

Meat consumption, behaviour and the media environment: a focus group analysis across four countries

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Abstract

The livestock sector is a major driver of climate change, accounting for 14.5% of anthropogenic greenhouse gas emissions. Population growth and rising prosperity are expected to see global consumption of meat rise by 76% by mid-century, a rate which is associated with significant social and environmental costs. There is therefore a compelling case for public measures to promote dietary shifts towards a more sustainable model, but little action has been taken at the international or national level. This article reports on an international study, with research conducted across the UK, US, China and Brazil, which examines the role the media might play in driving social change in this area. The study focused specifically on the negotiation of new information around meat consumption and climate change and its impacts on existing attitudes and behaviours. Findings indicate that perceptions and beliefs on climate change are culturally specific – tending to reflect national political and social priorities - but are contextualised within individually constructed media environments. Key determining factors include assessments of trust and credibility in regard to scientists and other experts, perceptions of the role of government and questions of individual versus collective responsibility. These shape the parameters within which arguments about the impact of meat consumption upon climate change are received, and these responses interact with cultural and structural barriers and opportunities to shape the likelihood of behaviour change.

Keywords Climate change · Meat consumption · Global food security · Media · Sustainable diets

1 Introduction

Rising global consumption of meat and other animal products is a major driver of climate change. Population growth and rising global prosperity point to a further rise in consumption of meat by mid-century, a trend which is associated with significant social and environmental costs. There is a compelling case for public measures to promote dietary shifts towards a more sustainable model, but little action has been taken at the international or national level.

The way in which social behaviours or ‘practices’ change involves a dynamic relationship between structural processes, the belief systems within which new ideas are absorbed and the way in which practices are made meaningful within particular cultures and conventions. There is evidence that media

messaging may play a role in driving dietary behaviour change, though research indicates that the way in which content is received should not be assumed as the public are often active negotiators of meanings from media texts.

This article reports on research which investigated the relationship between media environments, reception of information, existing belief structures and behaviour change in the context of meat consumption habits across four international sites: the UK, US, China and Brazil. Qualitative research involving focus groups was mirrored across the four countries and focused specifically on the negotiation of new information around meat consumption and climate change and its impacts on existing attitudes and behaviours. Attention was given to the ways in which perceptions and beliefs on climate change are culturally specific but are contextualised within individually constructed media environments. We were particularly interested in structures of public trust and assessments of credibility in relation to scientists and other experts, perceptions of the role of government and questions of individual versus collective responsibility. We argue that an understanding of the parameters within which debates and evidence about the impact of meat consumption upon climate change are

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received, and of how those interpretations interact with cultural and structural barriers, are essential in any attempts to incorporate messaging and awareness raising measures into a public programme aimed at driving behaviour change.

2 Research context

The livestock sector is responsible for 14.5% of global anthropogenic greenhouse gas emissions (Gerber et al. 2013; Edenhofer et al. 2014) and is the largest single sectoral source of methane (CH_4) and nitrous oxide (N_2O), two of the most potent GHGs (Bailey et al. 2014). In addition to the climate impact of livestock rearing, global meat and dairy consumption patterns drive deforestation and land degradation, accelerate species and habitat loss, and account for 27% of global depletion and pollution of freshwater (Alexander et al. 2015; Machovina et al. 2015; Gerbens-Leenes et al. 2013). Excessive consumption of meat, particularly red and processed meat, has also been linked with the rising global incidence of obesity and diet-related non-communicable diseases such as type-2 diabetes, heart disease and certain cancers (Alexander et al. 2015; Machovina et al. 2015; Allen et al. 2008; Larsson and Wolk 2006; Bouvard et al. 2015; Aune et al. 2009; Rouhani et al. 2014).

The environmental and social costs of livestock production are rising. The nutrition transition unfolding across emerging and developing economies is escalating a worldwide shift towards protein- and calorie-rich Westernised diets (Vranken et al. 2014). By 2050, global meat consumption is expected to increase by 76% (Alexandratos and Bruinsma 2012), spurred by population growth, rising prosperity and dietary shifts in the emerging and developing economies. Even with supply-side mitigation measures to reduce the emissions intensity of production, this increase in demand will see GHG

emissions from the livestock sector continue to rise (Bajželj et al. 2014).

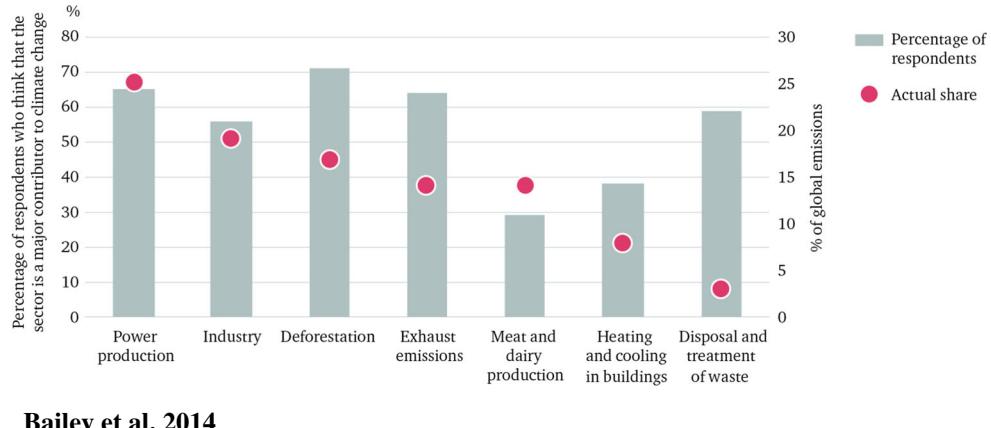
Without a global reduction in meat consumption, the agreement made in Paris at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP21), committing 195 countries to ‘holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C’ (UNFCCC 2015), will be un-realizable (Wellesley et al. 2015; Bajželj et al. 2014). In addition to increased GHG emissions, rising demand for meat implies a greater land footprint for the livestock sector. Already accounting for two-thirds of global agricultural land use, the expansion of pasture and cropland for feed would likely constrain the deployment of negative emissions technologies (NETS) - such as bioenergy, carbon capture and storage (BECCS) - that are integral to current 1.5 °C- and 2 °C-consistent models (Smith et al. 2016).

Within the wider context of the post-2015 sustainable development agenda, a concerted effort to promote healthy dietary patterns and to tackle overconsumption of meat in developed countries is similarly critical to realizing ambitious goals in public health and wellbeing, and in environmental and resource governance (Obersteiner et al. 2016; Popkin 2017; Aleksandrowicz et al. 2016). The 17 Sustainable Development Goals (SDGs; see Fig. 1) agreed by the international community in 2015 set targets for improved health and wellbeing and greater stewardship of natural resources, many of which would be supported by a global reduction in meat consumption levels. Obersteiner et al. (2016) point to the potential for reduced meat consumption to reduce pressure on finite land and water resources (goals 15 and 6), while also reducing health-related costs of overconsumption, including non-communicable diseases (goal 3). In developing countries,



Fig. 1 UN sustainable development goals

Fig. 2 Comparison of perceived and actual contribution to climate change



Bailey et al. 2014

a global reduction in demand for meat could bring lower food prices (goals 1 and 2), reduced mortality (goal 3) and reduced deforestation (goal 15) (Obersteiner et al. 2016), in addition to contributing to lower food-related greenhouse gas emissions (goal 13) and to more responsible consumption (goal 12).

