

Flexitarian foods : do plant-based meat analogs facilitate flexitarian diets?

Handbook of Plant-Based Meat Analogs

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Flexitarian foods: do plant-based meat analogs facilitate flexitarian diets?

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20.1 Introduction

Primarily with respect to the affluent world, a dietary transition away from meat-intensive diets toward more plant-intensive diets is a matter of growing urgency. Lower levels of meat intake have the potential to improve environmental and human health and are broadly believed to be beneficial to animal welfare and food security. Yet, scholarly agreement on multiple harmful consequences of excessive meat consumption patterns and dietary recommendations of public health authorities in favor of plant protein intake is not compelling enough to undo the fact that meat consumption levels remain high in the Global North. Food habits of many of today's Western consumers appear to be notoriously difficult to change. This especially holds true for meat consumption due to meat being one of the most prominent product categories in the diet for its symbolic meanings and identity values. No wonder such terms as “meat hooked” (Zaraska, 2016) and “meat attachment” (Graça et al., 2015) have been coined. Despite a minor decline in red meat consumption in high-consuming countries—a decline that is often accompanied by a rise in white meat consumption—a sizeable portion of Western food consumers express little willingness to actually reduce meat consumption or replace meat for plant-based meat analogs (PBMA)s.¹

¹ PBMA)s (also called plant-based meat alternatives, meat substitutes, meat replacements, or meat replacers) are plant-based protein products that mimic conventional meat products as closely as possible in terms of form and product names (burgers, mince, sausages, etc.), flavors (meaty/savory), texture (mouthfeel), appearance (e.g., “the bleeding burger”), and nutritional value (iron, vitamins, etc.). Pulses, seeds, or nuts are not considered PBMA)s, but they can all be termed meat nonanalogs, and considered as alternative proteins to meat because of their high protein content. In theory, next to PBMA)s multiple other alternative protein foods could substitute animal meat, such as fungi, quinoa, lupines, tofu, tempeh, jackfruit, microalgae, and seaweed as it comes to plant-based foods, and fish, eggs or cheese, and even insects or cultured meat could be considered animal-based alternatives to meat (cf. Onwezen et al., 2022). Closer to animal meat products than meat analogs and nonanalog protein products not associated with meat, respectively, are hybrid meat analogs. Such hybrid products are processed alternatives to meat and contain a blend of both animal-based and plant-based protein ingredients (Smart & Pontes, 2023). The closeness of these

How much Westerners' (emotional) attachment to meat is true as well as their reluctance or even resistance to decrease the meat intensity of their diets, simultaneously meat-reducing eating patterns have gained momentum in various high-income countries (Dagevos, 2021). This flexitarianism—or reductarianism as it is also called sometimes (Kateman, 2017)—is about abstaining from eating meat to a certain extent, ranging from occasionally to frequently or often (Dagevos, 2021; Halkier & Lund, 2023; Kemper et al., 2023; Malek & Umberger, 2021; Verain et al., 2022). Because different levels of meat reduction can fall under the flexitarian label, a clear-cut definition of flexitarianism on which everyone agrees does not exist. Consequently, flexitarians represent a broad and heterogeneous intermediary dietary group but, leaving within-group differences aside, flexitarians differ from both vegetarians and vegans (hereafter: veg*ns) on the one hand and avid meat eaters on the other hand (Kemper & White, 2021; Malek & Umberger, 2021; Rosenfeld et al., 2020a, 2020b; Verain & Dagevos, 2022). Flexitarianism is in between the poles of vegetarianism/veganism (hereafter: veg*m) and carnism. What flexitarians also have in common is that by actively reducing (the frequency of) their meat consumption they express to defy the normalcy and necessity of meat-heavy diets on the one hand and their unreadiness to compromising too much on cherished meat-eating habits on the other hand. With its focus on meat reduction, instead of fully removing meat from the diet (i.e., veg*m), flexitarianism represents a dietary form that is believed to be quite acceptable and feasible to a considerable number of modern food consumers in the Western world to shift away from prevailing meaty diets and transition to a more plant-based diet.

Unsurprisingly, considerable hope has been placed lately on the potential of flexitarianism to support this dietary shift toward a more sustainable trajectory (IPCC, 2019; Springmann et al., 2018; Willett et al., 2019). This expectant approach is not strange when it is considered that small changes on the plate of millions of individual consumers add up to deliver a vital contribution to change current protein consumption patterns into more sustainable and healthy diets. From this perspective, it is rightly acclaimed that “the most effective ways for affluent societies to reduce the environmental impact of their diets are to reduce consumption of meat and dairy (especially beef)” (Reisch et al., 2013, p. 1), and “choosing to eat fewer animal products is probably the most important action an individual can take to reverse global warming” (Foer, 2019, p. 150).

