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The role of social media in driving beliefs, attitudes, and intentions of meat reduction towards plant-based meat behavioral intentions

ABSTRACT

The environmental challenges associated with meat production and consumption have driven the rise of new plant-based (PB) meats. However, PB meat consumption among Europeans remains low. One of the main barriers to the consumption of PB foods is the consumers' need for information. Social media (SM) can help rapidly disseminate a wide range of information. Yet, misinformation in these channels raises concerns about consumers' trust. Therefore, this study examined whether involvement in SM mediates the relationship between beliefs, attitudes and intentions towards reducing meat consumption and PB meat behavioral intentions, particularly for omnivores and flexitarians. Data were collected from 10 European countries (n = 6869). Two SM-related factors, namely the likelihood of using SM to find information about PB foods and trust in information about PB foods from SM were designated as mediators. At least 30 % of the respondents were more likely to use and trust information on PB food from SM. The mediation analyses revealed significant partial mediation ($p < 0.001$) with respect to the direct effect between beliefs, attitudes and intentions towards meat reduction and the indirect effects of the mediators on PB meat behavioral intentions. This study builds upon how SM shape the behavioral intentions towards PB meat consumption and the meat reducing attitudes of Europeans. The results also provide evidence on how SM can promote European consumers' behavioral intentions for PB meat.

Keywords: Plant-based meat, Meat reducer, Mediation analysis, Social media, Consumer behavior, Europe

1. INTRODUCTION

Current agricultural systems are heavily taxing to the environment, insofar as the natural capacities of the planet are concerned (Gilbert, 2012, Lin et al., 2022, Rockström et al., 2009). Notwithstanding the prevalent dietary patterns around the world, conventional food production collectively requires large amounts of resources such as land, water, and feed, subsequently generating higher levels of environmental footprints (Godfray et al., 2010, Poore and Nemecek, 2018). Most notably, the meat and livestock industry substantially contribute to these environmental footprints, warranting more sustainable alternatives (Xu et al., 2021). Hence, many alternative proteins to meat (e.g., algae, pulses, insects, plant-based (PB) food products) have been developed or introduced, where some products come to prominence in global markets especially in the previous decade (Siddiqui et al., 2022, Onwezen et al., 2021, Formanski, 2021), as a potential solution to the negative externalities of conventional agriculture (Bryant, 2022). However, plant-based foods are one of the prominent pathways to support the challenge of meat reduction, particularly for plant-based meat products, which is flourishing in the market, globally and on the European level (Boukid, 2021, Aschemann-Witzel et al., 2021). Across extant literature, PB meat products are particularly valued due to the lower environmental impacts in their production and sale (Bryant, 2022). In addition, several variations of these PB meat alternatives have already occupied the consumer retail space, such as burgers, sausages and meatballs, and some of these products aim to imitate the functional and sensory properties of conventional meat (van Vliet et al., 2020, Curtain and Grafenauer, 2019, Kyriakopoulou et al., 2019). Majority of these alternatives are often promoted as novel foods to entice consumers, alongside claims of their health and environmental benefits compared to their regular or conventional versions (Bryant, 2022).

In response to this growing array of alternatives, consumer attitudes towards meat products have thus changed over time (Bryant and Sanctorum, 2021, Kwasny et al., 2022, Verain and Dagevos, 2022), as evidenced by the popularization of PB diets. While individuals who identify as vegetarians or vegans at present generally comprise only a small fraction of the population (Leitzmann, 2014), the literature sees a growing segment of individuals who are actively reducing their meat consumption either for health or ethical reasons (Dagevos, 2021). Additionally, studies have shown differences in consumer perceptions towards PB meat alternatives across varying socio-demographic characteristics, with younger and formally educated individuals typically being more predisposed to these alternatives (Onwezen et al., 2021). At a household level, similar findings exist – where smaller households with younger residents tend to purchase more PB meat alternatives, and they likewise are demographics

with high propensities to repeatedly purchase these products (Neuhofer & Lusk, 2022). Furthermore, other characteristics seem to be linked with the PB meat alternatives. For instance, higher meat attachment and food neophobia levels seem to be associated with lower consumption of meat alternatives, while income and price effects seem to be still debated across several groups (Szenderák et al., 2022).

Nevertheless, the acceptance of these products by the general population remains contested. Consumers still face challenges, particularly with their unfamiliarity towards these emerging commodities (Tuorila & Hartmann, 2020). PB meat alternatives also suffer from negative associations among a broader population, often being relegated in their sensory properties (Giacalone et al., 2022, Michel et al., 2021). Moreover, a study by Perez-Cueto et al. (2022) showed that the lack of information remains an acute concern for consumers, particularly for people who perceived themselves as omnivores or flexitarians. Subsequently, several questions still linger as to the exact nutritional compositions these products, and the risk of nutrition misinformation may heighten consumer skepticism (Ramachandran et al., 2018, Wickramasinghe et al., 2021).

Indeed, the lack of awareness, unfamiliarity towards commodities, and other unsatisfied consumer information needs can preclude purchase and eventual adoption (Kim and Krishnan, 2015, Vainio et al., 2018). Thus, in order to leverage on the growing PB meat alternatives segment, information dissemination on these commodities can entice more individuals to consume them (Li et al., 2022). In this regard, social media channels can be a viable means of promoting these PB meat alternatives. Currently, social media channels have dominated the communication ecosystem since they provide easily accessible ways of digesting information, compared to traditional or mass media forms such as television, newspapers and radio networks (Aichner et al., 2021, Appel et al., 2019). Consumers turn to social media for food related information, and the trend is growing. Among others, consumers seek information related to food inspirations (e.g., recipes, cooking videos), nutrition, and specific products (Steils & Obaidalahe, 2020; Nour et al., 2018). Moreover, the ubiquity of social media in modern society transformed the marketing and promotion strategy of the marketers, such as the utilization of influencers to promote targeted products (Cocker et al., 2021, Kapoor et al., 2023). The model studied by Russo & Simeone (2017) predicted that as social media gain more relevance and influence, the more consumers become knowledgeable in food related information. They further concluded that the potential of social media in delivering relevant information effectively led to the firms' lower incentive to use mass media, which can be a costly resort. With the ability of social media to rapidly share information to a

broad range of audiences, these channels can be leveraged to normalize discussions on PB meat alternatives and further demystify any misconceptions consumers have about these alternatives.

