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Television Consumption and Child Obesity: Linking Children's Contemporary Television Use, Physical Activity, and Advertising to Putnam's Displacement Hypothesis

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TELEVISION CONSUMPTION AND CHILD OBESITY: LINKING CHILDREN'S

CONTEMPORARY TELEVISION USE, PHYSICAL ACTIVITY, AND ADVERTISING TO

PUTNAM'S DISPLACEMENT HYPOTHESIS

by

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ABSTRACT

Television Consumption and Child Obesity: Linking Children's Contemporary Television Use, Physical Activity, and Advertising to Putnam's Displacement Hypothesis

by

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This study observed the relationship between television consumption and child obesity through the theoretical construct of Putnam's displacement hypothesis. It did so by updating the previous research through the investigation of the displacement of both physical activity and advertisements on contemporary television platforms. The inclusion of Putnam's displacement hypothesis was to provide a foundational framework, not found in previous literature, to study two important paradigms that were represented in previous research: 1) the displacement of physical activity; and 2) the displacement of traditional advertisement exposure.

Several trends became apparent within previous literature. Previous literature did not include an explicitly stated theory by which to study any phenomena in the relationship between television consumption and child obesity. In addition to a lack of theory, previous literature did not incorporate newer, contemporary television platforms. Therefore, it was necessary to modernize the literature in this area of research for the two aforementioned reasons.

The current study's methodology included a survey instrument by which to measure multiple variables present within the television consumption and child obesity relationship. The survey instrument included questions pertaining to the following measures: 1) parental gender and socioeconomic status; 2) gender and ethnicity; 3) body mass index; 4) general and

contemporary television consumption; 5) physical activity; 6) parent's perceived neighborhood safety; and 7) parental mediation. The survey investigated the information pertaining to children five to thirteen years old from three different populations in the United States: 1) Baldwin Park, California; 2) Monroe, Louisiana; and 3) Las Vegas, Nevada.

Once the survey administration period was completed, data from the site in Las Vegas, Nevada were not incorporated into the analysis because it skewed the data. A scale-item analysis was performed to determine internal consistency. The retained scale items were submitted to a factor analysis with varimax rotation. Factor analysis revealed sub-dimensions for one of the constructs measured via scales. Pearson's product moment correlation was then used to test each hypothesis and research question. While each hypothesis was not supported, there is a possible cultivation effect within the sample. Strengths, such as the survey scale items used, and limitations, such as the small sample size, are mentioned. Finally, the end of the study discusses the need for future research to utilize the methods within this study; however, to do so with a larger sample size.

ACKNOWLEDGEMENTS

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CHAPTER ONE

INTRODUCTION

Obesity has been studied and researched globally for decades (Guran, et. al., 2010; Gurney & Gorstein, 1987; Liang, Kuhle, & Veugelers, 2009; Wang, Monteiro & Popkin, 2002). The prevalence of obesity in both adults and children has been the focus of multidisciplinary research in the United States in recent years (Centers for Disease Control, 2013; Ogden, Carroll, Kit & Flegal, 2014; Richardson, Dietz & Gordon-Larsen, 2013). Child obesity is of particular health concern for researchers and scholars (Kunkel, Mastro, Ortiz & McKinley, 2003; O'Dea, 2005; Ogden, 2012). Obesity in children is known to lead to adult obesity in the absence of intervention (Dietz, 1998; Goldschmidt, Wilfley, Paluch, Roemmich & Epstein, 2013; Serdula, Ivery, Coates, Freedman, Williamson & Byers, 1993). Therefore, researchers like Dietz and Vandewater have dedicated their research to delving into the possible causes, implications, and prevention of child obesity.

One of the causes of child obesity is media consumption (Borzekowski & Robinson, 2001; Dietz & Gortmaker, 1985; Kalin & Fung, 2013; Robinson & Killen, 1995). Television has attracted a substantial body of research (Gortmaker, Must, Sobol, Peterson, Colditz, Dietz, 1996; Inoue, Sugiyama, Takamiya, Oka, Owen & Shimomitsu, 2013; Robinson, et. al., 1993). However, this body of research has not yet incorporated contemporary television consumption platforms. The rise of subscription-based platforms, like Amazon Prime, Vudu, and Sling, as well as the introduction of television recording technology, like TiVo and other DVR programming, has produced contemporary television viewing practices that are evolved deviations of traditional television viewing practices. The integration of these new practices is imperative to understanding the relationship between television consumption and child obesity.

This study is designed to observe the television consumption and child obesity relationship through the theoretical construct of Putnam's displacement hypothesis. The displacement hypothesis has been utilized in previous research (Buijzen, Bomhof & Schuurman, 2008; Burdette & Whitaker, 2005; Guran, et. al., 2010). The aim of this study, however, is to update that research by investigating the displacement of both physical activity and advertisements on contemporary television platforms. Therefore, the displacement hypothesis provides a foundational framework within which to study two important paradigms present in previous research: 1) the displacement of physical activity; and 2) the displacement of traditional advertisement exposure.

Obesity Defined

The Centers for Disease Control (CDC) defines child obesity as any child in the 95th percentile for their body mass index (BMI) while accounting for age (Dehghan, Danesh, & Merchant, 2005; Flegal, Wei & Ogden, 2002). It is imperative, however, to operationally define obesity with an accessible and measurable format for this study. Research has shown that the standard method of measuring body fat has been to utilize height and weight measurements to calculate a child's BMI and it is far easier for medical personnel to determine health issues related to weight status by utilizing these calculations (Barton, 2010; Gallagher, et. Al, 1996; U.S. Preventative Task Force, 2003). BMI is calculated by using measured or reported height and weight measurements and applying a simple formula that divides the weight of the child by the square of their reported height (Gallagher, et. al., 1996). These measurements are easily obtainable through self-reported measures; therefore, the body of previous research exploring the relationship between child obesity and television typically utilizes BMI as an indication of a child's obesity qualification (Cecil-Karb & Grogan-Kaylor, 2009; Chou, Rashad & Grossman,

2008; Vandebosch & Cleemput, 2007; Vandewater, Shim & Caplovitz, 2004). This study also used the height and weight measurements as reported by a parent participant to obtain a child's BMI ranking.

<div align="center">Media Consumption and Obesity</div>

Child obesity became globally acknowledged as an epidemic in the late 20th century and continues to be a problem today (Deckelbaum & Williams, 2001; Ebbling, Pawlak, & Ludwig, 2002; Popkin & Doak, 1998; Rutherford, Biron & Skouteris, 2011; Singh, 2013; Wang, 2001). In the United States, child obesity is affecting 17% or 1.2 million children (Centers for Disease Control, 2013). Typically, this epidemic is entrenched in the medical and health research fields (Ludwig, Peterson, & Gortmaker, 2001; Must & Strauss, 1999; Reilly & Armstrong, 2005; Strauss, 2000). However, over the last few decades researchers have turned to a myriad of academic disciplines in order to study the causes of this epidemic (Cawley & Liu, 2008; Feinlab, 1985; Mello, Studdert & Brennan, 2006; Puhl & Heuer, 2012; Wadsworth & Pendergast, 2014).

Media effects scholars have also studied obesity (Guran, et. al., 2010; Halford, Gillespie, Brown, Pontin, & Dovey, 2004; Kunkel, Mastro, Ortiz, & McKinley, 2003; Rashad & Grossman, 2008; Veerman, Van Beeck, Barendregt, & Mackenbach, 2009). Changes in children's behavior as a result of media use has been known to be an indication of their susceptibility as audience members (Buijzen & Valkenburg, 2003; Desmond & Carveth, 2007; Sanders, Montgomery & Brechman-Toussaint, 2000). For example, Buijzen and Valkenburg (2003) have examined the development of brand and logo recognition in children and a behavior change due to their susceptibility, which can be linked to possible marketing and purchasing potential. Likewise, Desmond and Carveth's (2007) meta-analysis examined a link from advertisers' aggressive and persuasive tactics to children's behavioral changes. Furthermore,

Ward, Wackman & Wartella (1977) believe children to be susceptible based on Piaget's theory of cognitive development, which indicates children to possess deficits in their logical cognitive processes leaving them susceptible to media influences. Previous scholars have uncovered that a media consumption cause affecting childhood obesity is probable due to these behavior and cognitive changes. They also postulate that they are perhaps reversible through behavior modifications (Coon, Goldberg, Rogers & Tucker, 2001; Lytle & Achterberg, 1995; Wakefield, Loken & Hornik, 2010). This study will hone in on one form of media consumption, television viewing, as a probable cause for behavior changes resulting in child obesity.

Television is still one of the most influential media perhaps due to the rise of the Internet as a means of streaming television shows conveniently (Lafayette, 2014; Pavlik, 2013). Television is a near-constant presence in the vast majority of homes with children (Andreasen, 2001; Lafayette, 2014; Medrich, 1979; Rideout & Hamel, 2006). School age children have been shown to spend at least three hours a day with television and thirty percent of average American homes have a television on during meal times (Jordan & Robinson, 2008; Rideout & Hamel, 2006). Some parents even depend on the television as a babysitter to occupy children while they carry out daily chores (Austin, Knaus & Meneguelli, 1997; Gantz, 1982; Gotz, Bachmann & Hoffman, 2007). The television's continual proximity and utilization in children's lives alongside the growth of the obesity epidemic has made researchers wonder for decades what elements of television could be causing child obesity.

Previous research has explored the growth of child obesity and the introduction of the television as a basis for the epidemic resulting from the sedentary activity associated with television consumption (Brown, Crammond & Wilde, 1974; Dietz, Bandini, Morelli, Peers & Ching, 1994; Epstein, et. al., 1995;). Research states that physical activity is abandoned in favor

of television watching and, therefore, contributes to this growing epidemic (Durant, Baranowski, Johnson & Thompson, 1994; Robinson, 2001; Vandewater & Caplovitz, 2004). More recent research has looked at the continuity of targeted children's advertising as a component of television viewing and how it affects child obesity (Bulmer, Eagle, DeBruin, & Kitchen, 2004; Derochers & Holt, 2007) Still other researchers claim that the inexplicit messages of television, for example the underlying message about fattening foods in some advertising, are to blame (Borzekowski & Robinson, 2001; Boynton-Jarrett, et al., 2003; Chou, Rashad & Grossman, 2008; Lobstein & Dibb, 2005). However, previous scholars have not included contemporary television consumption platforms, such as Netflix, Amazon, or other streaming video services, which are popular with children's programming (Stelter, 2013). Therefore, this study will incorporate such platforms in order to observe a possible current cause for childhood obesity related to television consumption.

<div align="center">Displacement Hypothesis</div>

Putnam (1995) stated that television viewing dominates American leisure time and adversely inhibits time spent outside of the home. This is the foundation of Putnam's displacement hypothesis, the theoretical basis for this study. Putnam calls television "the most obvious and probably the most powerful instrument" in the United States (Putnam, 1995, p.8). The general notion behind Putnam's displacement hypothesis is that "there is reason to believe that deep-seated technological trends are radically 'privatizing' or 'individualizing' our use of leisure time" (Putnam, 1995, p. 8). The large quantity of time spent with television essentially displaces time that would ordinarily be spent engaged with other activities. Similarly, time spent consuming television advertisements within a traditional television platform has been displaced with few to no advertisements in contemporary television consumption platforms. Therefore, the

time spent with influential advertisements has been substituted or dominated by increased television program consumption time. The aim of this study is to utilize the displacement hypothesis as a conceptual framework within which to observe two key paradigms: 1) the displacement of physical activity; and 2) the displacement of traditional advertisement exposure.

The first paradigm asserts that the displacement of more energy-demanding activities for television consumption leads to obesity (Buijzen, Bomhof & Schuurman, 2008; Durant, Baranowski, Johnson & Thompson, 1994). Previous research that explores physical activity or sedentary activity and media shows that children are heavily influenced by parental mediation and modeling of television consumption (Keiller, Colley & Carpenter, 1979; Vandewater, Park, Lee & Lee, 2008; Valkenburg, Kremar & De Roos, 1998; West, Sanders, Cleghorn & Davies, 2010). Therefore, this study will include an additional parental mediation factor in order to gauge the displacement hypothesis' effect on children without personal choice of activities. Previous studies also point to neighborhood safety as a determinant of the displacement hypothesis (Grow, et al., 2010; Lopez, 2007; Ludwig, et. al., 2011). Parents who perceive their neighborhoods to be unsafe are less likely to allow children to play outside thus leaving children to occupy time with indoor activities such as television consumption (Burdette & Whitaker, 2005; Cecil-Karb & Grogan-Kaylor, 2009; Kimbro, Brooks-Gunn & McLanahan, 2011). These varying aspects offer a deeper understanding of the displacement of the physical activity paradigm and will be explored in greater detail in the next chapter.

The second paradigm addresses contemporary television delivery and consumption platforms. Time-shift viewing is a contemporary asset of television consumption and has not been thoroughly explored in previous research (Hall, 2014; Matrix, 2014). The advent of digital video recording (DVR) and video subscription services without any or with minimal

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advertisements, such as Netflix, has displaced the time spent consuming commercials. This displacement is a significant nuance with regards to previous research exploring the relationship between television and child obesity. Previous scholars focus heavily on the content of advertisements to children (Chou, Rashad, & Grossman, 2005; Derochers & Holt, 2007; Guran, et. al., 2010; Harris, Pomeranz, Lobstein & Brownell, 2009; Veerman, Van Beeck, Barendregt & Mackenbach, 2009). However, by incorporating contemporary television consumption platforms and the displacement of time with advertisements, this study will provide a modern view of advertisement exposure's impact on child obesity and will be further explored in the following chapter.

Purpose of the Study

The overarching purpose of this study is to explore the contemporary relationship between child obesity and television consumption. The amount of literature in this area of research is extensive (Caroli, Argentieri & Masi, 2004; Dietz & Gortmaker, 1985; Moreno, Fleta & Mur, 1998; Robinson, et. al., 1993; Robinson, 2001; Rutherford, Biron & Skouteris, 2011). However, very few studies have examined contemporary television consumption platforms (Hall, 2014; Matrix, 2014). "Never before have we seen this level of fragmentation… [t]oday, content is delivered and consumed through competing delivery platforms" (Lafayette, 2014, para. 4). Data suggest that television consumption among younger demographics through these platforms has increased in recent years (Lafayette, 2014; Lewin, 2011; McDonough, 2009). With this notion in mind and the acknowledgement of the limited hours in a day, scholars have shown that the increase of time spent engaged in television consumption serves to displace time spent with other, more physically demanding activities (Buijzen, Bomhof & Schuurman, 2008; Mutz, Roberts & Van Vuuren, 1993; Sparks, 2012). Therefore, the purpose of this study is to

incorporate modern television consumption platforms while implementing Putnam's displacement hypothesis as a framework in which the relationship between television consumption and child obesity can be explored in a contemporary context.

Public Policy Implications

Children cannot identify persuasive intent within media's embedded messages (Browne & Hamilton-Giachritsis, 2005; Buijzen & Valkenburg, 2013; Lobstein & Dibb, 2005). Likewise, the notion of individual choice becomes nearly obsolete in regard to a young child's personal choice to displace one activity for another (Epstein, Smith, Vara & Rodefer, 1991; Nucci & Smetana, 1996; Richards & Smith, 2007).

