

Can Neighbors Make You Healthy? Understanding how adolescent obesity is associated with neighborhood characteristics and physical activity.

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Abstract:

Findings from several studies suggest that higher levels of neighborhood safety and social capital are associated with higher levels of physical activity, a known predictor of obesity. Presently, the obesity rate for adolescents ages 12 to 19 in the United States is 16.9%, which is four times the rate noted in the 1960s. This study focuses on neighborhood characteristics, activity patterns and their association with obesity in adolescent females in the United States. Specifically, this paper examines whether neighborhood characteristics (e.g. built environment, social capital, neighborhood safety) are associated with adolescent activity patterns (e.g. weekly physical and sedentary activity) and obesity in females ages 12-17. Data were gathered using the National Survey of Children's Health, a study that focuses on health in children and adolescents 0-17 years of age in the United States. Findings will clarify the relationship between neighborhood characteristics, female adolescent activity patterns and how these variables relate to adolescent obesity.

INTRODUCTION

The recent increase in the prevalence of obesity is a great concern for the nutrition and health of the world. Many countries, including the United States, have seen an increase in obesity research to help not only understand the cause of this epidemic but treatment that can be offered. The current study explores measures of neighborhood characteristics and physical activity and their association with obesity.

“Obesity in youth aged 2-19 years can be defined as a body mass index (BMI) at or above the 95th percentile of the sex-specific Center for Disease Control BMI-for-age growth charts (Ogden et al., 2014, p.1).” Obesity in youth has risen from 6.1% from 1971 to approximately 17% in 2011 and has been steady at approximately 17% since 2003. This more than doubled increase can be seen in all major racial and ethnic groups and across the majority of developmental age cohorts (Ogden et al., 2014; Singh et al., 2008). The rise in obesity status can also have detrimental health effects for adolescents later on in life as research shows that 80% of adolescents will develop to become obese adults (CDC, 2014). Obesity in adulthood can lead to health problems such as high cholesterol, high blood pressure, cardiovascular disease, stroke and Type 2 diabetes (CDC, 2014). These progressing health conditions are sure to impact one’s livelihood. For this reason, it is important to understand the causes and predicting factors of obesity.

According to Parsons and Power (1999), some predictors of obesity include dietary factors and physical activity. According to Kimm et al. (2002), since the early 1960’s, the prevalence in youth obesity rates has increased dramatically, more than doubling. Research, however, has not proven that there has been “concomitant increase in food intake” thus allowing physical activity to become the focal point of study in combating the prevalence of obesity. Physical activity is a modifiable behavior that can reduce the prevalence of obesity. Research studies suggest that physical activity improves health and can work against many of the aforementioned health conditions such as cardiovascular disease, stroke and Type 2 diabetes (CDC, 2014). It is also known that current prevalence rates of obesity originate in part from declines in energy expenditure due to increasing physical inactivity (Wareham et al., 2005).

Physical activity recommendations from the Centers for Disease Control and Prevention (2014) recommend 1– 2 hours and 30 minutes of physical activity (specific recommendations depend on age) daily including aerobic activity, muscle strengthening and bone strengthening. However, less than half of adults and 10% of adolescents meet the physical activity requirements for their age group (CDC, 2014; Ding, 2011). Research also shows that physical activity decreases with age by as much as 50% (CDC, 2014; Kimm et al., 2002). Physical inactivity and sedentary activity have been found to be gender specific. A study by McMurray et al. (2000) found that girls reported less vigorous activity than boys and watched less television. A study by Boone and Gordon-Larsen (2007) examining screen time and physical activity during adolescence, found that screen time significantly influenced obesity prevalence in females. This study found that less screen time was associated with lower prevalence of obesity in females as well. A reduction in screen time and other sedentary behaviors could possibly result in more physical activity that would include play and activity outdoors in the neighborhood.

