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ABSTRACT

Increasing numbers of people are vegan, vegetarian, or reducing meat consumption. There has also been growth in campaigns such as Meat Free Monday (MFM) that encourage and support reduced meat consumption. We conducted a mixed-method exploration of the behaviour and beliefs associated with reducing or eliminating meat consumption. An online questionnaire was completed by an opportunistic sample of 655 people aged 18-82 who were registered on the MFM website, and were meat eaters at the time of registering. The key focus of quantitative analyses was comparisons between three groups: those who described themselves as “omnivores” who ate all meat at the time of completing the survey, those who ate only some meat, and those who had stopped eating meat since registering for MFM. The qualitative component entailed Interpretative Phenomenological Analysis of in-depth interviews with 18 people who had completed the questionnaire. The quantitative data revealed that people who had stopped eating meat since engaging with the MFM campaign had more positive attitudes toward being vegetarian or vegan, had been engaged with MFM for a longer time, and had used more elements of the MFM website. The qualitative data illustrated that individuals understood and appreciated MFM’s aim of supporting people to make an initial change and then considering expanding on this. Interviewees highlighted the value and importance of campaign materials that helped them to turn their beliefs and motivation into enduring behaviour change. The observed associations between longer engagement with the campaign and greater behaviour change suggest that MFM and similar campaigns will maximise their impact if can maintain people’s active engagement: that this will necessitate deeper understanding of the forms of support and advice are most wanted and most effective.

Approximately 3-4% of people in the USA and UK are vegetarians - i.e., do not eat meat - and around 1-2% are vegans - i.e., do not consume any animal products (Bates et al., 2014; Cramer et al., 2017) However, these proportions appear to be increasing alongside increases in the numbers of people interested in reducing or eliminating their meat consumption (Vegan Society, 2016). Campaigns such as “Veganuary” (which started in 2014) have developed to challenge people to a month of not eating animal products (uk.veganuary.com), and “Meat Free Monday” has been encouraging people to have at least one meat-free day per week since 2009 (www.meatfreemondays.com). However, evidence from a large-scale prospective study indicates that diet is quite consistent for most people: over a 14-year follow-up period, 96% of those who were meat eaters at baseline remained meat eaters at follow-up (Tong et al., 2019). It is therefore important to explore the behaviour and beliefs of people who change their consumption of animal products, as well as the behaviour and beliefs of those who do not maintain intended changes.

Quantitative and qualitative research suggests that people may be influenced by one or more of three broad reasons not to eat meat (de Backer & Hudders, 2014; Fox & Ward, 2008; Hopwood et al., 2020; Janssen, Busch, Rödiger & Hamm, 2016; Pribis, Pencak & Grajales, 2010). First, many people believe that a meat-free diet is healthier, and there is evidence that not eating meat conveys significant

health benefits (Appleby & Key, 2016; Dinu et al., 2017; Tong et al., 2019). Second, many people are concerned about the environmental impact of animal agriculture, and it has been estimated that substantial reductions in greenhouse gas emissions and water use occur when people switch to vegetarian or vegan diets (Aleksandrowicz et al., 2016; Berners-Lee et al., 2012; Gerber et al., 2013; Scarborough et al., 2014). Third, many people are concerned about animal welfare and the morality of killing animals for food. One study across four large samples revealed that health was a more common motive than environmental concerns or animal welfare for non-vegetarians to consider vegetarian diets (Hopwood et al., 2020). A smaller study suggested that older people may be more likely to cite heath reasons, and younger people more likely to cite moral reasons (Pribis et al., 2010).

Another approach to understanding relevant beliefs is to consider three motivational frames that can be mapped onto one or more of the three reasons just described: "personal" motives - e.g., it is better for my health not to eat meat; "moral" motives - e.g., it is wrong to kill animals for food; and "prosocial" motives - e.g., not eating meat is better for the environment (Rosenfeld & Burrow, 2017). In addition, it is important to consider barriers and facilitators of eating or not eating meat: many people note that in cultures in which meat eating is normative, it is not always easy to have a meat-free diet. Some of the reported barriers to a meat-free diet include beliefs about its nutritional sufficiency and concerns about pleasure and satiety, others relate to ease of access to, or preparation of meals (e.g., Lea & Worsley, 2003; Pribis et al., 2010; Reipurth et al., 2019). People who perceive fewer barriers are more likely to have meat-free diets.

