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## Vegetarian Utopias: Visions of Dietary Patterns in Future Societies and Support for Social Change

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### Highlights

- Explored visions of plant-based, vegetarian, or vegan future NZ societies.
- Qualitative themes included changes to health, the environment, and the economy; and changes to individual traits and values.
- Examined relationships between collective future dimensions and current support for social change towards plant-based diets.
- For a vegetarian future, the strongest predictor of support for social change was anticipated reduced dysfunction in the future.
- For a vegan future, the strongest predictor of support for social change was anticipated increased warmth in the future.

### Abstract

The current study draws on the collective futures framework to examine how visions of future societies where most people consume plant-based, vegetarian or vegan diets are related to current support for social change towards plant-based diets. Participants were 506 university students in Aotearoa New Zealand invited to imagine a society in 2050 where most individuals consume a plant-based, vegetarian, or vegan diet. A thematic analysis was conducted on responses to an open-ended item asking how these future societies would be different to today. Participants reported a variety of potential positive and negative outcomes for individuals and wider society. Subsequent analyses of attitudes scales investigated the relationships between the collective dimensions of

plant-based future societies and support for policies to promote plant-based diets. For a vegetarian future, the strongest predictor of current support for social change was the expectation that widespread vegetarianism would reduce societal dysfunction. For a vegan future, the strongest predictor of support for social change was an expectation of increased warmth in a vegan society. Implications for theory and advocacy are discussed.

Keywords: Vegetarianism; meat consumption; collective futures; social change; New Zealand

## 1. Introduction

There is growing concern about the environmental impact and sustainability of diets based on high levels of animal products (Hertwich et al., 2010; Odegard & van der Voet, 2014; Stehfest et al., 2009; Steinfeld, Gerber, Wassenaar, Castel, & deHaan, 2006). An estimated 70% of the world's agricultural land is now dedicated to livestock production, which has contributed to biodiversity loss, soil degradation, and air and water pollution (Steinfeld et al., 2006). Additionally, research suggests that animal agriculture is responsible for an estimated 18% of global greenhouse gas emissions, an amount greater than the entire transport sector (Steinfeld et al., 2006). One strategy to reduce the environmental impacts of livestock production is to encourage the adoption of diets low in animal products, such as vegetarian and vegan diets (Marlow et al., 2009; Schösler, Boer, & Boersema, 2012; Stehfest et al., 2009). Surprisingly, while environmental advocacy groups have heavily promoted pro-environmental behaviours such as recycling or using public transport; until recently there has been relatively little promotion of plant-based, vegetarian, or vegan diets (Freeman, 2010). It is important to investigate ways of framing these alternative dietary patterns that could function to increase support for social change in this area.

Visions of a better future society are argued to play an important role in motivating people to engage in social change in the present (Bain, Hornsey, Bongiorno, & Jeffries, 2012; Bain, Hornsey, Bongiorno, Kashima, & Crimston, 2013). Although there are potentially endless ways to depict the future, Bain et al. (2013) suggest that most visions of the future involve references to the following basic dimensions: societal development, societal dysfunction, and individual traits and values. Additionally, Bain et al. (2013) argue that some of these collective future dimensions might form the “active ingredients” (p. 523) promoting support for social change in the present. Bain et al. (2013) conducted a meta-analysis of eight studies assessing individuals’ perceptions of different future scenarios. Although there was some variation across scenarios, in general, the strongest predictor of current intentions to engage in social change was the expectation that a future society would have more warm and caring people.

The relationship between future dimensions and current support for social change has implications for message framing and advocacy strategies. Bain et al. (2012) investigated whether framing climate change policies in terms of increasing benevolence in the future could stimulate support for these policies in individuals sceptical about climate change. Participants read a paragraph describing the future in one of three ways: the potential negative outcomes of climate change, the effect of climate change policies on improving warmth in society, or the effect of these policies on increasing societal development. Participants then rated their willingness to support climate change policies. The warmth and development future frames resulted in more pro-environmental intentions than the real/danger frame, and this effect was particularly strong for climate change sceptics (Bain et al., 2012). The authors

concluded that for this audience, it may be more useful to focus on the potential positive societal outcomes of pro-environmental policies (such as increased warmth and development in society) rather than attempting to convince them of the threat of climate change.

In addition to positive visions of future society, beliefs about the way that society is most *likely* to develop also appear to play a role in motivating support for social change (Kashima et al., 2009). Individuals in Western societies generally understand social change as the linear development from traditional society to modern society; a belief that has been labelled the “folk theory of social change” (Kashima et al., 2009, p. 227). More specifically, there is a perception that traditional societies tend to display more interpersonal warmth, but less competence, whereas modern societies are perceived as more competent, but less warm. Kashima et al. (2009) identified that, for individuals who believed that policies can influence society, the perception that a future modern society would be less communal was associated with greater support for policies that promoted communality. Increasing theoretical developments such as the work by Kashima et al. (2009) and Bain et al. (2013) have contributed to our understanding of when and why visions of the future can motivate current support for social change across different contexts. An area that is yet to be explored is visions of the future involving large-scale shifts in dietary behaviours.

We would suggest that utopian visions of future society may play a role in shaping attitudes towards plant-based, vegetarian and vegan diets in Western cultures. In Western utopian literature, vegetarianism (or the condemnation of animal slaughter) has appeared several times as an underlying theme; for example, in Thomas More’s *Utopia* (More & Baker-Smith, [1869] 2012), H. G. Wells’ *Modern Utopia* (Wells &

Sullivan, 1905), and Charlotte Perkins Gilman's *Herland* (Gilman, [1915] 1979).

Vegetarian utopias are often attributed characteristics such as better relationships with animals, lower rates of violence, increased support for feminism, and individuals with greater control over animalistic instincts and higher levels of purity (Belasco, 2006).

However, vegetarianism can also be imagined as the outcome of a dystopian future.

For example, Parry (2009) discusses Margaret Atwood's dystopian novel, *Oryx and Crake*, in which the future population consists of a new engineered type of human who is effectively vegetarian. Parry (2009) suggests that the author constructs the few remaining 'real' humans (in contrast to the 'new' humans) as *naturally* desiring meat.