One of the functions of this study is to provide research in order to fuel public policy campaigns for reducing the prevalence of obesity in two areas: healthy food choice advertising and physical fitness promotion. Research has examined television advertising that promotes fast food, junk food, or other fattening food choices to young children as an indicator of poor health choices and outcomes linked to obesity (Borzekowski & Robinson, 2001; Derochers & Holt, 2007; Veerman, et. al., 2009). However, within contemporary television platforms, the consumer is many times given the choice to skip, fast forward, or avoid advertisements altogether. Some may view this aspect of contemporary television consumption as a positive alternative to being subjected to watching advertisements with unhealthy food messages (Halford, Gillespie, Brown, Pontin & Dovey, 2004; Kunkel, Mastro, Ortiz & McKinley, 2003). Some scholars like Dixon, Scully, Kelly, Chapman and Wakefield (2014) have recently found that counter-advertisements are effective when children comprehend the message. In Dixon, Scully, Kelly, and Wakeman's (2014) study, children were shown Internet banners promoting healthy foods as web-based advertisements, which were intended to counteract the effects of unhealthy food advertisements.

The success of their study offered this web-based strategy to public health organizations and government policy officials as a means of advertising healthy eating to children within a contemporary platform. This study's findings may help bolster efforts made to encourage healthy food choices within a web-based platform to promote the reduction of child obesity.

Physical fitness promotion is another area of public policy this study targets. There is extensive research in favor of physical fitness promotion for children (Epstein & Goldfield, 1999; Lindsay, Hongu, Spears, Idris, Dyrek & Monore, 2014; Ortega, Ruiz, Castillo & Sjostrom, 2007; Parizkova, Roville-Sausse & Molnar, 2013). However, the child obesity epidemic still exists today and the necessity of physical fitness promotion in the public sector (schools and community based programs) and the private sector (campaigns targeting parents and lifestyle choices in the home) has not changed. Lytle and Achterburg (1995) identified elements of successful educational programs that promoted healthy lifestyles. They found that some of those elements that affect young children were behavior change interventions in the school environment, intervention in the community and family involvement. These programs were based on the research conducted by scholars. Therefore, this study will help bolster further research to support current public policy and public programs that promote the reduction or the reversal of child obesity.

Organization of Thesis

Chapter One provided a general overview of the relationship between television consumption and child obesity as well as Putnam's displacement hypothesis. It also provided a definition of obesity and its measures. Chapter Two provides an in-depth examination of previous literature pertaining to 1) advertisement exposure; and 2) physical activity. Chapter Three provides the hypotheses and methods for the current study. Chapter Four provides the statistical findings and implications of the current study. Lastly, Chapter Five provides the subsequent discussion based on the results of the statistical findings. It also provides limitations of the study and implications for future research.

CHAPTER TWO

LITERATURE REVIEW

This chapter includes previous research in two prominent areas investigating the

relationship between television consumption and child obesity: 1) advertisement exposure; and

2) displacement of physical activity. Previous research regarding television's displacement of

physical activity incorporates many different mediating factors. Therefore, this chapter also

includes two pertinent subsections within the physical activity research paradigm: 1) parental

mediation/modeling; and 2) neighborhood safety. The majority of previous research

investigating the relationship between television consumption and child obesity omit an

explicitly defined hypothesis. Therefore, not all of the subsequent studies will include a

theoretical basis; however, some researchers included an implied theoretical basis for their study

and this will be mentioned when appropriate. Discussion of each of the following studies will

include method, statistical analysis, and subsequent findings.

Advertisement Exposure

Children are susceptible to different cues presented in television advertising in many areas

of research (Henricksen & Flora, 1999; Ross, Campbell, Wright, Huston, Rice & Turk, 1984;

Wilson, Quigley & Mansoor, 1999). Therefore, this has led scholars to investigate food

advertising content and time slot placement of such advertisements as causes for child obesity.

Unhealthy food advertisement exposure resulting in child obesity has not been proven; however,

many developed countries around the world have banned or restricted these advertisements

regardless. It is imperative to delve into previous literature regarding this relationship since

traditional television advertising platforms are evolving.

In 2001, Borzekowski and Robinson (2001) conducted a study to examine preschoolers'

food preferences based on food advertising. The study's sample group consisted of preschool children ages 2-6 years old ($N = 46$) in a controlled, randomized trial. The authors did not explicitly state a theoretical basis for the study; however, they did allude to the presence of a priming effect of food advertisements on children. The study allocated the children into two distinct groups. The subjects selected as the control group watched a video of a children's cartoon (twenty-six minutes in length) with no commercials and the subjects selected to be the treatment group were shown the same cartoon with commercials embedded into the program. The embedded commercials consisted of food advertisements for juice, doughnuts, sandwich bread, remote-control toy cars, breakfast cereal, snack cake, fast-food chicken, and candy.

Research assistants were employed to conduct post-test interviews consisting of basic questions such as "Do you like to watch TV?" (Borzenowski & Robinson, 2001, p. 43). Research assistants also presented the children with picture boards to determine if there was a link between the children's food preferences and the commercials, some with different items than presented in the commercials, and some with different brand names.

The study incorporated a Cochran Q statistical analysis to determine whether or not the children in the treatment group chose the advertised food items more frequently or not. Borzekowski and Robinson found that the proportion of children that chose the advertised foods was greater in the treatment group than in the control group ($Q_{diff} = 8.13$, $df = 1$, $p < .01$). Furthermore, Borzekowski and Robinson's study found that boys and girls did not significantly differ in their selection of the advertised foods over the non-advertised foods ($Q_{diff} = 0.52$, $df = 1$, $p = .47$). They concluded that even small amounts of unhealthy food advertisement exposure would produce unhealthy, short-term food preferences in children. They also stated that further research pertaining to the long-term effects of food advertising on children was necessary.

Kunkel, Mastro, Ortiz and McKinley (2003) compared Spanish-language television advertisements and English language advertisements to measure the exposure of food marketing to children in the United States. While this study is a content analysis and does not contain a measure by which to ascertain the effects the content may have on children and their BMI, it presents an important look at a marginal television classification not represented prominently in this area of research (Aranceta, Perez-Rodrigo, Ribas & Serra-Majem, 2003; Subervi-Velez & Ncochea, 1990; Vicente-Rodriguez, et. al., 2008). They justify this comparison by referring to previous studies that have found unhealthy food advertising to be influencing food preferences and obesity in children.

Kunkel, Mastro, Ortiz and McKinley's (2003) study examined broadcast and cable network shows which aired children's Spanish-language programming. The three Spanish-language broadcast television networks included were Azteca America, Telefutura, and Telemundo. The three Spanish-language cable networks included were Discovery Familia, Disney XD, and Sopresa. The authors chose a particular time slot in order to sample the hours within which children's programming was aired. They chose a broad time slot (7 a.m. – 10 p.m.), but narrowed down the sample of shows ($N = 158$) by defining children's programming according to their rating (TV-Y and TV-Y7). The study also included the nutritional quality of the advertised foods using a rating system provided by U.S. Department of Health and Human Services.

Kunkel, Mastro, Ortiz, and McKinley (2003) did not include a statistical analysis for their study due to the qualitative nature of the study; however, their findings are still very relevant to the body of research due to its implications for ethnic targeting of obesogenic food advertising. They found that the quantity of Spanish-language channel food advertising was less (2.2 food

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ads/hr.) than English-language food advertising (7.6 food ads/hr.). Their food rating system indicated that the nutritional quality of the foods advertised on Spanish-language television was worse (82% of ads in the poorest nutritional ranking) than on English-language television (72.5% of ads in the poorest nutritional ranking). The authors concluded that Spanish-speaking children are more likely to choose nutritionally poor products due to the disproportionate amount of obesogenic food advertisements.

European researchers, Halford, Gillespie, Brown, Pontin, and Dovey (2004), conducted a study that not only looked at the content of advertising within children's programming, but also studied the effects of consumption promotion shortly thereafter. The sample included 9-11 year old children from Liverpool ($N = 42$). The sample was divided into three groups: a control group, test group shown food advertisements, and a test group shown non-food advertisements. The study incorporated a two-step experiment. The first portion of the experiment contained a children's cartoon to be watched by the children, some contained advertisements and some did not. In the second portion, the children were presented with various foods to eat. The children's BMI for this study was measured using self-reported height and weight. There were two test periods for each of the children with a two-week span of time between them.

The children were asked to watch the cartoon and were then presented with a list of sixteen advertisements from which they were asked to identify the advertisements shown during the cartoon. The authors found, using Kruskal-Wallis analysis of ranks, that the children considered obese, based on BMI, recognized more food advertisements than did the children who were not obese ($X^2 (2) = 19.2, p < 0.001$). Following the identification portion of the experiment, the children were then given a plate with different types of food on it. They were instructed to eat as much or as little as they wanted. Researchers then weighed any remaining

food on the plates. Utilizing Pearson's *r*, the authors determined that the number of advertisements recognized by the children was positively and significantly correlated with the amount of food eaten ($r = 0.49$, $p < 0.001$). Additionally, the authors employed ANOVA in order to examine the difference in food type consumption among the two advertisement test groups. They found that the weight of the food after watching the advertisements varied significantly among all of the children (F (3, 39) = 18.4, $p < 0.001$). A significant difference, however, was that high fat foods were selected more predominantly over low fat foods ($p < 0.001$).

Halford, Gillespie, Brown, Pontin, and Dovey concluded that obese children's heightened alertness to food advertisement and mere exposure to all children resulted in an increase in food consumption. The authors also concluded that the relationship between television consumption and child obesity was due to an increased consumption caused by advertising of unhealthy foods.

Derochers and Holt's (2004) study is influential because of their comprehensive data on children's exposure to advertising and advertising content within a large sample size. The study was not experimental in nature and, therefore, differed from previous studies examining the relationship between television advertisement exposure and child obesity. Much of the successive literature has cited and referenced Derochers and Holt's study.

Their study obtained data pertaining to children's television exposure from four weeks of television programming provided by the Federal Trade Commission (FTC). The FTC possessed collected data pertaining to the audience demographics and advertisement content. The study also used the Nielsen Media Research/Nielsen Monitor-Plus Service to compartmentalize the types of advertising within those four weeks (paid commercial advertisements, public service announcements, and promotions for a network's programming). The child demographic was defined as audience members between the ages of 2 and 11. The study's stated objective was to

"provide a comprehensive description of children's exposure to television advertising in 2004 and to highlight any significant changes that have occurred since 1977" (Derochers & Holt, 2004, p. 185). Therefore, the authors incorporated data gathered from similarly conducted studies in 1977 by the FTC. The rationale behind this comparison was to update the previous literature by examining the levels of television advertising since the rise of the obesity epidemic in children.

The authors found that the amount of total advertisement exposure to children in 2004 was greater (25,629 total ads) than the amount in 1977 (21,904 total ads). They also found that 22% of those advertisements in 2004 were food-related. One-third of the total advertising exposure and one-half of food advertising exposure took place during programs directed at children. Saturday morning advertisement exposure was the largest single-day contributor to children's exposure, particularly between the hours of 8 a.m. and 12 p.m. However, the comparison of weekend exposure and weekday exposure revealed that the amount of weekday exposure (4.5%) exceeded weekend exposure (4%) simply because there are more days and therefore more television is being consumed. While Derochers and Holt did not incorporate any statistical analysis, their study was foundational in its ability to compare advertisement exposure's possible contribution to child obesity over time.

Chou, Rashad and Grossman's (2008) empirical study was intended to explore the idea that fast-food television advertisements have a direct, causal relationship with child obesity. The authors used three nationally representative studies called the National Longitudinal Survey of Youth (NLSY) from the years 1997 ($N = 8,984$), 1998 ($N = 8,386$), and 1999 ($N = 8,209$). Children 3-11 years of age were incorporated for this study's sample. They isolated one particular type of television food advertisement, fast-food advertisements, in hopes of

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discovering a stronger relationship than previous studies showed. Children's obesity

qualifications were analyzed using measured BMI of the children as well as their mothers. The

authors rationalized this inclusion by stating that parental BMI is an important predicting factor

of a child's BMI.

The authors retrieved the fast-food advertising data from a large advertisement tracking

company, Competitive Media Reporting (CMR). They calculated the exposure time by how

many seconds of fast-food messages were aired annually per observation unit. This observation

unit is called a designated market area (DMA). The BMI measurement derived from the reported

weight and height provided in the NLSY. Due to the large sample size, Chou, Rashad, and

Grossman used a regression model for their statistical analyses.

The results for when television exposure was the dependent variable was $R^2 = .146$ and

the results for when BMI was the dependent variable was $R^2 = .088$. Overall, the authors found

that the results delineated a strong effect of fast-food advertising on obese children, but not as

strong of an effect on non-obese children. Chou, Rashad, and Grossman concluded that, based on

the results and the indiscriminate nature of fast food advertisements, a ban on fast-food television

advertising to children should be incorporated into public policy.

A total ban on fast food advertisements would be an extreme response to their effect on

child obesity; however, some researchers have set out to investigate the consequences of such a

scenario. Veerman, Van Beeck, Barendregt, and Mackenbach (2009) conducted a literature

analysis and a partial meta-analysis to "estimate how much of the childhood obesity prevalence

is attributable to food advertising on television" (Veerman, Van Beeck, Barendregt &

Mackenbach, 2009, p. 365). The aim of their study was to examine the effects of a total ban on

television food advertisements. The study's sample included studies of six to twelve year old

children from the United States. The base study used by the authors relied on the results from the 2003-2004 National Health and Nutrition Examination Survey (NHANES) for the body measurements, the weight categories from the 2000 Centers for Disease Control (CDC) report. The information about advertisements as they relate to consumption and to BMI was obtained from a previous study conducted in 1983. They obtained their measurement for the impact of advertising on food consumption by consulting thirty-three academic experts in this area of research through a questionnaire. They then conducted a Delphi Study to account for any uncertainty in this relationship between television advertisement exposure and food consumption within the literature from 1983.

Veerman, Van Beeck, Barendregt, and Mackenbach used an intervention population and a control group in the first part of their analysis. This analytical framework consisted of four steps. The first step assumed that the introduction of a policy for lowering television advertising would be necessary. Reducing exposure to zero exposure is not realistic; however, the authors reduced the exposure to zero in order to test the theoretical maximum effect. The second step assumes that of the lowering of television advertising exposure would also lower the total amount of food intake. The third step assumed that the lower food intake of the children would lead to lower body weight. And the fourth and final step applied Rose's theorem to determine the number of obese children.

The authors' base case model predicted that by lowering children's advertisement exposure from 80.5 min/week to 0 min/week that their total food consumption would be reduced by 4.5%. This reduction would equate to a decreased BMI by 0.38 kg m^{-2} and a decrease in obesity 2.7 percentage points in males and 2.4 percentage points in females. The Delphi study panelists' estimates predicted a reduction in television exposure (from 80.5min/week to 0

min/week) would result in a 12% decrease in total food consumption which would equate to a decreased BMI by 1 kg m^{-2} and a decrease in obesity by 6.8 percentage points for males and 6.0 percentage points for females. The authors concluded that a complete ban of television food advertisements would decrease the prevalence of child obesity in the United States by 2.5 percentage points. They also stated that as many as one in seven children could have been prevented from having the disease of obesity if there was no food advertising on television.

Guran et al. (2010) conducted a content analysis of television advertising on Turkish television channels in order to examine food advertisements impact on Turkish children's weight gain. The authors chose four popular Turkish television channels. The popularity of the channels was determined by reports conducted by AGB Nielson Media Research (AGB Andelou). The television measurement included four different time slots within two weekdays and two weekend days. The four time slots were used to represent different volumes of television viewing by children at different times of the day. The first time slot (8 a.m.- 12 p.m.) represented a high concentration of children's programming, the second slot (12 p.m.- 4 p.m.) represented a low concentration of children's programming, the third slot (4 p.m.- 8 p.m.) represented a high concentration of children's programming, and the fourth slot (8 p.m.- 12 a.m.) represented a low concentration of children's programming, but with high volumes of children watching television. Each of these four time slots was examined within the four popular Turkish television channels. Therefore, the authors looked at various advertisements targeted at children within these slots in order to obtain their advertisement exposure measurement.

