Series Title: Effects of Ambient contexts on Food Perception and Acceptability

- Chapter 1: Influences of Light Color on Food Perception and Intake -

**Issue**

Multicolored light-emitting diode (LED) bulbs have been used for both general- and special-purpose lighting source in a variety of fields. Especially, colored light provided by LEDs is often used in a foodservice area, as well as in a retail store to increase customers’ attention to specific items or merchandise. It has been known that light source and light color can not only alter surface colors of foods and drinks displayed, but also affect consumers’ mood. Such changes induced by light source and light color may modulate consumers’ food perception, liking, and purchasing behavior since visual cues (e.g., surface color) and mood status play an important role in food perception and eating behavior. In our earlier research, when participants looked at photos of bell peppers taken under yellow, blue, green, red, or white, the participants were the most willing to consume the bell peppers placed in yellow light, while they were the least willing to eat those placed in blue light (Hasenbeck et al., 2014). Building on previous findings, the present project aimed to determine whether ambient light colors affect consumers’ sensory perception, willingness to eat, and meal size (i.e., the amount of food consumed) in a realistic setting.

**Action**

In Experiment 1, 112 participants (50 women and 62 men) were asked to consume a breakfast meal under one of three different light colors: white, yellow, and blue. During the test, liking of the breakfast meal’s appearance, willingness to eat, overall flavor intensity, overall liking of the breakfast meal, and the amount of meal consumed were measured. The blue light significantly decreased the amount of meal consumed in men, but not in women, compared to yellow and white light conditions. However, there were no significant differences among the three light color conditions with respect to overall flavor intensity and overall liking of the breakfast meal.

In Experiment 2, 74 participants (42 women and 32 men) were asked to taste sliced apples and red bell peppers presented under five different colors of light: yellow, blue, green, red, and white, respectively. During the test, the participants were asked to rate liking of the food’s appearance, willingness to eat, flavor intensity, crispness intensity, and overall liking of the food. Interestingly, participants were more willing to consume apples under yellow light than white light commonly experienced in everyday life. Again, the blue light significantly decreased consumers’ willingness to eat sliced apples and bell peppers, compared to yellow and white light conditions.
Impact

Our findings provide empirical evidence that light color not only affects consumers’ motivation to eat the food item displayed under the light, but also modulates the amount of food consumed in a realistic setting. Since consumers ate significantly less of their meal under blue light compared to under the white light commonly exposed in daily life, blue light could possibly be applied to reducing overconsumption in obese men, without decreasing their liking of the meal. In contrast, since yellow light, in comparison to white light, increased consumers’ willingness to eat sliced apples, the yellow light could be used as a tool for encouraging individuals to consume more apples in daily life. Based on those findings, sensory scientists and food-service professionals can design a specific setting of lighting for modulating appetite, hedonic impression, and the amount of consumption for specific demographics, as well as for the target food items, which may improve eating quality and its subsequent health status.

Outcomes

1) Papers published in peer-reviewed journals:


2) Mass-Media and Magazine Impacts (selected):


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