'Against the cult of veganism': Unpacking the social psychology and ideology of anti-vegans

Rebecca Gregson [a],[*], Jared Piazza [a], Ryan L. Boyd [a],[b],[c]

[a] Lancaster University, Department of Psychology, Lancaster, LA1 4YF, United Kingdom
[b] Security Lancaster, Lancaster University, United Kingdom
[c] Data Science Institute, Lancaster University, United Kingdom

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ABSTRACT

Despite the established health and ecological benefits of a plant-based diet, the decision to eschew meat and other animal-derived food products remains controversial. So polarising is this topic that anti-vegan communities — groups of individuals who stand vehemently against veganism — have sprung up across the internet. Much scholarship on veganism characterizes anti-vegans in passing, painting them as ill-informed, uneducated, or simply obstinate. However, little empirical work has investigated these communities and the individuals within them. Accordingly, we conducted a study using social media data from the popular platform, Reddit. Specifically, we collected all available submissions (~3523) and comments (~45,528) from r/AntiVegan subreddit users (N = 3819) over a five-year period. Using a battery of computerized text analytic tools, we examined the psychosocial characteristics of Reddit users who publicly identify as anti-vegan, how r/AntiVegan users discuss their beliefs, and how the individual user changes as a function of community membership. Results from our analyses suggest several individual differences that align r/AntiVegan users with the community, including dark entertainment, ex-veganism and science denial. Several topics were extensively discussed by r/AntiVegan members, including nuanced discourse on the ethicality and health implications of vegan diets, and the naturalness of animal death, which ran counter to our expectations and lay stereotypes of r/AntiVegan users. Finally, several longitudinal changes in language use were observed within the community, reflecting enhanced group commitment over time, including an increase in group-focused language and a decrease in cognitive processing. Implications for vegan-nonvegan relations are discussed.

1. Introduction

Despite the established health and ecological benefits of a plant-based diet (Willett et al., 2019), the decision to eschew meat and other animal-derived food products remains controversial. So polarising is this topic that anti-vegan communities, groups of individuals who stand vehemently against veganism, have sprung up across the internet. To date, very little is known about these communities and the individuals who join them. Accordingly, in this study, we take a close look at the r/AntiVegan community on the popular platform, Reddit, and the social psychology of its members publicly identifying as anti-vegan. We use anti-vegans' own words to understand their beliefs and motives and establish some implications for vegan-nonvegan relations.

1.1. Veganism

Veganism is a term coined by Donald Watson in 1944 to describe the voluntary abstention from animal derived food-products and a lifestyle governed by non-violent philosophy (The Vegan Society, 2021). In recent years, veganism has become increasingly mainstream in western societies, with the Economist declaring 2019 the "year of the vegan" (Parker, 2018). This increasing popularity of vegan diets has paralleled a rise in selective eating habits (Fischler, 2015), leading to the common misperception that veganism is a new-age fad diet (Cole & Morgan, 2011). Far from short-lived, the concept of abstaining from animal-derived food products for ethical reasons, is said to date back some 5000 years to Ancient Egypt, was later popularised by Greek philosopher Pythagoras in around 500 BCE (Zaraska, 2016) and has a rich tradition among several world religions, including Jainism,

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Hinduism, and Buddhism (Kumar, 2021).

A recent study which sampled 28 countries from all six inhabited continents, estimated that the average global prevalence of vegan diets is approximately 3%, with a range of 0–19% (IPSOS Mori, 2018). As such, vegans represent a minority who deviate from the social norm, which is to consume animal products. Particularly in the West, vegans are demographically more likely to be female, younger, highly educated and politically left-leaning individuals (Asher et al., 2014). Their motivations for following a diet free from animal products are numerous, typically incorporating moral, health and environmental considerations (Zur & Klöckner, 2014). Relative to other groups who eschew meat, such as vegetarians and pescatarians, vegans hold stronger personal, prosocial, and moral motivations (Rosenfeld, 2019). Vegans also consider their dietary choices as more central to their identity and tend to be more critical of people who, unlike themselves, do not abstain from animal products (Rosenfeld, 2019).

1.2. Anti-veganism

Recent western history offers abundant evidence that people strongly dislike those who eschew meat (Chiles & Fitzgerald, 2017). In the 19th century, people who refrained from meat were ridiculed and ostracized from mainstream culture for being *'odd'*, *'eccentric'* and *'half-crazed'* (Iacobbo & Iacobbo, 2004). In the counterculture era, spanning the 1960–70s, vegetarians were readily viewed as an absurd and socially problematic movement, synonymous with the views that the mainstream public held for hippies (Iacobbo & Iacobbo, 2004). Such sentiments which we see documented throughout Western history have since been echoed in the discourse analyses of news outlets in Australia (Ragusa, Crampton, & Masterman-Smith, 2014) and the United Kingdom (Cole & Morgan, 2010).

Today, with the growing popularity of meat-free diets (The Vegan Society, 2021), anti-vegan sentiments have become increasingly apparent (Dhont & Stoeber, 2020). This has led scholars and legal bodies to recognise anti-veganism as a prejudice (MacInnis & Hodson, 2015), resulting in the protection of "ethical veganism" under the UK Equality Act 2010 (Casamitjana v. League Against Cruel Sport, 2020). Some evidence, reported by *The Times*, even suggests that vegan-related hate crimes may be on the rise in theUK (Nachiappan, 2020). According to the article, there were 172 instances of vegan hate crimes between the years 2015–2020, one-third of which occurred in 2020 alone.

1.3. Anti-veganism and social media

Social media has transformed the way humans communicate and interact, which has attracted the attention of psychologists (Wallace, 2015). Although social media may be lauded as an essential tool for social interaction, some researchers suggest that it supports particularly *antisocial* behaviour (Trindade, 2020), including cyberbullying (Whittaker & Kowalski, 2014) and the dissemination of hate speech (Castaño-Pulgarín et al., 2021). Online communication at times lends itself to the expression of extreme behaviour because of the anonymity it offers the perpetrator (Branscomb, 1995), the invisibility of the victim (Lapidot-Lefler & Barak, 2012) and the instantaneous nature of posting (Brown, 2017), which can disinhibit an individual to convey thoughts they might not express in person (Suler, 2004).

Social media has provided a platform for those who stand against veganism to connect and identify with others who share in their opposition. Since early 2000, pockets of anti-vegan communities have begun to spring up across the internet, from Reddit's *r/AntiVegan* to Facebook's *Anti-Vegan Club* and Flickr's *Anti-Vegan League*. It is possible that these communities have become intertwined with alt-right ideology and discourse (Gambert & Linné, 2018; Reynolds, 2019). For example, the slang term "soy boy" which is said to have originated from alt-right online discourse on 4 chan, is used to describe men who lack *traditionally* masculine qualities (Gambert & Linné, 2018). Alt-right community

members have also been active in organising anti-vegan demonstrations at vegan food festivals and privately owned vegan cafes, which involve activities such as performatively consuming raw meat on the premises (Reynolds, 2019).

1.4. Existing lines of research on anti-veganism

Given that plant-based diets offer a potential solution to the health and ecological challenges posed by our current food system (Willett et al., 2019), there has been a considerable amount of research conducted to understand why people denigrate those who eschew meat (e. g., see De Groeve & Rosenfeld, 2021). Research in this area has largely focused on the form and content of anti-vegan prejudice. Characteristic of such attitudes is the perception that people who identify as vegans tend to be militant, hostile, overly sensitive, hypocritical, annoying, self-righteous, opinionated, inflexible, and judgmental (Cole & Morgan, 2011; De Groeve et al., 2021; Markowski & Roxburgh, 2019; Minson & Monin, 2011). Generally, this arm of research converges on the conclusion that moralistic impressions of vegans seem to account for the bulk of antipathy and discrimination against them (see De Groeve et al., 2021).