3 The public awareness gap

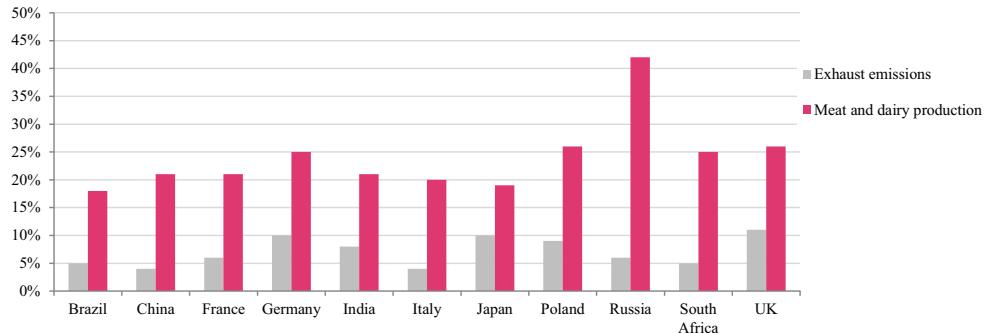
Despite the climate, environmental and social costs associated with global patterns of meat consumption, there remains a significant public awareness gap around the climate impact of meat production compared with other sources of GHG emissions such as deforestation and energy use in buildings (see Fig. 2). A multinational online opinion survey undertaken by Bailey et al. (2014) to examine levels of public awareness and understanding of climate change and its drivers finds that participants around the world are twice as likely to identify the transport sector as an important contributor to climate change compared with meat production, despite the two sources accounting for a roughly equal share of global anthropogenic GHG emissions (see Fig. 2). The share of participants stating that meat and dairy production contribute little or nothing to climate change ranged between 18% and 42% across the 12 countries, with Russia's participants demonstrating a

particularly significant awareness gap around the importance of the sector as a source of emissions (see Fig. 3).

This awareness gap presents a problem to on-going and future efforts to shift meat-eating habits: Bailey et al. (2014) find that lack of awareness contributes to indifference and inertia, and that low awareness of the climate impact of a given behaviour translates into a lack of willingness to consider changing that behaviour. Bailey et al. (2014) also find that closing the awareness gap is likely to be a precondition both for voluntary behaviour change and for a positive response from the public to government-led interventions encouraging dietary shifts. The vast majority of survey participants identified as meat eaters (see Fig. 4); but those participants with a greater awareness of the climate impact of meat and dairy consumption displayed a markedly higher propensity either to be taking action to reduce diet-related emissions or to consider taking action in the future (see Fig. 5).

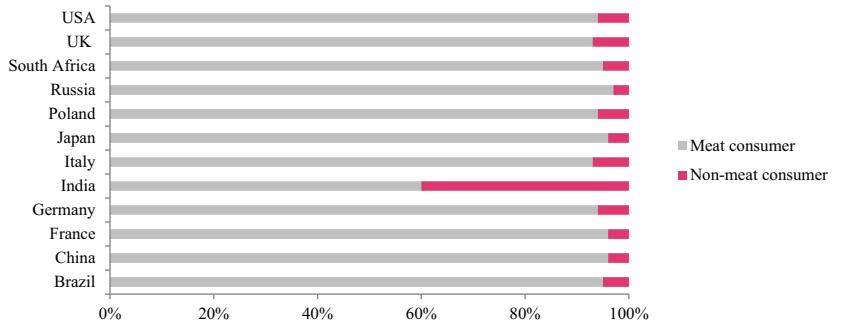
The potential for awareness-raising campaigns to foster behaviour change is contested. A number of recent studies into food choices and meat-eating describe the subconscious nature of many food choices (Bailey and Harper 2015) and detail the ‘value-action’ gap that sees more immediate concerns trump sustainability considerations at the point of purchase (Blake 1999; Carrington et al. 2014). The sociologist Elizabeth Shove (2010) critiques the ‘A, B, C approach’ in which attitudes and values are understood to drive behaviours,

Fig. 3 Share of participants stating that (i) exhaust emissions and/or (ii) meat and dairy production make little to no contribution to climate change



Adapted from Bailey et al. 2014

Fig. 4 Share of participants identifying as meat consumers or non-meat consumers



Adapted from Bailey et al. 2014.

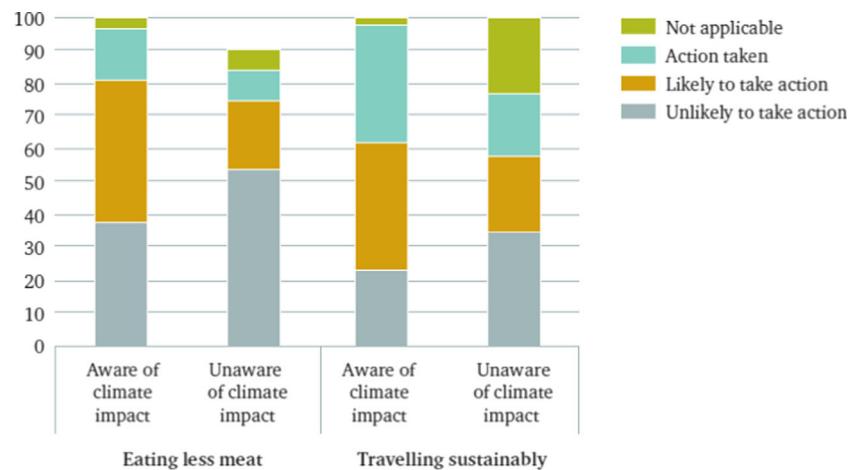
arguing that individual actions are also informed by social conventions and obligations, and are shaped by social institutions and relationships. Shove's argument underlines the importance of understanding the structures and relationships that underpin dietary behaviour, and indicates the limitations of information provision in shaping behaviours. Similarly, Crompton and Kasser (2010) argue that when information about the environmental benefits of shifting behaviour challenge individual goals of status and wealth, which often are integral to their individual identity, they find a way to negate the information. In this way, unsustainable behaviours are 'embedded' ideologically and structurally in ways which make them very difficult to tackle (Goel and Sivam 2014). Whether and how media shape social attitudes and their relation to behaviours is also much contested within the sociology of media, however research looking at the ideological functions of media indicates the importance of the symbiotic relationship between engagement, socio-cultural positionings and the way in which broader ideologies, such as individualism, may shape responses. In other words, media do not simply reflect, they play a shaping role too through the construction of a range of possibilities that audiences may take up (Hall 1980; Boyle 2005; Philo et al. 2015). A recent analysis of

potential policy pathways to lower meat consumption (Wellesley et al. 2015) finds that, while information provision alone is unlikely to be sufficient to trigger behaviour change, it has an important role to play in socializing the idea of reduced meat consumption.

4 The role of the media in closing the awareness gap

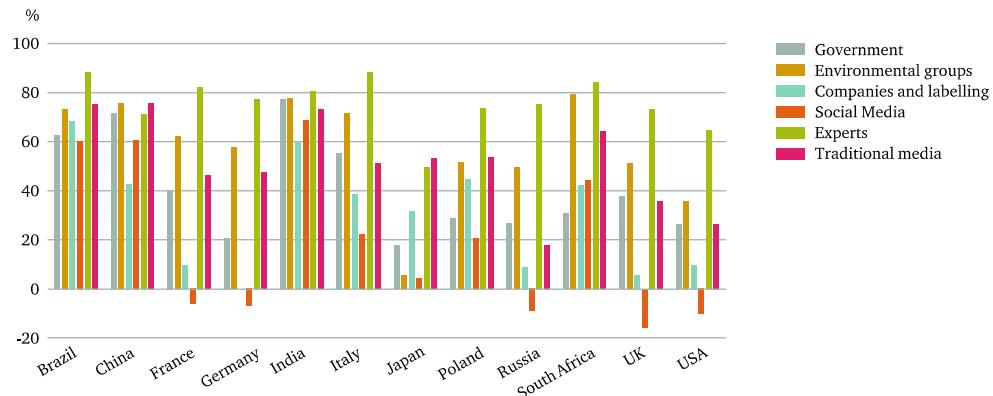
The role of the media in engaging the public on climate change is the subject of much academic work (Carvalho and Burgess 2005; Moser and Dilling 2007; Kahan et al. 2007, 2011; Whitmarsh 2011; Happer et al. 2012; Philo and Happer 2013). A central finding is that the cultural and political contexts within which information is interpreted play a key role in determining the audience's reaction to and engagement with that information. Research into climate scepticism by Whitmarsh (2011), for example, indicates that audience members' political orientation and environmental values are a stronger determinant of scepticism than the presence of climate-sceptic viewpoints in the media.

Fig. 5 Comparison of the impact of awareness on willingness to take individual action on meat consumption and on transport habits



Adapted from Bailey et al. 2014

Fig. 6 Actors perceived as helpful sources of information on climate and livestock issues



Bailey et al. 2014.

The multinational survey undertaken by Bailey et al. (2014) identifies a diverse range of actors deemed by participants as trusted sources of information on climate and livestock issues. The relative degree of ‘helpfulness’ afforded to each group – governments, companies, environmental groups, ‘experts’, traditional media and social media – varied considerably among countries, but traditional media were identified as one of the top three most helpful sources of information by participants in Brazil, China, the UK and the US (Bailey et al. 2014; see Fig. 6). Social media, while deemed unhelpful by participants in the UK and US, were afforded considerable importance by participants in Brazil and China (Bailey et al. 2014; see Fig. 7).