Given these findings, it is important to identify what motivates people to change their diet, how perceived barriers can be overcome, and what types of support facilitate maintenance of, and expansion on, initial behaviour change (e.g., making a transition from vegetarianism to veganism). One way to initiate and maintain changes is to engage with campaigns such as "Meat Free Monday" (MFM: www.meatfreemondays.com), a campaign launched in the UK in 2009 that is also popular in other countries - e.g., Belgium's "Donderdag Veggiedag" ("Meatless Thursdays": www.evavzw.be/donderdag-veggiedag) and "Meatless Mondays" in the USA (www.mondaycampaigns.org/meatless-monday). MFM encourages people to "help slow climate change, conserve precious natural resources and improve their health by having at least one plant-based day each week". The campaign also supports people who start with a weekly meat-free day to transition to increased meat-free days and further diet change (vegetarianism/veganism). The MFM website contains news about the campaign and broader related issues, recipes, information on how to get involved, celebrity endorsements, and resources for schools wanting to incorporate more meat-free meals in their menus. Periodic email newsletters direct people registered with MFM to visit the website for new content.

The growth of MFM has occurred at the same time as the emergence of similar campaigns in other lifestyle domains including temporary alcohol abstinence (alcoholchange.org.uk/get-involved/campaigns/dry-january), and physical activity (e.g., Move for Movember: https://uk.movember.com/get-involved/move). For example, "Stoptober" has been found to be an effective way to support smokers to take a one month break from tobacco (Brown, Kotz, Michie, Stapleton, Walmsley & West, 2014; Tieks, Troelstra, Hoekstra & Kunst, 2019), and participation in the temporary alcohol abstinence campaign "Dry January" can lead to enduring changes in beliefs and behaviour (de Visser, Robinson & Bond, 2016; de Visser & Piper, 2020). These challenges often use "gain-framed" messages to encourage behaviour change for health reasons, usually provide supportive advice, and often facilitate an online community: research indicates that greater engagement with such online campaigns is linked to a greater likelihood of behaviour change (de Visser & Nicholls, 2020).

In addition to seeking health benefits, people may also engage with these campaigns to facilitate fundamental change in their self-concepts (Cherry, 2015; Robert, 2016, 2018; Yeomans, 2019). This may be especially so for dietary changes given the personal, prosocial, and moral motives noted above (Rosenfeld & Burrow, 2017). However, there is currently a lack of information about how people engage with and respond to meat reduction campaigns in general or to specific components of such campaigns (Center for a Livable Future, 2019; Dibb & Fitzpatrick, 2014).

The aim of the study reported here was to investigate attitudes towards meat-free diets within a sample of MFM participants, to explore how such attitudes were related to changes in meat consumption, to explore what facilitated and what hindered dietary change, and to evaluate participants' opinions of the MFM campaign. It was hoped that the result of this study could inform MFM and other campaigns designed to encourage and facilitate meat reduction. A mixed-methods design was applied: an online questionnaire was followed by telephone interviews with a purposive sample of those who completed the questionnaire.

Methods

Participants

The quantitative analyses focus on 655 people (507 women, 142 men, 6 other) who were meat eaters at the time of registering on the MFM website. Participants were aged 17-82 years (mean = 51.2, sd = 13.9). Their mean age when registering was 48.2 (sd = 13.9), and the mean time since registering was 3 years (mean = 35.6 months, sd = 33.1). Respondents were excluded if they did not register for themselves - i.e., they registered for their school or workplace (n = 19), or if they did not eat meat at the time of registering (n = 288). The qualitative sample consisted of 18 interviewees (12 women, 6 men) who had completed the questionnaire: 6 gave questionnaire responses that indicated that they were most concerned about health reasons for not eating meat, 6 were most concerned about environmental impacts, and 6 were most concerned about animal welfare.

Quantitative measures

Demographics. Participants indicated their gender, age, and highest completed level of education. Time since registering for MFM was assessed in days, months, and/or years: responses were combined to form a single measure in months.

Meat consumption. Participants were asked to indicate their current diet as well as their diet when they first visited the MFM website. The 10 responses options allowed participants to indicate whether they ate red meat, poultry, and/or seafood, and whether they consumed other animal products. For the analyses reported here, responses were allocated to one of three categories: (1) those who ate no meat (self-defined "vegetarian" and "vegan"), (2) those who ate only some meat (e.g., "pesco-vegetarian - I do not eat red meat or poultry, but I do eat seafood"), and (3) those who identified as "omnivore - I eat red meat, poultry, and seafood".

Benefits of, and barriers to, a vegetarian diet were assessed with the two factor scale developed by Lea and Worsley (2003). Both scales involved use of a 5-point Likert scale ("strongly agree" - "strongly disagree"). The "Benefits" scale consisted of 24 items. The root statement "I believe a vegetarian or vegan diet could (or does) help me to ..." was followed by statements such as "Eat more fruit and vegetables". The scale had good internal consistency ($\alpha = .94$), and higher scores indicated perception of more benefits. The "Barriers" scale consisted of 24 items such as "I don't want to eat strange or unusual foods". The scale had good internal consistency ($\alpha = .90$), and higher scores indicated perception of more barriers.

