ABSTRACT

TECHNOLOGY AND ADIPOSITY: EFFECTS OF TELEVISION TIME, VIDEO OR COMPUTER GAME TIME, AND COMPUTER USE ON BODY FAT AMONG LATINO YOUTH

by

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May 2015

Obesity in the United States has reached epidemic proportions and is affecting younger generations. Research indicates that media usage contributes to adolescent obesity. Data shows that technology use (television, video games, and computer, etc.) is specifically higher among Latinos than their White counterparts. However, limited research exists on the effects that technology use has on Latino adolescents' adiposity. A cross-sectional baseline analysis was conducted using a sample of (N = 131) at-risk Latino middle school adolescents from the Youth Empowerment for Success *Sí Se Puede* Project. Body fat percent was used as the dependent variable; while television time, video or computer game time, and frequency of personal computer use were the independent variables. Results indicated that only video or computer game time had a positive association with Latino youth body fat percent, even after controlling for socioeconomic status. The implications and limitations of the study are discussed.

Keywords: body fat percentage, technology, Latino adolescents

TECHNOLOGY AND ADIPOSITY: EFFECTS OF TELEVISION TIME, VIDEO OR COMPUTER GAME TIME, AND COMPUTER USE ON BODY FAT AMONG LATINO YOUTH

A THESIS:

Presented to the Department of Sociology

California State University, Long Beach

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Applied Sociology

Concentration in Health and Medicine

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May 2015

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ACKNOWLEDGEMENTS

First, I would like to thank God for giving me the strength and patience to finish my thesis. I would like to dedicate this piece to Maria Del Carmen Rodriguez and J. Concepcion Gonzalez, my mom and dad, and my siblings who have always supported me and have been close to me throughout my academic career. I would like to express my deepest gratitude to Dr. Selena Nugyen-Rodriguez, Dr. Jeffrey Davis, Dr. Nielan Barnes, and Miguel Angel Ortiz-Valenzuela—without your support and time this would not have been possible. Special thanks to the NCLR/CSULB Center for Latino Community Health Evaluation and Leadership Training for letting me barrow data from the Youth Empowerment for Success Sí Se Puede! Project to conduct this study.

Gratitude to the many people who have played a crucial role in my academic career, naming all would require me to write a book which would be longer than my thesis. In short, I would like to end by saying that I am who I am because of a small community that has cared for me throughout my educational career.

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CHAPTER 1

INTRODUCTION

Obesity is a disease that has become apparent around the globe. According to the World Health Organization (2000, 2014), obesity has doubled worldwide since 1980 and is now considered a global epidemic. Data show that in 2008, 1.4 billion adults, 20 years and over, were overweight. From this estimate, 500 million adults were obese—indicating that 10% of the world's population was obese (World Health Organization, 2014). More striking, however, is the global childhood obesity rate. In 2010, 43 million children in the world were obese or overweight; this number is likely to increase to 60 million by 2020 (Onis, Blossner, & Borghi, 2010). Although researchers have found that developing countries have higher rates of obesity (Rosengren & Lissner, 2008), developed countries do not stay far behind. The World Health Organization (2014) reports that 65% of the world's population lives in high and middle-income countries that have higher rates of death due to obesity and overweight.

The United States is currently trying to find solutions to lower its obesity rate. In order to address the obesity problem in the United States, the American Medical Association labeled obesity as a disease in 2013 (Healy & Gorman, 2013). Data from the 2009-2010 National Health and Nutrition Examination Survey (NHANES) shows that the adult obesity rate is over 30%; this rate is higher than in countries like Canada and England (Flegal, Carroll, Kit, & Ogden, 2012). Childhood obesity, in particular, is a

public health issue that continues to increase. Based on the cut-off values from the CDC growth charts, an adolescent is considered obese if their body mass index (BMI), which considers their age and sex, is at or above the 95th percentile; those with a BMI at or above the 85th , but below the 95th percentile, are considered overweight (Kuczmarski, Ogden, & Guo, 2002). According to the Centers for Disease Control and Prevention (CDC; 2013), obesity among U.S. adolescents more than tripled from 5% in 1980 to 18% in 2010. According to Gail C. Frank (2008), there is a 70% chance that children who are obese will be obese when they are adults. This also increases risk for development of related chronic conditions such as coronary heart disease, diabetes, stroke, high cholesterol, and some types of cancer (Frank, 2008).

Health disparities among low-income racial and ethnic groups in the United States are a pressing issue. Health disparities have been defined as "differences across racial and ethnic groups in health conditions, risks, and prognosis" (LaVeist, 2005, p. 54). The United States' obesity epidemic is further exacerbated by significant ethnic disparities in its prevalence (Flegal et al., 2012; Ogden, Carroll, Kit, & Flegal, 2012a; Ogden & Carroll, 2010). Of particular concern is the prevalence of obesity among minority adolescents (Ogden, Carroll, Kit, & Flegal, 2012a, 2012b; Ogden & Carroll, 2010). A study of children ages 2 to 19 found that overall, 31.8% of all children in the United States were overweight or obese while 39.1 % of Latino children in the country were overweight or obese (Ogden et al., 2012a).

Studies show that obesity among adolescents is not equal and tends to vary by race. When race is taken into account, data shows that obesity affects young Latinos

more than their White counterparts. For instance, 2009-2010 data from the NHANES indicates that 21.2% of Latino and 24.3% of Black children and adolescents were obese compared to 14% of White children and adolescents (Ogden et al., 2012a). More striking is the fact that Latino youth are at greater risk of obesity than White or African American youths (Leadership for Healthy Communities, 2010; Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Considering the growth of the Latino population in the United States, Latino youth have become a major public health concern and a significant area of research among health professionals and researchers.

Technology use is a topic that has been studied to understand the role of sedentary behavior in the development of adolescent obesity. Over the past decade, technology has advanced dramatically. Television, video games, and computers are now forming part of the daily lives of adolescents. These forms of technology involve inactivity which, in turn, generate less energy expenditure (Lyons et al., 2011; Mitre, Foster, Lanningham-Foster, & Levine , 2011; Rosengren & Lissner, 2008). Victoria J. Rideout, Ulla G. Foehr, and Donald F. Roberts (2010) estimate that "today the typical 8-to-18 year old's home contains an average of 3.8 TVs…. 2 computers, and 2.3 console video game players" (p. 9). On a typical day, youth between the ages of 8 to 18 years old spend an average of 7 ½ hours using these types of technologies (Rideout et al., 2010). When race is taken into account, Latinos spend more time watching television, playing video games, and using computers than their White and African American counterparts (Rideout et al., 2010).

A review of the literature shows that of the three types of technologies mentioned, television time has been studied the most. Studies have found that television time is one of the most significant sedentary behaviors affecting overweight, when compared to other forms of technology such as video games (Rey-Lopez, Vicente-Rodriguez, Biosca, & Moreno, 2008). Only a few studies have found that playing video games is correlated with obesity (Stettler, Signer, and Suter, 2004). A cross-sectional study that sampled 11 year old children from nine countries found that computer use among adolescents was not related to overweight or obesity (Velde et al., 2007).

Video or computer games and computer use have been studied very little among Latinos. Considering the disproportionate numbers of overweight and obesity in Latinos (Ogden et al., 2012a) and their reported higher use of technology (Rideout et al., 2010), research in this area may further the understanding about the effects of sedentariness due to use of technology on their weight. Thus, the purpose of this study was to learn whether the three aforementioned forms of technologies are related to Latino adolescents' weight status.

Research Question

Is there a relationship between technology use and adiposity among Latino youth? Adiposity is used here to refer to fat percentage. It is hypothesized that television time, video or computer game time, and computer use will have a positive relationship with Latino youths' body fat percentage.

CHAPTER 2

THEORY

This study applied a theoretical model to guide the proposed understanding of obesity among Latino youth. The theoretical model consists of a blend between two theoretical frameworks: the web of causation and structural violence. The following section will explain how these two frameworks were linked to advance the current study.

The "web of causation" is the primary theory that applies to this study. The web of causation was first introduced by Brian MacMahon, Thomas F. Pugh, and Johannes Ipsen in their epidemiologic textbook entitled, *Epidemiologic Methods* (1960). The metaphor behind the "web of causation" is a spider web in which different strands are seen as pathways in society that can lead to different disease outcomes. This theoretical framework forces us to look at health outcomes in society as a result of multiple factors rather than placing emphasis on only one factor. The model was first based on the theoretical framework of biomedical individualism whereby individual traits and genetics are taken into consideration (Krieger, 1994).

Recently, however, Nancy Krieger (1994) extended this web of causation metaphor to include an eco-social framework. According to Krieger, the web of causation will not only include biological factors, but social factors as well. Krieger states that by taking these two factors into account, "it does not allow the individual to become separated from society, nor detracted from people's irreducible individuality" (p. 896).

Testing whether a relationship between any biological and social factors exists is not enough; what is required is controlling for variables that have been identified as social determinants of health. Social determinants of health are "conditions… in which people are born, grow, live, work, and age" and which can affect or benefit their health (World Health Organization, 2012, p. 1). Jay S. Kaufman and Richard S. Cooper (1999) found that race, class, and gender are three factors that have been commonly linked to social determinants of health. Controlling for variables such as race, gender, and class would not only show the unique strength of the specific relationship in this case (i.e., tease out the effects of other factors), but it would also identify whether "structural violence" is present.

A problematic issue with the web of causation theory is that it does not identify the "spider"—the "who or what" that is responsible for the problem. Paul Farmer (2005) seems to define the "spider" through his concept of "structural violence." In the book, *Pathologies of Power,* Farmer defines structural violence as "social and economic inequities that determine who will be at risk for assaults and who will be shielded from them" (p. 17). Structural violence is a context in which individuals live. This context can include inequalities associated with race, gender, and class or socioeconomic status (SES) which can make individuals more vulnerable to health problems. When studying health problems, such as obesity, it is important to control for social variables that may affect a population's health to provide a better understanding of the context or the "spider" which may be creating the pathways to obesity.

