



The mad leading the blind: Perceptions of the vaccine-refusal movement among Australians who support vaccination



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ABSTRACT

Background: Vaccine refusal is shaped by the social ecology in which it occurs. How people who refuse vaccines are communicated to and treated may affect the nature and strength of their negative vaccine beliefs, and their responsiveness to health promotion messages. Yet little is known about how people who refuse vaccines are perceived by the public. Our research examined perceptions among pro-vaccine Australians of the vaccine-refusal movement.

Methods: Descriptions of the vaccine-refusal movement by 2666 pro-vaccine Australians were analysed using thematic discourse analysis. Descriptive themes were identified via inductive, iterative coding. Discourse analysis techniques were then used to interpret latent beliefs about the vaccine-refusal movement.

Results: Participants had negative and stigmatising perceptions of the vaccine-refusal movement. They believed the movement is dangerous, misinformed, and comprised of charlatans and fools who are unintelligent, selfish, overly emotional, conspiratorial and scientifically illiterate. Discursive analysis showed that these perceptions were underpinned by beliefs that people would have to be defective in some way to believe anti-vaccine rhetoric. Furthermore, perceptions were underpinned by beliefs that the movement spreads not only disease, but also dangerous ideas that were seen to attack the social order, institutions, values and reason. Participants' intensely-negative views related to their inability to imagine why someone would refuse vaccines.

Conclusions: This research provides a focused, qualitative account of public perceptions of the vaccine-refusal movement. The findings are concerning: stigma towards vaccine-refusing people may adversely affect their wellbeing and entrench their negative vaccine beliefs. The research suggests that more compassionate, nuanced discussion of vaccine refusal in the public sphere is needed. It also supports the need to systematically examine public attitudes towards vaccine refusal as a determinant of vaccine confidence.

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1. Introduction

“Anti-vaccination” is a colloquial term used to characterise people who refuse vaccines [1]. Vaccine refusal itself is complex, varied and underpinned by diverse motivations [2]. Many people who are concerned about vaccination nonetheless fully vaccinate, mostly at recommended ages, but sometimes with delay [3,4]. Those who refuse vaccines do so to varying extents, from rejecting only certain vaccines or multi-dose vaccines, like the measles, mumps and rubella (MMR) vaccine [5], to wholesale rejection of vaccination [3]. Motivations for refusing vaccines include, but are

not limited to, concerns that vaccines may ‘overload’ the immune system [4] or have side effects [2,6], lack of concern about vaccine-preventable diseases [2], distrust in vaccine oversight [6,7] and beliefs in alternative health paradigms [8]. Only some people who refuse vaccines consider themselves “anti-vaccination”. Despite these nuances, public discourses tend to label all vaccine-refusing people as “anti-vaccination” [1].

While people who refuse vaccines believe that whether to vaccinate should be uncoerced individual choices [9], vaccine refusal is broadly considered a community health concern [5,10,11]. Low vaccination coverage linked to vaccine refusal has contributed to disease outbreaks across the world [12,13]. Such outbreaks afflict those who refuse vaccines for themselves, but also their children, those who are immunocompromised, too young or too sick to be

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vaccinated, or those who did not develop immunity from vaccines [11]. Vaccine-preventable diseases carry economic as well as social costs for the community [14]. These factors, as well as reliance on high vaccine rates to maintain herd immunity in the population [10], mean that vaccination is considered a community responsibility [5,10,11], and vaccine refusal is disincentivised in many countries [15]. Tensions between individual rights and community responsibilities, and between perceived risks and benefits to the individual and the community, play out in responses to vaccine refusal [11,15].

Research shows that lay discourses about vaccination are important drivers of vaccine confidence and uptake [16]. While healthcare providers remain the key source of vaccine information [17,18], the internet is also an important source, particularly for people who lack confidence in vaccines [17]. Lay webpages [19], blogs [20] and social media [21,22] are all important influences on beliefs about vaccination, as is 'traditional' media like newspapers [1,23]. Family and peer groups are other important influences on vaccine beliefs [24]. Research shows that these lay discourses frame vaccine choices differently than expert discourses. Media discourses tend to dichotomise vaccine positions into 'for versus against' groups [1] and portray "anti-vaxxers" as "folk devils": deviant outsiders who threaten society [1]. Similarly, social media discourses between people with dissimilar vaccine beliefs tend to be highly polarised and adversarial [16,22]. As well as framing vaccine choices differently, lay discourses influence vaccine attitudes and decision-making differently than expert discourses. In peer-to-peer interactions, lay concepts, emotive appeals and anecdotes are more likely to influence vaccine confidence than scientific evidence [25]. Lay sources, like blogs and internet groups, are prone to transmitting inaccurate and sensationalised vaccine beliefs [10,25]. Partaking in polarised online debates can cause participants to limit their conversations to people who reinforce their own beliefs, and ignore evidence that contradicts those beliefs [16,22]. Some groups censor intragroup dissent and may attack others who hold contrarian opinions about vaccination [26]. This environment can discourage people with vaccine concerns from asking questions [1,27] and entrench negative vaccine attitudes [22]. Vitriol directed at people as a result of their vaccination beliefs may be marginalising and stigmatising [28,29]. Under-vaccinated people are evaluated more negatively, discriminated against and given greater 'social distance' by the public [28], and vaccine-refusal is cast as a devalued social identity [1,30]. Vaccine-refusing people report keeping their vaccine choices hidden from fear of negative reactions from others [2]. While the mental health impacts of vaccine-related stigma remain unresearched, the adverse mental health impacts of social stigma in general are well-established [31]. Because lay discourses are influential, distinct and affect vaccination decisions differently to expert discourses, it is important to examine their role in vaccine promotion [32].

An important gap in understanding lay discourses about vaccination is a lack of knowledge about how the vaccinating population perceives people who refuse vaccines [33]. Most Australians vaccinate: 94.6% of children aged 5 are fully immunised [34]. Vaccinating Australians are likely to be important actors in lay discourses about vaccination and vaccine refusal. Conversation with a parent at the school gate, at the office or online may influence how vaccinating peers understand and treat people who refuse vaccines, and form part of the social ecology within which vaccine refusal operates. This ecology may be an important influence on the characteristics of vaccine refusal in Australia, and could affect which strategies are most effective for communicating with vaccine-refusing Australians. It is therefore important that further research examines the attitudes of pro-vaccine people towards those who refuse vaccines.

The current paper examines how Australians who support full vaccination characterise the vaccine-refusal movement.

2. Methods

Discursive thematic analysis was used to examine how 2666 pro-vaccine Australians responded to the survey question: "How would you describe the anti-vaccination movement?"

Participants interpreted this question variably, as referring to all people who refuse vaccines, to the vocal minority who organise against vaccination, to a mix of the two, or in some cases they did not appear to distinguish between subgroups among people who refuse vaccines. This should be considered when interpreting the results of this study.

2.1. Data collection

Data was collected in 2017 between January and May, as part of a larger online survey of Australians' attitudes to vaccination. Participation was sought from adults (aged 18+) living in Australia. The survey was advertised on social media and webpages about health, parenthood and vaccination. Participants completed the survey anonymously and were not offered reimbursement. The study was approved by the La Trobe University Human Ethics Committee (Reference number: S16-208).

The survey was completed by 4370 participants, who represented diverse attitudes to vaccination ranging from unquestioned acceptance of full vaccination to rejection of all vaccines. However, for this analysis, we only included responses from participants who (i) supported complete childhood immunisation, and who also (ii) answered the text response question: "How would you describe the anti-vaccination movement?" This resulted in a non-representative study sample of 2666 respondents. Among these responses, the average length was 25 words, with a median length of 12 words, and 118 comments that were 100 or more words in length.

Demographic information (i.e., age, location of residence, occupation) was collected as part of the survey. Participants' demographic characteristics are displayed in Table 1. Most participants had no concerns about fully adhering to childhood vaccination schedules. Most commonly, participants were female, middle-aged, university educated and living in metropolitan areas with a partner and children. Five percent of participants were employed as primary healthcare providers, such as nurses or generalist doctors. Women and those who were university educated were over-represented in our sample compared to the Australian population.

2.2. Analysis

Thematic discourse analysis (TDA) [35,36] was used to examine how participants characterised the vaccine-refusal movement. This method comprised two phases: first, overt themes were analysed using thematic analysis (TA); second, discursive analysis (DA) was used to examine the latent discourses within the TA themes [35,36].

The TA phase was guided by procedures developed by Braun and Clarke [37]. Following data familiarisation, initial coding was completed, with codes assigned at the individual comment level. The code-frame was subsequently amended several times. Final codes were grouped into broader themes. These themes were checked for data coverage and internal homogeneity, and further refined as needed, resulting in the four final themes. An independent researcher checked the coding of 100 randomly selected comments for accuracy and code-frame fit. He disagreed with 6 of the

Table 1
Participant demographic characteristics (N = 2666).

Concerns about vaccines	n	%
<i>No concerns about vaccines</i>	2278	85%
<i>Some concerns about vaccines</i>	388	15%
Gender		
<i>Male</i>	584	22%
<i>Female</i>	2052	77%
<i>Other</i>	30	1%
Age		
18–25	290	11%
26–35	823	31%
36–45	709	27%
46–55	425	16%
56–65	296	11%
66+	123	5%
Live in metropolitan, regional or rural area		
<i>Metro</i>	1621	61%
<i>Regional</i>	767	29%
<i>Rural</i>	274	10%
<i>No answer</i>	4	0%
Relationship status		
<i>Single</i>	574	22%
<i>In a relationship, living with partner</i>	1792	67%
<i>In a relationship, not living with partner</i>	158	6%
<i>Widowed</i>	29	1%
<i>Other</i>	113	4%
Number of children		
<i>None</i>	967	36%
<i>One</i>	491	18%
<i>Two</i>	726	27%
<i>Three or more</i>	482	18%
Highest education completed		
<i>Did not complete secondary school</i>	62	2%
<i>Completed secondary school</i>	206	8%
<i>Higher learning certificate / diploma</i>	531	20%
<i>Undergraduate degree</i>	946	35%
<i>Postgraduate degree</i>	919	34%
<i>No answer</i>	2	0%
Working or worked as a primary healthcare provider (generalist, frontline healthcare worker. I.e., doctor, nurse)		
<i>Yes</i>	135	5%
<i>No</i>	2305	86%
<i>No answer</i>	226	8%

229 coding instances. He discussed the disagreements with the first author: 5/6 were deemed to be coding errors. These errors would not impact overall results, so no changes were made to coding. The independent researcher judged the code-frame to be a good fit to the data.

The DA phase was primarily guided by Dijk's *Handbook of Discourse Analysis* [38]. The aim of the DA phase was to examine TA themes for latent discourses about the vaccine-refusal movement. We focused on what the discourses revealed about participants' "personal and social cognition" [38]: social attitudes, ideologies and sociocultural knowledge about the vaccine-refusal movement. We approached the analysis from what Alvesson and Kärreman described as a "tightly coupled" (p. 1130) "macro" (p. 1133) discourse position [39]. "Tightly coupled" means that discourse is assumed to offer a relatively good insight into participants' beliefs (i.e., stigmatising language likely points to stigmatising attitudes). "Macro" refers to a focus on underlying ideas and assumptions within the text (i.e., what the discourse reveals about the participants' beliefs about the vaccine-refusal movement) [39,40]. Grammar was not explicitly analysed. Two underlying discourses were identified using this process.

Both stages of TDA were primarily undertaken by the first author. The second and third authors checked coding and exemplary comments, contributed to refining the analysis and its interpretation, and to writing this paper.

While the two phases of TDA combine into a cohesive method, each phase provides different insights about perceptions of the vaccine-refusal movement. TA reveals how vaccine-refusing people are talked about: the phenomenological ecology in which refusal to vaccinate exists. DA reveals the belief systems underpinning how vaccine-refusing people are talked about: the epistemic beliefs related to how vaccine-refusing people are seen. Both the phenomenological ecology and the epistemic beliefs are valuable to understand in responding to vaccine refusal. To highlight each, we split the results to report TA and DA separately.

3. Results

Findings from each phase of TDA are reported separately in the results section. Table 2 lists exemplary comments alongside pseudonyms and some demographic information. To reflect the large dataset (N = 2666), exemplary comments were selected that typified the broader body of responses within a theme/discourse in terms of both language and sentiment, and that that typified several themes/discourses at once. We use the pseudonyms throughout the results section to direct readers to exemplary comments.

3.1. Thematic analysis

The aim of the TA phase was to examine overt descriptions of the vaccine-refusal movement. Four themes were identified: that the vaccine-refusal movement (1) is comprised of charlatans and fools, (2) is dangerous and misinformed, and (3) its members are defined by several negative traits and inabilities. Theme (4) captured the strength of negative feelings participants held towards the vaccine-refusal movement.

3.1.1. A movement of charlatans and fools

Participants differentiated between those who are vaccine-refusing to serve their ulterior motives, such as profiting off selling alternative therapies, and those who are vaccine-refusing because they are foolish or deceived. Participants tended to have harsher opinions of those with ulterior motives, who they characterised as influencers misleading others for personal gain. Participants used the term "anti-vaccination" flexibly, to describe one or multiple 'kinds' of vaccine-refusing people.

Exemplary comments articulate some of the ways in which participants' constructed the movement as comprised of charlatans and the misinformed, and of influencers and the influenced: "misinformed, dangerous twits who get all their information from charlatans who profit off people" (Emi); "mostly well-meaning, concerned parents... being fed false information by narcissists and sociopaths who do not care about others" (Dona); "deluded paranoid narcissists" and "vultures preying on the stupid deluded paranoid narcissists to make money" (Fatima).

3.1.2. Dangerous and misinformed

Participants characterised the movement as dangerous and misinformed. They believed the movement has erroneous opinions and information about vaccination. They described the movement as dangerous because it spreads misinformation and fear about vaccination and contributes to the spread of diseases. For example: "they believe and spread unsupported information and scare new parents into not vaccinating their children, leaving them vulnerable to dangerous diseases and causing outbreaks of preventable disease" (Karen), "[they are] damaging to society" and "putting fears into young mothers" (Lance).

Participants were also concerned that the movement believes and spreads dangerous, erroneous ideology, like promoting do-it-yourself approaches to healthcare and trusting 'alternative' facts.

Table 2
Exemplary comments.

Demographics	Comment
Amir, aged 46, childless	A bunch of superstitious, credulous, asinine conspiracy-theory converts and fatuous armchair Google researchers without capacity to identify legitimate scientific, peer-reviewed research if their lives depended on it. First world, over privileged ding-bats who have never had the integrity or conviction of their beliefs to volunteer in developing communities where vaccination has been unavailable to see the devastating effects of polio, measles, hepatitis, typhoid or other preventable diseases on the communities in those regions. The movement is beneath contempt and its leaders deserving of ridicule and exposure as pseudo-religious fraudsters and snake-oil salesmen worthy of legal proceedings resulting of indefinite jail time for crimes against humanity.
Becky, aged 37, 1 child	Their opinions are driven by emotions and anecdotes; they have extremely poor critical literacy skills; they have abysmal scientific literacy. They don't understand the difference between correlation and causation and refuse to trust doctors let alone experts in the field. Instead they sit, with smug arrogance, in the "mummy knows best/I know my child best/what's natural is best, I don't want any nasty chemicals around my baby" schema. They are self-indulgent scum.
Chloe, aged 54, 1 child	A bunch of ill-informed idiots who have taken one piece of fabricated results to prove that vaccines cause autism. Who believe that governments are out to get them. I have no time or patience or crayons frankly to deal with anti vaxxers.
Dona, aged 49, 2 children	Mostly well-meaning, concerned parents who do not like to see their children in distress, being fed false information by narcissists and sociopaths who do not care about others.
Emi, aged 35, 2 children	A bunch of misinformed, dangerous twits who get all their information from charlatans who profit off people refusing medical science. And that's being kind.
Fatima, aged 45, 2 children	Deluded paranoid narcissists! Or vultures preying on the stupid deluded paranoid narcissists to make money via 'Big Placebo'.
Grant, aged 41, childless	Dangerous quacks and scammers leading the gullible and desperate.
Heidi, aged 37, 2 children	Largely scientifically illiterate. They are uninformed and believe that feelings are the same as facts.
Isaac, aged 33, 2 children	Concerned parents attempting to keeps their children safe but lacking the skills to discern credible sources of information.
Jana, aged 44, 1 child	A selfish group of deliberately ignorant people who don't understand the social contract implicit in public health initiatives such as the vaccination program. They will often believe that diet or IV vitamin C are better treatments for cancer than established chemotherapy protocols and can wax lyrical about how the government is trying to poison them by putting fluoride in the water supply. I am beginning to despair of how little the general populace seems to value science. How can anyone seriously believe that spending 'hours doing research' on Google is the equivalent of a medical or science degree. It astounds me.
Karren, aged 41, 2 children	Dangerous. They believe and spread unsupported information and scare new parents into not vaccinating their children, leaving them vulnerable to dangerous diseases and causing outbreaks of preventable disease.
Lance, aged 52, 3 children	Crackpot, anti-scientific, alternative fact believing, conspiracy theorist, anti-establishment, populist, Trump voting... damaging to society- they should just wear a tin foil hat and stop putting fears into young mothers. These people are radicalized just as surely as a religious fanatic and can't be reasoned with.
Mark, aged 44, 2 children	Anti-science, anti-medicine, anti-logic, anti-reason. Utterly clueless, deceptive, money-grubbing filth.

Among exemplary comments, both Jana and Becky linked vaccine-refusal to distrust of mainstream medical authority, and to reliance on self-directed research to make alternative medical decisions:

"they will often believe that diet or IV vitamin C are better treatments for cancer than established chemotherapy protocols... how can anyone seriously believe that spending 'hours doing research' on Google is the equivalent of a medical or science degree." (Jana). Mark and Lance linked vaccine-refusal to anti-establishment beliefs, describing the movement as "anti-science" (Mark), and "alternative fact believing, conspiracy theorist, anti-establishment, populist, Trump voting" (Lance).

3.1.3. Characteristics attributed to people in the vaccine-refusal movement

Participants ascribed several negative characteristics to people in the vaccine-refusal movement. These comprised personal traits, like lacking intelligence, and lack of skill, such as poor scientific literacy. Accounts describing experiential factors, like perceived adverse events following vaccination, or lifestyle factors, such as belonging to the 'natural' movement, were uncommon.

Personal traits ascribed to people in the movement included that they are: (i) stupid or irrational, (ii) overly emotional, (iii) crazy, paranoid or conspiratorial, and (iv) selfish, egotistical or privileged. Examples of descriptions of people in the movement as stupid include: "ill-informed idiots" (Chloe), "anti-logic, anti-reason, utterly clueless" (Mark). Examples of framing people in the movement as overly emotional include: "they... believe that feelings are the same as facts" (Heidi) and "their opinions are driven by emotions and anecdotes" (Becky). Beliefs that people in the movement are crazy, paranoid or conspiratorial are exemplified in comments like: "crackpot... conspiracy theorist" (Lance), "superstitious, credulous, asinine conspiracy-theory converts" (Amir), and "deluded paranoid narcissists" (Fatima). Beliefs that people in the movement are selfish, egotistical or privileged are exemplified by Fatima's comment above, as well as descriptions like: "self-indulgent" (Becky), "first world, over-privileged ding-bats" (Amir), and "a selfish group... who don't understand the social contract implicit in public health initiatives" (Jana).

The lack of skills ascribed to people in the movement included poor scientific literacy and misunderstanding of how science or medicine work. For example: "they have extremely poor critical literacy skills... abysmal scientific literacy. They don't understand the difference between correlation and causation and refuse to trust doctors let alone experts in the field" (Becky), and "[they are] fatuous armchair Google researchers without capacity to identify legitimate scientific, peer-reviewed research if their lives depended on it" (Amir).

3.1.4. Strength of negative sentiments towards the vaccine-refusal movement

Participants' sentiments towards the vaccine-refusal movement varied, from sympathetic or neutral to derisive and abusive. Overall, comments tended to be highly negative.

Sympathetic accounts described people in the movement as well-meaning, loving parents who were misled or made poor choices: "mostly well-meaning, concerned parents who do not like to see their children in distress" (Dina) and "concerned parents attempting to keep their children safe but lacking the skills to discern credible sources of information" (Isaac).

Negative accounts often contained derogatory language. Examples were pejorative labels, like "filth" (Mark), "twits" (Emi), and "scum" (Becky). Negative accounts also comprised disparaging phrasing, like "I have no time or patience or crayons frankly to deal with anti vaxxers" (Chloe), framing the movement as immature, and "a bunch of" (Amir, Chloe, Emi), framing the movement as a rabble, pack, mob. Linking vaccine refusal with negative traits, like low intelligence, paranoia or emotiveness, also potentially reflected strong negative feelings. However more sympathetic

comments also relied on negative traits. For example, Isaac's comment attributes vaccine-refusal to poor scientific literacy.

3.2. Discourse analysis

The aim of the DA phase was to examine latent discourses about the vaccine-refusal movement. Two discourses were identified. Both cast people in the vaccine-refusal movement as the 'other': someone fundamentally different from the self [41]. These discourses framed the movement as (1) the result of defects, and (2) a threat to order, endangering values and institutions.

3.2.1. They are defective

TA themes were underpinned by a discourse framing vaccine-refusal as the result of defective states. Participants assumed that they, and people like them, could never 'fall' for vaccine-refusal rhetoric. Participants' comments can be understood as attempts to explain what differentiates people in the vaccine-refusal movement that made them fall for it. The explanations relied on framing people in the movement as defective, in one or more of three overlapping ways: capability, trust and morality.

Defects of capability involved blaming peoples' foolishness, emotiveness or lack of training for joining the movement. These accounts comprised theme 3 of TA. Examples included believing that to adopt vaccine-refusing beliefs, someone would need to be gullible or desperate (Grant), stupid and conspiratorial (Chloe), or incapable of appraising information (Becky). This variant of the defect discourse implied that if only people in the movement were not so desperate, foolish, conspiratorial or scientifically illiterate, they would know better than to fall for vaccine-refusal rhetoric, just as pro-vaccination people know better.

Defects of trust involved blaming vaccine refusal on a faulty epistemic outlook. In this epistemic outlook, distrust of mainstream institutions and messages leads people to turn to disreputable sources of authority about vaccines, or to imprudent attempts to understand vaccination choices themselves. In TA, these accounts were part of theme 2: misinformed, and theme 3: conspiratorial. Narratives within these themes framed vaccine-refusal as part of a broader schema that encompasses support for anti-establishment politicians, alternative fact belief and radicalism (Lance), and elevates maternal instinct (Becky) and Google research (Jana) above established medical science. This variant of the defect discourse did not necessarily imply that people who vaccinate are more rational or capable, but that they trust the right sources.

Defects of morality involved blaming vaccine-refusal on unscrupulousness, and tended to account for influencers and those with ulterior motives. These accounts described vaccine refusal as a selfish, amoral means to gain from people who lack the capacity or trust to know better. These accounts comprised TA theme 1, and described members as "snake-oil salesman" (Amir), "vultures" (Fatima), "sociopaths" (Dona), "quacks and scammers" (Grant), which all imply manipulation for gain. Accounts of 'influencers' genuinely believing they were doing the right thing were largely absent from comments.

3.2.2. They are a threat to order

Themes were underpinned by a discourse that framed the vaccine-refusal movement as a threat to core institutions and values, as well as a disease threat.

This discourse played out in several ways. Participants described the movement as dangerous (TA Theme 2), and this danger was linked to multifarious fears. Becky's and Jana's comments reflected a fear that the movement attacks evidence-based science, which it seeks to displace with alternative schemas, like Google research (Jana) or a natural, mummy-knows-best schema (Becky).

Mark and Lance's comments reflected a fear that the movement undermines reason: "anti-science, anti-medicine, anti-logic, anti-reason" (Mark). The idea that the movement is selfish (TA theme 3) reflected participants' beliefs that the movement rejects vaccines to mitigate personal risk, at the expense of the community: it rejects the "social contract implicit in public health initiatives", as Jana put it.

The framing of the movement as dangerous (TA theme 2) was not just about danger of vaccine-preventable diseases. It was also about a fear that the movement undermines the pillars of modern society, like science, reason and core institutions, of which the success of vaccination programs is an expression. It reflected fear that the movement is a vector for these dangerous ideas, like the rejection of science or reason, as well as a disease vector. The intensely negative sentiments captured in TA theme 4 appear to be driven by the combination of these fears, of vaccine-refusal as embodiment and as vector of dangerous diseases and deeply threatening ideas. Descriptions like "filth" (Mark) or a rabble seem to connote this discourse of vaccine-refusal as a threat to order.

4. Discussion

Using thematic discourse analysis, we examined how people who support full vaccination characterised the vaccine-refusal movement. Participants provided intensely negative, often derisive, and potentially-stigmatising accounts of the movement. Overt themes were that people in the movement are stupid, misinformed, dangerous, conspiratorial, selfish, overly emotional and lacking in science literacy. Participants described the movement as comprised of influencers, who are malicious and profiteering, and followers, who are misled and inept. Participant accounts contained two underlying discourses, both casting the vaccine-refusal movement as 'the other'. One discourse framed people in the movement as deficient, in either capacity, trust or morality. The second framed the movement as a threat to order, attacking health as well as core institutions and values. In the discussion we consider the implications of our findings for health promotion.

4.1. Hostility against 'anti-vaxxers': why, who cares, and what can be done about it?

Our respondents were hostile and stigmatising towards the vaccine-refusal movement. TA revealed a range of negative characteristics ascribed to the movement, like stupidity, dangerousness and lack of reason. The two discourses underpinning those themes painted the movement as 'the other'; as defective and dangerous, and reminded us of narratives about untouchability: abominable, disease-spreading, outside the social order and a threat to it. The extent to which participants could not empathise with people who are vaccine-refusing echoed research showing that the media portrays anti-vaccination as 'folk devils': deviant outsiders who threaten society [1], and research showing that healthcare workers 'other' people who refuse vaccines [30]. While, from our own experiences with lay discourses about vaccines and from previous research [28], we expected pro-vaccine respondents to be negative towards the movement, we were initially surprised by the degree of strength and pervasiveness of hostility towards the movement, and by the absence of conciliatory accounts.

Our analysis provides insights about why the public reacts so strongly to the vaccine-refusal movement. First, as theme 2 of TA describes, participants had real and imagined concerns that people who refuse vaccines may spread harmful diseases. Second, they saw refusal to vaccinate as selfish and irrational; an abnegation of responsibility to the community driven by erroneous belief. This is described in TA in the "misinformed" part of theme 2, and in

theme 3. Third, as described in the first discourse identified in DA, they could not imagine becoming vaccine-refusing, or why anyone else would. This may have contributed to seeing people in the movement as the ‘other’, who they could not empathise with, and who they explained using deficit models. Fourth, as the second discourse identified in DA shows, they saw vaccine-refusal as a threat that transcends diseases, and attacks healthcare institutions, science and even reason. The intensity of hostility towards the vaccine-refusal movement was fuelled by the combination of these factors.

Vaccine promotion faces an uncomfortable tension. In the context of the above, the vitriol and stigma our participants expressed against the vaccine-refusal movement is understandable. But the vitriol is also a problem, both from vaccine promotion and mental health perspectives. As discussed in the introduction, stigma and marginalisation of people who refuse to vaccinate may contribute to their ill-health [31]. Furthermore, abusive or dismissive discourses with vaccine-refusing people may further entrench their negative attitudes to vaccines, and alienate them from discussing vaccination outside of networks of like-minded people [16,22]. Research shows that vaccine-refusing mothers respond to stigma by forming support networks that help them resist norms around vaccination [29].

The tension between pro-vaccine people doing the right thing and having understandably negative beliefs about vaccine refusal, and the need to promote more understanding responses to people who refuse vaccines, presents a complex challenge. A campaign directly promoting kinder responses to vaccine refusal among pro-vaccine Australians would de-stigmatise vaccine refusal, but it may also be seen to validate it, and at any rate it would be difficult to justify or market. But perhaps kinder attitudes among the public could be fostered indirectly, via promoting less judgemental narratives about vaccine hesitancy and refusal in the public sphere. This could potentially be achieved using a range of avenues. For the media, guidelines could be developed to discourage sensationalist reporting and ‘blame and shame’ narratives, which are likely to be counter-productive [1]. Media reporting of vaccine controversies also fuels pro-vaccine activism against vaccine-refusing people [33], which may have negative consequences on vaccine refusal groups. While a ‘false balance’ or validation of vaccine-refusing attitudes should be avoided [42], media discourses could communicate the nuances of vaccine refusal and the reasons that people decide to refuse vaccines. Emphasising that people across the spectrum of vaccination beliefs are trying to be good parents may promote a message of commonality and reduce casting people who refuse vaccines as the ‘other’. This stance has been taken by some articles, like those published in the *Conversation* [43,44], but often reporting about vaccine refusal in the media tends to be problematic [1]. Another avenue to foster kinder public attitudes towards people who refuse vaccines may be to disseminate guidance about how to talk to non-vaccinators, such as through medical associations and other stakeholders, or through other means. The weaponization of vaccine controversies in political campaigns, as has happened in the United States [45,46] and Italy [47], may also be counter-productive. When stances on issues, like vaccine controversies, become linked to political allegiances, they become more entrenched [48]. Politicians taking an overly hard-line stance against vaccine refusal may also be counter-productive, because people who refuse vaccines already distrust the government [6,7] and have conspiratorial views [7]. However, these ideas for promoting kinder attitudes to vaccine-refusing people need to be further developed and tested, to determine what the most effective means to influence lay public attitudes towards vaccine-refusing people are. The key to addressing vaccine rejection is building understanding, dialogue and trust [49]: public discourse has a role in fostering that among the population.

4.2. Public attitudes towards vaccine refusal as a determinant of the nature of vaccine distrust

A systematic assessment of the ways public attitudes to vaccine refusal might determine vaccine hesitancy and refusal is needed. