Food Research International 90 (2016) 91–99

Contents lists available at ScienceDirect

Food Research International

journal homepage: www.elsevier.com/locate/foodres

An itinerant sensory approach to investigate consumers' perception and acceptability at a food exhibition

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ARTICLE INFO

Article history:
Received 17 August 2016
Received in revised form 20 October 2016
Accepted 23 October 2016
Available online xxxx

Keywords:
Itinerant sensory session
Consumer acceptability
Rate-all-that-apply
Just-about-right scale
Decision tree
Food pairing
Parmigiano-Reggiano cheese

ABSTRACT

In a food exhibition where several producers of the same product category are present at the same time, consumers usually have the opportunity to taste several free samples of the same product type, thus they can experience and compare the sensory characteristics of each and evaluate their liking for each sample tasted. This study assessed the potential of an itinerant sensory data collection in understanding the consumers' perception and acceptance of cheese during a multiple tasting experience at a food exhibition. Subjects tasted seven samples of Parmigiano Reggiano cheese aged for different times (24 and 36 months) at seven producer stands and recorded their evaluations using tablets, on which an application specifically developed for this study was installed. This evaluation situation was defined as "pseudo-natural," in opposition to the "natural" and the "naturalistic" settings. The itinerant sensory session comprised a liking test, a rate-all-that-apply (RATA) test using a just about right (JAR) scale, a food pairing test, and a questionnaire. Consumers significantly ($p < 0.05$) discriminated the cheeses as a function of the aging time, describing with different attributes the 24 months (sweetness, fresh fruit, grass, yogurt, butter flavors, elasticity, and humidity) and the 36 months (saltiness, bitterness, sourness, spicy, aromatic herbs, cheese rind flavors, crumbliness, granularity, hardness, and hotness) aged products. The combined application of regression models, Penalty-Lift analysis, and decision tree models in investigating the relationships between liking and the RATA data, provided results revealing that the attributes elasticity, sweetness, humidity, fresh fruit, and butter were the main drivers of liking. Whereas, the attributes sourness, bitterness, and hardness were the main drivers of dislike. Therefore, even though no significant differences in terms of liking were observed among the tested cheeses, consumers preferred the attributes more frequently perceived in the least aged products. In conclusion, the presented itinerant sensory approach had provided meaningful information to understand the consumers' cheese perception and acceptability. In the future, it could advantageously be applied for studying food perception in other situations in which subjects naturally choose or consume several products while freely moving from one to another (e.g. self-service restaurant).

1. Introduction

During food fairs, it is quite common for producers to offer free samples of their product to consumers. Free samples are one of the most broadly used sales promotion strategies (Chen, Marmorstein, Tsiros, & Rai, 2012) in order to stimulate immediate sales, product interest, and provide added value to a good (Prendergast, Shi & Cheung, 2005). A free sample could be a product or a portion of food given to consumers (De Bower, 2011). For food products that are stable at room temperature, the sample can be provided as a packaged product, thus it can be consumed in a different moment and space. For fresh products, producers have the opportunity at a food fair to offer consumers small portions of food (e.g. pieces of cheese, slices of cured meat, portions of bakery products, etc.) served without packaging, on a tray available at their stand. This last choice would suggest the consumption of the product directly at the stand. By trying and feeling the product, the self-expression of consumers can be promoted (Reid, Thompson, Mavondo, & Brunso, 2015) and hedonic judgments and free comments about the product can be generated. Dependent on the individual attitude, consumers would be prone or not to share their opinion with the producer. At the end of the free tasting, consumers could freely decide whether to buy the product or not. When different producers of the same product category are present together in the same food exhibition, consumers could potentially taste the products from all or some of these producers. This possibility represents a great opportunity for consumers to experience the sensory characteristics and evaluate their liking for each product tasted. For those consumers interested in purchasing one or more products, this itinerant multiple tasting experience could play an important role in driving their selection of the product to buy. In this natural setting for food tasting, it would be of great interest to understand the consumers' liking and the sensory attributes driving it.

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http://dx.doi.org/10.1016/j.foodres.2016.10.041
0963-9969/

Generally, food acceptance testing can be conducted in laboratories, in a naturalistic setting (designed to imitate or produce a realistic effect or appearance), or in a completely natural environment (real places where people normally choose, purchase, and/or eat) (Meiselman, 2007). While it is possible in laboratory testing to focus on the sensory properties of samples and to control for external variables related to the eating environment, it was observed that laboratory liking tests underestimate true product acceptability (Meiselman, King, & Hottenstein 2004) and were poor predictors of consumption (Cardello, Schutz, Snow, & Lesher, 2000). This could partially be due to consumers having different expectations for products in different locations (Cardello, 1994). Moreover, it was reported that a laboratory test is appropriate when the task is purely sensory (e.g. formulating a blend of ingredients) but when the aim is the measurement of liking a more natural setting should be considered. Studies conducted in natural settings were reported to have the advantage of higher external validity (Meiselman, 2007). Several studies were conducted to assess consumer food choice and acceptance in natural and realistic eating situations (Hersleth, Ueland, Allain, & Næs, 2005; Boutrolle, Delarue, Arranz, Rogeaux, & Ko, 2007; King, Meiselman, Hottenstein, Work, & Cronk, 2007; García-segovia, Harrington & Seo, 2015). However, to our knowledge, no research is reported in the literature that focused on the consumers' food perception in a natural or naturalistic setting in which an itinerant multiple tasting is considered, such as one occurring at a food exhibition or in a similar context of consumption.

