

Adaptation of the food choice questionnaire – Digitalization of the word association method

BARBARA BIRÓ*  and ATTILA GERE

Hungarian University of Agriculture and Life Sciences, Institute of Food Science and Technology,
Villányi út 29-43, H-1118, Budapest, Hungary

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ABSTRACT

In the last decade, bread consumption was decreasing in Hungary (from 44.5 kg to 34.4 kg/capita). Our aim is to identify the factors influencing the consumption of different bread and bakery products, using the Food Choice Questionnaire (FCQ).

FCQ is frequently used to explore factors (e.g., price, packaging, etc.) influencing the purchase of different food products. The adapted version of the FCQ for breads and bakery products is not yet available in Hungarian language. Word association (WA) and triangulation methods are usually used in the adaptation process.

Due to COVID-19, WA method was performed with a newly developed application presenting six photos of breads. This was completed by 193 participants. Responses were analysed using a categorizing triangulation technique, based on which the FCQ was modified.

In this 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, consumer choice, word association application, online consumer research

* Corresponding author. E-mail: barbarabirophd@gmail.com, biro.barbara.4@phd.uni-szie.hu

INTRODUCTION

Carbohydrates are the simplest 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 decrease 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 fibre a day (Sarkadi Nagy et al., 2017). These factors affect health both directly and indirectly through obesity. However, the consumption of grain products greatly facilitates the intake of the recommended daily amount of fibre, provided by producing wholegrain products, with flours containing the bran part of the grain (Magyar et al., 2020).

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 (Stephoe et al., 1995). The version of the questionnaire adapted for breads is not yet available in Hungarian language, 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 et al. (2019).

The used FCQ was the original version developed by Steptoe et al. (1995) (Fig. 1).

The original Food Choice Questionnaire and its translation

The translation of the questionnaire to Hungarian was performed based on the work of Beaton et al. (2000). The work of two target-language translators (one initiated and one uninitiated) was used to produce two translations. After a consensus, this translation was translated back from Hungarian into English by two native English-speaking translators. The final Hungarian questionnaire was created after comparing this new English version to the original one.



It is important to me that the food I eat on a typical day:	1 – Not important at all	2 – A little important	3 – Moderately important	4 – Very important
is easy to prepare				
contains no additives				
is low in calories				
tastes good				
contains natural ingredients				
is not expensive				
is low in fat				
is familiar to me				
is high in fibre and roughage				
is nutritious				
is easily available in shops and supermarkets				
is good value for money				
cheers me up				
smells nice				
can be cooked very simply				
helps me cope with stress				
helps me control my weight				
has a pleasant texture				
is packaged in an environmentally friendly way				
comes from countries I approve of politically				
is like the food I ate when I was a child				
contains lots of vitamins and minerals				
contains no artificial ingredients				
keeps me awake and alert				
looks nice				
helps me relax				
is high in protein				
takes no time to prepare				
keeps me healthy				
is good for my skin/teeth/hair/nails etc				
makes me feel good				
has the country of origin clearly marked				
is what I usually eat				
helps me to cope with life				
can be bought in shops close to where I live or work				
is cheap				

Fig. 1. The original Food Choice Questionnaire (edited by the authors, adapted from Steptoe et al. 1995)



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 Figs 2–6.

Thirty-seven males and 156 females participated, the ratios 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