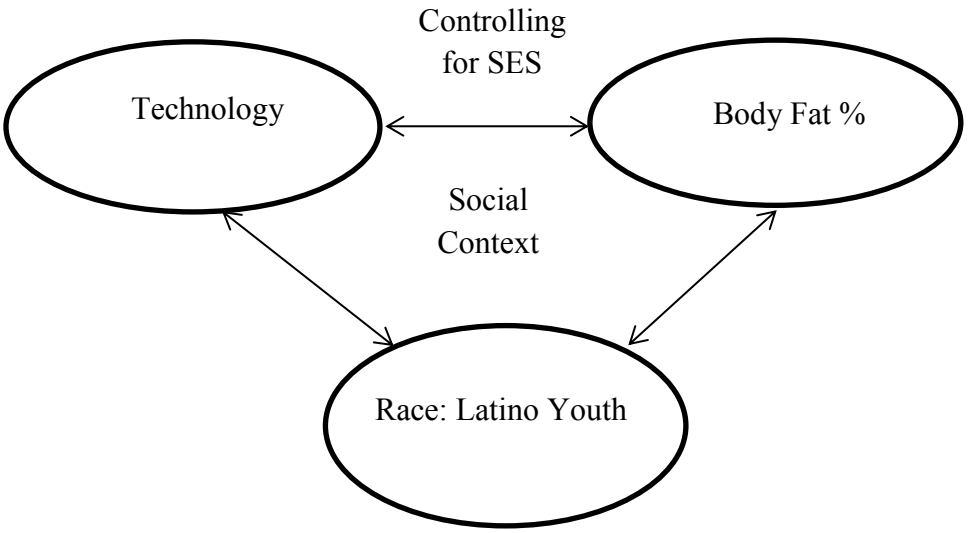


FIGURE 1. Theoretical model.

The model in this study included three groups of variables: technology, biology, and social factors (see FIGURE 1). Television time, video or computer game time, and personal computer use represented the technology group variable and was the new factor added to this model. Body fat percentage represented the biological factor. Race and family household income were the social factors included in this model. Specifically, family household income was used as a control variable. In the analysis the biological and technology variables were tested first to see if any relationships existed. Family household income was used to control for SES to test whether it was an influence. The use of these two theoretical frameworks determined whether any relationship exists between the biological, technological, and social variables that could help to explain obesity among Latino adolescents.

CHAPTER 3

LITERATURE REVIEW

Obesity

Adolescent obesity is a growing problem in the United States. According to the National Collaborative on Childhood Obesity Research (NCCOR; n.d.), adolescent obesity rates have more than tripled since 1980. National data indicates that in 2009-2010, 31.8% of adolescents ages 2-19 were obese or overweight in the United States (Ogden et al., 2012a). Such a condition in adolescents can have immediate, as well as long-term, effects, including: developing cardiovascular disease, high cholesterol, high blood pressure, pre-diabetes, sleep apnea, bone and joint problems, social isolation, and psychological problems (CDC, 2013; NCCOR, n.d.). Data also show that obese teens have up to a 70% chance of becoming obese adults (Frank, 2008). As a result of such findings, adolescent obesity has become a public health concern for health professionals and researchers in the United States. One of the objectives for Healthy People 2020 is to reduce the proportion of adolescents who are obese (Healthy People 2020, 2013). The purpose of this section is to introduce the main research areas that have been studied in order to understand obesity; they include: biology and genetics, race, SES, culture, lifestyle, and technology.

Obesity is defined as an excess of body fat and is measured using the BMI or by calculating a person's percent body fat. BMI takes into consideration person's age,

height, and weight while percent body fat is calculated using the body volume and mass (Hu, 2008). Any person with a BMI measurement at or above the 95th percentile is considered obese (CDC, 2012). However, BMI is a very crude measure of obesity since it does not account for healthy body tissue such as muscle. For example, if there are two people who weight the same and have a high BMI, but one of them has a higher muscle mass than the other, then both are still considered obese even though the person who has more muscle should not be labeled as such. Body fat percent is then a better measure to assess obesity than BMI. Although there are no exact ranks for percent body fat among adults or children, studies have found a positive relationship between BMI and percent body fat (Hu, 2008).

Obesity and Biology

Research has been conducted to understand the contribution of biology and the environment on the development of obesity. Twin studies have found that obesity is caused mostly by genetics, rather than environment (Maes, Neale, & Eaves, 1997; Stunkard, Foch, & Hrubec, 1986). However, these studies depict obesity as an individual problem that is a result of biologic malfunctioning (Krieger, 1994). Such studies do not account for social factors. According to James O. Hill, Holly R. Wyatt, and Edward L. Melanson (2000), the American genotype has not changed in the last three decades; therefore obesity is also an environmental problem. Specifically, Hill et al. argue that obesity is a result of both genetic and environmental causes and that attention should be focused on the environment. Furthermore, obesity among Latinos results from an interaction between genetic and environmental markers such as gender and age (Butte,

Cai, Cole, & Commuzzie, 2006). Those findings are supported by Krieger who claims that social and biologic factors should be considered simultaneously in order to understand the spread of health problems like obesity.

Obesity and Race

Obesity does not affect adolescents of different backgrounds equally. Nationally, there has been a focus to find out what racial groups are more prone to being obese. Richard S. Strauss and Harold A. Pollack (2001) found that from 1986 to 1998, the obesity rate for Latinos and African Americans increased 120% compared to a 50% increase in White children. Recent data shows that this pattern persists and that from 1999-2010, the odds of being obese were significantly higher among African Americans and Mexican Americans (Ogden et al., 2012a).

Leadership for Healthy Communities (2010) emphasizes that Latino adolescents are at a greater risk for overweight and obesity when compared to their African American and White counterparts. National data from children ages 2 to 19 show that Latino children have a higher overweight or obese percentage, reported at 39.1%, when compared to the overall population of children who are overweight or obese, reported at 31.8% (Ogden et al., 2012a). There is also research that shows that obesity is affecting the health of Latinos more than Whites. For instance, a study that used a national representative sample found that adolescents who were overweight or obese reported poor health; that same study found that Latinos were more likely than Whites to report depression, low self-esteem, and overall poor health (Swallen, Reither, Haas, & Meier,

2005). Therefore, it is no surprise that Latino obesity has become a concern and an area of interest for researchers.

Obesity and Class

A social factor that has been important in understanding the obesity rate among Latinos and other minority populations is SES. According to Lindsay McLaren (2007), a review of multiple studies revealed that in developed countries such as the Unites States, lower-SES was related with higher BMI measures. This finding is supported by other studies that have been conducted in the United States. For example, a study that used neighborhood-level data from the 1990-1994 National Health Interview Survey found that poor areas were 3 times more likely to have an obesity rate above 25 % compared to non-poor areas (Boardman, Saint Onge, Rogers, & Denney, 2005). Other researchers specifically have found that low-income communities lack green space or areas for residents to exercise which is related to obesity (Lovasi, Hutson, Guerra, & Neckerman, 2009; Wen & Maloney, 2011).

Socioeconomic status has been used as a control variable to see if the relationship between the three types of technologies and youth obesity persists (Christakis, Ebel, Rivara, Zimmerman, 2004; Kautiainen, Koivusilta, Lintonen, Virtanen, & Rimpela, 2005; Tremblay & Willms, 2003). Some studies that tested television time, computer use, and video or computer game time by SES found no significant effects of these behaviors on youths' weight status (Kautiainen et al., 2005; Stettler et al., 2004; Tremblay & Willms, 2003). These findings indicate that SES is a variable which needs to be included in the analysis.

Obesity, Culture, and Lifestyle

Acculturation into United States culture is one area that has been studied in order to understand the prevalence of obesity among Latino adolescents. Researchers have found that the Latino immigrant population is healthier when arriving to the United States (Vega, Rodriguez, & Gruskin, 2009). Researchers have found, however, that obesity prevalence increases in Latino immigrant populations as their years in the United States increase (Gordon-Larsen, Harris, Ward, & Popkin, 2003; Kumanyika, 2008). Foreign-born Latino youths have healthier dietary habits, are more active, and are less likely to be overweight compared to U.S. - born Latinos (Gordon-Larsen et al., 2003). Gordon-Larsen et al. state that these factors change to less healthy diets and sedentary behaviors increase among Latino youth as their time living in the United States increases. Thus, researchers conclude that adopting American lifestyles have an impact on all foreign-born Latino youth's overweight status (Gordon-Larsen et al., 2003). As a result, nutritional practices, physical activity, and technology use are three lifestyle behaviors that have been studied further.

Food consumption and foods purchased by Latinos are two lifestyle behaviors that have been analyzed by researchers. Shiriki K. Kumanyika (2008) found that food choices and child feeding practices are lifestyle behaviors that determine adolescent obesity. A research study that explored the food practices among low-income, Latino families found that most of the food purchased at baseline was calorically dense, high in fat, and low in fiber (Cortes, Millan-Ferro, Schneider, Vega, & Caballero, 2013). According to researchers, low income individuals purchase foods that they can afford,

which are less expensive, but are typically high energy-dense, refined, or fatty foods (Boardman et al., 2005; Rosengren & Lissner, 2008). Kumanyika states that the food purchases of low-income minority people are shaped by a lack of access to supermarkets that sell healthy food in impoverished communities; such environments are known as "food deserts."

Less physical activity is a lifestyle behavior that is also considered a risk factor for obesity and it is prevalent among Latinos. Physical activity is lower among Latino and Black adults when compared to Whites; this, according to researchers, can be an indicator that minority youth engagement in sports is limited (Kumanyika, 2008). Given that inactivity behaviors such as television watching and computer or video game use have been found to increase among Latino youths as their years in the United States increase, the net result is not good (Gordon-Larsen et al., 2003). Annika Rosengren and Lauren Lissner (2008) claim that lack of physical activity is the most important factor driving the obesity epidemic. A study that looked at a sample of Latina and African American girls found that physical activity played a more crucial role in obesity development over sedentary behavior or energy intake (McClain et al., 2011).

A third factor that has been attributed to the growing obesity rate among adolescents has been the use of media or technology (Leadership for Healthy Communities, 2010; NCCOR, n.d.). Research shows that Latinos, compared to Whites, watch more television (5.21 hours vs. 3.36 hours daily), play more video games (1.35 hours vs. 0.56 hours daily), and use the computer (1.35 hours vs. 1.17 hours daily) at a higher rate (Rideout et al., 2010). Some researchers claim that physical activity has

declined due to television watching, time spent playing video games, and computer use (Hill et al., 2000). The following sections will review the literature that currently exists on the relationship between obesity and technology use (watching television, playing video or computer games, and computer use) among adolescents.