Guran et al. (2010) found that of the 43.1 hours of advertising measured, 16.2 hours were dedicated to food and beverage advertisements. Within these food advertisements, there were five times as many for high-calorie/high-fat/high-sugar food and drink advertisements than

healthy food advertisements. The food and drink advertisements mainly occupied the 4 p.m. – 8 p.m. slot on weekdays and weekends. Each popular television channel contained 31 ads/hr., out of which ten were food and beverage related and eight of those ten were obesogenic/unhealthy food and beverage advertisements. The authors deduce that most obesogenic/unhealthy advertisements are aired during a time slot when the concentration of children's programming is high and that weekends also host most obesogenic/unhealthy advertisements while children are home rather than on school days.

Zimmerman and Bell (2010) aimed to look at different types of children's television content and their associations with children's BMI. Their data derives from a longitudinal study, the Panel Survey of Income Dynamics (PSID), which began in 1968. In 1997, the study incorporated a different component, a questionnaire, which incorporated demographics, psychological and behavioral assessments, and a time-use diary (activities recorded from one randomly chosen weekday and one randomly chosen weekend day). These time-use diaries were incorporated again in 2002 to those who had completed the questionnaire in 1997; however, 376 participants of the 2002 questionnaire did not complete the 1997 questionnaire and 92 were not measured for BMI. Therefore, some participants were deleted from the sample leaving 2,037 sample participants.

For the measurement of obesity, the authors used BMI and converted it into z scores according to growth charts published by the CDC in 2000 in order to account for the varying ages of the participants. The television consumption component was gathered using the time-use diaries and five categories supplied by the authors. These categories were: 1) educational viewing on broadcast or cable; 2) educational viewing on video or DVD; 3) entertainment viewing on video or DVD; 3) children's entertainment viewing on broadcast or cable; and 5)

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general-audience entertainment viewing on broadcast or cable. They also divided the participants into two groups: 1) participants younger than 7 years of age and 2) participants 7 years of age and older.

Zimmerman and Bell found that children younger than 7 years of age did not differ significantly in their associations of obesity to broadcast/cable educational television and video educational television ($p = .42$), video entertainment television and video educational television ($p = .61$), or broadcast/cable entertainment television and general-audience entertainment television ($p = .33$). In children 7 years old and older, they found a similar insignificant association of obesity to broadcast/cable educational television and video educational television ($p = .06$), video entertainment television and video educational television ($p = .33$), or broadcast/cable entertainment television and general-audience entertainment television ($p = .37$).

They then transformed their categories into two categories: 1) commercial viewing (incorporating children's broadcast/cable entertainment television and general-audience broadcast/cable entertainment television) and 2) noncommercial (incorporating broadcast/cable educational television, video educational television, and video entertainment television). The authors used regression models to incorporate the BMI z scores into the analysis. They found that in 1997, each hour of commercial viewing was significantly associated with the increase of BMI z scores (a 0.11 increase) in 2002 in children seven years and younger. They also found that in children seven years old and older, although the effect of commercial viewing was headed in the direction of a significant trend in 2002 ($p = .06$), none of the television viewing categories produced significant effects.

Most interestingly, Zimmerman and Bell conclude that their results provide a different perspective on the commonly accepted notion of television as a sedentary activity. They claim

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that their findings indicate obesity to be associated with television content containing advertisement exposure rather than the physical activity related to television consumption.

Moon (2010) posed five research questions while conducting a content analysis of food ads presented within Korean television and how they communicate health and nutrition to children. The research questions were as follows: 1) what types of food products are frequently advertised; 2) what types of persuasive appeals are frequently employed; 3) what types of health-related claims are used in Korean television food commercials directed at children in terms of general health claim and nutrition/substance; 4) what levels of nutrition/substance claims are provided in Korean television food commercials directed at children in terms of 3 types of disclosure (absolute, relative, and evaluative); and 5) in what manner are health-related claims presented in terms of audio/visual cues, text, spokesperson, and fine prints.

Moon's sample was gathered from the 2008 archives of commercials provided by Korea TV-CM Research. The extensive research gathered by this company included brand names, product categories and target audiences. Food commercials directed at children were extracted from this data. These food commercials were selected and narrowed down based on the ability to meet certain criteria. Only six cable channels and three network television networks were included. The author's selected broadcast hour slots were 7 a.m. to 9 a.m. and 4 p.m. to 8 p.m. Each commercial ($N = 403$) was 15 to 30 seconds long and any duplicated commercials were excluded from the sample.

The author incorporated two levels of analysis. The first level was the individual commercial itself and the second was the health-related claim it contained. There were seven coding scheme categories: 1) the product category; 2) the presence of persuasive appeal; 3) the presence of a general health claim; 4) the inherent qualities or components/emotional appeal; 5)

affective appeals; 6) nutrition/substance claim; 7) presentation manner of health-related claims. According to Moon, the intercoder reliability ranged from .89 to .98 for each of the categories using Perrault and Leigh's (1989) reliability measurement.

In the food product category, Moon found that, of the total amount of food advertisements ($N = 430$) present in the commercials, about three-fourths of them were for unhealthy food items ($N = 284$). The persuasive appeals category revealed that of the total amount of appeal strategies used ($N = 18$), nine appeals were found to be significantly different than the other appeals ($p < .05$). The author also found that advertisements containing one or more general health-related claims about were more prevalent in health food advertisements than unhealthy food advertisements ($X^2 = 44.84$, $df = 1$, $p < .05$). Moon looked for three types of nutritional claims (absolute, relative, and evaluative) in the commercials. Of the total amount of advertisements with nutritional claims, 74.7% of them were void of any nutrient specific information. The most pertinent finding was within the presentation manner category. Moon found that the nutrient/substance claims were not presented with the aid of visual and audio cues as much as general health claims were ($X^2 = 51.27$, $df = 3$, $p < .01$). Furthermore, the use of a spokesperson to deliver general health claims was seen more frequently than with nutrient/substance claims ($X^2 = 6.74$, $df = 1$, $p < .05$).

Moon concluded that unhealthy foods are advertised to children more then healthy foods. General health claims are included in commercials; however, substantial claims about nutritional information are not used as frequently among food marketers. Lastly, Moon reveals that health-related food claims are most often delivered through audio and visual cues and frequently presented by a spokesperson. Moon claims that children are susceptible audience members and

that the visual and audio cues can be identified as potentially misleading to child audiences. Moon calls for responsibility in advertising and policy changes in marketing to inform children.

Physical Activity

Many scholars have looked to an increase in television consumption as the culprit for the increase in child obesity attributed to the decrease of the physical activity (Anderson, Crespo, Bartlett, Cheskin & Pratt, 1998; Hernandez, Gortmaker, Colditz, Peterson, Laird & Parra-Cabrera, 1999; Marshall, Biddle, Gorely, Cameron & Murdey, 2004). Putnam's Displacement Hypothesis is not mentioned in much of the previous research; however, the notion of physical activity displacement is a prominent driving force behind the majority of the following studies. One of the earliest foundational studies in this area of research was Dietz and Gortmaker's (1985) study.

Dietz and Gortmaker (1985) conducted a study using two different waves of data collection from the National Health Examination Survey (NHES). Cycle II collected data pertaining to 6,965 children ages 6-11 and supplied by parent reporting. Cycle III contained data from 6,671 children ages 12-17 collected from self-reports by the adolescents themselves. These data reports included how many hours were spent doing various activities; Dietz and Gortmaker extracted the reported time spent consuming television from these reports in order to obtain the television consumption measurement component. The obesity measurement was found by pediatricians or trained nurses measuring triceps skinfolds on each of the children.

Dietz and Gortmaker used cross-sectional analyses to examine how the children's obesity variables compared to the television consumption variables in both cycles. After the examination of these factors, the authors then used chi-square, regression coefficients and F tests to

investigate the statistical significance. All demographic measures were analyzed using weighted multiple regressions.

In Cycle II, the study found that the children that consumed more television had a higher obesity ranking ($r = .011$, $p < .01$) than children that watched less television. Similarly, in Cycle II, the children who consumed more television daily were significantly more obese ($r = .019$, $p < .0001$) than those who did not. For each additional hour of television consumed, the children's likelihood to be obese increased by 1.2%- 2.9%. The study also included a longitudinal analysis to account for preexisting obesity in the children. This analysis showed that there was still a significant link between television consumption and a preexisting obesity condition ($r = .029$, $p < .0001$); however, the authors believed that these results still supported the notion of a causal relationship. Cycle III included 2,153 participants who were originally included in Cycle II. Therefore, the authors cross-examined the television consumption variable in Cycle II and the obesity variable in Cycle III ($r = .008$, $p = .07$).

The authors' discussion of the findings concluded that the causes of child and adolescent obesity are complex. There may be many contributors to this disease. However, they offered three possible explanations for the study's findings: 1) obesity causes an increase in television consumption; 2) obesity and television consumption are associated by a third, unknown variable; and 3) an increase in television consumption causes obesity.

Robinson et al. (1993) also used cross-sectional and longitudinal analyses when studying sixth and seventh grade girl participants from four middle schools in California ($N = 971$). Some of these participants were selected to participate in the cross-sectional portion of the study. Others were selected for the longitudinal portion, which took place over a two-year period. The television consumption component was measured by self-reported hours spent watching

afterschool programming and the obesity component was measured using the reported height and weight and calculating BMI and adjusting for sexual maturity.

The study used Spearman's regression for the statistical analyses of both the cross-sectional and longitudinal portions. In the cross-sectional analysis the authors found that television watching and BMI were insignificantly associated ($r = .053$, $p = .17$). Similarly, the longitudinal analysis produced an insignificant association for these two variables ($r = .030$, $p = .62$). Although the authors did not find this association significant for either analysis, they referred back to Dietz and Gortmaker's (1985) study and suggest that the findings are similar if sample size difference is adjusted. By applying an equation based on bivariate normal distribution ($r = z/[x^2 + N - 2]^{1/2}$) they calculated estimates of the correlation size from Dietz and Gormaker's study. They found that Dietz and Gortmaker's significant findings did not prove as significant as they reported ($r = .03$ to $.05$). Therefore, Robinson et al. (1993) claim that their findings, although insignificant, were consistent with the significant findings of Dietz and Gortmaker in 1985.

Dietz, Bandini, Morelli, Peers, and Ching (1994) gathered a sample group of 27 nine to twelve year old girls. The obesity measurements were taken using weight, height and triceps-skinfolds, which determined that nine of the girls were obese and eighteen of the girls were considered non-obese. Dietz, et. al. conducted their research measuring the sedentary activity observed during television consumption and other daily sedentary activities. In order to measure the sedentary activity, Dietz, et. al. used resting metabolic rate (RMR). The three sedentary activities measured in the study were 1) reading a book, 2) sitting quietly and 3) watching television. Each of these activities was monitored to calculate the girls' RMR through the use of

activity monitors and manually counting movement recorded on videotape during the sedentary activity period.

They employed a two-way ANOVA analysis to determine whether those movements observed during television consumption differed from movements observed while the girls were reading or sitting. The observed movements while sedentary were significantly greater ($p < 0.0001$) when asked to simply sit quietly that during reading a book or watching television. However, when the three sedentary measurements were combined, the correlation between observed movements and RMR ($r = .56$, $p < 0.0001$) as well as measured movements and RMR ($r = .56$, $p < 0.0001$) were significant. Non-obese girls (RMR = 49.4 ± 10.5kJ/15min) and obese girls (RMR = 56.9 ± 10.5kJ/15min) were found to have a significant difference in RMRs while watching television ($p \leq .05$).

These findings suggest that there is a lack of a different television consumption effect on RMR than other sedentary activities. However, there was a difference between non-obese and obese girls. The authors suggest that the sedentary activity of television consumption does not contribute to obesity, but rather "the displacement of more vigorous activities" may be a possible contributor (Dietz, et. al., 1994, p. 558).

DuRant, Baranowski, Johnson and Thompson (1994) also used an experimental approach to observe the relationship between television consumption and child obesity. However, unlike Dietz, et. al. they used a longitudinal approach in order to avoid the limitations of a cross-sectional study. Their study sample was a group of three to four year old children ($N = 110$) that were observed six to twelve hours for one to four days within the same year. They trained 11 observers to record minute-by-minute activity levels during home visits using a scale, the Children's Activity Rating Scale (CARS), previously implemented and tested for reliability by a

previous study conducted by DuRant and Baranowski themselves (DuRant, et. al., 1993). The CARS measurement contains five levels of activity engagement: 1) stationary movement with no movement; 2) stationary with movement; 3) slow and easy translocation; 4) medium/moderate translocation; and 5) fast/very fast/strenuous translocation. The measurement of obesity was calculated utilizing measured height and weight of the children to determine BMI.

The authors found that when the children were engaged in indoor activities that 18% of that time was dedicated to television consumption. However, they found that the time spent engaged in television consumption was not entirely inactive. The participants were still engaging in physical activities while watching television according to the CARS measurements (mean activity level $= 1.48 \pm .25$). Boys and girls did not significantly differ in their activity levels ($p > .05$). Among the five CARS levels, the time spent in levels 4 and 5 correlated significantly with the percentage of minutes engaged in television consumption to indoor activities ($r = -.19$, $p = 0.46$) and the percentage of minutes engaged in television consumption to total observed activities ($r = -.27$, $p < 0.01$). They observed that although children who spent more time with the television spent less time engaged in physical activity ($r = 0.02$, $p = 0.862$); however, the lower physical activity levels of children did not correlate to higher BMI ($r = .04$, $p = .684$). The authors concluded that the children who engaged in television consumption more often and for longer amounts of time engaged in physical activity less, but there were no statistically significant results to support an increase in children's BMI.

In 1995, Robinson and Killen, two researchers who co-authored the 1993 study *Does Television Viewing Increase Obesity and Reduce Physical Activity? Cross-sectional and Longitudinal Analyses Among Adolescent Girls* extended their research to gender and ethnic groups as they pertain to television watching, obesity, and physical activity. Robinson and Killen

looked for differences among gender and races in order to contribute to the literature and to offer a possible explanation as to why other studies had weak correlations. Robinson and Killen gathered a sample of 1,912 ninth grade students that consisted of 47.2% female participants and 52.7% male participants all of whom had differing ethnicities (Latino/Hispanic, Asian/Pacific Islander, Caucasian, African American, Other, and Multiracial). For both the television consumption and physical activity components, the authors employed self-reports and for the obesity measurement they used BMI using measured height and weight. They used Spearman rank correlation coefficients to statistically analyze the associations between television watching and BMI, physical activity, and dietary intake.

Robinson and Killen found, with regards to gender, that males reported more television viewing time than their female counterparts ($p < .0001$); however, this phenomenon was inverted with African American males and females. The male subjects also reported to spend more time being physically active than girls ($p < .0001$). All the male and female participants were found to have significant associations between dietary fat intake and television watching ($r = .23$, $p \leq .0001$). In terms of ethnic differences, Robinson and Killen found that the hours of television watching were insignificantly correlated with BMI across all ethnic groups ($r = .04$) with the exception of Caucasian boys, which revealed the only significant association ($r = .22$, $p < .01$). Overall, television viewing proved to be weakly associated with physical activity across genders and ethnic groups alike. Lastly, television watching and dietary intake were significant for the Latino/Hispanic group, Asian/Pacific Islander female group, and white males.

