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Mass Media Making Its Impact on Overweight and Obesity: A Developmental Overview

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Abstract: Obesity has become one of the most prevalent topics of interest in the United States due to the increasing number of overweight and obese children and adults in the past few decades. According to the Center for Disease Control and Prevention (2015), these numbers have been on the rise (e.g., Alabama's obese population is at 33%), with some states reaching beyond 35% of the population in the obese category. Typically, children in the United States grow up in environments saturated by food and beverage marketing, the bulk of which comprises foods low in nutrients and high in calories, sugars, salt, and fat. Mass media, in various formats influences such food choices and consumptions. Influences of television on the behaviors and habits of children and adolescents (up to 18 years) have been under study for the past two decades extensively. Current literature review seeks to identify the cognitive and behavioral factors that occur among children and young adults who make semi-autonomous and autonomous decisions regarding their lives, particularly about their food. The review would examine the various channels of media – audiovisual, print, and online, that could affect the food choices, food intake, and overall obesity among young adults. A conceptual model for understanding the various factors influencing eating behaviors of adolescents and young adults has been proposed by Story & Stang (2005). It includes the following major and sub-categories of influencing factors namely, personal, environmental, large macrosystem and other contributing factors.

Key words: *mass media, children, adolescents, advertising, overweight, obesity, digital media*

1. Introduction

Obesity has become one of the most prevalent topics of interest in the United States due to the increasing number of overweight and obese children and adults in the past few decades. According to the Center for Disease Control and Prevention (2015), these numbers have been on the rise (e.g., Alabama's obese population is at 33%), with some states reaching beyond 35% of the population in the obese category namely, Arkansas, Mississippi, and West Virginia. The following review describes a thorough inquiry of factors influencing obesity. Different forms of mass media and their influence on habits leading to overweight and obesity, television, Facebook and Twitter in particular, will be well examined with a focus on children and young adults in the group of 18-26 years.

Rising childhood obesity was declared to be a major problem in the U.S. by the Department of Health as early as 2004. A target was set by the agency to 'halt the year-on-year rise in the prevalence of obesity in children under 11 by 2010 (Rao, Routh & Denley, 2005). According to the National Survey of Children's Health (NSCH), in the United States, 16.4% of children nationwide, age 10-17 years, were obese (Nesbit, Kolobe, Sisso, Ghement, 2014). Recent government publications have declared obesity in children as one of the biggest threats to public health. Obesity is widely believed to be rising continuously and rapidly (Routh, Rao, & Denley, 2005). According to the Centers for Disease Control and Prevention (CDC) (2012), the proportion of overweight children ages 6-11 has more than doubled since 1980, and the rate of adolescents has tripled. Today these numbers are much higher ranging from 10% to 33% across the country among all age groups (CDC, 2012; Sullivan, 2010). According to the CDC (2015), thirteen states (Alabama, Arkansas, Indiana, Iowa, Kentucky, Louisiana, Michigan, Mississippi, Ohio, Oklahoma, South Carolina, Tennessee, and West Virginia) had a prevalence of obesity equal to or greater than 30 percent.

Typically, children in the United States grow up in environments saturated by food and beverage marketing, the bulk of which comprises foods low in nutrients and high in calories, sugars, salt, and fat. Mass media, in various formats influences such food choices and consumptions. Influences of television on the behaviors and habits of children and adolescents (up to 18 years) have been under study for the past two decades extensively. However, young adults (those above 18 years) were not under investigation that closely (APA, 2016; Ferguson, Munoz, & Medrano, 2012; Harris, & Bargh, 2009; Hingle & Kunkel, 2012; Lobstein & Dibb, 2005; Mikailova, 2014). Current literature review seeks to identify the cognitive and behavioral factors that occur among children and young adults who make semi-autonomous and autonomous decisions regarding their

lives, particularly about their food. The review would examine the various channels of media – audiovisual, print, and online, that could affect the food choices, food intake, and overall obesity among young adults.
Childhood and adolescent obesity has been related to a host of adverse proximal and distal health outcomes, which are strong predictors of adult obesity (Spruijt-Metz, 2011). According to the American Academy of Pediatrics (AAP), the increase in childhood obesity represents an "unprecedented burden" on children's health (AAP, 2009; Hingle & Kunkel, 2012). Common medical complications among the overweight population include hypertension, type 2 diabetes, respiratory ailments, orthopedic problems, trouble sleeping, and depression.