Television and Adolescent Obesity

The third NHANES indicated that 26% of U.S. children watched an average of 4 or more hours of television per day in the late 1990s (Andersen, Crespo, Bartlett, Cheskin, & Pratt, 1998). Data shows that in 2009, the number of hours spent watching television increased to 4.29 or more per day among 8-18 year olds (Rideout et al., 2010). Cross-sectional, longitudinal, and intervention studies have been conducted to assess the impact that television viewing or time spent watching television has on adolescents' weight status (Rey-Lopez et al., 2008). One goal of these studies has been to determine whether a relationship between the amount of time watching television and obesity exists (Kautiainen et al., 2005; Marshall, Biddle, Gorely, Cameron, & Murdey, 2004). Kautiainen et al. and her team of researchers analyzed a sample of Finnish adolescents and found that the more time adolescents spent watching television, the more likely they were to be overweight or obese.

There are also studies that have not found any associations between time spent watching television and adolescents' weight status (Robinson et al., 1993; Vandewater, Shim, & Caplovitz, 2004). However, some researchers have suggested that these non-significant results are due to a delay effect that seems to be occuring between television viewing and weight gain that is not being captured by cross-sectional data (Rey-Lopez et

al., 2008). Other studies have specifically indicated that the number of hours spent watching television explain the prevelance of obesity among youth (Stettler et al., 2004; Tremblay & Willms, 2003). For instance, one study found that adolescents who watch 4 or more hours of television during the day tend to have higher BMI's and skinfold thickness than those who watch less television (Andersen et al., 1998). Another study, found that for every hour a young person spends watching television there is a 2 to 3 times increased risk of that youth being obese (Stettler et al., 2004). The findings suggest that the more hours adolescents spend watching television, the more likely they are to be obese or overweight. This relationship is even true when adolescents enagage in minimal levels of physical activity (Andersen et al., 1998; Velde et al., 2007).

The last findings support recent research that has started to differentiate between the impact of physical activity and sendentary behavior on adiposity (McClain et al., 2011). When the effects of TV watching on obesity have been studied in hetergenous groups, mixed results have been found. Differences have been found in groups of different geographic locations (Velde et al., 2007), SES, and gender (Burke et al., 2006; Stettler et al., 2004). Velde et al. sampled a group of youth from different European countries and found that overweight and sedentary behaviors–such as television viewing and personal computer use–varied greatly by country. Youth in the Netherlands and Belgium, for example, watch more television during the day than youth in other European countries while Dutch boys had higher personal computer use (Velde et al., 2007). A possible explanation for these mixed results has been attributed to cultural differences (Velde et al., 2007).

There has been an effort to identify the mechanisms through which television time impacts adolescents' weight status. One assumption is that since watching television is an inactivity in which youths just sit, no type of energy expenditure is occuring (Gordon-Larsen, McMurray, & Popkin, 1999; Mitre et al., 2011). Another scientific explanation that has been offered is that watching television affects adolescent's diet (Marsh, Mhurchu, & Maddison, 2013; Falbe et al., 2013). According to Samantha Marsh, Cliona N. Mhurchu, and Ralph Maddison's, watching television does not allow viewers to track the amount of food they intake and they end up consuming more calories than their bodies need. Marsh et al. explain that this is because watching television is a distraction that seems to limit the participant's physiologic signals of satiety and satiation. Other researchers blame the consumption of unhealthy food on the advertisements that adolescents are exposed to when watching television (Story & Faulkner, 1990). Jennifer Falbe and her team of researchers claim that food marketing might be playing a role in what young people eat because of the amount of product placement in television (Falbe et al., 2013). This might then explain why television has been found to be a risk factor associated with diabetes (Goldfield et al., 2013).

A limitation of these studies is that very few include samples of minority groups such as Latinos or African Americans. Given that the data shows that Latino children and adolescents have the highest rate of obesity and tend to spend more time watching television when compared to their White counterparts, (Andersen et al., 1998; Leadership for Healthy Communites, 2010; Rideout et al., 2010) it was hypothesized that

there would be a positive relationship between television viewing and obesity among Latino adolescents.

Video or Computer Games and Adolescent Obesity

Another technological behavior that has caught the attention of researchers is video or computer games. Video games–whether played on a television console, portable screen, or on a computer – have long served as a distraction for adolescents. According to the study by Lyons et al. (2011), traditional video games serve as a distraction to relieve stress. A study by the Kaiser Family Foundation found that from 2004 to 2009, video game use increased by 24 minutes per day among youth (Rideout et al., 2010). Some studies have found that electronic games are associated with increased BMI in children (Mota, Ribeiro, Santos, & Gomes, 2006; Stettler et al., 2004). Mota et al. found that boys and girls who play electronics games for more than 1 hour have a higher rate of obesity than children who spend less time on video games. Some reasons for this relationship have been attributed to an increase in caloric intake for every hour spent playing video games with relatively low caloric expenditure (Chaput et al., 2011). Perhaps this is why playing video games is sometimes associated with cardio vascular disease (Goldfield et al., 2011).

Most research findings, to date, however, indicate no relationship between video or computer games and increased BMIs in youth (Bickham, Blood , Walls, Shrier, & Rich, 2013; Rey-Lopez et al., 2008; Wack & Tantleff-Dunn, 2009). Some reasons that could explain why no associations are being found between video or computer games and obesity include: (a) less time is being devoted to playing video games than watching

television; (b) calorie-free behavior is apparent because most video game devices are held with both hands; and (c) there is higher energy expenditure in this activity due to its interactive nature (Rey-Lopez et al., 2008, p. 246).

Experimental research has been conducted to test whether playing video or computer games leads to higher energy expenditure than more active video games (Chaput et al., 2011; Lyons et al., 2011). There are two types of video games availabe for people: 1) those played with hand-held devices and 2) active video games that require elaborate computer and or television set ups. Research shows that hand-held video games generate less energy expenditure than active video games (Lyons et al., 2011). For this reason, recommendations have been made for youth to engage in active video games rather than in hand-held video games. Substituting hand-held video games with active video games, however, does not seem to be promising since traditional hand-heald video games are prefered more by young people than active video games (Lyons et al., 2011). A study by Elizabeth Wack and Stacey Tantleff-Dunn (2009) study suggests that playing hand held video games provides an emotional and social context in males since their data indicated that this behavior helps to relieve stress, loneliness, and boredom.

Other studies have found slight variations to the ones just presented. One such study found that results vary by population (Stettler et al., 2004). For instance, differences were found when controlling for gender and age (Falbe et al., 2013; Kautiaineh et al., 2005). Most studies tend to have a sample population that includes a broad range of racial groups, but tend to have fewer Latino youths; nonetheless data show that video game use increased the most among Latino youth (Rideout et al., 2010). Thus,

based on the literature, it is hypothesized that video or computer game time will have a postive effect on Latino youths' body fat percentage.

Personal Computer Use and Adolescent Obesity

Of the three forms of technology being considered, personal computer use is the one that has been studied the least in attempting to understand obesity among adolescents. Data indicates that computer use increased by 27 minutes per day from 2004 to 2009 among youth (Rideout et al., 2010). The literature points out that most studies have found no relationship between computer use and youth BMIs (Bickham, et al., 2013; Lajunen et al., 2007; Velde et al., 2007). The few studies that have found significant associations between computer use and obesity in youths report varying patterns among subpopulations. For instance, a study found that increased time spent using personal computers was related to overweight in girls, but not in boys (Kautiaineh et al., 2005). A literature review study futher concluded that computer use is not a risk behavior for obesity (Rey-Lopez et al., 2008). However, since personal computer use is a sedentary behavior that seems to be increasing among youth, it was hypothesized that there would be a positive relationship between computer use and Latino youths' body fat percentage.

Conclusion

Obesity in the United States is a problem that is affecting minority adolescents; in particular, Latino adolescents. Three technological factors– television viewing, computer use, and video or computer games– have been researched by scientists to understand whether they have any effect on obesity. A review of the literature shows that of the

three types of technology factors studied, television viewing seems to be the most important sedentary factor associated with obesity. Some studies indicate that even when controlling for SES, time spent watching television, playing video or computer games, and using a personal computer have an effect on youth weight outcomes. On the other hand, findings on the effects that computer use and video games have on obesity seem to be inconsistent.

Another pattern apparent in the literature is that studies of hetergenous populations have yielded mixed results. In regards to computer use and video games, the only data available is from 2005 or earlier and does not account for the increasing Latino poplulation; thus, limited research exists on the effects that television viewing, computer use and video games might have on Latino youths. Research shows that Latino youths have the highest obesity rate in the United States and that they tend to use technology more than their African American and White counterparts. Thus, in light of the literature, three hypothesis were formulated: (1) Time spent watching television will have a positive relationship with Latino adolescents' body fat percentage; (2) Computer use will have a positive relationship with Latino adolescents' body fat percentage; and (3) Length of time playing video or computer games will have a postive relationship with Latino adolescents' body fat percentage. The purpose of this study is to understand whether television time, personal computer use, and video or computer game time may play a role in the development of obesity among Latino youth. The study is also intended to examine whether relatioships persist after accounting for the effects of SES.

CHAPTER 4

HYPOTHESES

H_1: Time spent watching television will have a positive relationship on Latino adolescents' fat percent.

H_2: Length of time playing video games will have a postive relationship on Latino adolescents' fat percent.

H_3: Computer use will have a positive relationship on Latino adolescents' fat percent.

CHAPTER 5

METHOD

The Sample Population

Long Beach is one of the most ethnically diverse cities in California. The city is comprised of 12.1% White, 12.9% Asian, 13.5% African American, and 40.8% Latino (Long Beach Community Database, 2010). The average household income in Long Beach is $ 52,997 (Long Beach Community Database, 2010); however, the city's obesity rate is very high. According to the Long Beach Community Database, 47% of the city's total population is overweight while 27.2% of these are obese. In the immediate geographic area where the study took place, the obesity rate is even higher; it totals 32.7%. City data also indicates that obesity is higher among Latinos (Long Beach Community Database, 2010). Since obesity in Long Beach is high and tends to be higher among Latinos, this study is based on a sample of Latino youth living in Long Beach.

