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Examining the Influence of Facebook Ads on Black and White Adolescents' Food Purchases (s20-01796)

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Purpose of the Study and Background

Purpose of the Study

Poor diet and excess weight during adolescence predicts excess weight and diet-related cancers during adulthood, yet there is little research on the risk factors that contribute to weight gain among adolescents. The National Academy of Medicine identifies exposure to food advertisements (ads)as a major predictor of poor diet among children (<12 years of age) because studies have shown that children who are exposed to food ads consume more calories than children who are exposed to non-food ads. The few food ad studies that have included adolescents (13–17 years of age) found associations between self-reported exposure to television (TV)food ads and poor diet, but we do not know which mechanisms explain this relationship. It is also well established that food companies promote their least healthy products to Black consumers more than White consumers and perceive Black youth as trendsetters. But it is not known whether seeing racially congruent ads (i.e., the person in the ad and the viewer are the same race) places Black adolescents at higher risk of poor diet relative to Whites. Finally, most food ad research is based on TV ads, but food companies are increasingly targeting adolescents on social media. The overall objective of our three studies is to identify the extent to which exposure to Facebook food ads increases the number of calories purchased and consumed by Black and White adolescents. Guided by strong preliminary data, we will test three aims: 1)To evaluate the extent to which exposure to racially congruent vs. incongruent Facebook food ads causes Black vs. White adolescents to purchase more calories for a snack;2)To determine the extent to which exposure to many vs. few "likes" on Facebook food ads causes Black and White adolescents to purchase more calories for a snack; and 3)To test the degree to which visual attention to unhealthy foods, racially congruent people, and/or "likes" in Facebook ads explains the relationship between ad exposure and calorie intake.

Background

Clear diet-related disparities exist among adolescents in the United States, and poor diet is linked to colon, kidney, and liver cancers.[1],[2],[3],[4],[5],[6] Black adolescents have higher rates of overweight and obesity (38.2%) than White adolescents(26.3%)[7]and face higher risks for diet-related cancers later in life.[8]And the prevalence of obesity continues to increase among adolescents from low-income households, but not other income groups. Biologically, adolescents may make unhealthy food choices due to underdeveloped impulse control and greater neural sensitivity to reward in the nucleus accumbent compared to adults and children.[9] Psychologically, adolescents are more likely than adults to focus on the present instead of long-term health[10],[11]and a strong need to belong leads them to mimic cultural influences (e.g., social media, television [TV]).[12],[13]Further, the National Academy of Medicine identifies exposure to food advertisements (ads) as a major predictor of poor diet among children (<12 years of age), and eye-tracking studies show overweight children visually attend to food ads more than non-overweight peers.[14]But far less is known about the influence of food ads on adolescents (age 13–17 years).[15], Some studies show adolescents' self-reported food ad exposure is linked with poor diet,[16],[17],[18]but we do not know which mechanisms explain this relationship. It is also well established that food companies promote their least healthy products to Black consumers more

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[15] Cairns G, Angus K, Hastings G, Caraher M. Systematic reviews of the evidence on the nature, extent and effects of food marketing to children: A retrospective summary. *Appetite*. 2013;62:209-215.

[16] Scully M, Wakefield M, Niven P, et al. Association between food marketing exposure and adolescents' food choices and eating behaviors. *Appetite*. 2012;58(1):1-5.

[17] McClure AC, Tanski SE, Gilbert-Diamond D, et al. Receptivity to television fast-food restaurant marketing and obesity among U.S. youth. *Am J Prev Med*. 2013;45(5):560-568. PMCID: PMC3934414.

