Data in Brief 30 (2020) 105558

Contents lists available at ScienceDirect

Data in Brief

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

Data Article

Data on the potential of nutrition-information apps from a consumer behaviour perspective

Antonella Samoggia*, Alessandra Bordoni, Francesca Monticone

Department of Agricultural and Food Sciences and Technologies, University of Bologna, Italy

ARTICLE INFO

Article history:
Received 21 February 2020
Revised 1 April 2020
Accepted 3 April 2020
Available online 18 April 2020

Keywords:
Behavior change
Healthy food
Consumer behavior
Healthy nutrition
Mobile app
Smartphone
Trans-theoretical model
Health belief model

ABSTRACT

This paper presents data on the influence of the use of a nutrition-information app (Edo) on healthy eating. The methodology adopted included a baseline (t0) and a follow-up online questionnaire (t1). The first survey was sent to 7000 consumers who had already downloaded the app. This survey collected data on users' perceived healthiness of their own diet, food purchasing habits, sociodemographic information, concern for appearance, perception of the Health Belief Model constructs, and objective and perceived healthy food knowledge. The follow-up survey (t1) was sent to the respondents who had used the app for 12 weeks. It collected data on app satisfaction, recommended additional app features, consumers' perception on the Health Belief Model constructs, and consumers' objective and perceived healthy food knowledge. Data elaboration included two factor analyses elaboration, one for t0 data and one for t1 data. The aim was the identification of constructs as latent factors of the data. The value of each construct was calculated and compared between t0 and t1. The data presented in this article can help the replication of studies about similar apps and enhance the

* Corresponding author.
E-mail address: antonella.samoggia@unibo.it (A. Samoggia).

https://doi.org/10.1016/j.dib.2020.105558

cooperation among app developers, consumer behaviour scientists, nutritionists and marketing experts for apps development. For conclusion and interpretation of data, the original article can be consulted (DOI:10.1016/j.foodres.2019.108766).

Specifications table

Subject	Health/Nutrition/Food Science
Specific subject area	Behavior change; Healthy Food; Consumer Behavior; Healthy Nutrition; Mobile app; Smartphone; Trans-theoretical model; Health Belief Model.
Type of data	Tables
How data were acquired	Online questionnaire (Google-forms)
Data format	Raw
Parameters for data collection	To be eligible for data collection, participants must have downloaded and used the mobile phone app for at least twelve weeks. Prior to taking part in the experiment, app users must have signed the informed consent form.
Description of data collection	Data were collected among the mobile app users: 7000 app users were invited to fill the baseline questionnaire right after downloading the app. Twelve weeks later, the follow-up questionnaire was circulated among respondents to the baseline questionnaire who continuously used the app during such timeframe. To increase the response rate, two sets of nutritional guidelines were sent to participants.
Data source location	Italy
Data accessibility	Within the article
Related research article	Samoggia, A., Riedel, B. (2020) [1].

Value of the data

- As the academic research on nutrition-information apps from a consumers' behaviour perspective is still limited, the data on questionnaire items can serve as a model for future research allowing for replicability of the research data.
- As suggested in the original paper, consumer behavior scientists, nutritionists, marketing experts and app developers should cooperate in the development of nutrition-information apps. Thus, all listed actors can all benefit from these data and information.
- Data can be used to make a comparison between countries on the potential on health behaviours of nutrition-information apps.
- The data provide an additional theoretical construct (social and family influence) to the Health Belief Model framework which can be used for further research on the topic of consumer behaviour and app use.
- The data support the effectiveness of nutrition-information apps in improving consumers' perceptions towards healthy eating barriers.

1. Data description

The data presented in this article provide information on the theoretical basis of the survey's questionnaires used for data collection, and further data developed from additional data. These integrating information complement the main research paper. Both sets of information are valuable for better understanding the main paper's data and develop future research. Table 1 provides socio-demographic information of the survey respondents. Table 2 shows the theoretical basis of the questionnaires' items. Tables 3-9 show data from the baseline and follow-up questionnaires. These data were not presented in the original paper but contain relevant information

Table 1
Socio-demographic data of the sample.

	%
Gender	
Women	55.9
Men	44.1
Total	100
Level of education	
With academic degree	56.7
Without academic degree	43.3
Total	100
Working status	
Employed	60.3
Non-employed (student, retired, job seeking, etc.)	39.7
Total	100
Level of income	
Medium or high income (above 1000 euro/month)	55.7
No or low income (max 1000 euro/month)	44.3
Total	100
Geographical location	
North Italy	62.1
South Italy	37.9
Total	100

for apps development. From the baseline questionnaire, more details are presented about the respondents' food purchasing habits, health orientation, and expectations from app use (Tables 3–6). From the follow-up questionnaire, additional data on respondents' satisfaction and use of the app are presented (Tables 7–9).

