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Media Use and Effects in Childhood

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The children's media landscape has changed dramatically over the past few decades. The explosive growth of the Internet and digital media platforms has given rise to a new digital media culture. At the same time, media content itself has evolved dramatically. Today's media are more complex, more arousing, and more fast-paced than ever before (e.g., Koolstra, van Zanten, Lucassen, & Ishaak, 2004). This has led researchers, health practitioners, and public policy makers to ask how these changes may be influencing children's development. And while these questions are critical, it is also important to recognize that the relationship between media and child development is not unidirectional, but rather is bidirectional. As a result, not only should we ask how children's media use influences their development, but also how children's development may influence their media use. To that end, this chapter presents both sides of this discussion, paying explicit attention to several key theories that have been used to explain the reciprocal relationship between child development and media.

Developmental Patterns in Media Use and Media Preferences

The media children use and prefer are predicted largely by their developmental capabilities. Children have a preference for media that can at least be partly incorporated into

their existing framework, and show less preference for extremely simple or extremely complex stimuli (e.g., D. R. Anderson & Lorch, 1983). This *moderate-discrepancy hypothesis* (Valkenburg & Cantor, 2000) predicts that at any given age, a moderate level of stimulus complexity is preferred and that this level increases as the child matures. This hypothesis offers a viable explanation for why the media preferences of children in various age groups differ so greatly. After all, the perceived simplicity and complexity of media content changes dramatically as children mature.

As such, in order to understand children's media usage and preferences, it is important to understand how children typically develop. Here we present a brief review of key developmental characteristics of three periods across childhood (infants and toddlers, early childhood, and middle childhood) and hypothesize how these characteristics influence media use and preferences. We also present statistics regarding the amount of media that is typically consumed during each period, relying primarily on American media use studies. However, in other industrialized countries, children's media use patterns are comparable to the ones presented in this chapter (Beentjes, Koolstra, Marseille, & van der Voort, 2001; Szybist, 2011).

Infants and Toddlers

This age group involves children between birth and 2 years. When children are around 4 months of age, they begin to exhibit interest in television watching. Around this time, their ability to detect cues in their environment has matured, as has their ability to locate a sound in space by turning their head or eyes in the direction of the sounds (Field, Muir, Pilon, Sinclair, & Dodwell, 1980). In the first year of life, the orienting reflex mainly predetermines attention. Infants are typically interested in sudden and novel sounds and movements along with bright colors. In the second year, attention becomes somewhat less influenced by novelty and more influenced by relevant and interesting content. By 18 months, they begin to experience a word

spurt of nearly 20 new words per week (Bukatko, 2007). At this point, they enjoy verbally labeling familiar objects (boat, house, train) that they recognize when presented with a storybook or audiovisual media.

Media use for this age group is a rather controversial topic. Beginning with the introduction of *Baby Einstein* in the late 1990s, media for the infant and toddler demographic have become an enormous international industry (Christakis, 2009). And yet, many health care practitioners argue that we do not yet know enough about the (potentially negative) influence of media on this audience (e.g., Christakis, 2009). These and other similar concerns have brought about several public policy initiatives. For example, in the United States, the American Academy of Pediatrics discourages screen media exposure in the first 2 years of life (Council on Communications and Media, 2013). Yet, despite these efforts, recent data show that the average child under 2 years of age is exposed to over an hour of screen time daily (Wartella, Rideout, Lauricella, & Connell, 2013).

Despite the debate on whether or not media are appropriate for this young audience, we do know that infants and toddlers exhibit distinct media preferences. For example, they prefer content that relies heavily on music and song and content with salient formal features is best able to hold their attention. This preference wanes slightly as children become older toddlers (around 18 months old) and is replaced by an interest in simple narratives. Given their limited cognitive and verbal skills, content which relies on slow pacing and familiar contexts, incorporates significant repetition, provides opportunities for verbal labeling, and incorporates simple characters is also appealing for this group.

