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A Longitudinal Study on Dietary Behavior and Change in Switzerland: Protocol of the Swiss Eating Study

RESEARCH

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ABSTRACT

What we choose to eat has far-reaching implications for individual health, environmental sustainability, and social justice. Understanding how dietary decisions are made in everyday life and how they evolve over time is therefore of substantial societal relevance. This protocol paper describes the rationale and design of the Swiss Eating Study (SwES), a longitudinal investigation of dietary behavior and its determinants among German-speaking adults in Switzerland. The SwES follows an initial cohort of 4,451 participants across more than two years using five survey waves combined with three intensive daily diary phases (21–28 consecutive days each) implemented in a measurement-burst design. The study examines factors operating at multiple timescales, including enduring influences such as dietary identity, motivations, preferences, and perceived social norms, as well as momentary influences such as cravings, situational motivations, food availability, and cost. These factors are analyzed as both independent and interacting determinants of dietary behavior and behavioral change. Embedded within the second assessment wave, 1,648 participants who expressed openness to modifying their diet were randomly assigned to one of three conditions: a goal-focused intervention presenting health, environmental, animal, and social reasons to eat less meat, a process-focused intervention providing actionable guidance and implementation prompts, or a control condition. Participants are followed longitudinally for 1.5 years to assess sustained effects. By integrating macro-level dispositions with micro-level situational processes and experimentally testing intervention strategies, the SwES aims to advance a comprehensive model of dietary decision-making and identify mechanisms that promote lasting dietary change.

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Food choices have wide-ranging consequences for individual health, environmental sustainability, and social justice. In fact, dietary choices are among the leading modifiable risk factors for non-communicable diseases such as cardiovascular disease, type 2 diabetes, and certain cancers (Afshin et al., 2019; Willett et al., 2019). Shifts toward more plant-based diets have been identified as a key pathway for reducing the climate, land-use, and biodiversity impacts of food production (Poore & Nemecek, 2018; Springmann et al., 2018). Animal agriculture also raises concerns about the rights and welfare of farmed animals (Clark et al., 2016, 2019; Hårstad, 2024), animal agriculture workers (Leibler et al., 2017; Slade & Alleyne, 2023), and communities in lower-income regions (IPCC, 2023). Leading intergovernmental organizations have increasingly acknowledged the potential of dietary shifts toward more plant-based food choices as part of broader personal and public health, climate mitigation, and equity strategies (IPCC, 2023; UNEP, 2022; WHO, 2023).

Many people want to adopt a healthier and more sustainable diet, particularly in affluent Western countries such as Switzerland where awareness of the health, environmental, and ethical consequences of current dietary patterns is growing (Godfray et al., 2018; Tschanz et al., 2022). For instance, the proportion of flexitarian households in Switzerland, those deliberately reducing their meat consumption, rose from 18.3% to 26.6% between 2022 and 2024 (Eggenschwiler et al., 2025). Swiss dietary recommendations limit meat to two or three portions per week (Federal Food Safety and Veterinary Office & Swiss Society for Nutrition, 2024), close to the EAT-Lancet planetary health diet (Willett et al., 2019). In the national nutrition survey, adults in Switzerland ate more than twice this amount (Tschanz et al., 2022), and their intake of meat other than poultry reached eight times the planetary health diet reference (Randegger et al., 2026). Yet translating these reasons for a healthy and sustainable diet into lasting behavioral change remains a challenge (e.g., Green et al., 2025). What people eat depends not only on their identity, preferences, motivations, and the norms and traditions they face, but also on what happens during specific meal choices like cravings, what food is available, what it costs, and with whom they are eating. Although research has identified many of these factors individually, it remains unclear how they work together across different timescales and which intervention strategies effectively support sustained change. This study protocol describes the Swiss Eating Study (SwES), a longitudinal study that combines repeated survey assessments, daily diary bursts, and an embedded intervention to understand determinants of dietary choices and change among adults in Switzerland.

FACTORS THAT SHAPE DIETARY BEHAVIOR

Among dietary shifts, reducing meat consumption has received particular attention, as it is one of the few behaviors with benefits for health, the environment, and social justice simultaneously (Clark et al., 2019; González et al., 2020; Poore & Nemecek, 2018). Yet despite growing motivation to change, translating intentions into lasting behavior change remains difficult. This intention-behavior gap is well-documented across a variety of health and sustainability domains (Sheeran & Webb, 2016). Meat eating is deeply embedded in personal identities, cultural traditions, social practices, and everyday routines, and even individuals who are willing to change their habits often struggle to do so in practice (Graça et al., 2019a; Nguyen & Platow, 2021). Meat reduction is an ideal case for studying the factors that drive dietary change and the strategies that may support it because it is a highly consequential behavior about which people make choices multiple times per day. To understand the factors that relate to people's eating behavior, the SwES focuses on individuals who are open to reducing their meat consumption.

Factors that influence dietary behavior can be distinguished along two dimensions (Figure 1). First, they operate at different timescales. Some are enduring influences that shape general dietary tendencies over longer timescales (though they may themselves change gradually, e.g., in response to interventions). Others are momentary factors that make particular food choices more or less likely at a given meal. Second, they can be personal in that they involve an individual's characteristics and motivations, or environmental, meaning they involve the social and physical environment. Enduring personal factors include *identity*-related variables such as personality traits, the centrality of diet to one's sense of self as well as demographics like gender and socioeconomic status (Pfeiler & Egloff, 2018; Reist et al., 2023; Rosenfeld, 2020; Rosenfeld & Burrow, 2018), *dietary motivations* in favor of or against plant-based diets (Hopwood et al., 2021; Stahlmann et al., 2024), *food preferences* (Pechey et al., 2021) and the *capability* to prepare plant-based meals (Graça et al., 2019b). *Family and cultural norms* represent enduring environmental influences on diet (Nguyen & Platow, 2021; Wenrich et al., 2010).

At the momentary level, personal factors such as *momentary dietary motivations*, including health, environment and animal rights as well as *cravings* shape individual meal decisions, while environmental factors such as food *availability*, *social pressure*, and *cost* determine what options are accessible in a given situation (Trenkenschuh, Tan, et al., 2026; Wahl et al., 2020).