Attitudes towards a vegetarian diet were measured using two scales composed of statements

responded to using a 5-point Likert scale (strongly agree to strongly disagree). The first scale was the 5-item Attitudes Toward Vegetarian Lifestyle (ATVL) factor of the questionnaire used by Pribis et al. (2010). It included items such "Being vegetarian/vegan is too complicated in today's society" (α = .74), and higher scores indicated more favourable attitudes toward vegetarian/vegan lifestyles. The second scale was the Vegetarianism Questionnaire (VQ; Worsley & Skrzypiec, 1998). The three subscales assessed "Meat acceptance" scale - six items such as "I am not bothered that meat comes from animals" (α = .89), "Concerns about meat production" - five items such as "I think meat production harms the environment" (α = .89), and "Meat is hard to avoid" - five items such as "It is difficult not to eat meat with my friends around" (α = .87).

Website evaluation. Participants indicated which parts of the MFM website they had used ('About', 'News', 'Recipes', 'Get involved', 'Supporters', and 'Schools'). They then rated how useful they had found them on a 5-point Likert scale (extremely useful to not at all useful). Screenshots of the pages were included within the questionnaire to help participants recall whether they had used them.

Qualitative interviews

The semi-structured interviews covered a range of topics, not all of which were directly relevant to this paper. The key questions included: What influenced your decision to consider Meat Free Monday? What changes have you made to your diet since engaging with Meat Free Monday? How have you maintained your dietary changes? What helped you to change your eating practices? What made it difficult for you to change your eating practice? How did the Meat Free Monday website affect your efforts to change? What advice would you give to Meat Free Monday in order to improve the website?

Procedure

The research was approved by the first author's Institutional Review Board. Participants were recruited via the April 2019 edition of the MFM newsletter, which was sent to the MFM mailing list of approximately 40,000 subscribers. Individuals who wished to participate followed a link that took them to an online questionnaire. The survey ran for two weeks, with a reminder email sent by MFM after one week.

Upon completing the questionnaire, participants were invited to complete a telephone interview about their experiences of engagement with MFM. Questionnaire responses were used to allow invitations to be sent to equal proportions of people who were: (a) most concerned about health reasons for not eating meat; (b) most concerned about the environmental impacts animal agricultures; and (c) most concerned about animal welfare. Interviews were audio recorded and transcribed verbatim. Identifying information was replaced with pseudonyms.

Analysis

Quantitative analysis. The key focus of the quantitative analyses was comparisons between three groups: those who described themselves as "omnivores" at the time of completing the survey, those who ate only some meat, and those who had stopped eating meat. First, bivariate analyses were conducted using MANOVA and χ^2-tests to identify variables that were significantly related to current meat consumption. These were followed by multinomial logistic regression to determine which variables explained unique variance in current meat consumption. Only those variables identified as significant bivariate correlates of current meat consumption were included, and the reference category was respondents who only ate some meat. All analyses were conducted using SPSS 25.0 (IBM, 2017), and the conventional significance level of $p < .05$ was used. Appropriate measures of effect size were included for all analyses: partial e^2 for MANOVA, and Cramer's V for c^2 with more than one degree

of freedom.

The sample size afforded sufficient power to detect small effects in analyses of between-group differences. Power calculations indicated that to detect small effects (d = 0.10) in MANOVA, at least 38 participants per group were required, and this minimum was exceeded. Some size guidelines for multivariate logistic indicate a minimum of 10 cases per independent variable, and this minimum was exceeded – but there is not consensus on determining the appropriate sample size for multinomial logistic regression (e.g., Hsieh, 1989; Schwab, 2002; Tabachnick & Fidell, 1996; van Smeden et al., 2019).

Interviews transcripts underwent Interpretative Phenomenological Analysis (IPA: Smith et al., 2009). IPA is part of the hermeneutic phenomenological tradition which seeks to make sense of experience, while acknowledging that the researcher is inextricably involved in interpretation. The stages of analysis described by Smith et al. (2009), allowed consideration of context, language, content, the researchers' agreed interpretations, and the subsequent building of emergent themes. Congruent with the idiographic focus of IPA, each transcript was analysed individually. Next, over-arching themes were identified that reflected the shared and divergent experiences across the corpus of interviews. After agreeing on an approach to analysis, the first, third, and fourth authors each independently analysed one of the three groups of interviewees identified above (i.e., those most concerned about health; those most concerned about environmental impacts; those most concerned about animal welfare). They then discussed, aligned, and combined their findings. Analysis was grounded in the transcripts, and all analytic claims were supported by verbatim quotes from interviewees.

