

ADAPTATION OF THE FOOD CHOICE QUESTIONNAIRE - DIGITALIZATION OF THE WORD ASSOCIATION METHOD

DIGITALIZED WORD ASSOCIATION METHOD

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Abstract

In the last decade, bread consumption shows a decreasing tendency in Hungary (from 44.5 kg/capita to 34.4 kg/capita between 2010 and 2018). Our aim is to identify and explore the factors influencing the consumption of bread and bakery products, including whole grain breads, using the Food Choice Questionnaire (FCQ).

FCQ is frequently used in international research to explore factors (e.g., price, ingredients, packaging, *etc.*) influencing the purchase of different food products. The adapted version of the FCQ for breads and other bakery products is not yet available in Hungarian. According to the literature, word association (WA) and triangulation methods are used in the adaptation process.

Due to the epidemic situation, the WA method could not be performed offline, therefore we developed an online word association application presenting six different photos of breads. This was completed by 193 participants. Responses were then analysed using a triangulation technique, in which the associations of the participants were categorized by professionals, first individually and then by consensus. Based on these categories, the FCQ can be modified. In the current study we present the implementation and the results of the digitalized WA method and its use in the adaptation process of the FCQ.

Keywords: bread consumption, food choice questionnaire, word association method, digitalization

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Introduction

Carbohydrates are the easiest energy sources to use, the body's essential nutrients, which are found in the largest quantities in plants, including cereals, thus in cereal-based food products. They are classified as energy-providing nutrients, but the indigestible carbohydrate polymers also play an important role in maintaining the normal functioning of the human body, as these dietary fibres can help in controlling body weight, reducing blood sugar and serum cholesterol levels, and reducing the risk of gastrointestinal cancers (Stephen et al., 2017).

According to the data of the Hungarian Central Statistical Office, bread consumption in Hungary fell from 44.5 kg / person to 34.4 kg between 2010 and 2018 (KSH, 2018). In addition, the popularity of white bread also decreased, from 76 % to 61 % between 2007 and 2017, according to GFK Hungária (Agrárszektor, 2017). This decreasing of bread consumption also reduces carbohydrate intake, which is 45.8 percent of the daily energy intake, based on the 2014 data of the Hungarian Diet and Nutritional Status Survey (Sarkadi Nagy et al., 2017). This is the lower limit of the daily carbohydrate intake recommended by EFSA, which is 45-60 % of the energy intake, and energy shortages from carbohydrates are covered by fats (European Food Safety Authority, 2010). The recommended daily fibre intake is 25 g to ensure healthy intestinal function (European Food Safety Authority, 2010). In contrast, Hungarians consume only 22.9 g of dietary fiber a day (Sarkadi Nagy et al., 2017). These factors affect health both directly and indirectly through obesity.

Our aim is to identify and explore the factors influencing the consumption of bread, including whole grain breads, using the Food Choice Questionnaire (FCQ). This questionnaire is often used in international research to explore which factors (*e.g.* price, ingredients, packaging, taste, convenience) influence the purchase of a particular food (Steptoe et al., 1995). The version of the questionnaire adapted for breads is not yet available in Hungarian, so the aim is to create and validate it. According to the scientific literature, word association (WA) and triangulation methods are used in the adaptation process.

Materials and methods

The adaptation method of the FCQ was based on the work of Linh and co-workers (2019).

The Word association method

In the word association method, respondents are presented with terms / product descriptions / images related to the topic, after which they have to describe the first 3-4 phrases,

associations, images, thoughts, or feelings that come to their mind about the given stimulus (Ares & Deliza, 2010). Due to the epidemic situation, this method could not be performed offline, therefore we developed an online word association application.

The development of the online Word Association application

The application presented six different photos of breads. The code was written in Java (54.4 %), HTML (42.3 %), CSS (2.9 %), JavaScript (0.4 %) programming languages, the recorded data were extracted in .xlsx and .json file formats. The language of the interface was Hungarian. The application was also optimized for mobile devices. The respondents were students at the Hungarian University of Agriculture and Life Sciences, and also recruited in Facebook using the snowball technique.

During the offline method, respondents usually have half a minute to respond. However, based on our trial completions, this time proved to be short for the online responses. Thus, in the finalized questionnaire, there was one minute to describe four associations for each image, after which the application automatically proceeded to the next part of the questionnaire. The six images appeared in random order for each respondent. To make the data easier to process, participants had to enter their associations separated by semicolons.

At the end of the questionnaire, respondents had to answer a series of demographic questions (gender, age, type of residence). At the beginning of the questionnaire, they were informed that no respondents can be identified based on these data.

Triangulation method

Responses to the WA were analysed using a triangulation technique, in which the associations of the participants were categorized by professionals, first individually and then by consensus (Linh et al., 2019). Based on these categories, the FCQ could be modified by removing categories which are irrelevant in the case of the examined product group and/or by adding new, relevant categories.

Results

The user interface and the obtained results of Word Association application

The final appearance of the application and the responding interface are shown in Figures 1-5.



