefore, three frameworks provide the theoretical foundation for this paper. These include Bandura’s (2008) Social Learning Theory, Displacement Theory (Moses, 2008)
and Austin’s (Arnett, 2007) Message Interpretation Process model. Each of the three theories contain separate qualities that, when used in combination, offer a better explanation of the phenomenon observed.

**Social Learning Theory**

Albert Bandura first developed the SLT in 1962. He theorizes that people learn by observing others, and thought processes are key to understanding personality (Bandura, 1986). Knowledge is acquired through observation of models. Interpersonal relations or media sources can serve as models. According to Bandura (1986), cognition, behavior, and environment influence learning and development, and are interdependent and reciprocal. For example, SLT is useful to explain and predict the media effects of TV and video games, which positively correlated with violence and aggression (Olsen et al., 2009). The repeated imprinting of a particular behavior via observation leads to assimilation of a similar behavior in the viewer. This model assumes that constant exposure to a behavior, even if the result is negative, has great impact on expressed behavior.

**Displacement Theory**

Many researchers utilize the displacement theory (DT) to explain and guide research on the effects of media on children. DT assumes that media use is a choice and that the greater amount of time children spend engaged with media, the less time that they have for other pursuits such as sports, schoolwork, and social interaction. The result of this displaced activity are increased physical and psychosocial health risks. DT is particularly useful to explain the research conclusions regarding obesity and other sedentary related disorders.

**Message Interpretation Process Theory**

Erica Weintraub Austin derived the Message Interpretation Process model from
Bandura's Social Learning Theory in order to track media effects (Arnett, 2007). Individuals apply logic-based and affect-based filters to the messages contained within media (Arnett, 2007). Logical comparisons concern an individual’s reflection of how a message relates to a person’s life and if it is correct or realistic. Affective comparisons involve an individual’s reflection of how the message appeals to a person on an emotional level. These filters will lead to acceptance or rejection of media messages. Therefore, an individual’s behavior may be dominated by either logic or liking. The model postulates that media messages are subjected to both in-depth logical analysis and wishful thinking (Arnett, 2007).

**Literature Review**

**Search Methods**

The literature search included Worldcat, Griffin Libraries, and CINAHL databases. Ebscohost and PubMed yielded the greatest numbers of journal articles. Titles and abstracts of 550 articles were assessed for their relevance to this review. With the exception of a review of media and obesity by the KFF (2004), the articles were published in the past four years. All of the articles discussed are peer reviewed and published by academic institutions or in academic journals.

Nineteen articles discussed the effects of a variety of media use on childhood development.

Six analyzed physical effects of media on children, including obesity, metabolic syndrome, vision, and blood pressure. The research illuminated co-morbid physical effects of media usage on children and addressed the question, *Are there detrimental physical effects of media use on children?* Foreign studies were included to assess, if study findings vary across
Thirteen articles addressed the psychosocial effects that media may have on children, such as depression, self-esteem, isolation, scholastic achievement, relationships, and aggression. The articles are original research, meta-analysis, and reviews of exiting literature on the psychosocial influences of media on children’s development. A comprehensive review of the research completed on the psychosocial health outcomes of media on children is beyond the scope of this paper. The review represents a sample of the research completed and assists one to answer the question -Do we understand the psychosocial implications of media on children?- In addition, the literature reveals the kinds of media use that are likely to lead to risky health behaviors. The literature review examines the detrimental physical effects of media on children and psychosocial effects of media on children.