A possible predicting variable of physical activity that may also be associated with obesity would be characteristics of a neighborhood. There are many characteristics of neighborhoods including parks, the presence of amenities and resources such as stores and supermarkets, presence of sidewalks or grass, safety, etc. The relationship between neighborhood characteristics and physical activity has been researched, although few have pertained to youth (Franzini et al., 2009; Popkin, Duffey, and Gordon-Larsen, 2005). The extent to which neighborhood environments influence physical activity remains in question, especially when focusing on youth. There are many factors of neighborhood characteristics such as built environment, social capital and neighborhood safety that may help to determine levels of physical activity. Built environment is a complex concept that defines factors of the neighborhood including, but not limited to, access to resources and amenities, levels of comfort and the presence of open space for physical activity.

Built environment, a neighborhood characteristic, has been defined as a multi-dimensional concept that examines human activity of different scales in given physical environments (Popkin, Duffey, and Gordon-Larsen, 2005). Built environment includes a combination of factors such as walkability, access to recreation facilities/open space, vegetation (i.e., presence of street trees), pedestrian safety structures and social incivilities depending on the physical make-up of the neighborhood setting (Ding, 2011; Singh et al., 2010). Recently, built environment has seen changes due to increased technological use (i.e., transportation and screen time), leading to increased sedentary lifestyles of youth (Sallis et al., 2006; Popkin, Duffey and Gordon-Larsen, 2005). Youth are being driven to school more often due to distance and traveling in highly-trafficked areas. The presence of fast food restaurants and the portion sizes of food being served have also increased-- a very convenient commodity in today's society (Sallis et al., 2006). These factors of built environment are likely to be associated with fueling the current obesity epidemic.

Findings suggest that adolescents with better built environments, characterized by the presence of local markets with healthier food choices, consume less fast food; and those with better walking and playing space (i.e., sidewalks and facilities) are more likely to have better health (Sallis et al., 2006). Supporting this claim, research done by Gordon-Larsen et al. (2006) found that children that lived in urban areas of low socioeconomic class had reduced access to facilities, which therefore decreased physical activity and increased the risk of being overweight. However, a study completed by Franzini et al. in 2009 negated the association of built environment with physical activity. This study examined the association between physical and social neighborhood environments for 650 children 11-12 years of age. Previous research studies show inconsistencies in depicting the association between the neighborhood factor of built environment and physical activity (Ding, 2011; Gordon-Larsen et al., 2006; Sallis et al., 2006). Research findings, however, definitely support a correlation between built environment and physical activity. Findings, however, suggest that there is a correlation between the neighborhood characteristic of social capital and physical activity.

The neighborhood characteristic of social capital is defined as one's sense of community regarding their neighborhood or the "resources available to individuals and to society through social relationships (McNeill et al., 2006, p. 1016)". This would include dependency on one another, understanding, trust and "norms of reciprocity". McNeill et al. (2006) also defined

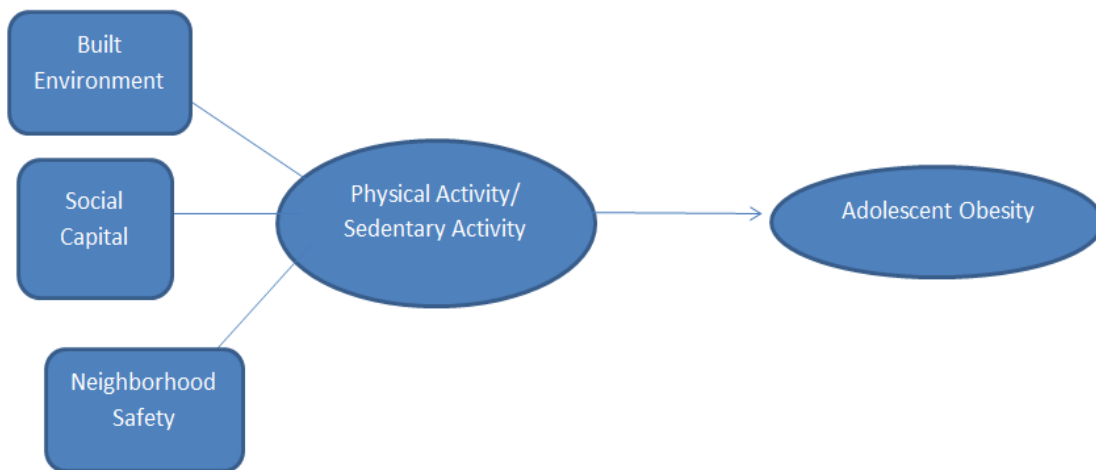
social capital as a fundamental social environmental factor that influences a multitude of health-related behaviors. Social capital has been significantly associated with risk of obesity. Specifically, lower social capital has been associated with a significantly increased risk of obesity (Singh, et al., 2008). Studies that have found an association between social capital and physical activity have also found social capital to be independently associated with low levels of obesity prevalence and, recently, with higher levels of physical activity (Singh et al., 2010; Franzini et al., 2009; McNeill et al., 2006). According to Berkman and Kawachi, as cited by McNeill et al. (2006), neighborhoods with high levels of social capital have an improved chance to reinforce good social norms that encourage positive health behaviors such as physical activity, and better and safer environments where residents could remain physically active.