The present work is devoted to exploring what kind of dietary changes contemporary food consumers are willing to make, when it comes to meat reduction. This focus aims to follow up on the knowledge gap addressed by Neff et al. (2018, p. 1836): “Little is known about what people eat when they reduce their meat consumption without going fully vegetarian.” Similarly, Macdiarmid (2020, p. 131) noted that “currently very little is known about what people would choose to eat in place of meat.” And in a similar vein, Niva et al. (2017, p. 160) observed

hybrids to farmed meat is occasionally also expressed by naming these products meat extenders (Fischer et al., 2023).

that “less research has been conducted on whether and to what extent consumers are ready to replace meat with plant proteins.”

Taking as starting points that both flexitarianism and PBMAAs could be considered relatively low-threshold options for transitioning into the direction of diets comprising more plant-based foods and less meat, we investigate to what extent PBMAAs are perceived as appealing substitute foods to meat, specifically to flexitarian consumers. Given their meat-reducing diet, it may be expected that flexitarians are particularly interested to switch to PBMAAs because these foods seem to facilitate their reduced-meat food style, and therefore may be more likely to incorporate plant-based alternatives into their diets. This chapter then raises the question: do PBMAAs cater flexitarians?

20.2 Plant-based meat analogs' popularity: empirical evidence from the Netherlands

20.2.1 Prelude: a glimpse of the Dutch context

Similar to many other countries in the wealthiest parts of the world, an omnivore diet is still the prevalent diet in the Netherlands. Meat consumption levels remain high and well above national dietary guidelines (Dagevos & Verbeke, 2022). However, there is more to the Dutch than meat lovers. Actually, a variety of dietary groups, ranging from devoted meat eaters to dedicated vegans, are part of today's Dutch society. Within the population a broad spectrum of flexitarians forms a significant food consumer segment, reflecting that flexitarianism has gained ground (Dagevos, 2021; Veen et al., 2023; Verain et al., 2022). Other indications for meat moderation and plant-based alternative products receiving growing attention are media coverage of detrimental consequences of meat production and consumption to climate change or human health making excessive meat consumption more controversial, or news items on the attractiveness of eating plant-based foods raising awareness and appetite for meat-free choices. Also, public health authorities and advisory boards in the Netherlands advocate the importance of shifting diets into more plant-based directions. The seminal work by the [Health Council of the Netherlands \(2011\)](#) represents an early example that has been followed by other reports to the Dutch government recommending to pay policy attention to rebalancing the ratio between plant-based and animal-based protein consumption by adopting a food policy that aims to lower current animal protein consumption levels (e.g., [Council for Environment and Infrastructure, 2018](#)).

In practice, a normalization of more plant-derived food products is also reflected in an extension of the range of PBMAAs—next to plant-based dairy products (PBDPs)—on the supermarket shelves. The rise in availability and quality of PBMAAs—ongoing improvements are made in mimicking the taste and texture of meat by the meat analog industry as well as in lowering sodium, saturated fats, or calorie levels—has resulted in a corresponding rise in sales. With respect to

dining out, Dutch consumers can increasingly opt for “herbivore” options in restaurants or other places where food is served. Currently, many menus of restaurants and other dining facilities offer tasty and full-fledged options for eating out without eating meat. Overall, various contextual opportunities contribute to make the plant-based choice an easy, normal, and appealing choice.

Taking such features of “flexitarian times” into account and at the same time acknowledging that food preferences and dietary choices remain deeply influenced by meat being perceived and cultivated as nice, normal, natural, and necessary, it is interesting to examine whether and which food consumers are inclined to replace conventional meat products with plant-only meat alternatives.

20.2.2 Previous studies: valuing a diverse range of protein products

As indicated above, we expect particularly flexitarians to be willing to adopt PBMA. We are not unique in this expectation. Besides managers, manufacturers, and marketers in the PBMA business who believe flexitarians are the main target consumer group, several recent studies associate flexitarians with PBMA too (Andreani et al., 2023; Curtain & Grafenauer, 2019; Eckl et al., 2021; Giacalone et al., 2022; Green et al., 2022; Nguyen et al., 2022; Sijtsema et al., 2021; Smart Protein Project, 2021; Spendrup & Hovmalm, 2022; Starowicz et al., 2022; Tonsor et al., 2023; van Dijk et al., 2023; Zhao et al., 2023). Having said this, our assumption is also inspired by studies we previously performed (Dagevos & Voordouw, 2013; Verain & Dagevos, 2022) in which participants were asked to rank a variety of meat products and plant-based protein foods in order to get an impression of differences in preferences for a range of protein sources across dietary groups. In a 2011 survey, a distinction was made between so-called heavy meat eaters and heavy meat reducers. The long list of animal- and plant-based protein foods consisted of 15 items of which one would be called nowadays a PBMA: a vegetarian meat substitute was included and was ranked the second lowest place (i.e., 14th) by the heavy meat eaters and 11th by the group of heavy meat reducers (Dagevos & Voordouw, 2013).