Early Childhood

Early childhood covers children between 3 and 6 years old. During this period of time, children typically demonstrate egocentrism (i.e., an inability to separate their own perspective from the perspectives of others), as well as perceptual boundedness (i.e., tendency to focus on

immediately perceptible attributes of an object) and centration (i.e., tendency to focus on an individual, striking feature of an object) (Bukatko, 2007). Early childhood is characterized by an inability to distinguish between fantasy and reality, as well as by rapid emotional developments (Thomas, 2005). While newborns can produce facial expressions associated with primary emotions such as joy, sadness, and anger, by early childhood, children start to experience conscious emotions such as envy, guilt, and embarrassment. Conscious emotions differ from primary emotions in that they require perspective-taking skills. By age 4, children are able to understand conscious emotions in others. However, their detection of emotions is still perceptually bounded in such a way that they are only able to recognize emotions based on external cues (e.g., crying, sad face).

Today's early childhood media market is one of the most competitive and crowded markets across the media landscape. Children between 3 and 6 years old spend over 3 hours per day using media (Wartella et al., 2013). Younger children (3 years) spend the majority of their media time using television, while older children (4 to 6 years) also begin to add video games to their daily media diet (approximately 30 minutes per day). Finally, in this age group the use of mobile devices such as tablets and smartphones is increasingly used (approximately 30 to 45 minutes per day) but they are not yet using social media.

During early childhood, attention to media content increases dramatically (Valkenburg & Vroone, 2004). This reflects the rapid increase in children's information processing skills and their improved vocabulary. However, their cognitive and emotional capacity is still limited. Children in early childhood lack experience and semantic knowledge, which can make processing new media content challenging. As a result, they typically prefer media content that relies on slow pacing, incorporates repetition, and contains simple characters in familiar contexts. These preferences may change at the end of early childhood when children, especially boys, become more attracted to fast-paced media, more complicated characters, and

adventurous contexts. The perceptual boundedness in early childhood leads children to judge media characters by perceptually salient features, thus character appearance and perceptually visible motives and emotions are important. And, because of their inability to distinguish fantasy from reality in media, fantasy characters are just as attractive and engaging as real-life characters.

Middle Childhood

Middle childhood involves children between 7 and 11 years old. During this stage, thought processes become more mature and adult-like. Although children are still unable to engage in abstract thinking, they are now able to think and solve problems in a logical fashion so long as the problems apply to concrete events or objects. Children can now clearly distinguish between fantasy and reality, and as a result, their admiration for cartoon characters decreases dramatically (Valkenburg & Cantor, 2000). Children's ability to understand their own emotions and the emotions of others is continuing to improve. Relatedly, children are increasingly able to understand the perspective of others. The combination of formal school entry during this period and understanding other's perspectives results in an important focus on peer relationships.

Children in middle childhood incorporate media into their daily lives at relatively high rates. In the beginning of middle childhood, we see estimates similar to early childhood with approximately 3 hours per day spent using media, most of which is predominantly television. By about age 8, children spend nearly 4 hours per day viewing television, 1 hour per day playing video games, and 30 minutes per day using social media sites (Rideout, Foehr, & Roberts, 2010). These estimates highlight an increased interest in and use of interactive media.

During this period, children lose their interest for slow-paced educational programs and develop a preference for entertainment media that is faster and more complex, and

contains action and violence (Valkenburg, 2004). Children also begin to “decentrate” and develop an interest in detail. As a result, they prefer more complicated media characters and more sophisticated plotlines. However, given that they still struggle with abstract thinking, they prefer content that focuses on concrete problems and objects (e.g., the quest for a treasure). Although children now understand the difference between fantasy and reality, not all children are equally interested in realistic content at this age. Whereas girls typically develop an interest in real-life entertainment, boys more often remain attracted to fantasy content (e.g., Teenage Mutant Ninja Turtles). There is also a change in character preference. While early childhood was characterized by a focus on character appearance, the increased emotional development of middle childhood results in a greater focus on the psychological characteristics of media characters. Children now enjoy characters with which they can psychologically identify, for example, characters with an attractive sense of humor.

Theories of Media Effects During Childhood

Given the amount of time that children spend using media across childhood, it is unsurprising that many researchers have investigated how this media use may impact children’s development. These inquiries have been guided by several theories to explain how children are affected by media. Here we present two theoretical models that are commonly used to explain media effects in childhood: Social Cognitive Theory and the Capacity Model. Additionally, we introduce a new theory of media effects, the Differential Susceptibility to Media effects Model, that represents an integration of several media effects theories to help predict for whom, and when, media effects occur.