To this end, prior studies have attempted to show the relevance of social media channels in food consumption phenomena. Several individuals are motivated to search for information from social media in order to discover new food products and trends, purchase discounts, recipes, and grocery lists (Ladhari et al., 2019). Furthermore, individuals tend to consult with their peers when they face uncertainties related to food information (Borda et al., 2021, Higgs and Thomas, 2016, Russo and Simeone, 2017). Aside from the role of social media as information sources, other previous studies have explored how social media can facilitate certain behaviors. For instance, a study by Chen & Lin (2019) has shown that marketing activities in social media generally impact consumer satisfaction and purchase intentions, and they posit that social media marketing indirectly influence these through impacting perceived value. The research conducted by Li et al (2022) connected the theme of social media marketing and plant-based meat purchase intention among Chinese consumers. According to their research, higher purchase intention was observed following social media marketing exposures. Li et al. (2022) argues that unfamiliarity of plant-based meat products and frequent exposure of related information via social media supported the increase of purchase intention. Further, food content in social media could also stimulate consumers' engagement in various ways, such as liking and sharing the information into their networks (Dolan et al., 2019, Drummond et al., 2020, Flaherty et al., 2021, Taheri et al., 2021).

Despite these initial studies on the role of social media in mediating consumer behaviors, the exact implications of these channels in negatively or positively influencing the link between attitudes towards meat consumption and behavioral intentions towards PB meat alternatives remain sparse. Therefore, this study seeks to illustrate to what extent an individual's social media involvement in PB food mediates this relationship.

Generally, consumer involvement is seen as a potential mediator towards particular behaviors (Mitchell, 1979), and that it is an individual's "perceived relevance of the object based on inherent needs, values, and interests" (Zaichkowsky, 1985, p. 342). Concerning social media, an individual's involvement does not only cover the personal significance of the activities carried out through social media, but also the extent to which these channels are used (Ha & Hu, 2013). Furthermore, trust in social media has been demonstrated by prior literature to be associated with consumption intentions of goods (Wang et al., 2022, Zhao et al., 2019).

Hence, this study hypothesizes that both the likelihood of using social media as well as trust might mediate the relationship between attitudes and beliefs towards meat and consumption intentions for PB food.

The conceptual framework which will be investigated in this study is seen in Fig. 1 below. Here, social media involvement as a mediator is operationalized as the likelihood of using social media channels to acquire information as well as the level of trust towards the information, but adapted to the context of PB food.

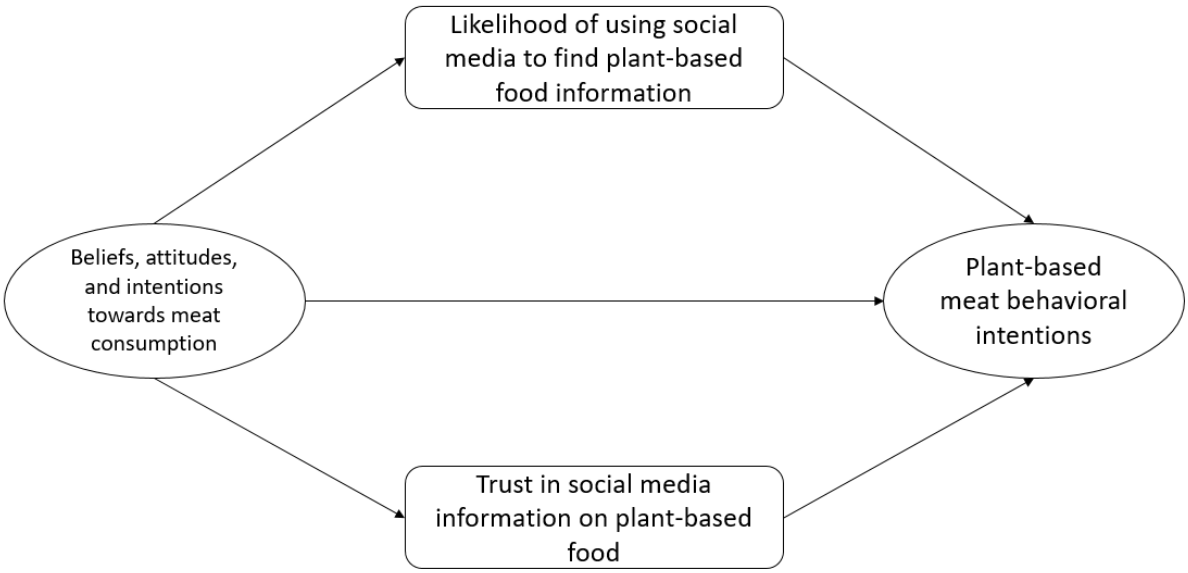


Figure 1. Mediation model of social media involvement

More specifically, this study aims to shed light on the following research questions:

1. How does social media involvement in PB food affect PB meat behavioral intentions?
2. To what extent does social media involvement in PB food mediate the relationship between meat reduction attitudes and behavioral intentions for PB meat alternatives?
3. How do socio-demographic characteristics affect the associations between meat reduction attitudes and behavioral intentions for PB meat alternatives?

