



Application of Eye Tracking Equipment to Understand Consumer Perception of Beef Color and Marbling

H. Martinez^{1*}

¹Department of Animal Science, Texas A&M University, College Station, TX, USA

*Corresponding author. Email: hend4790@tamu.edu (H. Martinez)

Keywords: beef color, beef marbling, cognitive behavior, eye tracking
Meat and Muscle Biology 3(2):22

Objectives

The objective of this study was to understand consumer perception of beef color and marbling using eye tracking equipment.

Materials and Methods

A total of 158 consumers from the Bryan/College Station, TX area were recruited to observe images of raw steaks and report overall, color, and marbling liking. The official USDA Small⁵⁰ grading card image was edited by an experienced photographer (Adobe Photoshop CC, San Jose, CA) to create different degrees of color and marbling. This allowed all other intrinsic attributes of the steak image (i.e., shape and ribeye area) to be consistent across all edited images, therefore minimizing conclusions to focus on exclusively marbling or color differences. Consumers viewed two scenarios of pictures. Scenario 1 consisted of three images with Average Choice marbling in color scores of 8, 6, and 4 that correspond to dark, ideal, and light color categories, respectively. Scenario 1 was designed to understand consumer perception of beef color. Scenario 2 displayed three images of similar color (ideal; color score 6) and differing degrees of marbling (Average Choice, Low Choice, and Select). Images were presented on a 1,920 × 1,080 pixels computer screen while a Tobii TX-300 eye-tracking device collected data at a rate of 600 Hz. Each scenario was exposed for 10 s before automatically advancing to slides where consumers reported their overall, color, and marbling liking of each image on a 9-point hedonic scale where 1 = dislike extremely and 9 = like extremely. Between each slide, filler slides were placed for 3-s intervals with a target randomly placed in the top left, top right, bottom left, or bottom right. Consumers were instructed to stare at the target until the next slide appeared.

This was intended to randomize where the consumers would begin their observations. Each image within the slide was defined as an area of interest (AOI) to collect eye-tracking metrics to compare the images within each scenario. Metrics included time to first fixation (TTFF), time spent, revisits, and fixation counts.

Results

In scenario 1, consumers liked for overall and color liking the ideal colored image and rated the light-colored image lowest ($P < 0.0001$). Consumers fixated on the dark and ideally colored images before the light. Additionally, more time was spent observing the dark and ideally colored images compared to the light ($P < 0.0001$). The number of revisits and fixation counts were greatest for the ideal colored image followed by the dark image and were lowest for the light-colored image. In scenario 2, consumer overall and marbling liking was highest for Average and Low Choice images. Consumers rated the Select image lowest for overall and marbling liking ($P < 0.0001$). Eye tracking data was reflective of these findings. The Low Choice image was viewed the fastest with more time spent viewing, attracted more revisits, and accounted for greater fixation counts compared to the Average Choice and Select images ($P < 0.0001$).

Conclusion

These findings confirm the use of eye tracking equipment can provide additional insight into the factors that drive consumer acceptability and therefore potentially increase beef consumption. Implementing this tool in future studies will provide information on consumers' cognitive behavior that cannot be observed solely through hedonic measures.