Figure 1: The initial interface of the application

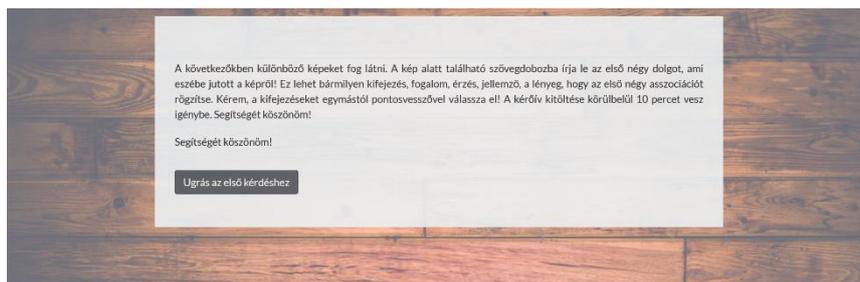


Figure 2: The instructions for the respondents

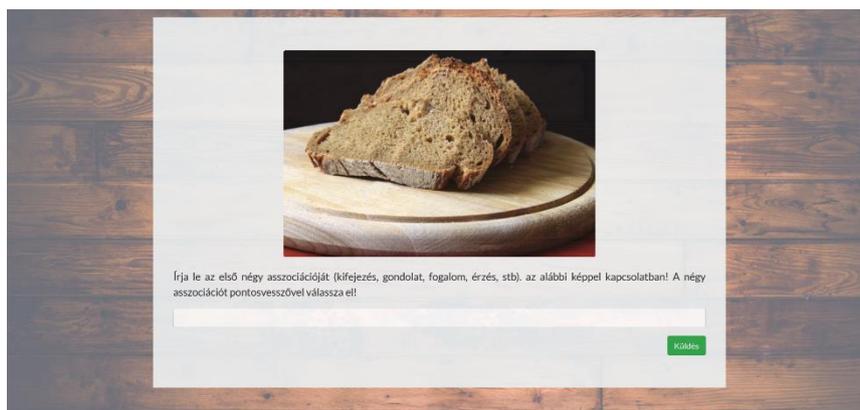


Figure 3: The responding interface

Figure 4: The interface of demographic questions

Figure 5: The final interface of the questionnaire

37 males and 156 females participated, the ratio of genders are 19.17 % male and 80.83 % female. The youngest respondent was 18 years old, while the eldest was 66 years old, the average age was 29.91 ± 8.92 years. Based on their residence 55.96 % lived in the capital (Budapest). A total of more than 4,500 phrases were collected about the six images.

The most common terms related to the sensory characteristics of bread (*e.g.* tasty, soft, brown, white, crispy), to its effects on health and its nutrients (*e.g.* healthy, unhealthy, fattening, fibrous, gluten) and to its quality and origin (*e.g.* fresh, rose, dries quickly, home, store) were related. Many expressions related to the respondent's families and moods (*e.g.* grandma's bread, my mother's bread, family dinner, childhood memories, Sunday morning). Terms related to bread ingredients (*e.g.* flour, wholegrain flour, seeds, yeast, preservatives) and other foods associated with bread (*e.g.* butter, pork fat and onions, goulash, fish soup, egg) were also common. Most of the generally bread-related terms appeared in the case of all pictures. Other terms were usually directly related to the type of bread shown in the picture (*e.g.* 'preservatives' for packaged toast bread, 'seeds' for the bread with linseeds and sesame seeds, 'holiday' for loaf tied with a national colour ribbon).

The Triangulation method

The data obtained with the word association application were sorted. After deleting the incorrect, incomplete fill-ins, the remaining terms were filtered based on their meaning and then grouped into larger groups. Thus, a total of 691 terms were categorized, first independently and then by consensus. During the consensus, these categories were compared with the original FCQ categories and terms. As a result, of the 36 terms of the original questionnaire 11 not-bread-related terms were deleted, 3 terms were modified, and 7 new, bread-related terms were added. Together with the remaining 22 terms, the new, adapted Food Choice Questionnaire consists of 32 terms.

This questionnaire will be used after the test-retest method, which will provide information about its reliability and repeatability (Dikmen et al., 2016).

Discussion

Due to the pandemic caused by COVID 19, it has become essential in almost every sector to develop solutions that do not require personal presence, of which research and development is no exception. In the fields of sensory evaluation and consumer science, it is difficult to implement, since sensory evaluation tests often need in laboratory conditions, and interviews, or focus group discussions take place with personal participation.

According to the guidelines of the Institute of Food Science and Technology, in the case of sensory evaluation tests, it is mandatory to separate the panelists, both during the tests and the evaluation. This is best achieved by keeping the 1.5 m distance. Disinfection of used equipment is essential. It may be appropriate to use home use tests if the tested product and the methodology allow it.

The same applies in the case of consumer science methods that require a personal presence. It is also possible to perform some methods online or with fewer participants (*e.g.* focus groups). The advantage of many questionnaires is that they can be completed online, or remotely (Bailey, 2020).

In the case of the WA questionnaire, the key questions were to determine the response time and how to record the data. It was important to have a longer time for responding than the available time in the case of personal presence, as the speed of typing varies from individual to individual. To separate the terms from each other, we had to choose a symbol that is unlikely to be used by respondents in the terms described. It was also key that the application be optimized for smartphones and tablets as well, since nowadays people use them more frequently, than computers.

Overall, based on the answers, the results, and the feedback from the respondents, we successfully digitized the Word Association method.

Conclusions

With the successful digitalization of the Word Association method, we carried out a methodological development that allows us to easily and simply perform similar tests even after the epidemic situation is over, since in our accelerated world, consumers are more easily accessible online.

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Aknowledgements

BB thanks the support of Doctoral School of Food Sciences, Hungarian University of Agriculture and Life Sciences. AG thanks the support of the Premium Postdoctoral Research Program of the Hungarian Academy of Sciences and the support of National Research, Development and Innovation Office of Hungary (OTKA, contracts No. K134260). Supported by the ÚNKP-20-3-II-SZIE-23 New National Excellence Program of the Ministry for Innovation and Technology from the source of the National Research, Development and Innovation Fund. The Project is supported by the European Union and co-financed by the European Social Fund (grant agreement no. EFOP-3.6.3-VEKOP-16-2017-00005).