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A diet-related health prompt with the Swiss Food Pyramid as a nudge to reduce meat consumption

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ABSTRACT

High meat consumption in Western societies is a major contributor to climate change, environmental damage, and health costs. One way to reduce meat consumption is through nudges in staff restaurants. Though previous studies have shown that nudges can influence consumer choices, there is a lack of comparative studies of the different types of nudges in the context of staff restaurants. The present study thus aimed to compare, individually and in combination, the effectiveness of a written prompt, a visual prompt (the Swiss Food Pyramid), and a dynamic social norm in encouraging consumers to more frequently choose meatless menu options. A 1 × 8 between-subjects design was applied, and an online choice experiment (n = 2198) was conducted, where the participants chose 15 times between a meat menu, a vegetarian menu, and a salad buffet. The participants who encountered the written prompt combined with the visual prompt chose the meatless option more often than those in the control condition. The written prompt contributed most to the intervention's effectiveness. Although the effect size was small, this intervention combination is worth testing in the field, as it proved effective for all participants regardless of their psychological characteristics.

1. Introduction

Since meat production generates large amounts of greenhouse gases and nitrogen emissions, meat consumption is a major contributor to climate change and environmental pollution (Westhoek et al., 2014). In particular, the overconsumption of red and processed meat is associated with serious health risks, such as cardiovascular diseases and colorectal cancer (González et al., 2020). Despite this, due to higher incomes and population growth, global meat consumption per capita and in total is increasing (Godfray et al., 2018). In European countries, meat consumption is two to three times higher than the recommended amount (depending on the country and its dietary recommendations) for a balanced and healthy diet (Cocking et al., 2020). For example, people in Switzerland consume, on average, 111 g of meat per day, which is three times higher than the recommended amount (Federal Food Safety and Veterinary Office, 2017b).

Policy interventions are a possible countermeasure to excessive meat consumption. Unfortunately, there is a trade-off between intervention acceptance and effectiveness. In general, more intrusive policies, such as regulations, are more effective but less accepted by the public and vice versa (Ammann et al., 2023). Nudging interventions could be a good compromise, as they do not restrict choice options (Thaler & Sunstein, 2009), but they are more effective than when only information is offered (Ammann et al., 2023). "Nudging" is used as an umbrella term for applying interventions that influence habitual human behavior, such as using prompts, cueing social norms, or integrating goal-related cues in the environment (Papies, 2017; for examples see Stämpfli et al., 2017; Stämpfli et al., 2020).

To implement eating-related nudging interventions, out-of-home consumption places could be suitable locations, as out-of-home eating has gained importance worldwide (Lachat et al., 2012). For example, in Switzerland, 71 % of the population regularly eats lunch away from home (Federal Food Safety and Veterinary Office, 2017a). Interventions in out-of-home eating places could thus reach many consumers. Moreover, at the out-of-home consumption places of public organizations, such as school canteens and staff restaurants of public organizations, policymakers can influence and promote interventions, as they can define rules and standards for restaurant operators. Furthermore, compared to a supermarket, counteracting marketing influences can be limited in a staff restaurant. This creates a relatively highly controlled environment, which enhances the effectiveness of nudging interventions (Lehner et al., 2016).

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Choose the vegetarian menu or serve yourself at the balanced salad buffet.
Compared to the recommendations of the Swiss Food Pyramid, we eat 2–3 times too much meat per week[1].

[1] Federal Food Safety and Veterinary Office: National nutrition survey menuCH, 2017.

Fig. 1. The written prompt, as translated analogically from German to English.

Interventions to reduce meat consumption in staff restaurants remain underexplored, compared to several existing studies on this topic in university canteens (Cerezo-Prieto & Frutos-Esteban, 2021; Egeler & Baur, 2022; Figueiredo et al., 2021; Schaubroeck et al., 2018; Weingarten et al., 2022). Unlike university students, the customers of staff restaurants belong to a wider age range and are more likely to visit the restaurants for a longer period of their lives. The present study thus addressed nudging interventions in a hypothetical staff restaurant situation with participants in the appropriate age range (18 to 65 years).

The trade-off between the effectiveness and acceptance of interventions not only exists across all policy interventions but also within different nudging interventions (Cadario & Chandon, 2019). Therefore, the selection criteria for the nudges of the present study were that the nudges are easy to implement in the field, and therefore are more likely to be accepted and implemented by staff restaurants, and that the nudges have already been shown to be effective but still need to be better understood. This study tested three nudging interventions that aim to reduce meat consumption: a written prompt, a visual prompt, a dynamic social norm, and all their possible combinations. This is because there is a lack of comparative experiments that separately test the effects of interventions and their combinations to reduce meat consumption (Kwasny et al., 2022).

1.1. Prompts to reduce meat consumption

Prompts are reminders in the form of a message and/or a sign that aims to encourage people in a particular situation to behave in a desired way (Abrahamse & Matthies, 2018). They have already been applied in several domains, including transportation, health, and pro-environmental behavior (Sussman & Gifford, 2012). A *meta*-analysis of 253 experimental treatments regarding pro-environmental behavior revealed that interventions involving prompts were relatively effective ($g = 0.62$) (Osbaldiston & Schott, 2012). In the food context, prompts have already been used to reduce food waste (Stöckli et al., 2018), and the combination of written and visual prompts has been effective in encouraging individuals to add more fruit and vegetable components to their servings in university canteens (Yi et al., 2022). However, the underlying mechanisms of prompts and the psychological constructs that explain their effects remain largely unknown (Stöckli et al., 2018).

As meat consumption has negative impacts on the environment, human health, and animal welfare, the question arises as to which topic should be addressed with the prompt. A representative study in the United States found health motives (50 %) and costs (51 %) to be the most common reasons for reducing meat consumption (Neff et al., 2018). Environmental reasons (12 %) and animal welfare (12 %) were much less important as reasons to reduce meat consumption. Similarly, in a study in Australia, health reasons and meat prices were found to be the most common reasons for reducing meat consumption (Malek et al., 2019). Therefore, the present study chose a health-related prompt.

Prompts have rarely been used to reduce meat consumption, although there is some evidence that they are effective in doing so. Individuals who received text messages about the maximum recommended amount of daily meat consumption consumed less meat than those in the control group who did not receive any messages (Carfora et al., 2017). Prompts have also been suggested as an appropriate intervention to reduce meat consumption for all segments of meat eaters, from "meat-reducers" to "strong-hindrance meat eaters" (Lacroix & Gifford, 2020). However, it remains unclear whether prompts are effective in reducing meat consumption in the context of a staff restaurant, how they should be designed (e.g., a written prompt combined with a visual element), and which psychological variables influence their effectiveness.

1.2. Dynamic social norms

Social norms serve as a reference for what constitutes socially appropriate behavior in a particular situation. Following or not following social norms is important, as they are linked to social judgments (Higgs, 2015). In particular, when the majority behaves in a certain way (e.g., regularly eating meat), engaging in the opposite behavior (e.g., being vegetarian) can be challenging. Vegetarians and vegans sometimes do not want to be recognized as such in social situations (Bolderdijk & Cornelissen, 2022), or they start eating meat again because they do not want to be "the odd one out" (Haverstock & Forgays, 2012).

One way to turn a static social norm of a minority (e.g., eating less meat) into a universal social norm is through dynamic social norms. Dynamic social norms reveal how social norms have changed in recent years (e.g., "In the last five years, 30 % of Americans have made an effort to reduce their meat consumption") and thus indirectly offer information on what behavior will be the social norm in the future. For example, in the USA, those who read a dynamic social norm about decreasing meat consumption chose a meatless menu more often than those who read a static social norm or those in the control group who read a dynamic social norm unrelated to food (Sparkman & Walton, 2017). However, these results could not be replicated in the UK, as the individuals there may have already been aware of the change in the social norm regarding meat consumption. Thus, in the UK, participants in the dynamic social norm condition did not differ from participants in the static social norm condition or the control condition regarding their intention to reduce meat consumption or their attitudes toward reducing meat consumption (Aldoh et al., 2021).

