

How to use a Living Lab restaurant to study satiety and food intake in a real meal situation?

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Introduction

Studying consumers' preference leads to raise the question of judgment variability, linked to the sensory quality of the products but also to subject differences and context influence. Context effects are more and more described such as interpersonal conditions, product presentation, label, price, physical environment etc. [e.g. 7, 2, 4, 6 & 15].

However, many food studies have grown on a *Stimulus – Response* model but such laboratory methods to get knowledge on food products do not take contextual factors into account.

Thus, it is clearly needed to consider food perception in a synthetic perspective determined by the object, the subject and the eating context [e.g. 12, 13]. Considering food preference in this triad perspective, new methodologies are developed, based on choices and decision making theories, on usages and practices descriptions, on perception and cognition models. Real-life situation approaches allow pointing out the complexity of food behaviour as opposed to controlled laboratory stimulus based approaches.

More specifically, experimental environments mastering *the food, the eater and the meal environment* are now available through experimental restaurants where cooks control the recipe, where consumers are clients and where the ambiance is also controlled (<http://www.institutpaulbocuse.com/us/food-hospitality/>).

Principle

The multidisciplinary environment of the Institut Paul Bocuse Living Lab offers a place where scientists work together with chefs and headwaiters, sharing points of view, methodological feedback and research results from their respective fields of competences.

The meal offer, the eaters and the environment are designed or selected depending on the objective of each study, reproducing the real-life situation under study in the Living Lab. Several studies will be presented to illustrate the diversity of possible designs:

- A school restaurant providing school meals and inviting children for their lunch break on a regular school day [8]
- A workplace restaurant, providing a single menu offer and gathering colleagues at the same table for a free meal [3]
- A cafeteria restaurant with a self-service device available for any consumer at a reasonable price [9, 14]
- A gastronomical restaurant with a 2 starters / 4 main courses offer with paying customers coming for dinner in groups of relatives – friends or family [10, 11]

More controlled buffet designs are also possible to study food intake and satiety in a naturalistic environment at the behavioural, psychological and biological levels [1].

Environment

The Living Lab is designed to replicate actual cooking and consumption situations. Both the floor and the ceiling of the restaurant and the kitchen are modular to adapt to different equipment configurations, allowing for the construction of different eating contexts. We are thus able to create every type of restaurant environment: traditional, collective, brewery, cafeterias, etc. as well as to change the kitchen configuration for specific studies. This includes changes in the ambiance and décor with adjustable temperature, sound system, visual environment, lighting, table dressing, plates and cutlery etc.

Participants

Users are key components of each Living Lab study. Chefs, waiters, consumers are involved as actors of real-life situations – captured through *in situ* methods.

Users are not necessarily aware of the whole range of issue of the study; discrete data acquisition material and adequate contextual setting provide a strong sense of real-life situation to users. This is particularly true for the experimental restaurant when it is used as a commercial restaurant.

Food

The food is prepared by students in culinary art programs under the supervision of a chef instructor. The selection of raw material, ingredients, and processes is made on the basis of the real-life situation to reproduce, both qualitatively and quantitatively, and in respect with supply chain and cost constraints. The way food is displayed, served, sold is also defined in line with the natural reference.

Data collection

The Living Lab is equipped with a data acquisition system (video cameras, microphones, and computerized questionnaires) as well as a laboratory for biomedical sampling and food control analyses.

Each work is based on human behaviors through observation, questionnaires or experimental tasks.

Ethnographic studies are done through video, interviews and food preference through questionnaire (visual analog scales), experimental economics (willingness to pay) or behavioral data (choices, served or consumed food). With the collaboration of academic partners (CENS, The European Center for Nutrition and Health, CRNL, The Lyon Neuroscience Research Center), complementary physiological and nutritional analyses can be performed and coupled with behavioral analysis.

The combination of all tools allow the acquisition and the comparison of behavioral, psychological and physiological data

Conclusion

To sum-up, the Living Lab experimental Restaurant allows the Center for food and Hospitality Research to develop an original research strategy that takes into account three major concerns:

- The taste and pleasure of a meal, tasting, table etiquette, service, hosting and hospitality;
- Health and well-being, nutritional balance, physiological and mental well-being;
- The environment of people eating, in its economic, social and contextual aspects...

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