A second arm of this research has sought to understand the psychosocial and demographic characteristics of those most likely to express anti-vegan sentiments. This largely survey-based body of research has found that those more willing to denigrate vegans are typically male (Vandermoere et al., 2019) and lower-educated individuals who hold traditional views on gender (Earle & Hodson, 2017) and politics (Dhont & Hodson, 2014). The degree of hedonic pleasure that people derive from eating meat, particularly red meat, has also been shown to predict prejudice toward vegetarians across several countries (Earle & Hodson, 2017; Ruby et al., 2016), suggesting that prejudice toward those who abstain from animal food products may be a reactive expression aimed at defending traditional cultural values linked to food choice.

1.5. A new line of research on anti-veganism

The research conducted to date has been invaluable in advancing scientific understanding of anti-vegan sentiment. However, this research has largely focused on the nature of anti-vegan sentiments expressed by members of the general public when solicited by questions or measures within a study or experiment. Thus, much of what we know about anti-veganism has come from those who express anti-vegan sentiment, *reactively*, when solicited under experimental conditions.

As such, the research in this area has moved toward studying anti-vegan ideology organically, using samples of people who *actively* identify as anti-vegan and chose to participate in the relevant anti-vegan behaviour. In new research by Aguilera-Carnerero and Carretero-González (2021), anti-vegan sentiments were studied across three anti-vegan Spanish Facebook pages (namely; *El mito del veganismo, Reich Animalista* and *Vida Naturopatética*). The authors acquired a multimodal dataset, containing language, image and video data for their discourse analysis. Their findings were confirmatory of the findings from previous controlled experimental and self-report research in English speaking samples. For example, it was confirmed that in Spanish culture, typical anti-vegan expressions share in the perception of vegans as *fanatic*, *radical* and *crazy*. However, their unique approach to the study of anti-vegan attitudes via the medium of social media allowed for novel insights. For example, the finding that members of these communities often draw on the lived experiences of ex-vegans as shared on YouTube and public figures, including academics and television presenters, to legitimize their anti-vegan sentiments. In addition, the view of veganism as cult-like (both in a literal and metaphoric terms) and vegans as misanthropic.

1.6. Current study

In the current study, we sought to move away from traditional methods of study and adopt a novel approach to understanding anti-vegan sentiment. Accordingly, we take a "big picture" look at the social psychology of those publicly identifying as anti-vegan. We use the public discourse of anti-vegans to better understand why they believe what they believe, and to try to establish some implications for vegan-nonvegan relations. We apply methods of computerized text analysis to language data derived from a social media community of self-identified anti-vegans.

Specifically, we analyse social media data from Reddit, a popular, anonymous online discussion forum comprised of sub-forums ("sub-reddits") within which users communicate through submissions and comments. We chose Reddit because of the anonymity it offers its users and its relative popularity in the world of social media. At the time of writing, Reddit reports over 52 million daily active Reddit users worldwide, ranking as one of the ten most popular and widely-used websites on earth (Pew Research Center, 2021).

Here, we collect data from the subreddit *r/AntiVegan*, a community with over 19,400 members. According to their strapline, *r/AntiVegan* is a community of people '*Against the cult of veganism*'. More descriptively, the community define themselves as:

> … a place to share and discuss content that opposes the ideology of veganism. We are a community of omnivores, carnivores, ex-vegans, vegetarians, and pescatarians. Food porn, recipes, news and nutrition articles, stories, rants, and humor are all welcome.

Such an approach affords the opportunity to understand (a) the profile of individuals who participate in online anti-vegan groups, and (b) the nature of the commentary that occurs within such groups, and (c) the long-term, motivational consequences of participating in such groups. Thus, our three research questions are as follows:

- RQ1: How do *r/AntiVegan* users differ from the general population on Reddit?
- RQ2: What are the most prominent topics of discussion among users of the *r/AntiVegan* community?
- RQ3: Does engagement with the *r/AntiVegan* community precipitate social psychological change, as evidenced by changes in users' language use?

1.6.1. RQ1: How do r/AntiVegan users differ from the general population on Reddit?

We pose our first research question with the aim of understanding more about the psychosocial characteristics of individuals who actively engage in a group organised around anti-vegan discussion: the *r/AntiVegan* community. Treating Reddit as the baseline population (the closest approximation to a 'general population' available within this online context), we want to know what, if any, psychosocial characteristics differentiate *r/AntiVegan* users from the general population on Reddit.

1.6.2. RQ2: What are the most prominent topics of discussion among users of the r/AntiVegan community?

It is unknown whether anti-vegan impressions, uncovered in survey studies, will be shared among individuals who actively participate in anti-vegan behaviour. It is also unclear what sorts of ideas and modes of thinking typify the discourse of such communities. Accordingly, we pose our second research question with the aim of understanding what the *r/AntiVegan* community discusses as a window into the beliefs and motives characteristic of anti-vegan identifiers. In doing so, we seek to understand anti-vegan beliefs and opinions as *they* choose to discuss and enact them.

1.6.3. RQ3: Does engagement with the r/AntiVegan community precipitate social psychological change, as evidenced by changes in users' language use?

Despite anti-vegan sentiment being commonplace across the internet, anti-veganism phenomena have yet to be studied through the lens of group processes. Past research has shown that interaction with an online community strengthens group-identification and, once a social identity is formed amongst an online group, its members may be increasingly susceptible to group influence, stereotyping and discriminating against outgroup members (Postmes et al., 1998). Accordingly, we pose our third question with the aim of understanding the social psychological effects of *r/AntiVegan* membership by examining longitudinal changes in language-based measures of group members' traits (e.g., Lam, 2008, pp. 2859–2869; see also: Boyd & Pennebaker, 2017). In line with past work on group members aligning their linguistic styles, goals, and norms, we explore whether *r/AntiVegan* users experience something of a group acculturation process, exhibiting more group-identification signatures over time, and whether the community itself develops more group-like qualities, for example, more hierarchical structures or leadership-followership distinctions.

2. Method

2.1. Sample overview

For this research, we used a custom pipeline, built around the Pushshift database (Baumgartner et al., 2020), to collect data from the subreddit *r/AntiVegan.* We collected all available posts, including both "submissions" (i.e., posts that users made to the forum containing a link, text, or other content) and "comments" (i.e., posts made in response to other users' posts) made in the *r/AntiVegan* subreddit between March 2014–December 2019. The final database included a total of 48,909 posts, comprised of 3,523 submissions and 45,386 comments produced by 3,819 unique users. Each post represented a unique data point and was associated with the language content of the post, the date and time the post was made and the username of the account which made the post. To better understand *r/AntiVegan* users and their wider interest, we additionally tallied the frequency of posts that each user made across all other publicly visible subreddits.

2.2. Text analytic approach

We adopted multiple text analysis methods for quantifying the content of posts made to the *r/AntiVegan* subreddit, ranging from well-established word counting methods to topic modelling and corpus linguistics. Below, we briefly describe each method and outline the measures provided by each. In the Results section, we included details of the question-specific analysis to help illuminate the results.

2.2.1. Meaning Extraction Method

To understand what motivates Reddit users to participate in *r/AntiVegan*, we used topic modelling to objectively extract and quantify the central topics discussed within the *r/AntiVegan* community. For this task, we employed the Meaning Extraction Method (MEM; Chung & Pennebaker, 2008), a topic modelling technique which statistically identifies, from a list of high frequency words, those that tend to co-occur into psychologically meaningful themes. This method is well suited to addressing social scientific research questions and has been used to understand the content of discourse in a wide range of topics, including relationship problems (Entwistle et al., 2021), food cognition (Blackburn et al., 2020), dehumanization (Markowitz & Slovic, 2021), and climate change denialism (Shah et al., 2021), to name a few.

Briefly described, the MEM is conducted in a series of steps: first, high frequency words within a corpus of text are identified and each text is then scored (in either binary or relative frequency fashion) for the presence or absence of each high frequency word. This part of the procedure has, more recently, been automated by the development of the

Meaning Extraction Helper (MEH; v2.2.03; Boyd, 2020). The final step is to perform a Principal Components Analysis (PCA) with the data, conceptually a method for finding groups of correlations, here a method for finding groups of words that tend to co-occur. For in-depth treatments of common MEM procedures, we refer readers to Boyd and Pennebaker (2016) and Markowitz (2021).