Robinson and Killen concluded that the findings suggested television watching was associated with dietary fat intake, but that this finding does not support the notion that television consumption is a key contributor to child obesity. However, the findings did suggest that gender

and ethnic association differences may be the reason some children are more susceptible to television consumption effects and others are not.

Crespo, Smit, Troiano, Bartlett, Macera, and Andersen (2001) conducted a study which incorporated data collected from a cross-sectional survey, the Third National Health and Nutrition Examination (NHANES III), which was intended to be representative of children's health across the United States. The survey included measures for weight and height to calculate BMI, weekly physical activity participation data, daily television watching data, and a dietary interview. The data was gathered from 4,069 children eight to sixteen years old. Crespo, et. al. found that obesity was less prevalent among children who reported watching one hour of television or less per day (8% of participants watching television $\leq$ 1hr./day).

Using a regression analysis, the authors found a small, but inverse relationship between daily television watching and weekly physical activity for both male (β coefficient, - 0.06; p = .02) and female (β coefficient, -0.075; p = .01) participants. They also found that children's food intake is positively associated with hours spent watching television in male participants (r = 0.43) and more so with female participants (r = 0.26). Likewise, they reported that female children and adolescents consume an average of 175kcal per day when their television consumption increases from one hour to five or more hours per day. Their findings indicate that television consumption and obesity are more closely associated than television consumption and physical activity are associated. Similarly, due to the slight inverse relationship between television consumption and physical activity, the displacement of physical activity with television watching is a possible contributor to child obesity.

Xinshu and Ying (2007) conducted an empirical study to look at children in China because it resembles the early years of currently developed countries and can serve as a model

for retroactive data from previous years in countries like the United States (Xinshu & Ying, 2007, p. 8). The authors' hypothesis stated that there is a positive relationship between television watching and children's body weight. They also included two explicitly stated research questions: 1) Is there a curvilinear relationship between Chinese children's TV watching and their body weights; and 2) Does the relationship between TV watching and body weight differ between Chinese boys and girls? Xinshu and Ying (2008) used a nationally conducted study aimed specifically to survey children's personal attributes, body mass index, and their media use. Their sample consisted of over 3,000 Chinese children who ranged in age from six to eighteen years old.

In the analysis of this study, t-tests, correlations, and multiple regression analyses were employed to discover relationships between the variables. Xinshu and Ying (2008) found a significant negative correlation between television use and BMI percentiles ($r = -0.054$, $p < 0.05$) and they did not find a significant displacement relationship with television consumption and physical activity ($p > 0.1$). Three multiple regression analyses were performed. In the first, multivariate models were examined using media use and BMI percentiles where the R-squares were rather small ranging from 0.003 to 0.008 and the significance was high ranging from 0.020 to 0.036. In the second multiple regression analysis, the BMI was the dependent variable and, again the significance was high ($p > 0.001$), yet the R-squares were still too small (0.111 to 0.116). Lastly, the third regression analysis utilized weight as the dependent variable and found that the significance was high ($p > 0.001$) and the R-squares were strong predictive models ranging from 0.660 to 0.662.

Xinshu and Ying (2008) concluded that they were not surprised to find that Chinese children did not demonstrate a television viewing and obesity relationship pattern when they

considered the amount of television Chinese children watch. The authors noted that the television was not a common household item in urban and rural China until the 1980s and with time perhaps Chinese children will watch as much television as children in the United States. While the authors did not find a significant positive relationship between the children's BMI and their television use, the authors noted that the Internet plays a prevalent role in today's television viewing habits and that future research would benefit from an Internet component within the television usage measurement.

Landhuis, Poulton, Welch, and Hancox's (2008) study looked at a portion of a longitudinal study, which tracked study members at ages 5, 7, 9, 11, 13 and 15 years old ($N =$ 1,037). Then 972 of those participants who were still living were studied again at age 32. They used survey methodology in which the parents were asked to answer the survey when the participants were ages five to eleven and when the participants were ages 13, 15, and 32 they answered the surveys themselves. Television consumption was measured by the mean amount of weekday hours of television consumption for ages five to eleven and the mean amount of weekend hours for those surveyed at age 32. The reported weight and height of the children and the parents were used to calculate BMI. Physical activity was incorporated into this study by using an exercise test to measure fitness based on heart rate beats per minute (bpm). The relationship among television consumption, BMI and heart rate was calculated using a linear regression model.

Landhuis, Poulton, Welch, and Hancox found child weekday television consumption to be positively correlated to adult weekend television consumption ($r = 0.33$, $p < 0.001$). When television consumption and BMI were analyzed, the authors found that both children ($r = 0.64$, $p < 0.001$) and adults ($r = 0.30$, $p < 0.013$) there was a positive association between these two

variables. Similarly, when television consumption and heart rate were analyzed, the authors

noted the negative association with these two variables in both children (r = -0.79, p = 0.001)

and adults (r = -0.41, p = 0.008). Lastly, the authors employed a logistic regression model to

analyze the television as a long-term predictor of obesity. They found that television

consumption in childhood to be a significant predictor of BMI in adulthood (r = 0.19, p = 0.006).

The findings suggest that risk of adult obesity is increased by the television consumption patterns

seen in childhood television consumption. Based on their findings, Landhuis, Poulton, Welch

and Hancox suggest that attempts need to be made to modify the sedentary behavior of watching

television in favor of more physically demanding activities in order to reduce the risk of adult

obesity.

Parental Mediation/Modeling

Children are known to be susceptible media audience members due to lack of personal

choice (Strasburger, 1993; Browne & Hamilton-Giachritsis, 2005, Lawrie, Sullivan, Davies &

Hill, 2006). Therefore, previous research has explored the mediating influences of parents on the

relationship between television consumption and child obesity. One study conducted by

Vandebosch and Van Cleemput (2007) surveyed various Flemmish elementary schools (N = 608)

and was based on two notions about parental influences. The first is that parents determine how

much television, the type of programming, and the circumstances under which their children

watch television. They referred to this as parental mediation. The second is that parents act as

models for their children showing them television consumption patterns that children will mimic

which they referred to as parental modeling. They conducted a study that correspondingly could

examine the influence of parents' mediation and modeling on children's television consumption

patterns and the prevalence of obesity.

They used survey methodology administered to 26 schools focused on children two to six years old. One parent per household filled out the surveys. The information determined by the surveys included the parent's education level, television habits, physical activity, food intake, parenting style with regards to television, opinions on obesity causes, and opinion about measures to be taken against child obesity. It also included questions about the child/children's television consumption, presence of a television in the bedroom, and food intake while watching television. They also used reported weight and height to calculate the BMI of both the parent and the child/children. Parental mediation was measured using the three parental mediation types outlined by Valkenburg, et. al. (1999).

In their multivariate analysis, Vandebosch and Van Cleemput found that the educational level of the parent was positively correlated with restrictive television mediation ($r = 0.131$, $p = 0.005$), restrictive mediation of food intake ($r = 0.280$, $p = 0.000$), using the television to occupy the child due to time constraint ($r = 0.140$, $p = 0.003$) or fatigue ($r = 0.102$, $p = 0.031$), and the presence of a television in the child/children's bedroom ($r = 0.263$, $p = 0.000$). Parents with higher education levels also agreed that child obesity is caused by food intake during television consumption ($r = 0.120$, $p = 0.011$). Conversely, they found that parents with lower education levels watched more television ($r = 0.409$, $p = 0.000$), their children watched more television ($r = 0.351$, $p = 0.000$), and the children ate more meals ($r = 0.152$, $p = 0.001$) and snacks ($r = 0.184$, $p = 0.000$) during television consumption. Parents with full time jobs reported to use the television when they did not have time ($r = 0.120$, $p = 0.011$) or were too tired when they came home from work ($r = 0.120$, $p = 0.031$) to play with their child/children. Older parents more frequently reported using a restrictive parental mediation with regards to television consumption ($r = 0.136$, $p = 0.004$). Parents watched less television if they believed television consumption to be a

leading cause of obesity ($r = 0.130$, $p = 0.006$), more frequently employed a restrictive mediation style of parenting ($r = 0.125$, $p = 0.009$), and encouraged outdoor sports activity for their child/children ($r = 0.145$, $p = 0.002$). Vandebosch and Van Cleemput also found a strong relationship between the amount of television consumption by the parent and by the child ($r = 0.638$, $p = 0.000$). However, while the parents' television consumption showed a significant correlation to their BMI ($r = 0.173$, $p = 0.000$), the television consumption of the children did not show a significant correlation to their BMI ($r = 0.063$, $p = 0.174$).

Vandebosch and Van Cleemput concluded that the majority of the parents utilized a restrictive mediation style of parenting. Those parents that used some sort of parental mediation with regard to television consumption also used parental mediation with physical activity and food intake. They also concluded that while there was a significant relationship between the parent's television consumption and obesity calculated by BMI, there was not a significant relationship between children's television consumption and obesity calculated by BMI.

Vandewater, Park, Lee and Lee (2008) isolated one type of parenting style, disengaged parenting, in which the parents took a more lenient role in their parenting due to being overwhelmed by their responsibilities as parents. Their sample included participants ($N = 1,309$) of the Panel Study of Income (PSID) Child Development Supplement (CD-I and CD-II). The parent participants were asked to use a Likert scale to report to what extent they are overwhelmed by parenting. Vandewater, Park, Lee and Lee (2008) assessed parents' range of disengagement from this scale. The television viewing component was assessed by a 24 hour time use diary, whether or not the child had a television present in his or her bedroom, whether or not there was a television present in the home and, if so, how many hours were spent viewing of that television. Their hypothesis was that when parents are disengaged their children's obesity

levels will rise due to unsupervised television viewing.

Vandewater, Park, Lee and Lee (2008) found that disengaged parenting was positively related to both children's obesity ($R^2 = .19$, $p < 0.05$) and their television viewing ($R^2 = .45$, $p < 0.01$). Therefore, they reported that as parents became increasingly disengaged, children's BMI and television consumption increased. While there has not been any significant relationship found directly linking childhood obesity and television use, according to this study, disengaged parenting is the underlying, mediating variable of the relationship between childhood obesity and television viewing.

Neighborhood Safety

The safety of a neighborhood is another factor that should be taken into account when looking at the relationship between television consumption and child obesity. Scholars have looked at both subjective (parental opinions about the safety of the neighborhood) and objective (crime rate, poverty level, prominence of public housing) reasons as to why children displace outdoor physical activity for indoor television consumption (Weir, Etelson & Brand, 2006; Evenson, Scott, Cohen & Voorhees, 2012; Sallis & Glanz, 2006).

Burdette and Whitaker (2005) used the Fragile Families and Child Wellbeing Study (FFCWS), a study that included 4,898 children and their families. The data was collected through self-reported telephone surveys and in-home interviews from parents across 20 major cities in the United States. They measured television consumption by asking parents how many hours on average their child watched on one weekday and one day during the weekend. They assessed the physical activity variable by the amount of time spent playing outside. They asked parents how many hours on average their child spends playing outdoors on one weekday and one day during the weekend. They gathered data about neighborhood safety based on mothers'

perceptions about activities taking place in the neighborhood. They provided an eight-point scale within which mothers were to report how often they see occurrences such as gang activity, drug dealers, and other disorderly conduct from adults and youth in the neighborhood. The authors' hypothesis supporting this assessment was that mothers who perceived their neighborhood to be unsafe would favor indoor television watching rather than outdoor play.

Burdette and Whitaker found that outdoor play during the weekend was more prevalent than on weekdays ($p < .001$). All of the children watched equal amounts of television on both weekdays and weekends ($p = .43$). The authors also report that television consumption and outdoor play were not significantly correlated to each other; however, they did not support this claim with data in their study. They also found that the neighborhood safety as perceived by mothers did not prove to be a determining factor of the child's BMI ($p = .75$). It also did not prove to be a determining factor for outdoor play on weekdays ($p = .24$) or weekends ($p = .16$). One of the possible limitations the authors presented was that the physical activity variable relied on the outdoor play measurement rather than a more detailed description in order to include indoor play as well. They also found their measurement of neighborhood safety based on social unrest and other extreme cases of potential unsafe conditions. Burdette and Whitaker concluded that these measures would need to be redefined in future studies.

Cecil-Karb and Grogan-Taylor (2009) conducted a longitudinal study in hopes of obtaining "statistical power to detect [an] effect not observed in cross-sectional studies" (Cecil-Karb & Grogan-Taylor, 2009, p. 172). By using data collected from the National Longitudinal Study of Youth (NLSY), they were able to obtain data of women who participated in this study in 1979 as well as data from their children starting in 1986 and ending in 2000. The children included in the sample ($N = 5,886$) were between the ages of five and 20 years old and multiple children were

included from families with more than one child.

Reported BMI was used to measure obesity from four different test years: 1994, 1996, 1998 and 2000. Six Likert scale survey items were used to measure the mother's opinion on the family's neighborhood safety variable. The television variable was measured using the number of hours of a child's television consumption reported by the mother. Lastly, demographic variables were also included. Cecil-Karb and Grogan-Taylor used a three-level hierarchical model in order to account for the relation of all the variables to BMI.

The authors found that overweight children watched about 30 minutes more television than children with normal weights. An analysis of neighborhood safety and BMI revealed that mothers who perceived their neighborhood to be unsafe resulted in their child having an average of one BMI point higher than those who perceived their neighborhood to be safe. More impressive was the result showing that 16.6% of children in perceived unsafe neighborhoods were overweight or obese compared to the 13.9% of children in perceived safe neighborhoods. They also found Black and Latino children were more likely to be in perceived unsafe neighborhoods than White children. Also, a significant association was found between neighborhood safety and BMI ($\beta = 0.19$, $p = 0.05$). However, when the television consumption was added to the model as a mediating variable, they found that the direct perceived neighborhood safety on BMI was not as significant ($r = .04$, $p < .05$).

Cecil- Karb and Grogan-Taylor concluded when parents perceive their neighborhood to be unsafe, they will restrict outdoor physical activity which would increase the likelihood of sedentary indoor activities such as television viewing. The authors call for better measurements for the neighborhood safety variable. They suggest that factual evidence of a neighborhood's safety may be a more accurate predictor of this relationship.

Kimbro, Brooks-Gunn, and McLanahan (2011) conducted a study involving five-year-old children in the U.S. ($N = 4,898$) in response to previous literature that did not incorporate particular constructs that, the authors believe, would reveal a significant association between neighborhood safety, child obesity, and television consumption. The data was gathered using the FFCWS in order to get a large, representative sample of all five-year-old children from the United States. The researchers then conducted two analysis waves using interviews, child/parent activities, and home observations. The first analysis focused on the children's measures for demographic and family information provided by surveys. The second analysis focused on child/mother information stemming from home interviews and parent response surveys.

The physical activity and sedentary activity variables were measured using survey questions addressing the number of hours the child engages in outdoor play, the amount of hours the child engages in television viewing, and the number of days the mother takes the child to engage in outdoor play. The demographic information provided for the child included race, gender, and BMI. The mother's demographic information included education level, age, employment, relationship status, mental health status, and if there are older siblings in the home. A ten-item Likert scale in which mothers rated their perception of their community measured the neighborhood safety variable. The scale was incorporated from a previous study ($\alpha = 0.86$) by Earls, Brooks-Gunn and Sampson (2002). In addition to mothers' perceptions, the authors also incorporated the opinions of the in-home interviewers who reported their impression of the neighborhood based on the type of home the family lived in.

