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History of Child Maltreatment and Excessive Dietary and Screen Time Behaviors in Young Adults: Results from a Nationally Representative Study

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Abstract

Child maltreatment is common and has been associated with substance use addictions, yet few studies have examined associations with potentially addictive dietary and screen time behaviors. The goal of this study was to assess associations between retrospectively self-reported child maltreatment (sexual abuse, physical abuse, emotional abuse, and neglect) and excessive self-reported dietary (sugar sweetened beverage and fast food consumption) and screen time behaviors (television/video watching and leisure time computer use) in early adulthood, overall and by sex and race/ethnicity. Associations were examined using data from 10,813 participants 24–32 years old from the National Longitudinal Study of Adolescent to Adult Health. We used predicted marginal proportions accounting for the complex sample design to obtain prevalence ratios (PRs) and adjusted for demographic characteristics and physical activity. In females, exposure to poly-maltreatment (2+ types of child maltreatment) was associated with excessive sugar sweetened beverage consumption, television/video watching, and leisure time computer use; in males, exposure to poly-maltreatment was associated with excessive sugar sweetened beverage consumption, television/video watching, and fast food consumption. Some associations were particularly strong in racial/ethnic minorities, especially Latina females (poly-maltreatment-sugar sweetened beverage association: aPR=6.14, 95% CI:2.12, 17.75; polymaltreatment-computer use association: aPR=3.08, 95% CI:1.44, 6.58). These findings show that child maltreatment is associated with excessive dietary and screen time behaviors into adulthood, and these associations are present in racial/ethnic groups at high risk of cardiometabolic disease. Extension of an addiction paradigm to include dietary and screen time behaviors may inform health risks and disease prevention efforts in child maltreatment survivors.

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Keywords

child abuse; diet; screen time; African Americans; Hispanic Americans

Introduction

Child maltreatment is a common experience. Nationally representative data from the Behavioral Risk Factor Surveillance System data show that 12%, 18%, and 34% of adults report being exposed to childhood sexual abuse, physical abuse, and emotional abuse, respectively¹ and the prevalence of physical and emotional neglect derived from meta-analysis are estimated at 16% and 18%, respectively.² Child maltreatment has been linked to a wide range of chronic conditions throughout the lifecourse, especially those related to cardiovascular disease.³ These include obesity that persists into adulthood,^{4–10} type-2 diabetes,^{10,11} hypertension,^{12,13} and heart disease.^{12,14} There is some evidence that these associations may vary by sex, as some studies have reported larger associations between child maltreatment and obesity⁶ and hypertension in females.¹³ Considering the high prevalence of child maltreatment and the increasing evidence of its association with cardiometabolic markers, it is important to understand what modifiable behaviors lead to this increased risk.

Negative coping behaviors may be an important factor in understanding why child maltreatment is associated with cardiometabolic risk. A large body of literature has shown that early life adversity, including child maltreatment, may negatively impact coping through several mechanisms. Some of these mechanisms include neurologic changes, impaired control and executive functioning, and self-regulatory behaviors^{15,16} Further, a substantial literature already has noted robust associations between child maltreatment and negative coping mechanisms in the form of substance use.^{17–24} An important aspect of substance use behaviors, besides their ability to serve as a coping mechanism, that may explain why they are robustly linked with child maltreatment is their addictive, persistent nature; the addictive aspect of substance abuse may reinforce these behaviors as coping mechanisms. It has been increasingly recognized that there are other negative coping behaviors beyond substance use with potentially addictive qualities.^{25–27} Specifically, there is evidence that consumption of high glycemic and fatty foods,²⁸ television watching,²⁹ internet use,³⁰ and internet gaming³¹ can turn into pathologically addictive behaviors, and these behaviors involve the same neurologic pathways that drive substance use addiction.^{32,33} Dietary and screen time behaviors are important behavioral targets for intervention since they are linked to poor cardiometabolic health through multiple mechanisms, including increased calorie consumption, sleep disturbances, and displacement of more physically demanding activities.^{34,35}