Social Cognitive Theory

Social cognitive theory (previously referred to as social learning theory, Bandura, 1977) is one of the most commonly used theories to explain why and how media can influence the behavior of children. The theory posits that behavior is not only learned by

one's own experience, but also by observing others (observational learning). Just as children can learn behavior by observing their parents, siblings, and peers, children can also learn new behaviors by observing characters in the media. Social learning theory argues that consequences of the behavior that is portrayed influences whether the behavior will be replicated. Behavior that is rewarded is more likely to be modeled than behavior that is punished (Bandura, 1977). Children will also imitate behaviors that receive no consequences because the lack of punishment is interpreted as tacit reward (Bandura, 1965).

Bandura observed, however, that not all children imitate rewarded behaviors, and not all observed behaviors are immediately performed. This observation led him to incorporate cognitive variables into his theoretical model. This newer perspective, which led to the name social cognitive theory (Bandura, 1986), states that several mental processes are involved in observational learning. As a result, a child's ability to engage in observational learning is dependent upon his/her cognitive development. For successful observational learning, social cognitive theory posits that four sequential cognitive processes must occur.

First, in order to learn behavior through observation, *attention* to the model and the model's behavior is critical. Television characters, in particular, have many distinctive and engaging features which easily attract attention (e.g., bright colors). Attention is also influenced by characteristics of the observer, such as her/his own needs and interests. Second, *retention* is a key cognitive process. Often there is a significant time lag between the observation of the behavior and the performance of the behavior. The observer can only model the behavior if s/he has retained the information. Following retention, the observer must also be able to engage in *motoric reproduction*. Motoric reproduction is a cognitive process in which the stored information is translated into motoric actions. And lastly, *motivation* is an important factor in whether or not the observer reproduces the behavior. In

addition to one's personal values, motivation comes from reinforcement that a person receives either directly or vicariously (by observing someone else receiving reinforcement).

Although social cognitive theory was developed from a psychological perspective, this theory has served as an important framework for communication researchers to understand how various media affect their users, particularly children. In particular, this theory has helped researchers understand when children are most likely to imitate behaviors they see in the media (e.g., aggressive behavior and prosocial behavior).

Capacity Model

Despite the large body of research that has investigated the educational potential of television for children (e.g., *Sesame Street*, Fisch & Truglio, 2001), many scholars have noted that there is a dearth of theoretical approaches available to explain how viewers comprehend educational content. In response to this, Fisch (2000) presented the capacity model—a systematic model of comprehension with its roots in information processing research. Central to the model is the idea that working memory is limited and for content to be processed effectively, viewing demands cannot exceed working memory resources.

The capacity model focuses on children's allocation of cognitive resources during television viewing, with specific attention paid to the degree to which working memory resources are allocated to comprehension of narrative versus embedded educational content. Fisch (2000) defines narrative content as content that presents the story in the program, whereas educational content is the underlying educational concept or message that the program is intended to convey.

In the capacity model, demands for cognitive resources are said to come from three basic elements: (1) processing the narrative storyline, (2) processing the educational content, and (3) the distance between the two. In terms of distance, when the educational content and the narrative are divergent, the two comprehension processes are said to compete for limited

