



# The French, German, and Spanish sound of eating fresh fruits and vegetables



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## ABSTRACT

A set of onomatopoeic expressions for eating fruits and vegetables is compared across subjects whose native language is Spanish, French, or German. Subjects chose the onomatopoeia that best represented the sound of eating a fruit or vegetable (celery, banana, strawberry, passion fruit, mango, apple, orange, and tomato). Results show there are onomatopoeias that have a higher frequency of response in one language compared to the others. Thus, it is possible to assume that depending on the language there is a better way to express haptic and auditory information associated to fruit and vegetable consumption. Moreover, and considering the three languages, results show there are three categories of responses based on the relative strength of the material (strong and medium strength, and soft). Thus, there is some consistency in the onomatopoeias that represent the sound of eating a fruit or a vegetable. To conclude, results differ by language, but they are consistent within a category of sound.

## 1. Introduction

Today fresh fruit and vegetable consumption is a mayor issue on public health as individuals, foundations and governments aim for weight control, proper intake of nutrients (Ashe & Sonnino, 2013), reduction of risks of heart disease and stroke, and prevention of some types of cancer and digestive problems (Hoejskov, 2014; Shool of Public Health, Harvard, 2016). However, the dilemma remains to find a way to motivate fresh fruit and vegetable consumption. This study uses onomatopoeias as an idea that may boost the expected experience of eating a fruit or vegetable. In this case, the onomatopoeia represents the sound of eating and tasting a fresh fruit or vegetable. This is possible because of the sensory combination of taste and sound (Simner, Cuskley, & Kirby, 2010). Thus, onomatopoeias are used in marketing to exhibit the sensory expression after food consumption. This creates a link between the product and consumers' sensory experience of the product.

The purpose of this study is to determine to what extent onomatopoeias can represent the act of eating a fresh fruit or vegetable and if this representation is consistent across different languages (Spanish, French, or German). The study includes the following fresh fruits and vegetables: Celery, banana, strawberry, passion fruit, mango, apple, orange, and tomato.

## 2. Perception of tactile stimuli

Tactile information is perceived through the activity of the hand and skin because it involves touch and movement, this cutaneous and kinesthetic information is also known as haptics (Gibson, 1962; Klatzky, 2010). The action of touching enables individuals to recognize objects; their texture, temperature, and weight. It may also include negative sensations as irritation or pain. A haptic experience requires individuals to touch, hold, and move an object to understand its properties; thus, touch is an active and proximal sense (Peck, 2010).

From a consumer's behavior perspective, there are specific reasons for touching an object (Peck, 2010). First, hedonic touch is oriented toward having a pleasant sensory experience; touch is done as an end in and of itself. The simplest practical reason for touching is purchase, this is the act of grabbing the object and buying it; where touch is not intended as a source of information. Next, consumers touch, hold and move a product to have non-haptic information (olfactory, auditory or gustatory inspections). Haptic information is used by consumers to evaluate products' quality (Grohmann, Spangenberg, & Sprout, 2007). Consumers who buy fresh fruits and vegetables tend to hold them, having a sense of their weight; shake them, which may be informative about its juiciness; and rub them, move them, and press them, feeling their texture to sense any damage. Through these actions, individuals understand the products' quality, stage of ripeness, and condition for consumption either cooked or raw.

Haptic information is learned. Based on their previous haptic

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experiences, individuals know how to interpret other tactile stimuli. For example, only by observing the image of a product the individual will be able to underhand its material and to recall its sense of touch (Peck, 2010). Based on the idea of touching for learning, this paper assumes that haptic information can be sorted along with other product characteristics. Thus, haptic information can be retrieved after providing an image or a written description of the material, for example the type of texture, weight, or smoothness (Peck & Childers, 2003).

### 3. Sound is informative about touch

The perception of food requires the combination of taste and smell to understand flavor; plus touch, vision and audition to have a complete sense of food (Auvray & Spence, 2008). The act of eating or tasting integrates information gathered from the different senses. Not all of this information is obtained simultaneously. Consumers' can complete products' information based on their previous haptic-sensory experiences like biting, chewing, sucking, and chopping. Therefore, consumers' fruits and vegetable perception has some sensory information obtained directly from the stimulus and some information retrieved from previous experience.

Intrinsic auditory food cues inform consumers about other sensory characteristics like texture, taste, and quality (Demattè et al., 2014; Zampini & Spence, 2004, 2005). The auditory cues occur after biting and eating the food, thus sound is a natural outcome that carries information about food's texture (e.g., crispy, crunchy, slimy). In turn, given the type of food, texture communicates attributes of quality and taste.

After a specific sound is associated to a fruit or vegetable and to attributes like freshness, taste, and texture, this sound can be retrieved to evoke such attributes. Additionally, food auditory cues can be modified to change individuals' perceptions of products' characteristics that affect consumption (Spence & Zampini, 2006). For example, when nursing care food is associated to a “crunchy” chewing sound, the perception of its texture is modified and it becomes rougher. (Endo, Ino, & Fujisaki, 2016). The influence of the auditory characteristics upon taste and touch has been explored in the food industry in products like beverages and potato chips.