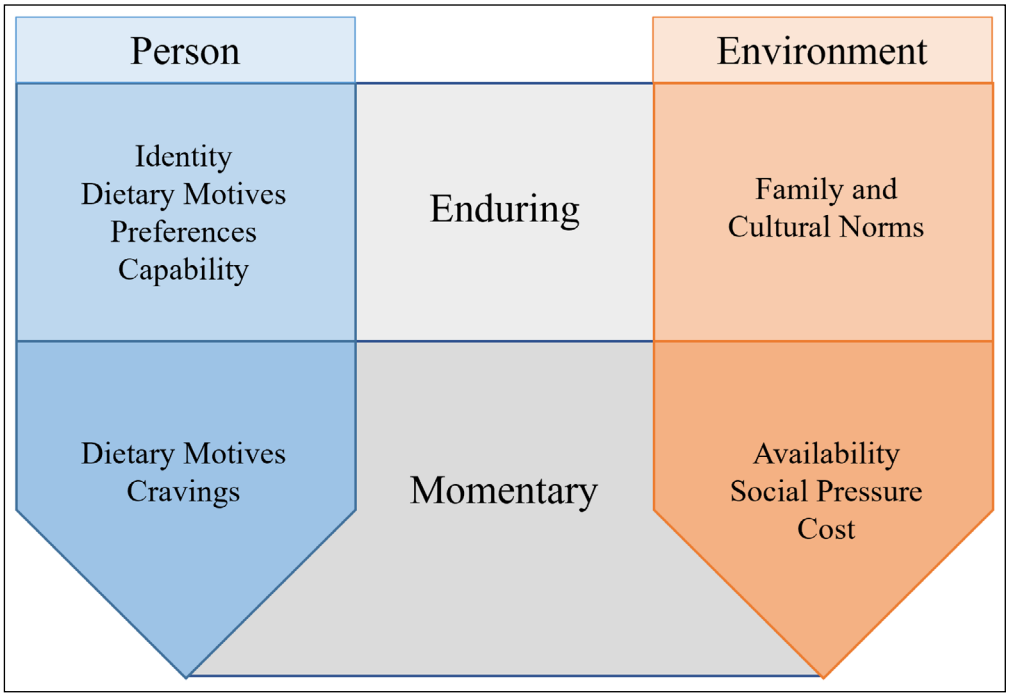


Figure 1 Determinants of dietary choices.

Prior research has typically focused on a relatively narrow range of either enduring predictors or momentary fluctuations, rather than examining them together in a single design. Moreover, longitudinal studies commonly track slow-moving changes but miss day-to-day variability, while intensive daily diary studies capture momentary influences but are typically too short to detect longer-term trajectories. Measurement burst designs that embed daily diaries within a broader longitudinal framework offer a way to bridge these timescales (Sliwinski, 2008). The SwES applies this approach to examine both long-term trajectories and daily variability in eating within a single design.

DIETARY INTERVENTIONS

Despite growing research interest in dietary behavior change, intervention research in this domain faces several methodological challenges that limit the conclusions that can be drawn. Reviews and meta-analyses—particularly those focused on plant-based eating—have consistently noted a reliance on small samples, a lack of randomized control and comparison groups, weak manipulations such as one-time exposure to informational materials, a focus on attitudinal (e.g., changes in beliefs or intentions) rather than behavioral outcomes, and short or absent follow-up periods (e.g., Green et al., 2025; Kwasny et al., 2022). The SwES was designed to address these limitations. The overall study combines a large sample of individuals open to dietary change with daily diary assessments and longitudinal survey waves spanning more than two years. Embedded within this design, a randomized controlled trial delivers two intervention approaches during a 21-day daily diary phase, with a one-week post-intervention daily diary phase and the subsequent survey waves serving as follow-ups over 1.5 years.

A key question in behavior change research is how to effectively translate intentions into sustained action, given that many people who intend to change their behavior fail to do so (Sheeran & Webb, 2016). Motivational science offers two broad approaches to bridge this gap. Goal-focused approaches emphasize why one should change their behavior by highlighting the long-term benefits and consequences of this behavior with the goal of generating and strengthening intentions (Locke & Latham, 2002). In contrast, process-focused approaches emphasize how to achieve behavioral goals by providing concrete resources and implementation prompts that support self-regulation during goal striving in specific contexts (Freund & Hennecke, 2015; Gollwitzer, 1999). Meat reduction is an ideal context to test these approaches: many people intend to reduce their meat consumption for health, environmental, social, or ethical reasons, yet struggle to do so consistently (Graça et al., 2019a). Messaging interventions have shown some promise in this domain, with effective content including appeals to health benefits, environmental impact, animal rights, and social norms (Amiot et al., 2018; Carfora et al., 2019; Sparkman et al., 2020). However, most interventions have relied exclusively on this goal-focused content. The intervention implemented in the SwES addresses this gap by comparing two conditions: a goal-focused condition emphasizing long-term benefits of meat reduction, and a process-focused condition

providing resources and implementation prompts, allowing for comparisons on how these message types affect dietary behavior.

AIMS

The SwES addresses three gaps in the research reviewed above. Studies rarely examine enduring and momentary determinants of eating together, rarely link daily processes to dietary change over years, and rarely test interventions against behavioral outcomes with long-term follow-up.

The first aim of the SwES is to develop a comprehensive model of dietary behavior by examining how enduring and momentary factors predict dietary choices and their change over time (Figure 1). The second aim is to evaluate two theory-driven intervention approaches to support dietary change in relation to a control group. Participants are randomly assigned to one of three conditions: a goal-focused condition emphasizing long-term consequences of their eating behavior, a process-focused condition providing implementation support, or a control group receiving no intervention.

Overall, the SwES addresses the following research questions: (1) How does dietary behavior of Swiss change over time, given that they are in principle open to reducing their meat consumption? (2) How do individual differences in enduring factors (e.g., identity, dietary motives) predict trajectories of dietary change? (3) How do within-person fluctuations in momentary factors (e.g., cravings, availability, social pressure) predict dietary behavior? (4) Do between-person differences in enduring factors moderate the within-person associations between momentary factors and dietary behavior? (5) Do momentary factors mediate the influence of enduring factors on dietary behavior? (6) Do goal-focused and process-focused interventions differentially affect dietary behavior? (7) Which participant characteristics moderate the effectiveness of these interventions?

METHODS

ETHICAL APPROVAL AND CONSENT

The study protocol was approved by the Ethics Committee of the Department of Psychology, University of Zurich (approval no. 23.10.15). All participants received a detailed study description outlining the purpose, procedures, and ethical considerations of data handling prior to participation. Informed consent was obtained from all participants at the start of the study.