The planning and execution of the qualitative study were informed by various recommendations for validity and quality in qualitative research (Malterud, 2000; Shaw, 2010; Yardley, 2000). *Sensitivity to context* (Yardley, 2000) and *reflexivity* (Malterud, 2000) were addressed by identifying the individual, micro-social, and macro-social influences on meat eating, and by reflexivity clarifying our own relationships to the issues. Here we note that the second author is employed by MFM, but the other authors were disinterested academic investigators. The authors gave priority to the interviewees' accounts rather than their own personal or professional knowledge of the topic. Throughout, we reflexively engaged in iterative processes of "setting aside" and "engaging with" our subjectivities by reflecting on our own experiences and interpretations and how these influenced the analytic process (Shaw, 2010). *Transparency and coherence* (Yardley, 2000) in relation to *interpretation and analysis* (Malterud, 2000) were demonstrated by outlining IPA's background, explaining how it was used to generate themes, and showing how themes were grounded in the data. *Commitment and rigor* (Yardley, 2000) were promoted by three authors independently coding transcripts before conferring to ensure that the interpretative process and outcomes were consistent. Reliability was ensured by regular communication between the authors to resolve any ambiguity in assigning codes. *Impact and importance* (Yardley, 2000) and *transferability* (Malterud, 2000) were demonstrated by showing how the results could inform MFM and similar campaigns.

Results

Quantitative analyses

Table 1 shows that compared to other respondents, those who had stopped eating meat by the time of completing the questionnaire were significantly younger when completing the questionnaire. Their attitudes were also significantly different: they perceived more benefits and fewer barriers, they had more positive attitudes toward vegetarian lifestyles (ATVL) scores, and their VEQ scores indicated

less acceptance of eating meat, less favourable views of meat production, and less belief that it was hard not to eat meat.

>> Table 1 <<

Among those who still ate meat, those who described themselves as "omnivores" had significantly different attitudes toward not eating meat. They perceived fewer benefits and significantly more barriers. They had significantly less positive ATVL scores. They also had VEQ scores indicating more acceptance of eating meat, fewer concerns about meat production, and greater belief that it was hard to avoid eating meat.

Table 2 shows that compared to others respondents, those who had stopped eating meat by the time of completing the questionnaire were significantly more likely to have been meat reducers/flexitarians at the time of registration. They were also significantly younger when registering for MFM, and had been registered with MFM for a significantly longer time. Among those who still ate meat, those who described themselves as "omnivores" had been engaged with MFM for a significantly shorter time.

>> Table 2 <<

It is notable that attitudes were significantly related to time engaged with MFM. A longer time since registering with MFM was significantly related to higher ATVL scores ($r = .18$, $p < .01$) perceiving more benefits ($r = .20$, $p < .01$) and fewer barriers ($r = -.19$, $p < .01$), less acceptance of eating meat ($r = -.27$, $p < .01$), less favourable views of meat production ($r = -.27$, $p < .01$), and less belief that it was hard not to eat meat ($r = -.22$, $p < .01$). MANOVA comparing the four engagement categories revealed that a longer time since registering with MFM was significantly related to higher ATVL scores ($F_{(3,653)} = 9.61$, $p < .01$) perceiving more benefits ($F_{(3,653)} = 12.46$, $p < .01$) and fewer barriers ($F_{(3,653)} = 7.70$, $p < .01$), less acceptance of eating meat ($F_{(3,653)} = 8.74$, $p < .01$), less favourable views of meat production ($F_{(3,653)} = 19.69$, $p < .01$), and less belief that it was hard not to eat meat ($F_{(3,653)} = 17.99$, $p < .01$). Full details are available in the supplementary file.

On average, respondents visited two of the six sections of the website (mean = 2.13 (sd = 1.34); median = 2). The most commonly visited section was the "Recipes" page, which was visited by 76% of respondents, who gave a mean usefulness rating of 2.19 (sd = 0.79) out of 5. In order of decreasing engagement, the other sections and their usefulness ratings were the "News" page (56% visited, rating = 2.39 (sd = 0.79), "About" page (42% visited, rating = 2.22 (sd = 0.75), "Get involved" page (19% visited, rating = 2.29 (sd = 0.86), "Supporters" page (13% visited, rating = 2.22 (sd = 0.83), and "Schools" page (7% visited, rating = 2.14 (sd = 0.76). The data in Table 2 display the relationships between diet at the time of completing the questionnaire and engagement with various elements of the MFM website. They indicate that those who had stopped eating meat had visited significantly more website sections, and were significantly more likely to have visited the "News", "Get involved", "Supporters", and "Schools" sections.

Multinomial logistic regression was conducted to identify significant independent correlates of changing to a meat-free diet. This was based on the significant bivariate correlates of changing to a meat-free diet in Tables 1 and 2. The final model was developed via forward-selection of variables. It included six variables with a Nagelkerke pseudo-R^2 of .54 ($\chi^2_{(12)} = 390.50$, $p < .01$). Table 3 shows that compared to people who ate some meat at the time of completing the questionnaire, those who had stopped eating meat were significantly younger when they registered with MFM, had significantly lower meat acceptance scores, and found it significantly easier to avoid meat. Table 3 also shows that compared to people who only ate some meat at the time of completing the questionnaire, those who

ate all meat were significantly less likely to be meat-reducers or flexitarians when they registered, expressed significantly less concern about meat production, found it significantly more difficult to avoid meat, and had been engaged with MFM for a significantly shorter time.