Normative information about reducing meat consumption may work better if it includes visual cues, if it indicates past and current meat consumption, and if it indicates how successful individuals have been in reducing meat consumption (Aldoh et al., 2021). Further, who communicates the social norm is important. A social norm about reducing meat consumption was found to be better accepted when communicated by a researcher rather than a business person; however, sometimes, there was reactance when a vegan activist communicated the norm (Boenke et al., 2022). Notably, there was no difference in acceptance depending on whether the researcher communicated a static social norm or a dynamic social norm (Boenke et al., 2022). Moreover, the effectiveness of normative information in reducing meat consumption depends on personal norms (de Groot et al., 2021), indicating that personal characteristics should be assessed when measuring the effectiveness of

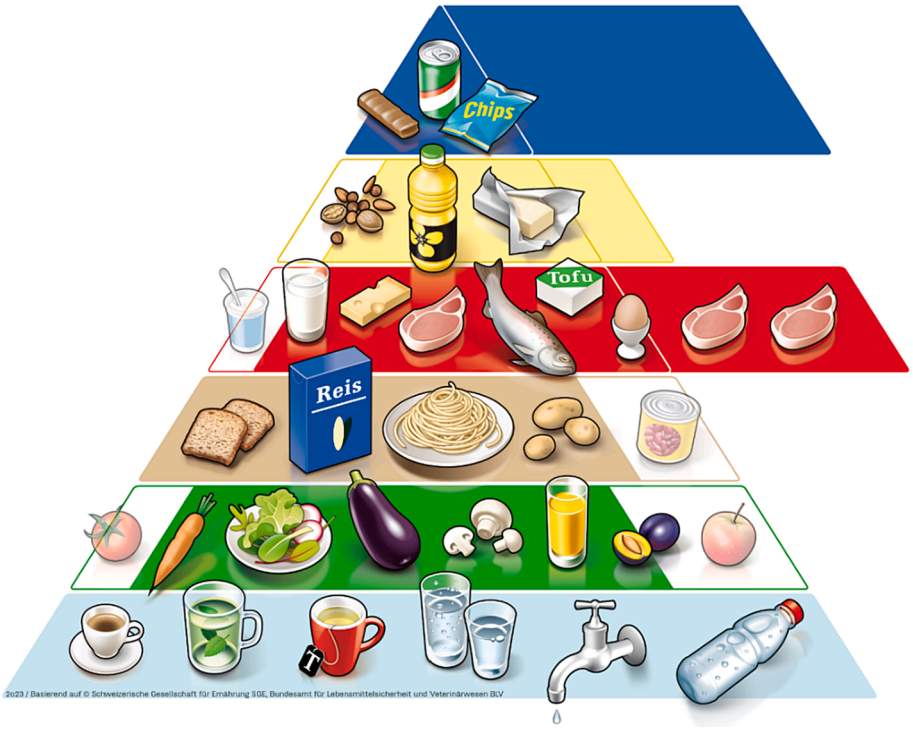

Fig. 2. Visual prompt: The unbalanced Swiss Food Pyramid adapted from the Federal Food Safety and Veterinary Office.

dynamic social norms.

1.3. Potential interactions among written prompts, visual prompts, and dynamic social norms

Text combined with pictures can attract more attention and improve recall of the health information provided (Houts et al., 2006). It could thus be useful to combine written and visual prompts. For the present study, which is set in Switzerland, an adapted version of the Swiss Food Pyramid, a visualization of the Swiss dietary recommendations (Federal Food Safety and Veterinary Office, 2011), is used as a visual prompt to illustrate the overconsumption of meat (see Fig. 2, Section 2.3.1.2). We hypothesize that interventions containing the visual prompt are more effective than interventions without the visual prompt. The written and visual prompts are aligned in terms of content. Therefore, they might support each other's effectiveness, as pictorial health information can increase knowledge and understanding of health information (Schubbe et al., 2020). However, whether this also applies in the context of reducing meat consumption remains unclear.

Further, the combination of prompts with dynamic social norms could be beneficial in reducing meat consumption. Messages to reduce meat consumption combined with dynamic social norms have already been shown to reduce self-reported meat consumption over several months compared to a control group (Sparkman et al., 2021). Messages about replacing meat with alternatives have also been shown to be more effective in the long term when combined with dynamic social norms (Carfora & Catellani, 2022). It is plausible that a dynamic social norm offers an extra motivation to follow the recommendations of a prompt, because individuals see how the social norm is changing and the prompt tells them how to behave accordingly. However, it is also possible that a dynamic social norm and prompts work against each other, as prompts normally reflect a static situation in contrast to dynamic social norms. If the prompts and the norm are, therefore, perceived as contradictory in terms of content, they could be confusing. Further, increasing amounts of information increases individual performance only to a certain point. If information is provided beyond this point, individuals experience an information overload and their performance decreases rapidly, as they become confused (Eppler & Mengis, 2004).

1.4. Potential moderating variables

The interventions may work, but only for a specific group of people. Thus, the present study included several psychological variables to test their influence on the effects of the study's interventions (i.e., whether they are moderator variables). The variables are self-efficacy, reactance, social conformity, attitude toward environmental protection, health consciousness, habits, hedonism, and intention to reduce meat consumption.

Self-efficacy—an individual's belief in their own resources to deal with different situations (Schwarzer & Jerusalem, 1995)—has already been found to promote the effect of an intervention to reduce red meat consumption. While individuals with high self-efficacy had a lower intention to eat red meat when reading a text about the negative effects of a diet high in animal proteins on their own health, individuals with low self-efficacy did not change their intention to eat red meat (Bertolotti et al., 2020). Those with high self-efficacy may, thus, be more successful in reducing their meat consumption.

Individuals value their freedom of choice. When something threatens this freedom, such as a persuasive message, ***reactance*** can occur (Reynolds-Tylus, 2019). For example, psychological reactance can explain the backfiring effect of social norms communicated by a vegan activist, as people assume ulterior motives behind the message (Boenke et al., 2022).

Social conformity reflects an individual's desire to act according to social norms (Bearden & Rose, 1990), and social norms are a strong

Table 1
The combination of the three intervention types resulted in seven experimental conditions (conditions [C]2–8) and the control condition (C1).

	Control condition (C1)	C2	C3	C4	C5	C6	C7	C8
Written prompt		X			X	X		X
Visual prompt			X		X		X	X
Dynamic social norm				X		X	X	X

driver for eating behaviors (Higgs, 2015). Therefore, it could be that an individual with a strong desire to act according to social norms is more influenced by a social norm message than an individual with a low need for social conformity.

Health consciousness and ***attitudes toward environmental protection*** may also promote the effectiveness of interventions to reduce meat consumption, as meat consumption negatively affects human health and the environment (Godfray et al., 2018). Those who are more concerned about the negative environmental effects of meat consumption have already been shown to have more positive attitudes toward reducing meat consumption (Cheah et al., 2020). Further, a reduction in meat consumption is often motivated by health concerns (Malek et al., 2019).

Habits are a strong psychological barrier to reducing meat consumption (Graves & Roelich, 2021) and may hinder the effectiveness of interventions to reduce meat consumption.

Further, if individuals have a strong attachment to meat, including a ***hedonistic view of meat***, it is likely to be more difficult to convince them to reduce their meat consumption (Graça et al., 2015).

Finally, the ***intention to reduce meat consumption*** could enhance the interventions' effects. This is because goal-related cues in the environment can activate goal-directed cognition, such as motivations or intentions, which, in turn, can activate goal-directed behavior (Papies, 2017). Therefore, if individuals have preexisting specific intentions to eat less meat, these can be activated by the planned interventions, and the effect of the interventions can thus unfold.

1.5. The present research

Many food-related intervention studies, including studies on meat consumption reduction, have combined several nudging strategies, but this does not allow them to draw conclusions about the effectiveness of single interventions and the possible additive effects of combinations (Kwasny et al., 2022; Reisch et al., 2021). Further, intervention studies in staff restaurants that aim to reduce meat consumption remain underexplored compared to studies in university restaurants (Cerezo-Prieto & Frutos-Esteban, 2021; Egeler & Baur, 2022; Figueiredo et al., 2021; Schaubroeck et al., 2018; Weingarten et al., 2022). This study aimed to address these research gaps to find promising nudges for future field experiments in staff restaurants.

