

Abstract

In Western cultures, thinness is equated with beauty. In order to obtain a thin physique, many women engage in restricted eating, particularly for food high in sugar and fats. Although sugar is considered a forbidden food, previous research revealed that the consumption of sugar-rich solutions can lead to decreased concerns about body size and lowered fear of fatness (Jacobi, Fante, & Bray, 2012). However, ethnic differences in response to sugar consumption with regard to body image have been noted (Jacobi, Taylor, & Fante, 2014). The current research was interested in the effects of sugar consumption and ethnicity on females' body image. A 3x3 between-groups design was utilized to examine the effects of consumption condition (sugar, salt, water) and race (Black, White, Hispanic) on body image. Female participants were randomly assigned to complete a magnitude estimation (ME) task with one of the three solutions. The ME task was designed to expose participants to one of the three solutions (sugar, salt, or water) without a direct focus on body image. After finishing the perception task, participants completed a series of well-validated body image measures. Race differences were found across the majority of the measures, where Black females expressed more positive feelings about their bodies than either Whites females or Hispanic females.

Introduction

In today's society, body image concerns are commonplace among women. For individuals with body image dissatisfaction, foods that have high sugar or fat content are considered forbidden foods, and the consumption of such foods is associated with increased body image concerns. Women with high levels of body dissatisfaction have a high fear of fat and are highly concerned about their fat and carbohydrate consumption (O'Mahony & Hall). Humans have an innate hedonic preference for sweetened, high fat foods (Drewnowski & Greenwood, 1983). There is a widespread belief that the preference for sweet foods is related to obesity (Capaldi, 1996); however, contrary to this perceived relationship, the preference for sweet food is independent of body weight status (Drewnowski, 1986).

Exposure to sugar has been found to result in temporary elevations in mood states. With regard to body image, exposure to sugar does have immediate positive effects on self-reported body image (Jacobi, Fante, & Bray, 2012), particularly among Black women (Jacobi, Taylor, & Fante, 2014). The purpose of the current research was to examine how the consumption of sugar using a faux magnitude estimation task would affect individuals' body image using multiple validated measures; this project is an extension study designed to further uncover the relationship between sugar exposure and states of body image satisfaction among different races.

This research investigated the effects sugar intake on body image in women of varying ethnicities (Black, Hispanic, and White). Participants were randomly assigned to a purified water, salt, or sugar condition. The study used a magnitude estimation task as a means for the participants to consume the solutions without revealing the true nature of the study. After the consumption of the solutions, body image satisfaction and fear of fat were assessed using a number of existing validated measures. Women in the sugar condition were predicted to have higher body and weight esteem, lower body dissatisfaction, and less fear of fat. Ethnic differences in overall body image were also expected. Black women were also predicted to have higher body and weight esteem, lower body dissatisfaction, and less fear of fat compared to White and Hispanic women.

Method

Participants

Among the 101 female participants, the average age was 18.9, with ages ranging from 18 to 25; the ethnic composition was as follows: 41 Black, 14 Hispanic, 42 White, 2 Asian, and 2 "other." Due to the small number of Hispanic participants, analyses could only be done on the black and white participants ($n = 83$).

The Effects of Sugar Consumption and Race on Satisfaction with Body Size and Weight



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Measurement Instruments

Magnitude estimation task. Participants were asked to perform a magnitude estimation task that included 20 solutions of varying concentrations of either salt, sugar, or plain water. For each protocol, participants were given a baseline solution that was the equivalent to either ½ teaspoon of salt or 2 teaspoons of sugar per 1 liter of bottled water. The control condition was simply bottled water.

Hedonic Scale. After each magnitude estimation task, participants were asked to complete the 9-point hedonic scale (Villegas, Angulo, & O'Mahony, 2008). The 9-point hedonic scale ranged from 1 (*Extremely dislike*) to 9 (*Like extremely*). Thus, after magnitude-estimation, a rating on the 9-point hedonic scale was required after each of the 20 trials.