Neighborhood safety is also an important neighborhood characteristic that should be considered when examining physical activity, as safety predicts physical activity (Singh, et al., 2010). Inconsistencies, however, exist in research about the association between neighborhood safety and physical activity (Davison et al., 2006). A literature review conducted by Davison et al. (2006) included nine studies that examined the relationship between perceived neighborhood safety and physical activity. Results in seven out of the nine studies reported that there were no associations between neighborhood safety and physical activity. Conversely, in 2006, Davison and Lawson et al. also found that in one of the two articles supporting a correlation between neighborhood safety and physical activity that perceived safety influenced higher self-reports of outdoor physical activity in adolescents. Research has also linked higher levels of perceived neighborhood safety with higher levels of physical activity and lower risks of obesity (Franzini et al., 2009; Singh et al., 2010). Singh et al. (2010) also found that “the odds of a child’s being obese or overweight were 20-60 percent higher among children in neighborhoods with the most unfavorable social conditions such as unsafe surroundings.” Some research suggests that associations between neighborhood safety and obesity are attributable to social and economic disadvantage (Ding, 2011).

The purpose of this study was to (1) examine the association between neighborhood characteristics, female adolescent activity patterns and obesity in female adolescents ages 12-17, (2) examine the relationship between neighborhood characteristics and obesity, and (3) examine the association between female adolescent activity patterns and obesity. Neighborhood characteristics were defined as built environment, social capital and neighborhood safety. The predicting factor of obesity, physical activity, was categorized with sedentary activity to define female adolescent activity patterns. This study examined how the neighborhood characteristics (i.e. built environment, social capital and neighborhood safety) were associated with female adolescent activity patterns (i.e. physical and sedentary activity) and resultantly how these variables were associated with obesity using a nationally representative sample of youth in the United States. The age range of 12-17 was chosen because it is within this stage that process of self-identification is enhanced through the development of personal identification. According to the Erikson’s developmental model, during adolescence, adolescents develop a “sense of self and personal identity” (Rosenthal, Gurney and Moore, 1981; Jones et al., 2014). They begin as adolescents and continue into adulthood outlining and exploring not only who they are and what they identify with, but how they will stay true to themselves (Jones et al., 2014). Female adolescents were chosen as the focus of this study because it has been proven that boys are more physically active than girls (CDC, 2014). Research by Boone and Gordon-Larsen in 2007 also

found that decreased screen time was associated with lower prevalence of obesity in girls. This study sought to study female adolescent physical activity levels. This study includes maternal respondents as a reflection of the National Survey of Children’s Health 2011-2012 in which over 50% of parental respondents were mothers. It was hypothesized that the neighborhood characteristics that would most influence physical activity would be neighborhood safety and social capital. Built environment was not hypothesized to be a significant characteristic in influencing physical activity and obesity status in adolescents. Physical activity was also hypothesized to be a predicting factor of obesity status. The research framework is outlined in Figure 1.

Figure 1: Conceptual Model



METHODS

Study Data

Data were gathered for this study using the 2011-2012 National Survey of Children’s Health (Appendix 1). This survey was conducted by the Center for Disease Control’s National Center for Health Statistics, State and Local Area Integrated Telephone Survey program. This survey serves to “assess the physical and emotional health of children aged 0 to 17 years, as well as factors that relate to child well-being, including medical homes, family interactions, parental health, school and after-school experiences, and neighborhood characteristics (Data Resource Center, 2014)” Data were collected from February 2011 until June 2012. The languages included in this survey were English, Spanish, Mandarin, Cantonese, Vietnamese and Korean.