Although there is plausibility of a link between child maltreatment and potentially addictive unhealthy dietary and screen time behaviors, existing studies are limited in scope. The majority of studies evaluating associations between child maltreatment and excessive eating behaviors only consider clinically recognized eating disorders, namely binge eating disorder.³⁶ The limited studies that consider non-clinical forms of disordered eating include Mason³⁷

and Stojek³⁸, who report associations between child maltreatment and food addiction in females, and Greenfield,⁸ who notes associations between physical and psychological violence in childhood and subsequent use of food in response to stress in adulthood. Just one study in adults, which noted an association between child maltreatment and high dietary fat intake,³⁹ has examined specific dietary components, and a study of preschool age children noted an association with salty snacks, sweets, soda and fast food.⁴⁰ Furthermore, only a few studies examine links between child maltreatment and screen time behaviors, specifically internet gaming disorder and problematic internet use, and these studies do not assess screen time behaviors beyond adolescence.^{41,42}

Despite the lack of studies examining associations between child maltreatment and potentially addictive dietary and screen time behaviors in adults, there is a larger child maltreatment of literature supporting a link between broadly defined psychosocial stress, biological markers of stress, and unhealthy behaviors. This is especially true with respect to dietary behaviors. Stress leads to alterations in the hypothalamic- pituitary-adrenal axis and brain reward circuitry,⁴³ thus affecting food choices in an attempt to re-regulate or “medicate” these systems.^{44,45} Stress also increases consumption of high calorie “comfort” foods, namely those with high sugar and fat content,^{46,47} and females may be particularly susceptible to increased sugary food consumption as a coping response to stress.^{48–50} Screen time behaviors may also act as stress coping mechanisms,⁵¹ as recent studies indicate an association between screen time and psychosocial stress,⁵² and emotional distress^{53,54} in adults.

An additional limitation of studies of associations between child maltreatment and excessive behaviors is that they do not consider associations within racial/ethnic minority groups. This is an important knowledge gap since racial/ethnic minorities, especially Blacks and Hispanics/Latinos, are disproportionately burdened by poor cardiometabolic health^{3,55} and some behaviors associated with cardiometabolic risk (e.g., sugar sweetened beverage and fast food consumption) are also more prevalent in these groups.⁵⁶ Racial/ethnic minorities experience additional stressors such as racism and discrimination and these additional stressors may interact with stressors such as child maltreatment to further increase health risks.⁵⁷ Thus, it is important to understand the impact of child maltreatment on unhealthy behaviors within racial/ethnic groups.

The overall goal of this study was to evaluate associations between child maltreatment and excessive, potentially addictive behaviors linked with poor cardiometabolic health. In this study, we specifically examined dietary (sugar sweetened beverage and fast food consumption) and screen time (television/video watching and leisure time computer use) behaviors. Given the above described plausibility of differences in associations between child maltreatment and excessive behaviors by sex and race/ethnicity, we made an *a priori* decision to first stratify results by sex, then further stratify by race/ethnicity (Hispanic, Black, and White).

Methods

Study Population

The National Longitudinal Study of Adolescent to Adult Health (“Add Health”)⁵⁸ interviewed over 90,000 adolescents in grades 7 through 12 during 1994–95 in schools located in 80 communities throughout the United States. Selected schools were nationally representative of the US with respect to region of country, urbanicity, size, school type, and ethnicity. A subset of participants with sampling weights were followed up at home at ages 18–26 (Wave III, 2001–2002), and 24–32 (Wave IV; 2008–2009); our analyses were restricted to the 12,288 individuals who participated at these study time points and had sampling weights. For these analyses, participants were excluded if they were pregnant during Wave IV (N=421), and missing information on exposures, potential confounders, and outcomes (final analytic N= 10,813). Pregnancy was excluded because pregnant females often attempt to adopt healthier behaviors and physiologic changes associated with pregnancy impact behaviors (e.g., nausea, food cravings).^{59–61} The original data collection received Institutional Review Board approval, and permission to conduct secondary analyses was approved by the Emory University Institutional Review Board.