The current review examines the efforts put in by the predecessors to studies of media influence and obesity, including Centers for Disease Control and Prevention (CDC), United States Department of Agriculture (USDA), Federal Trade Commission (FTC), Food and Drug Administration (FDA), Federal Communication Commission (FCC), and others. The analysis also extends the understanding established by prior research on childhood obesity issues and makes sincere efforts to identify the influencing factors for obesity during young adulthood. The age group of 18 and above has been studied much less compared to childhood and adolescence. The current project broadens the scope of exploration, thereby focuses treatment of overweight and obesity on the young adulthood years.

1. 1. Obesity and Overweight Defined:

According to a study by Bernadac, Ghori, Cannenterre, Mou, & Moul (2012), there is a significant difference between the two terms, overweight and obesity. Overweight is defined as having an extra body weight from muscle, bone, fat, and water. However, obesity is defined as having a high amount of extra body fat. According to Centers for Disease Control and Prevention, Growth Charts (Based on the Body Mass Index (BMI), are the most commonly used indicators to measure the size and growth patterns of children and teens in the United States (CDC, 2016).

Obesity contributes greatly to social aspects of interaction and impaired school performance in children (Harris, Moreland-Russel, Tabak, Ruhr, & Maier, 2014). In addition to those factors, obesity also contributes to serious long-term health issues, such as diabetes, hypertension, ischemic heart disease, and stroke, which increase morbidity, reduce quality of life, and result in millions of dollars in healthcare related costs (Finkelstein, Trogdon, Cohen, & Dietz, (2009). Further, childhood and adolescent obesity has been related to a host of adverse proximal and distal health outcomes, which are strong predictors of adult obesity (Spruijt-Metz, 2011).

2. Contributing Factors

A conceptual model for understanding the various factors influencing eating behaviors of adolescents and young adults has been proposed by Story & Stang (2005). It includes the following major and sub-categories of influencing factors. Earlier studies have been skewed in their target population, and in the categorizing of influencing factors.

FIGURE 1 ABOUT HERE

Personal factors:
- Cognitive-affective (personal health, meaning of food, body image, and self-concept)
- Behavioral (food choices, self-efficacy, food-related skills, and eating practices)
- Biological (puberty, growth, genetic predisposition, health, etc.)

Environmental factors:
- Micro-level (cultural group, social/cultural norms and values, food trends/fads, school meals, fast food, etc.)
- Social environment (family unit, parenting practices, parent modeling, home environment, family meal patterns, peer norms and influences)

Macrosystems:
(socio-economic political systems, food production and distribution systems, food availability, and mass media)

Other factors:
(lifestyle, individual food behavior, and nutritional status)

2. 1. Personal Factors

The preschool years are crucial because many food habits and taste preferences are shaped early, as is the long-term health of the child (Hoerr, Utech, & Ruth, 2005). Recent study on children found that those who watched a television program with food advertising ate 45% more food than children who watched a program with advertising for non-food items (Robert Wood Johnson Foundation, 2011; Lobstein & Dibb, 2005). According to the Social Learning Theory developed by Albert Bandura (1977), learning is a cognitive process; Bandura's study found that when exposed to television, like in his famous bobo-doll experiment, children learn by observing and imitating what they see on the screen, particularly when these behaviors seem realistic or are rewarded (Bandura as cited in Strasburger, Jordan, & Donnerstein, 2010). Cognitive development theory asserts that children's cognitive capacities at different stages determine if and how they understand media content. Media is most influential because of the impact that it has on those that are not quite able to rise above the influence. Children who are younger and are not able to comprehend persuasive intent will be most likely vulnerable to advertising (Strasburger, Jordan, & Donnerstein). This vulnerability is of significance as the tendency of media is to have an overall negative effect on body image (Khan, 2011). The relationships between media, food habits, nutrition and physical activity are complex; however the implication of media cannot be denied in the recent obesity boom (Bernadac, Ghori, Cannenterre, Mou, & Moul, 2012).

Initial studies during 1985 have concluded that the prevalence of obesity increased by 2% in 12-17 year-olds for each additional hour of television viewed (Dietz & Gortmaker, 1985). Since then, media overall, have been regarded as one of the key contributors to the global obesity epidemic (Kaiser Foundation, 2006). The Foundation's issue reviewed over 40 studies concerning the role of media in the nation's dramatically increasing rates of childhood obesity and explored what researchers do and do not know about the role media plays in childhood obesity. It also outlines media-related policy options that have been proposed to help address childhood obesity and identifies ways media could play a positive role in helping to address this serious public health problem.