2.2.2. Linguistic inquiry and word count

To explore the psychological consequences of *r/AntiVegan* membership, we quantified longitudinal changes in users' linguistic markers of psychosocial traits. We employed Linguistic Inquiry Word Count (LIWC; Pennebaker et al., 2015), a well-validated tool in computerized text analysis, underpinned by the extensive research demonstrating that the high occurrence of certain words is reliably indicative of corresponding psychological processes (Boyd & Schwartz, 2021). LIWC consists of two parts: a dictionary and a software program. The dictionary is comprised of word-to-category mappings for 82 categories, including common content (e.g., related to biology, power, family) and function words (e. g., pronouns, conjunctions, articles). The program itself calculates the percentage of words that belong to each of the dictionary categories, hence, scores for each variable (excluding word count) range from 0 to 100. This method of text analysis has been applied to a wide range of psychological research including personality, patterns of thought and social processes (Tausczik & Pennebaker, 2010).

3. Results

3.1. RQ1: How do r/AntiVegan users differ from the general population on Reddit?

Without standard demographic information (e.g., age and gender) at our disposal, we adopted a behavioral approach to identify those posting characteristics that were more prevalent in *r/AntiVegan* users relative to the overall population of Reddit users. We investigated the wider Reddit activity of *r/AntiVegan* users, with the assumption that the kinds of subreddits frequented by such users would be revealing of their psychosocial characteristics[1]. Our approach to analysing these data was thus twofold. First, we sought to understand how the posting activity of *r/AntiVegan* users differed from that of the general population on Reddit. Secondly, we sought to make a qualitative interpretation of the nature of those subreddits highly frequented by *r/AntiVegan* users.

To address the first aim, we compared the wider Reddit activity of *r/AntiVegan* users against that of a sample of *r/askreddit* users ($N = 9500$). With over 33 million users, *r/askreddit* is one of the most popular subreddits on Reddit. Given its popularity and the neutrality of its content, this subreddit has often been used as something of a "control group" for group-based comparisons (see, e.g., Bagroy et al., 2017). To determine which subreddits were more associated with r/*AntiVegan* users, we used the Basic Unit Transposable Text Experimentation Resource (BUTTER; Boyd, 2018) an open-source software and text analytic system that performs several text analytic and statistical functions. Specifically, we used the "compare frequencies" tool, which allows the user to calculate a series of pairwise comparison statistics.

Here, we report the %DIFF values (Gabrielatos & Marchi, 2011), an effect-size metric which indicates the proportion (%) of the difference between the normalised frequencies of any one subreddit, across two samples; the study sample of interest (here: *r/AntiVegan)* versus the reference sample (here: *r/askreddit*). The formula for %DIFF is as follows, where NF refers to *normalised frequency*, SS *study sample* and RS *reference sample*:

$$\%DIFF = \frac{(NF\ in\ SS - NF\ in\ RS)\ \times 100}{(NF\ in\ RS) +\ .0001}$$

In our case, positive %DIFF values indicate that a particular subreddit has a higher normalised frequency in the study sample (*r/AntiVegan*)

and negative values a higher normalised frequency in the reference sample (*r/askreddit*). Large values indicate that the subreddit is more highly representative of the sample, relative to the other. These values are not associated with a significance outcome and so to make an inference of the statistical significance of the observed difference, we draw on log-likelihood (LL) and employ the following threshold: LL $\geq$ 15.13, $p < .0001$ (see, e.g., Rayson & Garside, 2000).

Our analysis revealed meaningful differences in the wider Reddit activity of *r/AntiVegan* and *r/askreddit* users. Table 1 displays the 10 subreddits with the highest normalised frequency amongst *r/AntiVegan* users, relative to *r/askreddit* users and vice versa.

A qualitative inspection of the way in which the subreddits, most strongly associated with *r/AntiVegan* users, describe themselves revealed several insights (see Table 2 for the community descriptions of each of the ten subreddits with the highest normalised frequency amongst *r/AntiVegan* users). First, r/AntiVegan users extend their discussions around veganism to other areas on Reddit, including *r/DebateAVegan* and *r/vegancirclejerk*. This suggests that vegan opposition is a key social motive for many *r/AntiVegan* users. *r/AntiVegan* users also frequent *r/carnivore*, a subreddit dedicated to discussion around the carnivore diet, a diet entirely reliant upon animal-derived products, and one which excludes all other food groups, including vegetables and carbohydrates. These users find entertainment in shocking (*r/MakeMeSuffer*) and socially taboo topics (e.g., *r/AccidentalRacism*). They adopt a style of humour which is both self- (*r/suicidebywords*) and other deprecating (*r/darkjokes*). Taboo topics represented within these frequented subreddits include rape, miscarriage, suicide, and racism. Oppressed minority groups like women and people of colour feature heavily in both *r/AccidentalRacism* and *r/darkjokes*. Lastly, the activity featured in *r/AskDocs* and *r/youtube* suggests that *r/AntiVegan* users appreciate both rational and anecdotal argumentation, respectively.

3.2. RQ2: What are the most prominent topics of discussion among users of the r/AntiVegan community?

To better understand the topics that *r/AntiVegan* users discuss within their community, we conducted a MEM analysis on the language data generated within the *r/AntiVegan* subreddit. Specifically, we used the MEH to analyse the *r/AntiVegan* posts with a word count $\geq$100 ($N = 3253$). Following standard MEM procedures, we then performed a PCA

Table 1
The Ten Subreddits with the Highest Normalised Frequency Amongst r/Anti-Vegan and r/askreddit Users.

Subreddit	*r/AntiVegan* frequency	*r/askreddit* frequency	%DIFF	Log Liklihood
DebateAVegan	46872	1	626044.90	11734.97***
carnivore	7094	3	31488.67	1739.20***
AntiVegan	46902	61	10171.24	11089.85***
darkjokes	120146	174	9124.05	28250.19***
youtube	240237	432	7328.78	55766.29***
vegancirclejerk	23636	52	5972.00	5409.13***
AskDocs	202089	450	5899.17	46205.39***
suicidebywords	36311	104	4564.08	8124.34***
MakeMeSuffer	94436	299	4119.18	20920.12***
AccidentalRacism	32923	157	2701.31	6934.34***
Subreddit	*r/AntiVegan* frequency	*r/askreddit* frequency	%DIFF	Log Liklihood
CFB	0	38634	−99.99	165217.38***
nfl	0	33009	−99.99	141160.59***
reddevils	0	21747	−99.99	92995.80***
counting	0	21065	−99.99	90079.06***
hockey	0	20797	−99.99	88932.89***
SquaredCircle	0	19577	−99.99	83715.27***
BattlefieldV	0	18627	−99.99	79652.37***
GlobalOffensive	0	17285	−99.99	73912.99***
DestinyTheGame	0	15938	−99.99	68152.24***
Gunners	0	14762	−99.99	63122.81***

Table 2
The Community Descriptions of each of the Ten Subreddits with the Highest Normalised Frequency Amongst r/AntiVegan Users.

Subreddit	Community Description
DebateAVegan	A place for open discussion about veganism and vegan issues, focusing on intellectual debate about animal rights and welfare, health, the environment, nutrition, philosophy or any topic related to veganism.
carnivore	A subreddit about the elimination and way of eating known as the carnivore diet.
AntiVegan	/r/AntiVegan is a place to share and discuss content that opposes the ideology of veganism. We are a community of omnivores, carnivores, ex-vegans, vegetarians, and pescatarians. Food porn, recipes, news and nutrition articles, stories, rants, and humour are all welcome.
darkjokes	#BLM Chapo Reddit Takeover: Guess Which Sub Is Next
youtube	r/YouTube is for meta-discussion about YouTube as a platform - its features, bugs, business decisions, etc. This is a fan sub, not run or owned by YouTube!
vegancirclejerk	Veganism is a way of living that is just awesome, plus we totally get enough protein! Also, we totally get enough oral sex. Probably more than you, to be honest. Not bragging, just stating facts." - The Vegan Society
AskDocs	Having a medical issue? Ask a doctor or medical professional on Reddit! All flaired medical professionals on this subreddit are verified by the mods.
suicidebywords	A sub about self-inflicted insults.
MakeMeSuffer	If it hurts to look at, post it.
AccidentalRacism	This is where you can post all the accidental racism pictures.

with varimax rotation on the binary word output generated using the MEH, to extract common themes of *r/AntiVegan* discussion. The diagnostic Bartlett's Sphericity Test ($\chi^2 = 50796.805$, $p < .001$) and the Kaiser-Meyer-Olkin measure (KMO = 0.807) indicated that a component type model was an acceptable fit for these data. A 5-component solution was selected as the best fit for our data, considering a trade-off between breadth and depth of coverage; each component had an eigenvalue ≥2 and together the 5-component explained 10.82% of variance in the data, well within the expected range for a PCA on language data (see, e.g., Ikizer et al., 2019; Kilimnik et al., 2018). Thus, a 5-component solution, with factor loadings of ≥2.5 was retained for further inspection.