Participants

Participant eligibility for the 2011-2012 survey given by the National Survey of Children's Health was determined through a screening for residential status with household children aged 0 to 17 years of age in the United States and the United States Virgin Islands. Participants were then interviewed and surveyed by landline and cellular phones. Specifically, households that provided cellular phone information for this study were only considered eligible if they did not own a landline telephone or were unlikely to be reached until April 2011 when cases were no longer screened for cell-only/mostly status. A household adult was considered to be a respondent for this survey if they were "a parent or guardian with the knowledge of health and health care of the sampled child in the household (Data Resource Center, 2014)." 68.6% of the respondents were mothers (biological, step, foster, or adoptive), 24.2% were fathers (biological, step, foster, or adoptive) and 7.2% were other relatives and guardians. In the present study, the full NSCH sample (n= 95,667) was limited to female adolescents aged 12-17 (n= 10,881). The mother of each female adolescent included in this study responded to questions about the characteristics of the neighborhood where their daughters lived and their daughter's activity patterns. The mothers of the daughters were the only respondents.

Procedure

This survey is a cross-sectional telephone survey of US households with at least one child aged 0 to 17 when the interview was conducted. Households were chosen as a result of "list-assisted random-digit dial sample of landline telephone numbers and was supplemented with cellular phone numbers with stratification taking place by state." There were 95,667 interviews completed for the landline phone sample in the United States including the District of Columbia. On average, landline phone interviews in this sample took 33 minutes to complete. There were 51,972 cellular phone interviews completed in this sample for the same geographic location. The average length of the interview for the cellular phone sample was 34 minutes. There were also 2,342 interviews completed in the United States Virgin Islands that were not included in this data set. The comprehensive response rate (includes finishing the end of the survey – section 6 for children less than 6 years of age and section 7 for children 6 to 17 years of age) was 54.1% for the landline sample and 41.2% for the cellular phone sample.

Measures

Weight Status. In order to assess the relationship between neighborhood characteristics and its association to female adolescent activity, which overall influences weight status, variables were assigned based upon the data available in the National Survey of Children's Health. Obese status was assigned based on the participant's Body Mass Index. Participants that had a body mass index in the 85th–95th percentile and higher were labeled as overweight, and participants considered obese had a body mass index in the 95th percentile or higher. In the National Survey of Children's Health, body mass index was used.

Neighborhood Characteristics. The construct of neighborhood characteristics (NC) was characterized by variables in the data set that were categorized as measures of built environment, social capital and neighborhood safety. These variables express the dominant qualities that have an impact on outdoor physical activity that should take place in neighborhoods and communities.

Built Environment. There were two questions mothers answered with yes or no pertaining to built environment. The first question was “does a library or bookmobile exist in your community?” The second was “does a recreation center, community center or boys’ or girls’ club exist in your neighborhood?”

Neighborhood Safety. Neighborhood safety was assessed by a question that asked about how safe the child felt in their community or neighborhood. For this question the mother responded on a scale of 1 (never) to 4 (always).

Social Capital. The last subdomain under the construct of neighborhood characteristics was social capital, specifically measured by four questions. The first question asked mothers whether people in their neighborhood help each other out. The second question asked whether adults watch out for each other’s children. For the third question, mothers responded to whether or not there were people in the neighborhood that they could count on. Lastly, mothers responded to the question that asked “if my child were outside playing and got hurt or scared, there are adults nearby who I can trust to help my child.” Mothers responded from 1 (definitely agree) to 4 (definitely disagree).

Activity Patterns. The construct of physical activity (PA) is characterized by variables in the data set that were collected as measures of sedentary activity and weekly physical activity. These variables express two dominant forms of physical activity (CDC, 2014).