Outcomes

Four self-reported excessive behaviors assessed in Wave IV were examined as outcomes: sugar sweetened beverage consumption, fast food consumption, computer use outside of school/work, and television /video watching. sugar sweetened beverage consumption was assessed from the question, “In the past 7 days, how many regular (non-diet) sweetened drinks did you have? Include regular soda, juice drinks, sweetened tea or coffee, energy drinks, flavored water, or other sweetened drinks”. Fast food consumption, which is typically high calorie food that consists of high proportions of sugar, refined carbohydrates, and fat,⁶² was asked as, “How many times in the past seven days did you eat food from a fast food restaurant, such as McDonald’s, Burger King, Wendy’s, Arby’s, Pizza Hut, Taco Bell, or Kentucky Fried Chicken or a local fast food restaurant?”. Hours of television and video watching was asked, “In the past seven days, how many hours did you watch television or videos, including VHS, DVDs or music videos?”. Leisure time computer use was asked as, “In the past seven days, how many hours did you spend playing video or computer games, or using a computer? Do not count internet use for work or school”.

Given the lack of recommendations for clinically relevant cutoffs for these behaviors in adults, each outcome was operationalized as at or above the 90th percentile within the study population. A cumulative measure of the four behaviors was also examined (0, 1, and 2+ excessive behaviors).

Exposure Assessment

Six types of child maltreatment were measured: parent/caregiver perpetrated emotional, physical, and sexual abuse; neglect; and non-parent/caregiver perpetrated sexual abuse by non-physical threats and physical force (see Table A.1 for individual questions). All types of abuse were asked about in the Wave IV interview, and neglect and parent/caregiver physical and sexual abuse were queried at Wave III.⁵⁸ Since parent/caregiver physical and sexual

abuse were assessed at Waves III and IV, a participant was considered exposed if they endorsed exposure at either study wave. Participants were considered exposed to child maltreatment if it began <18 years old.

Child abuse (emotional, physical, sexual) subtypes were dichotomized into yes/no variables, based on previously defined cut points in the Add Health dataset.¹⁸⁶³ Any occurrences of neglect were defined as exposed. The primary measure of child maltreatment was a cumulative measure derived from the sum of individual child maltreatment measures (1 exposure versus no exposures and 2+ exposures (poly-maltreatment) versus no exposures). Poly-maltreatment is an exposure that has been noted as especially harmful.⁶⁴

Covariates/ Potential Confounders

Participant age at Wave IV, sex, race/ethnicity, parental highest level of education (a childhood socioeconomic status proxy), and physical activity (which is associated with both child maltreatment and excessive behaviors)^{4,65,66} were included as potential confounders. Parental education was assessed via parent interview if available and by the participant if there was no parent interview. Physical activity was measured as the sum of eight questions encompassing a wide range of activities,¹³ then dichotomized into any versus no physical activity in the last week. We did not adjust for body mass index or adulthood socioeconomic status indicators since variables may be mediators of the child maltreatment-diet relationship or induce collider bias, rather than serve as true confounders.

Statistical Analyses

The distribution of exposures, outcomes, and covariates/confounders was examined for the overall sample and by sex. Relationships between child maltreatment and excessive behaviors were calculated as adjusted prevalence ratios (aPRs) with predicted margins;⁶⁷ using SAS callable SUDAAN. Each of the four individual excessive behaviors were examined in separate models. For cumulative behaviors, we used multinomial models to compute PRs for 1 versus 0 excessive behaviors and 2+ versus 0 excessive behaviors. Models were initially stratified by sex, then by race/ethnicity and sex. For sensitivity analyses, we assessed associations between individual maltreatment exposures and behaviors. We also examined the impact of changing our cutoffs for excessive behaviors to the 50th and 75th percentiles. All analyses were conducted with complex sample weighting that accounts for the Add Health sampling design and loss to follow-up.⁶⁸