>> Table 3 <<

The supplementary file displays separate bivariate and multivariate analyses for men and women (it was not possible to include such analyses for the small number of people who reported other genders). It shows many similarities for men and women, but also some differences that may be important for efforts to help people to change their behaviour.

Qualitative analyses

Theme 1: Responses to the MFM message

The first relevant theme to emerge related to participants' responses to the MFM message and concept. Interviewees were unanimous that the message was "a good catchy slogan" (Rachael) that made it easier for them to convert motivation for eating less meat into action:

> *Charlotte*: The campaign is really good since it promotes a kind of gradual change. I like how the message is not "You need to change this!". It's "Do you think you can?"

Interviewees also noted that having made the initial change, they were able to extend to more meat-free days per week. One interviewee made an interesting analogy comparing dietary change to other behaviour change:

> *Adam*: You don't start taking up jogging and run a marathon straight away: you break yourself in gradually. I think that's possibly the way to do it, and it certainly was to me.

Others noted that the MFM campaign helped people by providing a manageable route into behaviour change: Lucy explained that she and her partner had tried without success to reduce their meat intake in general, but that the MFM concept helped them to enact their desired behaviour by giving them a specific focus and structure:

> *Lucy*: Our intentions were good but we sort of failed a bit. So we went on the MFM website and had a good look and decided: "Yes, definitely this was something we could manage to do on just a couple of days a week". This was some years ago now, probably two or three, so that's how we started…we actually stopped eating meat altogether about a year ago. So yeah, starting meat free Mondays definitely led, for us, towards a complete cutting out of any meat".

Nick noted that he had not seriously considered alternatives to meat - and not enjoyed them - until he engaged with the MFM campaign. However, thereafter, positive experiences of meat-free meals at home lead to a gradual reduction of meat consumption in all contexts:

> *Nick*: We did it a few Mondays in a row. And then it turned into sort of most weekdays and then all weekdays. And then all weekdays and most weekends. And then, even when I was eating out, I was just choosing not to eat meat as well.

In addition to these positive eating experiences, interviewees reported other benefits from eating less meat. Lucy noticed reductions in her blood cholesterol levels, which had been "through the roof" when she was eating more meat. Sarah gave an interesting account of how her experiences changed her broader view of meat consumption: although her initial motive for restricting her meat intake was animal welfare, losing weight and feeling healthier also made her aware of the made the health benefits of eating less meat, and this served as further reinforcement and encouragement:

> *Sarah*: I like the change, so then because of that I've continued to cut down on meat.

Theme 2. Engagement with MFM materials

In addition to exploring responses to the campaign message, attention was given to experiences of

engaging with the website and email support. Interviewees valued the various ways of engaging with the campaign. Aisha noted "recently I've engaged more with it through Instagram and I'm on the newsletter"; Kim said: "we are constantly on the internet these days. We get more emails and stuff like that whether it be on social media or email"

The quantitative findings indicated that the most used and most positively-rated elements of the website were the "recipes" and "news" sections. Given that respondents were already engaged with the campaign, it is perhaps not surprising that celebrity endorsements were not so highly-rated. Indeed, several interviewees suggested that content related to non-celebrities and how they addressed barriers might be more useful:

> *Mel*: The other thing I don't see anywhere where readers can share their own ideas. Might that be a possibility?

> *Angus*: Say if it was like: Here's the voice of someone who's not a celebrity, but is someone who's like you, and this is what they've done.

More positive views were held in relation to the "news" section particularly information about the benefits of a meat-free diet and/or the various negative impacts of eating meat. Interviewees noted that the website itself was informative and also contained links to other useful sources of information:

> *Nadia*: I think it's a pretty good website actually. I think it's a nice mix of information and entertainment. I like the recipes; they're good. The level of information there is good and if not it can point you to deeper resources.

However, some interviewees suggested that "Maybe some of the reporting could be a little more in-depth" (Sam). However, like many others, Helen responded positively to the various different types of content, which satisfied a need for information, motivation, and skills:

> *Helen*: Well initially the recipes, you know the recipes that were available, obviously the information was helpful, health wise as to why not to eat meat.

<u>Theme 3: Recipes and ingredients</u>

As suggested in some of the quotes above, the most positive engagements with the MFM materials were with the "recipes" section of the website. Lucy noted that once she had committed to not eating meat, the MFM website became "just another source of information for me on products and recipes". Similarly, Paula explained her use of the MFM website:

> *Paula*: I know the other sections are there, but I … I would, probably, just go into the recipes section and scan through them to see if I could find something to inspire me.