The sound produced after biting a potato chip informs consumers about its quality and freshness. Consistently, results for beverages show that the auditory feedback of a sparkling water drink can affect individuals' perception of carbonation if they are holding the beverage, that is, if touch is the sense related to audition (Zampini & Spence, 2005). The effect of carbonation is not observed if the individual only drinks the sparkling water. Thus, products have auditory cues that are related to the characteristics of its materials.

Haptic and auditory information are related, and they are combined in the consumers' experience and memory about the product (Zampini & Spence, 2004). As in the case of potatoes chips and sparkling water, the sound of eating a fresh fruit or vegetable (biting, chewing, and sucking) is an intrinsic auditory effect. Therefore, after eating fruits or vegetables, haptic and auditory information will complement each other depending on the products' material. For example, after biting an apple individuals expect to hear a specific sound related to how hard/soft, juicy, and fresh this fruit is.

### 4. Onomatopoeia

An onomatopoeia is a creative process of the conventional language that consists on imitating a sound, noise or even a shape (Gubern & Gasca, 2008; Sasamoto & Jackson, 2016). The sound of the onomatopoeic word attempts to imitate the correspondent sensory experience; thus onomatopoeias are a symbolic sound that have an emotional dimension (Kagitani, Goto, Watanabe, & Sakamoto, 2014).

Without even noticing, individuals use onomatopoeic expressions in their daily activities to complement and enrich their verbal or written

communication. They use onomatopoeias to represent food consumption, for example, yummy (i.e., delicious), pop (i.e., a popping bubble), or crunch (i.e., material that breaks). These examples describe the interaction individuals have with food, not only through taste, but also through all their senses.

In food consumption, onomatopoeias can be used to understand material textures and the tactile sensations evoked by the haptic experience with food: eating, biting, chewing, and popping. Compared to adjectives (e.g., soft, smooth), onomatopoeias can better describe a texture because they use symbolic sounds to represent a sensory experience (Doizaki, Iibay, Abe, Okataniz, & Sakamotoy, 2013). In fact, onomatopoeias for food texture are easier to use by consumers to describe their emotional evaluation about taste compared to words that describe taste (e.g. bitter, sweet) (Kagitani et al., 2014).

Onomatopoeias are a “composed phenomenon” because they attempt to represent a reality, but at the same time they include the subject's emotional experience (Gubern & Gasca, 2008). It is not an isolated expression; like a word, onomatopoeias are part of a language, have a consistent phonological representation, and a cultural meaning. For some languages that have phonemes that tend to represent ideas through symbols, like Japanese or Chinese, there may be a more extensive and commonly used onomatopoeic vocabulary (Kagitani et al., 2014).

Onomatopoeias complement the general vocabulary of a language with an intuitive idea that represents the sensory experience. Interestingly, although they are part of a language, there are some onomatopoeic expressions that may have a universal value. There is evidence that, to some extent, some symbolic sounds are universal because of the association between open vowels (U and A) and curve rounded shapes or close vowels (I and E) and pointy shapes (Caticallà & Guidi, 2015; Fiischer-Jorgensen, 1978; Imai, Kita, Nagumo, & Okada, 2008).

## 5. Method

### 5.1. Participants

Ninety four participants, 46% males and 54% females, with an average age of 23.60 (S.D. = 6.30) years, took part in this study. Two subjects dropped out from the study after reading the informed consent. The sample was divided in three groups according to participants' native language: Spanish (28.7%;  $n_1 = 27$ ), German (35.1%;  $n_2 = 33$ ), and French (36.2%;  $n_2 = 34$ ). Spanish speakers are individuals who live in Colombia, German speakers live in Germany, and French speakers live in France.

Participants indicated if they had tried each of the fruits and vegetables that were evaluated. The largest number of participants have tried strawberry (96.8%), banana (94.7%), apple (94.7%), orange (92.6%), and tomato (91.5%). A lower frequency of responses was obtained for celery (76.6%). The extent to which participants have tried strawberry, banana, apple, orange, tomato or celery does not differ by language ( $p > 0.1$ ). However, the extent to which participants have tried mango (76.6%) and passion fruit (70.2%) does differ by language ( $p < 0.001$ ). Those who speak Spanish (39.4%) or French (34.8%) have tried passion fruit to a greater extent than those who speak German (25.8%). Contrary, those who speak German (42.6%) have tried mango to a greater extent compared to those who speak Spanish (36.8%) or French (20.6%).

### 5.2. Procedure

Each participant responded to an online questionnaire administered using google forms. After the informed consent, the questionnaire showed pictures of eight types of fruits or vegetables: Celery, banana, strawberry, passion fruit, mango, apple, orange, and tomato. Each type of fruit or vegetable appeared three times, each time with a different

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