

Study on carbohydrates

Literature, Russian Literature



Effect of drinking soda sweetened high-fructose corn syrup on food intake Michael

ABSTRACT

in the with intake aspartame and body or weight G Tordoff and Annette. To examine Malleva suggest that sweet oral stimulation initiates a cephalic-phase metabolic reflex that increases appetite (10). The long-term effects of artificial sweeteners on food intake and body weight are less clear. Although some investigators report weight gain in animals given artificial sweeteners to eat or drink (11-13), the majority reports no effects (11, 14-17).

What little work has been done in humans does little to answer the question. Two correlative comparisons of users and nonusers of artificial sweeteners showed that the sweeteners had no effect on body weight (18, 19). In contrast, an epidemiological study of 78 694 women found that reported weight gain was greater in those who used artificial sweeteners than in those who did not (20). There are only three published studies that have used a causative amount when approach. of weight ate APM replaced In one, dieters who two, during were either whether artificial sweeteners aid intake and body weight, we gave free-living, normal-weight subjects 1 150 g soda sweetened with aspartame (APM) or high-fructose corn syrup (HFCS) per day. Relative to when no soda was given, drinking APM-sweet control of long-term food intake for 3 wk significantly reduced calorie intake drinking the of both females weight sweetened take (n = 9) and males (n = of males but not of females. soda body for 3 wk significantly and 2.

However, decreased the body HFCS calorie intake. Ingesting either type of soda reduced the intake of sugar from the diet without affecting the

intake of other nutrients. Drinking large volumes of APM-sweetened soda, in contrast to drinking HFCS-sweetened soda, reduces sugar intake and thus may facilitate the control of calorie intake and body weight. encouraged lost the same or discouraged and to use APM-sweetened.

In the other fewer calories all sucrose products hospital 6- or sized lean period obese subjects KEYWORDS tose corn syrup, Human sugar, food intake, aspartame, body high-fruit- sweetness, weight, weight control Introduction It is generally benefit believed taste that artificial sweeteners.

Provide Indeed, the foods of a desirable without calories and drinks containing these substances are frequently labeled “ diet. ” However, the possibility that sweet, low-calorie foods and drinks actually lead to a reduction in body weight has not been examined in detail. There is mounting evidence that in the short term (< 12 h), consumption of artificial sweeteners increases themotivationto eat. Rats increase food intake after drinking a saccharin solution

Humans report increased hunger after drinking solu- than when they were fed a high-sucrose diet (22, 23). None of the work to date has examined the effect on food intake or bodyweight adding artificial sweeteners to the normal diet. In the present study, we attempted to do this by determining the effect on long-term (3-wk) food intake and body weight of consuming APM given in soda, the most prevalent vehicle for artificial sweeteners. By comparing periods when subjects drank APM, HFCS, and no soda, we planned to examine the effect of APM both as an addition to the diet and as an l2-d sugar substitute. n the diet Methods Recruitment of subjects tions.

Food than These of aspartame (APM), saccharin, or acesulfame-K intake is greater after eating a saccharin-sweetened yogurt after a glucose-sweetened or unsweetened yogurt.

Results are not caused by a post ingestive or pharmacology - The experiment was run in two replications, held in the fall of 1987 and the spring of 1988. It was approved by the Committee on Studies Involving Human Beings at the University of Pennsylvania. Potential subjects were first attracted by advertisements | 2 cal effect of the artificial sweeteners; rats eat more food after sham-drinking (ingesting but not absorbing) sucrose solution, and humans increase hunger ratings after chewing a gum base sweetened with as little as 0.6 mg APM

Moreover, subjects who have normal sweetness perception while drinking a sweet milkshake subsequently eat more food than do subjects who cannot perceive the milkshake as sweet [because of treatment with gymnemic acid (8)]. These and other findings posted the Monell on local university campuses. Each subject was weighed (wearing casual clothes, to the nearest 100 g; the weight was not revealed to the subject), the dietary record from the previous week was examined for ambiguities, and printed instructions for the following week were given.

In the two soda conditions, subjects were directed to drink four sodas a day, keep unopened bottles in a refrigerator, and record the time each bottle they were notified, was consumed. In the no-soda “ There are no special instructions condition, for this constituent of aspartame-sweetened (APM) and high-fructose-corn syrup-sweetened (HFCS) sodas ingested daily during

21-d test periods bottles carrying collected At the end of the weekly of soda for the following the sodas was somewhat them in smaller batches visit, subjects were given 28 weeks (if necessary). Because cumbersome, a few subjects more frequently. rival at the laboratory subject received for an initial a written appointment, description each of the prospectus and Debriefing and taste tests signed a participation consent form.