It is notable that even those who initially highlighted sections of the website other than "recipes" predominantly referred to the value of information about ingredients and products:

> *Nick*: The bit I find most useful is the news section, I like hearing about new alternative food products and new fast food options.

Interviewees noted that the recipes section helped them not only to improve their repertoire, but also introduced them to new ingredients, both manufactured meat substitute products and vegetable alternatives to meat:

> *Nadia*: I certainly like the recipes. I am still kind of learning really about all the different vegetarian dishes out there and I do find them useful

Although some interviewees noted that it would be useful to have more information about alternative ingredients and where to find them, others like Helen suggested that "It's not that difficult anyway, the way supermarkets are pushing, it's not difficult whatsoever".

Discussion

Key findings

The key findings were that people who had stopped eating meat since engaging with MFM had more positive attitudes toward being vegetarian or vegan, had been engaged with MFM for a longer time, and had used more elements of the MFM website. The qualitative data complemented these findings by revealing that individuals understood and appreciated the campaign's aim of supporting people to make an initial change and then considering gradually expanding on this. Interviewees noted the value and importance of recipes and advice for helping them to turn their beliefs and motivation into enduring behaviour change.

In bivariate analyses, the effect size for initial diet and time since registering were medium, and effect size for attitudes were medium-large (Cohen, 1988), and in multivariate analyses these variables explained 54% of the variance in likelihood of meat consumption. These findings concur with the results of other studies showing that attitudes have a strong influence on diet and related behaviour change (de Backer & Hudders, 2014; Hopwood et al., 2020; Lea & Worsley, 2003; Pribis et al., 2010; Reipurth et al., 2019), and that greater engagement with online behaviour change campaigns is linked to a greater likelihood of behaviour change (de Visser & Nicholls, 2020). Indeed, some interviewees noted that their beliefs about the health benefits of a meat-free diet changed after they had experienced some of these benefits. The finding that a longer duration of engagement with MFM was associated with a greater likelihood of giving up all meat consumption suggests a need to understand how best to keep people engaged for longer to maintain initial behavioural changes, to promote expansion from this initial change to additional meat-free days, and to consolidate attitudes and beliefs that are most conducive to long-term behaviour change.

Although use of more website components was significantly related to stopping eating meat, the correlations reflected small effect sizes, which helps to explain why they were not significant in the multivariate analyses. The quantitative and qualitative data indicated that the "recipes" section was the most useful part of the website. This would be expected according to models of behaviour change that argue that whereas information and motivation may be required to encourage behaviour change, once people have decided to take action, they must develop the skills and competence necessary to maintain the desired change (Fisher, Fisher & Harman, 2003; Michie, Atkins & West, 2014; Prochaska & DiClemente, 1984).

There was not strong evidence of the impact of celebrity endorsements among study participants. In contrast, there was interest in tips and advice from other people signed up for MFM. Indeed, it has been noted in relation to temporary alcohol abstinence campaigns that the sense of community that they foster and the sharing of tips and advice may boost and maintain participants' motivation (de Visser & Nicholls, 2020; Pennay et al., 2018; Yeomans, 2019). However, that is not to say that there is no value in celebrity endorsement of MFM: for people who are still considering behaviour change - rather than the study participants who had already taken action - celebrity endorsements may help to raise awareness and motivation (Larson et al., 2005; MacNab & Mukisa, 2019).

The sample contained substantially more women than men, an observation that reflects the composition of the broader group of people who have engaged with MFM. This suggests that gender influences whether people engage with MFM, and reflects gendered constructions of meat-eating as masculine (Gough & Conner, 2006; Nakagawa & Hart, 2019; Rothgerber, 2013). However, among people engaged with MFM, gender did not influence whether they moved to completely eschewing meat. Data in the supplementary file show that there were many similarities in correlates of meat

consumption among men and women, but also some differences that could inform varied strategies for helping men and women to reduce their meat consumption (e.g., perceived benefits and barriers were significant multivariate models among men but not women).