Physical Appearance State and Trait Anxiety Scale (PASTAS). The PASTAS is a 16-item measure used to assess concern or anxiety regarding weight and non-weight sites of the body. The first 8 items are weight-related and focus on body areas such as thighs, buttocks, hips, abdomen, legs, waist, and general look of being overweight. Participants indicated how anxious, tense, or nervous they felt about each body area using a 5-point Likert-type scale; the scale points were as follows: 0 (*not at all*), 1 (*slightly*), 2 (*moderately*), 3 (*very much so*), and 4 (*exceptionally so*).

Body Image States Scale (BISS). This is a 6-item measure designed to measure an individual's body image state at a particular point in time. Response are combined to yield one score.

Contour Drawing Rating Scale. The Contour Drawing Rating Scale contains 9 schematic female figures that vary in size from extremely underweight to obese (Thompson & Gray, 1995). Participants were asked to circle the one drawing that represented their "actual" size, "ideal" body, and "society's ideal body size" for women. Actual-ideal body size discrepancy scores were calculated based on difference scores (actual minus ideal).

Body Esteem Scale. The Body Esteem Scale (BES) has 23 items related to body esteem using three subscales: Weight, Appearance, and Attributions, and an overall score (Mendelson & White, 1985). High scores indicate greater body esteem.

Body Shape Questionnaire. The BSQ is a 34-item measure that assesses concerns the concept of "feeling fat" rather than being fat. A total score ranges from a 34 to 204, with higher scores indicating a high level of concern about body shape (Cooper, Taylor, Cooper, & Fiarburn, 1987).

Goldfarb Fear of Fat Scale (GFFS). The GFFS is a 10-item measure that assesses the fear of becoming fat or gaining weight (Goldfarb, Dykens, & Gerrard, 1985).

Procedure

Each participant signed an informed consent form and completed two distinct tasks as part of the experimental protocol: 1) magnitude estimation perceptual task with hedonic preferences followed by 2) completing the aforementioned series of body image measures. Participants were randomly assigned to either the sugar, salt, or control condition. After the 20 magnitude estimation trials, participants completed the series of body image measures. Upon completion, a written debriefing statement explained the purpose of the research.