In order to further inspect the 5 components that of our PCA, we selected a sample of the 10 highest-scoring comments on each component. Where interpretations were more difficult, we additionally looked

at the ten lowest-scoring comments for comparison. The MEM-derived word clusters revealed five distinct themes of discussion: 1) health, 2) rationalism, 3) animal death, 4) experiential accounts, and 5) morality (see Table 3 and Fig. 1). The verbatim quotes that we present in the following subsections were taken from these samples and are intended to be most representative of the component.

3.2.1. Health

The first theme captured discussion around the negative health consequences of a vegan diet, relative to a meat-based diet. Hence, emergent word loadings included: *protein, nutrient, health, fat,* and *body*. Many *r/AntiVegan* users see veganism as nutritionally inadequate, a *"slow form of starvation"* and vegans themselves as being *"sick all the time"*, having weak bones, poor memory and a low libido. Some users saw veganism as disguising a disordered relationships with food, namely eating disorders like orthorexia nervosa: *"We* [r/AntiVegan users] *look at it* [veganism] *like an eating disorder, like anorexia"*. As a result of these perceived nutritional deficiencies and the subsequent need to supplement, a vegan diet is also seen as unnatural. *r/AntiVegan* users are of the opinion that were veganism a natural diet for humans, it would *"… not have to be monitored, adhered to or supplemented"*.

The discussion around the negative health consequences of a vegan diet takes a holistic and sophisticated look at the absence of essential nutrients, the complex interplay between certain nutrients, their metabolic profiles and absorption. *r/AntiVegan* users see a vegan diet as *"deficient in a lot more than just b12"* and introduce into their discussion nutritional elements such as omega 3, carnitine, taurine, iron, Vitamin A, and Coenzyme Q10. Some *r/AntiVegan* users explain that because of the complex metabolic profiles of certain nutrients, the body is more heavily taxed when trying to convert plant sources: *"there is additional conversion needed within the body to metabolize many nutrients from their plant form to animal form. The body has a limited capacity to do this"*. In this way, *r/AntiVegans* see meat-based diets as *conveniently* healthy; both nutritionally superior to a vegan diet and able to provide equal or better nutrition at a smaller density of food intake: *"Plants don't have the same bioavailability as animal products do, so you would have to eat far more whole plants than you would animal products"*.

The *Health* discussion theme was heavily populated with ex-vegans. An analysis of the posts made by ex-vegans that fall under this theme implicate the motivation to both *share* and *seek* advice about the negative health consequences of a vegan diet: *"Would love to hear advice or*

Table 3
Themes Extracted by the MEM on r/AntiVegan Submissions.

Component 1		Component 2		Component 3		Component 4		Component 5	
Health		Rationalism		Animal death		Experiential accounts		Morality	
diet	.560	study	.451	animal	.467	time	.352	vegans	.476
meat	.521	science	.344	farm	.454	day	.294	argument	.419
eat	.521	large	.312	live	.434	post	.285	moral	.414
food	.446	level	.311	kill	.428	comment	.280	vegan	.412
fat	.426	source	.297	cow	.406	start	.275	veganism	.367
egg	.420	high	.293	wild	.389	said	.272	animal	.310
protein	.417	research	.292	human	.379	give	.271	debate	.295
product	.412	due	.286	species	.351	talk	.266	argue	.275
nutrient	.391	point	.284	die	.349	see	.264	wrong	.257
plant	.381	number	.280	death	.319	look	.260		
body	.368	fact	.273	feed	.309	read	.256		
vegetable	.363	system	.270	farmer	.306	thought	.251		
health	.357	case	.269	produce	.295				
healthy	.337	true	.262	chicken	.293				
vegetarian	.332	amount	.262	hunt	.292				
dairy	.324	link	.253	raise	.287				
amount	.294			grow	.273				
fish	.283			small	.272				
consume	.282			suffering	.261				
milk	.265			life	.251				
high	.265								
vegan	.263								

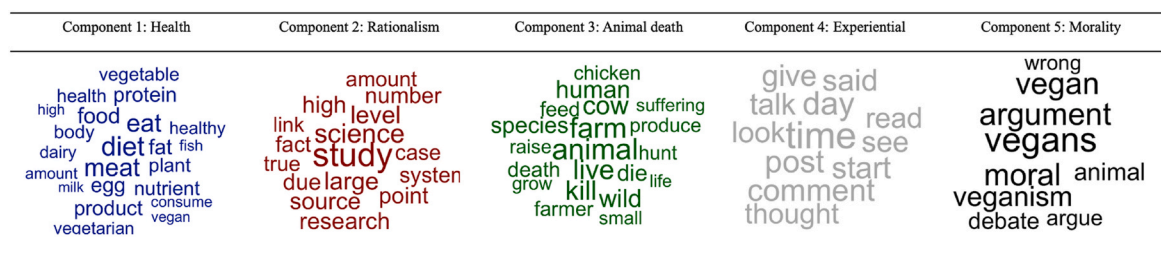| Component 1: Health	Component 2: Rationalism	Component 3: Animal death	Component 4: Experiential	Component 5: Morality

Fig. 1. Word Clouds of the Five MEM-Derived r/AntiVegan Components.

similar experiences … *And happy to answer any questions"*. Common health-related reasons for leaving veganism include both physical and mental health issues, namely: a lack of energy or fatigue, racing heart, high blood pressure, anaemia, iron deficiencies, anxiety depression, and recovery from disordered eating. Many advice-seeking ex-vegans were looking to validate their own personal health concerns and to understand how to re-introduce animal-derived food products into their diets. Both advice-seeking and advice-giving ex-vegans used *r/AntiVegan* as a social support forum and as a personal diary of the process involved in returning to their omnivorous diet: *"Checking in after two months of ex-veganism … I have gained weight … Oh, I also got my period"*.

3.2.2. Rationalism

The second theme captures discussion around logic-driven arguments, underpinned by scientific research and reason. Hence, the words *study, science, research, fact* and *true* emerged as key word loadings here. Discussion around logic-driven arguments occurred in two unique ways. First, the reference to scientific research can be understood as a tool used in anti-vegan argumentation; *r/AntiVegan* users appealed to the authority of scientific research to support their claims: *"You can literally find all I've said on Wikipedia and you can find there all the sources linked to studies by experts"*. Second, *r/AntiVegan* users denigrated vegans for their use of scientific research. For instance, some users accused vegans of committing the fallacy of incomplete evidence — *"Idiot vegans that cherry-pick sources to push propaganda"* — or drawing on research with flawed assumptions or methods — *"trusting groups like the AHA who still spout the thoroughly debunked 'high cholesterol causes heat disease' nonsense for health recommendations is a recipe for suicide."* r/AntiVegan users also criticise prominent vegan advocates, like YouTube personality Mic The Vegan and American physician Dr. Greger, founder of Nutrition Facts.org, questioning their expertise and objectivity on the subject.

