Running head: ATTITUDES TOWARD VEGETARIANS AND VEGANS

A Dual-Process Motivational Model of Attitudes toward Vegetarians and Vegans

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Abstract

Vegetarians and vegans comprise a minority of most western populations. However, relatively little research has investigated the psychological foundations of attitudes towards this minority group. The following study employs a dual process model of intergroup attitudes to explore the motivational basis of non-vegetarians' attitudes towards vegetarians and vegans. Participants were 1326 individuals recruited through advertisements in a national newspaper in New Zealand. Non-vegetarian participants first completed measures of ideological attitudes and social worldviews, and then were randomly assigned to complete a measure of outgroup attitudes towards either vegetarians or vegans. Although non-vegetarians' attitudes towards both vegetarians and vegans were generally positive, attitudes towards vegans were significantly less positive than attitudes towards vegetarians, and male participants expressed significantly less positive attitudes towards both outgroups than female participants. The structural equation model predicting attitudes towards vegetarians and vegans fit the data well and explained a significant amount of the variance in attitudes.

Keywords: Vegetarianism, veganism, right-wing authoritarianism, social dominance orientation, dual-process model

A Dual-Process Motivational Model of Attitudes toward Vegetarians and Vegans

To date, most research on the psychological foundations of intergroup attitudes has focused on a fairly narrow range of salient group categories, such as ethnic identity, gender, or sexual orientation (Crandall & Warner, 2005; Dovidio, Newheiser, & Leyens, 2012). The aim of the current research was to apply a theoretical model of the motivational basis of intergroup attitudes to a more novel research target; individuals described in terms of their dietary practices and identification. This investigation also contributes to other recent attempts to understand the basis of attitudes towards vegetarians and vegans (e.g., Chin, Fisak & Sims 2002; MacInnis & Hodson, 2015; Minson & Monin, 2012; Ruby & Heine, 2011; Ruby, 2012; Ruby et al., 2016) and the associations between right-wing ideologies and higher levels of meat consumption (e.g., Allen, Wilson, Ng, & Dunne, 2000; Allen & Baines, 2002; Dhont & Hodson, 2014).

Vegetarianism in western cultures is generally defined as the voluntary practice of abstention from meat, which can be adopted for a variety of (potentially overlapping) motivations, such as a concern for personal health, animals, or the environment (Beardsworth & Keil, 1992; Beardsworth & Keil, 1997; Fox & Ward, 2008). A related but distinct concept is veganism, defined by The Vegan Society (n.d.) as “a way of living which seeks to exclude, as far as is possible and practicable, all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose”. While the labels of ‘vegetarian’ and ‘vegan’ can be interpreted as describing specific dietary behaviours, they may also be interpreted as distinct social identities associated with particular values and beliefs. It can be difficult to determine exact proportions of vegetarians and vegans due to the self-defined nature of the label and the various forms of vegetarianism (Ruby, 2012); however, it has been suggested that that vegetarians represent around 3-5% of the population in the United States, and vegans represent 1-2% of the population (Stahler, 2012). In Aotearoa New Zealand, where the

current research is located, one survey identified that 1.9% of the population identified as vegetarian, and just 0.2% identified as vegan (Sanitarium, 2009).

Veg*ans¹ therefore comprise a minority group in most western societies. However, they are distinct from more common target minority groups in psychological research, given that being veg*an is commonly assumed to be a personal choice, and veg*ans are not generally considered to be structurally disadvantaged (indeed, some research suggests that veg*ans may be favoured over other minority groups in scenarios such as housing allocations; MacInnis & Hodson, 2015). Veg*anism could even be viewed as a form of *positive* deviance, due to associations with virtuousness or improved health. For example, Ruby and Heine (2011) found that both omnivore and vegetarian perceivers tended to rate vegetarian targets as more virtuous than omnivorous targets, independent of the perceived healthiness of the diet (though this effect was greater for the vegetarian perceivers).

Although veg*anism may be viewed as a virtuous behaviour, there is also growing evidence of a negative bias towards veg*ans (e.g., MacInnis & Hodson, 2015; Minson & Monin, 2012). In one study, 47% of the participants freely associated at least one negative word with vegetarians (Monin & Minson, 2012). From the perspectives of veg*ans themselves, some individuals (particularly vegans) have reported experiencing decreased contact from friends, stigma and even discrimination since adopting veg*anism (Hirschler, 2011; MacInnis & Hodson, 2015; Potts & White, 2007; Potts & White, 2008). As noted previously by MacInnis and Hodson (2015), unlike other more salient minority groups, it currently appears somewhat socially acceptable to express a negative view of veg*ans, and

¹ The term “veg*an” is used as shorthand to describe both vegetarians and vegans (e.g., Cole, 2008)

this provides a unique opportunity to explore the psychological underpinnings of a bias towards a social group before it becomes widely unacceptable (see also Crandall & Warner, 2005).