2. MATERIALS AND METHODS

2.1. Data collection

Cross-sectional online consumer survey data were collected from May until September 2021 with the aid of a market research agency (Innova Market Insights, The Netherlands) in recruiting participants across ten European countries (Austria, Denmark, France, Germany, Italy, the Netherlands, Poland, Romania, Spain, and the United Kingdom). These countries were deemed representative of different geographical regions. Prior to participating, participants were asked to give their informed consent. All responses were anonymized and securely handled in line with the prevailing European GDPR policies. This study obtained the ethical approval of the Research Ethics Committee of Science and Health at the University of Copenhagen (Reference: 504-0249/21-5000).

2.2. Measures

Two social media related factors were measured. The first measured the likelihood to use social media channels to find information about plant-based (PB) food products (LIKE-SM). Participants were asked '*How likely would you be to use these online communication channels to find information about plant-based food products?*' The second focused on trust towards PB food information on social media channels (TRUST-SM). Participants were asked '*In general, how much would you trust the information about plant-based food products from…*' The respondents provided evaluations through a 5-point scale for five social media channels applicable for both questions: (i) social networking sites (e.g., Facebook, Twitter, Instagram, Pinterest); (ii) Online videos (e.g., YouTube); (iii) Online blogs; (iv) Online forums (e.g., Reddit); and (v) Online collaborative projects (e.g., Wikipedia) as adapted from Kuttschreuter et al. (2014) and Lin et al. (2016). Specifically for TRUST-SM, an additional option, 'I do not use this channel', was provided to accommodate respondents who did not use the channel(s) specified. Participants were excluded if they selected the additional option for all mentioned channels.

Subsequently, beliefs, attitudes and intentions related to meat consumption (BAI) was evaluated through a 5-point scale (1: completely disagree to 5: completely agree) as adapted from de Gavelle et al. (2019). Respondents were asked to indicate their behavioral intentions (BEV-INT) towards PB meat when compared with conventional meat, evaluated through 5-point scale (1: not at all likely to 5: extremely likely). Specifically, participants were asked: '*Imagine that you've had the opportunity to try a plant-based meat that has the identical taste and texture as animal-based meat. How likely are you to..*' (1) eat PB meat instead of animal-

based meat; (2) purchase PB meat regularly; (3) pay a higher price for PB meat than for animal based meat.

Finally, respondents reported their socio-demographic characteristics include age, gender, living area, educational attainment, self-perceived financial situation, and self-perceived health condition. Participants entered their age in years, while they selected single response for the other variables. Three categories for gender (female, male, other), and living area (rural, suburban, urban), five categories for self-perceived financial situation (extremely easy to extremely difficult), and self-perceived health condition (excellent to poor). Finally, seven categories for educational attainment (some school/no diploma, secondary school graduate/diploma, vocational training/qualification/associate degree, bachelor's degree, master's degree, doctorate degree, other).

2.3. Participants

This research only included individuals following omnivorous or flexitarian dietary lifestyles as eligible participants. Responses from a total of 6869 (4589 omnivores (66.8%) and 2280 flexitarians (33.2%)) consumers were included in this study. Among these participants, 50.7% identified as male, followed by 48.5% female, and 0.8% as other. The average age of the participants was 40.61 ± 14.80 years old. Around 55.7% of the respondents lived in urban areas while the other 44.3% lived in non-urban areas. In addition, the majority of the participants (66.0%) obtained a higher education degree (including bachelor, master, or doctoral degrees), meanwhile around 25.9% and 5.4% of the participants followed some education (primary) and other education, respectively. Regarding their self-perceived financial situation, around 43.6% of the participants estimated their position to be neutral, followed by 39.5% as easy, and 16.9% as difficult. On the other hand, the majority of the participants (79.1%) considered their own health status as good while the rest (20.9%) as not good.

2.4. Data Analysis

All statistical procedures were carried out through IBM SPSS v27 (United States), together with the additional package of Process Macro v4.2 (Hayes, 2018) for mediation analysis. All data were analyzed for missing values and only complete responses were included in the final analysis. Means and standard deviation values were first calculated to generate an overview of each relevant variable. Next, exploratory factor analysis was performed to identify emerging thematic constructs from the adapted scales in the questionnaire. Afterwards, associations between the variables were assessed via Pearson's bivariate correlations and linear

regressions with the mediation analysis procedures were carried out. For all relevant statistical tests, the alpha level was set at 5%.

Moreover, some socio-demographic variables were recoded into binary categories, such as living area (urban, non-urban), and self-perceived health condition (good, not good). Two other variables were recoded into three categories: educational attainment (some school, secondary education, higher education), and self-perceived financial situation (easy, neutral, difficult).

2.4.1. Exploratory factor analysis

Exploratory factor analysis (EFA) was conducted for the scale on beliefs, attitudes and intentions related to meat consumption (BAI). A principal component analysis combined with varimax rotation was performed to extract emergent factors from the scale. Subsequently, the reliability and internal consistency of the statements in the questionnaire falling under each identified factor was evaluated via an assessment of Cronbach's alpha values. Afterwards, the calculation of the summated scales was conducted to construct relevant factor measures following the observation of Cronbach's alpha value (Hair et al., 2022). Only one factor displayed a satisfactory Cronbach's alpha value ($\alpha > 0.60$), and thus was referred to as pro-meat reduction beliefs, attitudes, and intentions (BAI-PRO). The statements belonging to this factor are displayed in Table 1 below, along with their factor loadings.

Table 1. Factor loadings and the reliable measures

Pro meat reduction beliefs, attitudes and intentions (BAI-PRO)	**Factor loading**
I am considering eating meat only very rarely (no more than once a week).	0.729
I feel able to reduce my meat consumption in the coming months.	0.695
I intend reducing my meat consumption in the coming months.	0.693
Substituting an animal-based burger with a plant-based burger helps to slow down climate change.	0.693
There are more and more people around me who are reducing their meat consumption.	0.690
People around me often say that reducing your meat consumption is better for your health.	0.650
To help reduce the impact of climate change, it is better to eat less animal foods (meat, dairy products, and eggs).	0.645
Cronbach's alpha: 0.835	
KMO: 0.855	

Bartlett's test of sphericity: ***approx. Chi-Square 28535.051; df 120; p < 0.05***

2.4.2. Linear regression with mediation analysis

A linear regression with mediation analysis (Model 4) (Hayes, 2018) was carried out with the relevant variables (see Figure 1). BAI-PRO was selected as the independent variable, the variables LIKE-SM and TRUST-SM were designated as the mediators, and the dependent variable was the respondents' PB behavioral intentions (BEV-INT). Finally, the socio-demographic variables were the covariates. The mediation analysis was conducted with 5000 bootstrap samples, generating confidence intervals for the resulting regression coefficients and parameters at the 95% level.