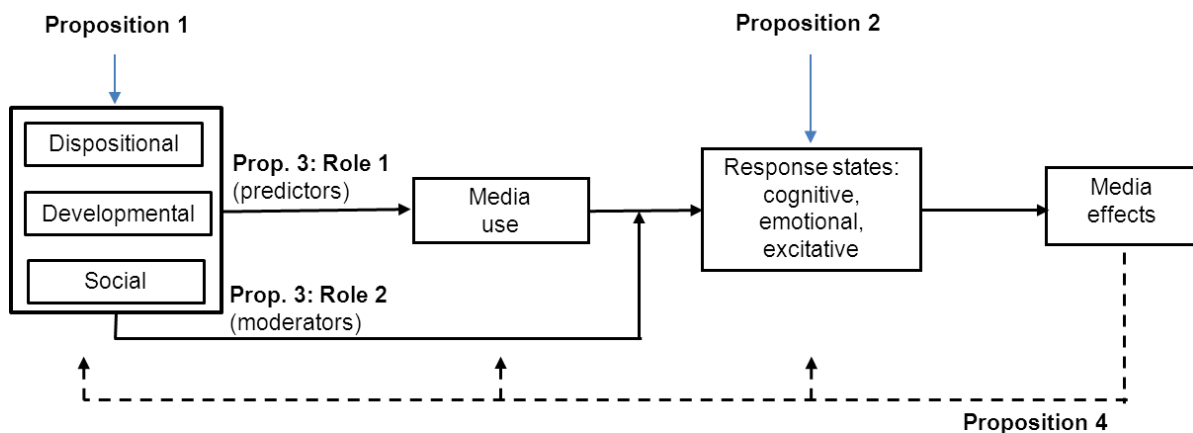
working memory resources and result in impaired comprehension of the educational content. However, when the educational content is integral to the narrative, comprehension processes are said to become complementary, and comprehension of the educational content will likely be strengthened. The capacity model further predicts that factors that allow for more efficient processing of either the narrative or educational content will reduce the demands associated with processing that type of information and subsequently increase comprehension.

Although the allocation of working memory resources to narrative and educational processing is a function of the demands of each, the capacity model specifies several governing principles that help determine the allocation of resources (Fisch, 2000). First, because television is primarily an entertainment medium, the model posits narrative dominance (i.e., priority is given to comprehension of narrative content). Second, the amount of cognitive resources available to process educational content is a function of the amount of resources not already committed to the narrative. Lastly, the capacity model posits that viewers can choose to allocate resources differentially among the processing of narrative and educational content, although narrative can never entirely be abandoned.

The model indicates several ways in which the comprehension of educational television content can be increased (Fisch, 2000, p. 82), for example, by reducing the demand of processing the narrative or by minimizing the distance between the narrative and the education demand. These tenets gives rise to empirical predictions regarding the conditions under which comprehension of educational content will be strongest, as well as practical implications for the design of effective educational programming. And while the capacity model was originally designed to address educational television, researchers argue it can be applied to other educational media as well (e.g., video games, Kirkorian & Anderson, 2011).

Differential Susceptibility to Media Effects Model

The Differential Susceptibility to Media effects Model (DSMM, Valkenburg & Peter, 2013a) is one of the most recently developed models to explain media effects. It incorporates many of the propositions of earlier media effects theories including social cognitive theory (Bandura, 1986), the (limited) capacity model (Fisch, 2000; Lang, 2000), and the reinforcing spiral model (Slater, 2007). The DSMM was designed to explain why some individuals are more susceptible to media effects than others. This model has four core propositions: (1) media effects are conditional, (2) media effects are indirect, (3) differential susceptibility factors have multiple roles, and (4) media effects are transactional (see Figure 1).



Proposition 1: Media effects depend on three types of susceptibility.

Proposition 2: Three media response states mediate the relationship between media use and effects.

Proposition 3: The differential susceptibility variables have two roles; they act as predictors and moderators.

Proposition 4: Media effects are transactional.

Figure 1. Differential Susceptibility to Media effects Model
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Proposition 1: Media effects are conditional. The DSMM posits that media effects are conditional and that they depend on three types of differential-susceptibility variables: dispositional, developmental, and social. *Dispositional* susceptibility refers to all personal factors that can determine selection of and response to media, such as personality, temperament, and existing schemata. *Developmental* susceptibility denotes the selective use and responsiveness to media due to cognitive, emotional, and social development. *Social*

susceptibility consists of all the social-contexts factors that can influence the use and effects of media.

Proposition 2: Media effects are indirect. The DSMM states that all media effects are indirect and mediated by cognitive, emotional, and excitative response states. The cognitive response state includes the processing of attention, retention, and absorption of the media content. The emotional response state incorporates all affectively valenced reactions to media content (e.g., sadness, fear, happiness). The excitative response state refers to one's physiological arousal in response to the media. Each of these is expected to vary individually in response to different media. This proposition illustrates that how individuals process media content is critical to the influence of that media content. A child who experiences a significant physiological response to fearful content, for example, is expected to be affected differently when compared to a child who does not experience a similar physiological response.