The time children and adults spend using media displaces time one could spend on physical activities. The food advertisements that children are exposed to on television influences them to make unhealthy food choices. The interplay of promotions between food products and popular television/movie characters can be encouraging children opt for, select, and eat more high-calorie foods. One of the behavioral issues with television and media in general, is that children tend to snack excessively, most likely tend to eat less healthy meals when eating in front of the television. While watching television or videos, the metabolic rate falls below that of sleeping level that prompts the consumption of foods high in salt, sugar, and calories. The young populations most at risk for overweight and obesity are also the most voracious media consumers (APA.org, 2012). Additionally, they are subject to school and neighborhood environments where marketing of unhealthy foods and beverages is pervasive and constant. Unabated, the current food and beverage marketing and media landscape will continue to contribute to child and adolescent obesity (Robert Wood Johnson Foundation, 2011).

According to Demers & Lapierre (2012), statistics reveal that 22.6% of children and youth ranging from age 2-17 are overweight or obese. Such increase in obesity numbers has caused researchers to not only look into casual factors, but also how these environmental factors influence eating behaviors. Researchers define environments that discourage people, especially children, from engaging in physical activity and eating healthy as obesogenic environments (Demers & Lapierre, 2012). Media in relation to the environment plays a big role in obesity and the rise in children being overweight. For example, when there is technology located in the home or even more convenient, the bedroom, the desire to overindulge in foods that are less healthy are more likely to occur.

2.1.1. Advertising and Obesity

Although the sequence of developmental stages is common across the world, children mature and move through the stages at different speeds (Harker, Harker & Burns, 2007). The children in the perceptual stage, ranging from ages 3-7, are familiar with brands and stores but do not necessarily understand the role of them. Next, during the analytical stage, ranging from ages 7-11, children develop more information processing abilities. Finally, in the reflective stage, ages ranging 11-16, children excel in their cognitions and social development (Harker, Harker, & Burns). So, during early years, if the child does not quite understand the concept of marketing communications, it is easy for the child to get drawn into the influence that marketing communication has on society. What looks appealing on television is not always the best choice for the viewer; however, marketing communications are so powerful and impactful at what they do that they have mastered a way to make unhealthy foods appealing to its viewers around the world. Research has confirmed that advertising has an adverse effect on an individual's food choice, which as a result leads them to obesity (Harker, Harker & Burns).

It is not surprising that people will be greatly influences by advertising. Advertising is used all over the world to modestly increase the consumption of food intake, especially the food that falls under the unhealthy category, such as fast food. Usually, the presentation of an advertisement comes in the form of visual or auditory. The influence of advertising does not solely cause obesity, but it definitely supports and maintains obesity for some people (Harker, Harker & Burns, 2007). Research has demonstrated that there is a direct relationship between food advertising to children and their food choices. These authors identified two important skills that children need to possess in order to evaluate advertisements; first, the child must be able to distinguish between advertising and non-advertising content and second, they must be able to recognize the persuasive content embedded within the advertisement. As it pertains to advertising, many researchers rely on Piaget's cognitive developmental theory; whose preoperational, concrete operational and formal operational stages could be compared loosely with these three stages of development described above. Piaget elaborates the significance of critical thinking when unrealistic claims are made by marketing companies regarding their products. As they grow, children develop logic and reasoning to differentiate between practical and impractical declarations or announcements made by the corporations.

2.2 Environmental Factors

Different sociocultural dynamics also were found to influence children's and adolescents' food choices and eating behaviors. Some of these dynamics related to income level, place of living, and race/ethnicity, etc. The frequency of binge eating was highest among adults under 40 years. For women, the frequency of binge eating was less associated with age and family income, and more associated with being married, depression, and time residing in polluted neighborhoods (Reagan & Hersch, 2005). Marketers view ethnically and racially diverse youth groups, adolescents, and young adults as being particularly vulnerable to media messaging. Studies related to such elements are mentioned below:

Among non-Hispanic black and Mexican-American men, those with higher incomes are more likely to be obese than those with low income. Higher income women are less likely to be obese than low-income women. There is no significant relationship between obesity and education among men. Among women, however, there is a trend—those with college degrees are less likely to be obese compared with less educated women. Between 1988–1994 and 2007–2008, the prevalence of obesity increased in adults at all income and education levels (Centers for Disease Control and Prevention, 2010). Latino and African-American youths are early adopters and heavy users of digital media, and food companies view them as trendsetters. They also are targeted with branded food and beverage products of lower nutritional quality than white children and adolescents (RWJF, 2011). High-energy, low-nutrient foods are advertised to Latino and African-American youths at even higher rates than white children. Since 2003, advertising to African-American children of items such as cookies and fast food has risen substantially in comparison to white children. Consequently, each day, African-American children watch twice as many calories advertised in fast-food commercials than white children (Story & Faulkner, 1990).