While at the beginning of the 2010s meat substitutes received little appreciation, at the end of this decade the odds have turned a bit. The 2019 survey comprised 21 foods including two PBMA: vegetarian burger and vegetarian minced meat. Avid meat eaters still do not appreciate both these PBMA considering that they were assigned a 17th and 18th place. However, so-called committed meat reducers (“heavy” flexitarians) show considerably more appreciation and ranked a vegetarian burger 7th and vegetarian minced meat a 12th place (Verain & Dagevos, 2022). Hence, PBMA appear to be on the rise. In the 2019 survey, we also asked veg*ns (“meat abstainers”) to rank the 21 protein foods and the two PBMA were assigned a 3rd and 7th place by this dietary group. Simply put, “veggies” like PBMA even more than “flexies.” Such results suggest that the “hegemony” of meat in the hierarchy

of food is not inalterable. In consumer groups that follow less animal-based diets, the appreciation of plant-derived foods is higher than among heavy meat eaters.

Although such findings give reason to skip passionate meat lovers (“committed carnivores”) as launching customers of PBMA, the preliminary outcomes also give reason to doubt whether flexitarians will embrace PBMA wholeheartedly. In other words, our initial expectation is cast into some doubt. As doubt is crucial to research, we continue our explorations and conduct an empirical study.

20.2.3 2023-Research: willingness to reduce

In a new study, we wanted to take a closer look at consumers' willingness to reduce their animal-based protein intake, the strategies they apply to do so, and the choices and trade-offs they make. In early 2023, a professional market research agency collected data from 1941 Dutch adult participants.²

Our objective was to explore to what extent and in what way contemporary food consumers are willing to reduce their meat consumption—with special interest in the role of PBMA in this dietary shift. To answer the first part of the question, we looked at participants' willingness to reduce their meat and dairy consumption. We gave them a short explanation on the negative impact of excessive animal-sourced consumption and asked participants how likely it was that they would reduce their meat and dairy intake with a third in the coming year. Opinions were divided, with 30% of the sample indicating that they are likely to reduce their consumption, 20% with a neutral score, and 50% indicating that for them it is unlikely that they will reduce their intake with a third. This 2023 outcome is in line with results obtained in other recent (2019–2022) Dutch studies asking similar questions in which it was found that about a third of the participants indicated to be willing to reduce their meat consumption and more than half of them responded to have no intention to do so (Dagevos & Verbeke, 2022, pp. 3–4).

20.2.4 2023-Research: reduction strategies in different consumer groups

To answer the “how”-part of the question raised above, we investigated participants' willingness to apply different strategies to reduce their meat consumption. In earlier work of Dutch scholars (de Bakker & Dagevos, 2012; Schösler et al., 2012), general pathways toward a reduced-meat diet were discerned, ranging from incremental dietary changes to shifts that deviate more radically from prevailing eating practices and

² Among the participants, 46.6% were male and 53.3% female (0.1% answered “other”), with a mean age of 48 within an age range from 18 to 80. Those with a low level of education were slightly underrepresented, as they contained 13.9% of the dataset. In contrast, higher educated people were overrepresented with 46.5% of the sample. Almost half of the sample self-identified as a meat eater (48.7%). Slightly less, 45.9%, self-identified as a flexitarian or meat reducer. The other 5.5% self-identified as a veg*n.

eating norms. In a more specific way, however, we pointed out (Dagevos, 2016; Verain et al., 2015; see also Andreani et al., 2023) that different pathways to a meat-reduced diet could be interpreted in terms of (1) reducing meat portion size, (2) replacing part of the meat in meat-dominated products with plant-based alternatives (hybrid meats) or applying a “less but better” principle (less quantity, more quality, i.e., more environmentally and/or animal-friendly meat), (3) leaving meat out from the dish without a replacement, (4) replacing meat by another protein source (ranging from animal-based foods such as eggs or cheese to plant-derived alternatives such as legumes, mushrooms or tofu—leaving aside other alternative protein foods such as insects and seaweed or cultured meat that are in its infancy or not available on today’s Western food market; see also footnote 1). And finally (5), in terms of consuming PBMA—s—or in the words of Giacalone et al. (2022, p. 1): “One strategy to achieve a transition to a more sustainable diet is to replace animal products with PB products designed to have similar sensory properties as their animal counterparts.”