Proposition 3: Differential susceptibility factors have multiple roles. The three types of differential susceptibility (dispositional, developmental, and social) mentioned in proposition 1 have two conceptual roles. First, they predict selection and exposure to media. Second, they can also strengthen or weaken the effect of media on behavior, through their influence on the response states mentioned in proposition 2. These two conceptual roles can occur simultaneously. For example, children (and adults) tend to seek out media content that matches their dispositions, developmental level, and the norms that dominate in their social environment (Oliver, Kim, & Sanders, 2006). At the same time, these individual characteristics may influence how a person responds to media content, for example, because media content that is congruent with one's disposition or developmental level is processed faster and more easily than incongruent media content (Valkenburg & Peter, 2013b).

Proposition 4: Media effects are transactional. The final proposition of the DSMM is that media effects are transactional—media effects can have a reciprocal causal effect on

media response states, media use, and on the differential susceptibility factors. For example, undesirable media effects on children may lead parents to restrict certain media content.

Alternatively, frequent consumption of media violence has been argued to change personality (C. A. Anderson & Bushman, 2002).

The DSMM in future research. Although the DSMM is not designed specifically to assess media effects in childhood, it is a comprehensive media effects model that is suitable for inclusion in research investigating media effects on children. It places a significant emphasis on developmental susceptibility to media content, a critical variable when considering how media may affect children. Further, it builds upon existing theory by recognizing that media effects are dependent upon developmental, dispositional, and social factors. And lastly, it is not medium-specific. The DSMM can be used to guide research on the influence of traditional media such as television and books, as well as the influence of new media such as digital games and social media.

Media Effects Across Childhood

Many researchers are concerned about the potential influence of media on children. In fact, these concerns have fueled more than 50 years of research on the role that media exposure plays in children's lives (e.g., Pecora, Murray, & Wartella, 2007). Although a complete review on the influences of media is beyond the scope of this chapter, we present an overview of the negative as well as positive effects of media that are most prominent in the public debate.

Negative Effects

Aggressive behavior. When it comes to the effects of media on children, the influence of violent media on aggressive behavior has received the most research attention. Hundreds of studies have investigated whether and how violent media exposure is related to subsequent aggression. These studies have looked at the influence of violent media exposure in middle

childhood (e.g., Huesmann, Moise-Titus, Podolski, & Eron, 2003) and early childhood (e.g., Christakis & Zimmerman, 2007). The majority of studies have evaluated the influence of violent television content (e.g., Bushman & Huesmann, 2001) on aggression, although in recent years the influence of violent interactive media (e.g., video games and computer games) has received increased attention (e.g., C. A. Anderson & Dill, 2000).

Some studies have suggested no relationship between violent media exposure and aggression (e.g., Ferguson, San Miguel, Garza, & Jerabeck, 2011); however, most demonstrate that violent media exposure is positively related to aggressive behavior and may even lead to aggressive behavior later in life (e.g., Huesmann et al., 2003). Several meta-analyses on the effect of violent television and violent video games support this argument (C. Anderson & Bushman, 2001; Bushman & Huesmann, 2006; Paik & Comstock, 1994), suggesting small to moderate effects ($r = .19$ to $.31$) of violent media on aggressive behavior.

The most widely used theory explaining the influence of media violence on aggressive behavior in children is the social cognitive theory (Bandura, 1977). Children can learn aggressive behavior by watching media characters perform violent acts and not being punished for this behavior or even being rewarded for it (e.g., Wilson et al., 2002). In fictional media productions, physical aggression is often portrayed as the only means to solve interpersonal problems. Heroes are often just as violent as the villains. Children learn from this that physical violence is an effective and appropriate way to solve conflicts.

Most media researchers today accept that violent media exposure plays a role in children's aggressive tendencies, yet many nuanced questions remain unanswered. For example, which children are most susceptible to violent media exposure? Research that seeks to identify who is most susceptible to violent media is a critical area for future research.

ADHD-related behaviors. Attention-deficit hyperactivity disorder (ADHD) is a behavioral disorder characterized by elevated levels of inattentiveness, hyperactivity, and

impulsivity (DSM-IV-TR, American Psychiatric Association, 2000). Although ADHD is a clinical diagnosis, many consider ADHD as the extreme end on a continuum of behaviors.