Using OLS and binomial regressions, Kimbro, Brooks-Gunn, and McLanahan found that the amount of hours children engaged in outdoor play was negatively associated with the child's BMI ($r = -1.26$, $p < .05$). The hours engaged in television consumption were found to be

positively associated with the child's BMI ($r = 0.49$, $p < .05$). In fact, for each extra hour the children were engaged in outdoor play rather than engaged in television consumption, the children's BMI percentage decreased by 1.5 points. The authors' demographic data found that Black and Hispanic children engaged in 18% less hours of outdoor play than White children. Mothers with full time jobs spent less time outside with their children as well ($r = -0.14$, $p = .001$). When the authors assessed the factors contributing to their hypothesis, which claimed that maternal fear due to neighborhood safety contributed to the displacement of outdoor physical activity in favor of indoor sedentary television consumption, they did not have any significant findings. They found that time engaged in outdoor activities ($r = -0.01$) and maternal fear ($r = 0.05$) did not produce any significant correlations to neighborhood poverty level. However, they did find that while children living in public housing engaged in 12% more television consumption than did those children living in a house, apartment, or townhouse, they engaged in 13% more outdoor play as well.

Kimbro, Brooks-Gunn, and McLanahan deduced that children's BMI had significant associations with physical activity and sedentary activity. However, when it comes to neighborhood safety and its effect on maternal fear there simply was no evidence of these variables affecting the outdoor activities of children. There was evidence to the contrary, in fact, that children in perceivably unsafe neighborhoods were showcased more engagement with outdoor activities than their safer counterparts. The statistical analysis showed a similar increase in television consumption with children in unsafe neighborhoods. Therefore, the authors concluded that, for their study population, there was not a displacement of outdoor play for television consumption resulting in higher BMI scores as a byproduct of what the study regarded as an unsafe neighborhood.

Summary

Several trends become apparent within the previous literature. The advertising and physical activity paradigms present various research methods, such as, experimental, content analysis, and survey methodology. The studies that employed experimental (Borzekowski & Robinson, 2001; Halford, et. al., 2004; Veerman, Van Beeck, Barendregt, Mackenbach, 2009) and content analysis (Kunkel, Mastro, Ortiz & McKinley, 2003; Derochers & Holt, 2007, Chou, Rashad & Grossman, 2008, Guran, et. al., 2010) methodology either produced weak or insignificant statistical findings. However, those studies that employed survey methodology (Zimmerman & Bell, 2010; Dietz & Gortmaker, 1985; Robinson, et. al., 1993) to investigate media effects on children's obesity produced more statistically significant results. Therefore, it seems appropriate to further the research and literature utilizing survey methodology.

Much of the previous literature examining television advertising or physical activity's relationship to children's obesity is rarely anchored in a foundational body of theory. However, there is a common trend within the literature regarding advertising that seems to inexplicitly suggest a priming effect is at work. Priming theory states that when an audience sees certain images or scenes, such as unhealthy food advertisements, they are more likely to act in accordance to those images, such as eat or crave those particular foods from the advertisements (Scheufele & Tewksbury, 2007; Goidel, Shields & Peffley, 1997; Preiss, et. al., 2007). However, the current study operates under the notion that television content is no longer consumed by children exclusively through traditional platforms. Contemporary television platforms offer children the option of skipping or fast-forwarding advertisements altogether. Therefore, utilizing the inexplicitly stated priming theory as presented in the previous literature becomes obsolete.

There is a need to update the literature in this area of research for two reasons: 1) to have an explicitly stated theoretical framework; and 2) to incorporate contemporary television platforms.

The displacement of physical activity literature rarely produced statistically significant results. However, when a mediating variable, such as parental modeling or neighborhood safety, was incorporated, the analysis revealed more statistically significant results. Previous literature examining the displacement of physical activity due to television consumption operates almost entirely on the notion that child obesity is health related. The parental modeling and neighborhood safety variables are not directly health related, but rather, these variables carry societal implications. These implications can give researchers an accurate assessment of the relationship between television consumption and child obesity. It is necessary to further this research in order to delve into the reasons why physical activity is being displaced by television.

Particular measures essential for the current study became apparent through the examination of previous research. These measures, emanating from the research, include television consumption, body mass index, physical activity, parental mediation, parent's perceived neighborhood safety and advertising exposure. These measures, with the exception of advertising exposure, are measured through self-reported surveys provided by parents or guardians. The current study imitates the collection of these measures from parent reporting. In addition, the advertising exposure measure derived from previous research is typically examined using experimental data collection. However, the current study uses parent reporting for this variable due to the desire to maintain uniformity within data collection practices.

The television advertising and physical activity paradigms needed to be examined with in a modern, theory-driven context while acknowledging the societal implications of the relationship between television consumption and child obesity. Therefore, Chapter Three

explores contemporary television platforms, displacement hypothesis, and the societal

implications of this relationship in order to modernize this body of research.

CHAPTER THREE

METHOD

This study updated the body of research examining the relationship between television consumption and child obesity by, first, incorporating a theoretical framework and, second, by integrating contemporary television platforms. It sought to explore this relationship and nuances within two paradigms: 1) the displacement of physical activity; and 2) the displacement of advertising. Many previous scholars have looked at the various effects television consumption has had on children over years (Dietz, 1998; Taras, Sallis, Patterson, Nader & Nelson, 1989; Huesmann, Moise-Titus, Podolski & Eron, 2003). However, minimal consideration had been given to a theoretical investigation of television consumption and its effect on child obesity. These factors were important to consider while advancing this body of research. With regard to Putnam's displacement hypothesis, longitudinal studies have provided the best, most in-depth analysis of media displacement (Mutz, Roberts & van Vuuren, 1993). Analysis of the displacement of traditional media with contemporary media happens slowly over time and can be observed on an individual basis if time and resources allow. However, longitudinal studies in this area of research are hardly ever used due to lack of time, funding and other resources (Lee & Leung, 2006). Therefore, considering the time and resources that were allotted for this particular study, a cross sectional approach was most appropriate.

Another important, and somewhat elusive, factor to consider in this area of research is the ability to measure audience effects within contemporary television consumption platforms. Child audience effects, in particular, are important to more than advertising companies and media corporations. Schools, parents and policy makers also have a vested interest in the effects of television on children. Recently, there have been efforts to address this issue; however, they have

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been limited and few thus far. In October 2014, Nielsen and Adobe became the first companies to begin looking at audiences and impacts of contemporary television viewing in the digital age (Saba, 2014). These measures are still very new and emerging. Today, there is no true measure for these effects or audience demographics within all contemporary television platforms and all streaming services. Therefore, this study aimed to make efforts to measure such effects by looking at children's BMI as a consequence of their exposure to contemporary television platforms.

Measures

The survey instrument included questions pertaining to the following measures: 1) parental gender and socioeconomic status; 2) gender and ethnicity; 3) body mass index; 4) general and contemporary television consumption; 5) physical activity; 6) parent's perceived neighborhood safety; and 7) parental mediation. It is best to examine early childhood obesity contributors; therefore, the survey investigated the information regarding children five to thirteen years old provided by their parents or guardians. This age range encompasses the ranges presented by previous researchers in this field of study. If a parent participant had more than one child, they were asked to fill out the survey with only one child's information. They were told that they could choose freely which child's information to provide. However, if the parent participant wished to provide more than one of their children's information the opportunity to do so was provided. This study then examined the data provided by these parent participants from three different populations in the United States.

Parental Gender and Socioeconomic Status

The first three items on the survey asked parent participants to indicate their gender, their highest education level and their approximate household annual income. These measures were

exploratory and allowed for a brief examination of these influential factors in relation to the

child's data provided. Parents were asked to indicate their gender assignment by indicating

whether they are either male or female. Parents were asked their highest education level

attainment by indicating one of the following choices: 1) no schooling completed; 2) nursery

school to eighth grade; 3) some high school, no diploma; 4) high school graduate, diploma, or

the equivalent (i.e. GED); 5) some college credit, no degree; 6) trade/technical/vocational

training; 7) associate degree; 8) bachelor's degree; 9) master's degree; 10) professional degree;

or 11) doctorate degree. Parents were asked to indicate their approximate annual household

income with one of the following: 1) less than $20,000; 2) $20,000 - $39,999; 3) $40,000 -

$59,999; 4) $60,000 – $79,999; 5) $80,000 - $99,999; 6) $100,000 – $119,999; 7) more than

$120,000; or 8) don't know.

Gender and Ethnicity

The next two items on the survey asked for the child's gender and ethnicity. Gender was

important because a couple of previous studies implied that obesity is more prevalent in girls

than in boys (Robinson & Killen, 1995; Crespo, et. al., 2001). The survey used gender to

investigate whether girls or boys spent more time engaged with contemporary television

platforms than with traditional television platforms. However, these platforms were not

investigated in most of the previous literature.

Additionally, ethnicity was a principal investigation in most of previous research in this

field (Robinson & Killen, 1995; Kunkel, Mastro, Ortiz, & McKinley, 2003; Guran, et. al., 2010;

Cecil-Karb & Grogan-Taylor, 2009). Therefore, it was necessary then to examine any obesity

and television consumption trends among different ethnic groups in order to maintain the

integrity of the investigation and modernizing the literature. The categories for the children's

ethnicity included in this study are as follows: 1) American Indian or Alaska Native; 2) Asian American; 3) Black or African American; 4) Hispanic or Latino; 5) Native Hawaiian or Pacific Islander; 6) White; 7) Multiracial; and 8) Other.

Body Mass Index

As previously mentioned, BMI was the measure for examining a child's obesity ranking. As described in Chapter One, a simple calculation revealed a child's BMI. BMI, represented by parental estimates, has been used in previous studies due to the lack of resources and ability to measure each child (Vandebosch & Van Cleemput, 2007; Vandewater, Park, Lee & Lee, 2008). Additionally, researchers have validated parent reported estimates when objective measures are not a feasible option (Hagstomer, Oja & Sjostrom, 2005; Loprinzi & Cardinal, 2011). Therefore, this study used parental estimates of BMI as previous studies have.

In order to use the BMI calculation, information regarding the child's height and weight were necessary. The survey instrument incorporated two items for the participant to report these measurements. The first item asks the parent participant to report their child's height in inches and the second item asks them to report their child's weight in pounds. These measurements were then converted and computed in order to reveal the obesity ranking of each child. Additionally, two follow up questions were incorporated regarding parental estimates of BMI in the survey instrument. The first follow up item asked parent participants to indicate whether they believe their child is taller, shorter or about the same height as other children their age. The second follow up item asked parent participants to indicate whether they believe their child is heavier, lighter or about the same weight as other children their age.

General and Contemporary Television Consumption

Previous studies have asked participant parents to report their child's approximate

television consumption or some researchers have calculated the time spent with television based

on experimental observation (Robinson, et. al., 1993; Dietz, Bandini, Morelli, Peers & Ching,

1994; DuRant, Baranowski, Johnson & Thompson, 1994). However, this study measured general

television consumption, contemporary television consumption and advertisement exposure using

Lee and Leung's (2006) *Relative Proportion of Time Measurement*. This measure assumes that

children have a time budget for media use. The *total time budget* was measured using the amount

of time a child spends with any form of media (i.e. television, movies, video games, cell phone

use, etc.). The *general television consumption* was measured using the sum of time the child

spends watching cable/network television and television on digital platforms/DVR-

programming. The *contemporary television consumption budget* was measured using the digital

platform/DVR-programming item on the survey. Lastly, the *advertisement exposure rate* was

measured using parental estimations of advertisement exposure. Lee and Leung did not report

reliability or validity for this measure in their study.

All of the above measurements were represented by questions presented in the survey

instrument. Parent participants were asked to provide estimations for the following questions:

'On average, how many hours per day does your child spend interacting with any form of

media?', 'On average, how many hours per day does your child spend watching any form of

TV?', 'On average, how many hours per day does your child spend watching TV on digital

platforms', and 'On average, how many hours per day does your child spend watching TV that is

digitally recorded?'. Parent participants were also asked the following questions pertaining to

advertisements: 'On average, how many advertisements do you think your child is exposed to

when they watch one program on cable or network television?' and 'On average, how many advertisements do you think your child is exposed to when they watch one program on digital platforms or digitally recorder programs?'. Additionally, the survey contained two questions regarding parents' opinions about advertisements' negative effect on their child as well as their opinion pertaining to advertisements promoting unhealthy foods. Both of these items used a Likert scale ranging from 'strongly disagree' to 'strongly agree'. The two items asked the parent participants to rank their level of agreement to the following statements: 'I am concerned that TV advertisements affect my child negatively' and 'I am concerned that unhealthy food ads will make my child crave unhealthy foods'.

Physical Activity

The survey instrument contained five items regarding physical activity. The first physical activity measure question, "How many hours per day does your child engage in physical activity?", was the basic format found in previous studies (Dietz & Gortmaker, 1985; Crespo, et. al., 2001; Xinshu & Ying, 2007). However, two different items were added in order to obtain a well rounded understanding of children's weekly physical activity. These two questions asked about the participant's child's involvement in physical activity in school and outside of school. Each contained follow-up questions pertaining to how many hours their child spends doing those activities per week.

Neighborhood Safety

Studies conducted by Burdette and Whitaker (2005) as well as Cecil-Karb and Grogan-Taylor (2009) incorporated scales to measure parents' perception of their neighborhood's safety. This study incorporated both of these scales. Some of the survey instrument measures were based on the Neighborhood Environment for Children Rating Scales (Burdette and Whitaker,

2005). This scale examined eight items regarding safety perception based on social disorder. Each scale item was ranked by opinions. The opinion options are "never", "rarely", "sometimes", and "frequently". The eight items on the scale included "loitering adults", "gang activity", the presence of "drunks and drug dealers", "disorderly or misbehaving youths".

Other survey instrument scale measures were based on six scale items presented in a study by Cecil-Karb and Grogan-Taylor. These six items included an item regarding mothers' perceptions of their neighborhood as a place to raise children in which the respondents were asked to choose a rank on a scale ranging from "poor" to "excellent". The remaining survey items contained five neighborhood characteristics and the respondents were asked to rank these items as "not a problem", "somewhat of a problem", and " a big problem". This scale was "standardized with a mean of 0 and a variance of 1" (Cecil-Karb & Grogan-Taylor, 2009).

Parental Mediation

Valkenburg, Krcmar, Allerd, and Marseille (1999) examined various parenting styles pertaining to the mediation of television consumption. They concluded that there were three prominent mediation styles: restrictive mediation, instructive mediation, and social co-viewing mediation. Of the three styles, restrictive mediation incorporated the most amount of engagement and intervention by parents. The authors then constructed a television mediation scale, which could be developed for later research. Vandebosch and Van Cleemput (2007) adapted this scale to determine parents' influence on preschool children. They surveyed parents using a Likert scale to determine the level of mediation used by each parent. The current study utilized an adaptation of Valkenburg, Krcmar, Allerd, and Marseille' s scale as well as Vandebosch and Van Cleemput's adapted scale.

The survey instrument included nine items on a Likert scale regarding parenting mediation styles. Parents are asked to indicate whether they "strongly disagree", "disagree", "neither agree nor disagree", "agree", or "strongly agree" with nine statements which are presented in no particular order. Statements regarding restrictive parenting included "I set specific TV viewing hours for my child", "I tell my child to play outside", and "I will not allow my child to 'veg out' in front of the TV". Statements regarding instructive parenting included "I explain to my child the importance of physical activity", "I tell my child the consequences of watching too much TV", and I instruct my child why I allow/don't allow them to watch TV at certain times". Statements regarding social co-viewing parenting included "I set an example of TV watching limits for my child by watching TV with them", "I engage in physical activities with my child", and "I, as the parent, model how much/how little to watch TV for my child". The scale items that addressed parenting style and physical activity yielded α = 0.636 and the items addressing parenting style and television watching yielded α = 0.719 (Vandebosch & Van Cleemput, 2007).