Therefore, a vegetarian future society can be constructed as a positive natural development of humanity, or alternatively, as an undesirable, unnatural development.

How do individuals in meat-centred Western cultures envision the future of meat consumption? Vinnari and Tapio (2009) surveyed beliefs about the future of meat consumption among 177 consumers and 39 experts in Finland. Although most participants reported an expectation of business as usual (in which no major changes to levels of meat consumption were expected), a small number of participants anticipated that there could be widespread vegetarianism in the future. Potts and White (2008) interviewed vegetarians and cruelty-free consumers in Aotearoa New Zealand about their perceptions of the future of animal agriculture in the nation. Participants reported pessimistic, pragmatic and utopian visions of the future, including predictions of better animal welfare, a shift to crop-based farming, or even the outlawing of meat consumption (Potts & White, 2008).

Aotearoa New Zealand is an interesting context in which to examine visions of plant-based future societies. There is a strong historical and contemporary emphasis on

animal agriculture and meat consumption, primarily linked to European colonisation and the current productivist emphasis on pastoral farming (Potts & White, 2008; Rosin, 2013). Sinclair (1986) suggests that for early European colonists, “‘breaking in’ the land [to cultivate pastures for agriculture] was seen as central to the process of building a nation”. In contrast, Māori indigenous food systems tended to be based on the values of *kaitiakitanga* (kinship with and guardianship over the natural environment; Selby, Moore, & Mulholland, 2010). Given the emphasis on animal agriculture and meat consumption, it is not surprising that vegetarianism has been suggested to be contrary to the values and traditions associated with the myths of the dominant national identity (Potts & White, 2008). The current study explored visions of vegetarian, vegan, and plant-based future NZ societies, and examined the relationships between visions of the future and current support for social change.

The current study employed a convergent parallel mixed methods design, via the use of a questionnaire that included both open and closed-ended items (Teddlie & Tashakkori, 2009). In this research design, the responses to the open-ended item allowed for a richer understanding of perceptions of the different future scenarios, while the closed-ended items allowed for statistical tests of the relationships among variables (Teddlie & Tashakkori, 2009). The qualitative and quantitative analyses were linked in the overall discussion section by examining how the quantitative results could be understood in more depth by reference to the qualitative findings.

Attitudes towards vegetarians tend to be mixed; for example, a recent study based in the US found that nearly half of the participants freely associated a negative word with vegetarians (Minson & Monin, 2012). Some advocacy organisations have therefore employed the term ‘plant-based’ instead of ‘vegetarian’ or ‘vegan’ in their

advocacy because they argue that this term is less threatening (Lea, Crawford & Worsley, 2006; Maurer, 2002). To explore whether these labels communicate different future societal outcomes to participants, the current study employed an experimental between-subjects design, where the future frame label was the independent variable with four levels: control (in which participants were simply asked to imagine the future), plant-based future (where almost all people consume plant-based diets), vegetarian future (where almost all people are vegetarian), or vegan future (where almost all people are vegan). Participants were randomly assigned to one of the four conditions via a function of the software utilised to present the survey.

The specific research questions for the study were:

- What dominant themes emerge when participants imagine a future NZ society in which most of the population consumes plant-based, vegetarian, or vegan diets?
- For participants who are not currently vegetarian or vegan, which collective futures dimensions are the best predictors of current support for social change towards plant-based diets?

## 2. Method

### 2.1 Participants

Participants were 506 first-year psychology students who completed the survey voluntarily in exchange for course credit. There were 351 females (69%) and 155 males (30.5%), who ranged in age from 17 to 43 ( $M = 19.21$ ,  $SD = 2.43$ ). The majority of the sample identified as NZ European (70.7%), and 6.3% identified as

Māori. Two participants identified as vegan (0.4%), 29 participants identified as vegetarian (5.7%), 11 participants reported they did not eat meat (2.2%), and 434 participants (85.3%) reported that they ate meat (33 participants did not answer this question).

## 2.2 Measures

**Demographic items** Participants provided information about their gender, age, ethnicity and dietary identification. Dietary identification was indicated by selecting one of the following options: 1 (*I eat meat*), 2 (*I don't eat meat*), 3 (*I'm vegetarian*), or 4 (*I'm vegan*).

**Imagining a future New Zealand (open-ended item)** Four different future frames were employed for the open-ended question: a) Think about New Zealand society in 2050; b) Think about New Zealand society in 2050, where almost all people consume primarily *plant-based diets*; c) Think about New Zealand society in 2050, where almost all people are *vegetarian* and do not consume meat, chicken or fish (but may still consume dairy and eggs); d) Think about New Zealand society in 2050, where almost all people are *vegan* and do not consume any animal products, such as meat, dairy, or eggs. According to responses to the open-ended item, 111 participants were assigned to the general future frame, 123 to the plant-based future frame, 119 to the vegetarian future frame and 117 to the vegan future frame (39 participants did not answer this question). Instructions for this item were: “Spend a minute thinking about how this future would be different from today, and then write a short paragraph summarizing your initial thoughts”. Participants were provided with space to write their vision.

**Likelihood of the future scenario** Participants indicated how likely it was that the future they had been asked to imagine would actually occur. Responses were recorded on a single item scale ranging from 1 (*Not at all likely*) to 7 (*Very likely*).

**Collective futures dimensions** There were nine collective future dimensions based on 46 items created by Bain et al. (2013; an updated version of the items was provided by P. Bain, personal correspondence, June 11, 2013, see Appendix A). Three dimensions pertained to the individual traits of Warmth (six items), Morality (six items), and Competence (six items). Participants indicated whether they thought these traits would be more or less typical in the future, on a scale from -5 (*Much less typical*) to 5 (*Much more typical*). Four dimensions pertained to Schwartz's (1992) values of Conservation (three items), Self-Enhancement (three items), Openness to Change (three items), and Self-Transcendence (three items). Participants indicated whether they thought these values would be more or less important in the future, on a scale from -5 (*Much less important*) to 5 (*Much more important*). Two dimensions measured the societal characteristics of Dysfunction (seven items) and Development (eight items). On these scales, participants indicated whether they thought each societal characteristic would be more or less common in the future, on a scale from -5 (*Much less common*) to 5 (*Much more common*). Consistent with Bain et al. (2013), reliabilities for the future dimensions scales ranged from .65 to .88, with the exception of Self-Enhancement (for which reliabilities ranged from .44 to .54). As Cronbach's alpha can be highly impacted by the length of the scale, we also report the mean inter-item correlations for the dimensions with only three items: .40 for Conservation (Cronbach's alpha of .66), .28 for Self-Enhancement (Cronbach's alpha of .54), .71 for Openness to Change (Cronbach's alpha of .88), and .71 for Self-Transcendence

(Cronbach's alpha of .88).