There have been recurrent claims that specific features of entertainment media may cause children's ADHD-related behaviors (Christakis, 2009; Nigg, 2009). Most of the claims focus upon children in early and middle childhood, as these are the periods in which ADHD diagnoses typically occur. While the research investigating these claims remains limited, existing research supports the argument that time spent with media (television and video games) may play a role in subsequent ADHD and ADHD-related behavior (Swing, Gentile, Anderson, & Walsh, 2010). Other researchers have gone beyond global exposure amounts to investigate the relationship between specific media content and ADHD-related behaviors. This research has shown that *violent* media content is related to more attention problems (Kronenberger et al., 2005) and impulsivity (C. Anderson & Maguire, 1978).

There are few theoretical mechanisms that explain how media content is related to ADHD-related behaviors. The DSMM (Valkenburg & Peter, 2013) may be a potential way to understand this relationship. Researchers have argued that media, particularly violent media, can negatively influence the arousal level (i.e., excitative response state) of children which may subsequently lead to ADHD-related behaviors (Arousal-Habituation Hypothesis, Huizinga, Nikkelen, & Valkenburg, 2013). Other researchers have suggested that media is a *function* of ADHD, where levels of ADHD-related behaviors determine the exposure to media (DSMM proposition 1). For example, low baseline arousal (which is typical in children with ADHD-related behavior) leads children to seek out arousal-enhancing activities because low arousal is experienced as an unpleasant physiological state (Eysenck, 1997).

Although the existing literature suggests a positive relationship between (violent) media exposure and ADHD-related behaviors, research in this field is very limited and there remain many gaps in our understanding of this relationship. For example, most studies mainly

focused on the direct relationship between media use and ADHD-related behaviors. Future research should investigate whether and if arousal is the underlying mechanism of this relationship. Evaluating the role of individual differences is also an important next step.

Materialism, parent-child conflict, and childhood overweight. Children's media environment has become increasingly commercialized. More than ever, advertisers view children as an important and relevant target group. And advertisers now rely on a host of technologies to reach these young audiences—ranging from traditional television commercials to branded websites and brand placement in video games. Relatedly, there are concerns associated with the negative influence of advertising on children's behavior and well-being. These concerns have predominantly focused on the negative influence of child-directed advertising on *materialism, parent-child conflict, and childhood overweight*. Research investigating these outcomes has typically looked at the effects of television advertising (e.g., Halford, Gillespie, Brown, Pontin, & Dovey, 2004), although newer interactive advertising formats (e.g., Henry & Story, 2009) are receiving increased attention.

In terms of materialism, scholars have argued that the inherent nature of advertising makes children more materialistic. Empirical studies have indeed demonstrated that advertising leads to an increase in materialism in children (Buijzen & Valkenburg, 2012; Oprea, Buijzen, van Reijmersdal, & Valkenburg, 2013). Empirical evidence also shows that advertising exposure leads to increased parent-child conflict because children ask for the advertised products and parents do not want to comply (Buijzen & Valkenburg, 2003).

In recent years, advertising has also been implicated as an important factor in children's likelihood to become overweight or obese. Researchers argue that the preponderance of junk food advertisements has created a generation of children who expect a heavy presence of these foods in their diets, and parents who opt against this practice are thought to act outside the norm (Jordan, 2007). Advertising exposure is said to stimulate

intake of high-calorie and low-nutrient food and beverages among children, which subsequently leads to overweight and obesity (Food Advertising Effects Hypothesis, Gantz, Schwartz, Angelini, & Rideout, 2007). A growing body of empirical research supports this contention (e.g., Borzekowski & Robinson, 2001).

The evidence for the negative influences of advertising on children is rather convincing. While more studies are needed to identify those children who are most susceptible to the negative effects of advertising, it is also important to recognize that advertising is part of today's consumer culture. Although one can imagine taking steps to limit children's exposure to violent media content, for example, it is harder to imagine ways to limit children's exposure to advertising content. Perhaps as a result of this fact, scholars are now investigating ways to help children become more resistant to advertising messages (e.g., by teaching advertising literacy) as well as identifying how the power of advertising can be used to promote healthier outcomes in childhood (e.g., healthier eating).