African-Americans and Latinos use almost five hours more of media each day than their white counterparts, and by 2011, 61.5 percent of African-Americans and 50.3 percent of Hispanic/Latinos are projected to have access to the Internet (Boyce, 2007). Four studies found that children who play online advergames (games that incorporate brands as content into the game experience) are more likely to prefer the associated brand and its food products when compared with unbranded foods (Dias & Agante, 2011). It was found that African-American teenagers saw more television ads for foods like burgers, pizza, and fried chicken than did the other ethnic groups (RWJF, 2011). Similarly, in neighborhoods where mostly African-American or Latinos lived, there were 13 times as many billboards and other outdoor ads as compared to white neighborhoods (RWJF, 2011). African-American females are relatively better off than their white counterparts, in supporting a positive self-image, even at higher weights, a product of affirming messages prevalent in African-American communities about individual style and respect for one's body (as cited in Saguy & Almeling, 2008).

The availability of certain types of food is thought to be directly linked to socioeconomic status. Generally, food deserts are thought to be a barrier to making healthier food choices (Hackett, Boddy, Boothby, Dummer, Johnson, & Stratton, 2008). Schools in higher-income neighborhoods have 32 percent and 50 percent fewer fast-food restaurants and convenience stores within walking distance, respectively, than schools located in lower-income neighborhoods. Schools that serve higher socioeconomic status (SES) students offer more healthy options, while schools that serve predominantly lower-SES populations have less-healthy options in vending machines, school stores, and snack bars. Overall, lower- and middle-income neighborhoods have 1.28 to 1.34 times the number of fast-food restaurants compared with higher-income neighborhoods (Brown & Witherspoon, 2002).

2.3 Macrosystems

In an effort to see the causes of this disturbing trend, researchers and experts have pointed to a variety of potential contributors to the rise in childhood obesity – media, reduction in physical activity, increased availability of soda and snacks in schools and public places, growing numbers of fast-food outlets, "super-sizing" food portions in restaurants, and increased number of highly processed high-calorie, and high-fat food products in the market. One in three (34%) parents say they are "very" concerned that their children are exposed to too many ads in the TV programming they watch, with another 35% saying they're "somewhat" concerned (IOM, 2006; Kaiser Family Foundation, 2007). Only 10% of parents named food advertising as the issue that concerns them the most. In another related study, results indicated that children were more likely to choose the advertised item, despite parental input, making their input moderately effective (Ferguson, Munoz, & Medrano, 2012). Young people consume more media than ever before, spending 7.5 hours per day online, watching TV, using mobile devices, listening to music, playing video games and reading print materials. Moreover, youths often multitask so their consumption of various media totals nearly 11 hours daily (Ofcom, 2004). Research on TV advertising alone shows that exposure affects young people's consumption of the marketed products and influences their food and beverage purchasing patterns even five years after the initial exposure (Ferris, 2003). Over the past few years, media use among children and teens has become more prevalent than ever. With the launch of the iPod, the explosion in instant messaging, the birth of mobile video and YouTube, and the advent of social networking sites like MySpace, Facebook, Pinterest, etc., young people are rarely out of contact, or out of reach of the media.

2.3.1. Digital Media

Technology takes media to a whole different level with social media, gaming sites and virtual world such as the Sims, and with additions such as YouTube and blogs (O'Keeffee & Clarke-Pearson, 2011). Technology enhances communication as well as social connection with friends, classmates and people with shared interests with the convenience of corresponding from one's own desktop or cellular phone. Technology is even convenient to the point where students are using social media to connect with one another for homework or class assignments (O'Keeffee & Clarke-Pearson, 2011). Because technical knowhow is so diverse and can be used for so many different purposes, technology overtime has gained a huge influence on people whom have devices such as cellular phones, laptops, desktop computer, game systems, televisions, etc.

There are over 1.8 billion people ranging from age 10-24 who are facing significant pressure and challenges due to the media (Best, Manktelow, & Taylor, 2014). A lot of young people look to social media for attention, comfort and or, support, which explains why social media has such a huge effect on young people today. The food, beverage and restaurant industry's spending on digital media platforms, including mobile, social networks, and online video, is expected to increase rapidly. For example, General Mills' investment in digital media spending tripled during 2007-2010 (Boyce, 2007). The amount of advertising and commercial promoting of high-fat, high-salted and high-sugar foods has increased significantly (Bernadac, Ghori, Cannenterre, Mou, & Moul, 2012). According to a study by Ferguson, Muniz, & Medrano (2012), advertising has a meaningful effect on children and thus impacts their food choices. Children are more likely to choose the advertised item that media portrays which has an impact on children's healthy eating and weight management by encouraging them to snack, nibble or to go for their favorite fast food whenever they want during the day (Bernadac, Ghori, Cannenterre, Mou, & Moul, 2012; Ferguson, Muniz, & Medrano, 2012). Research across a variety of print, broadcast and digital media (i.e., TV, websites, digital advergames, and product packaging) demonstrates that marketing is effective in selling product (Dias & Agante, 2011). Young people's exposure to food and beverage marketing affects their preferences for the branded products.