**Policy support for plant-based, vegetarian, and vegan diets** Six items measured support for governmental policies promoting plant-based, vegetarian, or vegan diets: "I would support governmental policies that promote *plant-based* diets", "I would support governmental policies that promote *vegetarian* diets", "I would support governmental policies that promote *vegan* diets", "I would support policies to increase the availability of *plant-based* food options in schools, cafeterias, hospitals, and prisons", "I would support policies to increase the availability of *vegetarian* food options in schools, cafeterias, hospitals, and prisons" and "I would support policies to increase the availability of *vegan* food options in schools, cafeterias, hospitals, and prisons" (all six items were presented to all participants, rather than being matched to conditions). Responses were made on a scale from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The reliability of this scale ranged from .87 to .89 across the four future frames.

### 2.3 Procedure

The survey was presented to participants on a computer during their first tutorial of a first-year psychology course, as part of a mass testing program. The survey was also available online for participants who did not attend the tutorial. Ethical approval for the study was granted by the School of Psychology Ethics Committee at Victoria University of Wellington. Participants read a consent form and provided their consent before continuing on to the survey. Participants first provided demographic information, and were then randomly assigned (via a function in the software programme) to answer a survey tailored to one of the four future frames. At the beginning of the survey, participants spent a few minutes imagining the future scenario,

and provided a short paragraph summarizing their thoughts on how this future might be different from today. Participants then rated the future society on the nine collective futures dimensions (Bain et al. 2013), and completed items measuring their support for policies promoting plant-based diets.

### **3. Results**

#### **3.1 Thematic Analysis: Imagining Plant-Based Future Societies**

The thematic analysis involved searching for recurring themes or patterns across responses to the open-ended survey item (Braun & Clarke, 2006). Of the 506 participants, 470 (92.5%) completed the open-ended survey item. After excluding participants in the control frame (as their responses were not specific to plant-based, vegetarian, or vegan futures), the sample size for the qualitative analyses was 371. The length of written responses ranged from one to 230 words, and most participants wrote three to four sentences. The qualitative survey responses were imported into the qualitative software, NVivo 10, for analysis.

The thematic analysis was approached from a realist epistemological position (Braun & Clarke, 2006). The initial step of the analysis involved reading through the data looking for general patterns, and recorded initial thoughts in a log book. The data was then coded systematically at the semantic level, examining the surface meanings in participant responses. Codes were developed in an inductive bottom-up approach; however, the coding was also somewhat theoretically driven, in that responses were expected to be related to the collective future dimensions proposed by Bain et al. (2013). The analysis was a recursive process, where codes were created and then refined as the analysis went along. The entire dataset was coded, and then these codes

were grouped into themes. In deciding what ‘counts’ as a theme, the first author took into account the number of times a theme appeared in the dataset, as well as whether the theme contributed something important in relation to the research question (Braun & Clarke, 2006). Braun and Clarke (2013) generally discourage the use of numbers or proportions when reporting themes in pattern analyses, and instead suggest that researchers explain the terms that they use to indicate the strength of a theme across the dataset. Therefore, for the following analyses, the description ‘a large number’ indicates that between 100 and 150 responses were categorised as mentioning that theme. ‘Many’ indicates between 50 and 100 responses, while ‘some’ indicates between 25 and 50 responses. ‘A few’ indicates between 10 and 25 responses, while ‘a small number’ indicates less than 10 responses.

For the following discussion, the dominant themes have been separated into two main sections: themes regarding societal development or dysfunction, and themes regarding changes to individual traits or values in society. Due to the experimental manipulation, participants imagined slightly different future scenarios (i.e., vegetarian, vegan, or plant-based futures). However, during the analysis it became apparent that there was a great deal of similarity in the responses and dominant themes across the future frames. Therefore, the codes were merged, and in the following analysis the plant-based, vegetarian, and vegan societies are referred to more generally as ‘plant-based future societies’ (highlighting points of divergence where appropriate). Five themes were identified, and these are described in the following section.

### **3.1.1 Changes to public health**

The most prevalent theme in the dataset concerned changes to public health in plant-based future societies. This theme was present in almost half of the responses provided by participants. A large number of participants reported that animal products were important for health, or were the only source of some essential nutrients, and therefore populations of plant-based future societies would be less healthy (this notion was especially frequent in comments regarding a vegan society). Predicted negative health outcomes included individuals becoming fatigued, weaker, less muscular, more vulnerable to disease, less intelligent, and emotionally unstable. A small number of participants foresaw particularly pessimistic consequences, such as declines in life expectancy, increases in infertility, and even the extinction of the human species.

#### Extract 1

The population of New Zealand would, on the whole, be weaker and more vulnerable to sickness and injury. This is because of the basic need of humans to consume animal products in order to get muscle and bone strength and also to boost general immunity. (male, 20, eats meat, vegan future)

Some participants predicted that plant-based future societies would need to develop technological solutions in order to address widespread nutritional deficiencies. For example, some participants suggested that nutritional supplements would become a requirement in order to prevent malnutrition, or that plants would be genetically modified to provide essential nutrients. Some other participants predicted that physiological changes would need to occur before humans could survive solely on plant-based diets (this was described as ‘evolving’). Although a large number of participants predicted that plant-based future societies would negatively impact public health, many participants predicted that these populations would likely be *healthier*

than current society. Potential positive health outcomes included reductions in rates of obesity, cancer, heart disease, and diabetes. A few participants predicted improvements in energy levels, mental health, and life expectancy. A small number of participants also associated plant-based future societies with a reduction in the consumption of fast food and processed foods.

