Determining the effect of gradual sugar reduction on liking of sweetened iced tea

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Introduction

Sugar-sweetened beverages are major sources of added sugar intake. Recommendations for decreasing added sugar intake include reducing the amount of sugar in beverages. A proposed method to reduce sugar is gradual sugar reduction. A concern with gradual sugar reduction is that it would decrease consumer's liking and ultimately lead to loss of sales and consumers switching back to higher sugar levels.

Objectives

By gradually reducing sugar in sweetened iced tea over time:

1. Will liking ratings change?
2. How will liking ratings compare to a no reduction of sugar group?
3. Will liking for lower levels of added sugar increase?
4. Will the ideal level of sweetness in iced tea decrease?

Materials and Methods

Participants

We enrolled a total of 62 participants from the University of Minnesota students and staff.

Inclusion criteria:

- Liking for and willingness to consume iced tea
- Availability to participant in a 14-week long study

Exclusion criteria:

- Participants who reported having diabetes.
- Participants with food allergies and sensitivities.

Overall Study Design

Repeated consumption
-12 weeks
-36 sessions

Initial taste test
-30 minutes

Final taste test
-30 minutes

Products

Sweetened iced tea was made from Lipton™ decaffeinated black tea, purified water, and varying amounts of added sugar.

Experimental Procedure

Initial taste test

- Rated liking of nine tea samples ranging from 0% to 11.7% added sugar (also used to balance participants on their hedonic sensitivity to sweetness)
- Rated lowest acceptable, ideal level, and highest acceptable level of sweetness

Longitudinal Stage

- 3 sessions/week for 12 weeks
- Participants in the no reduction group received tea made with 7.7% added sugar each week (Figure 1).
- Participants in the gradual reduction group received tea gradually reduced by 10% increments.

Prior to drinking the tea:

- How thirsty are you right now?
- How much iced tea do you feel like drinking right now?

After drinking the tea:

- How much did you like the iced tea you just drank?
- To what extent are you tired of drinking this iced tea?

Final taste test

The final taste test was identical to the initial taste test in all aspects of testing protocol.

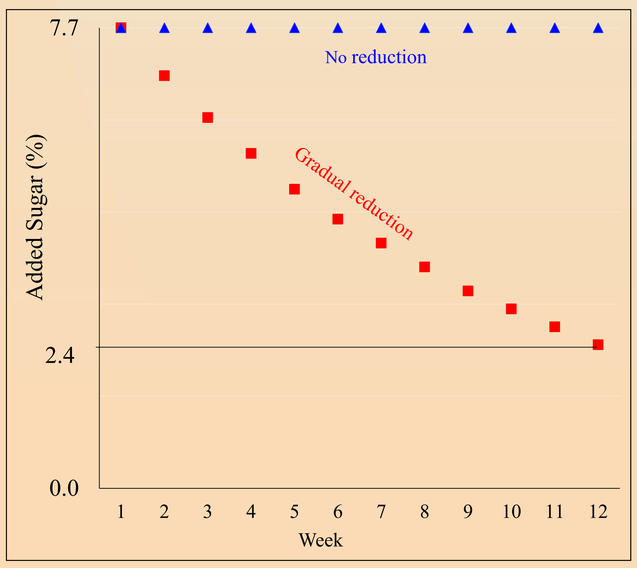

Figure 1. The percent of added sugar in iced tea for the no reduction and the gradual reduction of sugar group for each week of the 12 week repeated consumption stage.

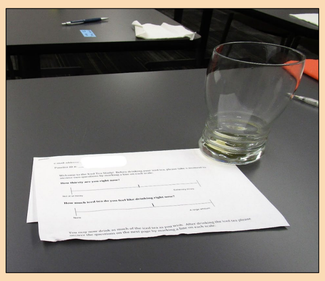

Figure 2. Example ballot sheet and empty glass of iced tea left.