[18] Story M, Neumark-Sztainer D, French S. Individual and environmental influences on adolescent eating behaviors. *J Am Diet Assoc*. 2002;102(3 Suppl):S40-S51.

than White consumers[19],[20],[21],[22],[23],[24],[25]and perceive Black youth as trendsetters.[26]But it is not known whether seeing racially congruent ads(i.e., the person in the ad and the viewer are the same race) places Black adolescents at higher risk of poor diet relative to White adolescents. Finally, most food ad research is based on TV ads, but social media is a new advertising frontier that may pose serious health risks. Adolescents' daily social media use (2.0 hours) now rivals time spent watching TV (2.6 hours),32>90% of them use social media,[27]and they command $175billion in spending power.[16]And global expenditures for social media ads have now surpassed $35billion annually.[28]

Study Design

The overall objective is to determine the extent to which racially congruent Facebook food ads influence adolescents' food purchases and actual caloric intake. We will accomplish these objectives by conducting three randomized controlled trials (RCTs). The first two aims trials will involve 15-minute online surveys in which participants (Black and White adolescents) will rate ads then complete a "food purchasing" task through a virtual vending machine. The third trial will involve an in-person, hour long lab study where participants will be shown ads while investigators covertly monitor their eye movements. The first RCT will answer the research question "Does exposure to racially congruent vs. incongruent Facebook ads for unhealthy foods cause Black (vs. White) adolescents to purchase snacks with more calories?". The second RCT will answer: "Does exposure to many "likes" (vs. few "likes") on Facebook ads for unhealthy foods lead to even higher calorie purchases for both Black and White adolescents?". Lastly, the hour-long study will answer the question: "To what extent does the visual attention to foods vs. people vs. "likes" in ads predict adolescents' caloric intake?" (Aim 3). For the first two online survey trials, we will measure the average calories purchased for a snack and for the last trial we will measure the average calories consumed.

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Characteristics of the Research Population

Number of Subjects

For this study we intend to recruit a total of 3,032 adolescents (1,252 in Aim 1; 1,300 in Aim 2; and 480 in Aim 3—the in-person lab study). Participants will be selected through Dynata, a survey firm. A power analysis was conducted to determine the sample size in which the size of 1,252 participants provides 80% power to detect an effect size of 0.2 SD between conditions.

Gender of Subjects

We will recruit males and females because research shows pre-adolescent males consume more fast food than females. We will therefore examine differences in responses based on sex. Adjustment of primary analysis will be undertaken to accommodate any imbalances.

Age of Subjects

We intend to recruit a total sample of 3,032 adolescents ages 13-17 years. This age group is chosen as a follow up to the online within-subject pilot experiment and because of the purpose of the study being to gain more knowledge specifically on how targeted ads affect this age group.

Racial and Ethnic Origin

We will recruit 3,032 adolescents that identify as only non-Latino White or only Black/African American. The purpose being that targeted ads usually appeal to Black youth in particular. This marketing tactic is a potent one worth further investigation since most of the targeted ads are for unhealthy foods. And black adolescents experience higher rates of obesity and report higher social media use than their peers. We will use the White participants as a comparison group since they are featured in most ads and are, therefore, unlikely to experience heightened effects from racially targeted ads. There are plans to study other racial/ethnic groups in future research, but we would not be adequately powered in this proposal to understand the effects for each racial/ethnic group.

Inclusion Criteria

Participants must: 1) be 13–17 years of age; 2) identify as only non-Latino White or only Black/African American; 3) report that they log into Facebook at least once daily; and 4) read and speak English. We will include the SCOFF[29], screening tool—a five-item, validated eating disorders assessment—at the end of the study. We will not exclude adolescents who report symptoms. If a participant reports having symptoms, we will provide them resources as described in our Human Subjects attachments.

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[29] Hill LS, Reid F, Morgan JF, Lacey JH. SCOFF, the development of an eating disorder screening questionnaire. *Int J Eat Disord*. 2010;43(4):344-351.

Exclusion Criteria

Any criteria not met as listed above will bar an adolescent from participating in the study.

Vulnerable Subjects

In this study we will include 13–17 year olds because they are the target population and highly susceptible to targeted food ads.