#### Extract 2

If everyone was vegan, i would think that the average living age for humans would grow. Less humans would be dying from obesity, diabetes, heart problems and other illnesses that are caused by dairy and fatty products. We as the human race would be more healthier. (female, 18, eats meat, vegan future)

Although many participants predicted health improvements, a few of these participants still specified that these improvements would be *conditional* on the availability of nutritional supplements. As previously described by Wilson, Weatherall, and Butler (2004) the impacts of plant-based diets on public health are frequently posed as a dilemma between potential positive outcomes and potential negative health outcomes. This was also the case in the current dataset; for example, many participants predicted a co-occurrence of positive outcomes (e.g. reduced obesity), but also negative outcomes (e.g. increased malnutrition).

### **3.1.2 Changes to the environment**

The second dominant theme concerned changes to the environment. This theme was present in approximately one third of the codes assigned to the dataset. Many participants envisioned a future with widespread environmental degradation, predominantly resulting from increasing urbanisation and the overconsumption of

resources. A small number of these participants hypothesised that plant-based future societies may have developed out of necessity, because environmental degradation had caused the animals that are currently consumed by humans to become extinct.

Extract 3

I think that a main reason for people to be eating plant based diets would be because millions of species will be becoming extinct due to climate change and a lack of resources to keep these animals alive. (female, 18, eats meat, plant-based future)

Some participants predicted that plant-based societies would result in an *overpopulation* of farmed animals. A small number of these participants explicitly described plant-based future societies as upsetting the food chain and damaging ecosystems. These comments appeared to imply that humans play a role in maintaining the current balance of ecosystems, by consuming farmed animals. A small number of participants also expected there would likely be food shortages and starvation, because excessive amounts of plants would be required in order to feed the growing populations of humans and animals in plant-based future societies (this concept could be linked to the perceptions of the nutritional inadequacy of plant-based diets, as mentioned in section 3.1.1).

Extract 4

The world would be overpopulated by animal, leaving little plant life. Since there would be no point in killing animals for food, there would be an influx of domesticated farm animals i.e. cows and pigs, as today these have been bread

for food purposes. (female, 18, eats meat, vegan future)

In contrast to the predictions of negative environmental outcomes discussed above, some participants predicted that plant-based future societies could potentially *improve* the environment. Predicted positive outcomes included reductions in greenhouse gas emissions, increases in native habitats, the recovery of endangered species populations, increases in land available for growing food, and more sustainable societies.

#### Extract 5

There would be a lot less land need for rearing edible animals and it would instead be used for growing plants for food or replanting native species of plants in an attempt to restore the native environment. (male, 19, eats meat, vegan future)

As with the theme regarding changes in health, a small number of participants framed predicted environmental changes in plant-based societies as a dilemma, hypothesising that there was potential for both positive and negative environmental outcomes to occur from the widespread adoption of plant-based diets (potential environmental improvements were also sometimes pitted against potential reductions in human health). Although there is growing evidence to support the environmental benefits of plant-based diets over meat-based diets (e.g., Baroni, Cenci, Tettamanti, & Berati, 2006; Stehfest et al., 2009; Steinfeld et al., 2006), some participants suggested that plant-based diets would be likely to have a *negative* impact on the environment. Therefore, there may be a need for more education regarding the environmental impacts of different dietary patterns.

### 3.1.3 Changes to the economy and the dominant NZ culture

The third dominant theme involved predicted changes to the NZ economy and dominant culture. This theme was mentioned in around a quarter of the codes across the dataset. Many participants expressed concern that the widespread adoption of plant-based diets would reduce exports of animal products and negatively impact the NZ economy, resulting in poor societal outcomes such as higher rates of poverty and unemployment. However, a few participants hypothesised that future societies would adapt to prevent the expected economic decline, via farmers converting from animal agriculture to producing crops, a shift towards the technology sector, or increased diversification of the economy. A small number of participants proposed that animal products might continue to be exported to the rest of the world, if solely NZ society adopted plant-based diets.

#### Extract 6

There would be more people out of jobs, such as dairy farmers, sheep and beef farmers, those in the freezing works and everyone else throughout the supply chain that makes it possible to get the food on to the shelves for New Zealanders to consume. The farming industry would die down and there wouldn't be an economic growth within NZ because majority of the income in New Zealand comes from farming and dairy. However if it was only the New Zealand society that went vegan, we would be able to produce more dairy and animal products for the international market which could grow economy and mean more international exposure. (female, 19, eats meat, vegan future)

Many of the comments regarding changes to the economy seemed to imply that

widespread plant-based diets are opposed to the collective national interests of Aotearoa New Zealand. Additionally, many comments implied a collective NZ identity via the use of words such as ‘our’, ‘we’, and ‘us’. Aotearoa New Zealand is a bicultural nation with multicultural influences (Liu, McCreanor, McIntosh & Teaiwa, 2005), and it is likely that some cultural groups have more plant-based dietary patterns than the dominant western diet. However, in the current study, the dominant NZ identity that participants referenced appeared to be strongly associated with the production and consumption of animal products. A small number of participants explicitly stated that plant-based futures would be unlikely because of the strong associations between meat and the dominant NZ culture.

#### Extract 7

I think that it wont happen to be honest, especially in New Zealand where our culture is so meat and animal based. (female, 18, eats meat ,vegetarian future)

Research suggests that perceptions of the cultural and historical collective continuity of the ingroup are associated with positive psychological outcomes (Sani, Bowe, & Herrera, 2008). In a small number of the comments in the dataset, it appeared that a plant-based future NZ society was interpreted as threatening the collective continuity of the ingroup, due to the historical myths associating meat consumption with the dominant national identity (Anderson, 2006; Bell, 1996).

#### **3.1.4 Individuals as more caring, peaceful and communal**

In addition to describing changes in societal development and dysfunction, many participants described changes to the traits and values of individuals in society.

The most common prediction in this theme (mentioned by some participants) was an expected increase in care and respect for the natural environment and animals. For a small number of participants, the expectation of the better treatment of animals in plant-based futures was associated with the development of a more peaceful society and the better treatment of other humans.

