*Proceeding Paper*

# Development of an Emotion Lexicon in Greek for the Self-Report and Measurement of Emotions Elicited by Foods †

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**Abstract:** Sensory linguistics and food science meet in the field of consumer studies. Glossaries of emotions and tools for measuring feelings related to food consumption are being developed in order to understand consumer preferences, and to gain insight to be used in consumer-focused product development and marketing. Although there are lexicons and tools for measuring emotions in various languages, there are none in Greek, leading to reduced competitiveness of Greek products and companies. As is the trend in cross-cultural studies, for the present study an English emotion measurement tool was translated into Greek. The consumers with whom the translated tool was tested reported that many of the emotions contained were inappropriate for the task. Thus, the need to develop a lexicon in Greek from scratch was identified. Following the methodology for the development of EsSense Profile (King & Meiselman, 2010) an established commercial measurement tool, input from consumers was collected using questionnaires of various forms and for a variety of foods and beverages. Additionally, language sources were used for the development of the new Greek tool. The World Wide Web and Instagram were also used as linguistic resources, a practice that does not belong to standard methodology but follows current literature. The new emotion lexicon was used as a measurement tool and compared with a broadly used measurement tool that contains emoji.

**Keywords:** food; consumers; lexicon development; emotion measurement; EsSense Profile

## 1. Introduction

Food science is an interdisciplinary field that studies all aspects related to food, from production to packaging and marketing. Consumer studies are an integral part of the field. Monitoring consumers' sensory and emotional responses to foods either implicit, such as facial expression, eye movement, heart rate, body temperature, skin conductivity, or explicit, such as verbal self-report through word- or emoji-based questionnaires, provide insight into the mechanism and degree of product acceptability for product development and marketing that serves the needs of the end user. Specifically verbal self-report is considered a fast, easy, and user-friendly approach, as they do not require much involvement of the participant (Lagast et al., 2017).

The importance of emotions in consumer choice has been identified, and the need to study emotions elicited by foods alongside the sensory features of the products has led to the development of several emotion lexicons. These lexicons can be either language and culture specific (Chaya et al., 2015), or crosslinguistic and cross-cultural (Silva et al., 2016). These emotion lexicons are used as measurement tools combined with grading methods, such as rating scales.

Most food-related emotion measurement tools have been developed in the English language (Panagiotou & Gkatzionis, 2022). For languages less widely spoken, translated

tools are being used, which is time and cost effective (Gutjar et al., 2015; Hu & Lee, 2019; Jaeger et al., 2017). However, such tools do not always provide accurate results, especially as regards emotions, because experience and emotional expression are intrinsically linked to language and culture (van Zyl & Meiselman, 2016). Until recently, food-related emotion lexicons in the Greek language were nonexistent, contributing to the Greek products being at a disadvantage in the Greek and global market.

## 2. Methods

### 2.1. Using an English Tool Translated into Greek

At first, an attempt was made to translate a widely used English tool, the EsSense Profile (King & Meiselman, 2010), into Greek. This tool contains 39 emotions with rating scales. The translation of the emotion words was done by the authors, native speakers of Greek, proficient in English, certified in translation and bilingual lexicography, using typical methods of translation and backtranslation. The emotions were not translated one to one, but all emotions on the English list were semantically covered by the emotions on the Greek list. As a result, the translated lexicon consisted of 36 instead of 39 words. The translated tool was tested with 134 Greek participants for a variety of foods. The participants reported that many suitable food-elicited emotions were missing from the list and that most emotions on the list seemed "odd", "unsuitable for the task at hand", and "not food-elicited". This can be attributed to food-related cultural and linguistic differences between English and Greek consumers (Panagiotou, 2022).

### 2.2. Development of the Greek Tool from Scratch

Subsequently, the development of a Greek food-related emotion lexicon from scratch was undertaken. Typical vocabulary sources were used, such as dictionaries and thesauri, as well as input from consumers. The WorldWideWeb and Instagram were also used as language sources, which is not yet the norm, but follows modern literature (Tsakalidis et al., 2018; Vaezian, 2018). From term collection to validation of the new emotion measurement tool 1933 people participated in total; of them 983 took part in the development process, and 950 in the validation process.

A Greek thesaurus was used to create a full list of emotion words, not food-specific. They had to collocate with the verb "feel" (e.g., "I feel upset" but not "I feel violent"). Through this process 204 adjectives were collected. Then, a dictionary of Modern Greek was used to group synonyms. The adjectives that remained on the list were 119. The most general or the most frequently used term from each group of synonyms, according to the dictionary and the thesaurus used, was chosen to represent the group as an "umbrella term" (i.e., the term that semantically covers all others within the group).