Within this context, we subsequently asked participants how willing they were to apply such distinct strategies toward more sustainable protein consumption patterns (Fig. 20.1). Participants turned out to be primarily open to replace processed and/or red meat by white meat, followed by reducing portion sizes of products of animal origin. This clearly demonstrates that the participating consumers in this study preferably stick to animal-based meals. Strikingly, the strategy

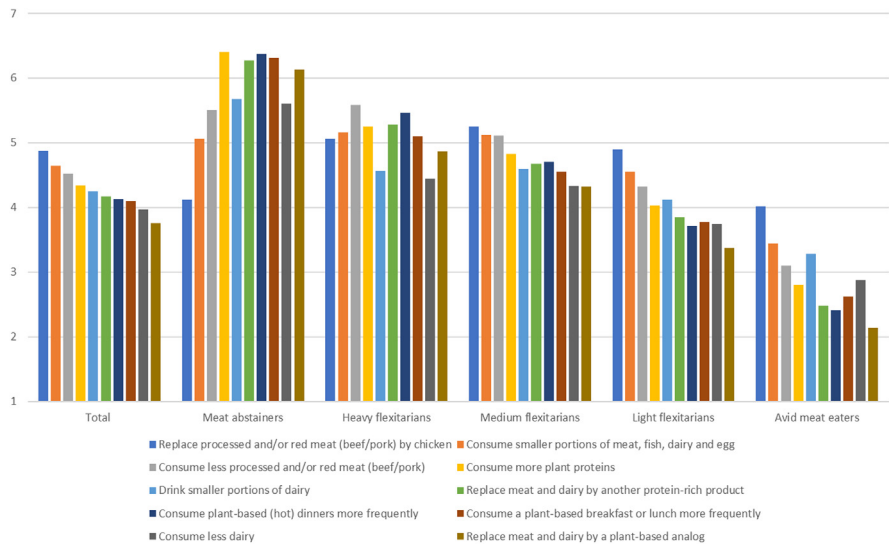


FIGURE 20.1

Strategies to more sustainable protein consumption. Note: Participants had the possibility to select “Not applicable.” Note: Meat abstainers never consume meat at dinner, heavy flexitarians once or twice a week, medium flexitarians 3 or 4 days a week, light flexitarians five or six days a week and avid meat eaters consume meat daily.

of replacing meat and dairy with PBMA is the least preferred of the 10 included strategies, which seems to question the prospect of PBMA as a very promising way forward.

However, closer scrutiny of distinctive consumer groups who differ in meat consumption frequency revealed large differences in preferred strategies. Among those who indicate to never consume meat at dinner, the strategy to use PBMA is the fifth-most preferred strategy, and in absolute terms, only scores 0.4 less than the most preferred strategy, which is “Consume more plant-based proteins.” The score of 6.13 on a 7-point scale indicates that the group of consumers who do not eat meat for dinner is very receptive to PBMA. In contrast, using PBMA is the least preferred strategy for those who consume meat three to four times a week (medium flexitarians) and those who consume meat five to six times a week (light flexitarians). PBMA are even less popular among daily meat eaters, with a score of 2.14 out of seven. The latter results find support in studies that claim that PBMA acceptance and adoption are negatively related to meat attachment (e.g., [Bryant et al., 2019](#); [Michel et al., 2021](#); see [Circus and Robinson, 2019](#) for a study in which not only the entire group of participants with low meat attachment scores but also the vast majority (85%) of the high meat attachment group wanted to consume plant-based substitutes). The group of heavy flexitarians (“semi-vegetarians”), who consume meat for dinner once or twice a week, in turn showed a pattern that is in between meat abstainers on the one hand and those who consume meat for dinner three or more days a week on the other hand. Although heavy flexitarians ranked the strategy to use PBMA 8th, the score of 4.9 is quite positive and not far from the score of the most preferred strategy “Less processed and/or red meat,” which scored 5.6. This result engages with studies referred to at the beginning of Section 2.2.

