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Appendix: Content Summary of Selected Best Paper for the IMIA Yearbook 2023, section Consumer Health Informatics

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Digital nudges to stimulate healthy and pro-environmental food choices in E-groceries

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Throughout the past decades, a switch to healthy and environmentally friendly diets has been promoted by countless Front-of-Package labels (FOP) on food products. Confusion and mistrust amongst consumers, caused by the wide diversity of existing FOP labels, could partly explain their limited role in consumers' food choices. From a nutrition point of view, the introduction of Nutri-Score in various European countries has been contributing to harmonisation. Moreover, evidence has shown that Nutri-Score could lead to healthier food choices among consumers and reformulation among producers. A similar standardisation is ongoing with the spread of Eco-Scores, reflecting products' environmental footprints (PEF). The goal of this study is to provide insights into the effectiveness of displaying both scores simultaneously, which is now increasingly done by retailers. As E-groceries have the capability to influence food choices by using smart and personalised nudges, this study also aimed to explore the potential of several digital functionalities in an E-grocery environment to stimulate more healthy and pro-environmental food choices. the following hypotheses were put forward: H1. Nutri- and Eco-Scores at the product level improve nutritional values of food choices more than environmental impacts. H2. Supporting these scores with personalised feedback and social norm increases their effectiveness. H3. Facilitating a food environment with recommendation agents increases the effectiveness of scores, personalised feedback, and social norm. A randomized control trial was conducted in a mock-up E-grocery. In November 2019 in Flanders, a representative sample of Belgian consumers (n = 1,000) selected food products for one meal for their daily household. As in real E-groceries, this selection process was subdivided into two stages. Consumers apply different decision strategies in different phases of product choice. Therefore, two focus groups preceded this study to get insights into which phase the nudges would be most favoured by consumers. The sample was roughly representative for the Belgian population in terms of gender and age while being slightly overrepresented by respondents from higher income and educational classes. The findings suggest that displaying Nutri- and Eco-Score at product level led to improved nutritional qualities of food choices, while the environmental impact was not reduced. Respondents being exposed to the scores report to have relied significantly more both on Nutri-Score and on Eco-Scores compared to those who were not. On the one hand, the findings corroborate the growing body of literature indicating that Nutri-Score would be an effective communication tool for inducing healthier food choices among consumers. On the other hand, it confirms recent evidence that jointly displaying Nutri-Score and Eco-Score would improve the NQI of food choices but not the environmental impact indicator (EII). The addition of personalised basket scores to the product scores or the addition of social norms to the product & basket scores norm did not lead to additional shifting behaviour as regards neither the nutritional quality nor the environmental impact. This study illustrates how smart interventions on the visibility and proximity of products with better Nutri- and or Eco-Scores in the food environment can still affect food choices, where more cognitively oriented nudges may fail. Once uniform labelling is in place, these effort-reducing strategies could be key to realising dietary transition.

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Measuring Digital Vaccine Literacy: Development and Psychometric Assessment of the Digital Vaccine Literacy Scale

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Social media have been defined as a powerful catalyst for the "anti-vax movement". With the COVID-19 pandemic, the number of people seeking vaccine-related information on the internet has skyrocketed as well as the circulation of false information about vaccines on social media platforms. the spread of fake news. Misinformation on social media is blamed as a primary cause of vaccine hesitancy. But the Internet is also a source of official reliable information and might provide new instruments to fight against vaccine hesitancy. To reduce the anxiety of this duality and provide information on the way users understand, trust and appraise vaccine-related information, authors aimed at building a tool to measure a new literacy scale mixing digital health literacy and vaccine literacy, called "digital vaccine literacy" (DVL). The study described the development and psychometric properties of this new scale measuring DVL. A panel of five public health researchers proposed a series of items inspired by the Health Literacy Questionnaire, the eHealth Literacy Scale, and the Vaccine Literacy Scale. They identified a total of seven questions answered on a 4-point Likert scale (from 4 [agree] to 1 [disagree]) and an additional answer option "I do not know, I do not look for vaccine-related information.": 1. I find vaccine-related information on social media and forums is understandable; 2. I find vaccine-related information on government websites is understandable; 3. I can detect vaccine-related fake news; 4. I trust vaccine-related information provided by government websites; 5. I find vaccine-related information on social networks is valid; 6. When I read vaccination information online, I cross-reference it with other sources to verify its validity; 7. I think the information I find online may influence my decision to get vaccinated A group of 10 volunteers with characteristics like the target population pretested the questions. The total score of the DVL scale was calculated through the sum of all answers to the items and varied from 7 to 28. The higher the score, the better the DVL level. DVL tool was administered to participants from an open online cohort, CONFINS, which is a cohort collecting data on the impact of confinement on the health and well-being of the French population. All participants were aged more than 18 years, living in France, and were able to read and understand French. The study sample contained