In particular, a dynamic social norm, a written prompt, a visual prompt, and all their possible combinations were tested in an online experiment for their potential to reduce meat consumption in a staff restaurant context. Since staff restaurants often publish their offerings in advance—for example, on the intranet as a weekly schedule—and since employees may decide about the menu choice before they enter the restaurant, an online experiment seemed suitable for representing the decision process. Further, the psychological variables of self-efficacy, reactance, social conformity, attitude toward environmental protection, health consciousness, habits, hedonism, and intention to reduce meat consumption were captured, as they could influence the effect of the interventions.

The study design and planned analyses were pre-registered before the data were cleaned or analyzed (AsPredicted #122535).

2. Methods

2.1. Participants

We calculated the required sample size (n = 2,176) for a 1 × 8 between-subjects design using G*Power version 3.1.9.7. The effect sizes needed were determined through pilot data collection (n = 180). In February 2023, the panel service provider Bilendi AG recruited the participants. They received a financial compensation of 0.20 Swiss francs per minute of answering the questionnaire; they needed on average 21.6 min to complete it (i.e., the incentive was averaged as 4.3 Swiss francs per participant). To be eligible for the study, the participants had to eat meat and/or fish (at least once a week in a main dish), live in Switzerland, and be of working age (18 to 65 years). We also set a quota for gender (50 % female). Participants who either did not complete the entire survey or failed both of the two attention checks or participated twice or answered the questionnaire in a very short time (less than half the median of all the answering durations) were excluded (n = 854). After the exclusions, the sample consisted of 2,198 participants (50.1 % female; M_{age} = 41.34 years, SD_{age} = 12.84; education 4.9 % low, 67.4 % medium, 27.7 % high). Most of the participants stated that they knew the Swiss Food Pyramid (86.9 % yes) and that they did not intend to reduce meat consumption (73.9 % no). On a scale from 0 to 7, the participants stated that they consume meat and/or fish in their main meals on average about four times per week (M = 3.81, SD = 1.72).

The study obtained ethics approval from the Ethics Committee of the Faculty of Business, Economics and Social Sciences of the University of Bern. The study data are publicly available (https://osf.io/axkfb).

2.2. Study design and experimental procedure

A 1 × 8 between-subjects design was applied based on all the possible combinations of the three intervention types (Table 1). This design resulted in seven experimental conditions: three in which the participants read or saw one intervention type, and four in which they dealt with combinations of the intervention types. Additionally, there was a control condition in which the participants encountered no intervention.

The participants were randomly assigned to one of the eight conditions. First, the participants gave their informed consent. Each participant read a neutral introductory text about staff restaurant management. The participants in the experimental conditions (C2–C8) then encountered the intervention content corresponding to the respective conditions. In the next step, they read the instructions for the choice task. They were asked to imagine that they were in a canteen and had to choose between three menu options (see the wording in Appendix Table A.4). In every choice task, they could choose between a vegetarian dish, a meat dish, and a vegetarian salad buffet (e.g., vegetable lasagna versus spaghetti Bolognese versus salad buffet) (Appendix Table A.5). The menus were presented with pictures and menu titles. The menu titles of the salad buffet and vegetarian menus were labeled vegetarian. The salad buffet consisted of many different salads and was always the same. There were eight meat menus and eight similar vegetarian menus (Appendix Table A.6). This resulted in 64 possible menu combinations, which were randomly displayed to the participants (Appendix Table A.3). When sampling 15 times without replacement from 64 options, the probability of a participant seeing

In Switzerland, more and more people are reducing their meat consumption. Whereas ten years ago, it was 40% of the population that occasionally refrained from meat, today it is 60%, which have adjusted their eating habits and occasionally refrain from meat[1].

[1] Coop: Plant-based food report, 2022.

Fig. 3. The dynamic social norm translated analogically from German to English.

Table 2
Parameter estimates and odds ratios for mixed-effects logistic regressions.

Effect of intervention(s) and their combination on food choice (0 = meat, 1 = vegetarian)				
Fixed effects	*B*	*95 % CI*	*OR*	*95 % CI*
(Intercept)	−0.105	−0.338, 0.129	0.901	0.713, 1.137
Prompt written (pw) (versus control)	0.097	−0.122, 0.316	1.102	0.885, 1.372
Prompt visual (pv) (versus control)	0.062	−0.156, 0.279	1.064	0.856, 1.322
Dynamic social norm (dyn) (versus control)	0.151	−0.068, 0.370	1.163	0.934, 1.448
Pw + pv (versus control)	0.293**	0.076, 0.511	1.341	1.078, 1.667
Pw + dyn (versus control)	0.147	−0.070, 0.364	1.158	0.933, 1.438
Pv + dyn (versus control)	0.077	−0.140, 0.294	1.080	0.870, 1.342
Pw + pv + dyn (versus control)	0.192	−0.023, 0.408	1.212	0.977, 1.500
Random effects	***SD***			
Participants (intercept)	1.161			
Food item (intercept)	0.254			
Observations	32,970			
Log likelihood	−20,652.1			
Deviance statistic	41,304.3			
AIC	41,324.3			
BIC	41,408.3			

Note. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

neither the vegetarian nor the meat version of a dish is less than one percent. Therefore, each participant had to choose 15 times between the three menu options. The participants first saw the menu pictures with the menu titles. Further down the page, the participants in the experimental conditions encountered the intervention content again. At the end of the same page, the menu titles were listed again, and the participants made their choice. The possible moderating variables and covariates were then assessed (Table A7).

2.3. Materials and measures

2.3.1. Intervention elements

2.3.1.1. Written prompt. The written prompt first stated the target behavior, written in bold, and then explained why the target behavior should be performed (Fig. 1). As there is limited evidence regarding the effectiveness of written prompts in reducing meat consumption (e.g.,

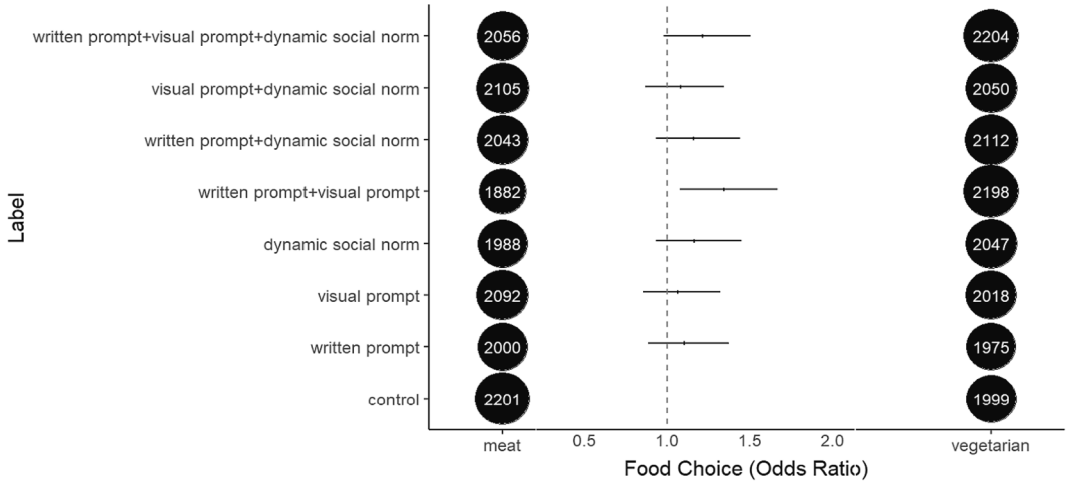

Fig. 4. The size of the black dots depicts the counts for the choice of a menu with meat or a menu without meat (vegetarian menu or salad buffet). On the y-axis, the seven treatment conditions and the control group are presented. The plot also shows the 95% confidence interval (CI) for the seven treatment conditions. The counts are based on 2198 study participants who made 15 menu choices each (32,970 decisions).

Table 3
The contribution of every element to the intervention's effectiveness.