Recent research by Happer and Philo (2016) exploring the multi-faceted nature of the interplay between media and audiences’ attitudes and behaviours indicate that the content of media should not be marginalised. Whilst confirming that interpretations of media messaging are culturally specific, they found that media accounts which emphasise the uncertainty of climate science play a role in generating doubt amongst audience members, which often contributes to a tendency to de-prioritise the issue of climate change. The way in which audiences in the digital arena construct a tailored media environment to deliver content from preferred sources, the researchers found, often exacerbated this tendency rather than clarifying the credibility of evidence-based arguments.

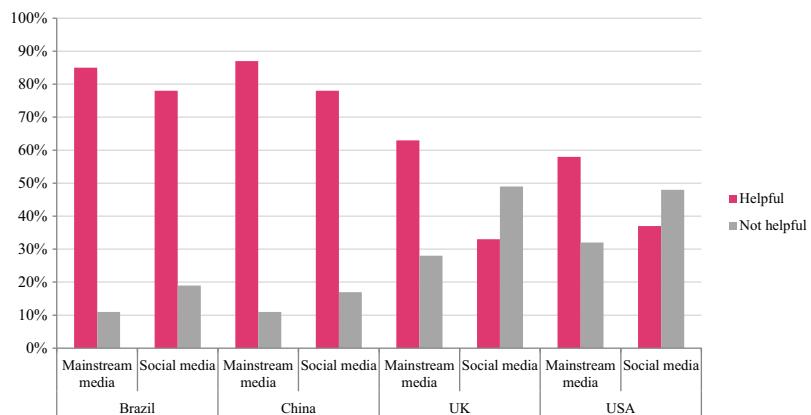
The importance of media content,¹ as well as its delivery, is supported by correlations between the degree of sceptical content and attitudinal positions which research indicates is higher in the English-speaking media than in the developing countries (Boykoff and Boykoff 2004, 2007; Painter 2013), though there is not a comparable body of work exploring this outside of the West. There is, however, far less evidence of

climate change scepticism in the Brazilian public than in the US and UK (Ray 2009; Dayrell and Urry 2015) and this is paralleled by the relative absence of non-scientists and dissenting voices in the mainstream media (Shanahan 2009; Painter 2011; Carneiro and Toniolo 2012). In China, similarly, the inclusion of sceptical voices in the print media is far less widespread than in the English-speaking press (Painter 2011) but overall, in the largely state-dominated television sector, coverage and media attention is much more limited than in Brazil (Painter 2013; Eberhardt 2015). The influence of Western media in these regions should also be considered; research indicates that the majority of climate change coverage published online in China is ‘recycled’ from Western media (Shanahan 2009), which extends the possibility of sceptical voices reaching the public. However, the general trend since 2007 has been a reduction in concern and the growth of scepticism in the English-speaking world (Pidgeon 2010; Pugliese and Ray 2011; Capstick et al. 2014).

Little research has been undertaken into the interplay of audience attitudes and media messaging in the context of meat consumption. The work of Macdiarmid et al. (2016) confirms that there are cultural, social and individual values that are positively associated with meat consumption; research by Hawkes (2006) identifies films and TV programmes as one of the aspects of globalization that is driving the shift to Westernized diets in China; and Joy (2010) recognizes the media as a social channel through which the widespread belief in meat-eating in the US as natural, normal and necessary is reinforced. However, there remains scant understanding of the media as complicit in shaping these beliefs, the importance of social structures in understanding the behavioural impacts of information provision by the media, or the way in which digital media impacts on these processes. This research seeks to redress this gap, and to investigate both the role of media engagement in driving levels of public awareness, and the range of factors which play a role in constructing a cultural environment sympathetic to considerations of behavioural change.

¹ It is important to note that we did not conduct a media content analysis. The research which has been conducted looking at the nature of content, such as that of Painter provides some context for this study; however, it is worth noting that information on the nature of content in China in particular is very limited, hence we devoted a lot of time in focus groups asking respondents to detail the kinds of information they were seeking out and engaging with.

Fig. 7 Share of participants perceiving mainstream media and social media as helpful/unhelpful sources of information on climate and livestock issues.*



* 'Helpful' includes those participants that answered 'very helpful' and 'fairly helpful'. 'Not helpful' includes those participants that answered 'not very helpful' and 'not at all helpful'.

Adapted from Bailey et al. 2014.

5 Research design

Focus group analysis was undertaken looking at meat-eating habits and public attitudes in Brazil, China, the United Kingdom and the United States. These countries were chosen because they are (a) amongst the largest meat-consuming populations (Bailey et al. 2014), (b) amongst the most important emitters of livestock-driven greenhouse gases (Bailey et al. 2014), and (c) experiencing the public health effects of excessive meat consumption (Wellesley et al. 2015). While meat consumption levels in the UK and US have plateaued, they have done so at unhealthy and unsustainable levels, representing twice and three-times the Harvard Medical School's recommendation respectively (Wellesley et al. 2015). Average consumption levels are also high in Brazil (Bailey et al. 2014) where meat-eating is often the focal point of meals and social gatherings, including the popular *churrascarias* (da Silva Gomes Ribeiro and Corção 2013) and where rapid growth in the consumption of processed foods is driving a rise in meat consumption levels (Monteiro et al. 2013). Meat consumption is relatively low in China compared with Brazil, the UK and the US, but is rising at pace as rapid urbanisation and rising prosperity drive up demand (Vranken et al. 2014; Delgado 2003).

As the research was qualitative, sample sizes were small and so not generalizable to whole populations. The aim was to uncover the way in which attitudes and behavioural commitments might be negotiated in response to new information and through interaction with others. The innovations of our methodological approach lie in the three-staged look at audience reception which makes it possible to isolate the specific triggers for engagement and response providing insights into how materials are assessed, why they might be powerful, to whom and in what context. There are three key aspects to our findings. The groups aimed to:

- Examine the nature of attitudes and beliefs on climate change, in general, and its relation to meat consumption specifically. These were contextualised within broader discussions about media engagement, the degree to which participants selected, evaluated and responded to information sources and how these related to the social and cultural worlds participants inhabited.
- Explore the potential reception of new information. In order to do this, we developed a methodology by which the same information would be received across different continents, by contextualising it within participants' self-reported media and cultural environments. Each participant received an information sheet composed of simple facts and diagrams focusing on the impact of food production on climate change. The sheets were produced in English and translated for the Chinese and Brazilian participants. Participants were given a few minutes to absorb the range of information. Group discussions were then conducted focusing on initial responses to the information, the key triggers for engagement (and the form that engagement would be likely to take in the actual digital environment) and those which carried broader resonance. A key focus was the way in which such information would be received and evaluated within the media cultures the participants normally inhabited.
- Assess the impact of the information and its potential role in shaping a cultural environment more sympathetic to attitudinal and behavioural change.

5.1 Sample

The sampling procedure was mirrored across China, the US, Brazil and the UK. In each country, 9 focus groups were held in three regions with participants drawn from three socio-economic groups in each area – low income, middle income/professional and students. The focus groups consisted of six

people on average – each from the same social group. All respondents were drawn from geographically diverse but urban areas. The groups were recruited by Ipsos-MORI to represent normal socio-demographic criteria, and were selected on the basis of age, gender and income levels. Participants were also screened prior to the groups for levels of concern on climate change, meat consumption and environmental issues in order to have a spread of views on these issues. The same sampling procedure was used in all four countries. The total sample was 270 (Table 1).

5.1.1 The social, cultural and attitudinal environment around meat and climate

In order to develop a deeper understanding of the processes of reception of new information on meat and climate, we mapped out the social, cultural and attitudinal environment within which the sample groups were embedded. There are a number of dimensions to this, which may inter-relate in complex and unpredictable ways.