2. Experimental design, materials, and methods

Research on nutrition-information apps is relevant as this app type is the most widespread among health apps. Limited previous research analysed the apps' impact from a consumer behaviour perspective. The primary data on consumers' healthy food behaviour and nutrition knowledge presented in this article were collected through a structured online questionnaire. Such questionnaire was distributed among participants in two research steps: 7000 app users received the baseline questionnaire (t0) right after spontaneously downloading the app, while the follow-up (t1) questionnaire was sent to the respondents who kept using the app for twelve weeks. A total of 143 responses were collected. No monetary incentive was provided to respondents. To increase the response rate, two sets of nutritional guidelines were sent to participants, one for each completed questionnaire. The convenient sample includes respondents balanced in terms of gender, levels of education and income, working status and geographical location. Participants age ranged between 18 to 71 years old, with an average of 38 years old (std. dev.: 14.49). When asked about their personal health, 30% of participants declared to have allergies and 25% chronic diseases. It was calculated that participants used the app at least once a week, for three minutes and twelve seconds on average, which is in line with the average session of common users.

The questionnaire draws from the theoretical constructs of the social psychology health behavior change model called Health Belief Model (HBM) measured with the five stages of the Trans-Theoretical Model (TTM). Table 1 provides detailed information on each questionnaire item. In particular, it shows how the item was formulated in the questionnaire presented to the participants. More than one item could be used for a single construct (*Item*); how participants measured the item, that is with a Likert scale or a true or false answer (*Item scale*); what sources and theoretical background were used to identify the items used to measure the single constructs (*Sources*).

Table 2
The theoretical foundation of the questionnaires' definition.

Constructs	Item	Item scale	Sources
Self-reported stage of change	- Eating healthier food does not (and will not) interest me in the next six months. - I know I need to eat healthier, but I'm not sure I'll be able to do it in the next six months. - I know I need to eat healthier and I plan to do so within the next month. - I have done my best to eat healthier in the last six months. - I usually eat healthily	From 1-Strongly Disagree to 5-Strongly Agree	[10,11]
Severity	- My feelings about myself would change if I ate unhealthy food - I am afraid to even think about eating unhealthy food - If I eat unhealthy food, my entire life would change	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]
Susceptibility	- My chances of eating healthy food are great - It is likely that I eat healthy	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]
Family influence	- My family habits make it likely to eat unhealthy food - My friends or family discourage me from eating healthy food	From 1-Strongly Disagree to 5-Strongly Agree	Self-developed
Barriers	- I feel like I am not strong enough to eating healthy food - Eating healthy food requires adopting a new habit, which is difficult	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]
Cue to action	- Doctor or nurse recommendations prompted me to eat healthy food - Campaigns (e.g., media: press, TV, and radio) prompted me to eat healthy food - Family members or friends with illnesses prompted me to eat healthy food	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]
Appearance	- I care to look attractive - I care to have right weight	From 1-Strongly Disagree to 5-Strongly Agree	[4,5]
Benefits	I believe that eating healthy food improves the way my body looks	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]
Self-efficacy	- I feel better when eating healthy food - I usually eat the healthy food I choose for myself - I am able to often eat healthy food - I do eat the healthy food that I planned	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]
Perceived healthy food knowledge	- I am confident in knowing which food is good for my health - Compared with an average person, I am more knowledgeable about healthy food - I am aware of my food choices from a nutritional point of view	From 1-Strongly Disagree to 5-Strongly Agree	[9]
Objective healthy food knowledge	- Vegetables contain fiber - Using saturated fats can increase blood cholesterol level - Oily fish, such as salmon and mackerel, contain healthier fats than red meat - Sea salt is not harmful to blood pressure - Skimmed milk contains fewer minerals than full-fat milk	True/False/Don't Know	[14]

(*continued on next page*)

Table 2 (*continued*)

Constructs	Item	Item scale	Sources
	Imagine a person, who aims to eat a very healthy diet. What do you think he or she should do? - Eat foods high in fiber - Avoid all fats - Eat 5 or more servings of vegetables, fruits or berries a day - Eat sources of animal proteins, such as meat, fish, eggs, dairy, every day - Limit carbohydrates, such as potatoes, pasta, rice, bread - Eat fish every week	True/False/Don't Know	[9]
Consciousness on healthy eating (a)	- I feel that I am not determined enough to eat healthy - Eating healthy requires the adoption of new habits and this is difficult - My friends or family discourage me from eating healthy	From 1-Strongly Disagree to 5-Strongly Agree	[8]
App as complementary source of information on healthy eating (a)	I use the app: - instead of going to the doctor or a nutrition expert (dietician, nutritionist, etc.) - in addition to visits to a doctor or nutrition expert (dietician, nutritionist, etc.); - instead of searching the Internet for information about healthy food - in addition to searching for information on healthy food on the Internet	From 1-Strongly Disagree to 5-Strongly Agree	[12]
App contribution (a)	Thanks to the app: - I make healthy choices - I reduce the probability of gaining weight - I increase my knowledge on the role of nutrients - I understand which foods are best suited to my nutritional needs - I try healthier food alternatives - I understand if a product is suitable for my eating style	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]
Barriers and difficulties in using the app (a)	I think using the EDO app: - interferes with my daily routine - takes a long time - causes me embarrassment - requires the adoption of new habits and this is difficult	From 1-Strongly Disagree to 5-Strongly Agree	[6,15]
Healthy eating self-determination (a)	Thanks to the app: - I can often eat healthy food - I force myself to eat healthy food, even if it is not easy - my motivation to eat healthy food increases	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]