Though *r/AntiVegan* users might be criticised for engaging in "myside bias", the evaluation of evidence in a manner biased toward one's own opinions (Baron, 1995; Stanovich et al., 2013), they nonetheless present relatively well-reasoned critiques of scientific research. For example, those that call attention to the issues associated with the use of non-comparative control groups, the over-generalising of findings from small samples, and averaging data while neglecting individual differences and outliers. Where meta-analyses can often overcome these types of issues, *r/AntiVegan* users often make the valid claim that aggregating flawed research only leads to flawed conclusions: *"if a meta study compiles data from flawed studies, then it's also just as flawed"*. Discussions also touch on the recent crisis of reproducibility through talk of publication bias (*"Who funds the studies can and does very often determine what we end up learning")* and scandals of data fabrication which suggest that *r/AntiVegan* users remain on the pulse of the most recent goings on in scientific culture.

Talk on this theme is not restricted to vegan-related content and merges into discussion around other topics, for example, vaccine research. While anti-vaccination views are said to occupy a small space online, research has shown that such discussion has seen recent explosive growth, which at times spills into adjacent topics (Johnson et al., 2020). Here *r/AntiVegan* users critically discuss vaccination, in

particular the risk-benefit approach taken in vaccination research (*"The very science of vaccination requires there to be a trade-off between safety and effectiveness")* and the issues around defining risk specifically (*"If you can't properly define the risk, then that calculation cannot be made")*. Much of the same evaluations that are used to critique the science in support of plant-based diets (e.g., non-comparative controls, here 'placebos') are applied here. Though, it is important for us to note that, elsewhere in the discourse on vaccination, some *r/AntiVegan* users can be seen holding more favourable views on vaccination and equating vegans with *"anti-vaxxers"* about whom they hold particularly negative views. This critical and nuanced discourse suggests that *r/AntiVegan* users' may be well versed in scientific inquiry and critical evaluation.

3.2.3. Animal death

The discussion that underpins theme three takes a matter-of-fact approach to animal death, and argues that regardless of an individual's dietary choice, animal suffering and death is inevitable: *"Death is certain. Suffering is part of life"*. Hence, prominent word loadings include: *animal, kill, death, suffering* and *life*. Construing animal death in such a way may be intended to rebuff the belief commonly attributed to vegans that killing an animal is *always* wrong. Put another way, the argument that death is inevitable builds upon the belief that loss of life is ultimately unavoidable and, particularly in the case of food, necessary. In this vein, veganism is portrayed as naïvely idealistic; *"you have to understand that 'no suffering' is never going to be possible"* and vegans are viewed as disconnected from the natural world: *"They have no hands-on experience with how their existence fits into the food chain, or indeed how life on earth itself works"*. Tied to this, many *r/AntiVegan* users find inconsistencies in the vegan message, as they claim that even non-animal agriculture kills animals as a by-product of production: *"The number of animals that die to produce vegan food is astonishing"*. Though some *r/AntiVegan* contributors recognise that with meat there is greater intention to kill than with plant cultivation, ultimately they feel that *"A death is a death. Suffering is suffering"*. For these reasons, vegans can be painted as *"ignorant and hypocritical"*.

Importantly, when talking about animal agriculture, many *r/Anti-Vegan* users discriminate between killing animals for meat and factory farming. Indeed, there is a fair amount of consensus within *r/AntiVegan* that factory farming is wrong: *"I'm not talking about factory farming here. I don't think anyone truly disputes that factory farms are unfathomably and heart-wrenchingly cruel, as well as environmentally catastrophic"*. There is also the strong belief that, outside of factory farming, the killing practises of the animal agriculture industry are far more humane (*"a swift bolt to the head")* than an animal might expect to endure in the wild (*"torn apart by a predatory wild animal")*, and that, in farming animals, humans provide them a service: *"I'd much rather a caged catered life over being a roaming scrounger"*.

As a result of a matter-of-fact approach to animal death, many *r/AntiVegan* users feel that their role as animal consumers is to shop responsibly for high-welfare, environmentally sustainable food products. Many users express the fatalistic, pragmatic belief that, ultimately, animals are going to die and so the best they can do for animals is to support an agricultural system that minimises harm and waste: *"I believe*

it is every omnivore's duty to make sure that animal life is not taken in an inhumane manner and that none of the products from a slaughtered animal are wasted". For many *r/AntiVegan* users, high-welfare farming *is "family-owned, small-scale, organic farms with pasture-raised livestock"*. This preference for purchasing *better* meat, leads many *r/AntiVegan* users to abhor so-called *militant* vegans, those who hold a rigid view that *"all meat is murder"* and do not respect people's choice to make better rather than restrictive decisions around food.

3.2.4. Experiential

The words that load onto factor four are indicative of storytelling semantics: *time, day, start, thought,* and *said.* Indeed, this theme relates to the *anecdotal* evidence that *r/AntiVegan* users draw on when discussing their motivations for identifying as anti-vegan, or for turning to this community for support. It is striking that this theme is contrasted with the second theme, a logic-driven argumentation style. Unlike the logic-driven theme where *r/AntiVegan* users can be seen as drawing on scientific research to evidence their points, these users draw more on their own personal experience with veganism. For example, sharing personal narratives (*"I lived and grew up on ..."*), relational experiences, conversations they have had, videos they have seen and *r/AntiVegan* discourse itself. As a result, much of the content seems to be born out of intuition (e.g., *I think, I know, I wonder*) and reads like hearsay (e.g., *"I hear that people", "some people say"*). The general tone of this content in relation to that under theme two is less analytic and less cognitively rigid (e.g., *should, maybe, might, suppose*).

In an experiential fashion, *r/AntiVegan* users share their stories of the negative personal experiences with vegan individuals; ranging from personal relationships that have been destroyed as a result of veganism and interactions with the general public. The highest scoring submission on this factor, a 2291-word story which explores how the user's relationship was destroyed when their ex-fiancé made the decision to become vegan overnight. Not alone, another user explains: *"Over a year ago, my husband watched some documentary on Netflix and decided to go Vegan. We had a blow up fight about it"*. In another post, the user, a pet-shop assistant, narrates a conflict with a vegan member of the public who was insisted on feeding their newly adopted cat a vegan diet. That *r/AntiVegan* users revel sharing stories of this nature, suggests that some of their anti-vegan identity might be underpinned by personal offline experiences.

3.2.5. Morality

The last theme reflected discussion of the moral arguments that underpin veganism. Hence, emergent word loadings included: *argument, moral, animal, debate* and *wrong*. Needless to say, *r/AntiVegan* users are opposed to the moral arguments that vegans present. Instead, they believe that *"it is morally permissible to humanely slaughter a non-person animal for its products"*. For this reason, they see the moral message as being ineffective for encouraging people to go vegan: *"moral arguments for veganism will never compel me to go vegan"*. We have summarised the arguments within this theme into three strands.

First, many *r/AntiVegans* view vegans as making indefensible, absolutist moral claims. One user explains: *"I'm not anti-vegan per se, but I'm highly intolerant to people who think they have the ultimate wisdom because of their belief and dictates their way of life (vehemently) on others"*. By contrast, many *r/AntiVegans* see morality as a relative construct which *"differs from person to person"* believing that not everyone shares the same moral convictions, nor should they feel compelled to act contrary to their own convictions: *"everyone has different moral values there aren't a set of defined rules we must ad-hear to"*. The issue of militant vegans re-occurs in this theme, with *"radical"* vegans criticised for their inflexible moral absolutism: *"Those animals do need to live in better conditions but for their* [vegans] *radical minds, they just can't compromise"*.

Second, *r/AntiVegan* users strongly dislike the ways in which vegan advocates use the moral message in their campaigns, specifically when drawing comparisons between non-human animals and humans who represent social minorities. Oftentimes, in their advocacy, vegans can draw on human examples of rape, slavery and murder to explain animal agriculture practises like artificial insemination, confinement and slaughter. These comparisons are particularly vexing. One user explains: *"I adopt an anti-vegan stance purely to reject the stream of accusations of murder, rape, holocaust etc"*. The *r/AntiVegan* community believe that these so-called *"emotional shock tactics"* are designed to catch non-vegans acting morally inconsistent (*"gotcha type questions"*) and are thus met with particular reproach. Words like 'murder' and 'rape' are seen as extreme and this adds to the perception of vegans as being militant and overly zealous: *"Many vegans, like yourself, are overly aggressive when making your point ... You attack people verbally and use extreme words like 'murder' and imply someone is 'evil'"*.

