



Development of a novel sensory method: Image Measurement of Emotion and Texture (IMET)



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ABSTRACT

Could images be the next step to understand consumers' attitude towards texture and emotion? Little work has been conducted to evaluate the relationship between texture and its emotional response with consumers. In addition, previous work suggests men and women may experience the same emotions, but with different intensities. The overall objective of this work is to determine the impact of using images compared to words only for emotion and texture measurements throughout the consumption experience.

Subjects were randomly selected to use either the texture images or texture words only and one of two emotion image methods or an emotion words method. Emotion questions were asked at the beginning, middle, and end of consumption. The products evaluated were orange soda, dairy type beverages, and convenience cheeses.

The IMET method developed was useful in determining differences in emotion and texture. Texture images were better at determining significant differences between the changes in each emotion for orange soda and convenience cheese categories compared to the use of texture words only. Consumer selected emotion images were less variable than emotion words in positive emotions. A significant difference between gender across all product categories and methods combined was determined. Comparing emotion methods across all product categories, the change in emotion was significant between genders for the My Picture group, but not significant for Predefined or words only. The My Pictures method may identify differences between genders indicating the potential for consumer generated image test methods.

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Introduction

Traditionally, texture measurements are correlated with descriptive sensory texture assessments (Anker, Stading, & Hermansson, 1999; Ares, Gimenez, & Gambaro, 2006; Bourne, 1978; Brandt, Skinner, & Coleman, 1962; Breene, 1975; Civille & Liska, 1974; El-Bakry, Beninati, Duggan, O'Riordan, & O'Sullivan, 2011; Foegeding et al., 2011; Pons and Fiszman, 1996); however, they do not necessarily correlate with the consumer's textural perception of the product (Foegeding et al., 2011; Moskowitz, 1987). Consumers are typically not asked to respond to highly specific texture attribute questions because they are not trained in how

to characterize these textures (Moskowitz, 1987). Yet, if the consumers were given images which depicted these specific texture attributes perhaps two key outcomes could be obtained: (1) additional textural attributes could be assessed above what is currently available through instrumental texture profile analysis (TPA) and other methods (Pons & Fiszman, 1996; Bourne, 1978) and (2) capture specific textural characteristics of food products as perceived directly from the consumers themselves. Emotion testing with flavor and aroma has been well studied (Croy, Olgun, & Joraschky, 2011; Desmet & Schifferstein, 2008; King & Meiselman, 2010; King, Meiselman, & Carr, 2010; Macht, 1999, 2008; Seo et al., 2009; Thomson & Crocker, 2011), but little investigation has been done on the potential relationship between texture and emotion in the context of eating. Texture is a multimodal characteristic of food (Foegeding et al., 2011) and several successful approaches have been developed to obtain texture attributes; however none of the

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current texture methods utilize texture images and consumer perceptions to help understand texture characteristics

One caveat of measuring emotion is the non-cognitive nature of emotions which can be difficult to measure and quantify. One criticism of current emotion testing is the potential for variability from person to person, an intrinsic characteristic of emotions (Schifferstein and Desmet, 2010). Thomson, Crocker, and Marketo (2010) indicated the difficulty of using words in emotion testing due to the issues of scaling and the rational thought processes that occur with words and scaling, modification of scaling was suggested and tested. Emotions and picture images are thought to be more effectively processed in the brain's right cerebral hemisphere, while language and logic are thought to be better processed in the left hemisphere (Freberg, 2006). Speculation on the relationship between emotion and sex differences has been commonly discussed amongst the general population for decades (Kring & Gordon, 1998); however, with the recent increase in consumer emotion testing, the desire to understand this relationship has greatly increased. Perhaps the use of images for eliciting emotions and to visually explain texture attributes could be provided to consumers to obtain novel information about both emotions and texture as perceived by consumers.