The list of 119 terms was randomly broken down into three groups of words. Each group of adjectives was presented to native speakers of Greek in a Check-All-That-Apply (CATA) questionnaire in an online survey. The participants were instructed to think about how they feel when consuming their most favorite and least favorite foods and choose the words that express their emotions. The 23 terms selected by more than 20% of the participants were kept for further testing.

To make sure that the emotions evoked by all major food categories were represented on the list, a CATA questionnaire with a short-answer section provided after each choice was set up using the same three randomly created groups of adjectives from the previous stage. The participants were provided with a set of emotions and were instructed to choose only those that express emotions elicited by foods and provide an example of food that elicits this emotion.

To provide participants with a different type of stimulus, instead of word-based questionnaires used in previous stages, a questionnaire with pictures of foods was set up. It consisted of 34 pictures of foods and beverages with an open-ended answering space below each. The pictures were selected purposefully to cover various every-day (e.g.,

cooked vegetables, legumes, bread, coffee, pasticcio, souvlaki) and celebratory conditions (e.g., Easter lamb on the spit, magiritsa soup, champagne, ouzo with seafood meze) of food and beverage consumption for the Greek culture, as well as foods not habitually consumed by the Greeks (e.g., insects, tartare, sushi, Roquefort cheese). The task was to write one to three adjectives expressing the emotion that each food/beverage evoked in the participant.

To deepen our understanding of how emotion related to foods is expressed in Greek, the Web and Instagram were used as corpora. The Google search engine was used to check whether the 119 terms of the original list were indeed used in natural speech by consumers. The emotions on the list were confirmed.

The same 119 terms were searched for on Instagram as hashtags, to check the connection between foods and emotions, and the positive/negative valence of the emotion words. The latter was done by assessing the posts as a whole: text, picture, emoji/emoticons, hashtags. During this stage, 18 terms were added to the list. This confirms the facts that language sources of authentic speech are required and that the Web and social media provide valuable linguistic and cultural data.

After performing statistical analyses and assessing the list of emotions acquired from all sources, the final list was reduced to thirty-three (33) emotion terms. Thus, the new Greek food-related emotion lexicon consists of the words: angry, ashamed, calm, cheerful, cheerless, disappointed, disgusted, dissatisfied, energetic, glad, good-looking, grateful, guilty, happy, healthy, nervous, optimistic, pleasant, pleased, privileged, relaxed, relieved, resentful, sad, satisfied, sensual, stressed, tired, uninterested, unrestrained, unsatisfied, weak, whole.

### 2.3. Validation Process of the New Greek Emotion Measurement Tool

To validate the emotion measurement tool and check its discriminating ability, eleven different food items (classic non-carbonated orangeade, non-carbonated orangeade with propolis extract, crackers, olives, olive oils, pizza, vanilla ice cream, fried chicken, meat and potatoes, chocolate, fruit) were used in CLTs and online surveys, within and across food categories. More specifically, the final emotion lexicon list was used with CATA and rating scales questionnaires, as was the EsSense Profile. The stimuli used to elicit emotions were food tasting, food names, and food pictures.

### 2.4. Comparing the New Greek Emotion Measurement Tool to an Emoji-Containing Emotion Measurement Tool Using Greek Consumers

Finally, as an extra validation check, following the current trend in written communication of expressing emotions using emoji, the new emotion measurement tool and a widely used emoji-based measurement tool (Jaeger & Ares, 2017), both containing 33 emotions, were used with Greek consumers for pizza, fried chicken, vanilla ice cream, meat and potatoes, chocolate, and fruit (Panagiotou, 2022). List of emoji used:

😣 😭 😌 😛 😌 😫 😌 🥴 😣 😍 😚 😴

😊 😄 😁 😉 😔 😏 😑 😮 🙁 😯 😖

😅 😐 😀 😠 😓 😎 😩 😬 😱 🙂

## 3. Results and Discussion

CATA analyses, Cochran's Q tests, Principal Components Analyses (PCAs), ANOVAs and Reliability Analyses were used to validate the emotions on the final list for each of the validation case studies. The tool was able to discriminate between samples of the same food category and across different food categories. By performing ANOVAs, statistical differentiation was provided by more than 20 out of the 33 emotions, which is a satisfactory 70%, assessing this according to other measurement tools in literature.

Some of the words on the emotion list, such as *healthy*, *sensual*, and *good-looking*, are not emotions in the strict sense of the term. However, these words appeared very frequently in all consumer-defined sources, namely the Web, Instagram, and questionnaires, as feelings/sensations elicited by food consumption. These words also appear frequently in advertisements of products in general, and food products specifically, and are a key driver of purchase.

