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The Influence of Modest Weight Gain on Taste and Smell Acuity in College Freshmen

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The Influence of Modest Weight Gain on Taste and Smell Acuity in College Freshmen

Authors: Tucker RM, Ludy MJ, Tomko PM, Mansperger J

Background: Reduced taste and smell acuities are common among those with high body mass index (BMI). Evidence of improved taste sensitivity after modest weight loss (~3-4 kg) exists in overweight individuals. Whether taste and smell decrements precede or result from weight gain is unknown. This study’s purpose was to determine the effect of modest weight gain on taste and smell acuity.

Methods: College freshmen (n=60), a cohort at risk for modest weight gain, were assessed upon arrival to campus and 5 months later. Weight, BMI, and body fat percent (%BF) were measured. Intensity ratings for graded, suprathreshold concentrations of sweet (n=3) and salty (n=3) solutions, as well as a suprathreshold orange odor were assessed. Paired samples t-tests were used to indicate change from baseline to follow-up. Pearson correlation coefficients were used to identify associations between variables.

Results: Sixty participants (82% female, 92% white, 18.1±0.3 years) completed testing. BMI (22.9±3.8 to 23.6±4.1 kg/m²) and %BF (24.5±9.6 to 27.1±9.1%) increased at follow-up (p<0.001 for both). Weight gain (62.8±12.8 to 64.6±13.7 kg, range -2.9 to +9.1 kg) occurred in 79% of participants. No changes in taste intensity for low, medium, and high concentrations of sweet or salty solutions were observed. No change in smell intensity was observed over time, although smell intensity at follow-up was negatively associated with BMI (r=-0.36, p=0.048).

Conclusions: Modest weight gain in college freshmen did not influence taste acuity. Lack of change in intensity ratings may relate to use of suprathreshold concentrations rather than detection thresholds, or recruitment of a predominantly lean population.

Learning Outcome: Participants will be able to discuss the influence of weight change on taste and smell acuity.
The Influence of Modest Weight Gain on Taste and Smell Acuity in College Freshmen

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Abstract

Background: Reduced taste and smell acuities are common among those with high BMI. Evidence of improved taste sensitivity after modest weight loss (~3-4 kg) exists in overweight individuals. Whether taste and smell decrements precede or result from weight gain is unknown. This study’s purpose was to determine the effect of modest weight gain on taste and smell acuity.

Methods: College freshmen (n=60), a cohort at risk for modest weight gain, were assessed upon arrival to campus and 5 months later. Weight, BMI, and body fat percent (%BF) were measured. Intensity ratings for graded, suprathreshold concentrations of sweet (n=3) and salty (n=3) solutions, as well as a suprathreshold orange odor were assessed. Mann-Whitney U tests were used to identify change from baseline to follow-up. Spearman correlation coefficients were used to identify associations between variables.

Results: Sixty participants (82% female, 92% white, M=21.7 years, range 18.1-23.6 years) completed testing. BMI increased 3.8 kg/m² ± 9.6 kg/m² and %BF increased 1.9 ± 13.7 kg. %BF (

Conclusions: Most weight gain in college freshmen did not influence taste acuity. Lack of change in intensity ratings may relate to use of suprathreshold concentrations rather than detection thresholds, or recruitment of a predominantly lean population.

Learning Outcome: Participants will be able to discuss the influence of weight change on taste and smell acuity.

Introduction

• Taste and smell contribute to the hedonic value (or pleasantness) of food.
  • Hedonic value plays important role in food selection and intake (1).
  • Individuals with high BMI typically experience impaired taste and smell sensitivity (2, 3).
  • This could cause them to eat more to achieve sufficient levels of reward (3).
  • After weight loss, taste sensitivity improves (4, 5).
  • No studies have measured sensitivity changes as weight is gained.

Research Question

Does weight gain impair taste and/or smell acuity?

We hypothesized that first-year students who gained the most weight would experience decreases in taste and smell sensitivity.

Methods

Figure 1. Study protocol

• Among all participants (n=60)
  Weight increased 1.9 ± 2.3 kg from August/September to January (p<0.001, range -12.8 to 64.6 kg).
  %BF increased 1.9 ± 13.7 kg. Range -2.9 to 91.1 kg occurred in 79% of participants. No changes in taste intensity for low, medium, and high concentrations of sweet or salty solutions were observed. No change in smell sensitivity was observed over time, although smell intensity at follow-up was negatively associated with BMI (r=-0.36, p=0.048).

• Due to the large degree of variation in weight change, participants were split into tertiles: lowest (≤ 25 th percentile), middle (25 th percentile to 75 th percentile), and highest (≥ 75 th percentile) gainers.
  Table 1. Participant Characteristics

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<table>
<thead>
<tr>
<th>Age</th>
<th>18.1 ± 0.3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>62% female (n=49)</td>
</tr>
<tr>
<td>Race</td>
<td>92% white (n=55)</td>
</tr>
<tr>
<td>BMI</td>
<td>22.9 ± 3.6 kg/m²</td>
</tr>
<tr>
<td>%BF</td>
<td>24 ± 9.6 kg</td>
</tr>
</tbody>
</table>

Figure 2. No differences in sweet intensity (ratings based on 100 mm) between individuals in the 25 th percentile of weight gain compared to the 75 th percentile gainers.

Conclusions

• Modest weight, BMI, and %BF change did not influence perceived intensity of sweet and salty tastes or olfactory sensitivity in college freshmen.
  • This could be due to:
    • Suprathreshold concentrations rather than detection thresholds.
    • Predominantly lean rather than overweight/obese population.
    • Or the small sample size.

Results (continued)

Figure 3. No differences in salt intensity (ratings based on 100 mm) between individuals in the 25 th percentile of weight gain compared to the 75 th percentile gainers.

References & Acknowledgements


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