3. RESULTS

3.1. Descriptive Statistics

The likelihood of European consumers to use social media (SM) channels to find plant-based (PB) food information is shown in Figure 2. Among the channels, around 40% of the participants showed a higher likelihood of consulting online videos (e.g., YouTube) or online collaborative projects (e.g., Wikipedia).

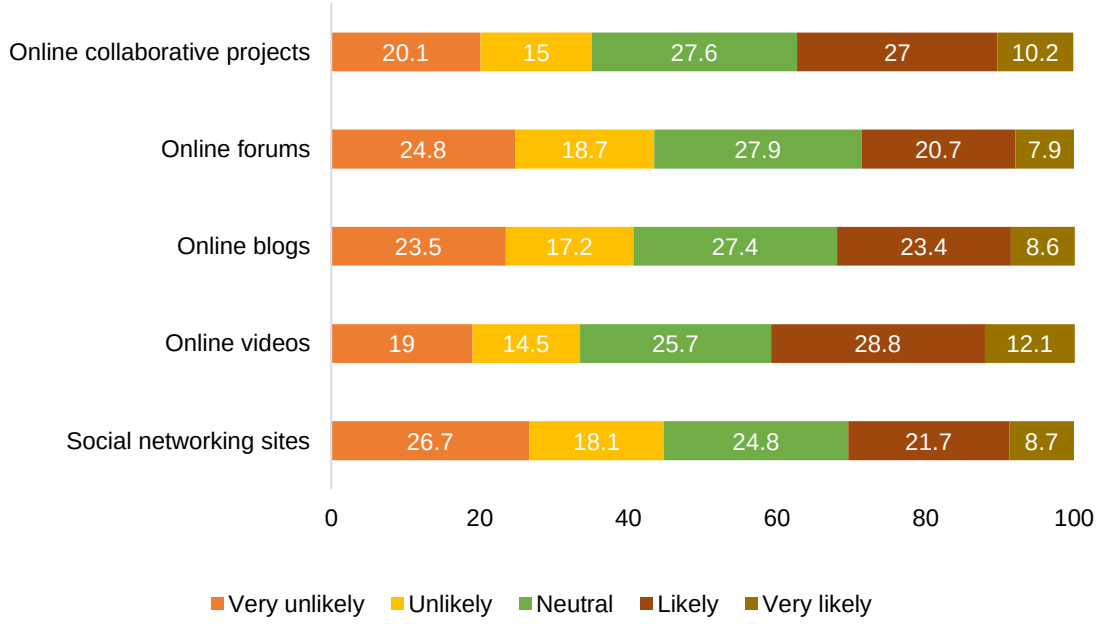


Figure 2. Likelihood to use social media channels to find PB food information, in % (n = 6869)
Note. Online collaborative projects (e.g., Wikipedia); Online forums (e.g., Reddit); Online videos (e.g., YouTube); Social networking sites (e.g., Facebook, Twitter, Instagram, Pinterest).

Figure 3 shows the degree of trust participants had towards information obtained from each of the various SM channels regarding PB food information. Participants indicated that online collaborative projects (e.g. Wikipedia) were the most trustful (28.4% stated 'Fairly trustful' and 14.7% stated 'Very trustful') compared with the other channels in obtaining PB food information. Social networking sites (e.g., Facebook, Twitter, Instagram, Pinterest) came at the bottom place in this domain.

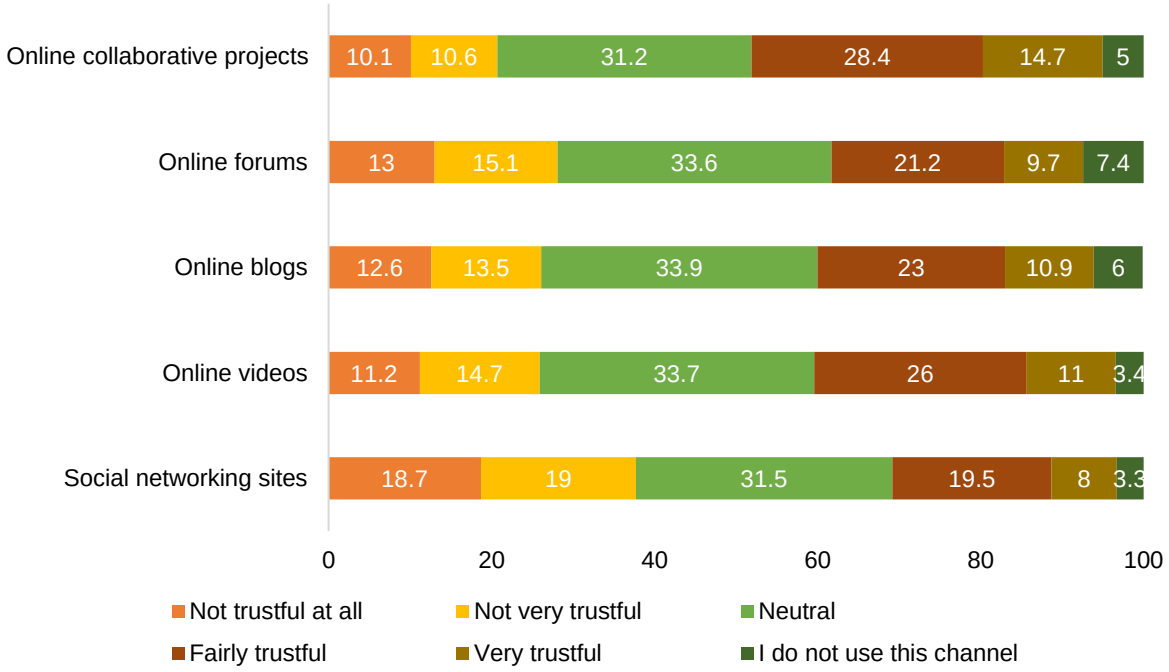


Figure 3. Level of trust towards PB food information in social media channels, in % (n = 6869)