Results

Table 1 describes the distributions for child maltreatment exposures, cumulative behaviors, and demographic characteristics, both overall and by sex. Child maltreatment was relatively common and most types of child maltreatment were more common in females than males (e.g., prevalence of parent/caregiver sexual abuse in females= 9.36% versus 5.79% in males). More males than females reported engaging in two or more excessive behaviors. Table 2 shows the distributions of individual dietary and screen time behaviors. The distributions indicated that most participants engaged in at least some degree of dietary and screen time behaviors, and the cutoffs for the 90th percentiles reflected very high amounts of

these behaviors. All types of individual excessive behaviors were more common in males than females.

Table 3 shows associations between child maltreatment and individual excessive behaviors by sex. In females, exposure to one type of child maltreatment and poly-maltreatment were both associated with sugar sweetened beverage; poly-maltreatment was also associated with leisure time computer use and television/video watching. In males, exposure to poly-maltreatment was associated with excessive sugar sweetened beverage consumption, fast food consumption and, television/video watching.

Table 4 shows associations between child maltreatment and cumulative excessive behaviors. In females only, poly-maltreatment was associated with one excessive behavior. Experiencing one type of child maltreatment was associated with 2+ behaviors in males, and although less precise, the point estimate was similar in magnitude in females. Poly-maltreatment was associated with 2+ excessive behaviors in males and females (aPR= 1.52; 95% CI: 1.18, 1.97 and aPR=1.62; 95% CI: 1.09, 2.39, respectively).

Table 5 shows associations between child maltreatment and individual excessive behaviors stratified by race/ethnicity and sex. Among Hispanics, exposure to poly-maltreatment was strongly associated with sugar sweetened beverage consumption and computer use in females (aPR=6.14, 95% CI:2.12, 17.75 and aPR=3.08, 95% CI:1.44, 6.58, respectively), whereas in men, poly-maltreatment was strongly associated with fast food consumption. In Black men, most associations between poly-maltreatment and excessive behaviors were elevated, with all point estimates were above 1. In Black females, associations between child maltreatment and sugar sweetened beverage and leisure time computer use were only observed for experiencing one type of child maltreatment and point estimates were appreciably smaller in magnitude for poly-maltreatment. In White females, poly-maltreatment was associated with sugar sweetened beverage consumption and leisure time computer use. There were no significant associations between child maltreatment and excessive behaviors in white men and point estimates were generally smaller in magnitude, relative to minority men.

Table 6 shows associations between child maltreatment and cumulative excessive behaviors stratified by race/ethnicity. Poly-maltreatment was associated with 1 excessive behavior in Hispanic and White females. Although imprecise, the association between poly-maltreatment and 2+ excessive behaviors was strong in Hispanic females.

In supplementary analyses, when individual exposures were modeled with respect to excessive behaviors (Supplemental tables A.2–A.6), the majority of point estimates were above the null. The largest point estimates were observed for non-parent/caregiver sexual abuse, especially that which occurred by physical force (e.g., for leisure time computer use, aPR in men=2.02, 95% CI:1.27,3.23, aPR in women= 2.04, 95% CI:1.32, 3.15). When a 75th percentile cutoff was used to define excessive behaviors, point estimates were attenuated, relative to cutoffs using a 90th percentile cutoff and estimates were further attenuated using a 50th percentile cutoff, supporting a causal association between child maltreatment and excessive behaviors.

Discussion

In this study, we found positive associations between exposure to child maltreatment and multiple excessive dietary and screen time behaviors in young adult men and females. There was also variability in the size of the point estimates, with some PRs over 2 among racial/ethnic minorities, but most falling between 1 and 2. Also, the confidence intervals for several associations, namely those related to exposure to only one type of maltreatment, contained 1. These findings were robust to adjustment for sociodemographic factors and current physical activity. While there were associations between child maltreatment and excessive behaviors in White females, indicating the importance of child maltreatment as a risk factor for excessive unhealthy behaviors within this group, the presence of associations in Black and Hispanic participants is particularly noteworthy since they are at high risk of poor cardiometabolic health; elucidating risk factors within these vulnerable populations is of especially high public health importance.