[Fig. 20.1](#) conveys and confirms that flexitarians form a diverse and intermediary group between those who never consume meat at dinner and those who eat meat every day. Within the heterogeneous group of flexitarians, different opinions exist. Heavy flexitarians showed a positive score on using PBMA (4.9), while medium flexitarians showed a rather neutral score (4.3) and light flexitarians even showed an unfavorable score (3.4). This figure illustrates that flexitarians are not entirely positive about using PBMA and suggests that the “initial” situation of a few decades ago in which meat alternatives were primarily believed to cater veg*ns remains relevant ([Andreani et al., 2023](#)). Plant-based food products turned out to be most preferred by the group of meat abstainers, followed by heavy flexitarians. The stage of development of the PBMA market seems less advanced than anticipated, according to such findings. Particularly not-regular meat consumers and nonmeat eaters are still PBMA's primary target groups according to the results reported in this section—and will be mainly corroborated in following sections. Both heavy flexitarians and veg*ns are minority dietary groups at present, representing “alternative” diets. Those who identify as modestly moderating meat eaters and meat lovers represent the mainstream and appear not very inclined to include PBMA in their diets.

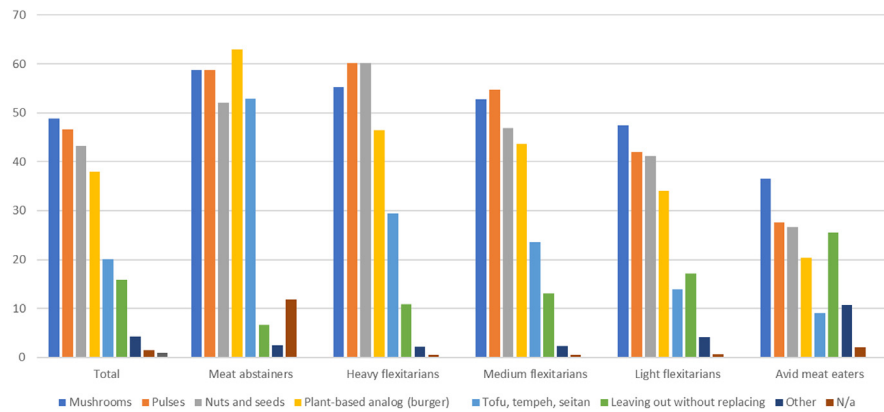


FIGURE 20.2
Replacing animal-based products at dinner (% mentioned).

20.2.5 2023-Research: preferences for alternative proteins

We not only asked participants about their preferred strategy to reduce meat, but we also asked them with what type of products they would replace animal-based products (meat, fish, egg, and cheese) at dinner, if they had to reduce their animal-based protein intake by a third. The results obtained in the previous section with respect to PBMA's popularity across dietary patterns are confirmed. [Fig. 20.2](#) shows again substantial differences that are consistent with the pattern that has unfolded with respect to the responses of the participants on the preferred strategy question. Among meat abstainers, PBMA's are the most frequently mentioned (63%) meat substitute. For all flexitarian subgroups—so heavy flexitarians included—PBMA's score on the fourth place, behind pulses, nuts and seeds, and mushrooms. For avid meat eaters, PBMA's ranked fifth making PBMA's tellingly less popular than leaving out animal-based products without replacement. In other words, they prefer to eat nothing else rather than a plant-based alternative to their meat, fish, egg, or cheese component of their main meal.

These findings are in line with the results of the abovementioned 2019 survey, in which we asked participants with what they currently replace meat when leaving it out of their meals. We distinguished two categories of meals: 3-component meals and combined meals.³

In general, PBMA's appeared to be more popular in 3-component meals compared to combined meals. In the group of avid meat eaters, PBMA's were not popular since less than 10% of avid meat eaters use PBMA's to replace meat in both

³ In the tradition of the ideal meal in many Western countries, so-called 3-component meals are typical Dutch meals, composed of three separate components for proteins (e.g., a sausage), starch (e.g., potatoes) and vegetables (e.g., broccoli), whereas combined meals are dishes in which ingredients are mixed, such as in curry dishes, pasta dishes or stir fry dishes.

types of dishes. In contrast, among meat abstainers PBMA appeared to be the most popular category to replace meat, with almost 65% of meat abstainers using PBMA in combined meals and over 80% using PBMA in 3-component meals. Committed meat reducers (i.e., heavy flexitarians, who consume meat a maximum of twice a week) most often replace meat by other animal-based protein sources such as eggs and fish, but also in this group PBMA are quite popular with over 50% of them consuming PBMA in 3-component meals and over 40% in combined meals (Verain & Dagevos, 2022).

20.2.6 2023-Research: trade-offs in meat moderation

To get a better understanding of the trade-offs contemporary Dutch food consumers make in reducing their meat consumption, we set-up a conjoint experiment. To begin with, participants were asked about current (meat) consumption practices. At first sight, meat consumption frequency at dinner does not look extremely high, with an average frequency of 4.4 days a week. A closer look, though, showed that eating meat remains the default option for many of the Dutch: more than half of the participants consume meat five or more times a week, with 38% consuming meat for dinner five or six days a week and 15% consuming meat daily. At the opposite end of the spectrum, only 9% indicated to consume meat once or twice a week, and 6% never consumed meat for dinner. Such percentages of self-reported actual food consumption practices are well associated with percentages presented in Section 2.3 as a result of willingness and intention questions as well as with the percentages based on self-reported identity as meat eater, flexitarian, and veg*n (Footnote 2).