What might motivate expressions of negativity towards veg*ans? One area of research has proposed that vegetarians are viewed as ‘do-gooders’ or ‘morally-motivated minorities’, who create feelings of threat due to unfavourable upward moral comparisons and expectations of personal moral reproach (Minson & Monin, 2012). Other research has proposed that veg*ans represent a symbolic threat to the status quo in western societies, and could be viewed as targets of prejudice (MacInnis & Hodson, 2015). Research on attitudes towards outgroups has identified two individual difference measures that consistently and powerfully predict a large amount of the variance in generalised prejudice: Right-Wing Authoritarianism (RWA), and Social Dominance Orientation (SDO) (Altemeyer, 1998; McFarland & Adelson, 1996; Pratto, et al., 1994). Although RWA and SDO *both* tend to predict prejudice towards outgroups, the two are usually only moderately correlated (Altemeyer, 1998; Duckitt, 2001; McFarland & Adelson, 1996; Pratto, et al., 1994).

Building on prior theory on RWA and SDO, Duckitt (2001) and colleagues proposed a Dual-Process Model (DPM) of ideology and prejudice, in which RWA and SDO are conceptualised as relatively independent ideological attitude dimensions representing two basic motivational goals (Duckitt, Wagner, du Plessis, & Birum, 2002). Duckitt (2001) suggested that these motivational goals develop from broad social worldviews that have been made chronically salient for particular individuals due to their social experiences and personality traits. A view of the world as a dangerous place leads to an emphasis on the motivation for social security and protection from threats, as opposed to individual freedom, which manifests as RWA. In contrast, a view of the world as a competitive jungle (where the strong succeed and the weak are defeated) leads to the motivation to maintain ingroup

dominance, as opposed to egalitarianism, which manifests as SDO (Duckitt, 2001). Social worldviews are suggested to be the mechanism that connects personality traits and experiences within social contexts, to the ideological attitudes of RWA and SDO (Perry, Sibley, & Duckitt, 2013). There has been considerable empirical support for the utility of the DPM in differentially predicting a variety of intergroup attitudes (e.g., Duckitt & Sibley, 2006; Duckitt & Sibley, 2009; Duckitt et al., 2002; Sibley, Wilson, & Duckitt, 2007). For example, Duckitt (2006) demonstrated that RWA, but not SDO, predicts negative attitudes towards deviant groups that threaten social conventions, such as drug dealers. In contrast, SDO, but not RWA, predicts negativity towards conventional but low status groups, such as housewives and beneficiaries. Both RWA and SDO predict negative attitudes towards groups seen as both deviant and challenging social hierarchies, such as feminists (these findings were also replicated in a later study; Duckitt & Sibley, 2007).

Not surprisingly, the DPM has yet to be tested in the prediction of attitudes towards groups based on their dietary practice and identification. Although MacInnis and Hodson (2015) demonstrated that RWA and SDO predicted increasingly negative attitudes towards vegetarians and vegans, their mediation analyses appeared to examine the effects of RWA, SDO, and political conservatism separately, rather than combining RWA and SDO in a single model predicting attitudes. Additionally, their measure of perceived vegetarian threat (based on research by Dhont & Hodson, 2014, see also Dhont, Hodson & Leite, 2016) which was proposed to mediate the relationship between right-wing ideologies and outgroup attitudes only partially mediated the relationship between SDO and outgroup attitudes, and also appeared to confound social threat (“vegetarianism poses a threat to our country’s cultural customs”) with economic threat (“vegetarianism has a negative influence on the [Belgian] economy”). It is therefore possible that there are two similar but distinct pathways predicting

attitudes towards vegetarians and vegans from ideological attitudes, which have not yet been demonstrated in the literature.

Drawing on the DPM, we propose that vegetarians and vegans are perceived as dissident, and therefore outgroup attitudes will be associated with both the motivation to maintain social stability (manifested as the ideological attitude items of the RWA scale) *and* the motivation to maintain group dominance (manifested as the ideological attitude items of the SDO scale). Firstly, veg*ans could be viewed as threatening social stability by challenging social norms regarding dietary practices and also challenging normative moral beliefs about the status of nonhuman animals (Joy, 2010). As mentioned above, an estimated 92-98% of the NZ population consumes meat (Sanitarium, 2009), and meat is central to many dominant NZ traditions (Potts & White, 2008). Additionally, meat and dairy exports are argued to form an integral part of the NZ economy (Statistics New Zealand, 2013), and have been associated with the dominant myth of the national identity (Potts & White, 2008). Therefore, veg*anism could be interpreted as a symbolic threat to cultural traditions (see also, Dhont, Hodson & Leite, 2016).