Detrimental Physical Effects of Media Use on Children

The implications of childhood obesity on mortality, morbidity, and health care costs are enormous. The Surgeon General predicts that childhood obesity associated disease may soon exceed those associated with cigarette smoking (Ogden & Carroll, 2010). Childhood obesity is defined as those children 2 to 18 years of age who are at or above the 95<sup>th</sup> percentile for age and sex (Burns, 2010). Overweight is defined as those children 2 to 18 years of age who are at or above the 85<sup>th</sup> percentile for age and sex (Burns, 2010). The Centers for Disease Control (CDC) and Prevention (2010) estimate that 17% of children age 2-19 in the US are obese. In the last thirty years, obesity among pre-school children has doubled, tripled among 6-11 year olds, and almost quadrupled among 12-19 year olds. The AAP, CDC, and KFF agreed that approximately 80% of obese children continue to be obese in adulthood.
Researchers who investigate a cause for the large increase in childhood obesity discovered that there are multifactoral influences contributing to the problem. These included reduced funds for school athletic programs, an increase in the availability of soda and snacks, an explosion of fast-food availability, larger restaurant portions, and a growing number of high-calorie and high-fat products (Rideout, 2004). Another potential influence to childhood obesity attracting attention is that of the role of media in obesity trends.

Rideout's (2004) testimony summarized the KFF’s research in the past 20 years on media and childhood obesity. The KFF’s report evaluated research in public health, marketing, media, and childhood development. As early as 1985, Rideout (2004) reported that a study of more than 13,000 children found evidence to suggest that for each additional one hour of TV viewing, there is a 2% increase in childhood obesity. This study adjusted for prior weight, socio-economic status, maternal weight, and race. The KFF (2004) reported a similar relationship in a majority of national studies, suggesting that Displacement Theory may account for the findings.

This review of the literature did not support Displacement Theory as the reason for increased rates of obesity, though logic may suggest otherwise. Rather, Rideout (2004) pointed to TV ads as the possible culprit. Children see an estimated 40,000 ads annually, most of which are for food (cereal, candy, soda, chips, fast food). With a 2004 food product budget of $10 billion, marketing increasingly focuses on children (KFF, 2004). Research demonstrated that foods ads strongly correlate to a child’s choice of food, how many products they request, and which products they request. Ultimately, these requests have a high rate of success in what parents choose (Rideout, 2004). Rideout’s findings supported the Social Learning Theory and the Message Interpretation Process model. Advertisers present popular children’s characters, enjoyable games, exciting adventures, and promises of positive outcomes to the target audience.
and thereby guide food choices.

The National Health and Nutrition Examination Survey included 2964 children ages 4 to 11 years and demonstrated a positive correlation between increased media use and increased adiposity (Anderson, Economos & Must, 2008). Others have reported similar findings (Henderson, 2007; Anderson, Crespo, Bartlett, Cheskin, & Pratt, 1998; Mendoza, Zimmerman, & Christakis, 2007). The research sought a correlation between weight and children engaged in low levels of physical activity and high levels of sedentary behavior to understand if age, gender, race, and weight effected results.

The Anderson, Economos and Must’s (2008) analysis suggested that “a substantial proportion of young children are inadequately active and highly sedentary” (p. 9). These two factors likely contribute to childhood obesity rates in the US. A significant higher proportion of obese girl, age 4-11 years, had low levels of physical activity and high sedentary behavior (Anderson, Economos & Must, 2008). Greater media use was associated with an increased likelihood of obesity in pre-adolescent non-Hispanic girls (Anderson, Economos & Must, 2008). The researchers (Anderson, Economos & Must, 2008) concurred with Rideout (2004) that exposure to food ads encouraged consumption of nutrient poor, high caloric snacks while viewing TV influenced obesity rates. Displacement Theory is controversial since highly sedentary behavior alone does not predict an increase in obesity among all cohorts. The Social Learning Theory and the Message Interpretation model provide an explanation of the Anderson, Economos and Must (2008) findings. The appeal to the 4 to 11 year old TV audience includes role models, topical interest, and socially desirable outcomes, which influence the program choices of children and supports the idea that the Social Learning Theory and the Message Interpretation Process model were at work.
There is compelling evidence that obesity/overweight in children is a global trend that may result from increased sedentary behavior related to increased media use. Wang and Lobstein (2006), the World Health Organization (2000), and the International Obesity Task Force (2004) reported that childhood obesity continues to accelerate in areas of the world where media access has become readily available. Health consequences of obesity in children included hypertension, metabolic syndrome, coronary artery disease, poor self-image, and reduced physical activity tolerance. International studies highlighted the morbidity of childhood obesity and its relationship to media.