The associations between child maltreatment and individual excessive behaviors are consistent with other findings in the literature. As previously noted, studies have reported increased sugar consumption, particularly in females, during times of stress.^{48–50} This aligns with the noted strong associations between child maltreatment and sugar sweetened beverage in females, although we also found associations in men. Our work extends previous findings of associations between child maltreatment and gaming and internet use^{41,42} into adulthood, but in men, this positive association was more pronounced for specific child maltreatment subtypes, rather than the cumulative child maltreatment measure. Regarding the stronger associations for sexual abuse, in a meta-analysis of the effects of child maltreatment on obesity,⁶ the largest point estimates were seen for sexual abuse, adding to the plausibility that this type of maltreatment may be more common in individuals engaging in obesogenic behaviors. Our finding of the strongest associations for non-parent/caregiver sexual abuse specifically agrees with another study evaluating birth outcomes in the Add Health study population.⁶⁹

While there is a dearth of literature describing relationships between child maltreatment and unhealthy dietary and screen time behaviors in racial/ethnic minorities specifically, studies considering a broader range of stressors support associations between stress and unhealthy eating behaviors within exclusively Black and Hispanic populations.^{70–72} As previously noted, it is plausible that additional stressors specific to minorities (e.g., acculturation stress and racism) may uniquely impair their ability to cope with the stressful impact of child maltreatment. Structural racism may also encourage unhealthy coping behaviors in Black and Hispanic survivors of child maltreatment. Minorities are more likely to live in neighborhoods with high concentrations of fast food outlets, thereby increasing access to fast food and unhealthy foods such as sugar sweetened beverages.^{73,74} Racial/ethnic disparities in lack of access to community green and recreational spaces may also impede adoption of exercise and other positive coping mechanisms, leading minorities to resort to unhealthy dietary and screen time coping behaviors.⁷⁵ Thus, strategies to counter unhealthy behaviors in survivors of child maltreatment who are racial/ethnic minorities may hinge, at least in part, on addressing acculturation stress as well as structural and interpersonal racism.

Strengths and Limitations

Our study has at least three important strengths. First, the Add Health study population is nationally representative of individuals who were enrolled in grades 7–12 in the United States. Second, Add Health collects data on a diverse number of child maltreatment exposures, and allows for distinctions by perpetrator for sexual abuse. Third, despite measurement limitations for our excessive behaviors, this is the only study we are aware of that has examined multiple behaviors, spanning both dietary and screen time behaviors, with respect to child maltreatment.

Despite these strengths, there are limitations. First, while there is a temporal relationship between child maltreatment and excessive behaviors, our analyses were cross-sectional in nature, limiting causal interpretations of our findings. Second, our data relied on self-reported child maltreatment and excessive behaviors, which may be prone to misclassification. The retrospective nature of our child maltreatment assessment, which relies on recall of events many years earlier, is vulnerable to recall bias in the context of a cross-sectional study, but in spite of this limitation, others have concluded that retrospective child maltreatment reports have reasonable validity.⁷⁶ These data were collected in early adulthood, meaning that recall error may have been less of a concern in our data as compared to retrospective reports from later in adulthood. Regarding excessive behaviors, participants were asked to recall dietary and screen time behaviors over the course of a week, which is also vulnerable to recall error. Questions for dietary behaviors were also imprecise, as participants did not quantify precise amounts of food/beverages they consumed (e.g., serving sizes). However, even with these sources of error, we note that the 90th percentile cutoff likely captured individuals who were engaging in high amounts of these behaviors. Third, Wave IV interviews were conducted in 2008–2009, when social media was relatively new and not as pervasive as in the 2010s; thus, data on computer use may not necessarily generalize to today. Further, although our 90th percentile cutoff captures individuals who engaged in very high amounts of these behaviors, we cannot truly identify addiction from data based cutpoints alone. Also, we did not have data available on timing of all child maltreatment measures, precluding our ability to examine periods of vulnerability. Finally, we had limited power to test for child maltreatment*sex*race/ethnicity interactions and there were wide confidence intervals in the race/ethnicity stratified associations, impeding our ability to formally evaluate disparities.