TRANSPARENCY AND OPENNESS

This study was funded by the Swiss National Science Foundation (grant no. 220036). Details on the SwES are updated on the project codebook on the OSF page with each assessment wave: https://osf.io/k8vzc. We did not preregister the overall study procedures. We preregistered the hypotheses and analysis plan for evaluating the intervention's effectiveness before receiving the Wave 2 data (https://osf.io/38xvz).

Each subproject preregisters its hypotheses and analysis plan before data analysis and shares anonymized data and analysis code upon publication. Preregistered subprojects examined associations of dietary motivations with different forms of meat engagement (Trenkenschuh et al., 2025) and with ambivalence (Trenkenschuh, Buttlar, et al., 2026), the effects of the intervention on meat consumption (Trenkenschuh, Graça, et al., 2026), momentary food-choice reasons and meat consumption (Tan, Trenkenschuh, Bleidorn, Graça, & Hopwood, 2026), and affect during meals (Tan, Trenkenschuh, Bleidorn, Freund, & Hopwood, 2026). Further preregistered projects examine personality and meat engagement (Tan, Bastian, et al., 2026), day-to-day patterns in meat consumption (https://osf.io/yuca9), willingness to consume cell-based meat (https://osf.io/83y9j), and gender identity and animal product consumption (https://osf.io/bjrq6). The OSF page lists all current subprojects: https://osf.io/k8vzc.

STUDY DESIGN

The SwES is a multi-wave longitudinal study with five survey waves spaced approximately six months apart (Figure 2). At the beginning of each wave, participants are invited to complete an online questionnaire lasting 15–20 minutes (denoted S; e.g., T1-S for the Wave 1 survey). Three of these waves (Waves 1, 2, and 4) additionally include a burst phase, during which participants are invited to complete brief daily diaries (~ 3 minutes each) over a period of 21 days at Waves 1 and 4, and 28 days at Wave 2 (denoted B; e.g., T1-B).

An intervention was implemented during the burst phase of Wave 2. At this wave, participants were randomly assigned to one of three groups. One group served as a control group and completed the daily diaries without receiving any messages. Participants in the two intervention groups received a short daily message via SMS or email (depending on their preference) alongside the daily diaries. These messages were informed by contemporary motivational science (Freund et al., 2019; Freund & Hennecke, 2015; Locke & Latham, 2002). The goal was to examine whether messages influenced participants' eating habits and attitudes.

PARTICIPANT RECRUITMENT AND RETENTION

All data reported in this paper are descriptive. They document recruitment, retention, and compliance through Wave 3 and do not address the research questions listed above. Participants were eligible if they were at least 18 years old and resided in German-speaking cantons of Switzerland (Figure 3). Data collection was conducted by the Swiss Centre of Expertise in the Social Sciences (FORS; https://forscenter.ch) using the sampling

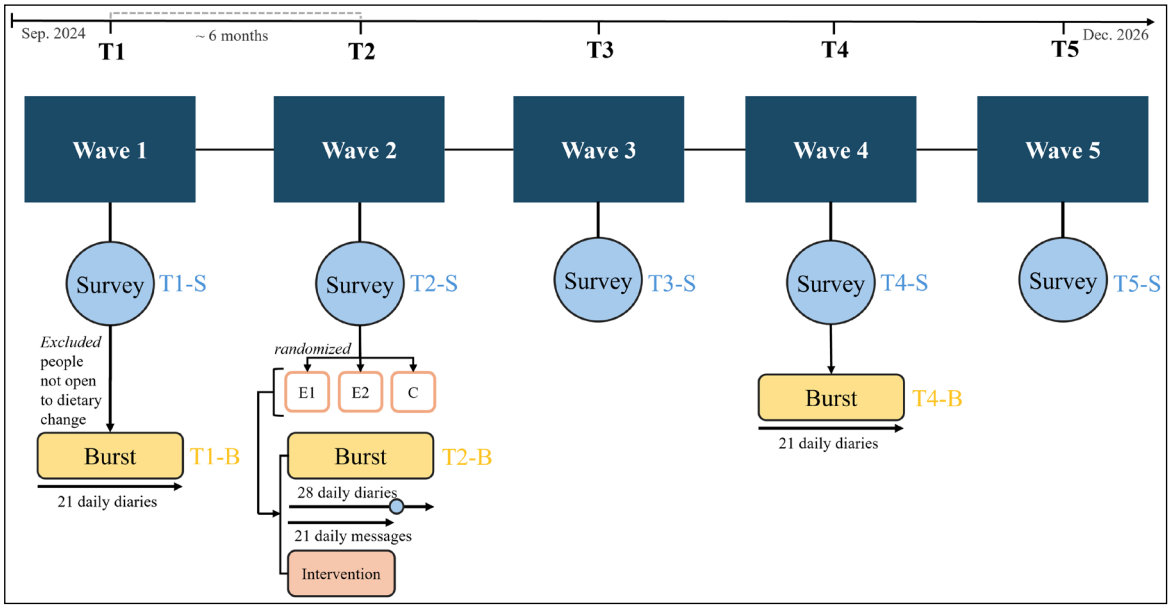


Figure 2 Study design.

Note: All waves are spaced approximately 6 months apart. Bursts start one week after the survey assessments. E1 = goal-focused intervention group; E2 = process-focused intervention group; C = control group. At Wave 2, participants in E1 and E2 received daily intervention messages for 21 days while completing up to 28 daily diaries. Control group participants completed daily diaries without receiving intervention messages. The blue dot at Wave 2 burst indicates that a few survey items were administered on day 22.