(*continued on next page*)

Table 2 (*continued*)

Constructs	Item	Item scale	Sources
Healthy food purchasing self-determination (a)	Thanks to the app: - I purchase healthy food for myself - I purchase healthy food for my family - It happened to purchase healthier products suggested by the app	From 1-Strongly Disagree to 5-Strongly Agree	[2,3,13]
Satisfaction on app (a)	- I would recommend to family and friends to use the EDO app to eat healthily - The EDO app is a reliable source of information for those who want to eat healthily - I have consumed products suggested by the EDO app (among the alternative and healthier products) and I was satisfied	From 1-Strongly Disagree to 5-Strongly Agree	[7]

Note: The level of agreement of each item was valued by respondents with the Likert scale.

Table 3
Respondents' food purchasing outlet of most of the food consumed.

Hyper and supermarkets	81%
Small retailer	8%
Discount	7%
From the farm	3%
Online	1%
Total	100%

Table 4
Respondents' food purchasing involvement.

Very involved	59%
Somewhat involved	24%
Neither involved nor uninvolved	14%
Somewhat uninvolved	3%
Absolutely uninvolved	0%
Total	100%

(a) Data can be found in Table 7

2.1. Further data from questionnaires

The baseline questionnaire provided relevant data on consumers' food purchasing habits. Most respondents shop for food in hyper and supermarkets (80%), and other food outlets are less common (Table 3). The majority of participants (83%) are significantly involved in food shopping (Table 4). These data support that app users are committed to food purchasing and they opt for stores with high food product variety. Thus, the app users are likely to be responsible for the food purchasing of all family members. This is a relevant information for future food and nutrition-information apps' development, as these kinds of apps may aim to provide information and advice relevant for all family members. Apps could support the person responsible for food purchase or preparation to make informed choices about the specific needs of all family members.

Since the research was going to investigate the app's influence on consumers' food behaviour, it was important to understand the current state of the participants' approach to healthy eating. The research explored the importance of health as a food shopping driver. Most of participants

Table 5
Respondents' health-orientation in dietary choices.

Rather health-oriented	43%
Neutral	42%
Strongly health-oriented	12%
Rather not health-oriented	3%
Total	100%

Table 6
Users' expectations from app use.

Have more information on nutritional aspects of food	37%
Make nutritionally aware food choices	31%
Adopt an healthier food eating approach	18%
Choose nutritionally adequate food at purchasing	13%
Lose weight	1%
Total	100%

Table 7
Respondents' Edo app use experience.

	Strong agreement	Medium to low agreement
App contribution	95%	5%
Satisfaction on app	86%	14%
Healthy food purchasing self-determination	73%	27%
Healthy eating self-determination	71%	29%
App as complementary source of information on healthy eating	65%	35%
Consciousness on healthy eating	47%	53%
Barriers and difficulties in using the app	9%	91%

Note: Data percentages represent the average of the items of each construct.

Table 8
Frequency of healthy alternatives for food category suggested by the app (More than one answer could be provided).

	Frequency	Percentage (on respondents)
Desserts (biscuits, sweet snacks, chocolate, jams)	137	96%
Ready-made foods and soups	82	57%
Savoury snacks and bread substitutes	30	21%

(55%) are highly health-oriented (Table 5). Only 18% stated to use the app to improve their approach to healthy eating, while the most common expectation was to increase awareness on food nutritional aspects in order to make more informed choices.

The follow-up questionnaire collected data and information about the perceived effectiveness of the app. Consumers were satisfied (86%) and only a minority of consumers had obstacles in handling the app (9%) (Table 7). Further research findings are valuable as may provide guidance for future app development (Tables 8 and 9). In particular, Table 8 reports data about users' opinions on the app feature that allows to gather suggestions on healthier food alternatives. Respondents appreciate to have information on healthy desserts, ready-made foods and soups, and snacks and bread substitutes. Advice on healthy food alternatives can support consumers in healthy food purchasing and consumption. Consumers also suggested complementary features which they would appreciate when using the app (Table 9). The most popular features were the recipes provision, tailored food guidance, and the monitoring of calories and nutrients intake. Users have limited interest in purchasing food from the app or in having gaming function, but may appreciate information on discounted products. These results sustain that users consult the app expecting nutritional advice and cooking suggestions, thus providing support for the adoption of healthy food behaviour. To conclude, nutrition-information apps can be an effective public health tool to improve consumers' perceptions towards healthy eating barriers. Future

Table 9
Preferred additional features for EDO (More than one answer could be provided).