A study by Lajous et al. (2009) used a cross-sectional survey of over 13,000 boys and girls ages 11-18 in Morales, Mexico to assess media usage and its correlation with increased fat mass and distribution. Multivariable regression analysis adjusted for potential confounders, such as age, sex, and socioeconomic status, correlating the variables with time viewing TV, DVDs, and video games. Lajous et al. (2009) found a positive correlation between increased adiposity and increased media use in pre-teen and teen-aged males and pre-menarche females. Increased body mass index (BMI) and fat distribution was greatest among 11-12 year old boys and lowest among sexually mature females. These results compared favorably to others, which found a correlation between obesity and increased media use (Proctor et al., 2003; Anderson et al., 1998; Hernandez et al., 1999; Gortmaker et al., 1996). Lajous et al. (2009) results may be confounded by inaccurate reporting, a lack of a reverse effect of media viewing, and other unrecognized variables. The report underscored the importance of understanding modifiable determinates of adolescent obesity and identifying culturally effective behavior strategies to help shape national public policy.

Kang et al. (2010) examined the association between media use and metabolic syndrome
based in a cross-sectional survey of households with children who participated in the 2005 Korean National Health and Nutrition Examination Survey. The National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III) defined metabolic syndrome. Over 10,000 households were randomly selected “through a stratified, multistage, probability sampling design that was based on geographical area, sex, and age” (Kang et al., 2010, p. 73). A weighted probability of samples allowed for extrapolation of results to the entire Korean population. A group of cardiometabolic risk factors associated with adult populations including coronary artery disease, hypertension, and metabolic syndrome were associated in children’s samples as well. The cluster of risk factors observed in children continues into adulthood (Deitz, 1998; Katzmarzyk et al., 2001; Srinivasan, Meyers, & Berenson, 2002).

Using quartiles of screen time, Kang et al. (2010) data revealed that the mean BMI, waist circumference, blood pressure, total cholesterol and triglyceride levels increased positively as the quartile of media time increased. A negative correlation existed between income and screen time (Kang et al., 2010). The mean media time were higher for the subjects with metabolic syndrome. After adjusting for age, sex, income, and geographic location, subjects who spent ≥ 35 hours per week engaged in media activities had an odds ratio of 2.23 for having metabolic syndrome as compared to subjects who spent ≤ 16 hours per week (Kang et al., 2010). Media usage is independently associated with metabolic syndrome in Korea (Kang et al., 2010). In addition, the Kang et al. (2010) data suggested a positive association between metabolic syndrome and increased media time. The prevalence of metabolic syndrome was dose dependent.

The Kang and Lajous studies appeared to lend credence to Displacement Theory. As the amount of media usage increases, there are fewer hours in the day for other more physical activities. The greatest adverse health effects on children occurred when media use increased to
the point where there was no time left for physical activities. Reports indicated that TV viewing increased meal frequency and intake of energy-dense snack food (Stroebele & Castro, 2004; Philips et al., 2004; Lowry, Weschler, Galuska, Fulton & Kahn, 2002). As media use increased, readily available snack foods displaced more preparation-intensive healthy foods.

Children’s blood pressure rates in the US have increased in recent years (Din-Dzietham, Liu, Bielo, & Shamsa, 2007; Muntner, He, Cutler, Wildman, & Whelton, 2004). Sorof and Daniels (2002) demonstrated an association between obesity and hypertension in children, while Heelan and Eisenmann (2006) reported an association between adiposity and sedentary behaviors, which included media usage. A positive correlation between TV viewing and increased systolic BP was found among Belgian boys ages 6 to 12 (Guillaume, Lapidus, Bjorntorp, & Lambert, 1997).