The study's purpose was stated as " an ongoing project to examine basic mechanisms of food preference, food intake, and appetite. " The only procedural details given were the requirement to keep a dietary record and " you will receive beverages to drink on various days," but " we you will receive cannot tell you at this or what they contain. time how many The description drinks also included notice of the requirement to attend a weeklyinterviewat the laboratory and a schedule of remuneration, totaling \$ 100 for satisfactory completion of the experiment. Subjects were administered the 40-question eating attitudes test (EAT-40) (24), the 5 1-question Restrained Eating Questionnaire (25), and other questionnaires to assess medical history, food preferences, eating attitudes, and dietary restraint. On the basis of questionnaire responses, applicants were excluded if they were recently or currently dieting, were avoiding caffeine, had afamilyhistory ofdiabetes, or were pregnant.

Initial training period At the end of the 9-wk test period, taste tests were conducted to see if subjects could recognize differences between soda containing APM and HFCS. First, each subject received a series of 16 counterbalanced triangle tests: the subject attempted to pick the disparate soda from three 10-mL samples of soda, two of one variety and one of the

other. Second, the subject was allowed to drink as much as he or she wanted from four cups of soda. He or she was asked to identify whether the soda was a diet or a regular type.

Unbeknownst to the subject, two glasses contained APM-sweetened soda and two, HFCS-sweetened soda. Finally, we asked what the subject thought the study was about. Analysis of dietary records. Dietary diet-analysis records software were analyzed release 3. 0, by use of NUTRITIONIST-3 N-Squared Computing, Sil- An experienced registered dietitian instructed each subject on how to complete dietary records. The 45-min lesson emphasized the necessity of timely and accurate record-keeping and included demonstrations with food models and household measures.

To augment compliance, subjects were told, “ We could determine what you have eaten from analysis of urine samples” (although this was untrue). To ensure understanding of the instructions, subjects kept a practice dietary record for 2 or 3 d. The completed record was scrutinized by the dietitian (with the subject present) to clarify any ambiguities and to familiarize subjects with the rigor required for keeping a dietary record. At this stage, six females and eight males elected to quit the experiment. Two males who kept insufficiently detailed records were also eliminated. Experiment design and procedure Orton by trained personnel who were unaware of the treatment conditions.

Components of foods not listed in the database were obtained directly from the manufacturers or by chemical analysis. For simplicity, we combined fructose, glucose, sucrose, and other mono-and disaccharides as “ sugar. ” After inspection of initial results, separate values were derived for sugar in

beverages (ie, soft drinks, coffee, and tea) and food (all other sources of sugar). Results Preliminary analyses found there were no differences between groups. Each subject maintained a dietary record continuously for 9 wk. During this period they received, in counterbalanced order, for 3 wk each, soda sweetened with APM, soda sweetened with high-fructose corn syrup (HFCS), or no experimental drinks. The cola-flavored soda was provided in 300-mL glass bottles. There was an alphanumeric code on the cap or sleeve of each bottle but nothing to inform the subject of the identity of the drink. During the appropriate periods, subjects were required to drink four bottles (1135 g) of soda daily. At the start of the test period and then at weekly intervals, between the results of the two replications of this study, so they were combined.

Of the 13 female and 28 male subjects who started the study, 1 female and 5 males stopped keeping dietary records or failed to keep appointments at the laboratory. Three females were eliminated because of chickenpox, pneumonia, and relocation away from the area. Two males complained about having to drink so much soda, so they were also dropped from the study. Analyses and data presentation are based on the remaining 9 females and 21 males. Body mass indexes of the females and males were 25.4 ± 1.4 and 25.1 ± 0.1 kg/m², respectively, which fall just below the 75th percentile of body weight distribution (26). With the exception of four males who ate fixed meals four times per week, all subjects controlled their own food choice and meal size. The 19-item Questionnaire revealed normal eating behavior. No subjects had extreme eating disorders (females 5-item Restraint eating behavior except Eat that two females and one male had high (> 2 SD above the mean)

restraint (factor 1) scores and five males had high disinhibition (factor 2) scores.

None of the questionnaire responses correlated with the significantly except (Restrained with Eating food intake Questionnaire) or weight between and = change hunger calorie $p <$ during (factor intake the 3 dur- experiment, for correlation ing the no-soda Bodyweight baseline) period (r 0. 37, 0. 05). Subjects gained slightly but wk of drinking HFCS-sweetened significantly more weight after 2 soda than after the same soda or no experimental soda was more marked after 3 wk (Fig did males durHFCS-sweet- rioid drinking APM-sweetened (Appendix A). This difference female lost significantly more weight than in the control (no-soda) period. While drinking soda, females gained $p <$ 0. 0 1) and males gained drinking APM-sweetened \pm 0. 29 kg, pkg, $<$ weight significantly ($0. 97 \pm 0. 25$ kg, slightly ($0. 52 \pm 0. 23$ kg, NS).