Obesity in children is a result of spending an average of five-and-a-half hours a day using media (as much as a working job); this is more time than they spend doing anything else besides sleeping (Hingle & Kunke, 2012; Latner, Rosewall, & Simmonds, 2007). According to Rudolf, Hunt, George, Hajibagheri, and Blair (2010), there are as many as 1 in 4 children who are overweight. Even the very youngest children, preschoolers ages 1-6 years, spend as much screen time (television, videos, video games, and computers) as they do playing outside. Much of the media targeted to children is loaded with extensive advertisements promoting foods such as candy, soda, and snacks. It is estimated that a typical child sees about 40,000 ads a year on television alone (Kaiser Family Foundation, 2007).

The total media exposure, including simultaneous use across media, for youth ages 8 – 18 increased from 8 hours 33 minutes in 2004 to 10 hours and 45 minutes in 2009 (Boyce, 2007; Sullivan, 2010). New forms of digital media include websites, mobile marketing via SMS text and Web-enabled phones, social networks, online games and video, and DVD content. Less time spent engaged in media, with an addition to regular physical activity and eating healthy enhance present and long-term health benefits (Huhman, Potter, Wong, Banspach, Duke, & Heizler, 2015); however, according to Khan, Khalid, Khan and Jabeen (2011), living in a world greatly controlled by mass media makes it impossible to escape its pervading influence.

Today's youth have unprecedented access to new media and use them in expected and unexpected ways (Strasburger, Jordan, Donnerstein, 2010). According to (Harris, Moreland-Russel, Tabak, Ruhr, & Maier, 2014), social media has increased in recent years; as of 2013, 72% of adults have online accounts and social media profiles in the United States. The term social media is defined as any website that allows social interaction, such as the most popular, Facebook, with other frequented sites being Myspace and Twitter (O'Keeffee & Clarke-Pearson, 2011). Social media allows for convenient and immediate, low-no cost, private, and hidden communication for each of its users (Best, Manktelow, & Taylor, 2014).

Today, young people are dependent on social media. Social media and cell phones have become prime marketing devices. Advertisers focus their efforts to attract and engage youth through new media. As an example, 11 out of 12 fast-food companies maintain Facebook, Twitter, and YouTube accounts. Furthermore, eight major food/beverage companies have smartphone applications for the younger generation to constantly stay in touch with their product (RWJF, 2009; Abbott, 2011). It has been documented that nutritional deficits and poor eating established during adolescence have long-term health, growth, and developmental consequences (Jenkins & Horner, 2005). Exposure to media during adolescence (both amount of time and choice of content) is likely to increase unhealthy eating and physical activity patterns (Jordan, Kramer-Golinkoff, & Strasburger, 2008).

Twitter use among U.S. adults has more than doubled between 2010 and 2013, to 18% of adults overall Harris, Moreland-Russell, Tabak, Ruhr, & Maier (2014). Recent research by the Pew Internet and American Life Project revealed that 93% of children and youth are online (Strasburger, Jordan, & Donnerstein, 2010). Internet users report indicates – watching videos (57%), creating and visiting social networking sites such as Myspace and Facebook (65%), making online purchases (38%), and getting health information (28%) (Strasburger, Jordan, & Donnerstein). According to a study by Harris, Moreland-Russel, Tabak, Ruhr, & Maier (2014), government and media sources on Twitter (social media) are more likely to be followed overall because of the influence and reputation that these online profiles demand.

2.3.2. Television

It is true that children learn a lot about their social world through the observation of media (as cited in Harris & Bargh (2009). When children watch television and engage in media and technology, they are exposed to different things in regards to food. Children engage in television more than any other form of technology. In-between child television shows especially, advertised foods of low nutrition associated with positive themes in food such as those that show tastiness, happiness and positive effects are advertised (Harris & Bargh, 2009). Technology greatly influences children to eat food that is not healthy for them and keeps them engaged long enough for them to become inactive, which leads to being overweight and eventually obese. According to Bickham, Blood, Walls, & Shrier (2013), television is one of the most detrimental forms of media for children because of the influence of advertisements. Advertisements and such messages are rare in media such as video games and computer content. It is hard for a child to over-indulge in eating when they are busy playing video games and computers, which require physical interaction.