The PCA and ANOVA statistical analyses performed on the data from the word- and emoji-based tools provided different groupings of the foods and different amounts of statistically significant emotions (23 out of 33 words, 13 out of 33 emoji) (Figures 1 and 2). The word-based tool provided more accurate and detailed distinction among the food categories, while the emoji-based tool provided almost identical emotional profiles for all food categories.
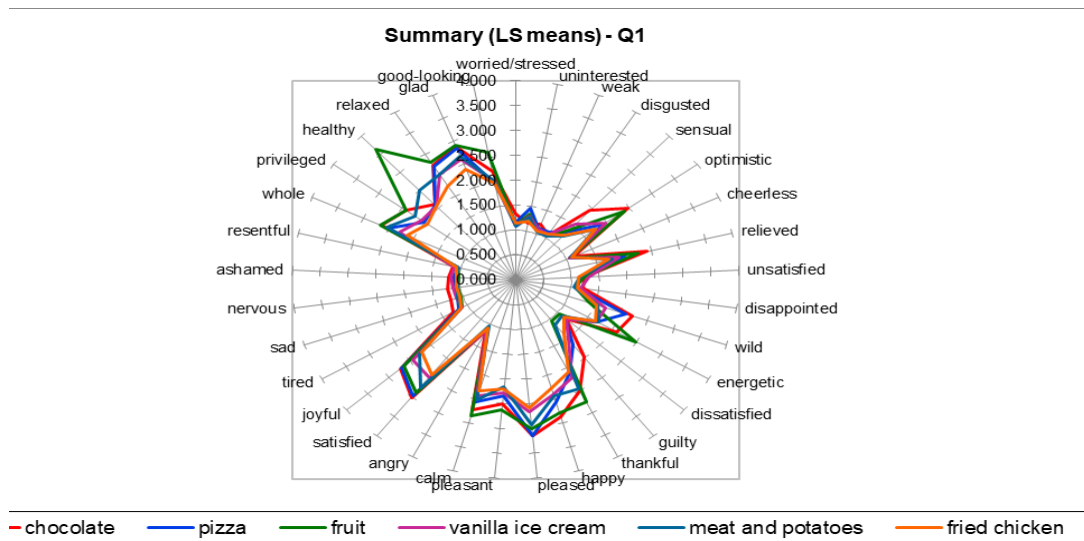


**Figure 1.** Summary of SL means from ANOVA of word-based tool: 23 out of 33 emotion-words were statistically significant.
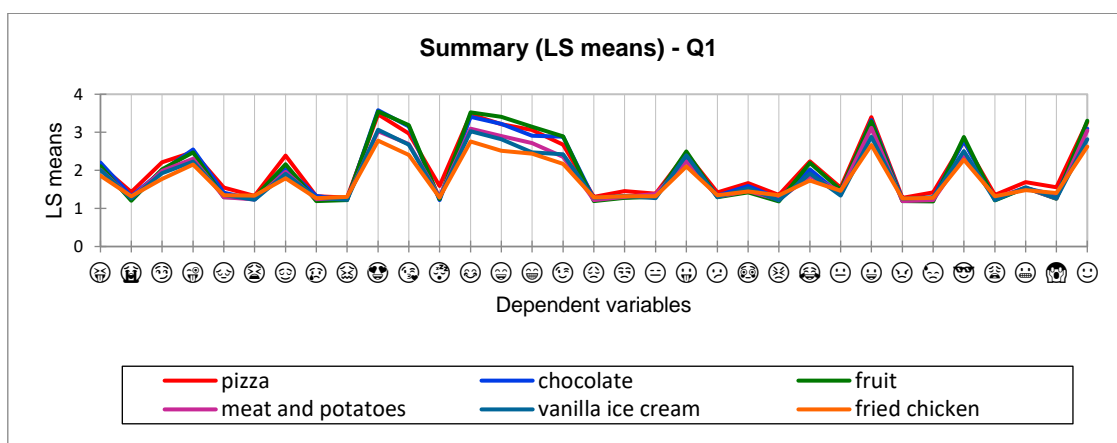


**Figure 2.** Summary of LS means from ANOVA of emoji-based tool: 13 out of 33 emoji were statistically significant.

## 4. Conclusions

The choice between using a translated emotion measurement tool versus using a tool developed in Greek for the Greek consumer must be an informed one. Having readily available tools, translated from another language, can be quicker and more economical but it is preferable to use emotion measurement tools developed in the language and

cultural context in which they are going to be used. Culture- and language- specific tools provide more accurate results and are more participant friendly.

The use of social media as language sources provides the advantage of combining words with images, and are a means of spontaneous self-report on behalf of the consumers. However, it should be taken onto account that posts usually aim at attracting followers and "likes", and thus the content can be exaggerated.

The Greek emotion measurement tool developed is the first tool of its kind, specifically developed for the Greek language and the Greek consumer.

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