848 participants who responded to the items. 73.1% (620/848) were females. The mean age was 29.9 (SD 12.3). Participants working or studying in the field of health were 397/848 (46.8%). The percentage of parents was 20.9% (178/848) and 557/848 (65.7%) were not vaccinated against flu. The mean DVL score of the baseline sample of 848 participants was 19.5 (SD 2.8) with a range of 7-28. The median score was 20. Scores were significantly different by gender (P=.24), age (P=.03), studying or working in the field of health (P=.01), and receiving regular seasonal flu shots (P=.01). The first subdimension (items 2 and 4) refers to understanding and trusting official information about vaccination provided by institutional websites. The second subdimension (items 1 and 5) refers to understanding and trusting information about vaccines as provided by social media. The third subdimension (items 3, 6, and 7) refers to the appraisal of vaccine information online in terms of evaluation of the information and its application for decision-making. Having a low DVL score (<20) can be interpreted as a relevant alarm in relation to the extensive use of the internet for vaccine-related content, especially in France. As is the case with health literacy, low DVL scores are associated with a higher risk of adopting unhealthy behavior; in this case, this refers to the decision not to get vaccinated. Not being able to navigate information on the internet could increase the chance of having a negative perception of vaccines. Lower scores in the scale would also correspond to the incapacity to recognize fake news and trust in unofficial information provided by social media. DVL scale is a screening instrument contributing to detect people who need to be supported in navigating vaccine-related information online.

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Co-creating a local environmental epidemiology study: the case of citizen science for investigating air pollution and related health risks in Barcelona, Spain

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The publication of new scientific evidence about the health risks of air pollution is contributing to raising public concerns. Researchers have started to incorporate participatory practices to better align the design of their studies on air pollution and health with public concerns, with the hopes that research results can then lead to actions relevant to the local community's needs. Over the last few years, although there have been several initiatives claiming to apply a citizen science approach to measure air quality parameters, participatory research projects on air quality are not new and exist since more than two decades. While such initiatives are driven by health-related concerns, those research projects for the study of air pollution using citizen science or other participatory approaches do not often focus specifically on assessing the link between air pollution and health. The authors adapted and developed a four-phase framework with features that occur in different participatory practices in environmental health research: (1) identification (civic concerns are identified and translated into a research question), (2) design (data collection tools, data governance and other aspects of the study protocol are defined), (3) the deployment (data are collected and analyzed) and (4) action (results are transformed into practical citizen produced knowledge to inform public policies). Following this co-created citizen science framework, the project aims to involve citizens in all phases of the research, including deciding the research question, designing the study, collecting and analyzing data, interpreting and disseminating the results and ultimately, suggesting policy-related actions. The pilot study was conducted in the city of Barcelona (Spain), which covers the topic of air pollution and health. The process of co-designing the research question was conducted from August 2019 to January 2020 and included (1) an online survey on knowledge, perceptions and preferences on topics to be investigated around the theme of air pollution and health, (2) a pop-up intervention to approach citizens and discuss their interests and concerns, (3) a community meeting with citizens in order to start formulating potential research questions based on the results of the survey, and (4) a second online survey to identify the most preferred research question to be implemented in the epidemiological study. The first survey was launched alongside a strategic video campaign entitled "Everything you wanted to know about the air but were too afraid to ask". The invitation proposed the respondents to partake in the design of a scientific study, the first phase of which consisted of collecting citizen concerns and topics of interest regarding research on air pollution and health. An offline pop-up intervention across all the districts of Barcelona was also organized during the Parking Day, an annual initiative in which various organizations and communities temporarily transform public parking spaces by giving them a different use, one that promotes a sustainable urban environment. One stand was installed in ten districts of Barcelona and for each stand a canvas was developed for allowing for in-depth discussions. This canvas consisted of a poster with the title "What worries my neighbourhood regarding pollution and health?" listing different body parts and health topics. Citizens had to identify the one they would like to know how air pollution affects it using stickers and were asked to explain why. The final study protocol was written by the scientists considering all citizens' inputs, made available online and shared with a selected group of citizens for feedback. A total of 488 out of the 582 respondents were living in the ten districts of Barcelona City. Almost 65% of the respondents perceived the air as considerably polluted (37.50%) or highly polluted (27.46%). According to 488 respondents from the first survey, cognitive and mental health were the main priorities of investigation. From the answers of a total of 466 respondents describing the effects of air pollution on their health, a total of 192 keywords were counted, in which the most frequent health-related word reported referred to the respiratory system (312 times), to cardiovascular health (80 times) and to stress (75 times). Based on the second survey, with 27% of the votes from 556 citizens, the most popular research question was, "How does air pollution together with noise and green/blue spaces affect mental health?". The study design selected was an observational study in which citizens provide daily repeated measures of different cognitive and mental health outcomes and relate them to the air pollution concentrations. Based on the co-creation activities and the results obtained, the authors conclude that applying citizen science in an environmental health project is valuable for researchers despite some challenges such as engaging citizens and maximizing representativity.