Methods & Procedure

Aim 1: After obtaining parental permission and assents, participants will view and rate 18 ads in the online survey. They will view and rate one ad before viewing and rating the next ad. They will then complete the food purchasing task. In this task, six foods and six beverages from the brands that target adolescents the most will appear in a virtual vending machine embedded in the online survey. Half of the food items will be healthy snacks and half will be unhealthy, as scored by the Nutrient Profile Model, a validated nutrition rating tool designed by nutritionists and used in public health studies. Three of the beverages will be sugar-sweetened beverages and three will be the zero-calorie versions of those sugar-sweetened beverages. Participants will select one food item and one beverage they would like to consume. To incentivize actual purchasing behavior, we will tell them we will provide $8 for their snack purchases and they can keep any money they choose not to spend. We will also tell them that we will mail the items to their home. This approach will incentivize adolescents to consider the trade-offs of keeping money vs. spending it on snacks, which is more representative of real-world purchasing behavior. In reality, we will provide the $8 at the end of the study instead of mailing the items. After the food purchasing task, participants will complete demographic questions and then receive $25 for participating and $8 for their snack purchases

Aim 2: Parental consent and adolescent assent process will be obtained as described for Aim 1. After providing assent, participants will be randomized to view and rate 18 racially congruent Facebook food ads that feature many (>10,000) or few (<100) “likes.” After viewing each ad, they will complete the ad rating questions for that ad (Table 2) before proceeding to the next ad. Participants will then complete the same food purchasing task described in Aim 1(section E.3.4.). Finally, they will complete the demographic questions. At the end of the study, they will view a debriefing statement similar to the statement from Aim 1 (sectionE.3.4). Dynata will then provide each participant with $25 compensation and $8 for the purchased snack products.

Aim 3: Participants will visit our collaborator Dr. Balcetis in her lab —located at NYU Washington Square Campus—and sit in front of a Tobii eye-tracking computer. The computer monitor displays an advertisement and youth view it as they would any other type of document on a computer. Eye-tracking technology allows for the documentation of fixations, an objective measure of attention, which occurs when an individual pauses to examine or interpret a component of an advertisement or image. The Tobii eye tracking device allows moderately free head movements. It returns a real-time estimate of the left and right eye gaze positions on the screen, as well as the 3D position of the two eyes with respect to the screen center. After obtaining consent and assent in-person, we will ask

participants to “answer a few questions about how they are feeling today” and hunger will be one of the items they rate, which will allow us to unobtrusively measure baseline hunger and control for it during analyses. We will then tell them that we will show them a series of images that are for their viewing pleasure, and that we have snacks and a drink they can enjoy as a thank you for participating. Participants will view 30 ads per block that appear at a predetermined rate to hold total viewing time constant across all ads. Researchers will calibrate the eye-tracking computer using a guise developed by our collaborator Dr. Balcetis that asks the participant to count the number of times a ball bounces on the screen (n = 6), "so you can take a moment to let your mind rest after rushing through the busy city to arrive at the lab today." Dr. Balcetis has used this technique on >1,000 participants and <1% noted suspicion.

During the eye-tracking task, snacks will be positioned in bowls on a Cardinal Detecto stainless steel scale that looks like a serving tray but transmits weight information wirelessly to the control room. Similar to previous food ad studies,[30],[31],[32]we will include two unhealthy snacks and two healthy snacks with a 20-ounce bottle of water. The unhealthy snacks will include M&Mcandies (high-fat, sweet) and Doritos chips (high-fat, savory). The healthy snacks will include Quaker Rice Cakes (low-fat, savory) and grapes (low-fat, sweet). To minimize the risk of ceiling effects (i.e., where participants eat all the food), we will include 150g of each snack: M&Ms (296-ml bowl), Doritos and Quaker Rice Cakes (1,419-ml bowls), and grapes (473-ml bowl).Our pilot data also suggest—and a systematic review reinforces[15]—that most participants eat during food ad studies. To conclude the study, participants will complete demographic questions (Table 1). We will use a funneled debriefing procedure to ask participants what they believed was the purpose of the study so we can test for moderation of effects as a function of awareness during analyses. We will disclose the purpose of the study, solicit questions, conduct a second assent procedure after disclosing eye-tracking was used and was ethically approved, and provide the same information from the debriefing form in Aim 1 and 2 (section E.3.4). Finally, we will distribute $35 compensation in cash and subway/bus fare to cover travel costs. Those who travel by other means will also receive the travel fare.