Results

Liking ratings decreased equally for both groups

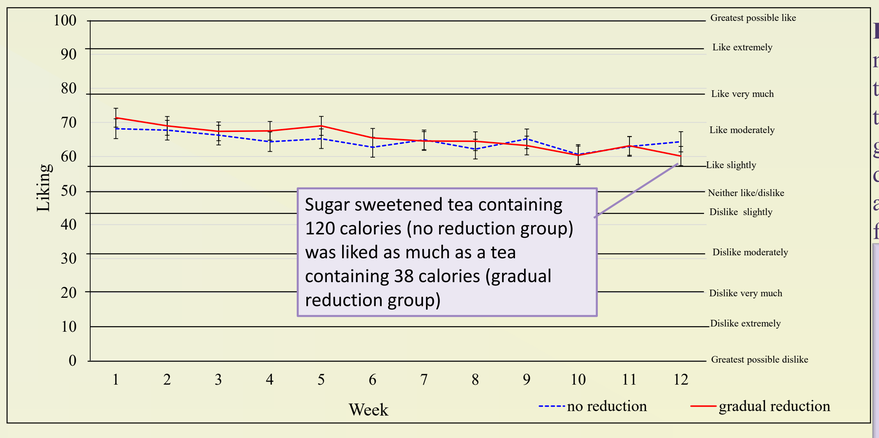

Figure 3. A comparison of mean weekly liking ratings for the no reduction (n = 21) and the gradual reduction (n = 23) groups. Corresponding verbal descriptors to the labeled affective magnitude scale are found on the left.

Number of calories consumed decreased

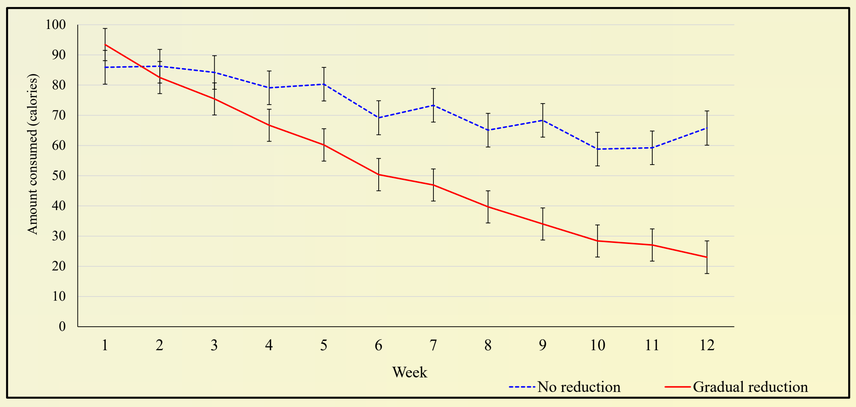

Figure 4. Weekly mean caloric intake for the no reduction and gradual reduction groups. Participants in the no reduction group were served 119 calories per 355 ml glass of tea each week. Participants in the gradual reduction group were served a 355 ml glass of tea reduced by 10% of added sugar each week..

Liking ratings for lower levels of added sugar did not increase after gradually reducing sugar

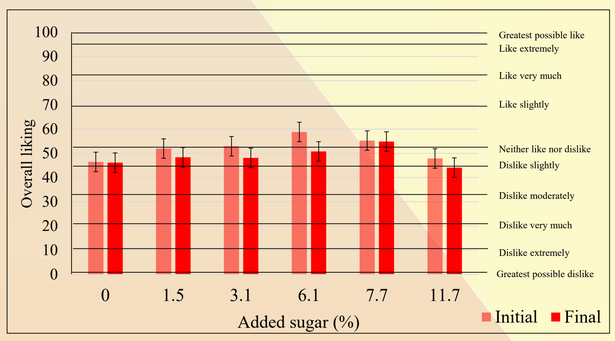

Figure 5. Mean overall liking ratings for iced tea samples with 0% to 11.7% added sugar from the initial and final taste tests for the gradual reduction group.

The ideal level of sweetness and the acceptable range of sweetness did not change after gradually reducing sugar.

Acknowledgements

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