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The Effect of a Target Bite Count and Plate Size on Food Intake

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Methods (cont’d)

Participants ate a meal of macaroni and cheese with up to 3 others in a laboratory setting.

Design

- Small plate
  - n=32
- Large plate
  - n=28

Instruction given: “Take 12 bites”

- n=32
- n=28

Instruction not given

- n=27

Table 1. Experimental design and sample size by condition.

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Prior to eating participants completed a hunger scale. They were allowed to serve themselves from one large container in the middle of the table (Fig. 2). After obtaining a stable food weight from recessed scales in the eating station the experimenter instructed participants to turn on their Bite Counters and begin eating. As the participants ate, the experimenter monitored the session via two laptops that were connected to four video cameras in the ceiling, recording each participant (Fig. 2).

As participants finished their course they either indicated that they were finished eating at which time they were instructed to turn off their Bite Counters and wait for others to finish, or they requested an additional course of macaroni and cheese which was served by a research assistant. If additional courses were served a stable food weight was obtained and the participants were allowed to continue eating.

The dependent variables were: grams consumed, bites taken, bite size, and hunger change.

Results

ANOVA's were used to analyze the dependent variables. Analysis of grams consumed revealed a main effect of plate size (p<.001) (Fig. 3). Analysis of bites taken revealed a main effect of plate size (p<.001), a main effect of instruction (p<.001) and a marginal effect of plate size instruction (p=.06). Analysis of bite size revealed a main effect of instruction (p<.001) (Fig. 4).

Analysis of hunger change revealed a main effect of plate size (p=.05) and a marginal interaction (p=.06).

Conclusion

The purpose of this study was to determine if an instruction to take fewer bites than normally taken, would reduce intake and overcome the environmental cue of plate size, where eating from a larger plate causes individuals to eat more8,9. Research has shown that such environmental cues may contribute to the increasing rates of overweight and obesity10. This study replicated the effect of plate size on consumption while demonstrating the ability of a wearable intake monitor such as the Bite Counter, along with an instruction, to overcome that effect. Individuals who were given the instruction to take only 12 bites compensated for the lack of control over their own environment by significantly larger bites9. This is consistent with research that has demonstrated an effect of plate size and portion size on bite size when participants are aware of the manipulations8,11.

In conclusion, the results suggest that the use of a wearable intake monitor along with an instruction on the number of bites to take can overcome the effect of plate size on the number of bites people take. Future research should examine ways to mitigate the effect of instruction on bite size to prevent compensation by taking larger bites.

Figure 1. Wrist-roll measured by the Bite Counter.

Figure 2. Instrumented eating station showing recessed scale (above), and laptop monitoring station (right).

Figure 3. Means for grams consumed by condition.

Figure 4. Means for bites taken by condition.

Figure 5. Means for bite size by condition.

Figure 6. Mean number of bites taken by condition.

Figure 7. Mean grams consumed by condition.

Figure 8. Mean bite size in grams by condition.

Figure 9. Mean bite size in grams by condition.

Figure 10. Mean bite size in grams by condition.

References


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