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Adolescent Sedentary Behaviors: Correlates Differ for Television Viewing and Computer Use

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 A B S T R A C T

Purpose: Sedentary behavior is associated with obesity in youth. Understanding correlates of specific sedentary behaviors can inform the development of interventions to reduce sedentary time. The current research examines correlates of leisure computer use and television viewing among adolescents in California.

Methods: Using data from the 2005 California Health Interview Survey, we examined individual, family, and environmental correlates of two sedentary behaviors among 4,029 adolescents: leisure computer use and television watching.

Results: Linear regression analyses adjusted for a range of factors indicated several differences in the correlates of television watching and computer use. Correlates of additional time spent watching television included male sex, American Indian and African American race, lower household income, lower levels of physical activity, lower parent educational attainment, and additional hours worked by parents. Correlates of a greater amount of time spent using the computer for fun included older age, Asian race, higher household income, lower levels of physical activity, less parental knowledge of free-time activities, and living in neighborhoods with higher proportions of nonwhite residents and higher proportions of low-income residents. Only physical activity was associated similarly with both watching television and computer use.

Conclusions: These results suggest that correlates of time spent on television watching and leisure computer use are different. Reducing screen time is a potentially successful strategy in combating childhood obesity, and understanding differences in the correlates of different screen time behaviors can inform the development of more effective interventions to reduce sedentary time.

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 IMPLICATIONS AND
 CONTRIBUTION

Reducing sedentary behaviors may decrease obesity risk among teens. This is the first study to examine the independent association of a range of factors with different screen time behaviors. Understanding differences in correlates can inform the development of more effective interventions to reduce total sedentary time by targeting specific behaviors.

Lack of physical activity and more time spent in sedentary behaviors are associated with obesity in youth [1–3]. Reducing time spent in sedentary behaviors may reduce the risk for obesity [4,5]. The American Academy of Pediatrics and other experts recommend that adolescents limit television and other screen time to no more than 2 hours per day [6,7]. However, the typical

adolescent is estimated to watch 2.5–3 hours of television per day and to spend an additional 1.5–2 hours using the computer [8]. In recent years, the amount of time adolescents spend in sedentary activities has increased largely because of increases in the amount of time spent using computers [8–10].

Studies examining correlates of sedentary behavior in youth typically examine factors associated with television viewing alone or with total screen time (television viewing and computer time combined) [11–14]. Few studies have examined the factors associated with television use and computer use separately [15,16]. However, the factors associated with time spent watching television

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may differ from those associated with time spent using the computer. Understanding these differences can inform the development of more effective interventions to reduce total sedentary time by targeting them to specific sedentary behaviors.

Previous research suggests that the factors associated with time spent watching television likely differ from those associated with time spent using the computer. Nelson et al found significant increases in computer use with no significant changes in television viewing from 1999 to 2004 [8]. More recently, a descriptive analysis conducted by Sisson et al examined age, sex, racial, and income differences in the prevalence of television viewing separately from computer use [15]. They found more time spent watching television among low-income adolescents and children, whereas time spent using the computer did not vary with income. In addition, television viewing varied more by race/ethnicity than did computer use.

To our knowledge, no study has compared the correlates of different screen time behaviors, while adjusting for a range of factors. However, Sisson et al have examined the association of different screen time behaviors with overweight status [16]. The present study uses population-based data to examine time spent using the computer separately from time spent watching television to determine whether the factors associated with each activity differ. This allows for the identification of populations with the highest prevalence of each type of sedentary behavior, which can further inform targeted interventions. Additionally, the analyses presented include a number of potential correlates of adolescent screen time not examined in previous studies. Individual sociodemographic characteristics, as well as family and environmental factors, are considered. Examining factors from multiple levels within an ecological model provides information useful for the development of strategies to reduce the amount of time adolescents spend in sedentary activities at both the individual and environmental levels.

Methods

Data source and population

This research used data from the 2005 California Health Interview Survey (CHIS), a random digit-dial telephone survey of >43,000 households designed to be representative of California's noninstitutionalized population. The 2005 data are the most recent CHIS data that allow the examination of total weekly screen time in conjunction with the range of sociodemographic, family, and environmental factors included in the current analysis. One randomly selected adult (aged 18 years or older) was interviewed in each household. In households with adolescents aged 12–17 years, one adolescent was randomly selected and interviewed directly after obtaining parental permission and assent from the adolescent. A total of 4,029 adolescents completed the survey, representing a completion rate of 48.5% [17]. Interviews were conducted in English, Spanish, Chinese, Vietnamese, and Korean. Detailed information about CHIS methodology is available elsewhere [18].

Outcome measures

Adolescent responses to four questions were used to assess the amount of time spent watching TV/playing video games and using the computer for fun: (1) "Thinking about your free time on Monday through Friday, on a typical day, about how many hours

do you usually watch TV or play video games (such as Playstation)?" (2) "Thinking about a typical Saturday and Sunday, about how many hours per day do you usually watch TV or play video games (such as Playstation)?" (3) "About how many hours per day on Monday through Friday do you use a computer for fun, not schoolwork?" and (4) "About how many hours per day on a typical Saturday or Sunday do you use a computer for fun, not schoolwork?" Responses were recorded as continuous variables. For each type of screen time, responses for weekdays were multiplied by 5 to reflect the total hours for Monday through Friday, and responses for weekends were multiplied by two to reflect the total hours for Saturday and Sunday. These were added together to estimate the total weekly hours for TV viewing/video game playing and for computer use. Similar measures have been used in previous research and were found to have good reliability and validity for adolescents [4,19–21]. Adolescents who reported having no television ($n = 4$) or no access to a computer ($n = 60$) were excluded from the corresponding analyses.

Correlates

The following sociodemographic characteristics were included: age, sex, race/ethnicity, household income, and adolescent work status. Additionally, analyses accounted for several key variables including the number of days during the past week that the individual was physically active for at least 60 minutes. In the adolescent survey, physical activity was defined as "any activity that makes your heart beat faster and also makes you breathe faster." Analyses included the following family characteristics: parental education, nativity, work status, adult presence after school, and parental knowledge of adolescent's activities during free time. Finally, analyses included the following neighborhood characteristics: urbanicity, parental perceptions of neighborhood safety, neighborhood income, and neighborhood racial composition.

Adolescents reported their age, sex, and race/ethnicity (white, Latino, Asian, African American, American Indian, mixed race). In addition, they reported the number of days in the past week that they were physically active for at least 60 minutes (0, 1–4, 5, or more); whether they worked in the past year (yes, no); how often an adult was present after school (always or most of the time vs. sometimes, almost never, or never); and how much parents knew about their whereabouts after school (a lot vs. little or nothing).

Household income, household address, parental educational attainment, parental nativity, parental work status, and perceptions of neighborhood safety were reported by the adult respondent. Household income was reported as a percentage of the federal poverty level: <200% versus \geq 200% [22]. Parental nativity was coded as both parents born in the United States, one parent born in the United States, or both parents foreign-born. Parental work status was examined as both parents work full time (including households with a single parent who works full time), at least one parent works part time, or at least one parent does not work outside the home. Parental educational attainment was coded as high school or less, some college, and college graduate. This variable represents the educational attainment of the responding parent only. Perceptions of neighborhood safety were based on ratings of how often the adult felt safe in the neighborhood (all the time, most of the time, and some or none of the time). Household address was used to determine the census tract in which a family lives. Data from the 2000 Census were linked by census tract to examine neighborhood income and

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