There have been several mechanisms explaining the link between television media use and obesity that have been proposed in a study by Bickman, Blood, Walls, Shrier, & Rich (2015). The mechanisms include: 1) exposure to food advertising increasing consumption of energy-dense, nutritionally questionable foods; 2) distracted eating while using screen media contributing to increased overall caloric intake; and 3) sedentary screen media use displacing strenuous physical activity (Bickman, Blood, Walls, Shrier, & Rich, 2015).

According to Harker, Harker, and Burns (2007), weight gain, obesity and health conditions that result from being overweight are not due to television advertisements but a combination of:

- The nature of television viewing which decreases metabolic rates and is a time substitute for other healthier activity
- The creation of a "positive" energy balance from frequent snacking, pre- prepared meals and food consumption during television viewing
- Increased television-viewing time offering increased possible exposure to food and soft drink product advertisements.

Weekly time spent watching TV, videogames, and reading magazines were significantly correlated with more negative reactions to obese girls and boys. It was intriguing to find that children who spend a lot of time watching television, etc., have a negative reaction to obese children; even when they are/are not overweight themselves. It was found that media exposure was promoting stigmatizing attitudes towards obese children, thus leading to devalue peers with above-average body weights (Latner, Rosewall, & Simmonds, 2007). The

portrayal of nutrition and body weight in entertainment media can encourage children to develop less healthy diets (Kaiser Family Foundation, 2007).

Continuing further on impact of mass media on children, it was found that television programs that can be considered "boring" or not as interesting encouraged excessive intake of food. Programs that involved comedy and kept the viewer engaged reduced concurrent consumption (Chapman, et al, 2014). This especially was true in young adult females (Chapman, et al.). In some situations, as the viewer watches television, they unconsciously ate from physiologic hunger. They often chose energy-dense snack foods and were less aware of the amount they ate (as cited in Bickham, Blood, Walls, Shrier, & Rich (2013). In a study by Dennison, Erb, & Jenkins (2012), higher- educated mothers were more likely to prohibit certain shows and monitor their child's television use. However, children of less-educated mothers not only watched more hours per week of television but also had greater uncritical exposure to messages on the screen.

As the prevalence of child overweight trends increase, child media use is dramatically increasing. Studies have linked two trends specifically: high levels of television viewing and obesity in children. According to Demers and Lapierre (2012), the role of the environment is one of the key contributing factors to excessive energy intake, resulting in children being overweight and obese. Almost half of all children have some form of media at their convenience, such as a television located in their bedroom (Adachi-Mejia, Longacre, Gibson, Beach, Titus-Ernstoff, & Dalton, 2007). When a television is located in the child's bedroom, parents are less able to monitor viewing habits and as a result, children participate in fewer activities such as reading, hobbies and sleep is often shortened (Zimmerman (2009). Having a television located in the bedroom impacts the child greatly and in most cases, consumes the child and takes a great deal of their time. It was found from past research that even after controlling for the expected risk factors (frequency of television watching, physical activity and socioeconomic status) children with a television in the bedroom were still 1.3 times more likely to be overweight than children without a TV in the bedroom (Adachi-Mejia, et al, 2007; Dennison, Erb, & Jenkins, 2002).

However, in spite of such findings, other researchers discovered another contributing factor surrounding the television watching. According to a study by Chapman, et al (2014), it appears that the content of the television program is elemental to the effect of concurrent food consumption (See more under 2.3.4). Eating while viewing often leads to greater food consumption (Anderson, Kirkorian, Pempek, Prince, & Koleini, 2006; Coon, Goldbert, Rogers, & Tucker, 2001; Harris, Bargh, & Brownell, 2009). According to a 2010 study on college-aged students showed significantly greater consumption of food when they were watching television compared to listening to music (Strasburger, Jordan, & Donnersteing, 2010).

2.3.3. Marketing

More recent data is even stronger, suggesting that compared with 2003, research marketing via media in 2009, preschoolers ages 2 – 5 years viewed 21 percent more fast-food advertisements; children ages 6 – 11 viewed 34 percent more advertisements; and teens ages 12 – 17 viewed 39 percent more advertisements than in earlier years of research (Hingle & Kunkel, 2012). Marketers surround children with promotions in the places where they live, learn, and play. For example, children are exposed to marketing in schools; where they are a captive audience, at the points-of-purchase in stores and restaurants, and through food retail outlets and billboards accessible and visible to children (University of Minnesota Public Health, 2011). When studying food preferences and eating behaviors among college students, relative influence of two potential contributors to obesity were observed namely, parental communication and television experience (Harris & Bargh, 2009). During those hours of media exposure the food marketing is pervasive. For example, the fast-food industry alone spent more than $4.2 billion dollars in 2009—nearly half a million dollars every hour—on marketing to children and adults via print, television, and in-store advertising (CDC, 2011).