Data from a sample of 131 Latino youth from the Youth Empowerment for Success Sí Se Puede! Project, (hereafter referred to as the YES! Project) was used to conduct this study. The YES! Project– funded by the Office of Minority Health, Department of Health and Human Services, Grant #: YEPMP090046– was a 3-year (2010-2012) school-based program that focused on academic achievement, cultural

enrichment, wellness, career development, and life skills. The target population was Latino students from a middle school located in Long Beach, California.

A purposive sampling procedure was implemented to recruit students. Latino students were referred to participate in the YES! Project on a yearly basis by middle school staff (instructors, counselors, principal, etc.) and parents; students also had the option to enroll themselves. In order for students to qualify for the project, they had to be considered "at-risk." For a student to be considered "at-risk" they had to meet one of the following criteria: a student having a violent environment or behavior, poor academic performance, isolation or lack of participation in school activities, and/or poor health indicators such as diabetes mellitus type II, obesity, or other health problems.

Procedures

Students who met the inclusion criteria were given a bilingual program packet which included project information. Parental and student consent was obtained prior to allowing students to participate in the project. Once consent was obtained, students were asked to meet on a specific date and time in a classroom. During the meeting, students were administered a confidential, self-reported survey; the survey took approximately 25 to 30 minutes to complete. Upon completion of the survey, their anthropometric measurements were taken by trained staff. Students' height was measured using a portable stadiometer, while weight and body composition was assessed using a Tanita Bioimpedance Scale (Model SC-331S).

For the purpose of the current study, demographic and baseline surveys were used in conjunction with anthropometric data. The YES! Project procedures were approved by

California State University, Long Beach's Institutional Review Board in 2009. Access and permission to use the data was granted by the National Council of La Raza/California State University Long Beach (NCLR/CSULB) Center for Latino Community Health, Evaluation, and Leadership Training who conducted the YES! Project.

Measures

Three variables– time spent watching television, playing video or computer games, and computer use– were analyzed to test whether a relationship existed between technology use and body fat percentage among Latino youth. Family household income was used to determine whether this variable affected any relationship that was initially identified. The following section is a description of how the dependent and independent variables were measured and collected.

Fat percentage: The dependent variable in this study was body fat percentage, an indicator of obesity. Fat percentage for each student was calculated via bioimpedance, using the aforementioned Tanita Scale (Model SC-331S). Each student's height was measured to the nearest 10^{th} of an inch using a portable standiometer. The following information was entered into the Tanita Scale: a one pound allowance to account for the participant's clothing; gender; age; and height of the student. Once the information was entered on the scale, the student stood barefoot on the scale in order to record his/her weight. The bioimpedance scale then calculated various body composition elements based on the known information, including body fat percentage, and provided a printout of the personalized data.

Technology use: The independent variables for this study included the use of various forms of technology. *Personal computer use* measured the frequency by which students used their personal computer (PC) to perform various tasks. The first fifteen questions used to measure this variable came from the YMCA Youth Institute Survey (O'Donnell & Coe Regan, 2006); wording of the survey questions was revised to make them suitable for middle-school reading proficiency levels and some of the questions were updated to account for current technologies.

The sixteenth question was created by staff members at the NCLR/CSULB Center. The question asked students to scale their responses to the following question, "In the last month, how often did you use computers to…?" The statement was followed by 16 different tasks that required feedback on the degree of use for each item listed (e.g., send e-mail, text, chat, talk, video call, etc.) (See Appendix H for pre-survey information). For each of the tasks itemized, students had to choose one of the following response options: "never," "once per month or less," "weekly," or "daily." A mean score based on the responses provided was calculated to indicate the frequency with which students used the computer.

Television time: Data for time spent watching television was measured by asking students to provide the number of hours they spend watching television on an average school day; this question came from the Youth Risk Behavior Surveillance Survey (CDC, 2009). Response choices were: "I do not watch TV on an average school day," "less than an hour per day," "1 hour per day," "2 hours per day," "3 hours per day," "4 hours per

day," and "5 or more hours per day." Each response option was further recoded into meaningful numerical values to create a continuous score for analytical purposes.

Video or computer game time: The variable for time spent playing video or computer games also asked students to choose the number of hours spent playing video or computer games on an average school day (CDC, 2009). The question was framed as follows: "On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work?" The question asked students to provide information about the use of: Nintendo DS, Gameboy, Play Station, X-box, computer games, and general use of the Internet. However, students were asked to exclude time spent using the computer to play Dance Revolution, Wii Fit, Active Life, and Sports Active. Six response options were available; participants had to choose one of the following: "I do not play video or computer games or use a computer for something that is not school work," "1 hour per day," "2 hours per day," "3 hours per day," "4 hours per day," or "5 or more hours per day." As done with the television time data, responses to this question were recoded into numerical values to present a continuous variable.

Family household income: Family household income was collected by this project from parents. The income question was part of the demographic survey and was asked during a telephone interview. The question asked parents to indicate their yearly household income. The possible responses were: "less than $10,000 (< $835/mo)," "$10,000- $20,000 ($835-$1670/mo)," "$20,000-$30,000 ($1670-$2500/mo)," "$30,000- $ 40,000 ($2500-$3333/mo)," "$40,000-$ 50,000 ($3333- $4167/mo)," "greater than $50,000 (> $4167)," or "I don't know." Due to the fact that there were very few cases

for the last three response categories, data was recoded. Upon modification, the new variable included only the following response categories: "less than $10,000," "$10,000-$20,000," "$20,000-$30,000," and "more than $30,000." The reason that these categories do not include a wide range of salaries is because the data indicated that most participants were low income and actually earn much less than what the Long Beach database reports (Long Beach Community Database, 2010). Family household income was used as a proxy for SES and was included in the analysis as a covariate.

Design and Data Analysis

A cross-sectional secondary analysis of baseline data from the YES! Project was conducted. Descriptive analyses were run to describe the overall sample. The mean, standard deviation, and range were included for continuous variables. For nominal variables, frequencies and percentages were obtained.

To assess whether a relationship existed between technology use (television time, video or computer game time, PC Use) and adiposity, bivariate correlations were conducted. Prior to analysis, data was screened to determine whether the assumptions of normality were met. A visual check was first conducted by examining histograms (See Appendix A) and it appeared that the data reported for fat percent, television time, video or computer game time, and computer use were normally distributed; this determination was made by confirming histograms matched up to a normal curve. Raw scores for skew and kurtosis were also analyzed. Evaluation of the raw scores for skew and kurtosis indicated normality for fat percent (.116, -.991), television time (.289, -.704), computer use (.674, .622), and video or computer game time (.684, -.560) since values are close to

zero. Once the assumption of normality for all variables was met, a Pearson (*r*) correlation test was conducted.

In order to evaluate the ability of technology use to predict fat percentage and to assess this relationship after controlling for family household income, a hierarchical multiple linear regression analysis was performed. Only variables that were shown to have a statistically significant correlation with the outcome were included in the regression analysis. To conduct the hierarchical multiple linear regression, family household income was entered into the model in Step 1 and video or computer game time was entered in Step 2. Hierarchical regression allows for evaluation of the unique predictive ability of variables in each block. Fat percentage was entered as the dependent variable. Statistical significance was set at $p < 0.05$, unless otherwise stated. SPSS version 21 was used to conduct all analyses.

After conducting the regression analysis, the model was assessed to examine how well the model fit the data. Standardized residuals were first evaluated. Only one case was identified by the analysis as potentially extreme. In an average sample, 95% of standardized residuals should fall between ± 2. For a sample size of 131, it is expected that approximately 7 cases (5%) would have standardized residuals beyond this limit. In this sample, there was 1 case (less than 5%) that fell beyond this limit, so this is an acceptable amount of error. An outlier is defined by a standard residual beyond ± 3; there were no cases beyond this value in the current sample.

The data were also screened for influence. In order to evaluate influence on the cases, Cook's distance, Leverage, Mehalanobis distance, and DFBeta statistics were

analyzed. According to the data, none of the cases had values greater than 1 for Cook's distance. The average leverage equals 3 times the average leverage which is equal to .06. None of the leverage values, in this case were greater than .06. Critical value for Mahalanobis distance was 15.99, based on $n = 200$ and $k = 2$; there were no cases with a Mahalanobis distance greater than 15.99. Lastly, there were no cases with values beyond 1.96 for Standard DFBeta for any variable. Thus, analysis of residuals indicated an acceptable level of error. Analysis of influence statistics showed that no cases were influential. Considering all of the statistics, it seemed that the model was a good fit for the observed data.

Assumptions of multiple linear regression were then assessed to examine generalizability of the model. Visual checks via histogram and P-P plot (see Appendices A and B) showed that residuals were normally distributed (histogram looks similar to normal curve and residual points in P-P plot are close to the line).

Homoscedasticity and linearity were assessed by plotting the residuals of the outcome variables with each of the predictors. Appendix C shows the partial plots that were generated. Visual examination of partial plots indicated no funneling or curvature; therefore, it appears that overall homoscedasticity was not violated and linearity was met. The assumption of independent errors was tested by conducting the Durbin-Watson test. The value of the Durbin-Watson was = 2.398; since the value was very close to 2 (not < 1 or > 3), it appears that the assumption of independent errors was met.

Multicollinearity was assessed by examining tolerance and variance inflation factors (VIF). Appendix D shows that if no VIF values were > 10 and no tolerance

values were < 0.1, then there is no multicollinearity (Bowerman & O'Connell, 1990; Myers, 1990; Menard, 1995). Cross-validation of the model was also evaluated by comparing the adjusted R^2 to the original R^2. Since the adjusted R^2 (.124) is quite close to the original R^2 (.154), it does not appear that there was any shrinkage from the unadjusted value, thus indicating that the model may generalize well. Overall, the assumptions were met and the model appears to cross-validate, supporting generalizability of the model.

CHAPTER 6

RESULTS

A total of 152 students agreed to participate in the YES! Project, but only 131 students completed the data collection instruments. Descriptive statistics are shown in Table 2 (Appendix E). Of the participants surveyed, 82.1% ($N = 96$) were born in the United States and 17.9 % ($N = 21$) were born outside of the United States. There were more male participants ($N = 76$, 59.4%) than females ($N = 52$, 40.6%) and their mean age was 12 ($SD = 90$). Most of the students were in the 6th grade ($N = 88$) or in the 7th grade ($N = 30$); only a few ($N = 9$) were in the 8th grade. In terms of weight status, about 50.5% ($N = 47$) of the students were either overweight or obese. The average BMI percentile of the students was 74.86 ($SD = 27.91$); their average body fat was 26.49% ($SD = 9.74$).