Survey Sites

The original desire for this study was to mimic previous literature by using a large-scale, national study to gain a sample size that would yield the most accurate and well-rounded data. However, after spending a few months attempting to secure access to such large studies, the likelihood of accessing them was denied on multiple occasions due to a lack of monetary resources and lack of a contractual agreement.

The three survey sites used in this study's data collection were, therefore, based on convenience and access to gatekeepers. The three sites were located in: 1) Las Vegas, Nevada; 2) Monroe, Louisiana; and 3) Baldwin Park, California.

Rationale and Hypotheses

As previously discussed, Putnam's displacement hypothesis states that time spent engaged in television consumption displaces time spent engaged with other activities. This is the most basic understanding of displacement hypothesis and it operates within the confines of an absolute time budget. The *absolute time budget* as presented by Lee and Leung (2006) assumes that there is a fixed amount of time allotted to every individual that is spent engaged in daily media consumption. If a new, contemporary media platform is introduced, the absolute time budget notion assumes that the fixed amount of time spent engaged with a traditional media platform will simply be replaced by the contemporary media platform. Thereby presuming that the amount of time spent engaged with media is absolute.

In addition to the absolute time budget notion, the displacement hypothesis proposes the idea of functionality. Two types of functionality are presented in a study conducted by Mutz, Roberts, and van Vuuren (1993): 1) functional similarity; and 2) functional reorganization. These ideas of functionality go hand-in-hand with the approaches presented in a study conducted by Lee and Leung (2006): 1) the medium-centric approach; and 2) the user-centric approach. *Functional similarity* assumes that the replacement of traditional media platforms with new, contemporary media platforms derives from the similarity in function that the contemporary media platform serves. Functional similarity resembles the *medium-centric approach*, which assumes that new media platforms are merely updated, modern versions of traditional media platforms, such as television void of a time-shift capability. *Functional reorganization* proposes that introduction of new, contemporary media does not necessarily replace the time spent engaged in other activities, but rather reorganizes the function and priority of activities. Similarly, the *user-centric approach* proposes the idea that new media offers different types of

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gratification and therefore when this happens the absolute time budget reorganizes based on the function the new media platform offers. With these approaches in mind, this study utilized the two sub-frameworks within the displacement hypothesis to analyze the advertisement exposure and physical activity aspects of the television consumption and child obesity relationship: 1) the medium-centric, similarity framework; and 2) the user-centric, reorganization framework.

Previous literature has determined the effect of *advertisement exposure* within experimental studies typically alluding to a priming effect on children and their food choices. However, this study examinined advertisement exposure within the medium-centric, similarity approach to displacement hypothesis. This assumes that contemporary television consumption platforms have replaced traditional television consumption platforms. This also operates under the assumption that the advertisement exposure within contemporary television platforms is lower than that within traditional television platforms.

H_1: contemporary television consumption will be negatively associated with

advertisement exposure

This study examined the effect that the amount of advertisement exposure and contemporary television consumption platforms has on child obesity. Previous scholars have looked at children and advertisement exposure as a means of analyzing their cognitive abilities to interpret advertisements or to examine their product choices based on particular categories of advertisements (Wartella, 1979; Ward, Wackman & Wartella, 1977). This study examined another aspect of advertising and its contribution to child obesity. Children's "attention to advertising messages…is selective" (Ward, Wackman & Wartella, 1977, p. 21). Therefore, this study operates under the assumption that children are not engaged with all aspects of advertisements and, even when they are exposed to advertisements within contemporary

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television platforms, they have a much more limited experience with them. As previously stated, contemporary television tends to have shorter commercial breaks or none at all which limits children's exposure to commercial advertisements during television consumption within these platforms. The reduction in advertisement exposure will result in more time with programming (more sedentary activity) and less time exposure to advertisements.

H_2: contemporary television consumption will be positively associated with BMI

H_3: advertisement exposure will be negatively associated with BMI

Previous scholars have looked to television's ability to displace children's *physical activity* as an avenue by which to explain the child obesity epidemic. This study used the user-centric, reorganization approach to analyze contemporary television consumption's effect on the physical activity of children. The user-centric, reorganization approach assumes that the contemporary television platforms will meet different gratification needs in children thereby reorganizing their time. In regard to the aforementioned decrease in advertisements and sub sequential increase in programming exposure resulting in sedentary activity, children's time will be reorganized to incorporate more time engaged in television consumption. This increase in television consumption engagement will result in a higher BMI.

H_4: contemporary television consumption will be negatively associated with physical
activity

H_5: physical activity will be negatively associated with BMI

Children's absolute time budget, more often than not, is not self-regulated. A parent or guardian typically dictates a child's television consumption patterns. Previous literature has examined both *parental mediation* and *parent's perceived neighborhood safety* as determining factors in the relationship between television consumption and child obesity. This study also investigated

these factors within the user-centric, reorganization framework in order to account for parental influence on children's television consumption patterns.

H_6: contemporary television consumption will be negatively associated with parent's perceived neighborhood safety

H_7: parent's perceived neighborhood safety will be positively associated with physical activity

H_8: parent's perceived neighborhood safety will be negatively associated with BMI

H_9: contemporary television consumption will be negatively associated with parental mediation

H_{10}: parental mediation will be positively associated with physical activity

H_{11}: parental mediation will be negatively associated with BMI

In addition to these hypotheses, two research questions were included in order to examine the impact of gender (Male or Female) and ethnicity (American Indian or Alaska Native, Asian American, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Multiracial, and Other) on the relationship between contemporary television consumption and child obesity. A third research question addressed children's engagement in contemporary television consumption in comparison to their general television consumption.

RQ_1: Is the association between contemporary television consumption and BMI greater among boys or girls?

RQ_2: Does the association between contemporary television consumption and BMI differ among various ethnic groups?

RQ_3: Do children engage in more general TV consumption or contemporary TV consumption?

Procedure and Sampling

Previous scholars have utilized experimental design when examining advertisement exposure's effect on children and survey design when assessing physical activity's displacement by television consumption. Both of these designs have strengths and weaknesses within their particular area of research. Most previous research also has a means to gain access to national surveys for their sample and data collection. In addition, studies examining the best analysis plan for displacement hypothesis studies suggest that longitudinal approaches provide a more ideal investigation to displacement over time (Moy, Scheufele & Holbert, 1999; Mutz, Roberts & Van Vuuren, 1993). By incorporating Putnam's displacement hypothesis to both advertisement exposure and physical activity, a uniform and practical analysis design was necessary.

Survey design is most appropriate for displacement hypothesis in this instance due to its ability to limit the options for participant answers (Babbie, 2013; Mutz, Roberts & Van Vuuren, 1993). The survey implemented in this study allowed parent participants to identify the amount of time their child spends engaged in contemporary television consumption, their child's advertisement exposure, their child's physical activity participation, what parental mediation style they use, their perception of their neighborhood's safety, and their child's BMI. The survey instrument provided an evaluation of the displacement of advertisement exposure and physical activity due to contemporary television consumption platforms by measuring the above variables. The survey design was most appropriate for gaining access to how various contributors could affect children's BMI. The implemented survey also incorporated gender demographics for both the parent participants and their children, ethnicity demographics of the children, and socioeconomic status demographics of the parent participants.

The survey instrument for this study was designed using Qualtrics. This online survey software allowed for manageable data collection from each of the study's populations. It also provided an easy and understandable way for parents to obtain and use a link to the survey via email. This permitted this study to uniformly access participants and collect data on a single platform.

The duration of the survey administration period was four weeks. This time period was set based on conversations conducted with each of the three survey sites' gatekeepers. Each of the sites' gatekeepers extended their willingness on behalf of their organizations to participate in this study prior to the survey distribution. The three data collection sites were as follows: 1) Creative Planet School of the Arts in Baldwin Park, California; 2) The Geneva School in Monroe, Louisiana; and 3) the children's daycare program within the Greater Las Vegas Church of Christ in Las Vegas, Nevada.

Parent participants were accessed from these three sites. The sites located in California and Louisiana were accessible due to the permission granted by their principal and headmaster respectively. The site located in Nevada was made reachable through the consent of the church's minister. Although these populations' data were made available through these gatekeepers, each parent was given a consent form to inform them as to the nature of the study they were participating in. If a parent decided they did not wish to participate in the study after reading the consent form, they were given the choice to exit the survey. Parents or guardians who wished to participate were then asked to fill out the survey with their child's information. As previously mentioned, if a parent participant had more than one child they were asked to choose one of their children and fill out the survey with that child's information. If the parent wished to provide information regarding more than one of their children they were given the opportunity to do so

with a separate email link for each child. Each survey held the information of only one child. Administration of the final survey took place in the fall of 2015 when children began the new school year.

Data from each of the three survey sites were collected in a moderately different manner. The survey for the site in Baldwin Park, CA was administered via email directly from the school's director. The email included the parameters of the study and the anonymity of the data collected. A follow-up email was sent two weeks after the initial email as a reminder to those parents who had not participated. The survey administration for the site in Monroe, Louisiana was similar to the California site. The school's headmaster sent an email to the parents inviting them to participate in the study. A description of the study's framework and purpose was included in addition to a guarantee of total anonymity. A follow-up email was sent after two weeks to those parents who had not yet participated in the survey. Lastly, the survey for the site in Las Vegas, Nevada was administered via email; however, this site's emails were individually distributed through the email system within Qualtrics. The gatekeeper provided personal email addresses and the survey link was distributed via email to those personal addresses. The gatekeeper for the site in Las Vegas, NV requested that the survey be distributed in this manner. The email also included the study's guidelines, purpose, and guarantee of anonymity. Those from this site who did not participate in the study by the end of the second week also received a follow-up email reminding them to participate.

Sample

Previous research has mostly incorporated national surveys. The original intent of the study was to follow the pattern of previous research in seeking out a national survey or a large-scale data set. The search proved to be difficult due to necessary contractual agreements. A

secondary data set was sought from both Dr. Euna Han, an Associate Professor at Yonsei University in South Korea, and Dr. Lisa Powell, a Professor at the University of Illinois at Chicago; however, their contracts with Nielsen did not allow them to share their data. Therefore, a convenience sample of participants was used for this study. The survey was administered to a sample of parents of elementary school-aged children five to thirteen years old. This target sample was spread out among the three populations (60 families in Baldwin Park, CA, 47 families in Monroe, LA, and 40 families in Las Vegas, NV). Data collection and initial data testing assessed the presence of homogeneity among the three different data collection sites. It was determined that if two of the three populations or all three of the populations provided similar answers to the scale items then those populations' data would be combined in order to achieve the ideal target sample size according to a study conducted by Cohen (1992). However, if all three populations remained heterogeneous, separate analyses would be conducted.

While research pertaining to the displacement hypothesis was ideally compatible with a sample of participants willing to participate in a longitudinal study, this study used its sample within a cross-sectional study. The cross-sectional approach is more common in this field of research when resources and funding are limited (Mutz, Roberts, Van Vuuren, 1993).

Analysis

Once the survey administration period was completed, data from the three separate data collection sites were compared for homogeneity. BMI, television consumption, physical activity, perceptions of neighborhood safety, and parental mediation measures were compared utilizing *t*-tests or ANOVA where appropriate. As previously mentioned, if data from one or more sites were homogeneous, they would be combined for consequent analysis. If data from one or more sites were heterogeneous, they would remain separated for consequent analysis.

.....Second, a scale-item analysis was performed to determine internal consistency. A .40 coefficient criterion level was established *a priori* (Spector, 1992). An internal consistency *a priori* level of alpha was established via Coefficient Alpha at .70 (Cronbach, 1951). Retained scale items were submitted to principal component factor analysis with varimax rotation. Factor analysis revealed two sub-dimensions for one of the constructs measured via scales. Once the number of factors was determined, varimax orthogonal rotation was used, in an effort to determine if each item loads on one and only one factor. A minimum eigenvalue of 1.0 and at least three scale-item loadings were required to retain a factor with a minimum correlation value of .40 *a priori* (Kim & Mueller, 1978a, 1978b; Spector, 1992). Pearson's product moment correlation was then used to test each hypothesis and research question.

CHAPTER FOUR

ANALYSIS AND RESULTS

General Demographics

Child Data

The parent participant sample consisted of 99 total survey respondents and was composed of 22.2% of participants from Las Vegas, Nevada; 52.5% from Monroe, Louisiana; and 25.3% from Baldwin Park, California. These parent participants provided information regarding their children. However, as described in Chapter Three, comparing the key variables across the three sites using ANOVA statistics revealed significant differences in the height (F (2, 81) = 3.38, p = .039) and weight (F (2, 83) = 4.58, p = .014) data from the Nevada site as compared to the California and Louisiana sites. Therefore, all reported data will be exclusively from the California and Louisiana sites (N = 77).

The children represented in the remaining survey information were 44.7% male and 55.3% female. The average age of the children was nine years old with the majority of the children being 10 years old and younger (62.7%). The majority of the children were White or Caucasian (50.0%) and Hispanic or Latino (22.4%). Additionally, other ethnicities were represented in smaller quantities: Asian American (2.6%), Multiracial (21.1%), and Other Ethnicity (3.9%). The average height of the children was 53.89 inches, the average weight of the children was 79.77 pounds, and the average BMI of the children was 18.87.

Various factors determine whether a child is considered underweight, normal, overweight, or obese. These factors determine whether a child is in a categorical percentile, which has been assigned one of these four labels. The CDC has determined that less than the 5th percentile is considered underweight, the 5th percentile to less than the 85th percentile is

considered normal or healthy weight, 85th percentile to less than the 95th percentile is considered overweight, and equal to or greater than the 95th percentile is considered obese. (Centers for Disease Control and Prevention, 2015) In order to determine these percentiles, all factors including weight, height, age, and sex must be taken into account. Therefore, it is difficult, in a general sense to determine the national ideal weight for children; however, by looking at the average age and BMI calculation for the children in this survey, it seems that this sample would be slightly in the 85th percentile for girls (see Appendix B) which would be considered overweight and just below the 85th percentile for boys which would be considered of a normal or healthy weight (see Appendix C).

When parent participants were asked if they thought their child was shorter, the same, or taller than other children for their age, 52.3% said their child was about the same height as other children their child's age, while 15.4% said their child was shorter and 32.3% said their child was taller. Similarly, when they were asked if their child was lighter, the same, or heavier than other children their age, most parent participants responded that their child was the same as other children their child's age (49.2%), while 30.8% said their child was lighter and 20.0% said their child was heavier.

Parent Participants

Among the parent participants (N = 60), 25.0% of them were male and 75.0% were female. The majority of the parents (88.3%) are 45 years old and younger. The majority of the parents held a Bachelor's degree (44.3%), while 19.7% had some college credit, 6.6% went to trade or vocational school, 8.2% had an Associate's degree, and 16.4% had a Doctorate degree. The majority of the parents made between $20,000 and $79,999 annually, but most were in the $40,000-$59,999 bracket (22.0%) and the $60,000-$79,999 bracket (25.4%).