Sedentary Activity. Mothers reported the average amount of time that their child spends watching TV programs, videos, or playing video games on an average weekday in hours or minutes. A code was given if a television was not present in the household and if the child spent no time in front of the television.

Weekly Physical Activity. Mothers answered a question about the amount of time during the past week (number of days) that their child exercised, played a sport, or participated in physical activity for 20 minutes or more that made him or her sweat or breathe hard (basketball, walking, active dance, etc.). Mothers gave a specific number of days as a response.

Statistical Analyses

All data analyses were conducted using Statistical Analysis Software (SAS) version 9.2. Associations between neighborhood characteristics (neighborhood amenities, built environment, social capital and neighborhood safety) and activity patterns (sedentary and weekly physical activity) were examined using linear regression. Cronbach’s alpha was used to examine scale reliability for the social capital scale. Logistic regression was used to measure the degree to which the aforementioned variables predict adolescents’ odds of obesity. Correlations and p-values ($p \leq .05$) were examined to understand relations among predictor variables. The data were also restricted to female adolescents and mothers. There were no stipulations set for geographic location, therefore, all female participants within the ages of 12-17 were included in the analysis. Socioeconomic status was included in this study based on mother’s highest level of completed education and the poverty level of the household as established by the United States Department of Health and Human Services.

RESULTS

Sample characteristics. The sample descriptions by demographics and child health are presented in Table 2. Over 50% of the sample identified as non-Hispanic, White (57%) with the remaining sample identifying as Hispanic (20%) and Black (15%) and other (8%). Nearly 12% of families experienced household financial hardship; 66% of the female adolescents had mothers with more than a high school education. Approximately 12% of the sample came from single, female-headed households. The overall proportions of obese and overweight children were 33% and 12%, respectively.

Table 2: Sample Characteristics (n=10,881)	
DEMOGRAPHICS	SAMPLE FREQUENCY
Non-Hispanic, White	57%
Hispanic	20%
Non-Hispanic, Black	15%
<HS Education (Mothers)	12%
>HS Education (Mothers)	66%
Single, female-headed household	27%
Household Financial Hardship	12%
CHILD HEALTH	
Overweight (BMI \geq 85 th percentile)	33%
Obese (BMI \geq 95 th percentile)	12%

Associations between female adolescent activity pattern frequency and neighborhood characteristics. Female adolescent activity patterns are presented in Table 3. Mothers reported that their daughters had a mean of [3.76 (.05)] days of frequency in physical activity per week. For sedentary activity, mothers reported that their daughters spent an average of [109.71 (2.24)] minutes watching TV and DVDs or playing videogames out of 180 minutes (3 hours) each day of the week. Neighborhood characteristics showed that there was a mean of [3.38 (.01)] for social capital and [3.36 (.01)] for neighborhood safety. These results show that there was a large proportion of mothers in the sample that reported high levels of neighborhood social capital and neighborhood safety in their neighborhood communities and environments. Built environment was not significant in this study as it was not significantly related to adolescent activity patterns and obesity.

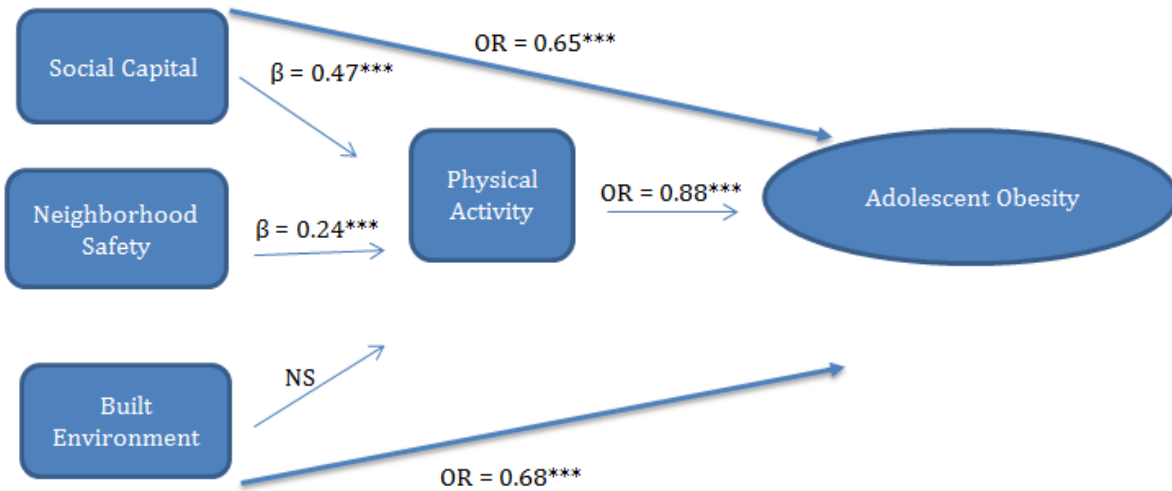
Table 3: Descriptive Information (n=10,881)		
	Mean (SE)	Range
CHILD PHYSICAL AND SEDENTARY ACTIVITY		
Physical Activity Frequency (days/week)	3.76 (.05)	0-7
TV/DVD/Video Game Time (min/week)	109.71 (2.24)	0-480
NEIGHBORHOOD CHARACTERISTICS		
Social Capital	3.38 (.01)	1-4
Neighborhood Safety	3.36 (.01)	1-4