Data Analysis

Aim 1- Statistical considerations: Power and sample size: We wish to have adequate power to detect a difference of ~20% in calories purchased between the groups. Data from studies on adolescents’ snack choices indicated an average of 400–600 calories. Thus, we wish to detect a between-group difference of ~100 calories. Estimates of standard deviation of food choices vary widely. Most estimates are 100–300 calories, but to be conservative, and because we do not have direct data on purchases in an online survey, we assume a standard deviation of 400calories. Accounting for participants who fail the attention check item, and using a two-sided Type I error rate of 0.017to control the experiment-wise error rate to 0.05, a final sample size of 1,252 participants (100 pre-test participants that will not be part of the final sample, plus 288 per group in each of the four conditions =

[30] Harris JL, Bargh JA, Brownell KD. Priming effects of television food advertising on eating behavior. *Health Psychol*. 2009;28(4):404-413.

[31] Dias M, Agante L. Can advergames boost children’s healthier eating habits? A comparison between healthy and non-healthy food. *J Consumer Behav*. 2011;10(3):152-160.

[32] Harris JL, Speers SE, Schwartz MB, Brownell KD. US Food Company Branded Advergames on the Internet: Children’s exposure and effects on snack consumption. *Journal of Children and Media*. 2012;6(1):51-68.

1,252 total participants)provides 80% power to detect a difference of 80 calories between the groups who see racially congruent vs. racially incongruent ads. This sample size also provides 80% power to detect a difference of 113 calories between White adolescents who see racially congruent ads and Black adolescents who see racially congruent ads. Secondary outcomes: This sample size provides 80% power to detect an effect size of 0.2 standard deviation (SD)between outcomes. Analytic plans: Descriptive analyses: All data will be summarized prior to analysis, using means, medians, ranges, and standard deviations for continuous variables and frequencies for categorical variables. BMI-z scores, which a readjusted for age and sex, will be calculated using Centers for Disease Control growth charts. Participants who fail our data integrity check questions will be excluded. This is expected to be ~9% of participants based on our pilot studies and previous work with adolescents.[33]We will assess balance by randomization status with respect to demographic and behavioral factors. Adjustment of primary analyses will be undertaken to accommodate any imbalances

Analysis of primary outcome: Linear regression will be used to evaluate whether the number of calories purchased by the adolescents who viewed racially congruent ads differs from those who viewed racially incongruent ads. If the calorie count data are skewed, a suitable transformation (e.g., log) will be applied to improve the approximation of normality. To evaluate our hypothesis that Black adolescents—compared to White adolescents—will purchase more calories after viewing racially congruent ads, an additional model will also include a term for participant race, as well as an interaction term between participant race and ad congruence to determine if there is a differential association. We will also run all models controlling for eating restraint and presence of eating disorders symptoms to examine if those factors affect the number of calories purchased by adolescents. Analyses of secondary outcomes: We will use linear regression models that include participant race, racial congruence, and the interaction of the two as predictors; emotional responses to the ads and time spent viewing ads will be our outcomes. To investigate affective responses to the ad as a potential mediator for the relationship between the type of ad viewed and calories purchased, an additional model will include participant race, racial congruence of the ads, and an interaction term, as well as affective responses to the ads as predictors of calories purchased. We Will assess whether associations between calories purchased and the racial congruence term and the interaction between racial congruence and participant race term are weakened by the addition of affective response to the model. We will use the Bonferroni-holm procedure to correct for multiple comparison

Aim 2- Statistical considerations: Power and sample size: We wish to have adequate power to detect a difference of ~20% in calories purchased between the conditions. As in Aim 1, we use data from studies on adolescents' snack selections to inform power calculations. Using a two-sided Type I error rate of 0.017 to control the experiment-wise error rate at 0.05, assuming a SD of 400 calories, and accounting for some participants to fail an attention check item, a sample size of 1,200 participants (600 in each of two conditions = 1,200 total, not including the 100 pretest participants) provides 80% power to detect a difference of 78 calories between teens viewing ads with many "likes" vs. few "likes." This sample size also provides 80% power to detect a difference of 110 calories between White adolescents and Black adolescents who see ads with many "likes." Secondary outcomes: This

[33] Bragg MA, Miller AN, Kalkstein DA, Elbel B, Roberto CA. Evaluating the influence of racially targeted food and beverage advertisements on Black and White adolescents' perceptions and preferences. *Appetite*. 2019;140:41-49.