Media Hours

When asked how many hours their child spends watching any form of television, most parent participants (54.0%) answered that their child watches one hour per day, while 28.6% said two hours, 4.8% said three hours, 7.9% said four hours, 1.9% said more than five hours, and 3.2% said their child does not ever watch any form of television. When asked how many hours per day their child spends watching television on digital platforms, most parent participants (59.6%) said they watch one hour, while 17.5% said they watch two hours, 5.3% said they watch three hours, 3.5% said they watch four hours, and 14.0% said their child does not watch any television on digital platforms. When asked how many hours per day their child spends watching digitally recorded television, most parent participants (46.3%) responded that their child watches one hour, while 19.5% said they watch two hours and 34.1% said their child does not watch television that is digitally recorded. Also, when asked how many hours per day their child spends watching television on a traditional platform, most parent participants (56.3%) responded that their child watches one hour, while 20.8% said they watch two hours, 2.1% said they watch more than two hours, and 20.8% said their child does not watch television on a traditional platform.

Advertisements

When asked about the affects of advertisements on children, parent participants generally agreed that they had a negative effect on their children. Most of the parent participants (42.2%) said they agreed that they were concerned that television advertisements affect their child negatively, while 26.6% strongly agreed, 25.0% neither agreed nor disagreed, 6.3% disagreed, and none of the parent participants strongly disagreed to the negative effects of advertisements. Additionally, most parent participants (37.1%) agreed that they were concerned that unhealthy

food advertisements; however, those who strongly agreed (21.0%) and those who neither agreed nor disagreed (22.6%) were closely behind, leaving 16.1% to disagree and 3.2 to strongly disagree that unhealthy food advertisements would make their child crave unhealthy foods.

When asked how many advertisements they thought their child is exposed to while watching one program on cable or broadcast television, 65.6% thought their child was exposed to ten advertisements or less. When asked how many advertisements they thought their child was exposed to while watching one program on digital or DVR programs, 77.4% thought their child was exposed to five advertisements or less.

Physical Activity

When asked how many total hours per day their child engages in physical play or activity, 16.7% of parent participants said one hour, 28.3% said two hours, 25.0% said three hours, 28.3% said four hours or more, and 1.7% said their child does not engage in any physical activity or play. Specifically, when asked about the physical activity their child engages in outside of school hours, 37.5% said one hour, 32.1% said two hours, 21.4% said three hours, 5.4% said four or more hours, and 3.6% said their child does not engage in any physical activity outside of school hours. When asked about their child's physical activity during school hours, 54.8% said one hour, 8.1% said two hours, 11.3% said three hours, 14.5% said four hours, 8.0% said five or more hours, and 3.2% said their child does not engage in physical activity during school hours.

Parenting Style

Parent participants were asked to indicate their level of agreement with parenting style statements regarding media use and physical activity (see Table 1). To the statement as to setting specific television viewing hours for their child (Statement 1), the most frequent response was

'agree' (M = 3.76). To the statement as to explaining the importance of physical activity

(Statement 2), the most frequent response was 'agree' (M = 4.19). To the statement as to setting

an example of television viewing limits modeled by the parent (Statement 3), the most frequent

response was 'neither agree nor disagree' (M = 3.45). To the statement as to telling the child the

consequences of too much television viewing (Statement 4), the most frequent response was

'agree' (M = 3.94). To the statement as to telling the child to play outside (Statement 5), the most

frequent response was 'agree' (M = 4.32). To the statement as to not allowing the child to 'veg

out' in front of the television (Statement 6), the most frequent response was 'agree' (M = 3.70).

To the statement as to the parent participating in physical activity with the child (Statement 7),

the most frequent response was 'agree' (M = 4.00). To the statement as to the parent modeling

how much or how little television is appropriate to watch (Statement 8), the most frequent

response was 'agree' (M = 3.89). Lastly, to the statement as to the parent telling the child why

they are not allowed to watch certain programs (Statement 9), the most frequent response was

'strongly agree' (M = 4.63).

Neighborhood Safety

Nearly forty percent of the parent participants (37.8%) ranked their neighborhoods as

very good places to raise children. Thirty-eight percent said they never have their child play

indoors due to unsafe activity in the neighborhood and 38.8% said they never have their child

play indoors due to unsafe people in their neighborhood. Additionally, 42.7% said they never see

loitering adults in their neighborhood, 79.3% said they never see gang related activity, 37.8%

said they never see a lack of police protection, 45.7% said they never see people not caring about

the neighborhood's happenings, 74.4% said they never see drunk people or drug dealers in their

neighborhood, and 62.2% said they never see disorderly adults; however, 40.2% say there is the rare occasion where they see misbehaving youth.

Table 1

Parenting Style Level of Agreement

	M	Std. Deviation
Statement 1: Set Standards	3.76	1.141
Statement 2: Explain Importance	4.19	.846
Statement 3: Set Example	3.45	1.126
Statement 4: Tell of Consequences	3.94	1.038
Statement 5: Tell to Play	4.32	.763
Statement 6: 'Veg Out'	3.70	1.109
Statement 7: Participate	4.00	.789
Statement 8: Parent Model	3.89	.994
Statement 9: Tell Why	4.63	.707

Internal Consistency

Two tests of scale item reliability were conducted. Table 1 details the reliability for both the Neighborhood Safety scale and the Parenting Style scale. The first test for reliability was administered to the scale for parental perception of neighborhood safety. For the seven items, an inter-item reliability analysis revealed a high level of construct reliability (Cronbach's $\alpha = .876$). Therefore, all seven items were retained. Additionally, the second test of item reliability was administered to the scale that measured parenting style. For the nine items in this scale, an inter-

item reliability analysis revealed a high level of construct reliability (Cronbach's α = .854). Therefore, all nine items were retained.

Table 2

Cronbach's α of Internal Consistency

	α (N = 77)
Perceived Neighborhood Safety	.876
Parenting Style	.854

Factor Analysis

The statistical analysis included exploratory factor analysis as a data-reduction tool (Spector, 1992, p. 54-55).

Neighborhood Safety

One factor was generated for neighborhood safety with an eigenvalue of 4.19 accounting for 59.97% of the variance. This factor was labeled Neighborhood Safety and was created with seven items. Those seven items were generated from the responses to the question "How often do you see the following things happen in your neighborhood?". The seven item responses were as follows: "Loitering Adults", "Gang Related Activity", "Not Enough Police Protection", "People Don't Care What Happens in the Neighborhood", "Drunks/Drug Dealers", "Disorderly Adults", and "Disorderly/Misbehaving Youth".

Parenting Style

Two factors were identified after three iterations for parenting style. The first factor had an eigenvalue of 4.16 accounting for 46.25% of the variance and the second factor generated had

an eigenvalue of 1.11 accounting for 12.35% of the variance. These two factors were labeled Parent Mediation and Physical Mediation. All nine items were retained and were divided into these two factors. Parent Mediation included the items which stated "I set specific TV viewing hours for my child", "I set an example of TV watching limits for my child by watching TV with them", "I, as the parent, model how much/little to watch TV for my child", "I will not allow my child to 'veg out' in front of the TV", and "I explain to my child the importance of physical activity". Physical Mediation included the items which stated "I engage in physical activities with my child", "I tell my child that they need to play outside", and "I tell my child why they aren't allowed to watch certain TV programs".

Hypotheses and Research Questions

Hypothesis One

Hypothesis one stated: contemporary television consumption will be negatively associated with advertisement exposure. It assumed that contemporary television viewing and advertisement exposure would have a significant negative correlation. Results provided no support for hypothesis one. Pearson product correlation showed that there was no significant correlation.

Hypothesis Two

Hypothesis two stated: contemporary television consumption will be positively associated with BMI. It assumed that contemporary television viewing and body mass index would have a significant positive correlation. Results provided no support for hypothesis two. Pearson product correlation showed that there was no significant correlation.

Hypothesis Three

Hypothesis three stated: advertisement exposure will be negatively associated with BMI. It assumed that advertising exposure and body mass index would have a significant negative correlation. Results provided no support for hypothesis three. Pearson product correlation showed that there was no significant correlation.

Hypothesis Four

Hypothesis four stated: contemporary television consumption will be negatively associated with physical activity. It assumed that contemporary television viewing and the amount of physical activity would have a significant negative correlation. Results provided no support for hypothesis four. Pearson product correlation showed that there was no significant correlation.

Hypothesis Five

Hypothesis five stated: physical activity will be negatively associated with BMI. It assumed that the amount of physical activity and a child's body mass index would have a significant negative correlation. Results provided no support for hypothesis five. Pearson product correlation showed that there was a negative association; however, it was not a significant correlation.

Hypothesis Six

Hypothesis six stated: contemporary television consumption will be negatively associated with parent's perceived neighborhood safety. It assumed that contemporary television viewing and the parent's perception of neighborhood safety would have a significant negative correlation. Results provided no support for hypothesis six. Pearson product correlation showed that there was a negative association; however, it was not a significant correlation.

Hypothesis Seven

Hypothesis seven stated: parent's perceived neighborhood safety will be positively associated with physical activity. It assumed that the parent's perception of neighborhood safety and the amount of physical activity would have a significant positive correlation. Results provided no support for hypothesis seven. Pearson product correlation showed that there was no significant correlation.

Hypothesis Eight

Hypothesis eight stated: parent's perceived neighborhood safety will be negatively associated with BMI. It assumed that the parent's perception of neighborhood safety and children's body mass index would have a significant negative correlation. Results provided no support for hypothesis eight. Pearson product correlation showed that there was no significant correlation.

Hypothesis Nine

Hypothesis nine stated: contemporary television consumption will be negatively associated with parental mediation. It assumed that contemporary television viewing and a parent's mediation would have a significant negative correlation. Results provided no support for hypothesis nine. Pearson product correlation showed that there was a negative association; however, it was not a significant correlation.

Hypothesis Ten

Hypothesis ten stated: parental mediation will be positively associated with physical activity. It assumed that the parent's mediation and the amount of physical activity of the child would have a significant positive correlation. Results provided no support for hypothesis ten. Pearson product correlation showed that there was no significant correlation.

Hypothesis Eleven

Hypothesis eleven stated: parental mediation will be negatively associated with BMI. It assumed that the parent's mediation and the body mass index of the child would have a significant negative correlation. Results provided no support for hypothesis eleven. Pearson product correlation showed that there was no significant correlation.

Research Question One

Research question one inquired as to whether there would be a significant gender difference shown when looking at the association between contemporary television consumption and BMI among boys and girls. No significant correlation was found for either boys or girls. Therefore, there were no differences found when examining gender in relation to contemporary television viewing and BMI.

Research Question Two

Research question two inquired as to whether there would be a significant ethnicity difference shown when looking at the association between contemporary television consumption and BMI among the various ethnicities represented in the sample. However, though a large amount of diverse ethnic options was available on the survey, the sample was small and the majority of respondents were White or Caucasian. Therefore, for purposes of analysis the sample was split into White or Caucasian and Other. However, even this adjustment to the analysis did not yield anything significant.

Research Question Three

Research question three inquired as to whether children engage in more traditional or contemporary television consumption. The sample watched a mean of 1.47 hours of traditional television and 3.12 hours of contemporary television. A *t*- test analysis with a 95% confidence

interval found a highly significant difference in the amount of television watched on a traditional

platform versus contemporary television ($t = 6.83$; $df = 37$; $p < .001$).

CHAPTER FIVE

DISCUSSION

General Discussion and Analysis

This chapter includes the discussion and analysis of the findings present in this study. This chapter provides further understanding for the results from the hypotheses from this study. It also provides implications from the results, strengths and limitations, and suggestions for future research.

Implications of the Results

Hypotheses

Previous scholars (Halford, Gillespie, Brown, Pontin & Dovey, 2004; Derochers & Holt, 2004) looked at advertisements and their effects on children and their eating habits. The studies conducted by these scholars prompted the assumption presented in hypothesis one. However, previous studies have solely examined traditional television viewing while the current study hoped to examine the association between advertising and contemporary television. Therefore, hypothesis one assumed that contemporary television viewing and advertisement exposure would be negatively associated. This assumption stemmed from the idea that there would be fewer to no commercials on contemporary television platforms rather than on a traditional platform. This hypothesis was not supported. Pearson's correlation showed that there was not a significant correlation between these two variables. This could be due to the small size of the sample population or the fact that the variables are highly unpredictable. Both of these variables depended on the estimations for children's television viewing hours and advertisement exposure by parent participants. Additionally, the analysis was also missing data for this correlation, which could have contributed to this hypothesis not being supported.

Hypothesis two was prompted by the assumption that television viewing can displace children's physical activity. Proof of this displacement has been put forth and supported by a great deal of scholars (Anderson, Crespo, Bartlett, Cheskin & Pratt, 1998; Hernandez, Gortmaker, Colditz, Peterson, Laird & Parra-Cabrera, 1999; Marshall, Biddle, Gorely, Cameron & Murdey, 2004). Again, these previous scholars exclusively examined traditional television platforms while the current study examined contemporary television platforms. Hypothesis two assumed that contemporary television viewing and children's BMI would be positively associated; however, this hypothesis was not supported. Pearson's correlation showed that there was not a significant relationship between these two variables. This, again, could be due to the small sample size and missing data. Only 61 cases were valid for both of these variables. Additionally, as before, these variables were highly unpredictable because they were dependent on parents' estimations of children's height, weight, and contemporary television viewing hours.

Hypothesis three assumed that advertisement exposure and children's BMI would be negatively associated. This assumption stemmed from the scholars mentioned in the analysis of hypothesis one. Zimmerman and Bell (2010) specifically claimed that their study's findings indicated obesity to be associated with television content containing advertisement exposure. However, this hypothesis was not supported either. Pearson's correlation showed that there was not a significant relationship between these two variables. Again, missing data, only 61 cases reported both of these variables, could be a factor. It could also be due to the small sample size or the unpredictable variables.

Similar to hypothesis two, hypothesis four assumed that there would be a negative association between contemporary television viewing and physical activity. Although this association has been proven in previous studies, as mentioned in the analysis of hypothesis two,

hypothesis four was not supported either. Pearson's correlation showed that there was not a significant relationship between these variables either. Again, most likely, this was due to the small sample size and highly unpredictable variables.

Hypothesis five assumed that there was a negative relationship between children's physical activity and children's BMI. Analysis proved there was indeed a negative relationship between these two variables; however, the Pearson correlation was not significant ($r = -.215$). These two variables were highly unpredictable as they relied on estimations of weight, height, and children's physical activity. Many times these types of estimations can prompt parents to provide a more socially acceptable answer rather than a more accurate estimation. However, the insignificant finding can also be due to the small sample size as well.

The next three hypotheses were prompted by the findings of previous scholars' studies (Burdette & Whitaker, 2005; Cecil-Karb & Grogan-Taylor, 2009; Kimbro, Brooks-Gunn & McLanahan, 2011) that examined the relationship between television and physical activity by examining the perceived safety of a neighborhood as a significant factor in that relationship. Hypothesis six assumed that contemporary television viewing and neighborhood safety would be negatively associated. This hypothesis did reveal a negative relationship; however, this hypothesis was did not show a significant correlation either ($r = -.128$). Therefore, this hypothesis was not supported. The Neighborhood Scale was reliable (Cronbach's $\alpha = .876$), but parent's estimation of contemporary television viewing was an unpredictable variable. This could be a reason hypothesis six was unsupported. It could also be due to the small sample size.

Hypothesis seven assumed that contemporary television viewing and children's BMI would be negatively associated. This hypothesis was not supported either. Even if this hypothesis showed a result that favored a significant positive association, it would be similar to the study

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conducted by Kimbro, Brooks-Gunn, and McLanahan (2011). Their study population revealed that there was not a displacement of outdoor play for television consumption resulting in higher BMI scores as a byproduct of what the study regarded as an unsafe neighborhood. However, the current study's analysis showed a Pearson correlation that was not significant neither in support of the significant negative association assumption of the hypothesis of the current study nor the significant positive association found by previous scholars.