Limitations

Although this study provided important insights, it did have some limitations. First, the study focused on a self-selected sample of the broader group of people ever registered with MFM. It is possible that non-responders may have differed from responders, especially if non-responders were those who had completely disengaged from the MFM campaign and its underlying principles. Although it was apparent that the sample contained fewer men than women, this reflected the profile of people registered with MFM, and the supplementary file shows that there were few sex differences in patterns of meat consumption or correlates or meat consumption. Second, the quantitative analyses considered whether people had ever used various website sections, whereas more recent engagement, and extent of engagement may have been more relevant. Third, within the cross-sectional design attitudes were assessed at the same time as behaviour, so it is not possible to determine causation. However, it is notable that more favourable attitudes toward various aspects of vegetarianism and/or veganism were found among people who had been engaged with MFM for a longer period of time. It is likely that there is a positive feedback loop linking attitudes and behaviour: furthermore, cognitive dissonance theory would help to explain such an association (Festinger, 1957). However, it should be noted that the qualitative data indicated that people's initial attitudes and motives may have prompted behaviour change which led to changes in other attitudinal domains (e.g., Sarah's account of how her initial motives related to animal welfare led to behaviour change that produced health benefits, and subsequent changes in beliefs). Comparable processes have been found in other behavioural domains, whereby initial changes in behaviour lead to health benefits and increases in skills and confidence, leading to consolidation of behaviour change (de Visser & Nicholls, 2020; de Visser & Piper, 2020). There would be value in research that followed people over time using quantitative and/or qualitative methods to understand how they make initial changes, and what influences whether they revert to earlier behaviour, maintain their changes, or expand further on their initial behaviour change. This would help to address the current lack of information about how people respond to meat reduction campaigns in general, and how they engage with specific components of such campaigns (Center for a Livable Future, 2019; Dibb & Fitzpatrick, 2014). Further research with MFM and other campaigns would help to identify (a) similarities and differences between campaigns, (b) the most effective ways to attract people to engage with such campaigns, and (c) how best to support participants to initiate and maintain behaviour change.

Conclusion

This mixed-method study provided quantitative and qualitative data to show that the MFM message resonated with many people seeking to reduce their meat consumption, and that the MFM website helped them to convert their motivation into enduring - and in many cases expanded - behaviour change. The observed associations between longer engagement with the campaign and greater behaviour change suggest that campaigns like MFM will maximise their impact if they can maintain people's active engagement. This will necessitate deeper understanding of the forms of support and advice that are most wanted and are most effective.

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Table 1 Associations between current meat consumption and demographic and attitudinal variables

		Current meat consumption				
		None (n=98)	Some (n = 424)	All (n = 133)	**Difference**	**Effect size**
Current age	M (SD)	45.2 (14.4)[a]	52.6 (13.0)[b]	51.0 (12.1)[b]	$F_{(2,652)} = 13.09$, $p < .01$	$\varepsilon^2 = 0.04$
Sex					$\chi^2_{(4)} = 3.32$, $p = .51$	$V = 0.04$
Female	(n = 507)	77.6%	76.4%	80.5%		
Male	(n = 142)	20.4%	22.6%	19.5%		
Other	(n = 6)	2.0%	0.9%	0.0%		
Education					$\chi^2_{(6)} = 0.97$, $p = .99$	$V = 0.02$
University	(n = 368)	57.1%	56.5%	56.6%		
Further education	(n = 125)	17.3%	19.7%	18.8%		
A level	(n = 81)	13.3%	11.6%	14.3%		
GCSE / O level or less	(n = 78)	12.2%	12.1%	11.3%		
Attitudes						
Benefits	M (SD)	4.11 (0.58)[a]	3.84 (0.55)[b]	3.46 (0.63)[c]	$F_{(2,652)} = 37.80$, $p < .01$	$\varepsilon^2 = 0.10$
Barriers	M (SD)	2.17 (0.54)[a]	2.46 (0.53)[b]	2.80 (0.42)[c]	$F_{(2,652)} = 45.29$, $p < .01$	$\varepsilon^2 = 0.12$
ATVL	M (SD)	3.89 (0.74)[a]	3.38 (0.63)[b]	2.92 (0.55)[c]	$F_{(2,652)} = 65.98$, $p < .01$	$\varepsilon^2 = 0.17$
VQ: meat acceptance	M (SD)	1.48 (0.58)[a]	2.32 (0.85)[b]	3.02 (0.70)[c]	$F_{(2,652)} = 109.07$, $p < .01$	$\varepsilon^2 = 0.25$
VQ: meat production concerns	M (SD)	4.55 (0.63)[a]	3.84 (0.79)[b]	3.13 (0.71)[c]	$F_{(2,652)} = 102.39$, $p < .01$	$\varepsilon^2 = 0.24$
VQ: meat is hard to avoid	M (SD)	1.67 (0.63)[a]	2.20 (0.80)[b]	2.70 (0.78)[c]	$F_{(2,652)} = 50.22$, $p < .01$	$\varepsilon^2 = 0.13$

notes means with different superscripts were significantly different in post-hoc test;
measure of effect size for MANOVA is partial $\varepsilon^{2;}$ measure of effect size for χ^2 is Cramer's V

Table 2 Associations between current meat consumption and engagement with Meat-Free Monday