	Sum of Squares	df	Mean Square	F	p
Constant term	8358.420	1	8358.420	8628.935	< 0.001
written prompt	0.301	1	0.301	4.659	0.031
visual prompt	0.093	1	0.093	1.440	0.230
dynamic social norm	0.020	1	0.020	0.302	0.583
written prompt × visual prompt	0.085	1	0.085	1.320	0.251
written prompt × dynamic social norm	0.065	1	0.065	1.013	0.314
visual prompt × dynamic social norm	0.131	1	0.131	2.029	0.154
written prompt × visual prompt × dynamic social norm	0.001	1	0.001	0.008	0.930
Residuals	2121.344	2190	0.969		

Note. Type III Sum of Squares.

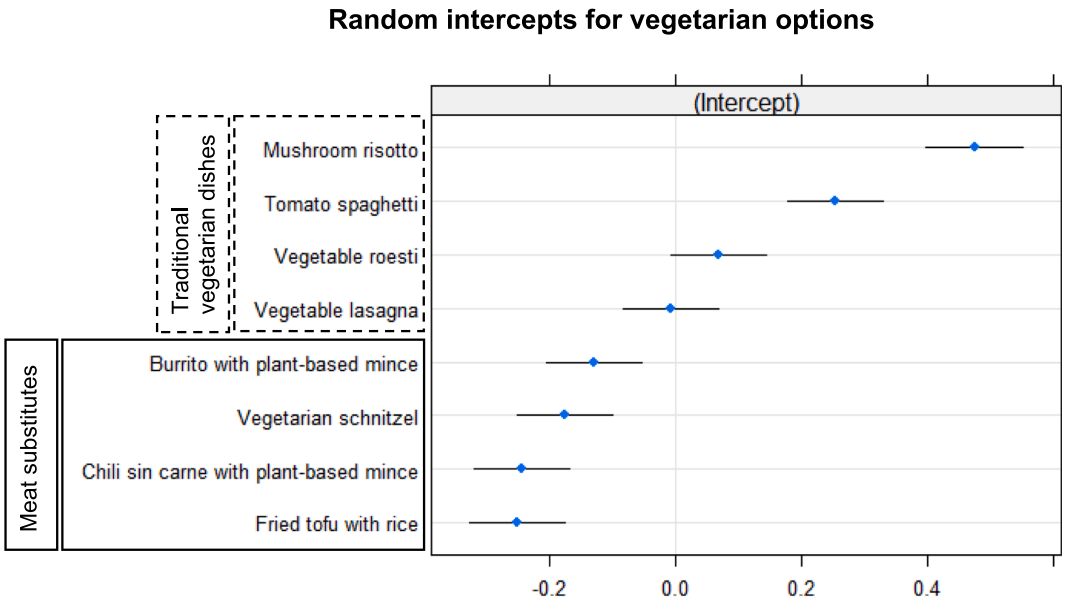

Fig. 5. The plot shows the 95% confidence interval (CI) for the eight vegetarian menus, which were introduced as random intercepts in the mixed-effects logistic model. The menus' CIs that touch the vertical line at zero were equally popular. Those to the left were less popular, and those to the right were more popular. The vegetarian menus with meat substitutes (the four menus in the box with the continuous line) were less popular than the traditional vegetarian dishes (the four menus in the box with the dashed line).

Carfora et al., 2017), we designed the written prompt based on the five characteristics required for an effective prompt (Geller et al., 1982; Sussman et al., 2013): (1) the target behavior is precisely defined, (2) it is well explained how to perform it, (3) it is easy to do, (4) the message about the target behavior is presented close to the point of the critical decision, and (5) it is worded politely and does not threaten the perceived freedom of choice. The content of the written prompt was based on the dietary guidelines of the Federal Food Safety and Veterinary Office in Switzerland (Federal Food Safety and Veterinary Office, 2017b) and the identified gap between the actual and recommended dietary behavior (Federal Food Safety and Veterinary Office, 2017a). The Federal Food Safety and Veterinary Office was cited in the written prompt as the communication source.

2.3.1.2. Visual prompt: The "unbalanced" Swiss Food Pyramid. The Swiss Food Pyramid demonstrates how much from each food category should be consumed proportionally for a balanced diet (Federal Food Safety and Veterinary Office, 2011). The unbalanced Swiss Food Pyramid reveals the gap between the recommended diet and the actual eating patterns of the Swiss population (Swiss Society for Nutrition, 2011). The unbalanced Swiss Food Pyramid, which is used by the Swiss Society for Nutrition as a communication and educational tool (Swiss Society for Nutrition, 2011), was used as the visual prompt in this study. The official visualization was slightly adapted to emphasize the overconsumption of meat (Fig. 2): The red bar, which represents the protein section, was made pyramid overlapping and showed two additional meat symbols (the overconsumption of snacks and sweets was adjusted accordingly from an overlapping triangle to an overlapping bar to simplify the visualization for consumers). The adapted version is based on the same data as the official visualization (Federal Food Safety and Veterinary Office, 2022).

2.3.1.3. Dynamic social norm. The dynamic social norm included a time dimension (how the social norm has changed over the past 10 years) and described the target behavior (adjusting eating habits and reducing meat consumption) (Fig. 3). Specifically, the dynamic social norm applied stated the former and actual meat consumption frequencies and that people successfully changed their behavior (as suggested by Aldoh et al.,

2021). The formulation was "people have adjusted their eating habits," which is more specific and stronger than "people have made an effort to reduce their meat consumption" (Aldoh et al., 2021; Sparkman & Walton, 2017). As the source of the content of the dynamic social norm, a recent report from a well-known retailer in Switzerland (Coop) was used, as this was the best available data source (Coop, 2022). Knowing that norms communicated by companies can make consumers suspicious of the ulterior motives behind the communication (Boenke et al., 2022).

The combinations of the intervention elements are visualized in the Appendix (Table A.1).Table A2.

2.3.2. Measures

As the dependent variable, a binary variable for meat versus vegetarian food choice was constructed. The meat dish was coded as zero and the vegetarian options as one (salad buffet or vegetarian dish).

Further, the variables that could have influenced the effects of the interventions (i.e., possible moderators) were captured in the online questionnaire. The variables, except for the intention to reduce meat consumption, were measured on a 7-point Likert scale ranging from 1 ("strongly disagree"/"does not apply to me at all") to 7 ("strongly agree"/"applies to me totally") (see details in the Appendix).

Self-efficacy—an individual's belief in their own resources to deal with different situations—was measured using the scale of Schwarzer and Jerusalem (1995) consisting of ten items. The scale showed a Cronbach's α of 0.91, $M = 4.91$, and $SD = 0.78$.

Reactance ($\alpha = 0.82$; $M = 3.75$, $SD = 0.98$)—an individual's opposition toward a particular situation—was measured using the short version by Dillard and Shen (2005) of the original scale (Hong & Faedda, 1996), and consisted of eight items. The factor 'emotional response toward restricted choice' was omitted, as this was not of interest for the study.

Social conformity ($\alpha = 0.76$; $M = 3.85$, $SD = 0.99$)—an individual's need to act in accordance with what others expect of them—was measured using the scale of Janda and Trocchia (2001), which was adapted from Bearden and Rose (1990) and consisted of four items.

Attitude toward environmental protection ($\alpha = 0.89$; $M = 5.87$, $SD = 0.99$)—an individual's beliefs about the importance of environmental protection—was measured using the scale of Chen and Chai (2010) and consisted of five items.

Health consciousness ($\alpha = 0.77$; $M = 5.05$, $SD = 1.00$)—which indicates how important a healthy diet is to an individual—was measured using the scale of Dohle et al. (2014) that was adapted from Schifferstein and Ophuis (1998) and consisted of four items.

Habit ($\alpha = 0.86$; $M = 4.76$, $SD = 0.99$)—how habituated an individual is in their food choices—was measured using the scale developed by Renner et al. (2012) and consisted of three items.

Hedonism ($\alpha = 0.91$; $M = 4.68$, $SD = 1.45$)—eating meat for reasons of personal pleasure—was measured using the scale developed by Graça et al. (2015) and consisted of four items.

Intention to reduce meat consumption was captured by a single-item, yes-or-no question (26.1 % yes).

3. Results

3.1. The effects of the interventions on food choice

To test the effects of the interventions on food choice, we performed a mixed-effects logistic regression in R version 4.2.2, with food choice as the dependent variable (repeated measure) and the eight intervention conditions as fixed factors. The random structure of the regression was specified, including random intercepts for participants and food choices, to account for variance within participants and the preference for different menus.