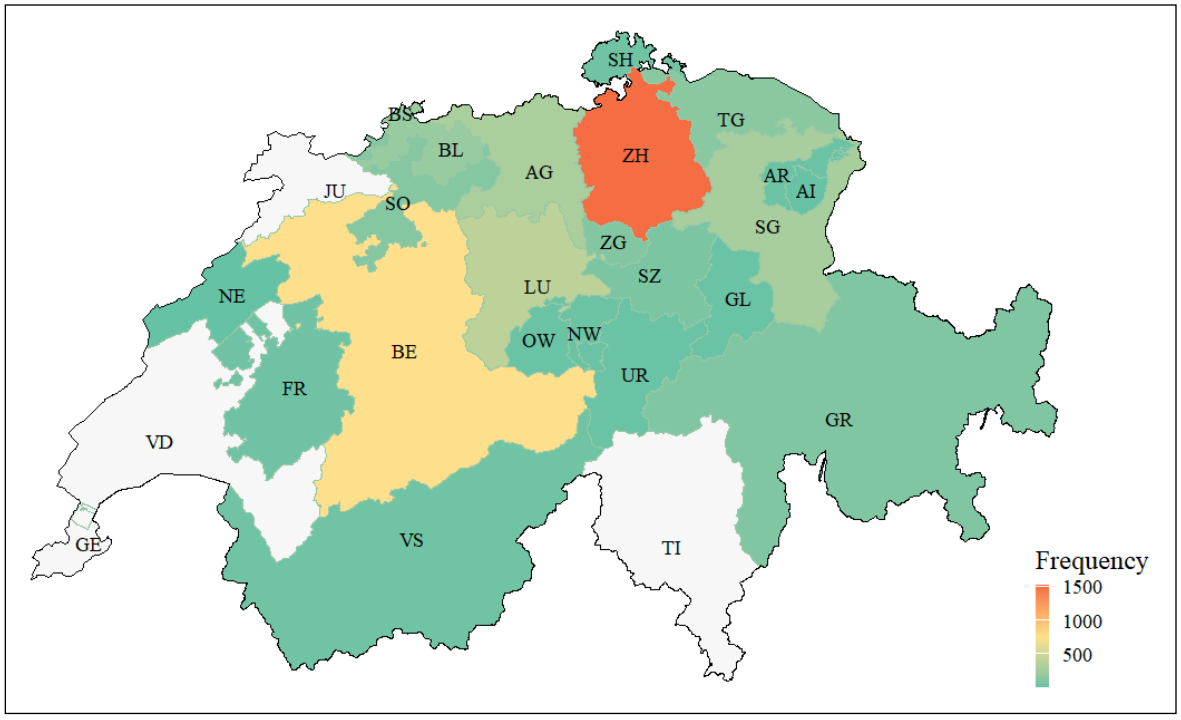


Figure 3 Participant distribution across Swiss cantons.

Note: Depicted are frequencies of participants who completed the initial survey at T1 (N = 4,451) residing in German-speaking cantons of Switzerland (e.g., Zurich [ZH], Bern [BE], Lucerne [LU]). White backgrounds indicate majority non-German speaking cantons.

frame for persons and households (SRPH) provided by the Swiss Federal Statistical Office (FSO; https://www.bfs.admin.ch). The use of this sampling frame was approved because the SwES was considered to be of national relevance. Data were collected via Qualtrics throughout the study period. Initially, 17,307 individuals were contacted by mail and received study information, and a link to the online questionnaire with a consent form. This outreach sample was demographically weighted toward younger individuals (18–34 years: 60%, 35–64 years: 30%, 65+ years: 10%), women (65% female, 35% male), and residents of urban areas (urban: 55%, suburban:

30%, rural: 15%), as these characteristics are associated with greater openness to meat reduction (Pfeiler & Egloff, 2018; Ruby et al., 2023). At the time of writing, data collection through Wave 3 was complete. Figure 4 depicts the participant flow up to this point (see Table 2 for sample sizes per timepoint and condition).

Baseline Survey (T1-S). The baseline survey assessed sociodemographics, personality, dietary behavior (food frequency, stage of change, and duration of and intention to maintain the current diet), food preferences, eating goals, meat-eating and vegetarian eating motivations, and meat ambivalence (Table 3). Participants were sent an invitation letter that included a brief description of the study, a link to access the online survey, a unique personal login code, an information letter on ethical considerations of data handling and a consent form. The letter also informed them that participation would automatically enter them into a prize draw in which five participants would receive CHF 300 each. For the first survey, we collected data from N = 4,451 participants (70.6% female, M_{age} = 37.8, SD_{age} = 15.6, see Table 1 for additional sample characteristics). Those providing consent were able to participate in the upcoming burst.

Burst (T1-B). One week after completion of the initial survey, participants who met the eligibility criteria were invited to take part in a 21-day daily diary burst. Eligibility criteria were: (a) being at least 18 years old, (b) providing sufficient data in the initial survey (i.e., completion of at least 50% of survey items), (c) a match between census information and self-reported demographic data, and (d) indicating openness to reducing meat consumption. In total, 4,451 participants completed the initial survey, of whom 3,136 (70%) met the eligibility criteria and were invited to participate in the burst phase (Figure 4). Of these, 2,299 participants (73%) provided at least one daily diary rating.

On the first morning of the burst, participants received a general message describing the procedure, followed by the first daily diary invitation that evening. For the subsequent 20 days, participants who had not opted out received a daily diary link each evening at 7:30 p.m. via SMS or email, according to the contact preferences indicated in the initial survey. Each link remained active for 26 hours. An incentive system was implemented that rewarded participants based on the number of completed daily diaries. The system included three milestones, each associated with a monetary reward. Participants received compensation based on their completion rate (CHF 5 for at least 5 questionnaires, CHF 20 for at least 14, and CHF 30 for all 21), and completing all 21 questionnaires automatically entered them into a separate prize draw for this burst, in which three participants received CHF 300 each. Of the participants who provided daily diary data, 27.4% identified as male and 72.6% as female. In total, 39,036 daily diary entries were collected (*mean* = 17, median = 20 per participant), of which 99% were fully completed.

	MEASUREMENT TIMEPOINT		
	WAVE 1	WAVE 2	WAVE 3
Gender			
female	70.6%	72.2%	70.6%
male	29.1%	27.8%	26.1%
Age			
Mean	37.8	39.8	40.1
SD	15.6	15.7	15.8
Political orientation			
Mean	3.7	–	3.6
SD	1.2	–	1.1
Education			
University degree	49.6%	–	54.5%
No university degree	50.0%	–	42.1%
Marital Status			
Single	52.9%	–	48.2%
Married	35.4%	–	35.6%
Other	11.7%	–	16.2%
Income			
<1,700	16.7%	–	13.1%
1,701–4,000	21.9%	–	20.1%
4,001–5,700	24.9%	–	24.4%
5,701–8,800	25.6%	–	27.4%
>8,800	9.4%	–	10.8%
Food Budget			
<500	25.1%	–	22.3%
501–1,000	39.5%	–	42.1%
1,001–1,500	21.1%	–	12.1%
1,501–2,000	8.0%	–	6.8%
>2,000	5.1%	–	5.5%
Diet and stage of change			
Vegan (maintenance)	2.0%	–	1.0%
Vegetarian (maintenance)	9.5%	–	10.2%
reducing meat (preparation/action)	48.2%	–	54.2%
open to reduce (contemplation)	27.0%	–	28.7%
not open to reduce (precontemplation)	13.2%	–	5.6%

Table 1 Sample characteristics across Waves 1 to 3.