As far as their use of technology, results show that students spent an average of 2.29 ($SD = 1.53$) hours watching television per day while they spent an average of 1.79 ($SD = 1.51$) hours per day playing video or computer games. As for computer use, the data show that students used the computer an average of 2.22 ($SD = .65$) times per month to conduct school and personal tasks not related to computer-based video games.

Table 3 shows the bivariate correlation that was conducted to assess the relationship between technology use and Latino youth's weight status (See Appendix F). Data show that time spent playing video or computer games significantly correlated with Latino youths' fat percent, ($r = .238$, $p = 0.011$). However, there was no significant

correlation between time spent watching television and fat percent (p = .086). In addition, there was no statistically significant relationship between computer use and fat percent (p =.296).

Multiple linear regression was further conducted to examine how much variability in students' fat percentage can be accounted for by factoring in the time spent playing video or computer games while controlling for family household income (See Appendix G, Table 4). Overall, the final model significantly explained 15.4% of the total variability in body fat percentage, F (1, 57) = 6.746, p = .012. Evaluation of each individual predictor showed that time spent playing video or computer games (β = .332, *SE* = .761, 95% *CI*: .453, 3.502) significantly predicted fat percentage, while family household income (p = .307) did not predict fat percentage. There was a positive relationship between video or computer game time and fat percentage—as video or computer game time increased, fat percentage increased in Latino students.

CHAPTER 7

DISCUSSION

The purpose of this study was to test whether a relationship existed between technology use and fat percentage among Latinos, even after controlling for SES. Overall, the hypothesis that video or computer game time would have a positive relationship to Latino adolescents' fat percentage was supported by the data. However, hypotheses 1 and 2 were not supported. Results indicate that of the three types of technologies examined, video or computer game time had a significant positive relationship with Latino adolescents' fat percent and the association persisted after controlling for the effects of household income. The analysis specified that video or computer game time is a behavior that increases the risk of being overweight or obese, regardless of SES, these results are similar to the study conducted by Tremblay and Willms (2003). Tremblay and Willms found that SES and inactivity behaviors are overlapping risk factors. This study lends quantitative support for the web of causation model, but not the structural violence theoretical framework.

The findings relate to other studies which have also found a positive relationship between video or computer game time and adolescent weight status, but not a significant relationship to television time and computer use (Carvalhal, Padez, Moreira, & Rosado, 2006; Vandewater et al., 2004). There has been an effort to understand why television time, for example, does not seem to have a positive effect. Some

researchers have suggested that cross-sectional data do not capture the effects that television time has on obesity (Rey-Lopez et al., 2008). Since cross-sectional data was used in this study,this might explain why television time did not have an effect on adolecents body fat percentage. Maybe the use longitudinal data in future studies could help detect if television time and computer use has an effect on adolecents weight status.

Results in this study indicated that young Latinos who spend more time playing video or computer games are more likely to be obese or overweight. Childhood research, specifically, shows that for every hour spent playing video games, there is a 2-fold or higher increased risk rate of obesity (Mota et al., 2006; Stettler et al., 2004). One reason for this can be due to the low level of energy expenditure or relative inactivity involved in playing hand held video games (Chaput et al., 2011; Lyons et al., 2011; Mitre et al., 2011). This can be attributed to the fact that video or computer games are either played sitting down or without any intense movement when played standing up.

The risk of obesity can particularly increase when physical activity and recommended screen time, including time spent playing video games on portable devices, are not followed (Laurson et al., 2008). The American Academy of Pediatrics (AAP) suggests that adolescents spend no more than 1 to 2 hours a day on screen time per day (Committee on Public Education, 2001). Based on the demographic data in this study, Latino youth spend an average of 1.79 hours per day playing video or computer games. The figure does not even include other forms of "screen time" like watching television or performing other computer tasks; this means that screen time recommendations are not

being followed. It can be said that playing video or computer games is a sedentary behavior that seems to be affecting youths' physical health.

Observational experiments have been conducted to understand why video game playing affects youths' weight status. Studies show that youth who play video or computer games tend to consume more food while playing (Oldham-Cooper, Hardman, Nicoll, Rogers, & Brunstrom, 2011) or after they have finished playing (Chaput et al., 2011). For example, Jean-Philippe Chaput et al. found that playing video games for one hour was followed by a greater caloric intake after having a meal than when relaxing in a chair for an hour. A possible reason for the increase in caloric intake involves a physiological response to the playing of video games. A stress-induce reward, food, seems to be needed as a result of the mental stress involved while playing video games (Chaput et al., 2011; Marsh et al., 2013). According to Chaput et al., mental workload increases in youths when they play video games and prompts a physiological response (eating) in order to decrease the mental stress. In this case, video or computer games are not only a sedentary behavior with minimal caloric expenditure, but it is also one that causes a biological burden to young people's bodies and psyche. The big question for researchers becomes what is causing youth to spend so much time playing video or computer games?

Taking these statistics into account, it is not evident that structural violence is affecting Latino youths' health most likely because the majority of participants are low income. Community zip code could not be included in the regression analysis because the majority of Latino students indicated that they lived in the 90805 zip code; but in a

sample where participants live in a wider range of area, this variable can provide more information about the relationship between SES and the environment or built-environment. A number of academic articles emphasize that an important built-environment factor, which low-income communities often lack and is related to obesity, is places to exercise or "green space" (Lovasi et al., 2009; Wen & Maloney, 2011).

According to the 2013 Community Health Assessment Report conducted by the Department of Health and Human Services of Long Beach, the 90805 zip code area has one of the lowest median family household incomes. Long Beach city data also indicates that zip code 90805 has 0.84 acres of open land available per 1000 residents (City of Long Beach Department of Health and Human Services, 2013). The amount of space available to the community in that zip code does not meet national recommendations. The National Recreation and Parks Association recommends ten acres of park space per 1,000 people (Garcia, Strongin, Brakke, & Recinos, 2011).

By most accounts, this community is considered to be a "park poor" community. According to California law, park poor "refers to any geographic area that provides less than three acres of green space per 1000 residents…this is the size of approximately one and one half soccer or football fields" (Garcia et al., 2011, p. 3). For this reason, the Community Health Assessment Report, states that the lack of green space in sections of the city "makes access to recreation open space problematic for much of the youth population in these areas" (City of Long Beach Department of Health and Human Services, 2013, p. 123). This could explain why some studies have found that minorities, such as Latinos who are often low income and can only afford to live in impoverished

densely populated neighborhoods, do not get enough physical activity (Andersen et al., 1998; Gordon-Larsen et al., 1999). It is possible that Latino youth prefer to play video or computer games in the safety of their homes rather than exercise or play outside because they do not have safe outdoor spaces or access to nearby parks. Such finding would be supported by other research which has found that minority groups engage in less physical activity and more inactivity than their non-Hispanic White counterparts (Gordon-Larsen et al., 1999). Recent research also indicates that differential health outcomes are more associated with sedentary behavior than physical activity (Ford, Kohl, Mokdad, & Ajani, 2005).

Future Research Directions

More research is needed in order to understand the effects that access to green space, socioeconomic factors, and video or computer game time have on Latino youths' weight status. In particular, researchers should conduct mixed methods studies (using qualitative and quantitative methods) that are richer in experience, history, and overall context. Such research needs to analyze how social, biological, and environmental factors intersect to influence the weight of a population. As reported in the literature, the effects that television time, video or computer game time, and computer use have on youth vary by geographic location (Stettler et al., 2004; Velde et al., 2007).

It is necessary, then, to focus on a specific location and population in order to understand the effects that video or computer game time or other types of technologies have on youths' weight status. Studying the use of video or computer games that are sedentary is particularly important since research has found that they tend to be preferred

by youth over active video or computer games (Lyons et al., 2011). The majority of the research done to date on this topic has been quantitative– which only allows for a portion of the big picture to be discovered. As a result, this limitation can prevent public health officials or health educators from addressing important factors that affect youths' weight.

Limitations

This study has some limitations that need to be noted. The first limitation is that this study's cross-sectional design does not allow for any causal inferences to be formulated. A second limitation is the self-reporting measures of television time, video or computer game time, and computer use. The full range of time for the television and video or computer game could not be captured; since the last option was "5 or more," data for any participant that engaged in more than 5 hours was truncated at five hours; the reduced variability may have affected associations detected. Thus, each of the responses had to be recoded into meaningful numerical values to create a continuous score. Objective measures of these variables were not possible, but may yield different estimates of behavior. Finally, the study targeted only at risk low income Latino youth, not a wide sampling of Latino students; furthermore, it consisted of a relatively small sample size–this limits the generalizability of results. However, a particular strength of this study is that the sample included only Latino students and addressed the aforementioned limitation of heterogeneous samples.

CHAPTER 8

CONCLUSION

Obesity is a disease that currently affects many people in the United States and is increasing among adolescents. At the same time, technology use among adolescents is also on the rise. These two factors, obesity and technology use, are even more prevalent among Latino adolescents. The purpose of this study was to test the effect that use of different types of technology have on Latino youths' adiposity. The three forms of technologies studied were: television, video or computer games, and personal computer. The amount of time spent on each one of these technologies was the variable against which body fat levels were analyzed. Socio-economic status was also included in the quantitative analysis to examine whether it changed the effect that technology use has on Latino youths' fat percentage.

The current study found that only video or computer game time had a positive relationship with Latino youths' adiposity. The correlation remained even after SES was factored. These findings contribute to the current growing body of knowledge on obesity and the role of technology use. The study also shows that there is a need to address sedentary behavior, aside from physical activity, in order to understand the etiology of obesity. Furthermore, these results inform sociologists, biologists, and other field researchers that social, economic, and technological factors need to be considered when studying obesity in a group. The aforementioned considerations should

not be overlooked since technology is, more than ever, present in the lives of almost every member of our society.