sample size provides 80% power to detect an effect size of 0.2 SD between conditions. Analytic plans: Descriptive analyses: Data will be summarized as described in Aim 1. We will assess balance by randomization status with respect to demographic and behavioral factors. Adjustment of primary analyses will be undertaken to accommodate any imbalances. Primary outcome: Linear regression will be used to evaluate differences in the mean calories purchased between conditions, with appropriate transformations to improve the approximation of normality if necessary. To explore whether the effect of many vs. few “likes” varies by race, we will include participant race as a main effect, as well as an interaction term between race and condition. We will also use linear regression to adjust for demographic and behavioral characteristics to investigate how these factors relate to responsiveness to ads. We will also conduct sensitivity analyses to control for the presence of eating disorder symptoms measured at the end of the study. Finally, participants who fail our data integrity check questions will be excluded. This is expected to be <9% of participants based on our pilot studies. Secondary outcomes: We will use linear regression models to assess the relationships between the number of “likes” on the ad and cognitive and emotional responses as well as time spent viewing ads. We will evaluate whether the association between the number of “likes” and calories consumed is moderated by affective responses to the model. The Bonferroni-Holm procedure will be used to correct for multiple comparisons.

Aim 3- Statistical considerations: Power and sample size: We based our sample size on the expectation of a racial congruence effect that is small in size for White adolescents (0.2) and larger for Black adolescents (0.3). West our final sample size with the requirement of 80% power to detect the smallest correlation coefficient (at least 0.2) within each group (i.e., 200 Black and 200 White adolescents provide adequate power).Analytic plans: We will follow data cleaning procedures for eye-tracking data established by our collaborator Dr. Balcetis for handling data loss or calibration issues.[34]The sampling rate—the proportion of time eyes are directed at the screen—must equal 80% or higher. Participants with <20% sampling rate will be eliminated (typically <5% of participants). Sampling Rates can be low because some rare types of cornea refractions and contact lens types impair the reflection of light the system measures. To account for nonindependence in consumption across blocks, we will conduct analyses using the MIXED procedure in SPSS, and calculate degrees of freedom using a Satterthwaite correction to predict consumption as a function of ad type within blocks 1–4 and separately blocks 5–8. We will include the random intercept of participants, the random intercept of block order, and the random slope of block order to account for linear changes in consumption over time. We will use linear regression to predict calorie intake from visual attention to race-relevant ad features, product, and “likes” for Black and White adolescents

Data Monitoring

The database will be secured with password protection. The study manager will receive only coded information that is entered into the database under those identification numbers. Electronic communication with outside collaborators will involve only unidentifiable information.

The PI and/or study staff will review all data collection forms on an ongoing basis for data completeness and accuracy as well as protocol compliance.

[34] Granot Y, Balcetis E, Schneider KE, Tyler TR. Justice is not blind: visual attention exaggerates effects of group identification on legal punishment. *J Exp Psychol Gen*. 2014;143(6):2196-2208.

Review of the rate of subject accrual and compliance with inclusion/exclusion criteria will occur monthly during the 4-month recruitment phase and then every 3 months to ensure that a sufficient number of participants are being enrolled and that they meet eligibility criteria and the targeted ethnic diversity goals outlined in the grant proposal.

Data on adherence to the treatment protocol will be collected once and reviewed by research staff, the PI, and the study statistician. Adherence of participants will be evaluated by completing the study. If a participant does not sign the assent form, they will be informed that they cannot participate in the study

This study will be stopped prior to its completion if: (1) the intervention (i.e., exposure to food ads) is associated with adverse effects that call into question the safety of the intervention; (2) difficulty in study recruitment or retention will significantly impact the ability to evaluate the study endpoints; (3) any new information becomes available during the study that necessitates stopping the study; or (4) other situations occur that might warrant stopping the study.

Because our study involves a 15-minute online survey experiment where participants view and rate Facebook food ads, as well as the use of an eye-tracking computer, we do not anticipate the need for an independent monitor nor a study report outline.