	Frequency	Percentage (on respondents)
Recipes	76	53%
Personalised food advice	74	52%
Auto-monitoring of calories and nutrients ingested	65	45%
discounts on healthier products	49	34%
localization of alternatives	48	34%
Size of packaging of existing available products	35	24%
In-app purchases	17	12%
Games and entertainment	1	1%

studies can further detail the analysis exploring to what extent app-use frequency impacts on healthy food behavior change and expanding the sample size to widen the research perspective on the impact of app-use on users.

CRediT authorship contribution statement

Antonella Samoggia: Methodology, Software, Formal analysis, Validation, Supervision. **Alessandra Bordoni:** Methodology. **Francesca Monticone:** Writing - original draft, Visualization.

Acknowledgments

The authors would like to thank Giulia Pieri, dietitian, for her support in the research development and data collection, and Edo company's managers for their assistance with data collection.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.dib.2020.105558.

References

[1] A. Samoggia, B. Riedel, Assessment of nutrition-information mobile phone apps' influence on consumers' healthy food behavior and nutrition knowledge, Food Research International 128 (2020) Article number 108766, doi:10.1016/j.foodres.2019.108766.
[2] G. Becker, A theory of social interactions, J. Polit. Econ. 82 (6) (1974) 1063–1093 Retrieved from http://www.jstor.org/stable/1830662.
[3] V.L. Champion, C.S. Skinner, The health belief model, in: K. Glanz, B.K. Rimer, K. Viswanath (Eds.), Health Behavior and Health Education. Theory, research, and Practice Eds., 4 ed., Jossey-Bass, San Francisco, 2008, pp. 45–62.
[4] W.C. Cockerham, G. Kunz, G. Lueschen, On concern with appearance, health beliefs, and eating habits: a reappraisal comparing Americans and West Germans, J. Health Soc. Behav. 29 (3) (1988) 265–269.
[5] D. Hayes, C.E. Ross, Concern with appearance, health beliefs, and eating habits, J. Health Soc. Behav. (1987) 120–130.
[6] K. Kaipainen, Design and evaluation of online and mobile applications for stress management and healthy eating, VTT Sci. (2014) ISBN 978-951-38-8124-5 (URL: http://www.vtt.fi/publications/index.jsp).
[7] S.A. Mummah, M. Mathur, A.C. King, C.D. Gardner, S. Sutton, Mobile technology for vegetable consumption: a randomized controlled pilot study in overweight adults, JMIR MHealth UHealth 4 (e51) (2016), doi:10.2196/mhealth.5146.

[8] R. Orji, J. Vassileva, R. Mandryk, Towards an effective health interventions design: an extension of the health belief model, Online J. Publ. Health Inform. 4 (3) (2012), doi:10.5210/ojphi.v4i3.4321.
[9] K. Parmenter, J. Wardle, Development of a general nutrition knowledge questionnaire for adults, Eur. J. Clin. Nutr. 53 (4) (1999) 298–308.
[10] J. Prochaska, C. Di Clemente, Stages and processes of self-change in smoking: toward an integrative model of change, J. Consult Clin. Psychol. 5 (1983) 390–395, doi:10.1037/0022-006X.51.3.390.
[11] J.O. Prochaska, C.C. Di Clemente, J.C. Norcross, In search of how people change: applications to addictive behaviors, Am. Psychol. 47 (9) (1992) 1102–1114, doi:10.1037/0003-066X.47.9.1102.
[12] A. Rai, L. Chen, J. Pye, A. Baird, Understanding determinants of consumer mobile health usage intentions, assimilation, and channel preferences, J. Med. Internet Res. 15 (2013), doi:10.2196/jmir.2635.
[13] I.M. Rosenstock, Historical origins of the health belief model, Health Educ. Monogr. 2 (1974) 328–335, doi:10.1177/109019817400200403.
[14] A. Samoggia, A. Bertazzoli, V. Hendrixson, M. Glibetic, A. Arvola, Women's income and healthy eating perception, Adv. Gender Res. 22 (2016) 165–191, doi:10.1108/S1529-212620160000022018.
[15] J.H. West, L.M. Belvedere, R. Andreasen, C. Frandsen, P.C. Hall, B.T. Crookston, Controlling your "App"etite: how diet and nutrition-related mobile apps lead to behavior change, JMIR Mhealth. Uhealth. 5 (7) (2017) e95, doi:10.2196/mhealth.7410.