A novel study by Martinez-Gomez, Tucker, Heelan, Welk, and Eisenmann (2009) examined the effect of sedentary behavior on blood pressure among young children. Martinez-Gomez et al. (2009) recruited 111 participants who wore an accelerometer for seven days to obtain objective measurements of sedentary behavior in children ages 3 to 8 years old. Body composition, anthropometric measurements, and resting blood pressure were obtained. Parents reported the amount of time subjects engaged in sedentary media activities. After controlling for age, sex, height, and adiposity, Martinez-Gomez et al. (2009) found a positive association between increased blood pressure and increased media usage. Sedentary behavior over all did not correlate with blood pressure, but TV viewing has a significant association with increased blood pressure independent of adiposity. Participants in the lowest tertile of screen use had the lowest blood pressure (Martinez-Gomez et al., 2009). Martinez-Gomez et al. (2009) postulated that TV viewing and computer use may not have the same metabolic and physiological effects,
and they should be considered as separate variables in future research. Displacement Theory and the Message Interpretation Process model appear to be acting upon the foregoing findings.

Negative associations between prolonged media use and detrimental outcomes among children are numerous. Associations range from childhood violence (Centerwall, 1994) and aggression (Robinson, Wilde, Navracruz, Haydel, & Varady, 2001) to obesity (Anderson et al., 1998; Gortmaker et al., 1996; Hernandez et al., 1999; Robinson, 1999; Crespo et al. 2001; Robinson, 1999) and poor school performance (Taras & Potts-Damenta, 2005). The effect of media on children’s vision is rarely studied and children often do not seek medical help for their vision complaints. Bener, Al-Mahdi, Vachhani, Al-Nufal and Ali (2010) aimed to elucidate whether excessive use of media affected vision in school aged children in a developing country.

A cross-sectional study by Bener et al. (2010) used random sampling to examine 2467 children ages 6 to 18 in schools in Qatar. The t-test determined significant differences between two continuous variables. The chi-square and Fisher’s exact test determined differences in proportions of variables among groups. To determine differences between group means, the ANOVA test was used. Bener et al. (2010) reported significant proportion of students with low vision spent ≥ 3 hours per day on the internet. Those cohorts who reported the most time spent in physical activities had the largest proportion of normal vision. Low vision is “strongly associated with unhealthy lifestyle habits, such as prolonged hours spent on the internet and reclining and having a high BMI” (Bener et al., 2010, p. 384). Physical activities are displaced by media use, which may aid the development of better vision by promoting different functioning of the visual apparatus. It is postulated that the refractive changes that cause myopia may be caused by extensive viewing of near objects during development (Straker, Pollock, & Maslen, 2009).
Psychosocial Effects of Media

The current generation of children are the first to grow up in a digital world and are the vanguards of a technological revolution. Media may have an even greater impact on children's socialization than do parents and schools. There is a pressing need to know more about the impact of media usage in children's social and scholastic competence, relations with peers/family, self-concept, isolation, depression, delinquency, and aggression. Researchers agreed that the foregoing are determinates of attitudes, development, beliefs, and coping skills in children (de Haan & Huysman, 2004; Harter, 1993; Jordan, 2004). Most researchers have viewed media as a threat to children's health. However, contradictory findings are emerging. Some analysts believed that media induces isolation and reduces social experiences, while others suggested that media use represent opportunities for play, communication, social support, and knowledge.

Heim et al. (2007) designed an exploratory study to investigate specific media use in children to determine if psychosocial factors and different types of media use variables were associated. They employed a factor analysis of surveys to measure children's self-concept and media usage. Children evaluated their internal own concept of psychosocial factors and how often they watch TV/videos, play video games, surf the Internet, use chat, or work on their computer. Certain activities were significantly associated with psychosocial factors (Heim et al., 2007). Children who spent less time on entertainment media scored higher on their perception of scholastic competence than the children who spent more time. This suggested that mastery of difficult technologies increased self-esteem among peers (Heim et al., 2007). However, children with high rates of media and Gameboy use scored lower on social acceptance (Heim et al., 2007). Heim et al. (2007) found an association between parental monitoring and usage of media.
Heim et al. (2007) suggested that “when parents are actively involved in their child’s daily activities, the child is more likely to embrace media for creative, educational purposes rather than as a medium for games or TV” (p. 449).