While soda, females lost gained weight slightly ($0. 47$ males weight significantly ($0. 25 \pm 0. 22$ NS) but 0. 05). Thus, the effect on both sexes combined and days (1-21 d). Separate analyses were performed either including or excluding the ingredients from the experimental sodas. All the analyses found that females consumed significantly less than did males, and there was no interaction between sex and treatment (Appendix A). None of the analyses produced a main effect or interaction involving the day's factor, indicating that intakes were stable across the 2 1-d treatment periods. The possibility of carry-over effects from one period to another was examined using the same procedure as for body weight data. Results from the first 3-wk period were analyzed separately by using between-subject comparisons. The results of these analyses from a period before carry-over effects could

have occurred were similar to those from the complete set of data, indicating that carry-over effects were either absent or, if present, undetectable and thus minor significance. Calories.

Relative to calorie intake during the no-soda condition, drinking 530 kcal HFCS-sweetened soda/d produced a large and highly significant increase in total calorie intake (including calories in the experimental soda). Drinking the same volume of APM-sweetened soda decreased calorie intake. Both APM and HFCS consumption significantly reduced the intake of calories from the diet (ie, calories excluding the sodas) to the same extent (by 179 and 195 kcal/d, respectively). The decrease in dietary calorie intake produced by drinking either form of soda was due entirely to a decrease in sugar intake (Fig 2).

Drinking soda did not affect the intake of protein, fat, alcohol, or complex (nonsugar) carbohydrate. Sugar and soda. During the period without experimental sodas, the average intake of sugar-sweetened soda was 292 ± 133 g for females and 414 ± 85 g for males. Three females and two males drank essentially no (< 25 g/d) HFCS-sweetened soda; one female and two males drank > 135 g/d. Intake of APM-sweetened soda during the same period was 159 ± 82 g for females and 88 ± 40 g for males, which included 6 females and 16 males who did not drink any. The total intake of both types HFCS-sweetened body weight, whereas the soda crease was to nonsignificantly in weight seen when gain soda was to significantly increase the effect of drinking APM-sweetened decrease males it. Female = 9) Male (n= 2 1) Because APM could of the counterbalanced reflect either a directly caused body design drank of the study, soda sweetened period the Jewish <https://assignbuster.com/study-on-carbohydrates/>

influence by a previous of the soda or remove HFCS- very from possibilities, the weight we sweetened-soda consumption. compared To discriminate weight changes between this three C male and three female subgroups of subjects during the first 3 wk of the experiment and during each of the three 3-wk periods of the study.

The pattern of results for each of the periods was more-or-less similar to that seen overall, although because of the smaller group loss in sensitivity produced by the use of between-subject parisons, the only significant during the first 3-wk period difference for females 0 -C 0 . 4. J ii No -1 sizes and corn- ci) was present >' 0 0 (Appendix who effects loss drank seen. Judging APM-sweetened weight when per se. of body y the decoded gain could drink FIG Soda APM crease in the weight before any possible occur, soda it appears containing that of males carry-over the weight subjects HFCS APM was due to the soda Food intake and of total calories were with factors of sex, treatment, Intakes of the various nutrients analyzed by three-way ANOVAs in body weight during 3-wk periods when subjects sweetened with aspartame (APM), an equal weight of soda sweetened with high-fructose corn syrup(HFCS), or had no experimental manipulation (no soda). *p < 0. 05 relatives to weight gain in the no-soda period.

Changes drank 150 g/d of soda 966 of drinking Effect on dietary nutrient intake sweetened with APM or HFCS* Measure Nosoda TORDOFF AND ALLEVA evidence that the effects weight were influenced soda of the sodas on calorie intake and body by the subjects' ability to identify the guessed the experiment's purpose; most soda (1 135 g/d) APM kcal/d HFCS None of the subjects Females(n = 9) Alcohol Fat Protein Carbohydrate 65±23 747±93

266±25 39±12 745±95 262±28 58±23 726± 84 256± 27 405 ± thought we were performing market a new brand of soda. None noticed changed their body weight or altered take or selection.

Discussion research of some kind on that drinking the sodas their patterns of food in- Imposing the requirement to drink 1 135 g/d of APM-sweetened soda on normal-weight, freely feeding subjects decreased calorie intake significantly (by 7%) and reduced body weight slightly (significantly in males). This was in marked contrast to 261±60 255±55 225±56 the highly significant, 13% increase in calorie intake and sig932±45 945±56 937 ±41 significant increase in body weight produced by consumption of 373±23 384±27 373± 18 the same amount of HFCS-sweetened soda. The two types of soda produced an identical, 33% decrease in dietary sugar in 617±43 612 ±48 ComplexCHO 624±49 461 ± 38t take (excluding the sugar in the soda), without affecting intake Sugar 674 ± 49 453 ± 40t Totalintake 2801 ± 150 2647± 153 2645 ± 124 t of other macronutrients. This was caused in part by the “ experimental” sodas displacing discretionary beverages; subjects I ±SEM. given four bottles of soda per day have little motivation to put Significantly different from no-soda condition: $p < 0.005$, $p < 0.005$ chase and drink their own. However, drinking either form of