This study highlights the need to target technology behaviors such as video or computer game use to support public health efforts to stop the childhood obesity epidemic. Research has overall revealed that findings for time spent watching television, playing video or computer games, and using a personal computer have been inconsistent. This study, however, showed that the increase of time spent playing video or computer games is affecting Latino youths in Long Beach. Although variation in SES could not be included in the quantitative analysis, uniformly low incomes of the primary zip code examined seemed to offer some insight. Analysis of this specific community's zip code revealed that not enough green space was available for recreational purposes and could be a reason for why Latino youth spend more time playing video or computer games and not as much time engaged in physical activity. Further research needs to be conducted on the effects that video or computer games have on the overall health of Latino youth; this should include the effects that hand held and active video game devices have on Latino youth.

In order to truly understand the effects that time spent playing video or computer games has on Latino and other ethnic youths, there should be an effort on the part of researchers to focus on the socio-economic and environmental context. Research shows that obesity in developed countries affects low-income individuals while in developing countries, high income people are affected. By focusing on context, we can learn how different social inequalities or conditions may be contributing to the adoption of

sedentary behaviors; as in the case of Latino youths in Long Beach. Knowing such information can help professionals to develop curriculum that are culturally competent and that address the various root causes of the epidemic.

Public health specialists and researchers should try to develop educational tools to make the community aware of the effects that playing video or computer games have on children. Currently, First Lady Michele Obama developed a program called "Let's Move" to alleviate the obesity rate among U.S. youths. "Let's Move" emphasizes proper nutrition and physical activity as necessary for healthy living, but these two factors are not enough. Young people need to learn how to balance technology use, physical activity, and other life responsibilities in order to be healthy. Finally, developing recommendations about how parents can help their children to strike a balance between time spent using technology, physical activity, and other activities could be beneficial.

APPENDICES

APPENDIX A

FIGURES 2-5: DEPENDENT AND INDEPENDENT VARIABLE HISTOGRAMS

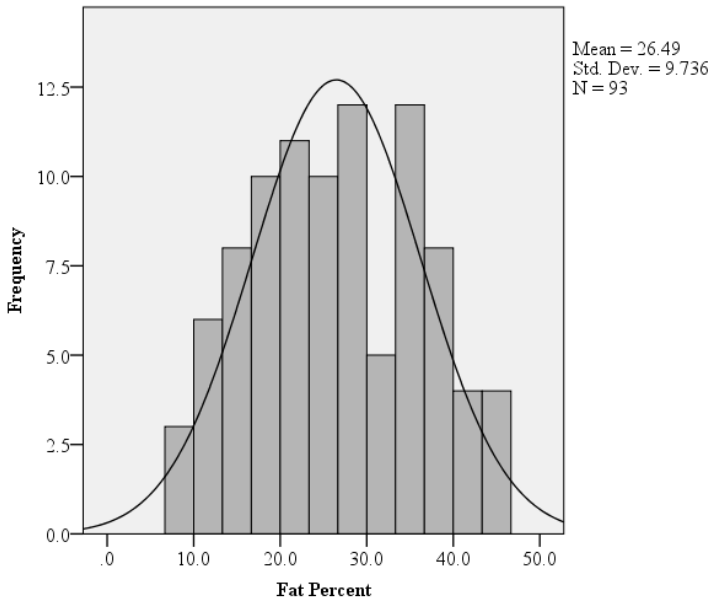


FIGURE 2. Histogram for fat percent.

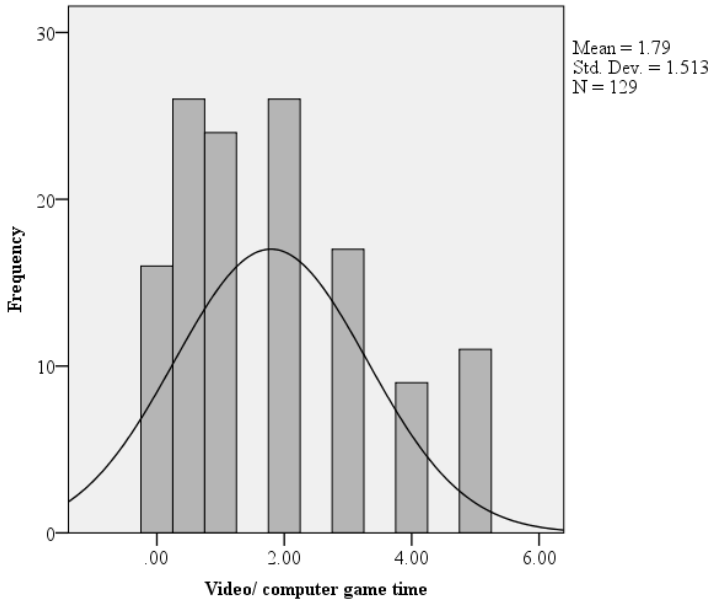


FIGURE 3. Histogram for video or computer game time.

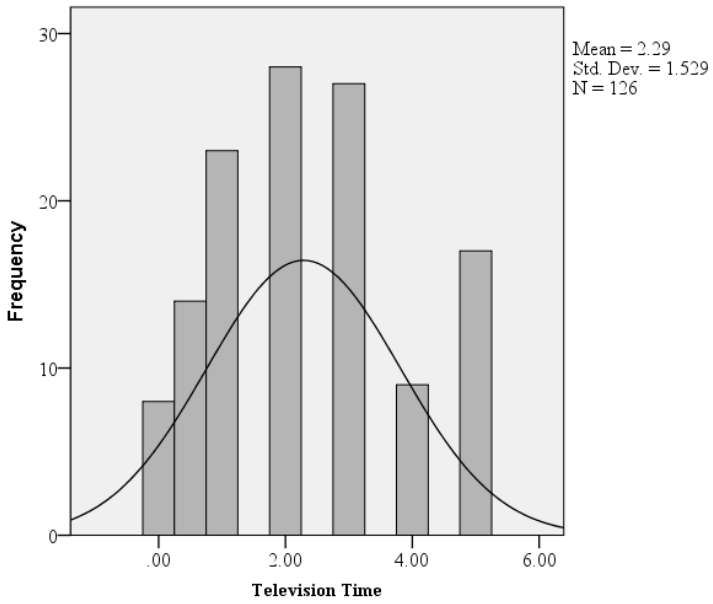


FIGURE 4. Histogram for television time.

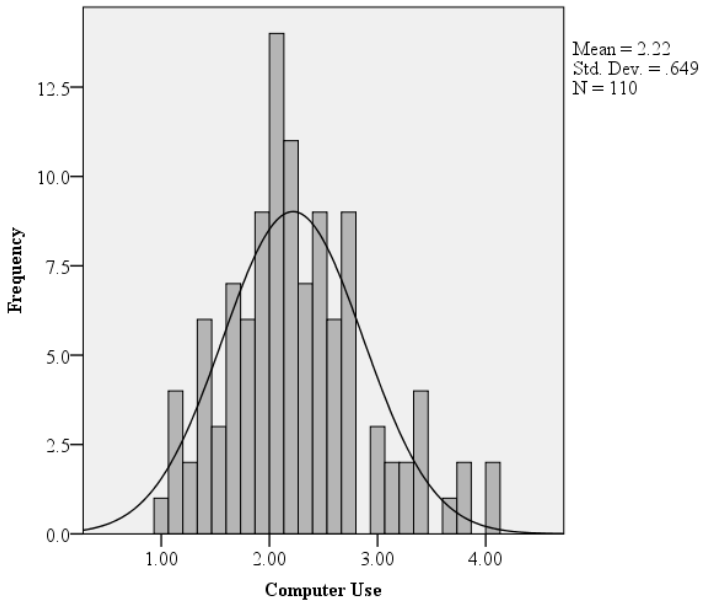


FIGURE 5. Histogram for computer use.

APPENDIX B

FIGURE 6: DEPENDENT VARIABLE P-P PLOT

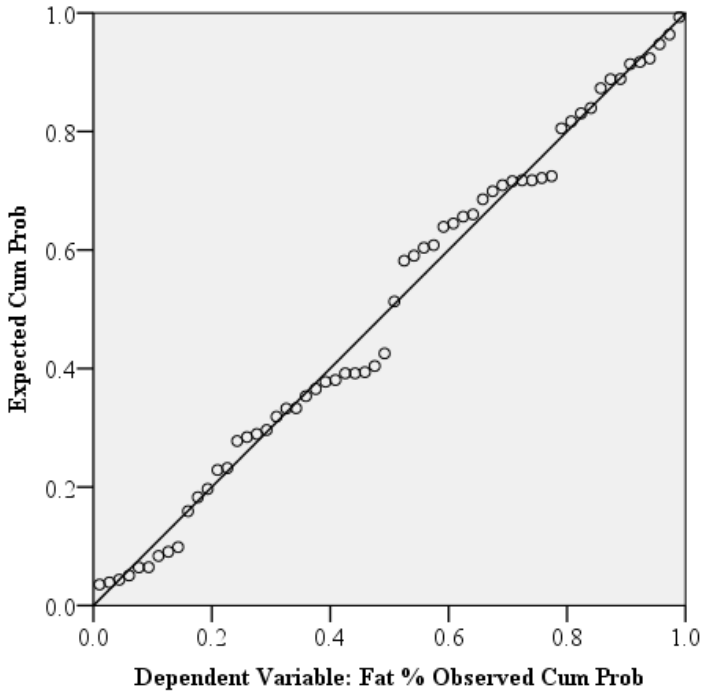


FIGURE 6. Dependent variable p-p plot.

APPENDIX C

FIGURES 7-8: DEPENDENT AND INDEPENDENT VARIABLE PARTIAL PLOTS

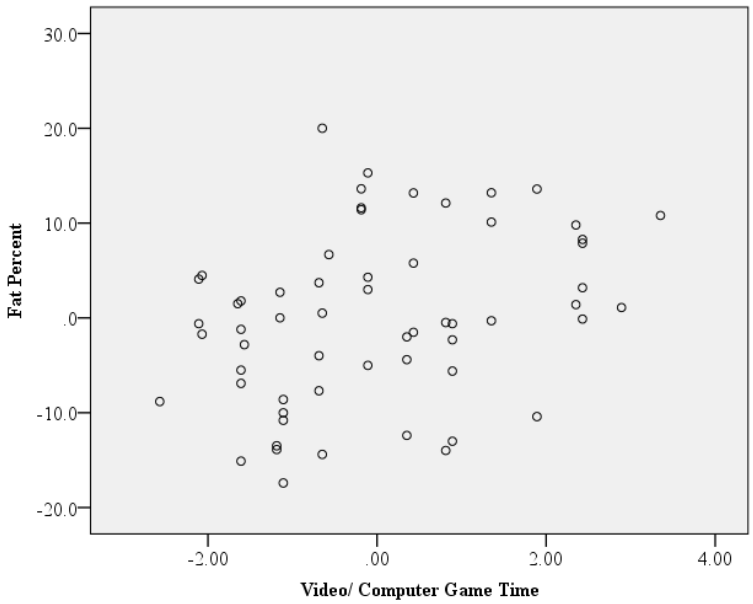


FIGURE 7. Partial plot for fat percent and video or computer game time.