Secondly, veg*ans could be perceived as threatening group dominance, due to the perception that veg*ans challenge the legitimizing myth of human dominance over other animals, or “the idea the humans have the ‘right’ to rule the planet and all living creatures on it” (Sidanius & Pratto, 2004, p. 324). Anthropologists and theorists have argued that meat has traditionally been highly valued in western societies not just because of its high nutritional value, but also because of its potent symbolic associations with human dominance over nature (Adams, 1990; Fiddes, 1991; Twigg, 1979). Consistent with the argument that meat symbolises power and dominance, research has found that individuals who identify strongly as ‘omnivore’ (on a scale ranging from ‘omnivore’ to ‘vegan’) tend to value hierarchical social structures more than ‘weak’ omnivores and vegetarians (Allen, et al.,

2000); and that endorsement of right-wing ideologies predicts greater acceptance of animal exploitation and higher levels of meat consumption, even after controlling for hedonic pleasure from meat consumption (Dhont & Hodson, 2014).

Another explanation for the link between meat and dominance comes from feminist theorists, who have proposed that the practices of vegetarianism may symbolise a rejection of hegemonic masculinity and patriarchal structures (Adams, 1990). This proposition is supported by evidence that meat tends to be metaphorically associated with masculinity, and that vegetarian males tend to be perceived as less masculine than omnivorous males (Rozin, Hormes, Faith & Wansink, 2012; Ruby & Heine, 2011). It is possible that the association between meat and masculinity will result in men expressing relatively more negative attitudes towards veg*ans than women (although this may depend on the gender of the target; MacInnis & Hodson, 2015). Previous research has identified that men tend to express relatively more negative attitudes towards vegetarians than women (Chin, Fisak & Sims, 2002); however, few studies have explored gender differences in attitudes towards vegans. A gender difference in attitudes towards vegetarians and vegans may be partially explained by the tendency for men to express higher levels of SDO (e.g., Sidanius, Pratto, & Bobo, 1994).

At present, most research investigating attitudes towards dietary groups has focused on the categories of ‘omnivore’ or ‘vegetarian’ (e.g., Chin, Fisak & Sims 2002; Minson, & Monin, 2012; Ruby & Heine, 2011), while few studies have examined attitudes towards *vegans* specifically (for recent exceptions, see MacInnis & Hodson, 2015, and Thomas, 2016). If dietary behaviour is conceptualised as existing on a continuum from omnivore to vegan, vegans may be viewed as more ‘extreme’ than vegetarians and evaluated more negatively (as supported by recent research by MacInnis & Hodson, 2015). The current study extends the Attitudes Towards Vegetarians scale developed by Chin et al. (2002), by

constructing a separate measure of attitudes towards vegans in addition to a measure of attitudes towards vegetarians. Based on prior research, we propose the following hypotheses:

H1: Attitudes towards vegans will be less positive than attitudes towards vegetarians.

H2: Male non-vegetarians will express less positive attitudes towards both vegetarians and vegans than female non-vegetarians.

H3: The DPM will be a good fit to the data. More specifically, both RWA and SDO will predict increasingly negative attitudes to veg*ans; RWA will mediate the relationship between a dangerous worldview and increasingly negative attitudes towards veg*ans; and SDO will mediate the relationship between a competitive jungle worldview and increasingly negative attitudes towards veg*ans.

Method

Participants

Participants were 1326 individuals who ranged in age from 16 to 87 years ($M = 48.75$, $SD = 15.65$). The sample was 66% female; 86% identified as NZ European/Pakeha (5% NZ Maori, 7% Other European, 1% Chinese, 6.7% Other; participants were able to select more than one ethnic group) and 90% reported New Zealand as their nationality. The median level of education was one or more years of study towards a qualification at a polytechnic or university. Additionally, 36.6% had completed Bachelor's degree/ Trade Certificate/ Advanced Training, and 25% had completed a postgraduate degree. Therefore, the sample had disproportionately more females, more NZ European/Pakeha individuals and slightly more years of education on average than the general population (Statistics New Zealand, 2006). According to the survey item; "Are you currently vegetarian/vegan?" the sample was 94.6% non-vegetarian, 4.9% vegetarian, and 0.5% vegan. Participants were recruited by

advertising the survey in the Sunday Star Times (a nationwide newspaper and online news website in Aotearoa New Zealand), as part of a larger survey regarding topical social and political issues (Wilson, 2011). Ethical approval was gained prior to advertising the survey, and participation was emphasised as voluntary. Participants were provided with the option of reading a detailed information sheet prior to commencing the survey.