Positive Effects

All too often, discussions surrounding the effects of media in childhood focus upon negative effects. Far less attention has been paid to the role of developmentally appropriate media in supporting positive outcomes among children. Yet, as Fisch (2004) has observed, if we believe that children can learn negative lessons from media, it stands to reason that they can learn positive lessons too. To that end, we review the existing research on the positive impacts of media on prosocial behavior, school readiness skills, and core subject knowledge.

Prosocial behavior. Prosocial behavior refers to a range of positive behaviors including positive interactions (e.g., friendly play or peaceful conflict resolutions), altruism (e.g., sharing, offering help), and behaviors that reduce stereotypes (Mares & Woodard, 2007). Researchers who believe that media can influence prosocial behavior argue that depictions of prosocial behavior in the media are more consistent with social norms than

antisocial behavior, and as a result, imitations of these behaviors are more likely to be received positively than imitation of antisocial acts (Rushton, 1979).

More than 30 studies have been conducted to identify whether and how prosocial media content (mostly television) might contribute to prosocial behavior. A meta-analysis by Mares & Woodard (2007) revealed that children who watched more prosocial television content exhibited significantly more prosocial behavior. The overall effect size ($Z_{Fisher} = .27$) is similar to that found in meta-analyses of the relationship between violent television content and subsequent aggression. Television is therefore just as prone to fostering prosocial behavior as it is to fostering aggression (Mares & Woodard, 2007). In line with social cognitive theory, the relationship reported by Mares and Woodward was strongest when prosocial behaviors were explicitly modeled in the television show. Moreover, children's age moderated this relationship in such a way that the effect of prosocial content increased sharply during early childhood, peaked at age 7, and then declined until and throughout the teen years. Mares and Woodard posit that the peak in middle childhood suggests that younger children may lack the cognitive ability to fully understand prosocial acts on television. More research is needed to understand why the relationship weakens after middle childhood. A possible explanation is that this decrease is due to a dearth of developmentally appropriate prosocial television content available for older children.

Recent studies also suggest that interactive media that are designed to support prosocial behavior do work. In a series of studies conducted in three countries across three different age groups (i.e., middle childhood, adolescence, adults), researchers found robust evidence to support the argument that playing video games in which characters model prosocial behavior does increase short- and long-term prosocial behaviors (Gentile et al., 2009). Similar findings support the relationship between prosocial video game play and subsequent prosocial behavior (Saleem, Anderson, & Gentile, 2012).

Overall, the literature indicates that exposure to media that explicitly depict prosocial behavior does result in children enacting this behavior. This effect is most typically explained via social cognitive theory (Bandura, 2001). And while this theory has helped us understand why prosocial media content can be beneficial for children, there remain unanswered questions. In particular, more research is needed to identify best practices when creating prosocial media content for children. We also know little about the role of individual differences in determining who is exposed to prosocial content and how individual differences impact processing of this content.

School readiness. School readiness refers to children's abilities to engage in and benefit from formal schooling. This concept encompasses early academic skills as well as social and emotional development. The majority of research on media and school readiness has focused on the role of television in early childhood. More than 1,000 studies, for example, have examined the influence of the television program *Sesame Street* on children's school readiness (for review, see Fisch, 2004). Results have consistently indicated that exposure to *Sesame Street*, and its international co-productions, is beneficial for young viewers' school readiness skills (Fisch, 2004; Mares & Pan, 2013). *Sesame Street*, however, is only one example of a program that has been shown to support school readiness. There are many others such as *Barney & Friends* (Singer & Singer, 1994) and *Pinky Dinky Doo* (Linebarger & Piotrowski, 2009). What these shows, and others like them, have in common is that they were developed with the *explicit* intent to support school readiness skills. Building upon formative and summative research, these programs merge best pedagogical practices with an understanding of the needs and preferences of young audiences.

The mechanisms to explain *how* media affect school readiness skills are less frequently discussed in the literature. When discussed, researchers typically proscribe to the capacity model (Fisch, 2004) or to social cognitive theory (Bandura, 2001). The notable

theoretical consistency across studies investigating school readiness is the recognition that young children are active viewers that use the formal features embedded within media to guide their attention and comprehension (D. R. Anderson & Lorch, 1983). However, more research is needed to understand the theoretical mechanisms to explain when, and for whom, media can support school readiness.