In a perspective from the Department of Pediatrics, Advanced Pediatric Center in India Ray and Jat (2010) reported that excessive TV use may be a risk factor for development of depression and ADHD. They reported a positive correlation between frequent reading of print media about dieting and weight loss and girls who reported unhappiness about their body weight. Ray and Jat (2010) suggested that TV impairs peer relationships, and increases the risk for social isolation, anxiety disorder, agoraphobia, ADHD, and antisocial behavior. There was a positive association between viewing media with violent content and increased violent behavior, ideas, and anger (Ray & Jat, 2010). The study reported a negative correlation between violent media viewing and altruistic behaviors (Ray & Jat, 2010).

Hastings et al. (2009) conducted a study of 70 children ages 6 to 10 via parental report. They sought information concerning the content, amount, and social context (e.g. parental monitoring, with siblings/friends etc.) of children’s game playing/computer use and if there is a relationship to child health outcomes. The results of their study were mixed, with the type of media and the amount of time spent with that media largely predictive of positive or negative health outcomes. Educational games provided stress relief, increased attentiveness, school performance, and may increase supportive relationships (Hastings et al., 2009). Recreational games were associated with poor school performance and attention, increased aggressiveness, and externalized behaviors (Hastings et al., 2009). A strong correlation existed between violent video games and aggressive behavior. Hastings et al. (2009) reported that both positive and negative health outcomes more strongly correlated as the time spent in media activity increases.
This study was limited by a homogenous, small, non-randomized cohort and biased by the use of parental report. In addition, the research represented a snapshot in time and provides no longitudinal information. Displacement Theory is not supported by the findings as increased educational media time correlated negatively to behavior problems. The Social Learning Theory and the Message Interpretation Process model may explain the results. For example, identification with violent game characters may increase propensity toward externalized behaviors.

Jackson, Brown and Pardun (2008) examined the association between risky health behaviors, media, and a TV in the bedroom. The study applied multivariable analysis to a detailed media use survey, which was completed by 1,200 participants from 14 public schools in the southeastern US. Variables included, but were not limited to having a TV in the bedroom, frequency of TV viewing, identification with actors, parental oversight, mature content programming, initiation of smoking and sexual intercourse. Respondents reported the least happiness and increased loneliness when viewing TV in the bedroom. A positive correlation existed between time spent TV viewing and identification with characters (Jackson, Brown, & Pardun, 2009). Jackson et al. (2009) reported that for white males there was a 3.5 times greater likelihood of initiation of smoking and a 2 times greater likelihood of initiation of sexual intercourse when a TV is in the bedroom. However, parental oversight appeared to moderate these negative health outcomes (Jackson et al., 2009). The Social Learning Theory and the Message Interpretation Process model support these results. If children positively identify with TV characters, it may have promoted risky health behaviors, especially if realistic consequences were ignored. Displacement Theory may account for feelings of unhappiness and loneliness; TV isolated an individual and displaced social interactions.
Wilson (2008) reviewed evidence of the link between media use and children’s emotions, and explored how media affects social development. She analyzed over 110 articles published between 1963 and 2007. Her report revealed a good deal of evidence to suggest that media contributed to children’s fear and anxiety especially in younger children. Those who viewed TV ≥ 6 hours per day were more likely to have anxiety, depression, and PTSD. There was strong evidence of a positive correlation between violent TV programs and video games with aggressive behavior (Wilson, 2008). However, Wilson (2008) found that educational programs and situation comedy targeted to youth increased altruism, cooperation, and tolerance. Wilson (2008) demonstrated that media effect “depends on the content to which the children are exposed” (p. 88), and is highly influenced by age, gender, race, home life, and temperament. Children’s choice of media, identification with characters, modeling of behavior, and imprinting may the mechanisms by which children’s behaviors were acquired. This lends support to Social Learning Theory and the Message Interpretation Process model.