6 Lived experience, and prioritisation of climate change

Meaning is constructed in the interplay between the codes within any text or message and the cultural associations which the audience brings to it; in that moment of equivalence or ‘fit’ (Hall 1980). As such, the way in which a publicly contested issue such as climate change is made meaningful is shaped by audiences’ embeddedness in local cultures and experiences and the broader priorities of their own social, political and

media environments. There was evidence that participants living in the Western nations struggled to connect the issue with their lived experience; climate change is a subject which is talked about, most often filtered through the dominant media. Groups in China and Brazil perceived climate change as something which is lived, and is having direct and negative effects on health and well-being. In China, climate change can be an emotive issue, tapping into a range of pre-existing anxieties in the wider society. The prioritisation of pollution – sometimes referred to as ‘haze’ in translation – reflected significant public concern over the tangible impacts of poor air quality on individual and public health, on food safety and everyday quality of life:

Chengdu, student, female: Every morning if you open the window you can see the visibility is very low and you can see the smog was everywhere, in the morning and during the dusk time I need to wear the mask, and also I have a very poor throat so I think that is a very big phenomenon of climate change.

In Brazil, water shortages, by which some participants had been directly affected, were a common reference point and, in many cases, these were directly linked to deforestation:

Porto Alegre, middle income, female: If you compare the water consumption and the water from rivers, we already have deforestation, they are all connected one with the other and also connected to climate change in one way or another and this chain of things. Especially drinkable water, from my point of view.

Deforestation held an elevated status amongst the Brazilian groups as a source of intense local concern and cultural significance – as a top of mind association, many saw it as the foremost issue in the climate change debate, responsible for greenhouse gas emissions ‘more than cars or airplanes’. In contrast, in the US and UK where interpretations and associations were less related to direct observations of climate impacts, the role of existing social and political values and the nature of media consumption played a more significant role than lived experience.

7 The social, economic and cultural practice of meat consumption

7.1 Meat eating as integral to health

For many, meat consumption is constructed as a fundamental human activity, hard-wired biologically and historically. There was some distinction across the developing world in this respect however. In the Brazilian and Chinese groups, in

Location	Low income	Middle income	Students	Total
China				
Shanghai	8	8	8	24
Beijing	8	7	8	23
Chengdu	8	8	8	24
				71
Brazil				
Porto Allegre	8	8	8	24
São Paulo	8	8	8	24
Rio de Janeiro	8	8	8	24
				72
US				
Dallas	8	8	7	23
San Francisco	8	8	6	22
Washington DC	9	8	10	27
				72
UK				
Glasgow	5	6	6	17
London	5	4	6	15
Manchester	6	8	9	23
				55
				270

particular, meat eating was understood by some as an integral part of a healthy human diet, for which there was no effective substitute in terms of nutrition:

Beijing, students, male: *If we don't eat meat we will change the whole biological link.*

Rio de Janeiro, student, male: *Yes, sort of like soy is a substitute to meat, but I don't really believe that soy has the same proteins as the meat does.*

The association between meat consumption and nutrition in the US and UK groups was more conflicted. The question of limiting meat consumption was more familiar in the context of reinforced cultural messages about the negative health impacts of meat consumption, in particular processed meat consumption, and the promotion of plant-based diets. Some participants had responded with behavioural shifts to these arguments, whilst others had unrealised intentions of doing so. In the US, a more common theme was the way in which mass production methods had disrupted the 'natural' and positive impacts of eating meat:

Dallas, middle income, male: *Well see what it has to do with it is the ones that are in Africa, they're eating all natural things out there, okay. We're sitting here and we're talking about animals that we eat and we're producing and we're giving them all these chemicals.*

7.2 Meat-eating as an economic aspiration

Returning to the argument of Crompton and Kasser (2010) about the way in which social behaviour is influenced by questions of status and wealth, and the degree to which unsustainable behaviours have been 'embedded' ideologically and structurally, there is evidence that the materialistic lifestyle is being mirrored in the developing world (Goel and Sivam 2014). In the Brazilian and Chinese groups, meat consumption was symbolic of social and economic progress, and symptomatic of the move towards a more Westernised (progressive) way of life:

Beijing, students, female: *Now we have good living conditions we can eat whatever we eat.*

Meat consumption, particularly in China, was noted to be much lower than in Western nations, and, as consumption rates relate to economic position to some degree, there was status attached to the serving and eating of meat.

Conversely in the UK and US groups, since meat-eating was most frequently in the form of the consumption of cheap mass produced meats such as burgers, associations were as likely to be with behaviours in lower-income communities. In the UK groups, some noted that it was perceived as aspirational to

follow plant-based diets and, in both groups, there was a sense that access to alternative diets was limited within the lower-income groups for both financial and cultural reasons.

7.3 Meat eating as a social norm

Meat eating is a social practice which is also filtered through cultural conventions and expectations (Shove and Pantzar 2005) and across all groups meat consumption was shaped by social norms which were deeply embedded in the culture. Meat-based meals cooked by friends and family were constructed as acts of love or friendship and contributed to the conditions under which meat consumption was normalised. In Brazil, a key factor was the cultural importance of the barbecue. It is a long established tradition of community cohesion which punctuates the week:

Porto Alegre, student, female: *It is our culture, every Sunday we barbecue, it's a very strong habit especially here, and with my family and near the border of the country, in the South.*

São Paulo, middle income, female: *I think about my friends, they always do barbecues. It would be hard. Everyone invites you to barbecues, you have to have meat. How will you barbecue without meat?*

Participants felt that limiting meat, in this context, may be seen symbolically as a rejection of the offer of being part of a collective, and would marginalise them within their peer groups.

Findings indicated that vegetarianism is still positioned as a non-mainstream option, even in the US and UK. A number of groups indicated a perceived social stigma attached with avoiding meat, particularly for those who do not identify as vegetarians. One US participant noted that limiting meat-eating would require a 'whole identity shift' (with meat-eating as the default). Others discussed the way that changing behaviours around meat would lead to them being stigmatised – as one US participant articulated: '*Dude, where's your burger?*' An aspect of this was a shared understanding of national identity and cultural heritage which involved the consumption of meat: '*we are America, we grew up on – we – most of us grew up on meat or raised on meat.*' As another participant put it: '*We eat meat because we just plain eat meat. It's what we do.*'

7.4 Meat eating as structurally promoted

As well as being ideologically positioned at the heart of society through these practices and conventions, in the UK and US in particular, the consumption of meat is also structurally embedded. In our samples, the low cost, convenience and availability of processed meat were seen to reinforce cultural factors

supporting widespread consumption. Healthier non-meat options were not only more expensive but more difficult to access:

Washington, low income, male: *Our system here in the United States, our food infrastructure is not geared to favour it. It is almost like vegetarianism and, you know, veganism is something you can afford.*

Washington, student, male: *It's simple, it's cheaper to be unhealthy.*

US groups pointed to the difficulty of accessing non-meat options in everyday situations like school meals, while UK groups indicated issues around cost and convenience; the limited availability of vegetarian options amongst pre-packed sandwiches for lunch, for example, and the lack of vegetarian options at work-related events. In these ways meat becomes the unthinking choice; non-meat the resistant choice.

7.5 Meat eating and climate change: Attitudes and awareness

The associations between climate change and meat consumption have not yet been established. There was not across any sample a widespread pre-existing commitment in theory or in practice to alter meat consumption due to concerns about climate change or any other environmental issue. Even amongst the groups who strongly felt that climate change should be a driver for behaviours, the connections between meat-eating and GHG emissions was not impacting on behavioural choices. Across the samples there were some who had already reduced or considered reducing their meat consumption, and this was most common in the US and UK groups, but environmental concerns tended to be a contributory factor rather than the primary driver as this vegetarian articulates:

Manchester, middle income, female: *Because of the environment, because of animal welfare, and because of the stuff they were putting into what is supposed to be chicken.*

This is a key point: in the West, there is a very strong culture of individualism which promotes the prioritisation of personal benefits over collective benefits, and as such tends to position individuals up in competition with each other. Whilst individual health is not always the best predictor of behaviours, it does tend to shape thinking around dietary issues (Macdiarmid et al. 2016).