Note: Political orientation (1 = left, 7 = right). Income and Food budget are reported in CHF. Participants indicating "not open" to reduce meat were excluded prior to Wave 1 burst. At Wave 2, only age and gender were assessed. In instances where percentages do not sum to 100%, this is due to missing data. For a more detailed breakdown of the variables, please see the codebook.

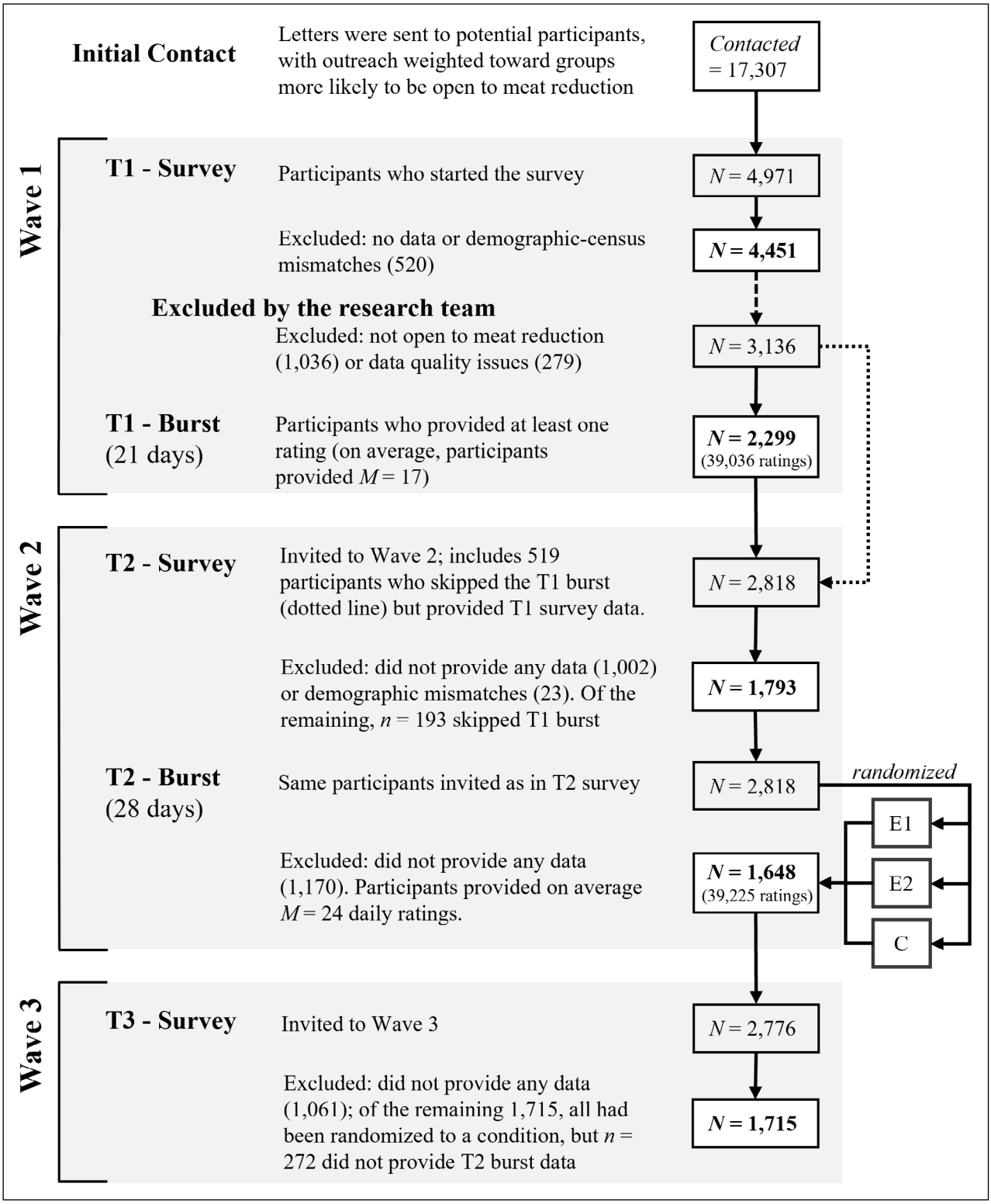


Figure 4 Participant flowchart for Waves 1 to 3.

Note: Solid arrows indicate the main participant flow; dotted arrow indicates participants who skipped the T1 burst but were re-invited at T2. Numbers in parentheses within the text refer to participants excluded at each step. Bolded *N*s indicate the cleaned dataset for each time point. E1 = goal-focused intervention group (n = 524); E2 = process-focused intervention group (n = 568); C = control group (n = 556). From Wave 2 onward, invitations did not depend on participation in the preceding assessment. Of the 1,715 T3 participants, 1,443 had provided T2 burst data.

Wave 2. Survey data for Wave 2 (T2-S) was collected approximately 6 months after Wave 1. The survey was accessed by *N* = 2,818 individuals, including 519 who had skipped the Wave 1 burst (T1-B) but provided Wave 1 survey data (T1-S). After excluding cases with no progress or demographic mismatches, *N* = 1,793 participants remained (72.2% female, M_{age} = 39.8, SD_{age} = 15.7). The attrition rate between the T1 survey and T2 survey

	MEASUREMENT TIMEPOINT				
	WAVE 1		WAVE 2		WAVE 3
	SURVEY	*BURST*	*SURVEY*	*BURST*	*SURVEY*
Overall	4,451	2,299	1,793	1,648	1,715
Conditions					
Goal-focused				524	494
Process-focused				568	456
Control				556	493
Total				1,648	1,443

Table 2 Sample sizes across measurement timepoints and conditions.

Note: 'Overall' is the sample size of participants who provided data at each measurement timepoint. Participants were randomized to conditions upon invitation to the Wave 2 burst. Condition-specific sample sizes at Wave 2 burst reflect those who provided daily diary data. At Wave 3, all 1,715 participants had a condition assignment; however, 272 had not provided data during the Wave 2 burst and thus did not receive intervention messages.