Core subject knowledge. Core subject knowledge refers to a broad array of information and skills that children are introduced to during formal schooling including literacy, mathematics, and science. The majority of research looking at the relationships between media use and core subject knowledge has focused on the role of television in middle childhood. For example, research with the literacy-based program *Between the Lions* found that daily exposure to the program, over the course of 4 weeks, resulted in significant literacy gains (Linebarger, Kosanic, Greenwood, & Doku, 2004). Similarly, exposure to the math-focused television show *Cyberchase* supported children's mathematical problem-solving skills (Fisch, 2003), and research looking at the influence of television on science skills has shown that programs designed to support science knowledge (e.g., *The Magic School Bus*) do support viewers' understanding of scientific concepts as well as how to engage in the process of scientific discovery (ARC Consulting LLC, 1995; Rockman et al., 1996). These findings illustrate that developmentally appropriate media content designed with the explicit intent to support children's core subject knowledge is effective.

The available research also suggests that interactive media can support core knowledge. For example, children who actively used the website corollary of the program *Cyberchase* demonstrated gains in their mathematical problem-solving skills, particularly when used in combination with the television program (Fisch, Lesh, Motoki, Crespo, & Melfi, 2010). Similarly, electronic storybooks can support children's reading comprehension (Doty, Popplewell, & Byers, 2001) and phonics skills (McKenna, Reinking, & Bradley, 2003), and

using interactive media to demonstrate scientific concepts results in better concept comprehension when compared to standard lessons (Ardac & Akaygun, 2004).

The mechanisms to explain *how* media support core subject knowledge are less known. The capacity model (Fisch, 2004) and social cognitive theory (Bandura, 2001) emerge as the two most prevalent explanations for these effects. However, the paucity of theoretical research on why and how media can affect core knowledge skills highlights a critical area for future research.

Conclusion

Media use and child development are reciprocally linked processes. This chapter has demonstrated how development plays a predictive role in children's media use and preferences as well as how media use subsequently impacts development in both positive and negative ways. Our review of the influence of child development on media usage and preferences highlights the consistent presence of television in children's lives across developmental stages. We also see that content preferences and preferences for interactive media change dramatically with age. As technology continues to evolve, interactive media are likely to make inroads into children's lives at younger and younger ages. It will be important for researchers to track these changes in use and preference as well as identify how these changes affect children's lives.

This review also highlights how media can affect child development. In particular, it illustrates the importance of media *content* when studying media effects. Violent content and advertising content are certainly reasons for parental concern and public policy initiatives. Yet on the contrary, developmentally appropriate media content designed with the explicit intent to support healthy outcomes in children can be beneficial for children's cognitive, emotional, and social developments. Efforts to help families achieve a healthy media diet that balances both quantity and quality are worthwhile.

Lastly, this chapter presents three important theories to explain the negative and positive effects that media can have on child development. Social learning theory and the capacity model tend to focus on how children, in general, are likely to be affected by the media. It is becoming increasingly important, however, for researchers to pay more attention to conditional media effects. The DSMM offers a promising direction for understanding conditional effects as it identifies several susceptibility factors that can determine media exposure and preferences as well as strengthen or weaken media effects. Only by identifying for whom and when effects occur can we obtain a true understanding of the role of media in child development.

Future Directions in Media and Children's' Research

From this review, we can see that there is a wealth of research on both the positive and negative effects of media use on children's behavior. However, this review has also illuminated several critical gaps in the literature. These gaps highlight two major directions for future research. First, when investigating media effects, it is crucial not only to determine whether media has an effect but also to investigate *how* media influences children's behavior. To date, although researchers have proposed underlying mechanisms to explain media effects, empirical evidence to support these underlying mechanisms is largely missing. This gap is particularly notable in the research on the effects of media on ADHD-related behaviors, school readiness, and core knowledge skills. Second, the existing research has shown that media's influence on children is small to moderate in size and not always consistent. These small to moderate effect sizes are likely indicative of the limited attention paid to individual differences. Too many research studies disregard the importance influence of individual differences, yet it is quite reasonable that certain children may be particularly susceptible to the influence of media while others may be less susceptible (Valkenburg & Peter, 2013). It is critical that future research investigate the moderating roles of individual difference variables

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to identify which variables may increase or decrease media's influence on children. Such research will help us better understand the true size and nature of media's influence on children.

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