Data Storage and Confidentiality

During this study, participants will view racially congruent or incongruent Facebook ads and answer survey questions about them. Afterwards, participants will complete a food purchasing task and answer demographic questions. All of the material collected are for research purposes only, and data will be kept in strict confidence. Demographic and survey data will be collected using Qualtrics, a survey software company that hosts the survey data. Qualtrics Enacts several safeguards to protect online data. Qualtrics FedRAMP certified which is one of the highest non-military security programs for security certifications. FedRAMP was initially designed to asses, authorize, and monitor cloud software providers and protect the data housed in federal agencies but has since expanded to protect third-party platforms and systems, like Qualtrics. Finally, our consent and assent form will inform parents and adolescents that although a data breach is possible, it is unlikely. No information will be given to anyone without permission from the subject. The consent and assent forms include the informed consent and assent statements required by New York University School of Medicine for studies Involving Adolescents. This statement guarantees confidentiality and identifies the subject as the owner of the information from the collected data Furthermore, since this is a NIH-sponsored study, we will be issued a Certificate of Confidentiality which prohibits the disclosure of identifiable, sensitive research information to anyone not connected to the research. Confidentiality will also be ensured by use of identification codes. All data will be identified with a randomly generated identification code unique to the subject. B. Database Protection The database will be secured with password protection. The study manager will receive only coded information that is entered into the database under those identification numbers. Electronic communication with outside collaborators will involve only unidentifiable information. Confidentiality During Adverse Event (AE) Reporting we do not anticipate the occurrence of adverse effects because the study is an online survey study where adolescents will view and rate food ads. Still, AE reports and annual summaries will not include subject-or group-identifiable material. Each report will only include the identification code.

All participant responses will be anonymous. For the study, only the PI will have access to identifiable private information and participant data, which will only be used for research purposes. Other members of the research team will have access to identifiable private information for the purposes of recruitment and scheduling or participant data, but not both

Specific study team members will be in charge of ensuring quality of collected data. During data collection, study team members will record themselves to be reviewed by the data management team to ensure adherence to the study protocol across study team members. The data management team will also review uploaded survey responses for completion and address any issues noted by the study team member. Additionally, study team members will be trained to record any anomalies during the participant interactions and/or data collection that could impact the quality of the data collected (e.g. interruptions of the survey, posters at location encouraging healthy eating, the participant mentioning that they are anticipating a big meal following the survey).

The data containing private information will be stored on RedCap . Only authorized study staff will have access to the study data. One RedCap data collection project will be, and a separate project will be used store etc.). This ensures that the personally identifiable information and research data are segregated. Data users on the research team must agree to restrictions against attempting to identify study participants, destruction of the data after completing their analyses, reporting responsibilities, and proper acknowledgement of the data resource. Any computers holding data will be stored in a locked office.

Study records that do not hold PI or PHI will be collected in a binder that will be stored in a locked cabinet in a locked office. The principal investigator and all other study team members will have access to this binder. Study records including consent forms, assent forms, receipt forms, and any other documentation containing PI or PHI will be put in participant packets and stored in a locked cabinet in a locked room. The Principal Investigator and study team members designated to deal with identifiable information will have access to these packets.

Study documents will be retained for the longer of 3 years after close out or 5 years after final reporting/publication. These documents should be retained for a longer period, however, if required by local regulations. No records will be destroyed without the written consent of the sponsor, if applicable. It is the responsibility of the sponsor to inform the investigator when these documents no longer need to be retained.

Risk/Benefit Assessment

The risks associated with this study, if any, are considered to be minimal and are addressed in the protocol and consent form. There may be some discomfort when using an eyetracker, but reports of this are minimal. Further, participants may experience boredom or irritation when completing the online surveys and other tasks embedded within them. Participants and their caregivers will be

informed that an online data breach is possible, though not likely, and that no identifying information will be collected during the study. Exposure to food ads during in-person lab experiments is known to increase consumption of unhealthy foods among children during the 30–60-minute period after ad exposure. During such studies, researchers provide the snacks in order to measure how many calories are consumed in response to food and exposure. This study does not provide snacks to participants, but it's still possible that participants of this study may consume unhealthy foods in response to seeing food ads in our study. Because we are providing a small dose of ad exposure compared to what adolescents view over the course of a week or more, it is unlikely that participating in this study would have longer-term negative influences on participants' diets. To inform adolescents of the possibility that viewing food ads may cause them to eat more calories after the study than they would have otherwise, we will also describe in an online debriefing statement that in-person lab studies involving food ad exposure have shown that children eat more unhealthy snacks in response to seeing food ads compared to non-food ads. The debriefing form will also state that it is possible that participants will experience a desire to consume more food during the 30–60 minutes after the study and should aim to select healthy options such as water, whole fruit, or nuts. The measures taken to reduce any associated risks will be protecting participant information. The study statistician, PI, and Independent Monitor will review adverse event rates monthly. Any Adverse event will be reported to the NYU IRB and NIH.