(not considering the 1,315 participants excluded by the research team) was 47.5%. Attrition analyses comparing completers with dropouts across all assessed variables found little evidence of systematic attrition bias. While some comparisons reached statistical significance, all effect sizes were negligible by conventional benchmarks (all $\eta^2 < .01$, all Cramer's $V < .10$; Cohen, 1988; see codebook for details: https://osf.io/k8vzc/files/szeyw). Following the survey, participants were randomized into one of three conditions: a goal-focused intervention (n = 524, 32%), a process-focused intervention (n = 568, 34.5%), or a control group (n = 556, 34%). Participants were assigned using simple randomization, and slight differences in group sizes reflect normal random variation.

One week after completion of the Wave 2 survey, participants were invited to complete daily diaries over a 28-day period (T2-B). For the first 21 days, participants in both intervention conditions received daily intervention messages (goal-focused vs. process-focused) at 10:00 a.m., while control group participants received no messages. All participants completed daily diary assessments at 7:30 p.m. throughout the 28-day period. Participants received compensation based on their completion rate (CHF 5 for at least 5 diaries, CHF 10 for at least 14, CHF 20 for at least 21, and CHF 30 for all 28), and completing all 28 daily diaries automatically entered them into a separate prize draw for this burst, in which three participants received CHF 300 each. Of those invited, *N* = 1,648 provided at least one daily rating. In total, 39,225 daily diaries were collected (*mean* = 24, median = 27 per participant), of which 99% were fully completed. Details on the intervention conditions are provided in the intervention section. At the time of writing, data collection through Wave 3 was complete (*N* = 1,715). Regarding upcoming data collection in Wave 4, participants are invited to the survey, and afterwards to a burst with 21 daily diaries. In Wave 5, participants are again invited to a survey.

POWER

The study design was informed by both practical considerations and statistical power. Primary analyses will use multilevel and latent/bivariate growth models. A common rule of thumb for multilevel models suggests at least 30 level-1 observations per person for adequate power to detect small to medium effects (Hox, 1998). However, power in intensive longitudinal designs depends on a range of additional factors, including the degree of temporal dependence in the data, the distribution of variance across levels, and the trade-off between the number of participants and the number of observations per participant (Bolger et al., 2012). Burst durations of 21 to 28 days were chosen to balance sufficient level-1 observations with the risk of participant fatigue, attrition, and declining data quality over extended assessment periods. For the intervention analyses, an a priori power analysis based on SEM model comparison tests using RMSEA as an indicator of close fit (Prindle & McArdle, 2012) indicated that a total sample of $N = 1{,}104$ would be enough to achieve power of .80 at $\alpha = .01$ for detecting a model difference of ΔRMSEA = .01 with df = 1. The achieved baseline sample of $N = 4{,}451$ and intervention sample of $N = 1{,}648$ both exceed this threshold. These sample sizes are also sufficient for testing between-person associations in multilevel and latent growth curve models. Finally, simulation studies suggest that a minimum of four waves are needed to reliably estimate slopes, detect group differences, and model co-development in bivariate growth models (Hertzog et al., 2006). With five survey waves, the SwES provides adequate power to test longitudinal hypotheses. Sampling followed a fixed design rather than a stopping rule based on sample size. No one outside the initial sample of 17,307 individuals could join, because later assessments invited only Wave 1 participants. Each assessment ran for a fixed field period.

MEASURES

The SwES includes measures administered at two levels: survey assessments completed at the beginning of each wave (Table 3) and daily diary assessments (Table 4) completed during the burst phases of Waves 1, 2 and 4. Together, these measures capture the enduring and momentary factors hypothesized to shape dietary behavior across different timescales (Figure 1). The following section summarizes the key measures. Additional information, including descriptive statistics and internal consistencies, is provided in the codebook.

Survey measures. The survey measures primarily target enduring person-level factors (Figure 1). Identity-related variables include personality traits assessed with the 10-Item Big Five Inventory (BFI-10, Rammstedt et al., 2013) and the Big Five Aspect Scale (BFAS, DeYoung et al., 2007), the centrality of dietary choices to participants' sense of self and the strictness of their adherence (Kirsten et al., 2020; Rosenfeld & Burrow, 2018), alongside demographics. Food preferences are assessed with a food preference questionnaire (Fildes et al., 2014), and capability by assessing participants' capability to prepare, awareness of, and interest in plant-based food (developed for this study; cf. Graça et al., 2019b). Dietary motivations related to meat consumption are assessed in terms of both reasons for eating meat (MEMI; Hopwood et al., 2021) and reasons for reducing it (VEMI+; Stahlmann et al., 2024), alongside a single item on meat eating ambivalence (cf. Berndsen & van der Pligt, 2004; Buttlar et al., 2021). Participants also rate the importance of ten specific eating goals (e.g., eating less meat; developed for this study). Family and cultural norms around meat consumption are assessed as enduring environmental factors (adapted from Nguyen & Platow, 2021; Wenrich et al., 2010).

Dietary behavior is captured through a food frequency questionnaire (e.g., Cade et al., 2002) created for this study and a single item categorizes participants into stages adapted from the Transtheoretical Model (Prochaska & DiClemente, 1983; Buttlar et al., 2024): not considering dietary change (precontemplation), considering change (contemplation), preparing to change (preparation or action), or maintaining a changed diet (maintenance). The item does not separate preparation from action. Those not considering dietary change were excluded after T1-S. Single items also capture the duration of participants' current diet and their intention to maintain it. A single item assessed support for an upcoming referendum on sustainable food production.[1] Several additional constructs are assessed at selected waves, including attitudes toward cultivated meat (i.e., meat produced from animal cell cultures rather than slaughtered animals; cf. Bryant & Dillard, 2019), attitudes toward vegans (adapted from Aloni et al., 2024), environmental values and behaviors, self-esteem (Robins et al., 2001), and happiness (Abdel-Khalek, 2006).

Daily diary measures. During each burst, participants complete daily diaries in the evening. For each, participants identify which of their meals offered the most flexibility in choosing what to eat and report the food items consumed during that meal across seven categories. Momentary eating motivations are assessed with seven items capturing cravings, affordability, convenience, social pressure, and dietary motivations related to the environment, health, and animal rights (cf. Trenkenschuh, Tan, et al., 2026; Wahl et al., 2020). Single items assess meal-related affect on a seven-point scale and daily effort to eat a plant-based meal. At the start of each burst, participants also report on nine potential influences on their current diet (e.g., illness, medical reasons).