The general aim of this research was to test the potential of a proposed itinerant sensory data collection in investigating consumers' food perception and acceptance during a multiple tasting experience at a food exhibition, in a situation that we could define as "pseudo-natural." This term was chosen to indicate that the tests were conducted in an existing location where people normally eat (conventional definition of natural setting) but evaluating the products following a pre-determined procedure (described below). Specific objectives of this work were: 1) to assess the feasibility of collecting sensory data by an itinerant session in a pseudo-natural setting; 2) to explore the perception of food sensory attributes by consumers during an itinerant sensory session; 3) to explore the impact of the sensory attributes perceived by consumers on their food pairing elicitations; 4) to explore the influence of the attribute perception by consumers on their liking for food products. In particular, the consumers' perception of Parmigiano Reggiano cheese was investigated at a food exhibition by means of tablets on which was installed an application for sensory data collection, specifically developed for this study.

2. Materials and methods

2.1. Cheeses

Seven Parmigiano-Reggiano cheese samples certified as protected designation of origin products (PDO) by the consortium "Consorzio Tutela Parmigiano Reggiano" were analyzed. Among the sampled cheeses, four were aged for 24 months (product codes: 24a, 24b, 24c, and 24d) and three for 36 months (product codes: 36a, 36b, and 36c). Each cheese sample was provided by a different cheese producer exhibiting his product at an international event dedicated to food and gastronomy called "Salone del Gusto Terra Madre" (Turin, Italy).

2.2. Subjects

Sixty-five subjects (55% males, 45% females; mean age = 55 years old) were verbally recruited among the participants of the "Salone del Gusto Terra Madre" event. Intercept sampling procedure was applied. Experimenters were positioned in a well-defined location in "Salone del Gusto Terra Madre". Each experimenter invited to participate to the study a visitor every 10 min between those who at that time went by the location. The inclusion criterion was that the subject was not a staff member of "Salone del Gusto Terra Madre", he was at least 18 years old and he was Italian, because the questionnaire was written in Italian. Subjects voluntarily joined the study and received gadgets and food products (vacuum-packed Parmigiano-Reggiano cheese and sausages) as incentives for their participation to promote motivation and to increase the likelihood of completing the evaluations. Participants took 45–60 min to complete the required tasks.

2.3. Location

The sensory tests were carried out in an area of the pavilion of the "Salone del Gusto Terra Madre" exhibition dedicated to the marketing of food products from the Emilia-Romagna region (the area where the majority of Parmigiano-Reggiano cheeses are produced). This location was chosen in order to conduct the study in the natural consumption environment of consumers visiting a food exhibition. Although the testing conditions were less controlled than in a sensory laboratory (ISO 8589, 2007), the data collected in a more realistic context are likely to be good predictors of product success in the market (Hultén, Broweus, & van Dijk, 2009; Meiselman, 1993).

2.4. Tablet application

The data acquisition was performed by means of a tablet application that was specifically developed for this study and named Sensorial. Sensorial is an Android SDK application compatible with releases ≥4.x. The code was written in Java using the object-oriented paradigm. The size of the application is ~1 MB. The application was installed on eight tablets (Lenovo PC GK Ltd., model A3500-FL) with a 7.0 1280 × 800 LCD IPS screen and an Android 4.2 operating system.

2.5. Experimental procedure

2.5.1. Itinerant approach

An itinerant sensory data collection was developed in order to simulate a multiple tasting experience that often occurs when consumers visit a food fair with the opportunity to taste free samples of several products belonging to the same product category. For this purpose, each cheese sample was evaluated by consumers not in a sensor booth or in a tasting room but at the stand of each cheese producer. At his/her stand, each producer was provided with one tablet, which was associated to his/her cheese sample. Before the beginning of the sensory tests, the experimenters individually instructed the producers in using the tablet, presenting the cheese sample in a blind condition (one piece, about 25 g), and providing instructions on how to use the tablet to the participants (if necessary). After recruiting the participants, the experimenters introduced them to the data collection procedure. In particular, they explained that the data collection was based on the use of a tablet and on the tasting of seven Parmigiano Reggiano cheese samples offered at the stands of seven producers. Firstly, the experimenters used the eighth tablet to instruct the participants in providing their responses using the Sensorial application. Secondly, the participants were provided with a black and white pavilion map on which the seven stands of the cheese producers were highlighted with red rectangles and identified by evident red alphanumeric 4-digit codes. The stands of the seven cheese producers involved in the research were located in a limited area (75 × 35 m) of the entire pavilion (141 × 54 m). The pavilion map also showed the subject code and the sequence of the stand codes indicating the itinerary that the participants were required to follow for tasting the cheese samples. The pavilion map was personalized for each subject in order to randomize and balance the sample tasting order. At each stand, participants were required to taste a cheese sample and perform the following described tasks.