Conclusions

In conclusion, these findings offer evidence of associations between childhood maltreatment and potentially addictive unhealthy dietary and screen time behaviors. These findings also suggest that these associations are present in racial/ethnic groups that are at high risk of poor cardiometabolic health. Future research is needed to confirm and further expand on sex and race specific findings. Additional studies, especially those of a longitudinal nature, are also needed to replicate these associations and help establish causal relationships. If such studies support these findings, they may be important to informing specific avenues of behavioral modification that can mitigate the increased risk of cardiometabolic disease among survivors of child maltreatment. Trauma informed approaches have been applied successfully to treating substance use addictions⁷⁷ and could be starting points for informing strategies for a

broader range of addictions. Such strategies would also likely need to address factors such as acculturation stress and racism for maximum impact in minority populations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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List of Abbreviations

PR	prevalence ratio
PR	adjusted prevalence ratio

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Highlights

- Child maltreatment (CM) is linked with excess dietary and screen time behaviors.
- Female and male survivors of CM are vulnerable to multiple excessive behaviors.
- Associations between CM and excess behaviors are present in diverse racial groups.
- Future studies should explore disparities and moderating factors (e.g., racism).
- A broader addiction paradigm may inform health risks in CM survivors.

Table 1.**Study Population Characteristics**

Characteristic	Overall (N=10,813) Weighted Percent (SD)	Males (N= 5,021) Weighted Percent (SD)	Females (N=5,792) Weighted Percent (SD)
Parent/Caregiver Perpetrated Maltreatment			
Emotional Abuse *	27.51 (.61)	22.41 (.85)	32.55 (.90)
Physical Abuse	25.51 (.64)	25.80 (.99)	25.22 (.83)
Sexual Abuse *	7.58 (.40)	5.79 (.52)	9.36 (.56)
Neglect *	10.86 (.50)	13.61 (.75)	8.13 (.5)
Non-Parent/Caregiver Perpetrated Sexual Abuse			
By Non-Physical Threat *	7.13 (.39)	2.17 (.30)	12.16 (.71)
By Physical Force *	5.17 (.29)	1.48 (.25)	8.81 (.51)
Maltreatment Sum *			
0 Exposures	51.33 (.75)	54.44 (1.08)	48.26 (1.08)
1 Exposure	25.70 (.62)	26.48 (.96)	24.92 (.81)
2+ Exposures	22.97 (.61)	19.08 (.77)	26.81 (.90)
Sum of Excessive Behaviors *			
No Excessive Behaviors	68.29 (.94)	60.23 (1.25)	76.19 (.92)
1 Excessive Behavior	23.77 (.69)	28.47 (.91)	19.12 (.78)
2+ Excessive Behaviors	7.94(.46)	11.22 (.77)	4.70 (.39)
Demographics			
Age	Mean=28.72 (.12)	Mean=28.83 (.12)	Mean=28.60 (.12)
Race/Ethnicity			
Hispanic	11.39 (1.65)	11.82 (1.71)	10.97 (1.67)
Black	14.12 (1.87)	13.28 (1.82)	14.97 (2.02)
Other	3.08 (.35)	3.53 (0.38)	2.63 (0.35)
Asian	3.85 (.88)	4.02 (.89)	3.69 0.93)
White	67.55 (2.81)	67.35 (2.85)	67.75 (2.91)
Highest Level of Household Parental Education			
Less than High School	10.83 (1.17)	10.36 (1.25)	11.30 (1.21)
High School Graduate	26.71 (1.24)	25.85 (1.45)	27.55 (1.31)
Some College	29.74 (.94)	30.42 (1.16)	29.07 (1.04)
College Graduate (4 year degree +)	32.72 (1.84)	33.37 (1.95)	32.08 (1.96)
No Physical Activity in the Last 7 Days	14.12 (1.87)	12.21 (.7)	15.96 (.75)

* = Chi-square p-value <.01 for differences between males and females

Table 2.