The objectives of this study were: (1) to investigate the use of two texture assessment and three emotion assessment methods across three different food categories, (2) to measure change in emotional response throughout the consumption experience, (3) to assess the relationship between change in emotion and texture attributes, and (4) to determine if the change in emotional response differs by sex.

Materials and methods

Emotion and texture testing was conducted across three days in two geographical locations (California Polytechnic State University – San Luis Obispo and The Ohio State University). Four commercial carbonated orange soda products were tested on day one ($n = 217$), six commercial dairy beverages were tested on day two ($n = 219$), and seven samples of commercial convenience cheese samples were tested on day three ($n = 216$). This protocol was approved by the California Polytechnic State University and The Ohio State University human subject review boards.

Subjects

Subjects were recruited by university and public advertisements and email and were selected based upon being consumers of the test products (consumed “everyday” to “about once a month”) and non-users of Crest-Pro health products (these products contain ingredients that may desensitize the tongue). Prior to testing, subjects were asked to complete: (1) a learning styles questionnaire and (2) their “My Pictures” poster board. The My Pictures poster board was divided into 12 boxes (one emotion listed per box) and

subjects were asked to place meaningful pictures (self-selected images selected from personal photos, magazines, internet, etc. of their own choice) that represented the different emotions to themselves in each box. Subjects included students, university staff, and community members (20.9 ± 3.56 years) with 159 females (73%) and 60 males (23%) and participants were financially compensated.

Products

A series of Napping exercises were performed to select the products for testing; commercial samples which elicited different textural experiences based upon defined axes were chosen for testing (Table 1). The Napping exercised were performed separately for each of the different food product categories. The textural attributes chosen to distinguish the orange soda samples were amount of carbonation and bubble size, viscosity and mouth coating for the dairy beverages, and firmness and stringiness for the convenience cheeses. All samples were kept at refrigeration temperature (44°F) until served to subjects; all samples were served directly out of the same refrigerator. The commercial products remained in its original container until the morning of testing. Prior to pouring the commercial dairy beverage, containers were lightly shaken, and poured into two ounce soufflé cups. With the exception of Orangina, the carbonated orange soda were not agitated prior to serving and the convenience cheeses were cut in half and placed on labeled paper plates. Soufflé cups and paper plates were labeled with randomized three-digit codes for serving. Subjects received approximately two fluid ounces of the orange soda beverages and dairy beverages, and half of a convenience cheese stick for testing. A William's design was used for testing; all samples were randomized within and across subjects and each subject saw all products tested on each day: four samples on day one, seven samples on day two, and six samples on day three. No replication was performed; each subject tested each product only once, with approximately 30 s between the end of one sample and the beginning of the next sample. The environmental conditions between the two locations differed slightly between the two locations. At the Ohio State University subjects performed each day of testing in temperature regulated sensory booths (72°F) under incandescent spot lights, while at Cal Poly State University subjects completed the test in a large conference room (70°F) with 14 subjects at a time evenly spaced under fluorescent lighting.

Emotion methods

Three different emotion methods were used for testing (1) words only, (2) Predefined pictures, and (3) My Pictures. The emotion methods were randomly allocated to the subjects upon arrival to the testing sight; randomization occurred separately for each day of testing. The words only method was a control to compare the use of words during testing to images. With the words only method no visual aid was provided, only the words used on the

Table 1
Commercial orange soda, dairy beverage, and convenience cheese samples selected based upon different textural experiences.

	Type of food		Commercial brands
Orange soda	Liquid	Fanta Izze	Orangina Sunkist
Dairy beverage	Semi-solid	Chug chocolate shake Danimals strawberry drinkable yogurt Horizon strawberry milk Lifeway strawberry kefir	Nesquick low fat chocolate milk Silk dark chocolate almond milk Yoo hoo chocolate drink
Cheese	Solid	Albertson's regular sting cheese Frigo light string cheese Frigo regular string cheese	Sargento light string cheese Sargento reduced fat cojack Sargento reduced fat sharp Cheddar

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