Measures

All of the scales included in the current study used a seven-point rating scale ranging from *strongly disagree* (1) to *strongly agree* (7), with the middle position described as *neither disagree or agree* (4). The reliabilities (and, in the case of the two-item Dangerous and Competitive Worldview scales, the inter-item correlations) can be found in Table 1. All scales displayed satisfactory reliabilities or satisfactory inter-item correlations.

Right-wing authoritarianism. Six items were selected from the 30-item RWA scale developed by Altemeyer (1981). The items selected were a balance of pro-trait and con-trait items, and included statements such as “Obedience and respect for authority are the most important virtues children should learn.”

Social dominance orientation. Six items (three pro-trait and three con-trait) were selected from the 16-item SDO scale developed by Pratto et al. (1994). Items included statements such as “Inferior groups should stay in their place”.

Dangerous worldview. A dangerous worldview was measured with the following two items from the Dangerous World Beliefs (DWB) scale (Duckitt, 2001): “Despite what one hears about “crime in the street,” there probably isn’t any more now than there ever has been”, and “There are many dangerous people in our society who will attack someone out of pure meanness, for no reason at all”.

Competitive-jungle worldview. The two items measuring a competitive jungle worldview (from the Competitive-Jungle World Beliefs scale; Duckitt, 2001) included: “It’s a dog-eat-dog world where you have to be ruthless at times.”, and “Life is not governed by the ‘survival of the fittest.’ We should let compassion and moral laws be our guide”.

Attitudes toward vegetarians. A 20-item Attitudes Towards Vegetarians (ATVegetarians) scale was developed, building on the 21-item ATVS created by Chin, Fisak and Sims (2002). More details and justifications for the changes made to the scale are provided in a footnoteⁱ. Higher scores on the ATVegetarians scale indicated a more negative attitude.

Attitudes toward vegans. A 20-item Attitudes Towards Vegans (ATVegans) scale was also constructed that was highly similar to the ATVegetarians scale. The only distinction between the two scales was that for the ATVegans scale, the word ‘vegetarian’ was replaced with ‘vegan’. This substitution meant that scores on the ATVegetarians scale could be directly compared with scores on the ATVegans scale. Higher scores on the ATVegans scale indicated a more negative attitude.

Procedure

The scales described above were included as a sub-section of the larger Sunday Star Times ‘BrainScan’ Survey (Wilson, 2011). The sub-section of the survey employed in the current study was available online on the SurveyMonkey website for a period of two weeks in September, 2011 (the larger survey was available online for a longer period). The ATVegetarians and ATVegans scales were administered using a between-subjects design. Participants were randomly assigned to complete either the ATVegetarians or the ATVegans scale. Following completion, participants were debriefed, thanked for their time, and

provided the option of contacting the authors if they had any questions regarding the research. Results of the survey were serialised in the Sunday Star Times over several weeks.

Results

An alpha level of .05 was used for all statistical tests. As the study was the investigating the basis of anti-minority attitudes, participants who identified themselves as vegetarian ($n = 64$), vegan ($n = 7$), or who did not answer this question ($n = 7$) were excluded from the following analyses. All con-trait items were reversed scored prior to the analyses.

Descriptive Statistics

Individual scores for the ATVegetarians and ATVegans scales were calculated by averaging responses across all items in each scale. As described in the Method section, higher scores on the outgroup attitude scales indicated a more negative attitude. One-tailed t-tests showed that attitudes towards vegetarians ($M = 2.92$, $SD = .90$) were significantly more positive than the neutral mid-point of 4, $t(616) = 29.83$, $p < .001$, as were attitudes towards vegans ($M = 3.19$, $SD = 0.84$), $t(630) = 24.07$, $p < .001$. Therefore, on average, non-vegetarians' attitudes towards both vegetarians and vegans were towards the positive end of the scale.