INTERVENTION

The intervention was embedded in Wave 2 and targeted the 1,648 participants who reported at least considering dietary change based on the stage of change item (i.e., excluding those who indicated they could not imagine eating less meat). It was designed to compare the effects of emphasizing why people should change (goal-focused messaging) versus how they can change (process-focused support) on meat consumption. This distinction maps onto the framework in Figure 1: goal-focused messaging targets enduring factors by reinforcing reasons for dietary change, while process-focused messages address momentary barriers by providing concrete resources to act on at specific meals. Randomization, message timing, and diary schedule followed the Wave 2 procedure described above. Intervention effects regarding overall levels of meat consumption are assessed immediately through the re-administration of the food frequency questionnaire on day 22, in addition to the daily diary data, and longitudinally across Waves 3–5, spanning approximately 1.5 years of follow-up.

Goal-focused condition. Participants received messages emphasizing the broader impacts of meat consumption. Messages highlighted consequences for animal rights (e.g., "Making plant-based food choices reduces harm to animals"), the environment (e.g., "Choosing plant-based meals helps prevent climate change"), health (e.g., "Following a plant-based diet is linked to a lower risk of cancer"), and social norms (e.g., "A growing number of people are making plant-based choices"). Each day, one of 21 messages was randomly selected for each participant.

Process-focused condition. Participants received messages containing a link to either plant-based recipes or restaurants with plant-based dishes in their local area, paired with a prompt encouraging them to commit to a plant-based meal that day (e.g., "Can you make it your goal to eat plant-based alternatives today?"). Both the

CONSTRUCT	QUESTIONNAIRE	ITEMS	EXAMPLE ITEM	REMARK	WAVE
Dietary Behavior					
Food consumption	Food frequency questionnaire (FFQ, e.g., Cade et al., 2002)	6	"Meat from land animals (beef, pork, lamb, etc.)"	1 (never at all) to 9 (more than once a day)	each
Stages of change	Buttlar et al., 2024	1	"I eat meat but consciously try to eat less meat."	TTM stages; preparation and action not separated	each
Duration of diet	–	1	"1–3 months"	Ten categories from 1–3 months to always	each
Intention to maintain diet	–	1	"Do you plan to stick to your dietary pattern in the long term?"	Binary (Yes/No)	each
Enduring personal factors					
Demographics	–	10	"In what year were you born?"	Response scale differs across variables	each
Personality (Big Five)	BFI-10 (Rammstedt et al., 2013)	10	"I easily get nervous and insecure."	1 (does not apply at all) to 7 (fully applies)	T1, T3, T5
	BFAS (DeYoung et al., 2007)	16	"I am sensitive to the feelings of others."	Assessed openness and agreeableness domains and their aspects	T1, T3, T5
Dietarian identity	Dietarian Identity Questionnaire (Kirsten et al., 2020; Rosenfeld & Burrow, 2018)	8	"My eating habits are an important part of how I would describe myself."	Centrality and strictness subscales assessed	T2, T4
Meat eating motivations	MEMI (Hopwood et al., 2021)	19	"I want to fit in."	Subscales: natural, necessary, normal, nice; 1 (least important) to 7 (most important)	each
Vegetarian eating motivations	VEMI+ (Stahlmann et al., 2024)	21	"I don't want animals to suffer."	Subscales: health, environment, animal rights, disgust, social influence, pandemics, workers' rights; 1 (least important) to 7 (most important)	each
Meat ambivalence	Berndsen & van der Pligt, 2004; Buttlar et al., 2021	1	"I am torn as to whether eating meat is good or bad."		each
Eating goals	–	10	"Eating less meat."	1 (this is not a goal for me) to 7 (this is one of my most important goals); option "already achieved"	T1, T3, T5
Food preferences	Food preference questionnaire (Fildes et al., 2014)	9	"Meat from land animals (beef, pork, lamb, etc.)"	Items correspond to the FFQ with three additions; 1 (I don't like it) to 7 (I like it a lot)	T1, T3, T5
Capability to prepare,	Developed for this study (see Graça et al., 2019b)	3	"I can cook plant-based meals that are nutritious."		T2, T4
Awareness of,		3			
Interest in plant-based food		3			
Enduring environmental factors					
Family and cultural norms	Adapted from Nguyen & Platow, 2021; Wenrich et al., 2010	4	"It would be unusual for people in my family and culture not to eat meat."	Combined the family and culture influences for each item	T2, T4

(Contd.)

CONSTRUCT	QUESTIONNAIRE	ITEMS	EXAMPLE ITEM	REMARK	WAVE
Additional constructs					
Attitudes toward vegans	Adapted from Aloni et al., 2024	6	"I consider people who eat a vegan diet to be unhealthy and weak."	Subscales: positive and negative attitudes	T2, T4
Attitudes toward cultivated meat	cf. Bryant & Dillard, 2019	4	"I would be willing to eat cultivated meat"	Starts with short cultivated meat explainer text, items refer to willingness to eat, taste, naturalness, ethics	T2, T4
Environmental values and behaviors	–	8	"Countries should pass more laws that protect the environment."		T2, T4
Referendum support	–	1	The referendum initiative "In favor of safe food" calls for the strengthening of sustainable domestic production, more plant-based foods, (...) how would you most likely vote?"	Answer categories: In favor, Against, Abstain, I don't know	T3
Self-esteem	Robins et al., 2001	1	"I have high self-esteem."		T2, T4
Happiness	Abdel-Khalek, 2006	1	"I am happy overall."		T2, T4

Table 3 Overview of constructs assessed at the survey assessments (T1–T5).

Note: During the Wave 2 burst following the 21-day intervention, food consumption was assessed on day 22, and the referendum item on day 28. Unless stated otherwise in the Remark column, items use a 7-point scale from 1 (strongly disagree) to 7 (strongly agree).