Associations between female adolescent activity pattern frequency and neighborhood characteristics by obesity status. Physical and sedentary activity patterns by adolescent obesity status are presented in Table 4. Mothers reported physical activity per week for their daughters that were obese as having a frequency of [3.20 (.16)] days, and mothers of non-obese female adolescents reported a physical activity frequency of 3.83 (.05) days. Mothers of female adolescents that were obese reported that their daughters spent [101.82 (2.13)] minutes watching TV and playing videogames while mothers of non-obese female adolescents reported that their daughters spent [128.66 (6.45)] minutes watching TV and playing videogames per day. Social capital was higher in environments of non-obese female adolescents [3.41 (.02)] than for obese female adolescents [3.17 (.05)]. Neighborhood safety was also higher in neighborhoods of non-obese female adolescents [3.39 (.02)] than for obese female adolescents [3.15 (.07)].

Table 4: Means (SE) by Childhood Obesity Status (n=10,881)		
	Obese	Non-Obese
CHILD PHYSICAL AND SEDENTARY ACTIVITY		
Physical Activity Frequency (days/week)	3.20 (.16)	3.83 (.05)
TV/DVD/Video Game Time (min/week)	101.82 (2.13)	128.66 (6.45)
NEIGHBORHOOD CHARACTERISTICS		
Social Capital	3.17 (.05)	3.41 (.02)
Neighborhood Safety	3.15 (.07)	3.39 (.02)

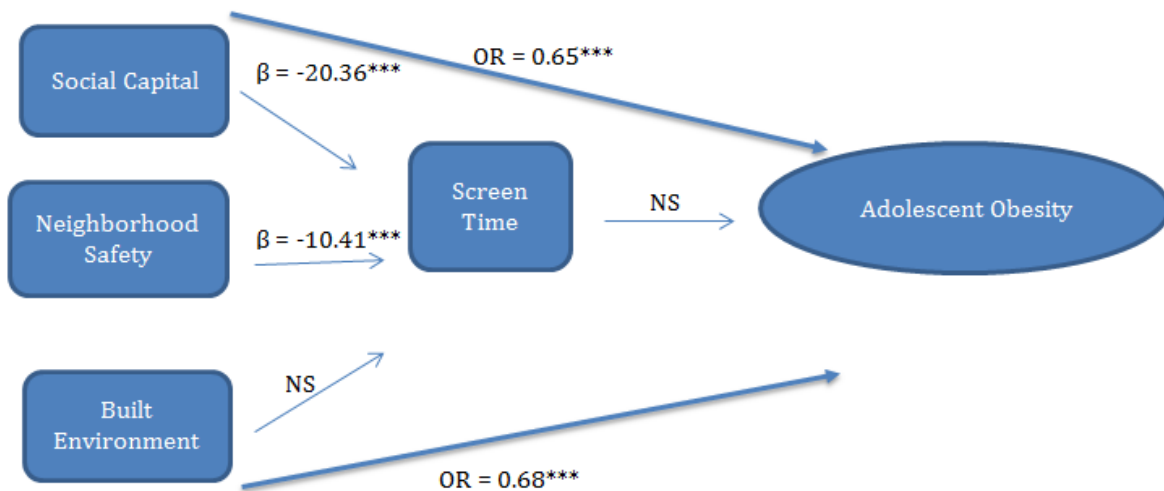
Regression associations between female adolescent physical activity and neighborhood characteristics. The association between physical activity in female adolescents and neighborhood characteristics is presented in Figure 5. These findings suggest that higher levels of social capital ($\beta = 0.47$) were related to higher levels of female adolescent physical activity. Higher levels of neighborhood safety ($\beta = 0.24$) were also related to higher levels of female adolescent physical activity. Built environment was not related to physical activity. Greater female physical activity was associated with reduced odds of having an obese status for female adolescents. Greater social capital was associated with a reduced odds of being obese as a female adolescent (OR=0.65). Greater neighborhood safety was associated with a reduced odds of being obese as a female adolescent as well (OR= 0.88). Built environment was also associated with a reduced odds of being obese as a female adolescent (OR= 0.68). Compared to adolescents with lower physical activity, adolescents with higher physical activity were less likely to be obese.