3. Implications and Conclusions

Health advocates focus on the amount of advertising of unhealthy food to children as being one of the major contributing factors to overweight and obesity. Children are exposed to food advertisement on various media platforms – television, cartoons, movies, commercial billboards, catchy jingles, superhero figurines/toys, etc. The food industry targets the adults and parents, who choose to leave their children unsupervised or who do not set boundaries for their children and youth on their technology usage. Also, the marketing pundits from the food trade know extremely well that by strategically placing certain food advertisements at selected times of the day and during particular television shows can capture maximum audience for their products. It is essential that parents teach their children the importance of healthy eating and an active lifestyle in order to maximize their well-being (Harris & Bargh, 2009). In this study (Harris & Bargh), students participated in an online survey that took roughly 30 minutes. Participants provided their total amount of time of television viewing per day, the types of shows that they preferred, and six different food categories that were differentiated by levels of perceived healthiness. Out of those surveyed, 15 percent were considered to be overweight. According to this

study, proposed solutions fall into three categories: 1) public service announcements and other messages via the media to teach children the importance of healthy foods; 2) parent-child communication and media literacy education to teach children not to be persuaded by advertising effects; and 3) restrictions on the amount of television that children engage in as well as restrictions on the amount of advertising unhealthy foods on shows strictly made for children (Harris & Bargh, 2009).

As a remedy to the epidemic of obesity and as a practice of general well-being, the American Academy of Pediatrics recommends no screen or media time for children under the age of two. Also, in order to reduce the influence of media on children, there should be limited screen time for all children (APA, 2016). The study by Rosen, Lim, Felt, Carrier, Cheever, Lara-Ruiz, Mendoza, & Rokkum (2015), examined the impact of technology use, daily food consumption, daily exercise and health. The result of the study was that for children and preteens, total media consumption was the overall determining factor in ill-being. For preteens, the media consumption could be distinguished as stemming from video gaming and electronic communication. Implications were discussed in terms of setting limits on technology use and encouraging healthy eating and physical activity at home and school (Rosen, Lim, Felt, Carrier, Cheever, Lara-Ruiz, Mendoza, & Rokkum (2015).

Nutrition educators have developed a variety of educational strategies designed to help individuals adopt nutrition-related behaviors (Leak, Benavente, Goodell, Lassiter, Jones, & Bowen, 2014). Instead of social media being a barrier to individuals, influencing them to eat unhealthy foods, the educators have begun to consider social media as a potential tool for better engaging participants and communicating beneficial information to encourage healthy lifestyles. One of the benefits of social media is that it consists of sites such as Facebook and Twitter, which allows users to exchange ideas thus giving participants in the exchange a more public platform (Leak, Benavente, Goodell, Lassiter, Jones, & Bowen). The Centers for Disease Control and Prevention and the Special Supplemental Nutrition Program for women have taken a positive direction by incorporating social media into their health communication efforts (Leak, Benavente, Goodell, Lassiter, Jones, & Bowen, 2014). The guidelines for the study included assessing what the participants wanted to see on their Facebook page what their thoughts were about getting tips on saving money at the grocery store, and included access to information on Facebook on how to cook meals which complement the need for nutrition and physical activity. In the study, concerns the participants had about receiving tips via social media were also discussed (Leak, Benavente, Goodell, Lassiter, Jones, & Bowen). Results showed that the participants were active social media users and were open to expanding their network for advice on health. The results also emphasized that people were willing to make a change but "trust" was an essential factor within the populations concerning communication and establishing relationships with the providers of information.

There is a dire need for educational strategies aimed at promoting healthy eating and increased physical activity through changes in the physical environment. Changes in government policies such as limiting advertisements to children are also much needed preventive strategies for the obesity epidemic (Hardus, Vuuren, Crawford, & Worsley, 2003). From the prevailing research, major contributors to obesity stem from behaviors associated with lifestyles and food selection based on media consumption and media's lack of concern with promoting healthy food selection. For example, an analysis of 139 food and beverage websites with games found that less than 3 percent focused on teaching children about nutrition and health (Dias & Agante, 2011; Mikailova, 2014). When published in popular media, the impact of food information is very significant in educating American adults (Shiratori & Kinsey, 2011). However, trends may be reversing as creative and beneficial ways of combating the obesity epidemic are starting to be developed by advertisers and media distributors, mainly to improve relationships between the consuming public and product marketers. Advertisers are developing other ways to market to youth online via advergames, which were originally created for brand promotion, are now becoming a widespread tool for promoting the products for systematic use by youngsters.