A two-way analysis of variance revealed a main effect of participant gender, $F(1, 1238) = 48.67$, $p < .001$, indicating that female non-vegetarians ($M = 2.94$, $SD = .86$) expressed significantly more positive attitudes towards vegetarians and vegans than male non-vegetarians ($M = 3.30$, $SD = .90$). There was also a main effect of target outgroup, $F(1, 1238) = 29.51$, $p < .001$, indicating that attitudes towards vegetarians were significantly more positive than attitudes towards vegans. The interaction between gender of participant and target outgroup was non-significant, $F(1, 1238) = .02$, $p = .89$. As the only difference between

the two scales was the substitution of ‘vegetarian’ with ‘vegan’, these results suggest that participants responded to the labels of vegetarian and vegan differently, and both male and female non-vegetarians tended to express relatively more positive attitudes towards vegetarians than vegans. We also examined gender differences on the ideological attitudes measures, and identified that male participants ($M = 3.04$, $SD = 1.01$) expressed significantly higher levels of RWA than female participants ($M = 2.66$, $SD = 0.95$), $t(1239) = 6.53$, $p < .001$. Male participants ($M = 3.03$, $SD = 1.04$) also expressed significantly higher levels of SDO than female participants ($M = 2.39$, $SD = 0.97$), $t(1240) = 10.68$, $p < .001$.

Testing a Dual-Process Model of Attitudes toward Vegetarians and Vegans.

Structural equation modelling was conducted to evaluate the utility of the DPM in predicting attitudes towards vegetarians and vegans. In this analysis, the two groups of participants were combined to form a single outcome variable measuring attitudes towards vegetarians and vegans, and a grouping variable was constructed to distinguish the groups. Following the test of a combined model, a multiple group analysis was conducted to test for measurement and structural invariance between groups (Byrne, 2010). Table 1 indicates that the social worldviews, ideological attitudes, and outgroup attitude scale means were all significantly correlated with each other in the predicted directions.

INSERT TABLE 1 HERE

Model fit was assessed following recommendations of Byrne (2010). A good model fit is usually indicated by a non-significant chi-square value. However, the chi-square statistic can be highly sensitive to large sample sizes (Byrne, 2010). In large samples, if the chi-square is significant and the χ^2/df is greater than two, it is appropriate to examine other goodness-of-

fit indices. The GFI and CFI indices should be close to 1 and values higher than .95 are considered good. For the RMSEA, values between .05 and .08 indicate a good fit (Byrne, 2010).

In the following analysis, all constructs were modelled as latent variables and item parcelling was employed due to the large number of items and the non-normality of the data² (Little, Cunningham, Shahar, & Widaman, 2002). The use of item parcelling is common when testing the DPM, as the main area of interest is the structural relationships between latent constructs rather than the relationships between individual items and factors (for some recent examples, see Bergh, Akrami, Sidanius, & Sibley, 2016; Cantal, Milfont, Wilson, & Gouveia, 2015). In this analysis, RWA, SDO and outgroup attitudes were conceptualised as unidimensional. For the worldview variables, the manifest variables were simply the two measured items for each scale. For the ideological attitude latent variables, the six measured items were parcelled into three manifest variables, and each parcel contained one pro-trait and one con-trait item assigned at random. For the outgroup attitude latent variable, the 20 items were parcelled into four manifest variables at random while attempting to include relatively equal numbers of pro-trait and con-trait items in each parcel. The EM procedure in SPSS was used to manage the issue of missing data prior to further analyses (the amount of missing data was .7%), and two cases missing greater than 50% of the data were deleted listwise.

Using the statistical software, AMOS 19, we first examined the measurement model (using parcels as manifest indicators for the latent variables), which was a satisfactory fit to

² We also ran a model that entered the 36 individual items as indicators and the resulting model demonstrated poor fit, $\chi^2 = 2996.488$, $df = 587$, $p < .001$, $\chi^2/df = 5.11$, $GFI = .86$, $CFI = .82$, $RMSEA = .06$.

the data, $\chi^2 = 256.10$, $df = 67$, $p < .001$, $\chi^2/df = 3.82$, GFI = .97, CFI = .97, RMSEA = .05 (Byrne, 2010). Structural equation modelling was then performed that included the directional paths between the latent variables set out by the DPM. Reciprocal direct effects were included in the DPM between RWA and SDO, as Duckitt suggests that these variables “would be expected to impact reciprocally on each other due to pressures toward cognitive consistency, at least in more highly ideologized socio-political systems such as New Zealand” (2001, p. 59). The model was a satisfactory fit to the data, $\chi^2 = 272.87$, $df = 70$, $p < .001$, $\chi^2/df = 3.91$, GFI = .97, CFI = .97, RMSEA = .05, and all pathways in the model were significant. The model explained 25% of the variance in attitudes towards vegetarians and vegans, while dangerous worldview scores explained 53% of the variance in RWA, and competitive jungle worldview scores accounted for 68% of the variance in SDO. The results of the structural equation model are presented in Figure 1.