Note. Online collaborative projects (e.g., Wikipedia); Online forums (e.g., Reddit); Online videos (e.g., YouTube); Social networking sites (e.g., Facebook, Twitter, Instagram, Pinterest).

Table 2 presents the main descriptive of, and correlation coefficients among the independent, mediator and dependent variables. For the LIKE-SM and TRUST-SM variables (mediators), summary measures were developed from the overall evaluations of each respondent for all selected social media channels. In general, flexitarian participants showed relatively higher scores in all variables, suggesting a more positive tendency towards reducing meat consumption, social media involvement and PB meat behavioral intentions. All variables also showed significant, moderate and positive correlations with each other.

Table 2. Descriptive statistics and correlations (n = 6869) among social media related variables, meat reduction beliefs, attitudes, and intentions, and plant-based meat behavioral intentions.

	Omnivore (n = 4589)		Flexitarian (n = 2280)		Total (n = 6869)		Overall Correlation		
	M	SD	M	SD	M	SD	BAI-PRO	LIKE-SM	TRUST-SM
BAI-PRO	2.87	0.76	3.51	0.63	3.08	0.78			
LIKE-SM	2.67	1.06	3.10	0.99	2.81	1.06	**0.46****		
TRUST-SM	2.91	1.06	3.26	0.93	3.02	1.03	**0.41****	**0.69****	
BEV-INT	2.52	1.01	3.25	0.92	2.76	1.04	**0.57****	**0.45****	**0.40****

Note. Bivariate Pearson correlation was carried out with all samples included (n = 6869)
***Correlation is significant at the 0.01 level (two-tailed). Abbreviations: BAI-PRO = Pro meat reduction beliefs, attitudes and intentions; LIKE-SM = Likelihood to use social media channels to find information about PB food products; TRUST-SM = Trust towards PB food information on social media channels; BEV-INT = PB meat behavioral intentions. M = Sample mean, SD = Sample standard deviation.*

However, when observing the total group statistics, the sample had rather moderately positive attitudes towards reducing meat consumption. Regarding the social media involvement, respondents also registered moderate levels both in their likelihood and trust to use social media to gain information on PB food. Meanwhile, the average respondents' PB meat behavioral intentions even scored below the midpoint of the scale, indicating a slightly negative skew.

3.2. Mediation analysis for social media involvement

Table 3 shows the overall fit statistics of the linear regression and mediation analysis. In the regression analysis of the dependent variable (BEV-INT) against the independent variable (BAI-PRO) and the mediators (LIKE-SM and TRUST-SM), a significant model fit ($p < 0.001$) was observed, implying positive correlational influences across all variables. Moreover, the first two regression paths, BAI-PRO → LIKE-SM and BAI-PRO → TRUST-SM, demonstrate significant associations between the independent variable and the proposed mediators in the model of this study, forwarding the notion that social media involvement constructs can bring about changes in the respondents' PB meat behavioral intentions. Put together, the significant regressions within the model demonstrated associations among all the variables, thus providing the appropriate grounds to conduct the mediation analysis.

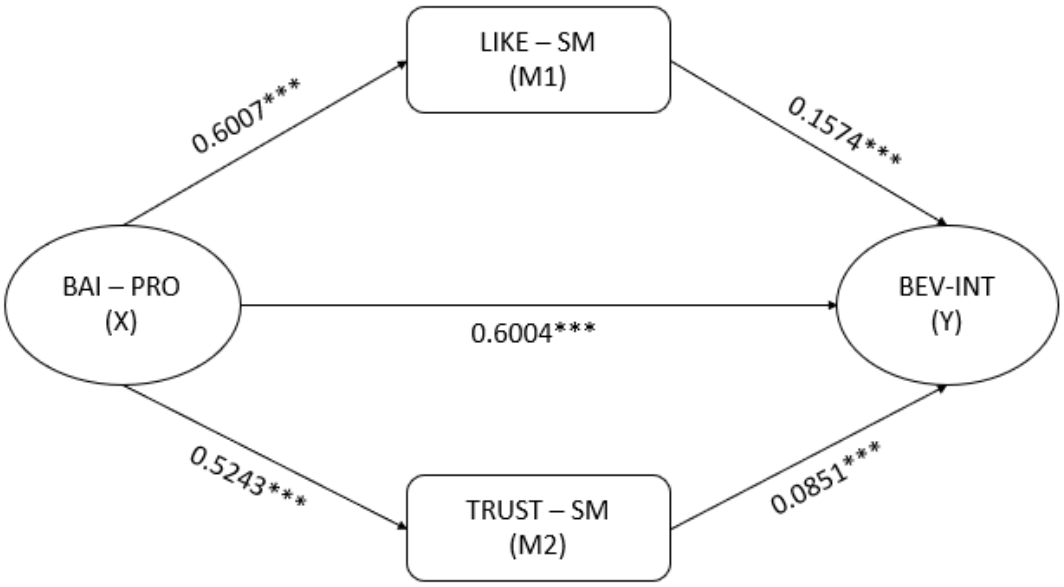
Table 3. Regression statistics' overall-fit measures

Path	R	R^2	F	p
1 BAI-PRO → LIKE-SM	0.5200	0.2704	363.18	< 0.001
2 BAI-PRO → TRUST-SM	0.4724	0.2232	281.59	< 0.001
3 BAI-PRO → BEV-INT	0.5848	0.3420	509.51	< 0.001
4 BAI-PRO + LIKE-SM + TRUST-SM → BEV-INT	0.6154	0.3787	464.58	< 0.001

Abbreviations: BAI-PRO = Pro meat reduction beliefs, attitudes and intention; LIKE-SM = Likelihood to use social media channels to find information about PB food products; TRUST-SM = Trust towards PB food information on social media channels; BEV-INT = PB meat behavioral intentions.