The combination of the visual prompt with the written prompt fostered participants' choice of vegetarian dishes ($\beta = 0.29$, $p < 0.01$; Cohen's $d = 0.16$). Compared to the participants in the control condition who did not encounter an intervention, the participants who saw the visual prompt (the Swiss Food Pyramid) together with the written prompt had 1.34 higher odds of choosing a vegetarian dish (vegetarian menu or salad buffet) over a meat dish (Table 2). None of the other interventions had an effect on food choices.

Fig. 4 plots the odds ratios (OR) and their 95 % confidence intervals for the seven treatment conditions and the control condition. The dots to the left count the number of meat dishes chosen, and the dots to the right count the number of vegetarian dishes chosen (vegetarian dish or salad buffet) for all conditions. The conditions whose confidence intervals do not touch the dashed line are significantly different from the control condition.

3.2. Potential moderating variables

The effect of the written prompt combined with the Swiss Food Pyramid did not depend on the psychological variables (self-efficacy, reactance, social conformity, attitude toward environmental protection, health consciousness, habit, hedonism, and intention to reduce meat consumption).

3.3. The role of the visual prompt

As the logistic regression showed, the written and visual prompt in combination fostered vegetarian food choices compared to the control condition. We hypothesized that interventions containing the visual prompt would be more effective than interventions without the visual prompt. For a better understanding of the role of the visual prompt, a repeated measures ANOVA was conducted with the nudging elements "written prompt," "visual prompt," and "dynamic social norm" and their interactions as the independent variables. Food choice was the dependent variable. The ANOVA revealed the written prompt as the only effective nudging element to foster vegetarian food choices ($F(1, 2190) = 4.659$, $p < 0.05$) (Table 3). There was no interaction effect of any nudging elements. Thus, the hypothesis that interventions containing the visual prompt are more effective than interventions without the visual prompt has to be rejected. However, the odds ratios in Fig. 4 revealed that the written prompt only increased the odds that participants chose a vegetarian option compared to the control condition when combined with the visual prompt. Calculating a contrast between the condition written prompt plus visual prompt and the condition written prompt alone revealed that the visual prompt marginally supported the effectiveness of the written prompt ($F(1, 1087) = 3.772$, $p = 0.052$).

3.4. Exploratory analysis

A closer look at the random intercepts of the vegetarian food options from the mixed-effects logistic regression revealed that the four vegetarian menus with meat substitutes (e.g., plant-based mince or tofu) were the least popular options (Fig. 5). On the other hand, the four traditional vegetarian dishes were the most popular. The popularity of the meat menus can be found in the Appendix (Fig. A.1).

4. Discussion

4.1. Summary and discussion of key results

The main aim of this study was to find interventions that reduce meat consumption in a staff restaurant situation. Since there is a lack of comparative intervention studies that separately test the effect of interventions and their combinations to reduce meat consumption, a visual prompt, a written prompt, a dynamic social norm, and all the intervention combinations were tested (Kwasny et al., 2022).

The combination of the written prompt and the visual prompt (the "unbalanced" Swiss Food Pyramid) influenced the study participants to prefer a meatless menu option over the meat menu option ($\beta = 0.29$, $p < 0.01$, $d = 0.16$) compared to the study participants in the control condition. An ANOVA revealed that the written prompt was the most important nudging element. However, the written prompt as a standalone intervention did not convince participants to prefer the meatless option. Therefore, future field experiments in staff restaurants should use a combination of the written prompt and the visual prompt.

The effect size of the combination of the written prompt and the visual prompt was small ($d = 0.16$). However, to put it in context, the effect sizes of nudges vary among different types of nudging. The so-called "cognitive nudges," such as providing information combined with visual cues, have a smaller average effect size ($d = 0.12$) than affective nudges, such as restaurant staff members actively suggesting healthy options to customers ($d = 0.24$) (Cadario & Chandon, 2019). The effect size of the intervention combination "written and visual prompt" in this study is similar and a little larger than that of the cognitive nudges, which is plausible because the nudge of the present study not only contained information but also a prompt to eat less meat.

Surprisingly, none of the tested individual characteristics—self-efficacy, reactance, social conformity, attitude toward environmental protection, health consciousness, habits, hedonism, and intention to reduce meat consumption—influenced the effect of the intervention "written and visual prompt." Regarding the intention to reduce meat consumption, for example, normally, nudging strategies are most effective when the target group perceives the target behavior as desirable (Lehner et al., 2016). However, there was no difference in the intervention's effectiveness between participants with and without an intention to reduce meat consumption. Moreover, the participants with high reactance were not less influenced by the intervention than those with low reactance. These are promising signs in terms of balancing the acceptance and effectiveness of interventions to reduce meat consumption. Even if the effect size is small, the potential broad application in public staff restaurants could lead to a large impact—that is, a substantial reduction in meat consumption. However, it must first be tested whether the intervention "prompt with unbalanced food pyramid" is effective in the field.

Menus with meat substitutes were found to be less popular than traditional vegetarian menus. This may be because consumers perceive meat substitutes as less natural than meat (Hartmann et al., 2022), or because consumers expect meat substitutes to be less tasty than meat dishes (Michel et al., 2021). The appearance and taste of meat substitutes are strong drivers of the regular consumption of meat substitutes (Weinrich, 2019). Future studies could test whether the type of vegetarian menu (traditional versus meat substitutes) is a predictor of the choice of a meatless menu for specific consumer groups. For staff restaurants, this means that if there is only one meatless menu, it should be a familiar and well-known menu. However, in restaurants with a wider range of menus, meat substitutes and other newly developed foods may be an interesting offer to meet the needs of specific consumer segments or to familiarize consumers with new products.

The dynamic social norm intervention did not promote participants' preference for meatless menus over meat menus. The dynamic social norm did not work, although the social norm intervention in the present study was designed by taking into account some of the previously identified limitations of interventions using dynamic social norms (Aldoh et al., 2021). First, the wording was made more specific ("a growing number of people have adjusted their eating habits and occasionally renounce meat" instead of "a growing number of people have made an effort to reduce meat consumption") (Aldoh et al., 2021). Second, as the dynamic social norm indicated that the former norm was holding only for a minority and now has changed to a norm holding for a majority ("Whereas ten years ago, it was 40 % of the population that occasionally refrained from meat, today it is 60 %"), the participants did not have to deal with uncertainty—that is, whether this social norm would ever become a norm holding for a majority—but were confronted with an established social norm; therefore, the wording of the social norm was made more powerful than in previous studies (Sparkman & Walton, 2017). Perhaps the effect would have been stronger if the source of the dynamic social norm statement had been a scientist rather than a food retailer, although the retailer cited had a good reputation in Switzerland (Growth from Knowledge, 2023). In addition, the participants may have already been aware of the changing social norm (Aldoh et al., 2021) or, even, may have adjusted their own behavior, leaving less potential for the intervention to exert its influence. Unfortunately, we did not include a manipulation check of the perceived dynamic social norm. Future studies about dynamic social norms should also check what participant's beliefs about dynamic social norms. The intervention might have had an effect on those who have not already perceived reducing meat consumption as an existing dynamic social norm but not for the others.

4.2. Methodological strengths and limitations

This study's methodological strength is the high reliability of its results. Each condition had a sufficient number of participants, and each participant repeatedly chose between several options, which is statistically more powerful than a single-choice proceeding. Online sampling allowed us to have participants from a variety of backgrounds. It is likely that not all of the participants regularly eat in a staff restaurant. However, everyone has been in the situation of having a limited number of menu options to choose from. Therefore, the situation is easy to imagine. Alternatively, we could have tried to recruit a sample from companies that have staff restaurants. However, this would have led to having many participants with similar profiles, contrary to our goal of finding an appropriate intervention for different organizations.

In terms of validity, the participants made a choice instead of indicating a consumption intention. Further, the choice options with the salad buffet probably reflected the options in staff restaurants well. In addition, the vegetarian menus were labeled as such to ensure that the participants were well-informed about the options. In reality, in staff restaurants, consumers are often aware of where they can get vegetarian dishes and where they can get meat dishes. The salad buffet was also labeled vegetarian, as vegetarian components usually dominate a salad buffet.