Figure 5



Regression associations between female adolescent sedentary activity and neighborhood characteristics. The association between female adolescent sedentary activity and neighborhood characteristics is presented in Figure 6. These findings suggest that higher levels of neighborhood social capital ($\beta = -20.36$) were related to lower levels of sedentary activity in the form of screen time. Higher neighborhood safety ($\beta = -10.41$) was also related to lower levels of screen time. Built environment was not related to screen time. Screen time was not significantly associated with adolescent obesity. Greater social capital was associated with a reduced odds of being obese as a female adolescent (OR=0.65). Built environment was also associated with a reduced odds of obesity in female adolescents (OR = 0.68). Neighborhood safety, conversely, was not significantly associated with adolescent obesity.

Figure 6



DISCUSSION

Female adolescents 12-17 years were more physically active in neighborhoods that had higher levels of neighborhood safety and social capital. Greater levels of physical activity were associated with reduced odds of being obese. There were also lower levels of screen time for female adolescents in neighborhoods that had higher levels of social capital and neighborhood safety. Screen time, however, was not significantly associated with obesity. The previously stated lack in association between screen time and obesity for adolescent females does not support the research findings on screen time found by Boone and Gordon-Larsen in their study “Screen time and physical activity during adolescence: longitudinal effects on obesity in young adulthood.” The findings from Boone and Gordon-Larsen suggested that less screen time was associated with a lower prevalence of obesity in females. This study, however, does suggest that neighborhood safety and social capital were predictors of physical activity and were associated with reduced odds in obesity status in female adolescents. The findings of this study are congruent with findings found by Kimm 2008 that studied the decline in physical activity in black girls and white girls. Both studies suggest that lower levels of social capital will lead to reduced levels of physical activity and will increase the likelihood of obesity.

The results of this study suggest that built environment is not significantly related in determining the activity patterns of female adolescents with both physical activity and screen time. However, built environment was associated with reduced odds of obesity in female adolescents. Many studies have sought to explore the role of built environments and physical activity such as the study done by Sallis in 2006. This study concluded that there was an association between built environment and physical activity. Conversely, other studies such as one exploring influence of social and physical environments by Franzini in 2009 have negated the association between built environment and physical activity. The influence of built environment on physical activity has been inconsistent as research has provided conclusions supporting and negating how built environment and physical activity are related. Consequently, further research will be needed in order to state a definitive conclusion (Ding, 2011; Sallis et al., 2006; Gordon-Larsen and Nelson, 2006). When focusing on the factors of built environment, which included the presence of amenities (i.e. recreation center, community center, or boys’ or girls’ club, libraries and book mobile), there was no association between the female adolescent activity patterns of physical activity and screen time. Built environment also was not significantly associated with obesity as well, confirming the findings of Franzini et al. from 2009.