Furthermore, many *r/AntiVegan* users expressed offense at these comparisons because they see certain animals as distinctly different from humans due to their lower sapience and inability to conceptualize abstract concepts like freedom and morality. This explains the final strand of argumentation that *r/AntiVegans* present for opposing the vegan moral message: they proudly hold speciesist views. Thus, by comparing the lives of farmed animals to that of humans, vegans are seen as belittling the plight of many people in society. The vegan movement is seen as a *"cult"* that *"discriminates a variety of people"*. Vegans themselves are seen putting *"animals above people"* and as such are viewed as misanthropists who: *"are so far up their misanthropy and, hilariously, projecting Humanity onto animals that they don't realize how absurd comparing slavery to animal domestication is."* Even more extreme views include seeing vegans as attempting to eradicate human life: *"On a psychological level they think humans are generally bad thus the consequence is the eradication of humans is the logical next step"*.

3.3. RQ3: Does engagement with the r/AntiVegan community precipitate social psychological change, as evidenced by changes in users' language use?

To investigate longitudinal changes in the language of *r/AntiVegan* users, we computed a variable reflecting a unique post made by each user in a new calendar week. The variable, which we refer to as '*week*', worked by scoring each user's first post as week one. Every subsequent post that fell in a new calendar week was assigned an ascending value, by increments of one. All posts made within the same calendar week were assigned the same value. This produced a string variable with a sequence from 1 to 52. By computing a time variable in this way, we were able to aggregate all posts at the week and user level, holding each user's first post and the year in which it was made, constant.

With these data, we first sought to identify the rate of attrition within the *r/AntiVegan* community and the point at which we lose the majority of our sample. As is typical in online communities (e.g., Wong et al., 2015), most users in *r/AntiVegan* remained active for a relatively short amount of time (see Table 4). The majority of the sample (62.2%) made one post in *r/AntiVegan*, while only a minority (7.15%) remained for a prolonged period of time, posting for 10 weeks or more. Just two highly active users consistently posted in *r/AntiVegan* each week for the

Table 4
r/AntiVegan Users Sample Attrition between Weeks 1–10.

Week	Users (N)	%
1	3819	100
2	1443	38
3	941	25
4	700	18
5	558	15
6	463	12
7	405	11
8	357	9
9	307	8
10	273	7

duration of 52 weeks. To map longitudinal changes, an attrition threshold of 80% was employed, which limited the investigation to the first four weeks of activity, a point at which 18.3% (N = 700) of the original sample remained.

All posts with a word count ≥50 occurring between weeks 1–4 were quantified for analysis using LIWC 2015. We conducted an initial exploratory analysis to determine potentially meaningful longitudinal changes in LIWC outcomes. This involved visually inspecting a sample of 18 relevant LIWC outcomes as a guide for later significance testing. The 18 variables that were selected were those deemed to be relevant to the topic of anti-veganism (e.g., "Health", "Body") or group-processes (e.g., "Affiliation", "Power"). All of the 18 variables that were visually inspected can be viewed via our analysis script (https://osf.io/5xs4a/). The six variables – "I", "Cogproc", "Authentic", "Clout", "We", and "Anx" (described in turn, below) - were those which evidenced promising findings upon visual inspection (See Supplementary Materials B) and were thus selected for further significance testing.

The LIWC variable named "I" refers to self-focused language, specifically the use of first-person singular pronouns such as *'I'* and *'me'*. The LIWC variable named "Cogproc" measures language pertaining to cognitive processing, including insight (e.g., *think, know*), causation (e.g., *because, effect*), discrepancy (e.g., *should, would*), tentativeness (e.g., *maybe, perhaps*), certainty (e.g., *always, never*) and differentiation (e.g., *hasn't, but, else*). The LIWC variable named "Authentic" refers to the use of authentic language, that which represents honest, unfiltered, and spontaneous speech (Jordan et al., 2018). Dimensions that positively load onto the authenticity index include self-focused language, insight, words, differentiation words (e.g., but, though, versus) and relative terms (e.g., *above, stop, sudden)*; dimensions that negatively load include discrepancies from reality (e.g., *hope, must, ought*) and third-person singular pronouns (e.g., *she, her, himself*). The LIWC variable named "Clout" can be considered a marker of confidence in language (Drouin et al., 2017; Jordan et al., 2019). Dimensions that positively load onto Clout include group-focused language (i.e., *'we'* words) negations (e.g., *no, not, never*) and swear words while dimensions that negatively load onto Clout include self-focused language (i.e., lower use of *'I'*). The LIWC variable "We" reflects the use of group-focused language, specifically the collective pronoun *'we'*. Lastly, the LIWC variable named "Anx" refers to the use of anxious language, including words like "worried" and "fearful".

To determine meaningful differences in each of these six LIWC outcomes, between weeks one and four; we conducted a series of paired-samples t-tests using Welch's Test to control for unequal sample sizes. Five of these six variables returned significant findings, with varying, relatively small effect sizes ("Anx" was not significant; see Table 5 for details).

4. Discussion

The present study applied computerized text analytic methods to language data produced by self-identified anti-vegans on the subreddit *r/AntiVegan*. These methods returned novel insights into the psychosocial characteristics and motivations of individuals actively opposed to veganism as a social movement and, how such a community evolves over time. The study represents a novel, large-scale, naturalistic view of anti-vegan attitudes and argumentation, from the first-hand perspective of anti-vegans, within an English-speaking sample. Below we discuss key findings relating to our three guiding research questions.

4.1. Who are r/AntiVegans?

Relative to the general Reddit userbase, *r/AntiVegan* users occupy spaces in Reddit pertaining to dark humour, that which finds comedic value in human suffering and topics which are typically considered taboo (Bloom, 2010). Previous research has shown that the appreciation of dark humour is more popular amongst males, those high in rebelliousness and younger people (Aillaud & Piolat, 2012; Oppliger & Zillmann, 1997), which is particularly revealing. Importantly, and in accordance with the desensitization hypothesis, previous research has linked violent media (Carnagey et al., 2007) and internet memes that draw on dark humour (Sanchez, 2020) with psychological desensitization to violence. *r/AntiVegan* users' interest in dark humour appears consistent with an unsentimental attitude towards animal slaughter and death.

Here, dark humour is a tool used to denigrate both the self (*r/MakeMeSuffer*) and others (*r/AccidentalRacism*). We see the use of other-deprecating or disparagement humour as particularly revealing of psychosocial characteristics of *r/AntiVegan* users. Disparagement humour is any attempt to amuse through the denigration of an individual or social group (Janes & Olson, 2000). Disparagement humour can be an opportunity for people who harbour prejudicial attitudes to express them (Ford & Ferguson, 2004). Many of the subreddits that *r/AntiVegan* users frequent, particularly *r/darkjokes* and *r/AccidentalRacism*, include the expression of prejudicial attitudes towards groups including (but not limited to) women and people of colour. Previous research has found that generalized ethnic prejudice, speciesist attitudes towards animals, and antipathy towards vegetarians share ideological roots, specifically, social dominance orientation (SDO; Dhont & Hodson, 2014; Dhont et al., 2016). Our analysis would thus suggest that *r/AntiVegan* users would score high on measures of SDO relative to the general population of Reddit users.