Distributions of Dietary and Screen Time Behaviors

Behavior	Overall (N=10,813)	Males (N= 5,021)	Females (N=5,792)
Median Number of Sugar Sweetened Beverage Drinks Consumed in the Last Week	7	10	6
Median Number of Times Fast Food Consumed in the Last Week	2	2	1
Median Number of Hours of Television and Videos Watched in the Last Week	10	10	9
Median Number of Hours of Leisure Time Computer Use in the Last Week	0	1	0
90 th Percentile of Sugar Sweetened Beverage Drinks Consumed in the Last Week	30	35	28
90 th Percentile of Times Fast Food Consumed in the Last Week	6	6	5
90 th Percentile of Hours of Television and Videos Watched in the Last Week	28	29	25
90 th Percentile of Hours of Leisure Time Computer Use in the Last Week	10	15	6

Table 3.

Associations (PRs) Between Child Maltreatment and Individual Excessive Behaviors in Males and Females

	aPR (95% CI) Males (N= 5,021)	aPR (95% CI) Females (N=5,792)
Sugar Sweetened Beverage Consumption		
1 Maltreatment Exposure	1.08 (0.84, 1.39)	1.53 (1.13, 2.07)
2+ Maltreatment Exposures	1.33 (1.05, 1.69)	1.81 (1.32, 2.49)
Fast Food Consumption		
1 Maltreatment Exposure	1.10 (0.96, 1.45)	0.98 (0.72, 1.32)
2+ Maltreatment Exposures	1.38 (1.10, 1.73)	1.13 (0.84, 1.52)
Television/ Video Watching		
1 Maltreatment Exposure	1.17 (0.91, 1.49)	1.20 (0.88, 1.63)
2+ Maltreatment Exposures	1.35 (1.06, 1.71)	1.27 (1.01, 1.60)
Leisure Time Computer Use		
1 Maltreatment Exposure	1.23 (1.00, 1.52)	1.18 (0.81, 1.70)
2+ Maltreatment Exposures	1.23 (0.98, 1.54)	1.85 (1.34, 2.56)

Adjusted for age, race/ethnicity, parental education, lack of physical activity

Table 4.

Associations (PRs) Between Child Maltreatment and Cumulative Excessive Behaviors in Males and Females

	aPR (95% CI) Males (N= 5,021)	aPR (95% CI) Females (N=5,792)
1 Excessive Behavior (versus 0 Excessive Behaviors)		
1 Maltreatment Exposure	1.04 (0.89, 1.21)	1.11 (0.91, 1.36)
2+ Maltreatment Exposures	1.12 (0.97, 1.30)	1.33 (1.13, 1.58)
2+ Excessive Behaviors (versus 0 Excessive Behaviors)		
1 Maltreatment Exposure	1.32 (1.03, 1.70)	1.37 (0.88, 2.13)
2+ Maltreatment Exposures	1.52 (1.18, 1.97)	1.62 (1.09, 2.39)

Adjusted for age, race/ethnicity, parental education, lack of physical activity

Table 5.