Regarding the limitations of the study, there is evidence that suggests that the popularity of vegetarian menus decreases when the menus are labeled vegetarian (Hielkema & Lund, 2022). We did not test for this. In addition, we did not pre-test the different forms of the interventions' wording. Moreover, the participants were forced to choose one of the three options, and staff restaurants could offer more options. Further,

the participants' choices had no consequences, as they did not have to actually eat what they chose. Finally, future field studies must consider that participants in the present online study could hardly avoid reading the intervention text. In the field, it is more difficult to ensure that people read and notice the intervention (Sparkman et al., 2020). They will be distracted and influenced by other factors, such as talking to colleagues. Therefore, field experiments will likely have smaller effect sizes.

5. Conclusion

In conclusion, this study contributes to achieving a better understanding of the separate effects of the interventions—written prompt, visual prompt, and dynamic social norm—and all their combinations in a staff restaurant context. The combination of the written and the visual prompt (i.e., the unbalanced Swiss Food Pyramid) proved effective, while the written prompt was the most important element of the intervention combination. This intervention could therefore be an effective and efficient way to promote meatless dish choices in staff restaurants and to support behavioral change toward lower meat consumption.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

Fig. A1. The plot shows the 95% confidence interval (CI) for the eight meat menus, which were introduced as random intercepts in the mixed-effects logistic model. The menus' CIs that touch the vertical line at zero were equally popular. Those to the left were less popular, and those to the right were more popular.

Table A1
The eight experimental conditions as they were presented in the online study.

<table>
<tr><td>Condition 1: Control</td><td>Condition 2: Dynamic social norm (dyn)

In der Schweiz reduzieren immer mehr Personen ihren Fleischkonsum. Waren es vor zehn Jahren noch 40 %, sind es inzwischen 60 %, die ihr Ernährungsverhalten angepasst haben und gelegentlich auf Fleisch verzichten[1].
[1] Coop: Plant-based food report, 2022.</td></tr>
<tr><td>Condition 3: Visual prompt (pv)

  </td><td>Condition 4: Written prompt (pw)

Wählen Sie das vegetarische Menü oder bedienen Sie sich am ausgewogenen Salatbuffet. Verglichen mit den Empfehlungen der Schweizerischen Lebensmittelpyramide essen wir wöchentlich 2-3-mal zu viel Fleisch[1].
[1] Bundesamt für Lebensmittelsicherheit und Veterinärwesen: Nationale Ernährungserhebung menuCH, 2017.</td></tr>
<tr><td>Condition 5: Dynamic social norm and visual prompt (dynpv)

 
In der Schweiz reduzieren immer mehr Personen ihren Fleischkonsum. Waren es vor zehn Jahren noch 40 % sind es inzwischen 60 %, die ihr Ernährungsverhalten angepasst haben und gelegentlich auf Fleisch verzichten[1].
[1] Coop: Plant-based food report, 2022.</td><td>Condition 6: Dynamic social norm and written prompt (dynpw)

Wählen Sie das vegetarische Menü oder bedienen Sie sich am ausgewogenen Salatbuffet.
Verglichen mit den Empfehlungen der Schweizerischen Lebensmittelpyramide essen wir wöchentlich 2-3-mal zu viel Fleisch[1]. In der Schweiz reduzieren jedoch immer mehr Personen ihren Fleischkonsum. Waren es vor zehn Jahren noch 40 % sind es inzwischen 60 %, die ihr Ernährungsverhalten angepasst haben und gelegentlich auf Fleisch verzichten[2].
[1] Bundesamt für Lebensmittelsicherheit und Veterinärwesen: Nationale Ernährungserhebung menuCH, 2017.
[2] Coop: Plant-based food report, 2022.</td></tr>
<tr><td>Condition 7: Visual and written prompt (pvpw)

 
Wählen Sie das vegetarische Menü oder bedienen Sie sich am ausgewogenen Salatbuffet.
Verglichen mit den Empfehlungen der Schweizerischen Lebensmittelpyramide essen wir wöchentlich 2-3-mal zu viel Fleisch[1].
[1] (Bundesamt für Lebensmittelsicherheit und Veterinärwesen, 2017, Nationale Ernährungserhebung menuCH)</td><td>Condition 8: Dynamic social norm, visual prompt, and written prompt (dynpvpw)

 
Wählen Sie das vegetarische Menü oder bedienen Sie sich am ausgewogenen Salatbuffet.
Verglichen mit den Empfehlungen der Schweizerischen Lebensmittelpyramide essen wir wöchentlich 2-3-mal zu viel Fleisch[1]. In der Schweiz reduzieren jedoch immer mehr Personen ihren Fleischkonsum. Waren es vor zehn Jahren noch 40 % sind es inzwischen 60 %, die ihr Ernährungsverhalten angepasst haben und gelegentlich auf Fleisch verzichten[2].
[1] Bundesamt für Lebensmittelsicherheit und Veterinärwesen: Nationale Ernährungserhebung menuCH, 2017.
[2] Coop: Plant-based food report, 2022.</td></tr>
</table>

Table A2
Translations of the wording of the conditions from German to English.

Condition	German	English
Written prompt	**Wählen Sie das vegetarische Menü oder bedienen Sie sich am ausgewogenen Salatbuffet.** Verglichen mit den Empfehlungen der Schweizerischen Lebensmittelpyramide essen wir wöchentlich 2–3-mal zu viel Fleisch[1].	**Choose the vegetarian menu or serve yourself at the balanced salad buffet.** Compared to the recommendations of the Swiss Food Pyramid, we eat 2–3 times too much meat per week[1].
	[1] Bundesamt für Lebensmittelsicherheit und Veterinärwesen: Nationale Ernährungserhebung menuCH, 2017.	[1] Federal Food Safety and Veterinary Office: National nutrition survey menuCH, 2017.
Dynamic social norm	In der Schweiz reduzieren immer mehr Personen ihren Fleischkonsum. Waren es vor zehn Jahren noch 40 % sind es inzwischen 60 %, die ihr Ernährungsverhalten angepasst haben und gelegentlich auf Fleisch verzichten[1].	In Switzerland, more and more people are reducing their meat consumption. Whereas ten years ago, it was 40 % of the population that occasionally refrained from meat, today it is 60 %, which have adjusted their eating habits and occasionally refrain from meat[1].
	[1] Coop: Plant-based food report, 2022.	[1] Coop: Plant-based food report, 2022.
Written prompt +Dynamic social norm	**Wählen Sie das vegetarische Menü oder bedienen Sie sich am ausgewogenen Salatbuffet.** Verglichen mit den Empfehlungen der Schweizerischen Lebensmittelpyramide essen wir wöchentlich 2–3-mal zu viel Fleisch[1]. In der Schweiz reduzieren jedoch immer mehr Personen ihren Fleischkonsum. Waren es vor zehn Jahren noch 40 % sind es inzwischen 60 %, die ihr Ernährungsverhalten angepasst haben und gelegentlich auf Fleisch verzichten[2].	**Choose the vegetarian menu or serve yourself at the balanced salad buffet.** Compared to the recommendations of the Swiss Food Pyramid, we eat 2–3 times too much meat per week[1]. However, more and more people in Switzerland are reducing their meat consumption. Whereas ten years ago, it was 40 % of the population that occasionally refrained from meat, today it is 60 %, which have adjusted their eating habits and occasionally refrain from meat[2].
	[1] Bundesamt für Lebensmittelsicherheit und Veterinärwesen: Nationale Ernährungserhebung menuCH, 2017.	[1] Federal Food Safety and Veterinary Office: National nutrition survey menuCH, 2017.
	[2] Coop: Plant-based food report, 2022.	[2] Coop: Plant-based food report, 2022.

Table A3
The menu combinations showing the example of the meat menu Lasagna Bolognese. All 7 other meat menus were also combined with the 8 vegetarian menus, resulting in a total of 64 combinations. Every participant randomly saw 15 of the 64 combinations.