A prominent demographic amongst *r/AntiVegan* users was a group of ex-vegans seeking health advice and social support from the community, despite ex-vegans having their own home on Reddit (*r/exvegans*). The finding that former vegans are motivated by health concerns and a

Table 5
Linguistic Inquiry Word Count *t*-test Analysis.

| LIWC Category Variable | Mean (SD) | | Mean Difference (Week 1 - Week 4) | 95% Confidence Interval | t | p | d |
	Week 1	Week 4					
I	4.06 (3.57)	3.31 (3.13)	−0.75	0.41, 1.08	4.37	0.000	0.21
Cogproc	15.10 (4.73)	14.42 (4.69)	−0.68	−0.18, 1.16	2.69	0.007	0.14
Authentic	39.53 (29.9)	35.77 (27.4)	−3.76	0.86, 6.65	2.54	0.011	0.13
Clout	51.25 (25.7)	54.39 (24.2)	+3.14	−5.68, −0.59	−2.42	0.016	0.12
We	0.57 (1.18)	0.72 (1.36)	+0.15	−0.28, 0.01	−2.09	0.037	0.12

Notes: *p* values were not corrected for multiplicity.
LIWC Category Variables: "I" refers to self-focused language, "Cogproc" cognitive processing, "Authentic" authentic language, "Clout" confident language, and "We" group-focused language.
Degrees of freedom were as follows: I (778.26), Cogproc (703.3), Authentic (748.79), Clout (730.57), We (637.17).
d refers to Cohen's *d*.

desire for greater social connectedness is consistent with past research (Asher et al., 2014; Barr & Chapman, 2002; Hodson & Earle, 2018). That these motivations would push former vegans to stand with those advocating against veganism was documented here and in the work by Aguilera-Carnerero and Carretero-González (2021). While these results highlight *why* many ex-vegans join anti-vegan communities, the extent to which ex-vegans endorse anti-vegan sentiments remains unclear. Drawing insights from the wider literature on religion, we know that when an individual leaves a group, they may often continue to exhibit many of the behaviours and cognitions typical of their former group – an effect known as religious residue (Van Tongeren et al., 2021). From this perspective, one might predict that ex-vegans will endorse anti-vegan sentiments to a much lesser extent than those who have never been vegan. Though, these assumptions would require further investigation.

Despite using scientific evidence to support their own arguments, *r/AntiVegan* users denigrate vegans for their supposed *misuse* of scientific evidence and question the research underpinning vegan advocacy. This may be evidence of a motivated cynicism toward, or denial of, the science in support of veganism. Indeed, the dismissal of well-established scientific evidence for non-scientific motives (Prot & Anderson, 2019) is particularly common when such evidence threatens cherished values (Cofnas et al., 2017) like the consumption of meat (e.g., Dhont et al., 2021). Since meat consumers at times experience dissonance with regards to their meat consumption (Rothgerber, 2020), this raises the provocative question of whether their distrust is partly fuelled by efforts to redress meat-oriented dissonance.

4.2. r/AntiVegan beliefs and opinions

Contrary to the common assumption that anti-vegan views are ill-informed and mean-spirited, our analysis suggests that anti-vegans are an interestingly heterogenous group with a varied set of beliefs and opinions. This includes the view that veganism is nutritionally inadequate. Discussion around the negative health consequences of a vegan diet was highly nuanced, extending beyond the mere absence of food-derived nutrients, to talk around bioavailability, metabolic profiles, and nutrient absorption. This aspect of *r/AntiVegan* belief system might be considered an extension of one of the "4Ns" of meat-eating justification (Piazza et al., 2015) – the argument that eating meat is *necessary* for human health. This argument was also highly entangled with a second of the 4Ns, the argument that eating meat is *natural,* as well as arguments around the nutritional convenience of a meat-based diet. Further, we noted some discussion of veganism as having links with disordered eating, which was both an argument against veganism, put forward by *r/AntiVegan* users, and part of the lived experience of ex-vegans active in the subreddit. Although this theme was rare, links between veganism and disordered eating has been reported elsewhere by researchers (e.g., Parra-Fernandez et al., 2020). A potential reason why personal health is such a cardinal line of anti-vegan argumentation is because arguably, nutritional inadequacy is one of the strongest counterarguments against veganism. If meat is *truly* necessary for human health, then it is unavoidable and a vegan diet unsustainable.

Animal death as an unavoidable reality was also central to anti-vegan opinion, as was the notion that veganism is an idealistic view of the natural world. Here, *r/AntiVegan* users argued that, in so far as humans do so responsibly, killing animals for consumption is natural and a service to the animal, whose death would be more brutal in the wild. This line of argumentation has strong parallels with the *less but better* concept, a strategy employed by NGOs (e.g., RSPCA Assured) to promote more sustainable consumption practises, and one which seems to garner a good deal of public support (Pohjolainen et al., 2016). Here, *r/AntiVegan* users can be seen using the *less but better* concept (albeit, with a greater focus on *better*) as a meat-eating justification, to defend their current practises and offer a counter-solution to veganism. *r/AntiVegan* users define *better* meat in terms of opposing factory farming and purchasing meat produced on small, family-owned, organic farms from

livestock free from confinement and instead raised on pasture. Given the pervasiveness of factory farmed meat in most countries (Sentience Institute, 2019), this line of argumentation could reflect either an insensitivity to animal suffering, or an attempt to resolve the cognitive dissonance that arises when one acknowledges their role in said suffering (Rothgerber, 2020). Indeed, there is evidence to suggest that meat consumers engage in wishful thinking by overestimating the availability of "humanely" produced meat (Cornish et al., 2016; Rothgerber, 2020). Regardless, what is clear is that vegans and many anti-vegans share the central belief that humans have a responsibility to care for animals, common ground that might be harnessed to facilitate inter-group relations.

The unpleasant, moralistic tone of vegans was a frequent topic of *r/AntiVegan* discussion. This finding is somewhat unsurprising given that the vast majority of anti-vegan research has converged on the conclusion that discrimination of vegans is often motivated by impressions of their "holier than thou" posture (De Groeve et al., 2021; Minson & Monin, 2011; Weiper & Vonk, 2021). Here, the vegan moral argument is rejected for three reasons: first, *r/AntiVegans* tend to be moral relativists and thus abhor so-called militant vegans who demand that others endorse their own convictions about animals. Second, *r/AntiVegan* users strongly dislike how vegan advocates use moral messages in their campaigns, specifically when drawing comparisons between non-human animals and minority human groups. Finally, they reject the vegan critique of speciesism. Some anti-vegans proudly held speciesist views, which might be additional evidence for profiling *r/AntiVegan* users as high in social dominance orientation, given the strong empirical overlap between speciesism endorsement and SDO (Dhont & Hodson, 2014).

4.3. Enhanced group commitments

Our final research aim was to explore the social psychological effects of *r/AntiVegan* membership using longitudinal changes in LIWC variables. Amongst a subset of committed users, we observed a small *decrease* in the use of first-person pronoun (i.e., "I"), cognitive processing (i.e., "Cogproc"), and authentic language (i.e., "Authentic") over time. In addition, there was a small *increase* in group-focused language use (i.e., "We") and confident language (i.e., "Clout"). Taken together, we see these findings as indicative of a strengthening of group processes and increased group socialisation. As an individual user becomes integrated with the group they rely less on the first-person 'I' and increasingly the collective 'we' (Lee et al., 2020). Not only do these users reference themselves less, but over time the authenticity in their speech is reduced suggesting a move away from valuing what is individual and original and a move towards group conformity. Users' persistent activity on *r/AntiVegan* increased their confidence and certainty (i.e., "Clout"). Such linguistic displays are characteristic of people with higher social status or who yield greater influence over a group (Cassell & Tversky, 2006; Dino et al., 2009), possibly suggesting that, as time goes on, a hierarchy of group leadership emerges amongst a subset of highly committed *r/AntiVegan* users.

This pattern of increased clout is inversely related to cognitive processing (i.e., "Cogproc"). Here we saw cognitive processing decreasing somewhat over time, suggesting that persistent activity on *r/AntiVegan* resulted in a reduction of logic-driven, critical thinking around the topic of veganism. Though, this is not to argue that anti-vegan argumentation descends into illogical thought, instead, it is more likely that talk moves away from defending the anti-vegan position as users' certainty of their beliefs in enhanced. Taken together, we see this inverse relationship between clout and cognitive processing as suggestive that, over time, the group processes under *r/AntiVegan* are refined and a hierarchy is established amongst a subset of committed users who are increasingly comfortable with their role within the group and more epistemically certain of their anti-vegan position.