Subsequently, participants were asked to rank nine dinner options from most preferred to least preferred. The meals varied on four attributes: (1) meal type (3-component meal or combined meal), (2) type of meat replacement (none, PBMA or nonanalogue alternative such as pulses), (3) portion size of animal-based product (none or small portion), and (4) type of dessert (none, dairy-based or plant-based).

The results show that preferences are not very outspoken, since the utilities are small for all attributes, so results should be considered with care. Type of meat replacement is the dominant factor in the selection of the meals. Since the type of meat replacement is most to our interest here and is most dominant in meal choices, we took a closer look to preferences of meat replacements among different consumer groups. Fig. 20.3 depicts the utilities of type of meat alternative for veg*ns (meat abstainers), three degrees of flexitarianism (heavy, medium, and light flexitarians), and avid meat eaters. Similar to results reported in the sections above, preferences differ among dietary groups. In this particular case, the preferred option for meat abstainers is to replace meat by nonanalogue protein foods such as pulses. Heavy flexitarians in turn prefer PBMA more than meat nonanalogs. Hence, also the conjoint experiment seems to add to the idea that PBMA are appealing to heavy flexitarians—consistent with findings as aforementioned. Also in accordance with the pattern that emerged in previous sections is that

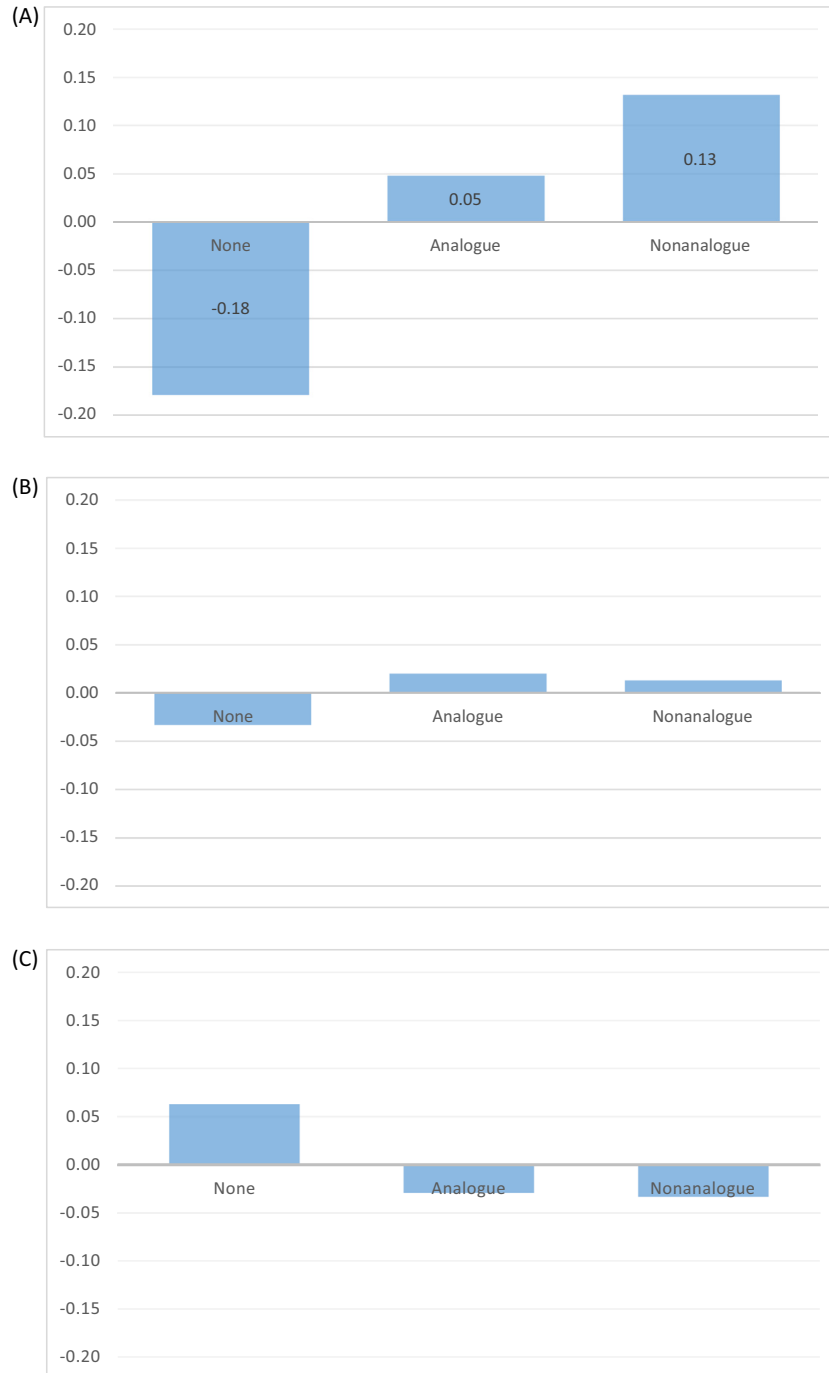
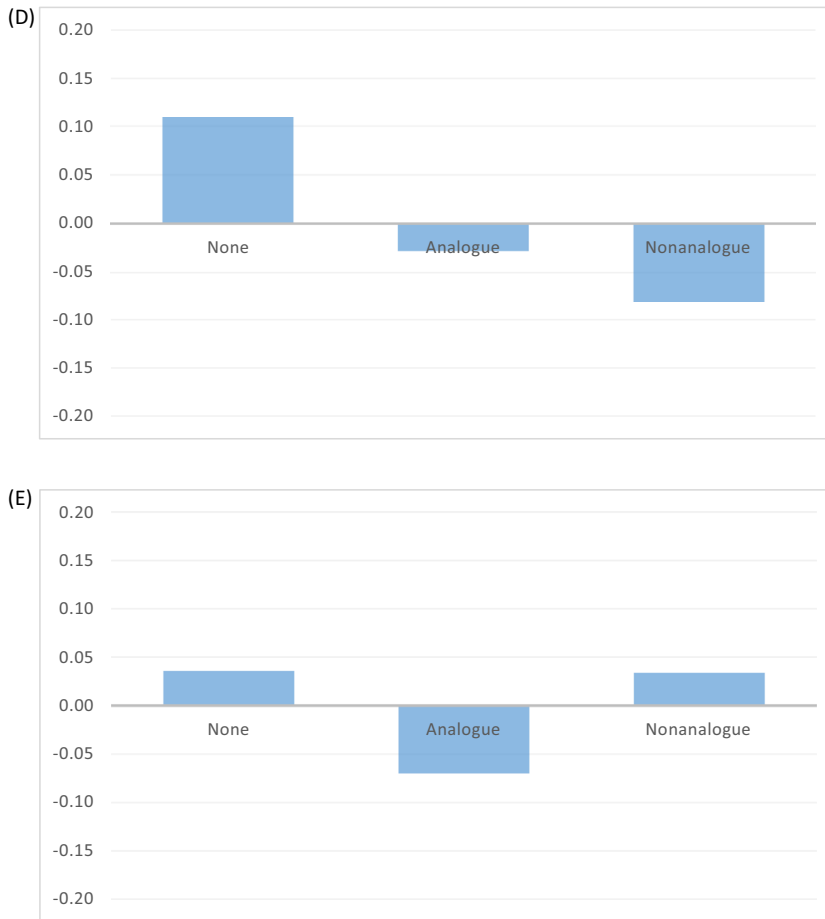