			Current meat consumption				
			None (n=98)	Some (n = 424)	All (n = 133)	**Difference**	**Effect size**
Diet at time of registration						$\chi^2_{(2)} = 131.55$, $p < .01$	V = 0.32
Omnivore		(n = 357)	67.3%	54.0%	2.3%		
Meat-reducer / flexitarian		(n = 298)	32.7%	46.0%	97.7%		
Age at registration		M (SD)	41.0 (14.8)[a]	49.6 (13.5)[b]	49.3 (12.4)[b]	$F_{(2,652)} = 16.88$, $p < .01$	$\varepsilon^2 = 0.05$
Months since registering		M (SD)	50.2 (36.6)[a]	36.2 (31.0)[b]	21.2 (24.1)[c]	$F_{(2,652)} = 23.70$, $p < .01$	$\varepsilon^2 = 0.07$
Time since registering						$\chi^2_{(6)} = 54.62$, $p < .01$	V = 0.12
up to 1 year		(n = 224)	20.4%	32.5%	49.6%		
1-3 years		(n = 230)	27.6%	35.4%	39.8%		
3-5 years		(n = 99)	20.4%	17.2%	4.5%		
over 5 years		(n = 102)	31.6%	14.9%	6.0%		
# of website sections visited		M (SD)	2.57 (1.56)[a]	2.15 (1.31)[b]	1.73 (1.13)[c]	$F_{(2,652)} = 11.71$, $p < .01$	$\varepsilon^2 = 0.04$
Visited “About”?	No	(n = 382)	55.1%	57.1%	64.6%	$\chi^2_{(2)} = 2.89$ $p = .24$	V = 0.05
	Yes	(n = 273)	44.9%	42.9%	35.4%		
Visited “News”?	No	(n = 286)	34.7%	41.3%	57.9%	$\chi^2_{(2)} = 15.14$, $p < .01$	V = 0.11
	Yes	(n = 369)	65.3%	58.7%	42.1%		
Visited “Recipes”	No	(n = 157)	23.5%	21.9%	30.8%	$\chi^2_{(2)} = 4.41$ $p = .11$	V = 0.06
	Yes	(n = 498)	76.5%	78.1%	69.2%		
Visited “Get involved”?	No	(n = 529)	68.4%	82.5%	84.2%	$\chi^2_{(2)} = 11.58$, $p < .01$	V = 0.09
	Yes	(n = 126)	31.6%	17.5%	15.8%		
Visited “Supporters”	No	(n = 573)	74.5%	88.7%	93.2%	$\chi^2_{(2)} = 19.69$, $p < .01$	V = 0.12
	Yes	(n = 82)	25.5%	11.3%	6.8%		
Visited “Schools”	No	(n = 611)	86.7%	93.9%	96.2%	$\chi^2_{(2)} = 8.79$ $p = .01$	V = 0.08
	Yes	(n = 44)	13.3%	6.1%	3.8%		

notes means with different superscripts were significantly different in post-hoc test;
measure of effect size for χ^2 is Cramer’s V; measure of effect size for MANOVA is partial ε^2

Table 3 Multivariate correlates of current meat consumption

	Current meat consumption		
	None (n = 98)	Some (n = 424)	All (n = 133)
Diet at time of registering			
Meat-reducer / flexitarian	B* = 0.322 (0.282); χ^2 = 1.31, p = .25 OR** = 1.380 (0.794 - 2.396)	1	B = -3.708 (0.604); χ^2 = 37.71, p < .01 OR = 0.025 (0.008 - 0.080)
Age at registration	B = -0.050 (0.010); χ^2 = 26.31, p < .01 OR = 0.951 (0.933 - 0.970)	1	B = -0.006 (0.010); χ^2 = 0.39, p = .54 OR = 0.994 (0.975 - 1.013)
VQ: meat acceptance	B = -1.135 (0.299); χ^2 = 14.46, p < .01 OR = 0.321 (0.179 - 0.577)	1	B = 0.420 (0.223); χ^2 = 3.56, p = .06 OR = 1.522 (0.983 – 2.353)
VQ: concerns about meat production	B = 0.364 (0.294); χ^2 = 1.54, p = .22 OR = 1.439 (0.809 - 2.560)	1	B = -0.751 (0.235); χ^2 = 10.19, p < .01 OR = 0.472 (0.297 - 0.748)
VQ: meat is hard to avoid	B = -0.535 (0.195); χ^2 = 7.56, p = .01 OR = 0.585 (0.400 - 0.858)	1	B = 0.523 (0.170); χ^2 = 9.53, p < .01 OR = 1.686 (1.211 - 2.353)
Months since registering	B = -0.004 (0.004); χ^2 = 0.91, p = .34 OR = 0.996 (0.989 - 1.00)	1	B = -0.015 (0.005); χ^2 = 8.54, p < .01 OR = 0.985 (0.975 - 0.995)

* B = Regression coefficient (standard error)
** OR = Odds Ratio (95% Confidence Interval)