Lieberman and So (2009) selected studies on media and learning completed on children ages 3 to 6 to assess the link that different media had on children’s acquisition of skills for language, thinking, reading, mathematics, creativity, and collaboration. Similarly, Hisrich and Blanchard’s (2009) literature review discussed the effects of digital media use and emergent literacy skills. Both teams reported a body of research that demonstrated numerous beneficial cognitive effects of digital media when well designed computer, TV, and game programs were utilized. Digital media can increase group interaction, collaboration, and motivation (Hisrich & Blanchard, 2009; Lieberman & So, 2009). Educational TV programs were associated with better school entry skills (Hisrich & Blanchard, 2009). Both studies reported a lasting positive effect of educational programs. Lieberman and So (2009) were unable to determine which form of media
instruction is most effective, or isolate the reasons why one form is more effective than another. Hisrich and Blanchard (2009) suggested that media exerted a largely unknown influence on children’s cognition. Most studies to date have been done with small numbers of children over a short period of time. These limitation hamper the conclusions of Lieberman and So (2009) and Hisrich and Blanchard (2009). Displacement Theory predicts that replacing ad hoc media use with well-designed video games, TV programs, and computer software, children’s psychosocial and cognitive outcomes may improve.

Hofferth (2010), Jolin and Weller (2011), and Shen and Williams (2010) all reported at least some detrimental psychosocial and academic effects of increased media use. Hofferth (2010) and Shen and Williams (2010) found that increased loneliness was associated with increased time spent on line, though the effect may be dependent upon context and personality. For every one-hour increase in watching TV, there was an association with an increase in depression (Jolin & Weller, 2011). The more time spent on media activities translated to less time spent with parents, siblings, and peers (Hofferth, 2010; Jolin & Weller, 2011; Shen & Williams, 2010), and a decreased sense of community (Shen & Williams, 2010). Poor self-esteem and social incompetence are reported by subjects who spent the greatest amount of time with media (Jolin & Weller, 2011; Shen & Williams, 2010). Hofferth (2010) found no association between increased media use and behavior problems, but Jolin and Weller (2011) reported an association with decreased attention, especially for TV viewing among 1 and 3 year olds. Jolin and Weller (2010) reported that 14 year olds who spent more than 3 hours per day with media correlated with greater academic failure and negative school attitudes. Hofferth’s (2010) study found an association between increased video game play and academic failure.

Hofferth (2010) and Shen and Williams, (2010) reported some equivocal results with
association. Swing et al. (2010) results concured with other studies that found an association between TV/video and attention problems/attention deficit hyperactivity disorder diagnosis, poorer executive function and proactive cognitive control (Bailey, West, & Anderson, 2010; Bioulac, Arfi & Bouvard, 2008; Mistry, Minkovitz, Strobino & Borzekowski, 2007). The Displacement Theory, Message Interpretation Process model, and Social Learning Theory are not useful to explain these results. A theory, which accounts for rapid changes of focus, inherent in media, and its relationship to development, would help to explain the Swing findings.

Media research studies on children and health outcomes can have different or equivocal findings. Olson, Kutner and Warner (2010) completed a qualitative study, which used focus groups to ascertain information regarding high school boys feelings about violent video games. Participants made distinctions between the real world and the game world (Olson, Kutner & Warner, 2010). A positive association between video game play and group cooperation, self-esteem, creative thinking, and problem solving, and a negative correlation between game play and isolation are reported. They hypothesize that violent game play served the same function as rough and tumble play. Olson, Kutner and Warner (2010) found that boys’ use of violent games regulates their emotions and perhaps reduced stress and real-life fighting. The Message Interpretation Process model can be applied to the study results as the participants were more attracted to violent content due to fantasies of power and fame, challenge, coping with anger and stress, and sociability. In addition, the boys are aware that game actions have very different consequences in the real world. The cohorts applied both logical and emotional responses and logical comparisons in their feelings and choices about video games.