FIGURE 20.3

(A)-(E). Utilities for type of meat replacement: none, meat analog or nonanalog. (A) Meat abstainers (N = 119), (B). Heavy flexitarians (N = 183), (C). Medium flexitarians (N = 618), (D). Light flexitarians (N = 731), (E). Avid meat eaters (N = 290).

**FIGURE 20.3**

(Continued)

more meat-attached consumer groups, i.e., medium and light flexitarians and passionate meat lovers, preferably do not replace meat by a plant-based protein alternative whether a meat analog or a nonanalog.

20.3 Conclusion and discussion

20.3.1 Conclusion

[Giacalone et al. \(2022\)](#), p. 1), among others, state that PBMAAs particularly cater flexitarian consumers seeking to reduce their meat consumption. Whereas there is

certainly logic in this assumption, as we also pointed out in the introductory section, it is pertinent to question it and try to find empirical evidence to substantiate it. Therefore we posed the question Do PBMAAs cater flexitarians? The present study's findings provided mixed validation. It was observed that PBMAAs tend to be particularly appealing to heavy flexitarians but that (medium and light) flexitarians closer to avoid meat eaters, are much less likely to replace conventional meat products and adopt a more PBMA-rich diet. This evidence suggests in the first place that flexitarians represent indeed a broad spectrum of consumers with different willingness to reduce meat intake and incorporate PBMAAs, as well as other nonanalog alternative protein sources, in their diets. Among the participants in this study, the veg*ns turned out to be most in favor of PBMAAs.