Subject Identification, Recruitment and Consent/Assent

Process of Consent

Aims 1–2

Informed Consent: Electronically signed informed consent will be obtained from each parent/primary caregiver and an electronically signed assent form will be obtained from each subject at entry into the study. Informed Consent is obtained by the following process:

1.Dynata, the online survey company who will recruit participants, will send a consent form to a primary caregiver.
2.Once the caregiver reviews the form and consents their adolescent's participation, Dynata will email the adolescent with the assent form and survey.
3.After reviewing the study and agreeing to participate, the adolescent will sign the assent form and begin the survey

Informed consent/assent and debriefing procedures: Parents whose adolescents are eligible for the survey will receive a link to the informed consent form; if they sign it, then the adolescent will receive a link to an assent form. This will be done through Dynata, a survey firm that maintains an online participant panel of adolescents and adults in the U.S. We have recruited thousands of adolescents through Dynata for pilot research and published studies.[34,35] Dynata conducts a rigorous, three-step

[35] VanEpps EM, Roberto CA. The Influence of Sugar-Sweetened Beverage Warnings: A Randomized Trial of Adolescents' Choices and Beliefs. *Am J Prev Med*. 2016;51(5):664-672.

recruitment process. First, randomly selected participants who are already members of Dynata's panels are combined with a pool of potential participants who are joining Dynata for the first time after responding to online recruitment materials. Participants will be told in the assent form that researchers are interested in learning about their opinions of social media and consumer brands. This minor deception (i.e., they will not be told the study is about food choices until the end) is commonly used with children in food and research and has been approved by the IRB at NYUGSoM for our previous studies (s19-01102 Ethnically Diverse Study and s15-00879 NYU Media Project).

Aim 3

In Study 3, the consent form will explain to caregivers the potential risks of the study and what measures have been taken to mitigate these risks. The form will also detail the use of personal information and will explain the removal of identifying information. Caregivers will be asked to sign the consent form, indicating that they understand the risks and preventative measures and that they give consent for the researchers to survey their adolescent and obtain assent.

Our research team will then confirm the adolescent's assent in-person to participate in the study. Before assenting, though, members of our research team will speak with the adolescent about the potential risks, the preventative measures to assess those risks, and the removal of any identifying data. During the study, two researchers will supervise each participant.

Debriefing Procedures

At the end of the study, participants will view a debriefing statement explaining the study's purpose. We will use a funneled debriefing procedure to ask participants what they believed was the purpose of the study so we can test for moderation of effects as a function of awareness during analyses. We will disclose the purpose of the study, solicit questions, conduct a second assent procedure after disclosing eye-tracking was used and was ethically approved, and provide the same information from the debriefing form in Aim 1 and 2.

To inform adolescents of the possibility that viewing food ads may cause them to eat more calories after the study than they would have otherwise, we will also describe in the online debriefing statement that studies have shown that viewing food ads can increase caloric intake among youth, and they should try to choose healthy options such as water, whole fruit, or nuts if they experience a desire to snack after the study. Dynata will then provide each participant with $25 in gift cards for participating and $8 petty cash for the snacks they purchased.

Costs to the Subject

Participants will not incur any costs for the first two trials. We will distribute $35 compensation via gift cards and reimburse travel costs for the third aim .

Payment for Participation

For Aims 1 and 2- After the food purchasing task, participants will complete demographic questions and then receive $25 in gift cards for participating and $8 petty cash for their snack purchases.
For Aim 3- Participants will receive $35 compensation via gift card. We will reimburse participants for any travel costs. To compensate community sites for recruitment assistance, we will provide each site an $800 honorarium via check.