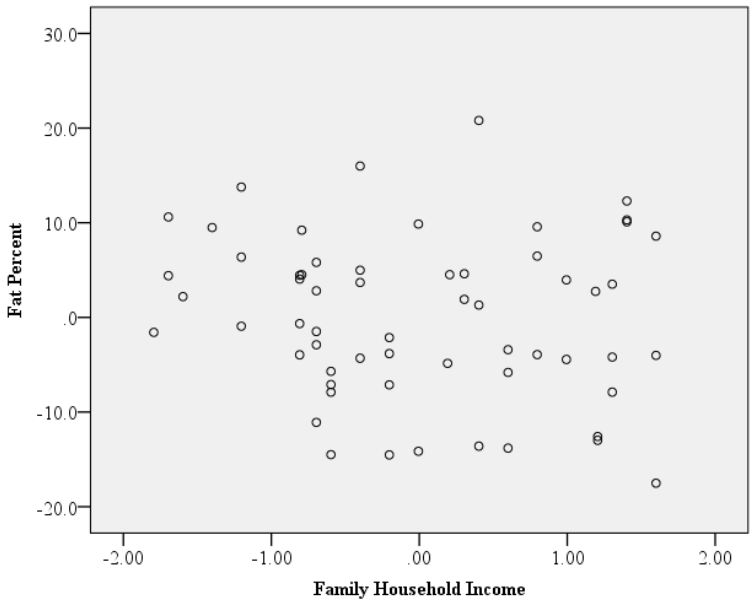


FIGURE 8. Partial plot for fat percent and family household income.

APPENDIX D

TABLE 1: VIF AND TOLERANCE TABLE

TABLE 1. VIF and tolerance table

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics: Tolerance	Collinearity Statistics: VIF	Collinearity Statistics: Minimum Tolerance
1	Video/Computer Game Time	.332[b]	2.597	.012	.325	.909	1.100	.909

a. Dependent Variable: Fat Percent

b. Predictors in the Model: (Constant), Family Household Income

APPENDIX E

TABLE 2: DESCRIPTIVE STATISTICS

TABLE 2. Descriptive Statistics

	N	%
Age*	11.96	.90
Females	52	40.6
Males	76	59.4
Country of Birth		
United States	96	82.1
Mexico	19	16.2
El Salvador	2	1.7
Grade in school		
6^{th}	88	69.3
7^{th}	30	23.6
8th	9	7.0
Weight Status		
BMI percentile *	74.86	27.91
Fat Percent *	26.49	9.74
Technology		
Daily TV Time (Hours)	2.29	1.53
Daily Video or Computer Game Time (Hours)	1.79	1.51
Computer Use (Times Per Month)	2.22	.65
*Mean and Standard Deviation were reported for continuous variables		

APPENDIX F

TABLE 3: BIVARIATE CORRELATION MATRIX

TABLE 3. Bivariate Correlation Matrix

	Fat Percent
Video or computer game time	r = .238 , p = .011*
Television time	r = .145 , p = .086
Computer use	r = .061 , p = .296
*p < 0.05	

APPENDIX G

TABLE 4: HIERARCHICAL REGRESSION RESULTS

TABLE 4. Hierarchical Regression Results

Step and predictor variables	R^2	adj. R	Std. β	F	p-value
Step 1:	.054			3.294	.075
Family Household Income		.037	-.132		.307
Step 2:	.154			6.746	.012*
Video/Computer Game Time		.124	.332		.012

*$p < .05$

APPENDIX H

YES! PRE-SURVEY

Date: _____ **ID Number:**_____

1

Youth Empowerment for Success YES! Sí Se Puede
Youth Pre-Program Survey

This survey asks about your thoughts, feelings, knowledge, and behaviors related to school, how you get along with others, computers and technology, eating habits, and physical activity. It also includes questions about your well-being.

You do not have to answer these questions, but your answers will be very helpful in improving youth academic and health programs like the YES! Sí Se Puede Program. **You will be able to answer all the questions** whether or not you have done or experienced any of these things. There is no right or wrong answer. All of your answers are completely private and no one who knows you will see your answers, not even your teachers or parents. Please do not put your name on this survey.

Mark only one answer unless told to ***"Mark all that apply"*** or ***"Select all that apply."*** **Even though some of the questions might seem to be the same, please answer each one separately. Sometimes it's hard to choose only one answer, please try to choose the one that best describes YOU!** If you have any questions, please raise your hand and we'll come to you.

This survey asks about things you may have done during different periods of time, for example: during the **past week** (7-days period), the **past month** or the **past 3 months**. Each provides different information. Please pay careful attention to these time periods.

Thank you for taking this survey!

First, please describe how much Spanish and English you use daily in different situations. For example, 1a asks what language(s) do you read? The number 1 means that you only read Spanish. The number 2 means that you read Spanish about 75% of the time and English 25% of the time, etc…

	Spanish 100%		**50%**		**English 100%**
A1. What language(s) do you read?	1	2	3	4	5
A2. What language(s) do you speak?	1	2	3	4	5
A3. What language(s) do you usually speak at home?	1	2	3	4	5
A4. In which language(s) do you usually think?	1	2	3	4	5
A5. What language do you like to speak with your friends?	1	2	3	4	5

The next questions are about school.

B1. How far do you want to go in school?

1❒ School is not important to me
2❒ Graduate high school or get my GED
3❒ College/university
4❒ Job training after high school (not college)

B2. One thing I would like to study in college or a university is _____.

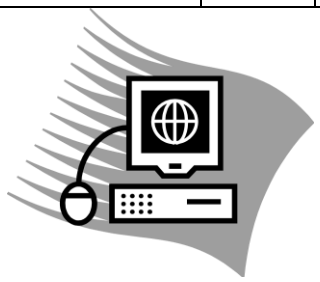
B3. One career I am interested in knowing more about is _____.

For the following statements, decide if the sentence is "TRUE" OR "FALSE" for you, or somewhere in between.	**False**	**Mostly False**	**More False than True**	**More True than False**	**Mostly True**	**True**
C9. People come to me for help in most school subjects.	1	2	3	4	5	6
C20. I'm too stupid at school to get into a good university.	1	2	3	4	5	6
C31. If I work really hard I could be one of the best students in my school year.	1	2	3	4	5	6
C42. I get bad grades in most school subjects.	1	2	3	4	5	6
C53. I learn things quickly in most school subjects.	1	2	3	4	5	6
C64. I am stupid at most school subjects.	1	2	3	4	5	6
C75. I do well in tests in most school subjects.	1	2	3	4	5	6
C86. I have trouble with most school subjects.	1	2	3	4	5	6
C94. I'm good at most school subjects.	1	2	3	4	5	6
C101. Most school subjects are just too hard for me.	1	2	3	4	5	6
D1. I enjoy learning new things.	1	2	3	4	5	6
D2. I want to go to college or a university.	1	2	3	4	5	6
D3. I see myself graduating from college or a university.	1	2	3	4	5	6
D4. I would like to attend California State University, Long Beach (CSULB).	1	2	3	4	5	6

The next questions are about your use of computers.

Not including at school or during the YES! Program...	**Never**	**Once per month or less**	**Weekly**	**Daily**
E1. I have access to a computer.	1	2	3	4
E2. I have access to the internet.	1	2	3	4

***In the last month*, how often did you use computers to…**	**Never**	**Once per month or less**	**Weekly**	**Daily**
F1. …send email.	1	2	3	4
F2. …text, chat, talk or video call.	1	2	3	4
F3. … access the Internet (visit websites/surf the web).	1	2	3	4
F4. …complete school assignments.	1	2	3	4
F5. …play games.	1	2	3	4
F6. …watch movies or videos.	1	2	3	4
F7. …shop or buy things on the internet.	1	2	3	4
F8. … listen to music.	1	2	3	4
F9 …write (using word processing software like Microsoft Word).	1	2	3	4
F10. …make presentations using PowerPoint, Keynote, Inspiration, etc.	1	2	3	4
F11. … create or up-date web pages.	1	2	3	4
F12. …create or use spreadsheets or databases (like Excel)	1	2	3	4
F13. …use digital video equipment (like digital camera/ videos).	1	2	3	4
F14. …use digital video software.	1	2	3	4
F15. ….use digital editing software (iMovie, Final Cut).	1	2	3	4
F16. … other (please list)_____	1	2	3	4



The next statements are about your knowledge of technology tools. Please circle only one response per question.

	No Knowledge	**Little Knowledge**	**Average Knowledge**	**Excellent Knowledge**
G1. I can use a keyboard and mouse to successfully	1	2	3	4

operate computers.				
G2. I can use software to create presentations.	1	2	3	4
G3. I can use computers to make and share information (presentations, reports).	1	2	3	4
G4. I can create multimedia products (digital videos, movies, newsletters) with help from staff or student partners.	1	2	3	4
G5. I can use computers and the internet to find and collect information.	1	2	3	4
G6. I can use technology to help manage my schedules, addresses, etc.	1	2	3	4

Next, please mark on your answer sheet how TRUE you feel each of the following statements are about the adults in your life. The statements are about what might happen outside of your school or home, such as in your NEIGHBORHOOD, COMMUNITY, or with an ADULT other than your parent(s) or guardian.

Outside of my home and school, there is an adult ...	**Not at all True**	**A Little True**	**Pretty True**	**Very Much True**
H1. …who really cares about me.	1	2	3	4
H2. …who tells me when I do a good job.	1	2	3	4
H3. … who notices when I'm upset about something.	1	2	3	4
H4. …who believes that I will be a success.	1	2	3	4
H5. …who always wants me to do my best.	1	2	3	4
H6. …whom I trust.	1	2	3	4
H7. …who notices when I'm not there.	1	2	3	4
H8. …who listens to me when I have something to say.	1	2	3	4

These next questions ask about how you get along with others...