Meat Menu	Similar Vegetarian Menu
Lasagna Bolognese (with minced beef)	Lasagna with vegetables
Chili con carne (with minced beef)	Chili sin carne
Burrito (with minced beef)	Burrito with plant-based mince
Spaghetti Bolognese (with minced beef)	Spaghetti Napoli (Tomato sauce)
Rösti with bacon	Rösti with vegetables
Chicken breast with rice	Tofu with rice
Riz Casimir (curry rice with chicken and vegetables)	Mushroom risotto
Schnitzel (pork) with fries	Plant-based Schnitzel with fries

Table A4
The survey procedure. First, the participants were exposed to the intervention and received the choice task description. The condition of written prompt plus visual prompt serves here as an example condition.

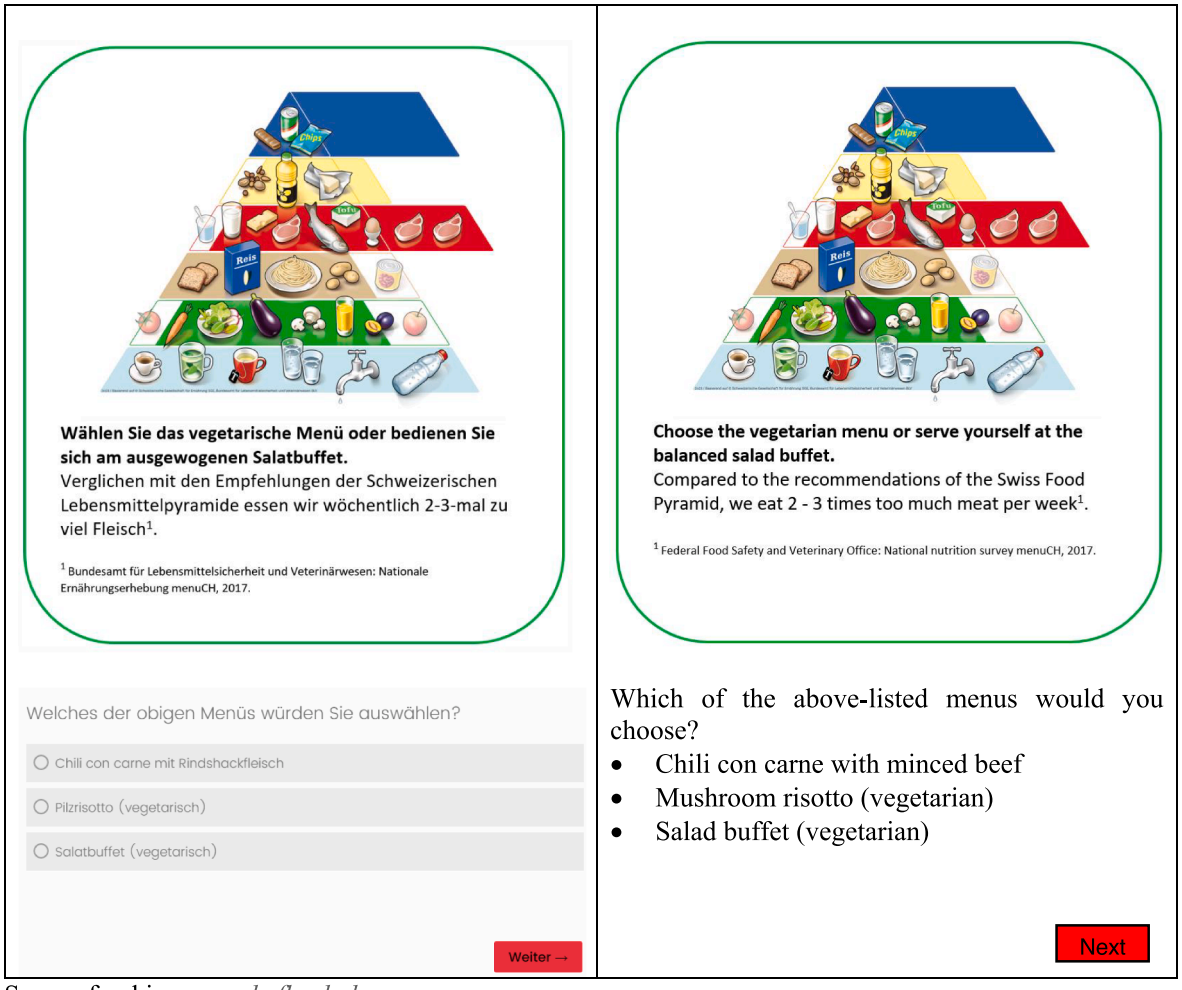
Original German formulation	English translation	
In der Schweiz verpflegen sich Tag für Tag mehr als eine Million Menschen in Betrieben der Spital-, Heim- und Gemeinschaftsgastronomie. Damit mittags alle Gäste ein attraktives Menü auswählen können, müssen die Zutaten in den richtigen Mengen eingekauft werden, die Menüs rechtzeitig zubereitet sein und innert kurzer Zeit an viele Personen verteilt werden.	In Switzerland, more than a million people eat every day in hospitals, nursing homes, and community catering. In order to offer an attractive lunch menu to all guests, ingredients must be purchased in the right quantities, menus must be prepared on time, and distributed to a large number of people in a short period of time.	Control text
Die Ernährung vieler Personen ist aber nicht ausgewogen. Verglichen mit den Empfehlungen der Schweizerischen Lebensmittelpyramide essen wir wöchentlich 2-3-mal zu viel Fleisch. Deshalb empfiehlt sich, vermehrt das vegetarische Menü oder das Salatbuffet auszuwählen.	However, many people do not eat a balanced diet. Compared to the recommendations of the Swiss food pyramid, we eat 2-3 times too much meat per week. It is therefore advisable to choose the vegetarian menu or the salad buffet more often.	Written promt
		Visual prompt
Im ersten Teil der Umfrage wird Ihnen eine Auswahl von Menüs präsentiert. Stellen Sie sich vor, Sie befinden sich in einer Kantine und müssen sich für Ihr Mittagessen zwischen drei Menüs entscheiden. Eines der drei Menüs ist immer das Salatbuffet. Da die Menüs zufällig kombiniert werden, kann es vorkommen, dass Ihnen dasselbe Menü mehrmals vorgeschlagen wird. Lassen Sie sich dadurch nicht verunsichern und wählen Sie die Menüs möglichst unabhängig der bereits getroffenen Entscheidungen. Die Menüs unterscheiden sich preislich nicht. Sie können vom gewählten Menü jeweils so viel essen, wie Sie wollen.	In the first part of the survey, you will be presented with a selection of menus. Imagine you are in a canteen, and you have to choose between three menus for lunch. One of the three menus is always a salad buffet. Since the menus are randomly combined, you may be presented with the same menu several times. Do not be discouraged, and choose the menus as independently as possible from the choices you have already made. The menus do not differ in price. You can eat as much of the chosen menu as you like.	Task description
Weiter	Next	

Table A5
An example of the choice task that was repeated 15 times with different menu combinations.

Welches der drei Menüs würden Sie wählen?	Which of the three menus would you choose?
Chili con carne mit Rindshackfleisch 	Chili con carne with minced beef 
Pilzrisotto (vegetarisch) 	Mushroom risotto (vegetarian) 
Salatbuffet (vegetarisch) 	Salad buffet (vegetarian) 

(continued on next page)

Table A5 (*continued*)



Source food images: *chefkoch.de*

Table A6
Pictures of meat menus and vegetarian menus.

Meat Menu	Similar Vegetarian Menu
Lasagna Bolognese (with minced beef) 	Lasagna with vegetables 
Chili con carne (with minced beef) 	Chili sin carne 
Burrito (with minced beef) 	Burrito with plant-based mince 
Spaghetti Bolognese (with minced beef) 	Spaghetti Napoli (Tomato sauce) 
Rösti with bacon 	Rösti with vegetables 

(continued on next page)

Table A6 (*continued*)

Chicken breast with rice 	Tofu with rice 
Riz Casimir (curry rice with chicken and vegetables) 	Mushroom risotto 
Schnitzel (pork) with fries 	Plant-based Schnitzel with fries 

Source food images: *chefkoch.de*

Table A7
Scales used in the survey and their translation (English to German).