CONSTRUCT	QUESTIONNAIRE	ITEMS	EXAMPLE ITEM	REMARK
Influences on diet	–	9	"Illness or other medical reasons"	Assessed once at the start of burst; Checklist (selected/not selected)
Rated meal	–	1	"Which of your meals today gave you the most flexibility in choosing what you wanted to eat?"	Options: breakfast, lunch, dinner, snack; other items referred to this meal
Food items eaten	–	7	"Meat/poultry/fish"	Assessed which food items were eaten during the rated meal; Checklist (selected/not selected) for the rated meal
Momentary motivations	cf. Trenkenschuh, Tan, et al., 2026; Wahl et al., 2020	7	"I had a specific craving"	Cravings, affordability, convenience, social pressure, environment, health, animal rights; 1 (does not apply at all) to 7 (applies completely)
Meal-related affect	–	1	"Please rate how you were feeling while you ate?"	1 (not at all pleasant) to 7 (completely pleasant)
Effort to eat plant-based meal	–	1	"Regardless of what you ate, how hard did you try to eat a plant-based diet today?"	1 (I did not try at all) to 7 (I tried very hard)

Table 4 Overview of constructs assessed at bursts (T1, T2, T4).

Note: Up to 21 daily diary assessments are collected for T1 and T4 and 28 for T2. Messages with links to the assessments are sent via SMS or email at 7:30 PM and each link was active for 26 hours. Please refer to the codebook for additional information on the assessed variables.

resource link and the prompt were randomized daily for each participant.

Participants in both intervention conditions indicated daily whether they had read the message they received. Participants in the process-focused condition additionally indicated whether they had clicked the provided link. Participants in the goal-focused condition read 84% of messages on average (SD = 25%), while participants in

the process-focused condition read 65% (SD = 34%). Furthermore, participants in the process-focused condition clicked on the provided links for 54% of messages on average (SD = 36%).

EXPECTED OUTCOMES, ANALYSIS APPROACHES AND PRACTICAL IMPLICATIONS

Data from the SwES can be used to address several questions about dietary behavior and change. At the enduring level, longitudinal survey data across five waves enables researchers to model trajectories of dietary behavior and examine how identity factors (e.g., personality traits, dietarian identity), dietary motivations, food preferences, capability, and cultural norms predict baseline meat consumption and changes over time. At the momentary level, daily diary data from bursts allow examination of how day-to-day fluctuations in dietary motivations, cravings, availability, social pressure, and costs relate to within-person variation in daily food choices. Importantly, the design also supports cross-level and mediation questions. Enduring characteristics can be included as higher-level variables to test whether stable individual differences moderate the influence of momentary factors on daily eating decisions. Similarly, daily shifts in momentary factors can be aggregated and examined as mechanisms through which enduring factors exert their influence, thereby testing whether momentary processes mediate longer-term dietary change. Finally, by examining patterns across multiple bursts and waves, it is possible to examine how enduring and momentary factors and dietary behavior co-develop over time accounting for potential shifts across the different experimental conditions.

To examine these questions, a combination of multilevel modeling and longitudinal structural equation models (e.g., latent/bivariate growth curve models) can be used to account for the nested data structure, with daily observations nested within persons. Additionally, the intervention data can be analyzed to test whether goal-focused and process-focused messaging differentially affect daily eating behavior during the 21-day intervention period and whether these effects persist through the subsequent 7 monitoring days, as well as across the 1.5-year follow-up. Further questions that can be addressed with the SwES data concern optimal intervention design: Do participants who engage more consistently with messages show larger effects? Does message content (e.g., animal rights vs. environmental vs. health appeals) differentially predict daily behavior? And do process-focused messages show stronger effects among participants who already hold strong intentions but struggle to act on them?

Beyond methodological advances, the SwES provides both basic and applied insights. At the basic level, the study implements a design matched to processes theorized to operate at long and short timescales. Because dietary choices such as meat reduction involve navigating personal preferences against concerns about their impact on other people, animals, and the environment (e.g., Fechner & Isbanner, 2025), the mechanisms examined in this project may generalize to other behavioral domains where individuals weigh self-interest against collective or moral goals. From an applied perspective, the comprehensive model developed in the SwES captures dietary behavior in a way that is contextualized in people's daily life. This approach provides more nuanced insights into the mechanisms that drive dietary decisions and the factors that support or hinder behavior change (Stawski et al., 2015). By modeling behavior across multiple timescales and contexts, the SwES can help to clarify who among people open to eating less meat is more likely to change their diet and when and in which situations change is more likely. This enables tailoring interventions to more specific contexts, instead of applying them uniformly (Nahum-Shani et al., 2018), leading to more focused and cost-effective strategies for promoting meat reduction. For individuals and organizations, these findings can guide evidence-based programs that leverage ethical motivations, social norms, and environmental influences, offering scalable tools to facilitate meaningful and sustained dietary change.

CONCLUSION

As dietary shifts toward more plant-based eating are increasingly recognized as important for personal health, environmental sustainability, and social justice, understanding the factors that shape food choices and how to support lasting change is of critical practical relevance. The Swiss Eating Study aims to develop a comprehensive model of dietary behavior by integrating enduring individual differences with momentary influences within a single longitudinal design. It moves beyond existing research on dietary behavior change by combining a measurement burst design with a randomized controlled intervention, providing insights into how factors operating at different timescales shape dietary decisions. As such, the SwES may facilitate the development of both a more comprehensive theory of dietary behavior and inform future efforts of promoting meat reduction.

TRANSPARENCY STATEMENT

We reported how we determined the sample size and the stopping criterion. We reported all experimental conditions and variables. We report all data exclusion criteria and whether these were determined before or during the data analysis. No statistical outlier criteria were applied.

DATA ACCESSIBILITY STATEMENT

Details on the Swiss Eating Study are updated on the project codebook on the OSF page with each assessment wave: https://osf.io/k8vzc/overview. Hypotheses and analysis plans are preregistered separately for each subproject, and associated anonymized data and analysis code will be made publicly available with each subproject's publication.

NOTE

1 At the time of the T3 survey wave, a federal referendum on sustainable food production ('Für eine sichere Ernährung') had been formally initiated but not voted upon yet.

ETHICS AND CONSENT

The study protocol was approved by the Ethics Committee of the Department of Psychology at the University of Zurich (No. 23.10.15). Informed consent was obtained from all participants at the start of the study.

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COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS

Maxim Trenkenschuh: Conceptualization, investigation, writing – original draft, writing – review and editing, methodology, data curation, formal analysis, visualization, project administration. João Graça, Alexandra M. Freund, Michael D. Krämer, Wiebke Bleidorn: Conceptualization, investigation, writing – review and editing. Christopher J. Hopwood: Conceptualization, project administration, writing – review and editing, funding acquisition, resources, supervision.

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