4.4. Implications

This research offers rich insights into anti-vegan thinking, motives and behaviour, which has important implications for vegan-nonvegan relations. While we have predominantly highlighted the ways in which anti-vegan and vegan ideology diverge, it would seem that the two are connected in their shared belief that humans have a responsibility to minimize the harmful impacts that their choices have on animals and the environment. How the two groups seek to achieve this goal is where they diverge. While anti-vegans believe it their role to shop responsibly (i.e., for high-welfare, environmentally sustainable products), vegans believe they should not shop for animal-derived products at all. All things considered, there may be more common ground to harness between vegans and anti-vegans than one might otherwise assume outside of the present investigation.

Further, many *r/AntiVegan* users confine their antipathy towards vegans to "militants" or the overly zealous (*"I don't hate/dislike vegans"; "But militant veganism makes me want to dig my heels in"*). In fact, some avow *"respect"* for the *"admirable"* work that vegans do and even enjoy eating vegan or meatless food themselves (*"I love a good vegan meal and I'm really open to eating less meat"*). We see this specialised hatred toward so-called *militant* vegans as meaningful in explaining much of the hatred directed towards vegans. Importantly, one of the extreme consequences of militant veganism that we observed from these data is the perception of vegans as misanthropists and veganism as a cult (recall the *r/Anti-Vegan* strapline *"against the cult of veganism"*). We conducted further exploratory qualitative analyses of the anti-vegan perception of veganism as a cult, which can be viewed in Supplementary Materials C. We recommend that future research examines the underpinnings and accuracy of these judgments, particularly claims about vegans as misanthropes.

Our analysis suggests that *r/AntiVegans* define militant vegans as those who are inflexible and particularly aggressive in their moral thinking. The literature of psychological reactance might help to explain these findings. Spelt et al. (2019) have found that highly controlling language in meat reduction appeals is associated with increased psychological reactance, as measured by scales of anger and perceived threat to freedom, relative to low controlling language. Thus, vegan advocacy that is extreme and unforgiving may be damaging to the progression of the movement insofar as reactance may a barrier to message receptivity.

4.5. Limitations and future directions

Despite the many strengths of this research, it is not without its limitations. One such limitation of this work is the inability to differentiate users in our sample who were members of *r/AntiVegan* from those who were active in the space, though not members. Thus, the percentage of users in our sample who do not identify as anti-vegan is unknown. Despite this, we have a number of reasons to believe that these numbers are extremely small and add minimal (if any) noise within our data. First, *r/AntiVegan* list in their community rules that *"no vegan may troll, preach, or spread misinformation or propaganda"*. To police this rule, *r/AntiVegan* employ both human moderators as well as a "*bot*" to filter out vegan *"trolls/brigaders"* and remove *"pro-vegan submissions"* from this space. Hence, we imagine that the number of vegans present in *r/AntiVegan* is small. We also have strong reason to believe that our findings are reflective of the social psychology of anti-vegans, given that we employed steps to sample data from highly committed contributors, for example, employing conservative word count thresholds and for RQ3 specifically, analysing a subset of highly committed users. Qualitatively, our findings also align with this notion. For example, our user base was active in other spaces on Reddit relating to anti-vegan ideology (e.g., *r/DebateAVegan* and *r/carnivore*), suggesting

anti-vegan ideology to be central to these users' identity and behaviour on Reddit. Furthermore, several anti-vegan arguments that are recognised here (e.g., the argument that veganism is inadequate for human health) also align with previous sentiments communicated by committed meat consumers (e.g., the belief that meat is necessary to be healthy; Piazza et al., 2015).

Another limitation is the demographic skew of Reddit users, which tends to trend in the direction of young, English-speaking males. It is estimated that approximately 90% of Reddit users are under the age of 35 (Bogers & Wernersen, 2014), 63% identify as males (Pew Research Center, 2021) and just under half from the US (Statista, 2021). In this regard, our research is highly skewed toward Western Education Industrialized Rich and Democratic (WEIRD) populations. Future research ought to investigate anti-vegan sentiments with other demographic profiles, for example countries where the prevalence of vegetarian and vegan diets is much higher (e.g., India, Israel).

In our analysis, we overlooked a number of dimensions of *r/Anti-Vegan* communication, for example, their use of multimedia, upvotes, permalinks and hashtags. Our dataset affords the opportunity for future work to study the sharing of multi-media content. Of particular relevance would be to study the communities use of internet memes. Internet memes, humorous images and videos, can be thought of as a fast-paced and somewhat competitive style of humour, with memes that arouse the most attention (measured in likes, comments or in this case *upvotes*) typically out-living those that are less impactful. Aguilera-Carnerero and Carretero-González (2021) found that anti-vegan memes can range from non-offensive light humour to hate-laden attacks on vegan character and the movement as a whole. Meme-sharing thus may provide yet another window into anti-vegan thought.

We restricted our investigation to *r/AntiVegan*, yet there is reason to believe that anti-vegan attitudes bleed out from this space into other relevant subreddits: *r/VegoonCircleJerk, r/ShitVegansSay, r/CringeyVegans* and *r/DumbVeganLogic*, to name a few. Outside of Reddit, there are several English-speaking anti-vegan communities on Facebook, which has more active daily users than Reddit (Pew Research Center, 2021). Our research overlooks these spaces and in doing may present a limited view of online anti-vegan attitudes. Future research should widen the scope by analysing anti-vegan discourse across multiple platforms.

It might be a fruitful endeavour for future research to seek to understand what motivated Reddit users to join the *r/AntiVegan* community. The authors made an attempt to address this question (detailed in Supplementary Materials D), however, results from this analysis were no more revealing of the motivations for joining *r/AntiVegan,* than were those from the MEM reported in-text. We report both for the sake of completeness. Future work could investigate this by mapping an individual user's Reddit journey prior to joining *r/AntiVegan,* for example, the subreddits they frequent and any changes in their language style in the months leading up to joining the community. Previous research (Phadke et al., 2020) has outlined such an approach and has found meaningful patterns in what motivates people to join conspiracy communities, specficially. In future research, these methods could be applied to the study of the formation of anti-vegan attitudes.

Lastly, these methods could be extended to study the inter-group relations between vegans and anti-vegans. These such interactions are observable in spaces like *r/DebateAVegan*, where lines of communication between vegans and those opposed to veganism is less restricted than in a space like *r/AntiVegan,* where vegans are censored. Recent research by Kumar et al. (2018) has mapped out intercommunity interactions on Reddit, specifically examining cases where one community becomes mobilized by negative sentiment to comment in another community. In future research, their methods could be applied to study the intergroup processes between *r/AntiVegans* and the vegan (e.g., *r/vegan*) community on Reddit.

5. Conclusion

In a fast-growing body of literature, academics are seeking to understand anti-vegan attitudes and what motivates them. The present study investigated anti-vegan attitudes first-hand, from the perspective of a community of individuals who publicly identify as being anti-vegan. Here, we observed that *r/AntiVegan* users are unique from the population on Reddit in the extent to which they embrace taboo topics and dark humour, they engage in critical and nuanced discussions of the moral and health claims of vegans, and show signs of increased certainty and group commitment over time. The views of *r/AntiVegans* represent a stiff challenge to vegan advocacy, but also, we expect, a useful battlefield of operation for helping vegan advocates creatively refine their arguments and strategies.

Author contributions

The first author conducted the analysis and wrote the manuscript. The second author contributed to writing and editing of the manuscript. The third author collected the data, informed the analytic method used and contributed to the writing and editing of the manuscript. All authors read and approved the final version of the manuscript.

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Ethical statement

Ethical approval for this research was obtained from the Faculty of Science and Technology Research Ethics Committee at Lancaster University (FST20094) on April 16, 2021.

Declaration of competing interest

None.

Open research statement

This research was not pre-registered. The raw dataset analysed for this work is not publicly available to protect the privacy of the Reddit users whose data were used in this study. The public Reddit data can be made available upon request, subject to an appropriate data use agreement, if applicable. To request these data, please contact b.gregson@lancaster.ac.uk. Analysis and output is available and can be obtained from: https://osf.io/5xs4a/

Ethical statement

This research followed all ethical guidelines for human research participants. Ethical approval for this research was obtained from the Faculty of Science and Technology Research Ethics Committee at Lancaster University (FST20094) on April 16, 2021.

Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2022.106143.

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