Associations (PRs) Between Child Maltreatment and Individual Excessive Behaviors by Race/Ethnicity and Sex

	aPR (95% CI) Hispanic Males (N=819)	aPR (95% CI) Hispanic Females (N=858)	aPR (95% CI) Black Males (N= 912)	aPR (95% CI) Black Females (N= 1,287)	aPR (95% CI) White Males (N=2,761)	aPR (95% CI) White Females (N= 3,129)
Sugar Sweetened Beverage Consumption						
1 Maltreatment Exposure	1.60 (0.71, 3.61)	3.38 (0.84, 13.67)	1.80 (1.02, 3.18)	2.11 (1.19, 3.73)	1.02 (0.76, 1.37)	1.31 (0.90, 1.90)
2+ Maltreatment Exposures	1.81 (0.79, 4.18)	6.14 (2.12, 17.75)	1.76 (1.03, 3.00)	1.66 (0.81, 3.40)	1.31 (0.99, 1.74)	1.67 (1.13, 2.45)
Fast Food Consumption						
1 Maltreatment Exposure	1.64 (0.83, 3.27)	1.07 (0.52, 2.20)	1.44 (0.93, 2.22)	0.87 (0.54, 1.40)	0.98 (0.73, 1.31)	1.22 (0.72, 2.04)
2+ Maltreatment Exposures	2.58 (1.39, 4.78)	1.63 (0.74, 3.57)	1.69 (1.02, 2.78)	0.80 (0.47, 1.36)	1.10 (0.80, 1.50)	1.27 (0.77, 2.08)
Television/ Video Watching						
1 Maltreatment Exposure	1.03 (0.53, 2.01)	0.69 (0.30, 1.60)	1.47 (0.85, 2.53)	1.22 (0.85, 1.75)	1.22 (0.88, 1.68)	1.22 (0.78, 1.90)
2+ Maltreatment Exposures	1.12 (0.55, 2.26)	1.19 (0.61, 2.30)	1.57 (0.97, 2.55)	1.12 (0.76, 1.65)	1.38 (0.96, 1.99)	1.26 (0.92, 1.72)
Leisure Time Computer Use						
1 Maltreatment Exposure	1.09 (0.60, 1.99)	0.97 (0.32, 2.99)	1.77 (1.06, 2.95)	2.04 (1.23, 3.39)	1.13 (0.88, 1.46)	0.90 (0.53, 1.53)
2+ Maltreatment Exposures	0.87 (0.39, 1.93)	3.08 (1.44, 6.58)	1.69 (1.09, 2.61)	1.45 (0.82, 2.57)	1.13 (0.84, 1.53)	1.76 (1.13, 2.76)

Adjusted for age, parental education, lack of physical activity

Table 6.

Associations (PRs) Between Child Maltreatment and Cumulative Excessive Behaviors by Race/Ethnicity and Sex

	aPR (95% CI) Hispanic Males (N=819)	aPR (95% CI) Hispanic Females (N=858)	aPR (95% CI) Black Males (N= 912)	aPR (95% CI) Black Females (N= 1,287)	aPR (95% CI) White Males (N=2,761)	aPR (95% CI) White Females (N= 3,129)
1 Excessive Behavior (versus 0 Excessive Behaviors)						
1 Maltreatment Exposure	1.21 (0.78, 1.89)	1.11 (0.71, 1.73)	1.27 (0.92, 1.75)	0.94 (0.70, 1.26)	0.99 (0.81, 1.20)	1.22 (0.94, 1.60)
2+ Maltreatment Exposures	0.76 (0.43, 1.34)	1.59 (1.13, 2.24)	1.08 (0.81, 1.44)	1.07 (0.81, 1.42)	1.17 (0.98, 1.40)	1.40 (1.12, 1.74)
2+ Excessive Behaviors (versus 0 Excessive Behaviors)						
1 Maltreatment Exposure	1.55 (0.76, 3.16)	0.93 (0.15, 5.94)	1.81 (0.99, 3.29)	1.98 (1.21, 3.22)	1.23 (0.93, 1.64)	1.07 (0.57, 2.00)
2+ Maltreatment Exposures	2.42 (1.16, 5.07)	3.39 (0.92, 12.48)	2.36 (1.32, 4.23)	1.17 (0.64, 2.12)	1.25 (0.86, 1.80)	1.49 (0.87, 2.55)

Adjusted for age, parental education, lack of physical activity