3.3. Mediation analysis and effect of covariates

Figure 4 presents the total, direct, and indirect effects of the mediation analysis for the variables included in the model. After controlling the analysis with the covariates, all effects (direct and indirect) between the independent, mediators, and dependent variables appeared to be significant at the 95% confidence level. The total effect of pro-meat reduction attitudes (BAI-PRO) on PB meat behavioral intentions (BEV-INT) was recorded at 0.7396 (95% CI: 0.7137 - 0.7655). Contrastingly, the direct effect of the same relationship, BAI-PRO → BEV-INT, when considering the presence of the mediators was smaller in magnitude, at 0.6004 (95% CI: 0.5719 - 0.6290), suggesting a partial mediation case. Nevertheless, all direct and indirect effects in the model were positive, implying as well complementary mediation.



Total effect	:	0.7396***	(SE: 0.0132; 95% CI: 0.7137 – 0.7655)
Direct effect	:	0.6004***	(SE: 0.0146; 95% CI: 0.5719 – 0.6290)
Indirect effect	:	0.1392	(Boot SE: 0.0086; 95% CI: 0.1219 – 0.1563)
Via M1	:	0.0946	(Boot SE: 0.0094; 95% CI: 0.0765 – 0.1132)
Via M2	:	0.0446	(Boot SE: 0.0079; 95% CI: 0.0294 – 0.0602)

Figure 4. Statistical pathway of the mediation analysis, observing the role of social-media involvement between meat reduction attitudes and PB meat behavioral intentions.
*Note. ***Coefficient is significant at the 0.001 level (two-tailed). Mediation analysis was conducted with 5000 bootstrap samples taking into account the covariates. Abbreviations: BAI-PRO = Pro meat reduction beliefs, attitudes and intentions; LIKE-SM = Likelihood to use social media channels to find information about PB food products; TRUST-SM = Trust towards PB food information on social media channels; BEV-INT = PB meat behavioral intention.*

The different socio-demographic covariates were factored in the regressions for the mediation analysis. The relationships among the covariates to mediators, LIKE-SM and TRUST-SM, and the dependent variable, BEV-INT, are shown in Table 4. Specifically, Table IV shows the regression coefficients for each of the covariates when factored into the different regression paths building the whole mediation model. Of particular interest would be the covariates' effects on the whole mediation model BAI-PRO + LIKE-SM + TRUST-SM → BEV-INT, as they reflect the summative relationships identified for all the variables.

Table 4. Covariate regression coefficients for the linear regression paths

Covariates	BAI-PRO → LIKE-SM	BAI-PRO → TRUST-SM	BAI-PRO → BEV-INT	BAI-PRO + LIKE-SM + TRUST-SM → BEV-INT
Age	**-0.1586*** **	**-0.1454*** **	**-0.0938*** **	**-0.0565*** **
Gender	0.0133	0.0110	-0.0375	**-0.0406***
Education	**-0.0274***	**-0.0284***	-0.0004	-0.0063
Living area	**-0.1663*** **	**-0.1080*** **	**-0.0831*** **	**-0.0477***
Financial situation	**-0.0434** **	**-0.0783*** **	-0.0190	-0.0055
Health condition	**-0.0783** **	-0.0502	-0.0329	-0.0163

*Correlation is significant at the: *0.05 level, ** 0.01 level, ***0.001 level (two-tailed).*
Abbreviations: BAI-PRO = Pro meat reduction beliefs, attitudes and intentions; LIKE-SM = Likelihood to use social media channels to find information about PB food products; TRUST-SM = Trust towards PB food information on social media channels; BEV-INT = PB meat behavioral intentions.
Note: Reference for gender: female; education: basic; living area: urban; financial situation: easy; health condition: good.

Only gender was not significant as a covariate in the regression of the independent variable BAI-PRO to the first mediator, LIKE-SM, while all other covariates were significant and negative, albeit at different levels. For the regression analysis of BAI-PRO to the second mediator, TRUST-SM, all covariates except for gender and self-perceived health condition appeared to be significant. Regarding the regression paths that consider the BEV-INT as the dependent variable, some covariates appeared to be significant, such as age, gender, and living area, while other covariates did not exert significant influences. Interestingly, the effect of gender was becoming significant only when the dependent variable was combined with the mediators. All significant covariates were negatively associated with BEV-INT, indicating that respondents with younger ages, identified as female, and living in the urban area have higher PB meat behavioral intentions and vice versa.

4. DISCUSSION

The lack of information is deemed as one of the most pronounced barriers, particularly by omnivore and flexitarian consumers in Europe, towards eating new plant-based (PB) food or incorporating PB dietary choices into their lifestyles (Lea et al., 2006, Perez-Cueto et al., 2022). While other information channels are also available (e.g., mass media such as television, radio, newspapers), as premised by Russo and Simeone (2017) that the influence of social media has been more prominent and consumers utilizing this media are more informed regarding food-related information. Moreover, these channels continue to become

integrated in the daily lives of consumers, thereby emphasizing the ubiquity of social media in society today (Appel et al., 2019).