Olson et al. (2009) examined 1,254 seventh and eighth grade students to find potential links between problem behaviors and time spent with violent video games. Exposure to mature-
rated games was a significant predictor of engaging in bullying and aggression, and strongest among girls (Olson et al. 2009). The odds of these behaviors increased with the dose of exposure (Olson et al. 2009). However, there was no association with M-rated games and being the victim of bullies or engaging in delinquent behaviors (Olson et al. 2009). The Social Learning Theory can be used to predict the above results via repeated imprinting and internalization of aggressive and violent behavior.

**Recommendations**

The Kaiser Family Foundation (2005) agreed with the AAP (2009) recommendation that parents limit screen time to two hours per day for children and keeping children’s bedroom media free. Parents can limit programs to those that are educational, informational, and non-violent. The AAP (2009) further recommended that children under two years of age be discouraged from TV viewing. Instead, parents should encourage interactive activities to enhance brain development. Violent video games should be kept out of the household where children are present. Most video games are content-rated allowing guidance to parents in choice of video games. Mature-rated video games were to be avoided by children under 16 years of age. These rating are fairly accurate, however they do not replace parental screening.

Continued parental monitoring of children’s media activities plays a vital role in moderating the potential ill effects of media on children’s health (Heim et al., 2007; Jackson, Brown, & Pardun, 2008; Wilson, 2008). Optimally, parents should participate in TV/video viewing and encourage discussion about violent, mature, or unrealistic content. Controversial programming can be used as a stepping-off point to initiate discussions about values, drugs, and sexuality. Parents can further support efforts to establish media education programs in schools.
Reading, athletics, hobbies, and creative play are alternatives parents may adopt in their toolbox of parenting skills.

Primary Care Providers are also instrumental in supporting the wise use of media (AAP, 2009). Foremost, it is the responsibility of providers to educate parents on the health risks posed by media. It is essential that Primary Care Provider remain knowledgeable about the effects of media on children. The AAP Media History form assists parents to recognize the extent of their children’s media consumption. Providers can serve as good role models by using TV appropriately in offices. For those Primary Care Providers involved in pediatric care, the AAP recommends involvement in their Media Resource Team, participating with local TV stations to ensure that they are in compliance with the Children’s Television Act, and monitor TV ratings systems while advocating for substantive, content based rating. Primary Care Providers of children should lead efforts in their communities to form coalitions, not only in schools, but in churches, libraries and other community organizations as well.

Discussion

A great deal of literature addresses media effects on children, yet many questions remain. In some cases, research on the effects of media on childhood development reveals definitive associations between media usage and a risk for childhood development and health. Other research does not support an association between media use and adverse health consequences to children. In addition, a number of media studies report beneficial effects, especially as regards improved cognitive skills.
Media and Physical Development of Children

Studies that addressed the impact of increased media use on the physical development of children provided the best evidence for detrimental associations. Obesity among children and its relation to increased media use is arguably the most currently researched topic. Furthermore, numerous well-designed research studies reported a direct correlation between obesity and hypertension, coronary artery disease, and metabolic syndrome and media use. Both US and international studies reported that as media use increased, obesity rates increased as well. This lends credence to the idea that obesity rates are dose dependant supporting Displacement Theory. The biological mechanism for this finding is unclear. Some researchers believed the cause for a rise in obesity is strictly related to the amount of time spent with media, while others postulate that it is more related to the messages that media conveys. Rising obesity rates among children represent a major health concern owing to the co-morbidity associated with the condition. Sedentary behavior begets obesity, which begets cardiovascular and metabolic health risks.

Other physical health concerns, such as vision problems, are beginning to be addressed. Scant research exists correlating visual deficits with media usage and requires more well designed longitudinal studies to affirm or disavow a connection. However, at least one large retrospective study reported that visual deficits in children may result from increased media use.