#### Extract 8

It will never happen. Why bother thinking about it? But if it does, NZ will be the first one to show the world that human species are expandable and transformable. There will be true peace and real freedom for any living things including human themselves as well as animals especially sheep and cattle in NZ farms. Life will be much more simpler and purer as a consequence of self-control and highly knowledgeable citizens. Somehow, it is going to be just a fake dream within a dream. (male, eats meat, 23, vegan future)

Some participants described individuals in plant-based futures as happier, kinder, more peaceful and more community-oriented, and suggested that life would be simpler and individuals would be more likely to ‘appreciate the smaller things in life’. Visions of a simpler, more communal society contained descriptions of individuals growing their own food and engaging in local trade (these values could be linked to the predictions of a more sustainable society mentioned in section 3.1.2).

#### Extract 9

This future would involve most or all people living lives which are concerned with nature and the environment. There would have to be some kind of unifying principles which guide this such as a strong sense and involvement of

community. (male, eats meat, 21, plant-based future)

If plant-based futures are viewed as simpler, more communal societies, perhaps this could be part of the reason why many participants described these futures as unlikely (i.e., perhaps plant-based futures do not fit within Western folk expectations of how the future is likely to develop; see Kashima, et al., 2009). However, the notion that individuals will become more community-oriented and collective in plant-based future societies is also a potentially useful concept for advocates of plant-based diets. Kashima et al. (2009) suggest that individuals who expect the future to be less communal (and who believe that policies can bring about social change), are more favourable to social policies that are likely to increase communality in society. Promoting increased communality through the growing and sharing of fruits and vegetables in plant-based futures could be a potentially effective strategy for advocating plant-based policies, especially for individuals who are concerned about a decline in communality in the future.

### **3.1.5 Individuals as more moral, judgemental and miserable**

Another theme involving changes to individual traits and values was predictions of individuals becoming more civilised and moral in the future. A small number of participants predicted changes to morality would occur in plant-based future societies, including individuals valuing good health, and becoming more civilised, purer, self-controlled, less violent or aggressive, and less greedy. However, the prediction that people would become more moral in plant-based futures was not always viewed as a desirable outcome. A small number of participants also imagined that individuals in plant-based future societies could be overly moralizing and judgemental of others who

eat meat.

Extract 10

Being vegetarian is usually a sign that you have a good conscience and are empathetic. This means NZ in 2050 will be quite a good place to live in.

Although, many vegetarians are also likely to be overly politically correct, and unfairly judgmental of those who eat meat. (male, 20, eats meat, vegetarian future)

Additionally, a few participants reported that they personally would miss meat and would not wish to live in a plant-based society, imagining a bleak, boring and tasteless future with miserable individuals.

Extract 11

First of all... that will never happen, well let's hope so. If it does... death would sounds better than that. Being a vegan it's almost sounds like being a robot.

Lack of freedom of choice. Death sounds more promising than vegan...

(female, 18, eats meat, vegan future)

In general, the valence of predictions regarding changes to individual traits appeared to be linked to participants' perceptions of *why* the widespread changes to dietary behaviour had occurred. Participants who foresaw the adoption of plant-based diets as voluntary and arising from associated widespread changes in values and social norms predicted more positive traits in individuals. Participants who foresaw plant-based futures as arising from necessity or force, rather than voluntary choice (e.g. as involving a potentially totalitarian society with restrictions to personal freedom)

predicted more negative traits.

### **3.1.6 Summary of the thematic analysis**

The open-ended item asking participants to imagine a plant-based, vegetarian, or vegan NZ society in 2050 resulted in a wide variety of predictions regarding the nature of these future societies. Responses ranged from utopian to dystopian visions of the future, as well as predictions of no change at all, and tended to include both societal and individual themes. A large proportion of participants framed their responses as a dilemma between potentially positive and potentially negative outcomes. While the current thematic analysis provided an illustration of the various potential outcomes associated with plant-based futures, it was not possible to identify which of these outcomes were most strongly associated with support for social change to bring about these futures. This was the focus of the quantitative section of the current research, which investigated the collective futures dimensions (Bain et al., 2013) as potential predictors of support for plant-based policies.

## **3.2 Quantitative Analyses: Collective Future Dimensions and Support for Social Change**

The following analyses tested the collective futures framework in the context of plant-based future societies. Based on the research by Bain et al. (2013), it was hypothesised that in the plant-based, vegetarian, and vegan future frames, the strongest predictor of current support for plant-based policies would be an expected increase in benevolence in society (i.e., increased warmth and morality). It was also predicted that there would be no relationship between the predictors and policy support in the control

condition.

### 3.2.1 Data preparation and descriptive statistics

For the following quantitative analyses, the sample was limited to participants who reported that they ate meat ( $n = 424$ ), as we were primarily interested in investigating the perceptions of individuals who were not currently vegetarian or vegan. An alpha level of .05 was employed for all statistical tests. The analyses followed the analytic approach previously employed by Bain et al. (2013). The means and standard deviations for the collective future dimensions in each future frame can be found in Table 1. On average, participants expected that traits of warmth, competence, and morality would be more typical in plant-based, vegetarian, and vegan futures than in present-day society. They also expected that there would be greater importance placed on self-enhancement, openness to change, and self-transcendence, while the value placed on conservation was not expected to change. Plant-based, vegetarian, and vegan futures were expected to have increased levels of development, but similar levels of dysfunction to present-day society.

Table 2 also presents the results of planned comparisons between the plant-based future frames and general beliefs about the future of society (the control frame) on each of the collective futures dimensions. In general, traits of warmth and morality were expected to be more typical in plant-based futures compared to participants' general beliefs about the future. Additionally, it appeared that plant-based futures were expected to preserve conservation values (that were otherwise expected to decline), and to result in relatively less importance placed on self-enhancement values. It also appeared that plant-based futures were expected to prevent expected increases in dysfunction, but also result in relatively lower levels of development. The zero order

and partial correlations between the collective futures dimensions and plant-based policy support can be seen in Table 3.