Similarly, hypothesis eight assumed that perceived neighborhood safety and children's BMI would be negatively associated. This assumption stemmed from previous scholars' observations in their own studies; however, this hypothesis was also unsupported and did not yield a significant Pearson's correlation. Perhaps this is due to the small sample size.

The last three hypotheses were prompted by previous scholars' studies (Vandebosch &Van Cleemput, 2007; Vandewater, Park, Lee & Lee, 2008) which examined different types of parenting styles and the role parents play in the relationship between television consumption and BMI. While both of these studies did not yield a significant relationship between television viewing and children's BMI, they did provide significant findings pertaining to parental mediation as it pertains to this relationship. However, the current study incorporated contemporary television when examining these interactions.

Hypothesis nine assumed that contemporary television viewing and parent mediation would be negatively associated. Pearson correlation showed that there was a negative association ($r = -.476$); however, it was not significant. While the Mediation Scale was reliable (Cronbach's $\alpha = .854$), the estimation of contemporary television viewing was an unpredictable variable. This could be a rationale as to why the result was not significant or, again, it could be due to the small sample size.

Hypothesis ten assumed that parental mediation and physical activity would be positively associated. This hypothesis was unsupported. Pearson correlation found no significant association between these two variables. Again, although the Mediation Scale was reliable, the parents' estimation of their children's physical activity is highly variable. However, this result could also be due to the small sample size.

Lastly, hypothesis eleven assumed that parental mediation and children's BMI would be negatively associated. Pearson correlation showed that these variables did not have a significant association; therefore, this hypothesis was unsupported. This, again, could be due to the small sample size.

Research Questions

Research question one posited whether or not the association between contemporary television and BMI was greater among girls or boys. There were no gender differences found and no significant correlations for either boys or girls. This question stemmed from previous studies, which looked at gender as a intermediary factor for the television and BMI relationship (Robinson & Killen, 1995; Crespo, et. al., 2001). This could be due to the small sample size. Once the divide was made between boys and girls, the sample size dwindled and this may have contributed to the inability to see any trends within gender differences.

Research question two posited whether or not the association between contemporary television and BMI would be more prevalent among one ethic group or another. This question stemmed from previous studies (Robinson & Killen, 1995; Kunkel, Mastro, Ortiz, & McKinley, 2003; Guran, et. al., 2010; Cecil-Karb & Grogan-Taylor, 2009), which incorporated ethnicity as a principal investigation when examining the television and BMI relationship. However, although various ethnicities were represented in the current study, most respondents were White

or Caucasian and other ethnicities were not represented in abundance, which caused complications within the analysis. Therefore, for purposes of analysis, other ethnicities were grouped into a category labeled 'Other'. Even these adjustments did not show any significant differences in the contemporary television and BMI relationship among the ethnic groupings. This could be due to the large and diverse options provided on the survey instrument, but, again, this is most likely due to the small sample size.

Lastly, research question three posited whether or not children engage in more contemporary television consumption or traditional television consumption. A *t*-test revealed a significant result for this research question. This could be due to the fact that children have more access to contemporary television platforms or that iPads and mobile devices are replacing the traditional television sets where children can access television in more places than the traditional fixated television set of the past. This result suggests that in today's society, children are viewing television more contemporary platforms than on traditional platforms.

All in all, the implications of this study were not found within the hypotheses; however, perhaps a media influence has played a part in shaping the perceptions of the parent participants. The use of parent estimations of their child's weight and height could be determined by what is presented as normal weight and height as represented by the media. Additionally, parents could provide what would be represented as normal media usage as well. This is not to the fault of the parent, but rather, a natural trend observed in society. Parent participants' view of what is acceptable and normal could be skewed due to this media influence. This consideration could account for some of the more socially desirable data provided for both body measurements and children's media use.

Strengths

The reliability yielded from both the Neighborhood Scale and the Mediation Scale was the biggest strength of this study. The Neighborhood Scale yielded a Cronbach's alpha of .876. This showed that this scale continues to be a reliable way to measure the neighborhood safety from previous studies (Burdette & Whitaker, 2005; Cecil-Karb & Grogan-Taylor, 2009). This scale relied heavily on parents' perceptions of their neighborhood and how they view the occurrences in their neighborhood. Although the current study could not prove this scale as a predictor of parents' allowances when it comes to television viewing or outdoor physical activity, the scale itself as a measure of how parents feel in their neighborhoods was reliable and should continue to be used in future studies.

The Mediation Scale also proved to be reliable with a Cronbach's alpha of .854. This scale, borrowed from previous studies (Vandebosch &Van Cleemput, 2007; Vandewater, Park, Lee & Lee, 2008) also continues to be relevant and reliable as a way to measure parenting style and mediation. In the current study, the scale did not prove to be a good predictor of parents' allowances with physical activity and television viewing. However, it was a good, reliable indicator of parents' mediation and should continue to be used in future studies.

Another strength of the current study was the finding related to children's traditional television consumption in comparison with children's contemporary television consumption. This study found that there was a difference between the average amount of hours children spend with traditional platforms and contemporary platforms indicating that there is quite possibly a shift happening in the television consumption among children ages 5-13. If a shift is not taking place, at very least, children are consuming more television on contemporary platforms and this phenomena should be examined further.

Limitations

The largest limitation in this study was the small sample size. The hypotheses were unable to show any significant findings because there was simply not enough of a population to draw from in order to statistically detect any nuances. Perhaps if the Nevada site could have been incorporated into the data from the California and Louisiana sites something of significance would have resulted. Additionally, another limitation due to the small sample size was the inclusion of missing data. Some respondents did not provide accurate responses to the questions furthermore decreasing the amount of data available to test each hypothesis.

Another limitation was the use of surveys. The current study used Cronbach's alpha to determine the reliability of the survey scales; however, many questions relied on parents' estimations and opinions. These types of survey items could be skewed due to parents' inaccurate estimations of children's body weight, height or the amount of time they spend engaged in physical activity or television consumption. Parents may have also provided socially desirable answers rather than true answers.

Additionally, the makeup of the sample population was based on convenience. Therefore, a different population may have been more desirable. The majority of the sample was White or Caucasian, which can skew the data. The two schools included in the sample were: a performing arts, magnet school (California) and a private, Christian school (Louisiana) in which parents may tend to monitor their children's physical activity and television consumption in relation to school and homework due to their financial investment.

Future Research

The examination of television consumption and its relationship with physical activity has been studied time and time again and will continue to be studied as long as television stays

relevant. On average, Americans spend 34 hours per week watching television (Nielsen, 2012).

In today's society, television has many different platforms for which researchers have just begun

to be able to track the amount of consumption taking place on those platforms. Therefore, as

television continues to evolve, the research needs to evolve. Future scholars could perhaps use

this study as a foundation for which to look at contemporary television platforms and to

incorporate them into the television consumption and childhood obesity examination.

Future scholars could also incorporate Putnam's displacement hypothesis as well. Many

previous studies did not include a theoretical foundation; therefore, there is a gap in the

literature, which could be filled by examining the possible theoretical occurrences taking place in

a population. Another limitation found in the current study was using a survey that included

estimation and opinion responses from parent participants. Perhaps future studies should

incorporate experimental tactics including observations of children's television and physical

activity behaviors. This may provide more accurate and uniform data collection.

Additionally, future research should include a larger population sample in order to detect

associations if any among the relationships explored in the current study. A larger, more diverse

population would also rectify the issue of examining these associations among various ethic

groups and nuances pertaining to gender.

<div align="center">Conclusion</div>

The purpose of this study was to explore the contemporary relationship between child

obesity and television consumption while incorporating Putnam's Displacement Hypothesis.

Results did not provide any support for associations examined in this study and; therefore, the

Displacement Hypothesis was difficult to incorporate, much less prove. However, the

relationship pertaining to the amount of traditional and contemporary television consumption

taking place among children ages 5-13 was able to result in the observation that children are consuming more television on contemporary platforms rather than traditional platforms.

There is still much to be done with regards to contemporary television research and its effect on children's health. This study has provided a jumping off point for future research taking place in this area.

UNLV

Information Consent
Department of Journalism and Media Studies

Title of Study: Television Consumption and Child Obesity: Linking Physical Activity and Advertising to Putnam's Displacement Hypothesis

Investigator(s): Dr. Paul Traudt, Principal Investigator; Brittany Altamirano, Associate Investigator

For questions or concerns about the study, you may contact Dr. Paul Traudt at 702-895-3647 or via email at paul.traudt@unlv.edu; Brittany Altamirano at 626-376-2321 or via email at Rodrig48@unlv.nevada.edu.

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794 or via email at IRB@unlv.edu.

Purpose of the Study
You are invited to participate in a research study. The purpose of this study is to determine the relationship between television consumption and child obesity incorporating variables that have not been explored in previous research. These variables will be 1) television consumption in the digital age; and 2) the application of Putnam's displacement hypothesis as a theoretical framework.

Participants
You are being asked to participate in this study because you comprise the targeted demographic: parents of school-age children 5-13 years old.

Procedures
If you volunteer to participate in this study, you will be asked to do the following: take a survey. This should take approximately 15 minutes.

Benefits of Participation
Your participation will contribute to the research at hand.

Risks of Participation
This study includes minimal risks. You may experience testing fatigue.

Cost/Compensation
There will be no financial cost for your participation nor will you receive any financial compensation. The study will take approximately 15 minutes of your time.

I have read and understand the above consent form and desire of my own free will to participate in this study.

○ Yes

○ No

UNLV

The following 3 questions will ask you to provide general information about your child. If you have multiple children, please utilize **ONLY ONE** child's information (the child needs to be **between the ages of 5-13 years old)**. You have the freedom to choose which of your children's information to provide.

How old is **your child?**

[dropdown ▼]

What is **your child's gender?**

○ Male

○ Female

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What is **your child's ethnicity?** (Check all that apply)

☐ American Indian or Alaska Native

☐ Asian American

☐ Black or African American

☐ Hispanic or Latino

☐ Native Hawaiian or Other Pacific Islander

☐ White

☐ Multiracial

☐ Other

UNLV

The next 4 questions ask you about your child's body mass index (BMI).

Please report your child's **height (in inches)** below.

[   ]

Please report your child's **weight (in pounds)** below.

[   ]

UNLV

In your opinion, is your child shorter, the same, or taller than other children their age.

Shorter	About the same	Taller
○	○	○

In your opinion, is your child lighter, about the same, or heavier than other children their age.

Lighter	About the same	Heavier
○	○	○

UNLV

Thank you! The next series of questions addresses your child's media use. Please answer honestly and to the best of your ability.

On average, how many **hours per day** does your child spend interacting with **any form of media**? (i.e., computer, TV, video games, iPad, cell phone, etc.)

[＿＿＿＿＿＿ ▼]

On average, how many **hours per day** does your child spend **watching any form of TV?** (i.e., TV on digital devices, broadcast network TV, cable TV, DVDs of a television series, etc.)

[＿＿＿＿＿ ▼]

UNLV

On average, how many **hours per day** does your child spend watching **TV on digital platforms?** (i.e., Netflix, Hulu, Vudu, Sling, YouTube, online videos, etc.)

[＿＿＿＿＿＿＿ ▼]

On average, how many **hours per day** does your child spend watching **TV that is digitally recorded?** (i.e., DVR programs, TiVo, etc.)

[＿＿＿＿＿＿ ▼]

On average, how many **hours per day** does your child spend **watching TV on a traditional platform?** (i.e., broadcast network or cable programs in real time on a TV set, etc.)

[＿＿＿＿＿＿ ▼]

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You're doing great! The following set of questions ask you to share your personal opinion about TV advertisements and your child's possible exposure to them.

Please rank your level of agreement with the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am concerned that TV advertisements affect my child negatively.	○	○	○	○	○
I am concerned that unhealthy food advertisements will make my child crave unhealthy foods.	○	○	○	○	○

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On average, **how many advertisements** do you think your child is exposed to **when they watch ONE program on cable or broadcast network television?**

[⬍]

On average, **how many advertisements** do you think your child is exposed to **when they watch ONE television program on digital platforms or DVR programs?**

[⬍]

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Thank you! The following 3 questions ask about your child's daily physical activity.

On average, how many **total hours per day** does your child engage in **physical activity** or **physical play**?

[▼]

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On average, how many **total hours per day** does your child spend engaged in physical activity **outside of school hours**? (i.e., sports, dance, gymnastics, playing outside in the neighborhood, etc.)?

[▼]

On average, how many **total hours per day** does your child spend engaged in physical activity **during school hours**? (i.e., break time, lunch time, physical education classes during school hours, etc.)

[▼]

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Thank you! Please indicate your level of agreement with the following statements in regards to your PERSONAL PARENTING STYLE with TV and physical activity.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I set specific TV viewing hours for my child.	○	○	○	○	○
I explain to my child the importance of physical activity.	○	○	○	○	○
I set an example of TV watching limits for my child by watching TV with them.	○	○	○	○	○
I tell my child the consequences of watching too much TV.	○	○	○	○	○
I tell my child that they need to play outside.	○	○	○	○	○
I will not allow my child to "veg out" in front of the TV.	○	○	○	○	○
I engage in physical activities with my child.	○	○	○	○	○
I, as the parent, model how much/how little to watch TV for my child.	○	○	○	○	○
I tell my child why they aren't allowed to watch certain TV programs.	○	○	○	○	○

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We are almost done! The following 3 questions ask your personal opinion about your neighborhood.

How would you rate your neighborhood as a place to raise children?

Poor	Fair	Good	Very Good	Excellent
○	○	○	○	○

Please indicate your level of agreement with the following statements.

	Never	Rarely	Sometimes	Occasionally	Always
I have my child play indoors because of unsafe activity in my neighborhood.	○	○	○	○	○
I have my child play indoors because of unsafe people in my neighborhood.	○	○	○	○	○

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How often do you see the following things happen in your neighborhood?

	Never	Rarely	Sometimes	Often	All of the Time
Loitering Adults	○	○	○	○	○
Gang Related Activity	○	○	○	○	○
Not Enough Police Protection	○	○	○	○	○
People Don't Care what happens in the Neighborhood	○	○	○	○	○
Drunks/Drug Dealers	○	○	○	○	○
Disorderly Adults	○	○	○	○	○
Disorderly/Misbehaving Youth	○	○	○	○	○

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Thank you! Just 4 more questions to go. The following questions will be about YOU, the parent participant.

Please indicate **your** gender.

○ Male

○ Female

What is your age?

[▲▼]

Please indicate **your** highest level of education.

- ○ No schooling completed
- ○ Nursery school to 8th grade
- ○ Some high school, no diploma
- ○ High school graduate, diploma, or the equivalent (i.e. GED)
- ○ Some college credit, no degree
- ○ Trade/technical/vocational training
- ○ Associate degree
- ○ Bachelor's degree
- ○ Master's degree
- ○ Professional degree
- ○ Doctorate degree

Please indicate an approximate idea of the total amount of annual income in your household.

- ○ Less than $20,000
- ○ $20,000 - $39,999
- ○ $40,000 - $59,999
- ○ $60,000 - $79,999
- ○ $80,000 - $99,999
- ○ $100,000 - $119,999
- ○ More than $120,000
- ○ Don't know

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Thank you for your participation!

APPENDIX B

2 to 20 Years: Girls Body Mass Index for Age Percentiles

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2 to 20 Years: Boys Body Mass Index for Age Percentiles

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