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Compensation for Adding Sugar-Sweetened Beverages (SSBs) to the Diet in Healthy College-aged Participants

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Abstract

Background: Regular consumption of sugar-sweetened beverages (SSBs) is associated with an increased risk for type 2 diabetes mellitus and other obesity-related diseases. Research evidence has been inconsistent with regard to the effects of increased SSB consumption on metabolic risk factors, potentially due to compensatory dietary-intake behaviors. Therefore, the purpose of the current study is to determine whether participants compensated for the addition of two servings of SSBs per day for three weeks by altering other dietary-intake behaviors.
Methods: Secondary data from a randomized controlled trial where participants added SSBs to their typical diets for three weeks will be used to determine whether participants changed their dietary intake during the intervention. Specifically, data from the four 24-hour recalls (ASA24), completed by participants at baseline, and following weeks 1, 2, and 3, will be used to determine changes in total calories, added sugar, and macronutrient distribution.
Results: Results will include the determination of changes in consumption of total calories, percent carbohydrate, percent protein, percent fat, added sugar, fiber, and sugary beverages. Additionally, we will examine whether or not changes in dietary intake are associated with changes in metabolic risk factors (fasting glucose and insulin, insulin sensitivity, and SSB-tolerance glycemic and insulinemic responses). Results are expected to show that participants compensated by reducing overall caloric consumption and overall sugar intake when consuming SSBs for three weeks.
Conclusion: These results will contribute to the understanding of the mechanisms behind potential changes in metabolic outcomes when adding sugar-sweetened beverages to the diet in healthy college-aged adults.

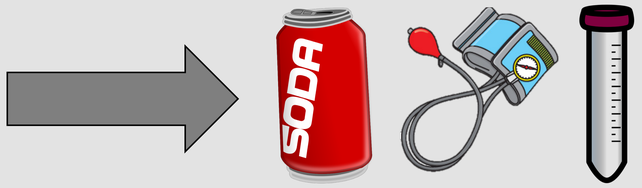
Background

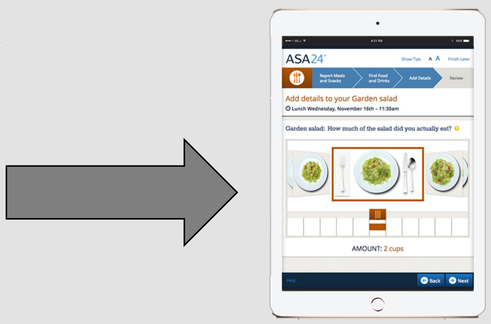
- Sugar-sweetened beverages (SSBs) account for one third of added sugar consumption in U.S. children and adults.[1]
- Previous research studies have shown a link between the consumption of SSBs and an increased risk of metabolic syndrome and insulin resistance.[2-4]
- A study conducted within our laboratory was performed to determine whether adding SSBs to the diet affects metabolic syndrome risk factors.
- Preliminary results showed no significant differences between the soda, fruit juice, and water conditions in glycemic and insulinemic outcomes.
- The aim of the current study is to determine whether participants compensated for the addition of two servings of SSBs per day for three weeks by altering other dietary-intake behaviors.

Methodology

Original Study

- Participants were randomized to a beverage category (caffeine-free soda, 100% fruit juice, and water).
- Baseline assessments of height, weight, waist circumference, blood pressure, and body fat percentage were measured.
- Participants underwent a glucose tolerant test where they consumed 50 grams of carbohydrate as either caffeine-free soda or 100% fruit juice.
- Repeated blood samples were collected via a catheter inserted in the participant's forearm to assess glucose over a 2-hour period after consumption.
- After collecting measurements, participants were given a supply of their assigned beverage 1 week at a time. Each week the participants filled out an ASA24 and replenished their assigned beverage as needed. The participants were expected to drink 2 servings/day for 3 weeks.
- Following the 3 weeks, participants visited the laboratory to complete all assessments measured during the first visit.





ASA24®

Secondary Data Analysis

- Data from 24-hour food recalls (ASA24), completed by participants at baseline, and following weeks 1, 2, and 3, will be analyzed to determine changes in total calories, added sugar, and macronutrient distribution.

Participants

- 36 participants (male and female) between ages 18–30.
- Participants were free of diabetes and glucose or lipid lowering medication.
- Participants had two or fewer risk factors for cardiovascular disease according to current American College of Sports Medicine Guidelines.

Table 1: Baseline Participant Characteristics

	All (n=34)	Soda (n=10)	Fruit Juice (n=12)	Water (n=12)
Gender (Male:Female)	17M:17F	6M:4F	3M:9F	8M:4F
	Mean ± SD			
Age (yr)	21.3 ± 2.8	21.1 ± 2.8	21.9 ± 2.2	20.8 ± 3.4
Height (cm)	174.8 ± 8.3	173.8 ± 8.5	170.9 ±7.5	179.4 ± 7.1
Weight (kg)	75.0 ± 13.2	72.5 ± 15.1	75.7 ± 13.2	76.2 ± 12.5
Waist Circumference (cm)	88.7 ± 10.3	88.8 ± 13.4	90.0 ± 9.6	87.4 ± 8.9
Body Fat %	25.9 ± 12.2	21.7 ± 13.8	32.5 ± 11.3	22.8 ± 9.4
Systolic Blood Pressure (mmHg)	116.5 ± 11.9	119.0 ± 12.8	111.7 ± 9.0	119.2 ± 13.2
Dystolic Blood Pressure (mmHg)	67.8 ± 10.6	73.8 ± 11.6	65.1 ± 7.5	65.4 ± 11.1

Results

- Results will include the determination of changes in consumption of total calories, percent carbohydrate, percent protein, percent fat, added sugar, fiber, and sugar beverages.
- Additionally, we will examine whether or not changes in dietary intake are associated with changes in metabolic risk factors.

Conclusion

- Future results are expected to show that participants compensated by reducing overall caloric consumption and overall sugar intake when consuming SSBs for three weeks.
- These results will contribute to the understanding of the mechanisms behind potential changes in metabolic outcomes when adding sugar-sweetened beverages to the diet in healthy college-aged adults.

References

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