### **3.2.2 Perceived likelihood of the future scenario**

A one-way between-subjects ANOVA was conducted to compare the effect of future frame condition on the perceived likelihood of the future occurring. Levene's test indicated that the variances were unequal,  $F(3,419) = 7.74, p < .001$ , therefore a Welch test with adjusted degrees of freedom was employed. This test indicated a significant difference between the frames,  $F(3,232.19) = 42.93, p < .001$ . Post-hoc Games-Howell tests indicated that participants perceived the control future frame ( $M = 4.41, SD = 1.22$ ) as significantly more likely to occur than a plant-based future ( $M = 3.05, SD = 1.66$ ), a vegan future ( $M = 2.66, SD = 1.48$ ), and a vegetarian future ( $M = 2.55, SD = 1.56$ ). There were no other significant differences between the plant-based, vegetarian, or vegan futures on this measure.

### **3.2.3 Predictors of current support for social change**

Following Bain et al. (2013), multiple linear regressions were employed to test the hypothesis that increased warmth and morality in the future would be the strongest predictors of current support for plant-based policies. Prior to the multiple linear regression analyses, the dataset was split between the future frames so that separate regression models would be obtained for each future frame. The predictors were the collective futures dimensions (Bain et al. 2013), and the outcome variable was Policy Support (the average of the six items measuring support for policies promoting plant-based, vegetarian and vegan diets). The predictors were included in the regressions in three clusters based on traits (Warmth, Competence, Morality), values (Conservation,

Self-enhancement, Openness to change, Self-transcendence), and societal characteristics (Dysfunction, and Development).

The results from the multiple regression analyses differed across the four future frames. As expected, in the control future frame, the collective futures dimensions did not explain a significant amount of the variance in policy attitudes, (traits:  $R^2 = .02$ ,  $F(3,97) = .48$ ,  $p = .70$ , values:  $R^2 = .28$ ,  $F(4,94) = .67$ ,  $p = .61$ , societal characteristics:  $R^2 = .03$ ,  $F(2,98) = 1.61$ ,  $p = .21$ ). In contrast, several of the multiple linear regressions for the plant-based, vegetarian and vegan future frame were significant. The parameter estimates and model statistics for these future frames can be seen in Table 4.

In the regression models for the vegetarian future, the most significant predictor of policy support appeared to be societal dysfunction. Therefore, when participants imagined a mostly-vegetarian future society, the strongest predictor of current support for plant-based policies was an expected decrease in societal dysfunction (or alternatively, a predicted increase in dysfunction was the strongest predictor of decreased support for plant-based policies). In the regression models for the vegan future frame, the strongest predictor of policy support was an expectation of increased warmth the future (or alternatively, an expectation of decreased warmth in a vegan future predicted decreased support for plant-based policies). In the vegan future frame, morality was also a significant predictor of support for plant-based policies, in the opposite direction to warmth.

Bain et al. (2013) have debated whether warmth and morality are separate dimensions, or whether they should be merged under the collective term of benevolence, as most previous studies have found that both warmth and morality tended to be highly correlated and positively associated with support for social change.

For most of the regressions, tolerance and VIF tests indicated that multicollinearity was not a major concern (the VIF scores were  $< 2.5$  and tolerance scores were  $> .1$ ; Field, 2009). However, for the regressions involving traits, the VIF scores for Warmth in the plant-based (4.54), vegetarian (5.37) and vegan (3.30) future frames was slightly higher than desirable (Field, 2009, suggests that this value should be less than 10, but numbers over 5 may also be a cause for concern). This finding, in combination with the small sample sizes and the high correlation between the Warmth and Morality scales, implies that multicollinearity between these two predictors could be a concern. Additionally, the zero-order correlation for morality was not significant, and the effect only emerged after controlling for Warmth and Competence (see Table 3). It is therefore possible that the significant negative relationship between morality and policy support in the vegan future frame was a spurious outcome due to multicollinearity.

#### **4. General Discussion**

The aim of the quantitative section of the study was to examine which collective future dimensions of plant-based, vegetarian, and vegan futures best predict support for policies that might bring about those futures. It was hypothesised that increased warmth in society would be the strongest predictor of support for plant-based policies in the plant-based, vegetarian, and vegan future frames (but not in the control frame). The hypothesis was partially supported, as the expectation of increased interpersonal warmth was the strongest predictor of policy support in the vegan future frame. This result is consistent with the findings of Bain et al. (2013), who identified that benevolence in the future was generally the strongest predictor of current support for social change.

In the vegetarian future frame, the strongest predictor of policy support was an

expected decrease in societal dysfunction. Bain et al. (2013) also identified reduced societal dysfunction as a strong predictor in several of their studies. Drawing from the qualitative analysis of the current study, it appears that vegetarianism may be viewed as likely to reduce dysfunction primarily in terms of improving health and reducing environmental degradation. An alternative explanation for the current findings is that widespread vegetarianism may have been viewed by some participants as likely to increase societal dysfunction (and this was associated with reduced support for plant-based policies). Again, drawing from the qualitative analyses, an expectation of increased societal dysfunction in a vegetarian future may have involved perceptions of threats to the economy, or increasing rates of malnutrition.

In the vegan future frame, the strongest predictor of current support for plant-based policies was an expectation of increased warmth in individuals. Drawing on the responses to the open-ended item, it could be argued the perception of increased warmth in a vegan future was linked to the reported associations between veganism and increased care for animal and nature (or alternatively, perceptions of decreased warmth in a vegan future may have been associated with decreased support for policies). In the vegan future frame, morality also appeared to be a negative predictor of policy support; however, this finding may have been due to multicollinearity between the warmth and morality predictors (as discussed in the Results section). Future research employing larger sample sizes would be useful for clarifying these relationships.