Findings on neighborhood safety are also analogous with previous research that stated an association between higher levels neighborhood safety and higher levels of physical activity. The results of this study did not support the lack in association found between neighborhood safety and physical activity in the review of literature conducted by Davison in 2006. Research findings of neighborhood safety support lower levels of neighborhood safety in areas of lower socioeconomic status as concluded by Ding in 2011. Despite inconsistencies found in research, findings from this research study support the conclusion that higher levels of perceived neighborhood safety are related to higher levels of physical activity. It also supports the findings of research done by Franzini (2009) and Singh (2010) that concluded that higher levels of neighborhood safety were associated with a reduced risk of obesity. While this study cannot

confirm the odds of youth being obese or overweight to an exact percentage as done in by Singh in 2010 (it was stated the odds of being obese or overweight were 20-60% higher among children in neighborhoods with unsafe surroundings), results of this study do support a correlation between neighborhood safety and physical activity.

The strengths of this study include using a nationally representative data set, thus, the findings can be generalized to all females ages 12-17 years living in the United States. There were also separate constructs to outline adolescent activity patterns which included physical activity and sedentary activity. This allowed a wide spectrum of activity patterns to be accounted for. However, there were limitations to this study, which include using parental respondents of adolescents in the data set. Some results of the study could have been biased because there is no way to ensure that the information provided on the youth included in the data set is accurate. There were also limited data for the variables that were included in this study. For measures of neighborhood safety, screen time and weekly physical activity, only one item in the data set applied and could be used. It would have been more resourceful to have a wider range of questions in the data set about each of the measures listed. This would be useful in controlling the data and exercising more discretion on the part of the researchers thus allowing for more selectivity in choosing questions to best represent the measures.

For future research it would be interesting to examine the same question using males, specifically fathers and sons. Although the National Survey of Children's Healthy 2011-2012 data set is comprised of mostly maternal respondents for youth included in the study, it would be interesting to see how the results differ and what commonalities are shared. Further research could also include testing the same research question in different countries with different levels of industrialization using similar data sets to the National Survey of Children's Health for those countries to compare data to that of the United States. As a continuation of this research study, researchers would use another data set such as the National Health and Nutrition Examination Survey with the same stipulations used in this research study in order to gain access to more questions that would describe the measures of the study. In addition, controlling for socioeconomic status would lead to a better understanding of how the variables are correlated with each other. This research question could also be explored only using built environment as a predictor of female adolescent activity patterns to establish a definitive conclusion.

CONCLUSION

Results of this study suggest that female adolescents were more physically active in neighborhoods that had higher levels of neighborhood safety and social capital. Greater levels of physical activity were also associated with reduced odds of being obese. There were also lower levels of screen time for female adolescents in neighborhoods that had higher levels of social capital and neighborhood safety. Screen time, conversely, was not significantly associated with obesity. The results of this study suggest that built environment is not significantly related in determining the activity patterns of female adolescents with both physical activity and screen time. However, built environment was associated with reduced odds of obesity in female adolescents. The results of this study suggest and confirm the measures of social capital and neighborhood safety relating to physical activity. Neighborhood characteristics are also associated with reducing odds of obesity status.

APPENDICES

Appendix A: National Survey of Children’s Health 2011-2012 Data Set Questions

Construct	Variable Name	Label
Built Environment	K10Q13	Does a recreation center, community center, or boys’ or girls’ club exist in your community?
	K10Q14	Does a library or bookmobile exist in your community?
Social Capital	K10Q30	People in this neighborhood help each other out.
	K10Q31	We watch out for each other’s children in this neighborhood.
	K10Q32	There are people I can count on in this neighborhood
Neighborhood Safety	K10Q34	If my child were outside playing and got hurt or scared, there are adults nearby who I trust to help my child.
	K10Q40	How often do you feel [S.C.] is safe in your community or neighborhood?
Weekly Physical Activity	K7Q41	During the past week, on how many days did [S.C.] exercise, play a sport, or participate in physical activity for at least 20 minutes that made [him/her] sweat and breathe hard?
Screen Time	K7Q60	On an average weekday, about how much time does [S.C.] usually spend in front of a TV watching TV programs, videos, DVDs, or playing video games? (Length of time)

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