Results

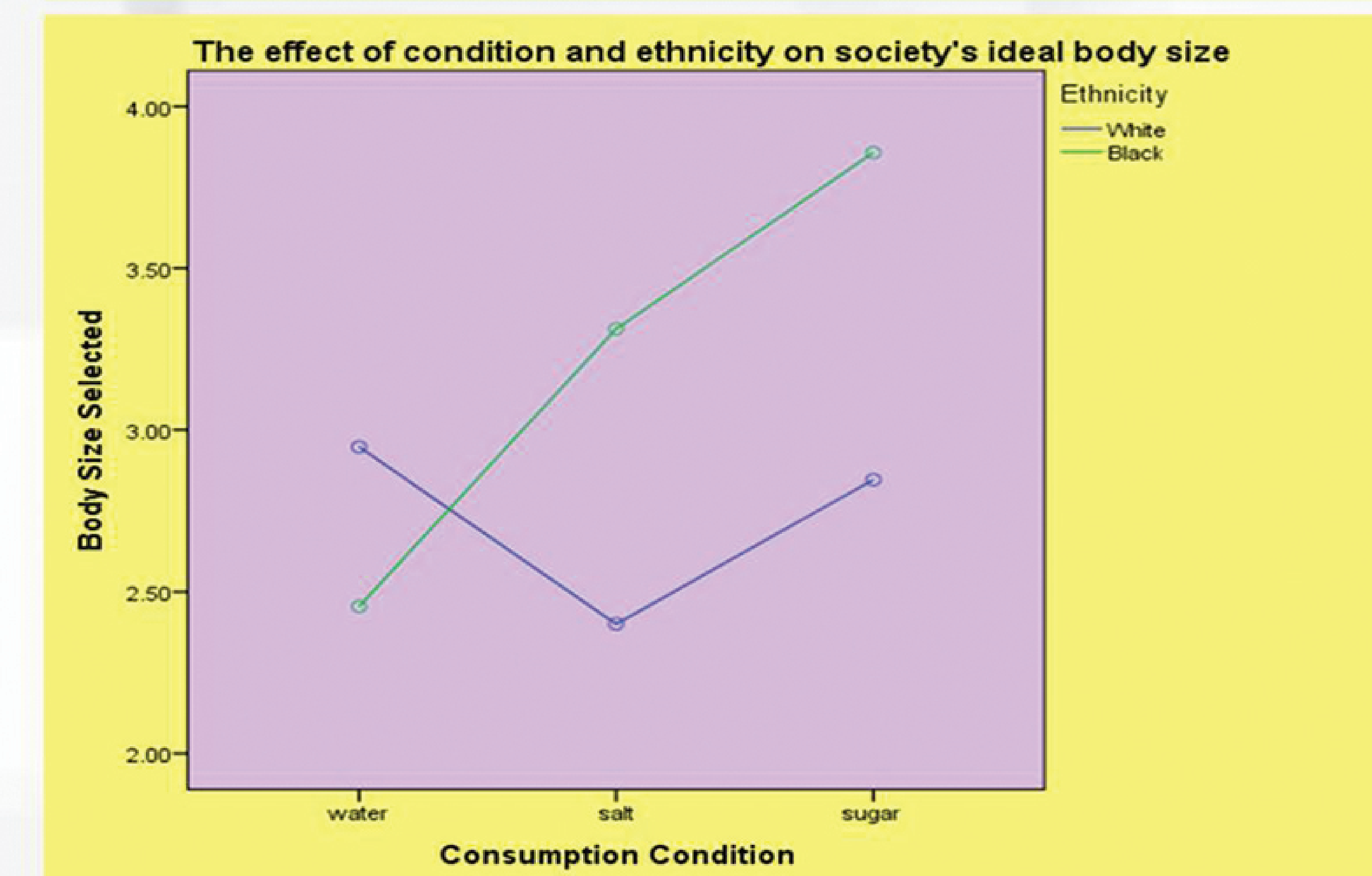
A series of 2 (ethnicity: Black/White) x 3 (condition) ANOVAs to determine the effects of ethnicity and the solution consumed on the dependent measures, which consisted on numerous measures of body image. Differences were found between the races in appearance evaluation, overall body esteem, body image states, satisfaction with body shape, and fear of fat. There was a significant interaction between Race x Condition for the selection of the perceived societal-ideal body size. There was a significant main effect for solution condition on weight esteem. Those who consumed sugar had higher esteem than those who consumed salt; however, the control condition reported the highest levels of weight esteem. Solution condition was found to marginally differ ($p = .07$) on measures of state anxiety regarding appearance (PASTAS); the sugar condition differed significantly from the water condition, where no differences were found for salt. The results found support for the hypothesis regarding racial differences in body image; however more research must be done to investigate the effects of sugar on women's body image.

Black women were found (compared to White women) to:

- Evaluate their appearance more favorably
- Report higher levels of body esteem
- Experience more positive body image states
- Feel greater satisfaction with their shape
- Lower fear of fat

Sugar, Salt, and Water Differences:

- Sugar reported higher weight esteem than salt; water had highest esteem
- Sugar consumers had higher anxiety about their appearance than water



Discussion

Body image differences were found between the Black and White participants, with Blacks having more favorable self-reported body image across multiple measures. Due to small sample size, Hispanic women were not included in the analyses. These findings are consistent with the literature, where Black women are found to more positively evaluate their appearance, experience greater satisfaction with their shape, and prefer a larger body size than White women (e.g., Cash & Henry, 1995; Perez & Joiner, 2003).

Although solution type was expected to affect body image across multiple measures, an effect was only found for weight esteem. Although those who consumed sugar had higher esteem than salt consumers, water consumers had the highest level of weight esteem. This finding was contrary to expectation. A significant interaction was found between the solution condition and ethnicity for the selection of the societal ideal body size. Due to limited cell sizes, statistical power was significantly reduced. A significantly larger sample is needed to determine true differences in body image based on the variables of interest (i.e., ethnicity and solution type).