This study primarily exhibited the relationships among social media involvement, meat reduction beliefs, attitudes, and intentions and PB meat behavioral intentions. Consumers' social media involvement appeared to significantly mediate the relationship of the other variables, implying the potency of social media in enhancing consumers' behavioral intention of PB meat, and consequently supporting our earlier hypothesis regarding the role of social media. As demonstrated by Moreira et al. (2021), the usage of social media is valuable in building and sustaining positive connections between PB meat producers and consumers. Furthermore, these platforms can still be utilized purposefully, e.g., to promote advocacies and dietary change (Hawkins et al., 2021, Jackson et al., 2021, Kopplin and Rausch, 2022). An increased awareness and level of knowledge through information disseminated within social media channels could then influence more positively the intentions of consumers to purchase or try plant-based meats, thus they can prove to be key in encouraging shifts to sustainable diets.

The results of the present study also indicated that age significantly affected the relationship of the investigated variables, where the effect exerted by age was stronger for younger participants. Indeed, social media, as rapidly evolving channels, could increase the awareness of consumers regarding new food products like PB meat, as seen with how they can impact an individual’s food cravings and desires (Filippone et al., 2022). Especially for younger generations, social media have become staple components in their daily lives and thus also become usual information channels (Kuttschreuter et al., 2014, Appel et al., 2019, Kucharczuk et al., 2022). Therefore, these channels can be potent vehicles in influencing food choices through the presence of media influencers for this demographic (Lenhart, 2015). Moreover, the results suggested gender and living area effects, where females and individuals dwelling in urban areas showed more behavioral intentions towards PB meat. The result was in line with previous studies focusing on plant-based food alternatives such as in De Boer & Aiking (2011) and Beacom et al., (2021). Specifically for gender, it might be explained with the social belief, particularly in Western cultures, that eating meat is deemed as more masculine (Schösler et al., 2015).

Among many social media platforms, the respondents in this study appeared to be likely to utilize and to put more trust on online collaborative channels, such as Wikipedia, and online videos (e.g., Youtube) when considering PB food information. The results also showed that

social networking sites scored the lowest in terms of consumers' trust. While not specifying any specific channel, a study conducted by Clark & Bogdan (2019) revealed similar results, where social media platforms were deemed the least trustful regarding PB food information among Canadian consumers. Although social media consistently ranked lower regarding the level of trust, the authors nevertheless found that these consumers still utilized social media to find information on PB food products. Consistent with these earlier findings, the present study expounds further on the level of trust accorded by consumers on specific social media platforms.

As PB food (e.g., PB meat) can be considered as a novel food product, phenomenon such as food neophobia can play a role in limiting consumers' familiarity and positive attitudes towards these products, let alone the acceptance (Tuorila and Hartmann, 2020). In line with food neophobia, the familiarity towards meat products could also drive the reluctancy of consumers to try the novel and alternative products. As reviewed by Siddiqui et al (2022), limited information towards novel food is a prominent barrier for its acceptance. The same barrier was observed particularly for PB food, where Europeans indicated that they need more PB food information, as outlined by Perez-Cueto et al (2022). Therefore, the likelihood of participants finding information as demonstrated in this study could be attributed to their needs towards PB food information. Social media has become an important source to help people obtain the relevant novel food information, such as those related to nutrition, recipe, and availability. In parallel, trust towards the information also affects consumers' novel food acceptance (Siddiqui et al., 2022).

Upon a more thorough scrutiny of the respondents in this study, social networking sites such as Facebook, Twitter and Instagram received lower levels of trust when it comes to information on PB food. These respondents also had lower levels of intentions to find PB food information in social networking sites compared to the other channels. Potentially, these findings can be attributed to the general perceptions of consumers towards these channels, including the impacts of misinformation pervading the online information landscape experienced by consumers. A study performed by Majerczak & Strzelecki (2022) disclosed that majority of their Polish respondents confirmed that they came across fake news in social networking sites, such as Facebook and Instagram. By and large, the presence of fake news and misinformation in social media is now rampant, and this phenomenon subsequently undermines the credibility of information gleaned from social media platforms (Olan et al., 2022, Shu et al., 2017).

However, there are some nuances as to what consumers perceive to be trustworthy in their own regard within the context of social media information. In another study conducted by Sterrett et al. (2019) discovered that people place more credibility towards information shared by their trusted public figures on social media, compared to the ones they do not trust. Additionally, interest and familiarity towards the topic on hand also affected the level of trust towards certain information (Sterrett et al., 2019). Therefore, for people who are not familiar or not interested with PB food, especially those accustomed to regularly consuming meat and animal-based products, the notion of trusting PB food information from social media is a delicate matter, as possibly they have no strong opinion towards it. However, for the future PB food adopters, which might not be familiar with the products, credible and reliable product related information should be available to not misguide them. Health halo phenomenon might play a role in this domain, where the product is exaggeratedly perceived as healthy while the related information appeared as not complete (Peloza et al., 2015). This phenomenon was perceived particularly for highly processed PB food products, as those may contain high level of additives, sugar, and salt, and fat (Wickramasinghe et al., 2021). Consumers may believe that PB food is relatively healthier, which is not certain (Gonzales et al., 2023). Thus, complete, and credible information regarding PB food information, including their realistic health impact, disseminated via social media is needed as to increase the trustworthiness of the information.

This study also highlighted consumers' attitudes and beliefs towards meat, notably the ones related to the reduction of meat consumption. Essentially, the negative externalities of the meat and livestock industry are associated with climate change, environmental well-being, as well as health and ethical issues of consumption (Bryant, 2022). Thus, the reduction of meat production and consumption is considered to be crucial in mainly supporting sustainable practices for the environment (Dasgupta, 2021, Willett et al., 2019). Within the present study itself, it was seen from the findings that there was a relative difference between omnivore and flexitarian consumers concerning these meat reduction attitudes, where the latter appeared to have more positive attitudes. In support of the flexitarian movement, the rise of alternative food products such as PB meats seem to be a viable means of reducing meat consumption. The result also reflected higher scores of PB meat behavioral intentions by flexitarians, as well as the significant positive correlations between their attitudes and behavioral intentions. On the other hand, omnivores scored lower on these aspects in terms of meat reduction attitudes. Being the mainstream dietary lifestyle, omnivores to an extent have been shown to prioritize different food choice motives than those who follow alternative diets (Hanras et al., 2022). Regarding social media involvement, flexitarians scored relatively higher than omnivores on both of the investigated variables, implying that flexitarians are more likely to engage with

social media related to PB food information. Both social media variables were also positively correlated, thus necessitating further investigations on their causal relationships.