Yet more research is needed to better understand the extent and effects of digital and media marketing in terms of children's and teens' vulnerability to marketing. Campaigns that especially employ highly effective neuromarketing research including use of functional magnetic resonance imaging and other technologies to monitor brain responses to advertising are now in vogue. Research is needed to explore the health consequences of other technological forms of marketing as well as emerging technologies such as mobile phone and location-based marketing. Overall, the current research will improve conditions by defining brand advertising and helping to determine standards for marketing foods and beverages to children and teens.

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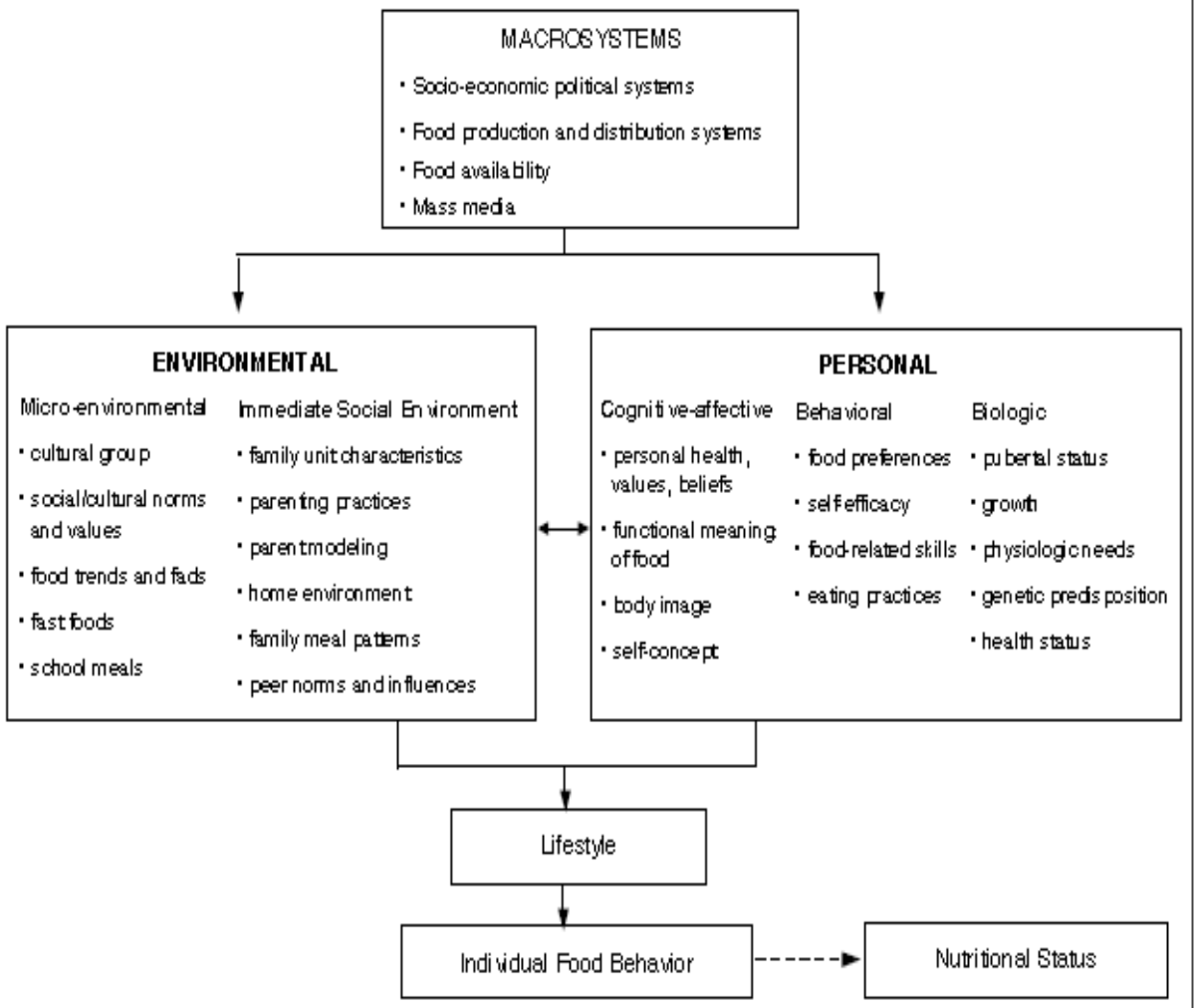
FIGURE 1
Conceptual Model for Factors Influencing Eating Behavior of Adolescents



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