Media and Psychosocial Development of Children

Studies, which analyzed the psychosocial implications of TV to the health of children, are numerous and have a long history. Media that the current generation of children routinely engage, such as video games, the Internet, and educational computer programs, are recent technological developments and only beginning to be understood. It seems clear that violent TV
and video games may pose a risk toward violent behaviors among certain groups (e.g. pre-teen males and teen-aged white females). Violent newscasts have been associated with fear and anxiety in very young children. Some researchers have found solid evidence that media interferes with sleep patterns, especially when there is access to media in the child’s bedroom. This phenomenon may well lead to attention problems, poor school performance, depression, and other health risks. Isolation and lowered self-esteem are consequences reported in literature that are related to solitary gaming and viewing activities. Attention deficit hyperactivity disorder has been associated with media use by some researchers as well. However, there are studies that concluded that media usage may benefit children in areas of socialization, motor skills, problem solving, and group cooperation. In conclusion, there are detrimental effects of certain media technologies, in certain groups, under certain circumstances, and some media use may affect behaviors of some children more than others.

Limitations of Extant Research

Media use is fast becoming commonplace in schools and is poised to begin replacing teachers. Therefore, it is critical that researchers investigate the best approach to design successful academic programs. Existing literature reported significant improvement in reading and math skills when well-designed programs are used to augment traditional teaching techniques. It is not clear which aspects of the teaching programs resulted in the greatest benefits to students. Questions also remain regarding which students benefit and which do not. It would be a mistake to assume a one size fits all agenda.

Problems with the state of current media research are many. The well-designed studies have attempted to illuminate variables among different cohorts of children. As yet, not all variables can be accounted for or identified. In this review, several of the studies used standard
regression analysis for sex, age, race, time, and socioeconomic status to identify which variables are the most predictive of detrimental health effects. Most of the studies reviewed are retrospective and allow for only a single point-in-time analysis. At least two of the studies reviewed, perform a modified longitudinal, or two-point-in-time analysis. The longitudinal studies are able to assess changes over time and lasting effects of media use. The sample size in current research is often limited, with the exception of the national Korean study (N=10,816). Self-reported surveys impose limitations on media research as under and over reporting may occur.

**Need for Further Research**

Further research is required to gain a more complete picture of media effects on the health of children. This research should include cohorts with a control group who have similar characteristics. Cross sectional research design limit demonstrated causality. Confounding variables must be accounted for to reduce errors in drawing conclusions. Self-reporting, while important, is not as reliable as electronic tracking. Self-reporting needs to be independently verified. It may be possible to track TV, gaming, internet use purpose, and time with developing technologies. Scholastic program research requires studies designed to elucidate exactly why certain programs are effective and perhaps allow for greater program flexibility that accounts for student differences and adjusts programs while students interact with a program. Finally, given the enormity of possible physical health risks to children, research should focus tools to differentiate between the effects of media messages and the time spent using the media.

There does not appear to be any single theory that drives the findings reported in this review. Displacement Theory can be used to explain the physical effects that media has on children. It makes sense that if children are spending much of their free time in sedentary
activities, such as TV viewing, they are not physically active and at a higher risk for obesity.

Psychosocial effects of media are less amenable to theoretical explanation. This review demonstrated how the Social Learning Theory and the Message Interpretation Process model were useful when applied to some of the phenomenon observed. For example, there is a strong association between aggressive behaviors and playing video games with violent content. It is likely that a combination of theoretical foundations will provide structure to future research, dependent upon the phenomenon of interest to the researcher.

Some of the studies reviewed supported the notion that even with questionable media content, such as violence and unrealistic consequences, the negative psychosocial health effects on children may be ameliorated by parental intervention. Supervision, limitation of media use, and content discussion are strategies parents can use to reduce the negative health consequences of media use. In addition, teaching, guidance, and community involvement by Primary Care Providers and educators are strategies that can influence the health consequences of media on children.

This review of literature revealed that the current state of research on how of media use influences the behavior of children found a moderate amount of compelling evidence that certain forms of media do have an effect. Violence, unrealistic portrayals of consequences of behaviors, and incessant repetition of media messages can provoke depression, aggression, attention problems, poor eating habits, and poor scholastic performance. Increased media usage, especially TV, to the point where it interferes with other activities, promotes sedentary behavior, increases the likelihood of poor food choices, and increases caloric intake leading to obesity and subsequent metabolic problems in children.
References