While the findings of this study supply evidence on the significant role of social media in the aforementioned relationship, there remains the risk of social media transmitting messages related to unhealthy and undesirable dietary choices (Kucharczuk et al., 2022), as illustrated by the breadth of unverified and misleading information spreading on social media (Chen et al., 2023). Therefore, stakeholders who provide information via social media regarding PB food such as government agencies and companies should put more complete, credible, and trustworthy information, highlighting evidence-based health or environmental benefits of these products. For instance, food companies engaged in the production and sale of PB meat products can focus on marketing strategies that debunk misconceptions for these products as backed up by prevailing evidence. Aside from these, they can also provide guidance via social media on how to use PB food products in meals or snacks (e.g., recipes, 'know-how'), or even in certain social settings (e.g., in events or gatherings). In this way consumers will become more acquainted with handling these products and encouraged to purchase them. Meanwhile, consumers should also be more critical and should be empowered in taking in the information presented as to help them to make their own informed choices.

Notwithstanding these findings, some limitations in this study need to be considered. Firstly, the responses obtained in the survey were self-reported measures and in a cross-sectional setting as is commonly seen in other consumer surveys in literature. As have been scrutinized by other researchers regarding the topic of online surveys (Jaeger and Cardello, 2022, Evans and Mathur, 2018), data collection utilizing self-reported survey have several drawbacks including sampling-, self-selection-, and social-desirability biases. On top of that, a certain topic of the survey could also be a limiting factor for some participants. For instance, when the topic is not familiar or interesting for them. However, social media has been utilized to an increasing extent for food-related information, such as for finding nutritional information, cooking inspiration, recipes, and product related information (Steils & Obaidalahe, 2020; Nour et al., 2018). Thus, the topic of the utilization of SM in relation to PBF information can be considered acceptable for the wide audiences. Secondly, social media involvement was only measured by two components, while this form of consumer involvement might also be driven by other factors such as social media interest and sharing behaviors. Finally, this study only focused on antecedents to PB meat behavioral intentions and not actual consumer actions. As seen in prior literature, consumer intentions do not necessarily translate to actual behaviors, which is known as the attitude-intention-behavior gap, especially in ethical or green

purchases (Carrington et al., 2014, Nguyen et al., 2019). The review conducted by ElHaffar et al (2020) related to this gap in green consumption suggested that future direction required more experimental design and qualitative approach. Alternatively, future studies could also consider data mining techniques, social media engagement metrics and other rapid assessment means as to capture actual social media behaviour (Tao et al., 2020, Min et al., 2019). Based on these limitations, certain caution is needed to interpret the results obtained from the present study. Nonetheless, the data from this was collected in the best manner available to produce the unique and novel insights to add into the literature related to social media and sustainable consumption.

The present study demonstrated the connection of social media involvement related to plant-based food information in mediating the beliefs, attitudes, and intentions towards meat reduction and the behavioural intentions of plant-based meat. The nature of the present study was generic, thus the insights related to the specific context, such as information- and product-type could not be fully captured. The future study could build upon our findings by exploring specific type of plant-based food information presented on social media, such as those related to food inspiration (e.g., recipes), nutrition, and specific products. Moreover, the influence of information on social media which consumers encountered actively by seeking or passively by scrolling on social media feed casually could also be evaluated. Much is left to be studied regarding the dynamics social media play regarding other PB alternatives. PB dairy alternatives are likewise gaining considerable attention in the market, and thus future research can focus on how social media platforms can be leveraged for these types of commodities. Moreover, upcoming research can factor in actual social media usage behaviors of individuals, stratified by socio-demographic characteristics, to determine whether or not the degree and context of exposure to social media information also impacts attitudes and intentions towards these emerging sustainable products. Future work can explore channel specific sentiments and how these fare alongside traditional media platforms in encouraging shifts to PB food consumption. Likewise, nudging and behavioral change experiments can be carried out to determine appropriate engagement strategies for promoting PB food consumption. Finally, as this study demonstrated the significance of usage and trust about social media information, their corresponding drivers can be explored to provide more targeted ways of leveraging these channels.

5. CONCLUSION

The present study studied how social media interplay with an individual's dietary lifestyle. As this study pointed out, one's social media involvement to an extent mediated one's meat reduction attitudes and PB meat behavioral intentions. This indicates that for individuals who were more predisposed to decreasing their meat consumption, social media involvement mediated the shift to purchasing or trying more PB meat alternative products. In essence, the findings have shown that an individual's likelihood to use and trust social media for information exert positive influences towards their behavioral intentions.

In this study, for omnivores and flexitarians in Europe, meat reduction beliefs, attitudes and intentions differed in magnitude, and this may lead to varying degrees of predispositions towards PB food products. Flexitarians, or those who actively limit their consumption of meat products, seemed to hold more positive attitudes towards meat reduction, as also seen in prior literature. Despite this, a substantial amount of both omnivores and flexitarians were likely to use and trust information from social media on PB meat.

Indeed, a plethora of studies concerning the impetus for dietary shifts towards more sustainable food sources is mounting. To aid in these transitions, the present study builds on the case for the effective usage of social media channels in encouraging PB meat consumption. Ultimately, this study has shown that social media can be potent in encouraging sustainable food consumption of PB meat alternatives through their capability to rapidly disseminate information among consumers.

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