Fig. 2. The initial interface of the application



Fig. 3. The instructions for the respondents

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



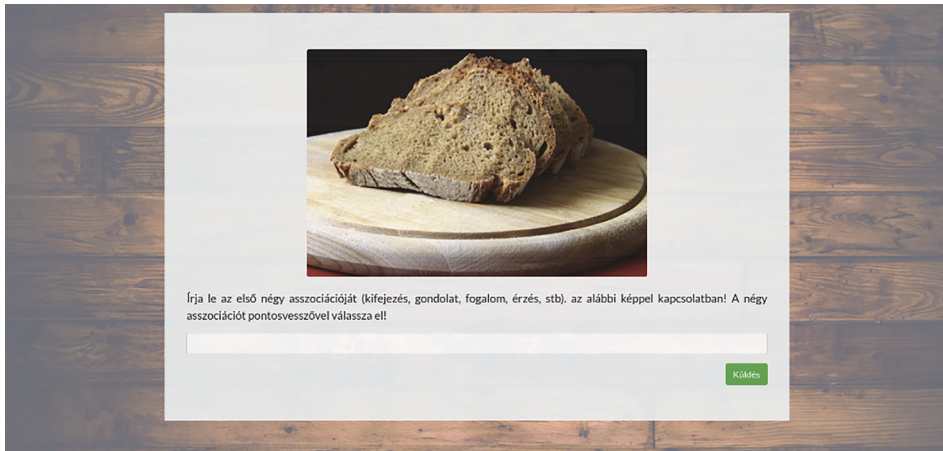


Fig. 4. The responding interface

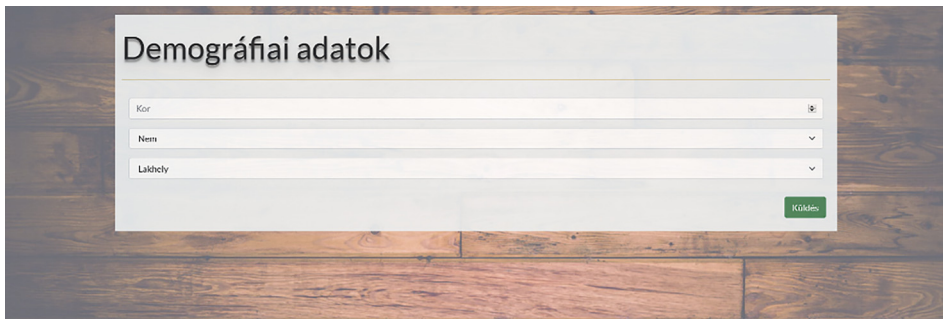


Fig. 5. The interface of demographic questions



Fig. 6. The final interface of the questionnaire



Table 1. Modification of the terms of the original Food Choice Questionnaire based on the Word Association results

Original terms	Newly added terms	Deleted terms	Terms required modification	Modified terms
keeps me healthy	can be consumed in special diets (e.g., gluten free, vegan)	contains lots of vitamins and minerals	is easy to prepare	is easy to use
is high in fibre and roughage	is traditional	is high in protein	is low in fat	how much carbohydrate it contains
is nutritious	is sliced	is good for my skin/teeth/hair/nails etc.	has the country of origin clearly marked	its producer is clearly marked
takes no time to prepare	is small pack/size	helps me to cope with life		
can be bought in shops close to where I live or work	is fresh	helps me relax		
is easily available in shops and supermarkets	is organic	helps me cope with stress		
looks nice	is a type of product recommended by professionals (e.g., a dietitian)	keeps me awake and alert		
smells nice	comes from a nearby producer	makes me feel good		
tastes good		cheers me up		
has a pleasant texture		can be cooked very simply		
contains no additives		comes from countries I approve of politically		
contains natural ingredients				
contains no artificial ingredients				
is cheap				
is not expensive				
is good value for money				
is low in calories				
helps me control my weight				

(continued)



Table 1. Continued

Original terms	Newly added terms	Deleted terms	Terms required modification	Modified terms
is what I usually eat is like the food I ate when I was a child is familiar to me is packaged in an environmentally friendly way				

independently and then by consensus. During the consensus, these categories were compared with the original FCQ categories and terms. As a result, from the 36 terms of the original questionnaire, 11 not-bread-related terms were deleted, 3 terms were modified, and 8 new, bread-related terms were added. Together with the remaining 22 terms, the new, adapted Food Choice Questionnaire consists of 33 terms (Table 1). 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 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 digitalized 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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