INSERT FIGURE 1 HERE

Bootstrapping (1,000 resamples) was conducted to obtain significance tests for the indirect effects in the model (Jose, 2013). The standardized indirect effect of a dangerous worldview on attitudes towards veg*ans via RWA was statistically significant ($b = .21$, $SE = .03$, lower 95% CI = .15, upper CI = .28, $p = .001$). The standardized indirect effect of a competitive jungle worldview on attitudes towards veg*ans via SDO was also statistically significant ($b = .24$, $SE = .03$, lower 95% CI = .18, upper CI = .31, $p = .002$).

We conducted multiple-group analyses in AMOS to test for invariance across the groups of participants who completed the ATVegetarians or ATVegans scales. We began by examining the measurement model to test for invariance in the factor loadings. The baseline

model for both groups was a good fit to the data, $\chi^2 = 359.78$, $df = 140$, $p < .001$, $\chi^2/df = 2.57$, GFI = .96, CFI = .97, RMSEA = .04. Constraining the factor loadings to be equal across groups resulted in a near-significant result for the change in chi-square test, $CMIN(8) = 15.14$, $p = .056$. However, because chi-square values can be affected by large samples sizes, we also examined the change in CFI (Cheung & Rensvold, 2002). As the change in CFI was not larger than .01 ($\Delta CFI = .001$), there was evidence for measurement invariance for the factor loadings across groups. We also tested for invariance across groups in the structural model. The baseline structural model for both groups was a good fit to the data, $\chi^2 = 359.78$, $df = 140$, $p < .001$, $\chi^2/df = 2.57$, GFI = .96, CFI = .97, RMSEA = .04. A change in chi-square test indicated that constraining the regression paths between latent variables to be equal did not significantly worsen the model in comparison to the unconstrained model, $CMIN(6) = 9.96$, $p = .126$. This suggested that the DPM fit equally well regardless of whether the target was described as vegetarian or vegan.

Discussion

The aim of the current study was to examine the ideological and motivational bases of non-vegetarians' attitudes towards vegetarians and vegans in Aotearoa New Zealand. On average, attitudes to both vegetarians and vegans were towards the positive end of the scale. However, as predicted, attitudes towards vegans were significantly less positive than attitudes towards vegetarians, and male non-vegetarians were significantly less positive towards both outgroups than female non-vegetarians.

The DPM of attitudes towards vegetarians and vegans also demonstrated satisfactory fit. As hypothesised, RWA was positively associated with increasingly negative attitudes toward vegetarians and vegans, and mediated a positive relationship between a dangerous worldview and increasingly negative attitudes. SDO was also positively related to

increasingly negative attitudes toward vegetarians and vegans, and mediated a positive relationship between a competitive jungle worldview and increasingly negative attitudes. The findings suggest that a view of the world as a dangerous place predicts increasingly negative attitudes towards vegetarians and vegans (mediated through RWA), which we propose is due to veg*ans representing a perceived symbolic threat to social and cultural norms in Aotearoa New Zealand. The findings also suggest that a view of the world as a competitive ‘dog-eat-dog’ jungle predicts increasingly negative attitudes towards vegetarians and vegans (mediated through SDO), which we suggest is due to vegetarians and vegans representing a rejection of the hierarchy-legitimizing myth of human dominance over other animals (i.e., acting on behalf of animals as a perceived low status group). These results support our prediction that veg*ans are seen as both deviant and dissident in the context of Aotearoa New Zealand. The pattern of associations by which both RWA and SDO predict attitudes to veg*ans is similar to the prediction of attitudes towards protestors and feminists, as identified by Duckitt and Sibley (2007; see also MacInnis & Hodson, 2015).

Overall, the combination of variables in the DPM accounted for 25% of the variation in attitudes to vegetarians and vegans. Typically, the DPM has been shown to account for as much as half (and in some cases more) of the variation in attitudes towards groups based on race or sex (e.g., Duckitt, 2001; Duckitt, Wagner, du Plessis, & Birum, 2002; Sibley, Wilson, & Duckitt, 2007). This suggests that vegetarian and vegan identities (and potentially other minority lifestyles that reject mainstream social norms) are simply not as salient as these more traditional research targets, or that other factors contribute towards attitudes towards dietary groups that may not apply to traditional targets.