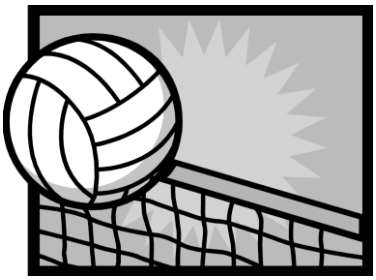
Please circle the number that comes closest to how you feel about each	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**

statement :				
I1. I talk with teens from different cultures/ethnic backgrounds other than my own.	1	2	3	4
I2. I care about teens of other cultures or ethnic groups.	1	2	3	4
I3. I understand that someone from a different culture/ethnic background may not really be that different from me.	1	2	3	4
I4. I am good at taking care of problems without fighting or violence.	1	2	3	4
I5. I try hard not to judge people based on skin color.	1	2	3	4
I6. I feel connected to and am proud of my own culture.	1	2	3	4
I7. I have respect for teens of other cultures or ethnic groups.	1	2	3	4
I8. I feel comfortable with teens of other cultures or ethnic groups.	1	2	3	4

The next questions relate to physical activity.

J1. On an average school day, how many hours do you watch TV?

1❒ I do not watch TV on an average school day
2❒ Less than 1 hour per day
3❒ 1 hour per day
4❒ 2 hours per day
5❒ 3 hours per day
6❒ 4 hours per day
7❒ 5 or more hours per day



J2. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Include activities such as

NintendoDS, Game Boy, Play Station, Xbox, computer games, and the Internet. Do NOT include active games like Dance Dance Revolution and Wii Fit, Active Life, or Sports Active.)

1❒ I do not play video or computer games or use a computer for something that is not school work
2❒ Less than 1 hour per day
3❒ 1 hour per day
4❒ 2 hours per day
5❒ 3 hours per day
6❒ 4 hours per day
7❒ 5 or more hours per day

How many times each **week** (7-day period), do you usually do the following kinds of physical activity for **more than 15 minutes**?

K1. Strenuous activity (heart beats rapidly) (like soccer, basketball, running, hockey, football, karate, roller skating, swimming laps, long distance bicycling, dancing, handball, PE, digging, mowing the lawn)
How many times per week?: _____

K2. Moderate activity (not exhausting) (like fast walking, baseball, tennis, easy bicycling, volleyball, easy swimming, kickball, mopping, weeding)
How many times per week?: _____

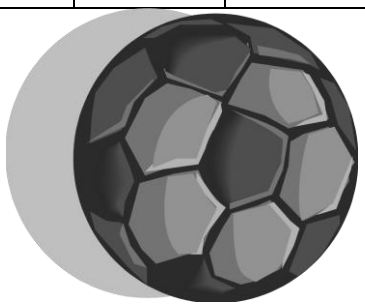
K3. Mild activity (little effort) (like easy walking, skateboarding, shooting baskets, bowling, yoga, archery, playing with brother/sister outside, washing dishes, sweeping)
How many times per week?: _____

K4. ***In a 7-day period (a week),*** during your free time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?
1❒ Often
2❒ Sometimes
3❒ Rarely

L1. During my free time on most days…
1❒ I am sure I *will not* be physically active.
2❒ I *probably will not* be physically active.
3❒ I *may or may not* be physically active.
4❒ I *probably will* be physically active.
5❒ I am sure I *will* be physically active.

Please circle the answer that best describes your feelings.

	Disagree A Lot	Disagree	Neither	Agree	Agree A Lot
M1. I can be physically active during my free time on most days.	1	2	3	4	5
M2. I can ask my parent or another adult to do physically active things with me.	1	2	3	4	5
M3. I can be physically active during my free time on most days even if I could watch TV or play video games instead.	1	2	3	4	5
M4. I can be physically active during my free time on most days even if it is very hot or cold outside.	1	2	3	4	5
M5. I can ask my best friend to be physically active with me during my free time on most days.	1	2	3	4	5
M6. I can be physically active during my free time on most days even if I have to stay at home.	1	2	3	4	5
M7. I have the coordination I need to be physically active during my free time on most days.	1	2	3	4	5
M8. I can be physically active during my free time on most days no matter how busy my day is.	1	2	3	4	5



During the past 3 months, my family (or members of my household) or friends:

N1. Exercised with me.

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N2. Gave me helpful reminders to exercise ("Are you going to exercise tonight?").

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N3. Offered to exercise with me.

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N4. Gave me encouragement to stick with my exercise program.

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N5. Changed their schedule so we could exercise together?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N6. Criticized me or made fun of me for exercising?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N7. Discussed exercise with me?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N8. Gave me rewards for exercising (bought me something or gave me something I like)?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N9. Complained about the time I spend exercising?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

During the past 3 months, how often have my family or friends…

N10. Planned for exercise on recreational outings?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N11. Helped plan activities around my exercise?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N12. Talked about how much they like to exercise?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

N13. Asked me for ideas on how *they* can get more exercise?

Family	***Friends***
1❒ none	1❒ none
2❒ rarely	2❒ rarely
3❒ a few times	3❒ a few times
4❒ often	4❒ often
5❒ very often	5❒ very often

How much do the following things prevent you from exercise, being active, or playing sports?

	Not at all	**Not Much**	**Sometimes**	**Mostly**	**A Great Deal**
O7. Lack of support from friends	1	2	3	4	5
O8. Cost	1	2	3	4	5
O9. Lack of self-discipline or willpower	1	2	3	4	5
O10. Self-conscious (feeling uncomfortable)	1	2	3	4	5
O11. Long-term illness, disability, or injury	1	2	3	4	5
O12. Fear of injury	1	2	3	4	5
O13. Feeling stressed	1	2	3	4	5
O14. Not feeling in the mood	1	2	3	4	5
O15. Feeling discomfort (for example, soreness)	1	2	3	4	5
O16. Not having fun	1	2	3	4	5

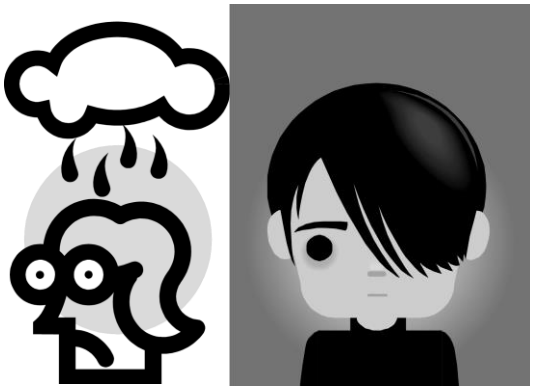
Please circle the answer that best describes your beliefs about the following statements.

If I were to be physically active most days…	Disagree A Lot	Disagree	Neither	Agree	Agree A Lot
P1. …it would get or keep me in shape.	1	2	3	4	5
P2. …it would be boring.	1	2	3	4	5
P3. …it would make me better in sports.	1	2	3	4	5
P4. …it would be fun.	1	2	3	4	5
P5. …it would help me be healthy.	1	2	3	4	5
P6. … it would make me get hurt.	1	2	3	4	5
P7. … it would help me control my weight.	1	2	3	4	5
P8. …it would make me embarrassed in front of others.	1	2	3	4	5
P9. …it would give me energy.	1	2	3	4	5
P10. …it would make me tired.	1	2	3	4	5
P11. …it would cause pain and muscle soreness.	1	2	3	4	5
P12. …it would help me make new friends.	1	2	3	4	5
P13. …it would help me spend more time with my friends.	1	2	3	4	5
P14. …it would help me look good to others.	1	2	3	4	5
P15. …it would make me more attractive to the opposite sex.	1	2	3	4	5
P16. …it would help me work out my anger.	1	2	3	4	5

Please circle the answer that best describes your feelings.

For the following statements, decide if the sentence is "TRUE" OR "FALSE" for you, or somewhere in between.	**False**	**Mostly False**	**More False than True**	**More True than False**	**Mostly True**	**True**
Q3. Overall, I have a lot to be proud of.	1	2	3	4	5	6
Q14. Overall, I am no good.	1	2	3	4	5	6
Q25. Most things I do, I do well.	1	2	3	4	5	6
Q36. Nothing I do ever seems to turn out right.	1	2	3	4	5	6
Q47. Overall, most things I do turn out well.	1	2	3	4	5	6
Q58. I don't have much to be proud of.	1	2	3	4	5	6
Q69. I can do things as well as most people.	1	2	3	4	5	6
Q80. I feel that my life is not very useful.	1	2	3	4	5	6
Q90. If I really try I can do almost anything I want to do.	1	2	3	4	5	6
Q97. Overall, I'm a failure.	1	2	3	4	5	6

Over the last 2 weeks, how often have you been bothered by any of the following problems?	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
R1. Little interest or pleasure in doing things	0	1	2	3
R2. Feeling down, depressed, or hopeless	0	1	2	3
R3 Trouble falling or staying asleep, or sleeping too much	0	1	2	3
R4. Feeling tired or having little energy	0	1	2	3
R5. Poor appetite or overeating	0	1	2	3
R6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
R7. Trouble concentrating on things, such as reading	0	1	2	3
R8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
R9. Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3



The next questions are about making healthy substitutions in your eating habits.

If You Usually Eat:		Try This:
fried chicken	➡	grilled chicken
breaded chicken sandwich	➡	grilled chicken sandwich
milkshakes	➡	fruit smoothie
italian sub	➡	turkey sub
grilled stuffed burritos	➡	chicken taco
grape juice	➡	apple juice
deep dish pizza	➡	thin crust pizza
Doritos, Cheetos, potato chips	➡	Triscuits with a slice of cheese
ice cream	➡	frozen yogurt
King Size, Supersize, Biggie Size, etc.	➡	small or kids' size
List some substitutions YOU can make!		
S1.	➡	
S2.	➡	
S3.	➡	

S4. How many times did you make healthy substitutions in the past 7 days?

1❒ None
2❒ 1 or 2 times
3❒ 3 or 4 times
4❒ 5 or 6 times
5❒7 times or more

Thank you very much for completing this questionnaire!

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