Awareness was largely non-existent amongst the Chinese sample and where it was present across the other samples, it was largely concentrated in the more educated groups. In Brazil, as noted, discourses around deforestation had focused attention on climate change:

Rio de Janeiro, student, male: *I hear a lot about the deforestation, the emission of gases, of methanol, basically that is it.*

But more broadly, amongst those who made at least a general connection with climate and meat, there was a great deal of confusion, as these comments show:

Glasgow, low income, female: *See even if you look at animal deaths in the last two years, it's absolutely amazing, there's been practically every single day there's been masses of fishes and crabs, there's been flocks of birds dropping out the sky, dying from all different things.*

Rio de Janeiro, low income, female: *Is it that the cattle eat things from nature? From the environment? What is it? Nutrition? The field that isn't good and then the meat is bad?*

The lack of engagement was also reflective of the way in which climate change, and by association any related issues, are deprioritised in the mainstream media across each of the four locations and the resultant low volume of coverage that it receives (Painter 2013). However, the degree to which audiences orient themselves to the mainstream (BBC, CCTV, CNN, Jornal Nacional, etc) as well as the levels of trust invested in it varies. These, in turn, relate to the range of social, political and cultural preferences which structure audience members' media engagement in increasingly complex ways in the digital environment.

8 Media engagement with issues around climate change

In respect of the findings of this study - the generalisability of which is subject to further empirical research – it is helpful to conceptualise media engagement habits of participants as falling along a broad spectrum from those traditionalists who tend to consume broadcast news as scheduled and/or a daily newspaper at one end to those who construct a media environment across a range of platforms which deliver information on the basis of a range of pre-set preferences, at the other.

Those who did not go online at all were rare in our sample,² but there were those who clearly prioritised traditional media, and when they went online tended to go to random sites or look at '*the first thing that Google says, or, Wikipedia*' (São Paulo, low income). This contrasts with those audience members, often drawn from the student groups, who had developed a more tailored approach to media engagement, in which social media often operated as a filter for information. For these

² This may reflect the fact that, while participants were drawn from geographically diverse areas, they were largely urban areas.

participants, personal and professional endorsements were important and some set up their media environment to deliver information on particular areas of interest. In line with the work of Henry Jenkins (Jenkins 2006; Jenkins et al. 2013), we also saw evidence of the way in which these processes reflected identity construction through alignment with cultural, political and lifestyle groupings. In other words, as participants shared and posted, they were often making statements about themselves, their values, interests and beliefs, and their relationship with specific groups.

For a small minority across samples, climate change was one of these subjects, and some had sites and/or friends' pages that they would return to for trusted information:

Washington, student, male: *My cousin works for the World Bank and he does like poverty and like, ah, and like environmental policy and stuff, so his job is to gather information. So a lot of times he just posts stuff on Facebook on his click it link. Usually I read the first paragraph and not the entire thing, but, ah, I try to like skim it or whatever and that's his – that's his thing, so I sort of trust whatever he posts.*

These processes therefore allowed these participants to shape a personal media environment that promoted climate change information often marginalised by the mainstream, in addition to providing a mechanism by which any reports could be assessed for accuracy and trustworthiness.

Perhaps counter-intuitively, amongst the minority who actively shaped their media environment through the selection, recommendation and sharing of information on climate change - either to access trusted information or to engage in a shared conversation - included many of the most climate-sceptic participants. These groups tended to source (what they defined as) scientific accounts most often:

Dallas, middle income, male: *I look at as many websites, as many sources as I can....on one of these studies that was supposed to be the absolute study that they manipulated the data before they published it. And they destroyed some of the data because they wanted to tell a certain story.*

Washington, middle income, female: *I guess I'm probably the most conservative in the group just by what I've heard. Um, I feel like there is a lot of agenda behind the data that comes out and there has also been some talk about, ah, scientists making statements that are based on their agenda rather than on scientific data, so that's – that drives my understanding a little bit.*

Facilitator: *So you don't necessarily trust the information that you're hearing?*

Well, I think I'll trust who I trust on a normal basis. So if I hear, ah, a scientist that goes along with what I think,

which is I think politicized, I will trust that person's look at the matter and probably discount the other side somewhat.

Both of these participants had engaged in extensive research, often analysing data and accessing other sources, to support their opinion. As the sceptical viewpoint is relatively marginalised, the ability to effectively challenge the science is central to taking this position. The latter participant also indicated that her stance on climate change, and the media and cultural environment she immersed herself in distinguished her as '*the most conservative in the group*'. Returning to arguments relating to identity construction, this participant's engagement with sceptical arguments, and wider conservative discourses, was central to the way she wished to present herself to the group. To some extent, we saw evidence of what Miller describes as a 'phatic culture' in which communications are about making connections, telling people virtually what you are all about, as opposed to a real engagement with content (Miller 2011). In our sample, this tendency was more established in the sceptical groups than in those who wished to align themselves more positively with climate change. Even amongst the minority who tailored their media environment to deliver climate change information in line with the scientific consensus and with very real concerns, there was not a strong sense of identifiable cultural groupings around this issue.

The majority of our sample, wherever they were positioned on the spectrum regarding media engagement, did not prioritise climate change as an issue, and the information they accessed was therefore largely limited to the mainstream. Where they were exposed to coverage of the meat-climate relationship, they afforded the information minimal attention since the mention of 'climate change' was not a sufficient hook to trigger their attention, or to operate as a way to make a connection, as this exchange indicates:

Manchester, student, female: *I previously had (heard about it) but it just fell out of my memory to be honest. [...] 'cause I know when we were at school... it was about waste and stuff but like, because it's not been a main factor, it just kind of deteriorated in my mind.*

9 Foundations of credibility and sources of scepticism

The construction of tailored media environments, whilst facilitated by technological advances, is also reflective of (as well as complicit in) broader social trends, a central element of which is the development of widespread cynicism and lack of trust. This applies both to

the governing classes as well as to the range of information sources that audiences access. Across the other samples, there was limited trust invested in the mainstream media and, particularly in the US and UK samples, a general distrust of journalism and awareness of the ideological bias of different news outlets. This did not necessarily lead to an abandonment of the mainstream but a more critical form of consumption, which often involved a comparative approach across mainstream and social media:

Porto Alegre, middle income, male: *So first you are awakened by the media, radio and TV, and then I would go to the internet, more secure sources and read on one or three sites that are reliable.*

Glasgow, middle income, male: *I try to do as much research as possible, scientific research and then on the back of that skim through various forms of media to see what they're saying, ranging from The Guardian to The Express just to see.*

The highest levels of trust invested in social media, and its ability to deliver credible information, were present in the Brazilian sample where findings suggested these processes were also more embedded in more traditional social networks such as peer and professional groups, family and friends, confirming the findings of the polling data (Bailey et al. 2014). For some of the social media users in this sample, knowledge and understanding on climate change had been gained through offline engagement with science teachers and professors as well as family members:

São Paula, student, female: *If we have the discussion with someone, and then you try to check it out together. My family and I, we Whatsapp about almost everything. And then you always have new sources because someone saw something there, another one somewhere else. And then we just exchange ideas.*

The majority of participants in the other samples, however, conceived of engagement with social and other alternative media as primarily social, for connecting and sharing with people rather than for accessing accurate information. Some noted that the media that circulated were often superficial: '*So is they will spend little time on such an important topic such as this one but then another 5 minutes talking about football.*' (São Paulo, student, female). However, that did not preclude these processes from directing the information that would be delivered to them, and some indicated that a key aspect of that was signalling relevance amongst their own peer group, and to be part of the wider conversation.

This was also the case in China where there was a clearer divide in the perceived credibility of official media - state media such as CCTV and, to a lesser extent, other respected news outlets - and non-official media. This reflected the generally high levels of trust in the state and CCTV's perceived rigour in news-gathering:

Chengdu, student, female: *Only if the content is true and validated that CCTV will release the information.*

Across all samples, the most trusted sources were the scientists. However, there was a significant divergence regarding the way in which groups positioned themselves on the question of the legitimacy of the science. Some of this related to scepticism of climate science as discussed above. However, also significant were first, perceptions of the democratic process and the role of individuals within it, and second, the dominant perspectives on current social and political priorities and how to achieve them.