We provide support for the findings of MacInnis and Hodson (2015), and also extend their research by recruiting a large non-US sample and by drawing on a well-supported model of intergroup attitudes that proposes two distinct pathways linking chronically-accessible

social worldviews, ideological attitudes and outgroup attitudes. The inclusion of social worldviews in a mediation model allows for a better understanding of *why* RWA and SDO are associated with increasingly negative attitudes towards veg*ans. Additionally, consistent with MacInnis and Hodson (2015), we found evidence for generally less positive attitudes towards vegans than vegetarians. This implies that researchers should be careful before aggregating vegetarian and vegan targets together for convenience. An alternative explanation is that the difference between attitudes towards vegetarians and vegans was due to lower familiarity with the term ‘vegan’, which cannot be ruled out as we did not include a measure of familiarity in the current study (we also did not provide definitions to participants). However, MacInnis and Hodson, (2015) controlled for levels of familiarity in their research, and still found a significant difference between attitudes towards vegetarians and vegans.

The current research therefore provides a useful extension to past research on individual difference explanations of intergroup attitudes. Past research in the area has generally focused on more salient categories such as ethnicity, gender, or sexual orientation (Crandall & Warner, 2005). Dietary identity is a much less salient group identity, especially for individuals who do not personally identify as vegetarian or vegan, and expressing negative attitudes towards veg*ans may currently be perceived as more normative and acceptable than expressing negativity towards other groups (MacInnis & Hodson, 2015). Our findings suggest that a DPM of outgroup attitudes can be extended to groups based on their dietary identification, and that proponents of other lifestyle-based social movements would be interesting targets for research into intergroup attitudes.

A future area of research could be to further investigate the reasons for the relationship between SDO and increasingly negative attitudes towards vegetarians and vegans. In this paper we have argued that the observed relationship between SDO and outgroup attitudes is due to veg*ans representing a challenge the legitimizing myth of human

dominance over other animals. An alternative explanation for the current finding is that vegetarians and vegans themselves are simply viewed as a low status group worthy of derogation. For example, veg*anism may be implicitly associated with femininity, and therefore, individuals motivated to maintain hierarchical structures may perceive veg*ans as weak or sentimental and deserving of derogation. This might imply that there would be different relationships between SDO and attitudes towards veg*ans, depending on whether the target individual is described as a male or female. Another possibility (suggested by an anonymous reviewer) is that the belief that veg*ans think they are 'holier than thou' (Monin & Minson, 2012) activates a competitive social context, which leads individuals high in SDO to derogate veg*ans for claiming to be morally superior. These different propositions could be examined in future research by varying the gender or stated motivations of the target individual (e.g. health or moral motivations), and by including measures of ambivalent sexism or the endorsement of animal exploitation as a potential mediators of the relationship between SDO and outgroup attitudes.

Another possible contextual explanation for the link between SDO and outgroup attitudes is that, due to the strong economic emphasis on the production of meat and dairy in Aotearoa New Zealand, the most salient dimension along which veg*ans are seen to be challenging hierarchical structures is in their perceived opposition to a practice which is associated with the economic interests of the dominant national identity. A potential direction for future research could be to experimentally manipulate the degree to which veg*ans are described as a threatening cultural traditions, challenging the human-animal hierarchy, or threatening national economic interests before measuring outgroup attitudes, to further establish the distinct causal contribution of these factors. This research would contribute to understanding whether individual differences in perceptions of lifestyle-based social

movements reflect general ideological motivations, without reliance on ideology specific to the content of the social movements themselves.

One limitation to the current experiment is that short measures were used due to space constraints. In particular, it is possible that the use of short two-item measures of DW and CJW may have impacted the results, making them less reliable. At the same time, other large-scale survey programmes have used similar sets of items to measure the same constructs, also for a similar pragmatic reason of wanting to maximise participation (see, for example, Perry & Sibley, 2013). Additionally, while the sample obtained was considerably more diverse than a typical university-based convenience sample, it was still unrepresentative due to having disproportionately more females, NZ Europeans/Paheka and being more highly educated than the general NZ population. Once again, however, the DPM has been tested across a range of populations with similar results.

It is acknowledged that a large amount of the variance in attitudes toward vegetarians and vegans still remains unexplained in the current model, and it is possible that other models including additional variables could also be a good fit to the data. The current study is also limited because the design is cross-sectional and correlational, so future research employing longitudinal data may be able to better establish the hypothesised causal links in the models. As stated by an anonymous reviewer, is also possible that the competitive jungle items (specifically, the item referring to a ‘dog-eat-dog’ world) could have potentially acted as a prime for evaluations of vegetarians and vegans. However, the measures for this study were included as part of a much larger survey, and there were several other measures (122 items in total) in between the competitive jungle and outgroup attitude scales. Therefore, the likelihood of a priming effect in this study is minimal. Another limitation is the use of self-report measures to examine outgroup attitudes. Although we have argued that it is relatively more acceptable to express negative attitudes towards veg*ans compared to other social

groups, there is still likely to be a strong social desirability bias against expressing negative attitudes in a research context. Future research would benefit from employing measures of implicit associations.