The apparent differences between the vegetarian and vegan frames may be due to more general differences in attitudes towards these labels. While views on vegetarianism have improved over recent decades and it is now often viewed as a

healthy dietary option (Maurer, 2002), veganism may still imply restriction, deficiency and even extremism (as illustrated by some of the comments in the qualitative analysis). Therefore, it is possible that vegetarian futures are viewed as reducing dysfunction in terms of improving public health, but vegan futures are not viewed in the same way. Negative attitudes towards the label ‘vegan’ may also provide an alternative explanation for the association between increased morality and reduced support for social change in the vegan future frame. Based on the qualitative findings, it is possible that increased morality in a vegan future is viewed negatively (i.e. as implying a ‘strict’ or ‘controlling’ form of morality), and is therefore associated with decreased support for social change.

As predicted, in the control frame, the collective futures dimensions were not associated with the measure of support for social change. However, contrary to the hypothesis, the collective futures dimensions also did not predict policy support well in the plant-based future frame. There are several possible explanations for the non-significant regression models in the plant-based future frame. Firstly, there may have been insufficient power to detect an effect in this condition (Field, 2009). Field (2009) suggests that the minimum sample size for examining individual predictors is  $104+k$ . However, several of the sample sizes in the current study did not reach this target. Secondly, it is possible that the ‘plant-based diet’ label may simply not have had connotations of wider effects on society, unlike the vegetarian and vegan labels. For example, the term ‘plant-based’ may be interpreted predominantly as an individual dietary behaviour, whereas the terms ‘vegetarian’ and ‘vegan’ may be associated with a particular set of values, beliefs and worldviews, that are seen as more likely to impact society. Alternatively, the term ‘plant-based diet’ may have had an ambiguous

meaning, implying a vegetarian diet to some individuals, and a diet containing small amounts of meat to others. Future research should include measures of familiarity with the terms plant-based, vegetarian and vegan.

#### **4.1 Limitations and future directions**

A potential limitation to the current study is that the items for the dependent variable were all worded in the same direction (a higher score indicating stronger agreement). This is problematic because of the potential for acquiescence response bias (Paulhus, 1991), and future research should develop a dependent measure of support for social change that includes both positively-worded and negatively-worded items. Additionally, it should be noted that the self-enhancement scale exhibited low reliability. However, this result may have been due to the limited number of items in the scale, and it appeared that the mean inter-item correlation for the scale was of reasonable size (Giles, 2002).

Caution should be taken in generalizing the findings of the current study, as it was based on a convenience sample consisting of first-year psychology students in Aotearoa New Zealand. This type of sample is often described as one of the “least representative populations” in the world (Henrich, Heine, & Norenzayan, 2010, p. 61). However, it is likely that the current findings would be able to be extended to other countries that also have a high emphasis on meat consumption, such as Australia, the US, and some South American countries. Perceptions of plant-based future societies are also likely to vary considerably between cultures. For example, research has identified that moral motivations for vegetarianism vary significantly between Canada and India (Ruby, Heine, Kamble, Cheng, & Waddar, 2013). It would therefore be useful to replicate this research in a more representative sample, and in non-Western

populations. Future research could include a cross-cultural investigation of perceptions of plant-based future societies, comparing cultures with high meat consumption, with cultures with low meat consumption.

On average, plant-based, vegetarian, or vegan future NZ societies were rated as having a significantly lower likelihood of occurring compared to the control condition (where participants simply imagined the future of their society). Additionally, many of the responses to the open-ended item described plant-based futures as ‘highly unlikely’. Given that the overwhelming majority of NZ society currently consumes meat and animal products, and that the production of these products is considered a significant part of the economy, it is possible that this time frame would have been too short to be viewed as plausible by participants. Future research may benefit from employing a longer time period.

## **4.2 Applications**

While it is useful to advocate the health and environmental benefits of plant-based diets, the responses in the quantitative section suggest that many participants in the current study were not convinced that plant-based diets were actually healthy or good for the environment. Many participants framed these outcomes as dilemmas. Perhaps, as Bain et al. (2012) recommended for climate change advocacy, it would be more useful to avoid the debates regarding the evidence for the impacts of plant-based diets on health and the environment, and instead focus on the potential positive societal outcomes that could result from the widespread adoption of plant-based diets (such as increased warmth in society). In future research, the results of the current study could be extended to design an experimental manipulation examining whether framing plant-based futures in terms of reducing dysfunction or increasing warmth in society

increases current support for policies supporting plant-based diets.

Consistent with the suggestions of Potts and White (2008), the comments in the qualitative section appeared to demonstrate associations between farming, meat consumption, and patriotism in Aotearoa New Zealand. If the associations between the national identity and meat consumption are robust, it may be more effective to downplay the national identity when advocating plant-based diets. Alternatively, it may be useful to emphasise aspects of the national identity that are consistent with the adoption of plant-based diets. Some potential opportunities for framing plant-based diets as consistent with the NZ identity were suggested by participants in the study by Potts and White (2008), including an emphasis on a close relationship with nature, and being open-minded and independent thinkers. These themes were also identified in some of the responses of participants in the current study.

### **4.3 Conclusion**

In Western contexts, plant-based diets are typically discussed in terms of individual behaviour or lifestyle choices. However, the current study demonstrated that many individuals associate the widespread adoption of plant-based diets with a range of wider societal outcomes. The qualitative section of the current study provided a rich illustration of the societal benefits and risks that participants associated with plant-based, vegetarian, and vegan futures, while the quantitative analyses provided evidence regarding which collective future dimensions most strongly predicted current support for plant-based policies across different future frames. The findings of the qualitative and quantitative analyses in combination demonstrated that even individuals who are not currently vegetarian or vegan can perceive positive outcomes to result from the widespread adoption of plant-based, vegetarian, or vegan diets (although many

individuals viewed plant-based futures as relatively unlikely to occur in the context of Aotearoa New Zealand). Future research may test whether manipulating the salience of increased warmth or reduced dysfunction in plant-based futures can increase support for social change towards plant-based diets.