Such an outcome highlights, second, that PBMAAs are still far away from mainstream adoption—albeit that PBMAAs belong to the most accepted alternative proteins (Onwezen et al., 2021). The empirical evidence provided in the present research points at PBMAAs being especially popular among consumers whose stage of change is most advanced. Since veg*ns and heavy flexitarians are minority groups, this implies that PBMAAs are not very appealing yet to many contemporary Dutch omnivore consumers who are rather to a greater or lesser extent resistant to PBMAAs. In brief, the consumer base of PBMAAs in the Netherlands is still narrow—regardless of recent findings that plant-based meat substitutes are more preferred by Dutch respondents than hybrid or cultured meat products (van Dijk et al., 2023), and a panel of Dutch consumers who indicated to perceive PBMAAs as healthier than conventional meat products (Ketelings et al., 2023). Despite “flexitarian times” bringing new opportunities to the normalization of plant-based eating practices, both socio-culturally by setting new eating norms for instance and physically by a more enabling food environment (Section 2.1), it appears to be anything but self-evident that PBMAAs may count on broad-based food consumers’ willingness to accept and adopt these alternatives to conventional meat products.

20.3.2 Discussion

Such conclusions demonstrate that curbing meat consumption is a long-term process and the uptake and consumption of PBMAAs is not self-executing. Moreover, a process of de-meatification is one thing, but re-meatification is an even greater difficulty (Gray & Weis, 2021; Weis & Gray, 2023). The latter refers to a situation in which plant-based alternatives are no longer parallel niche markets next to “Big Meat”—the current PBMA market is tiny compared to the size of the meat market (Apostolidis & McLeay, 2016, p. 76; Nezlek & Forestell, 2022, p. 3; Nguyen et al., 2022, p. 2)—but broadly accepted by consumers to such levels that meat consumption is effectively reduced—at individual, national and global scale. Recent studies suggest that such a re-meatification of diets in which plant-based protein foods directly impact on meat reduction is a strenuous challenge as it is shown that consumer interest in PBMAAs does not decrease meat purchases

(e.g., [Cuffey et al., 2023](#); [Neuhofer & Lusk, 2022](#); [Piernas et al., 2021](#)). PBMA are basically complementary to meat products instead of resulting into a dietary shift away from meat and posing a threat to the market demand for meat. In a situation where PBMA are frequently not eaten as substitutes for conventional meat products, the substitution effect of PBMA must be regarded as limited. Put differently, as long as PBMA growing consumer demand has no demonstrable effect on the current meat market, the process of re-meatification has to wait.

To bring this process closer, core consumer motives in favor of the choice for PBMA should be broader than human health issues, environmental concerns, and animal welfare considerations ([Bryant et al., 2019](#); [Giacalone et al., 2022](#); [Green et al., 2022](#); [He et al., 2020](#); [Weinrich, 2019](#)). However important such motivators, the long-term success of PBMA will heavily depend on being competitive with their conventional meat counterparts in terms of price, taste, tenderness, naturalness, etc. Already early research on PBMA highlighted the importance of product-related factors (e.g., appearance, sensory attributes) and practical issues (e.g., unfamiliarity with preparation, fitting in with established eating patterns) ([Elzerman et al., 2013](#)). Likewise, current studies proceed with emphasizing the importance of “egocentric” motives, such as price, taste, convenience, product familiarity, or perceived healthiness (e.g., [Malek & Umberger, 2023](#)). Pointing at attractiveness, affordability, and availability of PBMA is all the more relevant as long as PBMA are about mimicking meat and consequently continue to evoke the association with animal-based meat consumption and continue to compete with real meat products.

[Andreani et al. \(2023, p. 13\)](#) briefly refer to a future in which PBMA have turned out to be an intermediate phase that is now behind us and we have reached a phase in which whole plant-based food options prevail. The first counterintuitive result of the present study gives reason to suspect that such a situation is not impossible. That is, in contrast to earlier and more recent studies concluding that omnivore consumers favor PBMA that are like conventional meat products (e.g., [Hoek et al., 2011](#); [Michel et al., 2021](#)), we found that many nonvegetarian consumers prefer to replace meat with whole plant-based foods (meat nonanalogs) rather than meat-like PBMA. And turning to the other end of the dietary spectrum, the second, counterintuitive outcome of this study is that it found remarkably little support for the assumption that (semi-)veg*ns will not like PBMA very much because of their resemblance to conventional meat products and the veiled confirmation PBMA give to the central place of meat on the plate and its prominent role in dishes and diets.

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