From an applied perspective, evidence for a bias against veg*ans may be a concern for advocates of plant-based diets. Most research on the promotion of plant-based diets thus far appears to have focused on self-reported perceived barriers to changing one's diet, such as the enjoyment of meat and a reluctance to change eating patterns (Lea & Worsley, 2003). However, it is also important to consider the role of identity and intergroup processes in resistance to changing dietary behaviours. For example, research in other domains suggests that negative stereotypes of activists can reduce their effectiveness (Bashir et al. 2013). An intergroup dimension (i.e., a perception of 'veg*ans' as the outgroup and 'omnivores' as the ingroup) or desire to avoid being associated with a derogated social identity may explain additional variance in the relationship between right-wing ideologies and actual meat consumption levels identified by previous researchers (e.g., Dhont & Hodson, 2014). The current findings suggest that individuals low in RWA and SDO will be more likely to hold positive attitudes towards vegetarians and vegans, and therefore advocacy campaigns aiming to promote plant-based diets may be most successful for this audience.

In summary, the current findings demonstrate that the DPM model of intergroup attitudes (Duckitt, 2001) is able to predict non-vegetarians' attitudes towards vegetarians and vegans. This previously unexplored application of the DPM suggests that two distinct ideological motivations are associated with increasingly negative attitudes towards vegetarians and vegans; a motivation to maintain social norms, and a motivation to maintain group dominance. These findings provide a good starting point for further questions regarding the role of psychological motivations in explaining attitudes towards vegetarianism

and veganism as social/lifestyle movements, and can be used to explore potential strategies for the advocacy of plant-based diets.

ⁱ Firstly, we removed four items from the scale that appeared less relevant to the construct of interest (e.g., “Many vegetarians secretly eat meat in private” seemed to be more of a descriptive belief than implying a positive or negative attitude; “Vegetarians should NOT try to hide their eating habits” implied that vegetarians often do hide their eating habits; “There are some good reasons not to eat meat” appeared to be more about the diet than the group; and “I avoid interacting with vegetarians whenever possible” seemed to refer to a behaviour more than a belief). Secondly, three additional items relating to social distance in relationships were created (“I’d prefer it if my partner was not a vegetarian”, “It doesn’t matter to me if my friends are vegetarian or not” and “Some of my best friends are vegetarian”). The decision to include these items was supported by evidence that almost one quarter of vegans report that their friends decreased contact after they revealed their vegan identity (MacInnis & Hodson, 2015). Also, scales that measure explicit prejudice often suffer from social desirability bias; therefore, items such as “I’d prefer it if my partner was not a vegetarian” may provide greater variation, given that answering in the affirmative does not appear to be as socially undesirable. Lastly, three items from the original scale were reworded so that there was a balance of positively-worded and negatively-worded items in the scale, in order to reduce the likelihood of response acquiescence (Altemeyer, 1981). More specifically, the following items were reworded to be con-trait: “Individuals who don't eat meat are NOT “wimpier” than individuals who do eat meat”, “Vegetarians appear NO more sickly and unhealthy than other people” and “Refusing to eat meat is NOT just a phase”.

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Table 1.

*Descriptive Statistics and Correlations between Attitudes Towards Veg*ans and Other Variables*

Variable	1	2	3	4	5	6
1. Dangerous Worldview	-					
2. Competitive-Jungle Worldview	.27**	-				
3. Right-Wing Authoritarianism	.40**	.24**	-			
4. Social Dominance Orientation	.25**	.50**	.44**	-		
5. Attitudes Towards Vegetarians	.27**	.27**	.41**	.40**	-	
6. Attitudes Towards Vegans	.14**	.29**	.35**	.35**	^a	-
α	.43	.51	.70	.79	.89	.87
Average Inter-item Correlations	.28**	.35**				
M	4.27	3.28	2.80	2.61	2.92	3.19
SD	1.42	1.26	0.99	1.05	0.90	0.84
Skewness (SE)	-.09 (.07)	.11 (.07)	.36 (.07)	.47 (.07)	.26 (.10)	.15 (.10)
Kurtosis (SE)	-.61 (.14)	-.32 (.14)	-.39 (.14)	-.13 (.14)	.08 (.20)	-.12 (.19)

Note. ** $p < .01$. N = 1248 for all variables except ATVegetarians ($n = 617$) and ATVegans ($n = 631$). ^aCorrelations between the ATVegetarians and ATVegans were not calculated as this was a between-subjects design.