10 Attitudes to governmental and individual action

In direct relation to the crisis in trust amongst the UK and US samples, there was also a sense of powerlessness rooted in a cynicism about the democratic process, and about decision-makers. Many in these groups felt that politicians, in particular, could not be trusted to act in the public interest and many were ambivalent towards political rhetoric:

Manchester, student group, male: *Yeah, 'cause we hear a lot of stories now where they say one thing and they go back on it... then they give you excuses why... so you think are they really going to follow through?*

San Francisco, student, female: *I think that all politicians have a, ah, set agenda. So, I mean, whoever is really backing them I think they are going to take their side on any subject. So –*

Climate change in these groups was widely understood as a politically divisive issue, and there was awareness that existing political structures, and the embeddedness of corporate agendas, had stalled meaningful action on climate change. However, this awareness was also accompanied by an acceptance that individuals, acting alone or as a collective, had limited agency and/or limited motivation; action from the bottom-up was not hugely invested in. In the US and UK groups, focus group questions did not necessarily trigger discussions about behavioural choices, although groups broadly agreed that some form

of action should be taken on climate change. The issue, in many ways, was emblematic of more general feelings of impotence. Conversations after receiving the new information demonstrated that participants carried equally conflicting sentiments on the processes which shaped the culture of meat-eating. In the US, in particular, there was broad cynicism about the agenda of successive governments to promote unhealthy diets in the interests of the meat industry:

Washington, lower income, male: I think the government has failed as far as like the standard American diet. The diet it has been pushing for the past 20, 30 years has clearly made Americans unhealthy.

Again this tendency was also reflected in responses to the question of the need for governments to take action on this issue. There was a general sense that they should, but also a lack of trust in the decisions that would be made.

In Brazil and China, there were higher levels of trust both in the information environment and in decision-makers. Again in both countries, the state was seen to be central in raising awareness and tackling the issue. In Brazil, in particular, collaboration with trusted bodies such as the UN, but also corporations, was seen as a counter to any doubts about the efficacy or trustworthiness of governments – ‘*It (information) would be even more credible with the government and the UN!*’ (Puerto Alegre, lower income, male).

Higher levels of trust in decision-makers were also combined with a stronger sense of personal responsibility with participants aligning themselves more closely with the actions of those (such as politicians) who were responsible for both climate change impacts and responses:

Shanghai, middle income, male: you have to start from yourself, have to pay attention to your own eco awareness to save the water, to be more eco-friendly, to go green, and don't drive cars, try your best using public transportation, take Metro lines, reduce the pollution, and that is more about start from yourself.

10.1 Audience reception of new information, and its relation to attitudinal and behavioural change

The findings discussed in the previous sections map out the media culture and belief systems within which information about climate change and meat production is currently received. In the context of very low levels of awareness, we presented to participants new information on the meat-climate relationship in the form of the fact

sheet. In analysing participants’ responses, we sought to identify the particular factors that should be borne in mind when fostering engagement with the issue, at the level of both attitudinal and behavioural decision-making.

11 Reinforcement across the media environment

There was an initial resistance to accepting the information outside of the context of the media environments in which participants operate and through which information is routinely evaluated. Participants were sceptical of the credibility of sources and arguments and the consensus of expert opinion which, as discussed, is one of the most powerful counter-arguments to scepticism. Returning to the more critical form of information consumption, a key element of this is the aim of identifying consistency across groups, and media sources, which may be seen to have conflicting ideological stances. However, as this participant notes it is not simply about the credibility of the information but also a tendency promoted by the nature of engagement with digital technologies:

London, students, male: But that is not simply about credibility, it's just the process I go through – it's confirmation as much as checking credibility. It's just a process of gathering information even if the original source is credible, it's just what we do.

The reference to ‘information gathering’ is significant particularly for those who tailor their own media environments in that they do not conceive of a simple transmission of information but of a process of receiving, evaluating, sharing and so on. This also relates directly to the previous arguments about the need for media messages to gain momentum in the information environment by either tapping into prior social, political or lifestyle groupings who will spread and discuss related content.

The information was more readily accepted by participants with whom it resonated with extant areas of concern. For those in the US and UK groups who were already receptive to media messaging about meat consumption and impacts on health, general food quality and modern food production methods, this elicited a response more sympathetic to the arguments being made:

Dallas, middle income, female 1: I just think it's wrong for them to do the fast production like they do and doing

all the hormones and stuff like that to make them grow faster. I think that probably contributes to the factor of them burping more.

Female 2: *And producing so much gas because of the chemicals they're given.*

Conversely, the comparison of similar levels of emissions in respect of transport versus livestock presented a barrier to acceptance of the message partly because it required participants to rethink prior assumptions about the drivers of climate change. It also challenged messaging which had been reinforced across their information environments, including the formal education they receive at school, as these comments show:

Manchester, student, female: *Yeah, I think whenever you're told about greenhouse gases or anything, it's always like transport, we're never really, we don't really hear....it's not that widespread that it comes from food and animals, it's normally about planes and stuff like that.*

Rio de Janeiro, middle income, female: *And we always studied it. But this thing with the animals was never something taught at the schools, in conversations.*

Beijing, middle income, male: *This is the first time I've seen this figure. I feel surprised that it's so exaggerated, shocking, I doubt it, it's too much.*

For those participants in the Brazilian and Chinese groups in particular, the information disrupted the strong connection between climate change and direct, tangible impacts in their lived environments – as one Brazilian participant noted '*you can see the fumes coming out of cars but not animals*'. Even participants whose connections were not so direct noted that they found the issue difficult to visualise:

London, low income, male: *It's not logical, look at the pictures, I mean... a little animal, a big aeroplane. I mean I do a lot of flying and I tell you, when they fill up an aeroplane with fuel, I mean, that's all coming out into the sky.*

As such, the new information was generally subject to a high degree of scrutiny across the samples. Many, particularly those in the student groups, questioned the robustness of the data and some did their own data calculations drawing on the range of knowledge they had about related issues such as over-population and deforestation as well as their sense of 'logic'. Other participants in the US and UK returned to their founding assumption that the science is not fully understood and that it is limited in what it can tell us.

12 Trusted sources and consistency with existing belief structures

For the majority across all samples who did invest trust in scientists, the initial reluctance to accept the arguments presented was tempered by the grounding of the information in the science. Again, this was particularly strong in the Chinese and Brazilian samples, reflecting the degree of credibility and trust already expressed in formally recognised expert sources.

When asked about issues around evaluation of the information within the media environments they normally inhabited, most participants felt these sources, if verified, offered credibility. In China, notably, the crucial authoritative source was the government operating through the official TV channel, CCTV:

Beijing, low income, male: If I watched in on CCTV news I'd trust them. If I see it on some other newspapers I won't trust them. CCTV1 broadcast I will trust them otherwise I wouldn't trust them.

In the US and UK, there were greater reservations, many of which were rooted in the deep distrust of science funding, and the agendas of public bodies as previously discussed. But overall, even in the context of low trust and cynicism about the production of knowledge in the public sphere, the combination of expert sources was fairly powerful, and most conceded this made it far more difficult to dismiss the information. There was a sense that expert sources, with scientists and academics at the top of the hierarchy of credibility, offered the most effective foundation for considered evaluation, at least in the first instance.

Despite this, the way in which information, reinforced within the media environment, may begin to impact on motivations for dietary choices is reliant upon a range of other factors. Key amongst these are existing belief structures and the degree to which new information aligns with these structures. In the US and UK samples, for example, in spite of a broad acceptance of the information and the resonance with messaging in other areas, actual commitments to reduce meat-eating were limited. Much of this was related to the widespread ideology of cynicism about individual action and what it could achieve in the context of an ambivalent collective:

London, student, male: Yeah I could stop eating meat tomorrow but it's not going to stop how much meat is being produced. It's either everyone or no one, or a lot of people. If all of us in this room stopped eating meat tomorrow... it has to be done in mass amount.

The findings indicated contradictory tendencies across the spectrum of opinion on this issue in the US groups: in that

many participants embraced libertarian arguments about individual choice and the power of the individual to create change but were also highly cynical of government interventions in lifestyle choices such as meat-eating. On climate change, in particular, owing in part to the conflicted and divisive nature of public discourse on the subject, there was a general reluctance amongst participants to accept their own active role in driving it. As a result, there was a similar reluctance to accept responsibility for mitigating climate change. Messaging that resonated with issues around health offered more potential both in the US and UK given the tangible and visible benefits to the individual of changes to health behaviours.