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Table 1

*Means and Standard Deviations for Collective Future Dimensions in Control, Plant-Based, Vegetarian, and Vegan Futures (compared to Today)*

Future Frame	Traits				Values		
	Warmth	Competence	Morality	Conservation	Self-enhancement	Openness to change	tran
Control	-.22 (1.66)	.56*** (1.47)	-.30* (1.38)	-.65** (1.91)	1.69*** (1.57)	1.48*** (1.93)	
Plant-based	.78*** (1.67)	1.00*** (1.50)	.62*** (1.65)	.12 (2.06)	1.00*** (1.55)	1.23*** (2.22)	
Vegetarian	.63*** (1.58)	.52*** (1.19)	.37* (1.54)	.12 (1.76)	.57*** (1.53)	.87*** (2.16)	

Vegan	.41*	.56***	.51**	.07	.79***	.67**
	(1.73)	(1.35)	(1.60)	(1.75)	(1.55)	(2.14)

Note: Significance values indicate that the average score was significantly different from the 'same as today' midpoint of zero.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 2

*Means and Standard Deviations for Collective Future Dimensions in Plant-Based, Vegetarian, and Vegan Futures (compared to Control Frame)*

Future Frame	Traits				Values		
	Warmth	Competence	Morality	Conservation	Self-enhancement	Openness to change	transformation
Control	-.22 (1.66)	.56 (1.47)	-.30 (1.38)	-.65 (1.91)	1.69 (1.57)	1.48 (1.93)	
Plant-based	.78*** (1.67)	1.00* (1.50)	.62*** (1.65)	.12** (2.06)	1.00** (1.55)	1.23 (2.22)	
Vegetarian	.63*** (1.58)	.52 (1.19)	.37** (1.54)	.12** (1.76)	.57*** (1.53)	.87* (2.16)	
Vegan	.41** (1.73)	.56 (1.35)	.51*** (1.60)	.07** (1.75)	.79*** (1.55)	.67** (2.14)	

Note: Significance values indicate that the average score was significantly different from the Control future frame score for that dimension.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 3

*Zero Order and Partial Correlations between Collective Future Dimensions and Plant-Based Policy Support*

Future Frame	Dysfunction		Development	
	Zero order	Control for development	Zero order	Control for Dysfunction
Control	.16	.18	.04	.09
Plant-based	-.25*	-.24*	.10	.07
Vegetarian	-.47**	-.45***	.23*	.16
Vegan	-.05	-.05	.20*	.20*

Future Frame	Warmth		Competence		Morality	
	Zero order	Controlling for Comp & Moral	Zero order	Controlling for Warmth & Moral	Zero order	Controlling for Comp & Warmth
Control	.04	.12	-.02	-.03	-.03	-.11
Plant-based	.22*	.13	.21*	.09	.17	-.08
Vegetarian	.31**	.03	.32**	.19	.31**	.07
Vegan	.31**	.41***	.16	.05	.08	-.33**

  

Future Frame	Conservation		Self-Transcendence		Openness to Change		Self-Enhancement	
	Zero order	Controlling for other values	Zero order	Controlling for other values	Zero order	Controlling for other values	Zero order	Controlling for other values
Control	.10	.12	-.01	-.10	.07	.11	-.05	-.09
Plant-based	.25**	.21*	.12	-.14	.20*	.16	.12	-.06
Vegetarian	.30**	.21*	.08	.11	.18	.06	.08	-.08
Vegan	.13	.07	.20*	.05	.20*	.19	-.05	-.26**

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 4

*Predictors of Plant-Based Policy Support in the Plant-Based, Vegetarian and Vegan Future Frames*

Predictor	Plant-Based Future			Vegetarian Future			Vegan Future		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Warmth	.21	.16	.27	.05	.16	.06	.47	.10	.74***
Competence	.11	.12	.13	.22	.11	.21	.04	.09	.05
Morality	-.13	.16	-.16	.12	.16	.15	-.39	.11	-.56**
	$R^2 = .06, R^2_{Adjusted} = .03$			$R^2 = .13, R^2_{Adjusted} = .11$			$R^2 = .19, R^2_{Adjusted} = .17$		
	$F(3,101) = 2.14, p = .10$			$F(3,108) = 5.40, p = .002$			$F(3,104) = 8.11, p = .000$		
Conservation	.16	.07	.25*	.17	.08	.23*	.05	.07	.08
Self-enhancement	-.07	.12	-.09	-.09	.10	-.11	-.23	.09	-.32*
Openness	.19	.12	.31	.06	.09	.10	.16	.09	.31
Self-transcendence	-.14	.10	-.23	.09	.08	.15	.04	.09	.07
	$R^2 = .09, R^2_{Adjusted} = .05$			$R^2 = .12, R^2_{Adjusted} = .09$			$R^2 = .10, R^2_{Adjusted} = .07$		
	$F(4,100) = 2.49, p = .05$			$F(4,107) = 3.73, p = .01$			$F(4,102) = 2.92, p = .03$		
Societal dysfunction	-.16	.06	-.24*	-.36	.07	-.44***	-.03	.06	-.05
Societal development	.06	.09	.06	.11	.07	.14	.13	.06	.20*
	$R^2 = .07, R^2_{Adjusted} = .05$			$R^2 = .24, R^2_{Adjusted} = .23$			$R^2 = .04, R^2_{Adjusted} = .03$		

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$$F(2,102) = 3.57, p = .03 \quad F(2,109) = 17.48, p = .000 \quad F(2,105) = 2.44, p = .09$$

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\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Appendix A

*Words used for Collective Futures Dimensions (provided by P. Bain, personal correspondence, 11 June, 2013)*

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Traits

Values

Society

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	Warmth	Conservation	Dysfunction
	Caring	Respect for tradition	Homelessness
(R)	Unfriendly	Self-discipline	Global warming
Unsympathetic (R)		Family security	Poverty
	Warm		Gender inequality
	Insensitive	Self-enhancement	Suicide
(R)		Wealth	Depression
		Ambitious	Disease
Considerate		Pleasure	
			Development
	Competence	Openness to change	Major scientific discoveries
	Lazy (R)		Technological innovation
Independent		Enjoying life	Economic development
	Unskilled	An exciting life	Volunteering
(R)		Freedom	Community groups
	Capable		Healthcare standards
	Assertive	Self-transcendence	Financial wealth
Disorganized (R)		Equality	Science education
		Honesty	
		Social justice	
	Morality		
	Honest		
	Immoral		
(R)			
	Sincere		
	Deceitful		
(R)			
Trustworthy			
	Unfaithful		
(R)			