General self-efficacy (Schwarzer & Jerusalem, 1995)	**Selbstwirksamkeit**
1. I can always manage to solve difficult problems if I try hard enough.	1. Wenn sich Widerstände auftun, finde ich Mittel und Wege, mich durchzusetzen.
2. If someone opposes me, I can find the means and ways to get what I want.	2. Die Lösung schwieriger Probleme gelingt mir immer, wenn ich mich darum bemühe.
3. It is easy for me to stick to my aims and accomplish my goals.	3. Es bereitet mir keine Schwierigkeiten, meine Absichten und Ziele zu verwirklichen.
4. I am confident that I could deal efficiently with unexpected events.	4. In unerwarteten Situationen weiß ich immer, wie ich mich verhalten soll.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	5. Auch bei überraschenden Ereignissen glaube ich, daß ich gut mit ihnen zurechtkommen kann.
6. I can solve most problems if I invest the necessary effort.	6. Schwierigkeiten sehe ich gelassen entgegen, weil ich meinen Fähigkeiten immer vertrauen kann.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	7. Was auch immer passiert, ich werde schon klarkommen.
8. When I am confronted with a problem, I can usually find several solutions.	8. Für jedes Problem kann ich eine Lösung finden.
9. If I am in trouble, I can usually think of a solution.	9. Wenn eine neue Sache auf mich zukommt, weiß ich, wie ich damit umgehen kann.
10. I can usually handle whatever comes my way.	10. Wenn ein Problem auftaucht, kann ich es aus eigener Kraft meistern.

Reactance short version by (Dillard & Shen, 2005) without factor "emotional response towards restricted choice"; original scale by (Hong & Faedda, 1996)	**Reaktanz**
1. Regulations trigger a sense of resistance in me.	1. Vorschriften lösen in mir ein Gefühl des Widerstands aus.
2. I find contradicting others stimulating.	2. Ich finde es anregend, anderen zu widersprechen.
3. When something is prohibited, I usually think, "That's exactly what I am going to do."	3. Wenn etwas verboten wird, denke ich normalerweise: "Genau das werde ich tun."
11. I resist the attempts of others to influence me.	11. Ich wehre mich gegen die Versuche anderer, mich zu beeinflussen.
12. It makes me angry when another person is held up as a role model for me to follow.	12. Es macht mich wütend, wenn eine andere Person als Vorbild dargestellt wird, dem ich folgen soll.
13. When someone forces me to do something, I feel like doing the opposite.	13. Wenn mich jemand zwingt, etwas zu tun, habe ich Lust, das Gegenteil zu tun.
5. I consider advice from others to be an intrusion.	5. Ratschläge von anderen empfinde ich als Einmischung.
9. Advice and recommendations usually induce me to do just the opposite.	9. Ratschläge und Empfehlungen veranlassen mich in der Regel dazu, genau das Gegenteil zu tun.

Social conformity (Janda & Trocchia, 2001) adapted from (Bearden & Rose, 1990)	**Soziale Konformität**
1. When I'm in a group, I try to behave like everyone else.	1. Wenn ich in einer Gruppe bin, versuche ich mich so zu verhalten, wie alle anderen.
2. At parties, I usually try to behave in a manner that makes me fit in.	2. Auf Partys versuche ich mich üblicherweise so zu verhalten, dass ich dazu passe.
3. The slightest look of disapproval in the eyes of a person with whom I am interacting is enough to make me change my approach.	3. Die kleinsten Anzeichen von Missbilligung einer Person, mit der ich interagiere, reichen aus, damit ich mein Verhalten ändere.
4. If I am the least bit uncertain as to how to act in a social situations, I look for the behavior of others.	4. Wenn ich auch nur das kleinste bisschen unsicher bin, wie ich mich in einer sozialen Situation verhalten soll, achte ich auf das Verhalten anderer.

Attitude toward environmental protection (Chen & Chai, 2010)	**Einstellung zum Umweltschutz**
1. If all of us, individually, made a contribution to environmental protection, it would have a significant effect.	1. Wenn jede:r Einzelne von uns einen Beitrag zum Umweltschutz leisten würde, hätte das eine große Wirkung.
2. Everyone is responsible for protecting the environment in their everyday life.	2. Jede:r ist für den Schutz der Umwelt in ihrem/seinem Alltag verantwortlich.
3. Citizens should recycle their household waste.	3. Alle sollten ihren Haushaltsabfall korrekt entsorgen.
4. The increasing deterioration of the environment is a serious problem.	4. Die zunehmende Verschlechterung des Zustands der Umwelt ist ein ernstes Problem.
5. Preserving and protecting the environment should be one of our priorities.	5. Der Erhalt und Schutz der Umwelt sollte eine unserer Prioritäten sein.

Health consciousness Dohle et al. (2014) adapted from (Schifferstein & Ophuis, 1998)	**Gesundheitsbewusstsein**
1. I think it is important to eat healthily.	1. Mir ist es wichtig, dass ich mich gesund ernähre.
2. My health is dependent on how and what I eat	2. Meine Gesundheit ist abhängig davon, wie und was ich esse.
3. If one eats healthily, one gets ill less frequently.	3. Wenn man gesund isst, wird man weniger krank.
4. I am prepared to leave a lot, to eat as healthily as possible.	4. Ich bin bereit, auf Vieles zu verzichten, um möglichst gesund zu essen.

Habit (Renner et al., 2012)	**Essen aus Gewohnheit**
I eat what I eat, …	Ich esse, was ich esse, …
1. … because I am accustomed to eating it.	1. … weil ich es gewohnt bin, das zu essen.
2. … because I usually eat it.	2. … weil ich es üblicherweise esse.
3. … because I am familiar with it.	3. … weil ich es kenne.

Hedonism (Graça et al., 2015)	**Hedonismus**
1. To eat meat is one of the good pleasures in life.	1. Fleisch zu essen ist eine der grossen Lebensfreuden.
2. I love meals with meat.	2. Ich liebe Mahlzeiten mit Fleisch.
3. I'm a big fan of meat.	3. Ich bin ein großer Fan von Fleisch.
4. A good steak is without comparison.	4. Ein gutes Steak ist mit nichts zu vergleichen.
Additional questions to shift the focus from meat:	Zusätzliche Fragen, um den Fokus vom Fleisch wegzulenken:
• I love meals with lots of vegetables.	• Ich liebe Mahlzeiten mit viel Gemüse.
• A balanced diet is important to me.	• Eine ausgewogene Ernährung ist mir wichtig.
• Eating is more than just taking in food.	• Essen ist mehr als blosse Nahrungsaufnahme.
• I love to taste dishes from other cultures.	• Ich liebe es, Gerichte aus anderen Kulturen zu kosten.

Eating frequencies (slider from 0 to 7)	**Esshäufigkeiten,** Schieberegler 0 bis 7
How often do you eat foods out of the following categories during a normal week for your main dish?	Wie oft essen Sie während einer normalen Woche (7 Tage) Nahrungsmittel aus den folgenden Kategorien zu den Hauptmahlzeiten?
• Rice, pasta, or potatoes	• Reis, Teigwaren oder Kartoffeln
• Meat or fish	• Fleisch oder Fisch
• Vegetables (as a side dish or salad)	• Gemüse (als Beilage oder Salat)
• Legumes (e.g., lentils, beans, chickpeas)	• Hülsenfrüchte (z.B. Linsen, Bohnen, Kichererbsen)

Intentions 0, 1	**Absichten** 0, 1
Currently I have the intention to…	Ich habe zur Zeit die Absicht...
…eat less sweets.	...weniger Süssigkeiten zu essen.
…eat less salty.	...weniger salzig zu essen.
…eat more fruit and vegetables.	...mehr Früchte und Gemüse zu essen.
…eat less meat.	...weniger Fleisch zu essen.
…drink more water.	...mehr Wasser zu trinken.
Knowing the Swiss Food Pyramid: yes, no	**Bekanntheit Schweizerische Lebensmittelpyramide** ja, nein
Picture of the official Swiss Food Pyramid. Do you know the illustration (already before this study)? Yes →What is this illustration called?	Bild der offiziellen Schweizerischen Lebensmittelpyramide. Kennen Sie die Darstellung (bereits vor dieser Studie)? Ja →Wie nennt sich diese Darstellung?

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