In correlation with this, even though the information was less reinforced in their cultural and social environments, participants in the Brazil and China samples showed more willingness to addressing their dietary habits in response to the information:

Shanghai, lower income, female: *I will have maybe 1.5 kilograms per week; I want to reduce or halve these amounts of meat.*

Male: *Maybe two-thirds of the meal is for vegetables and maybe one-third of the meat. You need to eat more of the fish meat.*

In reflection of broader understandings of the impact that individuals can make when operating as part of a collective, discussions in the Brazilian group turned to the cultural shifts which might be necessary and acceptable. In spite of the very strong associations and value placed on the weekend barbecue, some noted that if there was a collective move towards alternatives, the cultural barriers to reducing meat consumption would lessen:

São Paulo, lower income, male: *....if fish became cheaper it would be good. Maybe that's what we would do our barbecues with every weekend.*

Rio de Janeiro, lower income, female: *Let's eat seafood, guys!*

13 Structural support for behavioural change

As previously argued, information and awareness raising will be most effective when combined with structural support for behavioural change, and there was a degree of cross-sample consensus on this issue. In spite of the differing responses to the question of individual action and levels of trust, the majority of participants across all samples agreed that action should be taken, and that governments had a responsibility to lead on this issue. In Brazil and China, groups saw the state as central in raising awareness of and tackling the issue, and as

particularly effective or persuasive when working in collaboration with trusted bodies such as the UN. Participants across the UK and US, while largely favouring government action, cautioned against the trustworthiness of politicians and, in the US, emphasised the importance of an ideology of individual liberty and minimal government intervention into lifestyle choices:

Dallas, low income, female: *Americans are going to be bad enough, conservatives especially because we like our rights, we like being able to make our own choices.*

However, when asked about the likely degree of resistance to action that is verifiably in the public interest, participants across all samples conceded that it would not be legitimate. It was felt that initial resistance to such measures would subside and that the public would accept them in the way that similar lifestyle changes advocated as beneficial to the public, such as restrictions on smoking, have historically been accepted:

San Francisco, low income, female: *For one minute they might be (resistant). But just like we had when we were all pissed off. But after a while, we got used to it.*

Critical to strengthening the wider public legitimacy of such interventions would be the gradual nature of imposed changes, the repeated reiteration of trusted information rooted in scientific evidence, and a credible assertion that governments were fulfilling their duty and acting in the interests of their voters.

14 Conclusions and implications

If the ambitious targets set out in the Sustainable Development Goals are to be realized, and the most extreme climate change scenarios to be avoided, we will need to bring about both a reduction in global aggregate meat consumption levels and a more equitable distribution of consumption across developing and developed countries. Policy makers, industry leaders and civil society change agents will need to use every tool and channel available to them to foster more sustainable, more equitable and healthier consumption patterns. A first priority should be to heed learnings from the fields of behaviour change, sociology and communications and to collaborate with mainstream and social media outlets in developing and disseminating compelling narratives for dietary change.

Our research adds to the existing knowledge on the contributory role which media play in shaping the practice of meat consumption and their potential to shift

behaviours in important ways. First, it shows the way intensely personalised media ecologies deliver and endorse particular sources of information in ways that challenge traditional structures of trust. Second, it demonstrates that these processes interact in a complex and dynamic way with off-line experiences, and the social and political structures in which they are embedded, to shape the likelihood of behavioural change. Through this interplay, the authority attributed to science and scientists, and policy rooted in their expertise, remain key determining influences, as do perceptions of the role of the state and individual versus collective responsibility. Future policy strategies that seek to raise awareness of the meat-climate relationship through media campaigns, with the ultimate aim of triggering behaviour change, must incorporate knowledge of these processes if they hope to be successful. We offer a series of findings based on the insights delivered by the research:

The first is that, with very low existing levels of public awareness around meat consumption and climate change, there exists significant potential to develop and reinforce a positive narrative around the benefits of dietary change prior to that message being misappropriated by groups which might seek to limit or negate the arguments being made, particularly in the Western context. If media coverage of the issue, influenced by scientists and expert opinion, is to convey the public health and environmental gains to be made through dietary change, there is likely to be great value in a collaborative approach among a range of stakeholders (including the medical profession, animal welfare and environmental and advocacy groups) in order to establish a strong, consistent and coherent narrative that does not prioritise any interest over the other and that delivers a message accessible to the widest range of audience groups.

The second is that, until the global imperative to tackle climate change is prioritised by governments and recognised by publics, the most effective levers for action are likely to be those that resonate with everyday concerns and that stress the co-benefits of dietary change such as, improved health and wellbeing. Local environmental challenges may well sway individuals in Brazil and China, or in other countries where the impacts of climate change and its drivers are already being felt and there are stronger commitments to collective moves. However, particularly in Western societies where scepticism of climate science remains relatively high, reinforcing the imperative to protect against poor health and disease through dietary change will likely offer the best chance of prompting positive individual action.

The third key finding is that, despite the rise in social media use and a good deal of scepticism around the independence and credibility of professional media outlets, national television and radio broadcasters and the press remain important vehicles for informing the public on developments in knowledge in relation to health and environment – and that these same media outlets are important influencers of potential government policy solutions and personal and collective solutions to individual and societal challenges. The absence of the meat-climate connection in mainstream debates is often taken by the public as an indication of its low level of importance. As such, traditional media remain critical for alerting the population at large to the issue. In recognition of the sway of media coverage over public awareness and interest, government actors in cooperation with NGOs and other stakeholders should consider engaging strategically with journalists, supporting ongoing collaborative dialogues devoted to knowledge development and accurate reporting around climate change and its drivers.

Finally, the role of social media is also crucial and communicators must not assume a linear and one-dimensional model of ‘information provision—raised awareness – behaviour change’. Instead they will need to address the ways in which new forms of media rework existing structures of trust, the motivations for liking, posting, sharing and commenting and how these relate to processes of validation across multiple communicators on multiple media platforms. Campaigners – whether state or non-state – will need to consider not only the information sources deemed most credible but also the conduits that are most embedded in the cultures inhabited by target audiences. The most effective and convincing sources of information are likely to be those that confer a sense of authority whilst being shared and endorsed within audience members’ own constructed media environments.

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Compliance with ethical standards

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References

- Aleksandrowicz, L., Green, R., Joy, E. J. M., Smith, P., & Haines, A. (2016). The impacts of dietary change on greenhouse gas emissions, land use, water use, and health: A systematic review. *PLoS One*, 11(11), e0165797.
- Alexander, P., Rounsevell, M., Dislich, C., Dobson, J., Engstrom, K., & Moran, D. (2015). Drivers for global agricultural land use change: The nexus of diet, population, yield and bioenergy. *Global Environmental Change*, 35, 138–147.
- Alexandratos, N., & Bruinsma, J. (2012). *World agriculture towards 2030/2050: The 2012 revision*. Rome: Food and Agriculture Organization of the United Nations.
- Allen, N. E., Key, T. J., Appleby, P. N., Travis, R. C., Roddam, A. W., Tjønneland, A., Johnsen, N. F., et al. (2008). Animal foods, protein, calcium and prostate cancer risk: The European perspective investigation into Cancer and nutrition. *British Journal of Cancer*, 98, 1574–1581.
- Aune, D., Ursin, G., & Veierod, M. B. (2009). Meat consumption and the risk of type 2 diabetes: A systematic review and meta-analysis of cohort studies. *Diabetologia*, 52, 2277–2287.
- Bailey, R., & Harper, D. (2015). *Reviewing interventions for healthy and sustainable diets*. London: Chatham House.
- Bailey, R., Froggatt, A., & Wellesley, L. (2014). *Livestock – Climate Change's forgotten sector: Global public opinion on meat and dairy consumption*. London: Chatham House.
- Bajželj, B., Richards, K. S., Allwood, J. M., Smith, P., Dennis, J. S., Curmi, E., et al. (2014). Importance of food-demand Management for Climate Mitigation. *Nature Climate Change*, 4(10), 1–6.
- Blake, J. (1999). Overcoming the value-action gap in environmental policy: Tensions between national policy and local experience. *Local Environment: The International Journal of Justice and Sustainability*, 4(3), 257–278.
- Bouvard, V., Loomis, D., Guyton, K. Z., Grosse, Y., El Ghissassi, F., Benbrahim-Tallaa, L., et al. (2015). Carcinogenicity of consumption of red and processed meat. *The Lancet Oncology*, 16(16), 1599–1600.
- Boykoff, M. T., & Boykoff, J. M. (2004). Balance as bias: Global warming and the US prestige press. *Global Environmental Change*, 14, 125–136.
- Boykoff, M. T., & Boykoff, J. M. (2007). Climate change and journalistic norms: A case-study of US mass-media coverage. *Geoforum*, 38, 1190–1204.
- Boyle, K. (2005). *Media and violence: Gendering the debates*. London: Sage.
- Capstick, S. B., Whitmarsh, L. E., Poortinga, W., Pidgeon, N. F. and Upham, P. (2014). International trends in public perceptions of climate change over the past quarter century. *Wiley Interdisciplinary Reviews: Climate Change*, 6(1), 35–61.
- Carneiro, C. D. R., & Toniolo, J. C. (2012). “Hot” earth in the mass media: The reliability of news reports on global warming. *Historia Ciencias Saude-Manguinhos*, 19, 369–389.
- Carrington, M. J., Neville, B. A., & Whitwell, G. J. (2014). Lost in translation: Exploring the ethical consumer intention-behavior gap. *Journal of Business Research*, 67(1), 2759–2767.
- Carvalho, A., & Burgess, J. (2005). Cultural circuits of climate change in U.K. broadsheet newspapers 1985–2003. *Risk Analysis*, 25(6), 1457–1469.
- Crompton, T., & Kasser, T. (2010). Human identity: A missing link in environmental campaigning. *Environmental Science Policy Sustainable Development*, 52, 23–33.
- da Silva Gomes Ribeiro, C., & Corçao, M. (2013). The consumption of meat in Brazil: Between socio-cultural and nutritional values. *Food, Nutrition and Health*, 8(3), 425–437.
- Dayrell, C., & Urry, J. (2015). Mediating climate politics: The surprising case of Brazil. *European Journal of Social Theory*, 18(3), 257–273.
- Delgado, C. L. (2003). Rising consumption of meat and Milk in developing countries has created a new food revolution. *Journal of Nutrition*, 133(11), 3907S–3910S.
- Eberhardt, C. (2015) Discourse on climate change in China: A public sphere without the public. *China Inf*, 29:133–159.
- Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Farahani, E., Kadner, S., Seyboth, K., et al. (2014). *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge and New York: Cambridge University Press.
- Gerbens-Leenes, P. W., Mekonnen, M. M., & Hoekstra, A. Y. (2013). The water footprint of poultry, pork and beef: A comparative study in different countries and production systems. *Water Resources and Industry*, 1, 25–36.
- Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., et al. (2013). Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Rome: Food and agriculture Organization of the United Nations (FAO).
- Goel, S., & Sivam, A. (2014). Social dimensions in the sustainability debate: The impact of social behaviour in choosing sustainable practices in daily life. *International Journal of Urban Sustainable Development*, 7(1).
- Hall, S. (1980). Encoding/decoding. In S. Hall, D. Hobson, A. Lowe, & P. Willis (Eds.), *Culture, Media, Language: Working Papers in Cultural Studies, 1972–79*. London: Hutchinson.
- Happer, C., & Philo, G. (2016). New approaches to understanding the role of the news media in the formation of public attitudes and behaviours on climate change. *European Journal of Communication*, 31(2), 136–151.
- Happer, C., Philo, G., & Froggatt, A. (2012). Climate change and energy security: Assessing the impact of information and its delivery on attitudes and behaviours. In *UK energy research Centre Available at: http://www.chathamhouse.org/sites/default/files/public/Research/Energy,%20Environment%20and%20Development/1212ukerc_climatechange.pdf*. Accessed 17 Dec 2018.
- Hawkes, C. (2006). Uneven dietary development: Linking the policies and processes of globalization with the nutrition transition, obesity and diet-related chronic diseases. *Globalization and Health*, 2, 4.
- Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York: New York University Press.
- Jenkins, H., Ford, S., & Green, J. (2013). *Spreadable media: Creating value and meaning in a networked culture*. New York: New York University Press.
- Joy, M. (2010). *Why we love dogs, eat pigs, and Wear cows: An introduction to Carnism, the belief system that enables us to eat some animals and not others*. San Francisco: Conari Press.
- Kahan, D. M., Braman, D., Slovic, P., Gastil, J. and Cohen, G. L. (2007). The second National Risk and culture study: Making sense of - and making Progress in - the American culture war of fact. GWU legal studies research paper: Yale Law School, No. 370.
- Kahan, D., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research*, 14, 147–174.
- Larsson, S. C., & Wolk, A. (2006). Meat consumption and risk of colorectal cancer: A meta-analysis of prospective studies. *International Journal of Cancer*, 119(11), 2657–2664.
- Macdiarmid, J., Douglas, F., & Campbell, J. (2016). Eating like there's no tomorrow: Public awareness of the environmental impact of food and reluctance to eating less meat as part of a sustainable diet. *Appetite*, 96, 487–493.
- Machovina, B., Feeley, K. J., & Ripple, W. J. (2015). Biodiversity conservation: The key is reducing meat consumption. *Science of the Total Environment*, 536, 419–431.
- Miller, V. (2011) *Understanding Digital Culture*. London: Sage Publications.

- Monteiro, C. A., Mourbarac, J. C., Cannon, G., Ng, S. W., & Popkin, B. (2013). Ultra-processed products are becoming dominant in the global food system. *Obesity Reviews*, 14(2), 21–28.
- Moser, S. C., & Dilling, L. (2007). *Creating a climate for change: Communicating climate change and facilitating social change*. Cambridge: Cambridge University Press.
- Obersteiner, M., Walsh, B., Frank, F., Havlík, P., Cantele, M., Liu, J., Palazzo, A., Herrero, M., Lu, Y., Mosnier, A., Valin, H., Riahi, K., Kraxner, F., Fritz, F., & van Vuuren, D. (2016). Assessing the land resource—Food price nexus of the sustainable development goals. *Science Advances*, 2(9), e1501499.
- Painter (2011) Poles apart: The international reporting of climate scepticism, Reuters Institute for the Study of journalism.
- Painter, J. (2013). *Climate change in the media*. New York: Reuters Institute of Journalism.
- Philo, G., & Happer, C. (2013). *Communicating climate change and energy security: New methods in understanding audiences*. New York: Routledge.
- Philo, G., Miller, D., & Happer, C. (2015). The sociology of the mass media: Circuits of communication and structures of power. In M. Holborn (Ed.), *Contemporary sociology* (pp. 444–471). Cambridge: Polity Press.
- Pidgeon, N.F. (2010). International Dimensions of Climate Change, Report 5: Public Understanding of and Attitudes Towards Climate Change. Foresight: Government Office for Science.
- Popkin, B. M. (2017). Relationship between shifts in food system dynamics and acceleration of the global nutrition transition. *Nutrition Reviews*, 75(2), 73–82.
- Pugliese, A. and Ray, J. (2011). Fewer Americans, Europeans view global warming as a threat. Gallup. Available at: <http://www.gallup.com/poll/147203/fewer-americans-europeans-view-global-warming-threat.aspx>. Accessed 17 Dec 2018.
- Ray, J. (2009). In Major Economies, Many See Threat From Climate Change. Gallup. Available at: <http://www.gallup.com/poll/121526/major-economies-threat-climate-change.aspx>. Accessed 17 Dec 2018.
- Rouhani, M. H., Salehi-Abarquoei, A., Surkan, P. J., & Azadbakht, L. (2014). Is there a relationship between red or processed meat intake and obesity? A systematic review and meta-analysis of observational studies. *Obesity Review*, 15(9), 740–748.
- Shanahan, M. (2009). Time to adapt? Media coverage of climate change in non-industrialised countries. In T. Boyce & J. Lewis (Eds.), *Climate change in the media*. New York: Peter Lang.
- Shove, E. (2010). Beyond the ABC: Climate change policy and theories of social change. *Environment and Planning*, 42(6), 1273–1285.
- Shove, E., & Pantzar, M. (2005). Consumers, producers and practices: Understanding the invention and reinvention of Nordic walking. *Journal of Consumer Culture*, 5(1), 1469–5405.
- Smith, P., Davis, S. J., Creutzig, F., Fuss, S., Minx, J., Gabrielle, B., Kato, E., et al. (2016). Biophysical and economic limits to negative CO₂ emissions. *Nature Climate Change*, 6, 42–50.
- Vranken, L., Avermaete, T., Petalios, D., & Mathijs, E. (2014). Curbing global meat consumption: Emerging evidence of a second nutrition transition. *Environmental Science & Policy*, 39, 95–106.
- Wellesley, L., Happer, C., & Foggatt, A. (2015). *Changing climate, changing diets: Pathways to lower meat consumption*. London: Chatham House.
- Whitmarsh, L. (2011). Scepticism and uncertainty about climate change: Dimensions, determinants and change over time. *Global Environmental Change*, 21(2), 690–700.



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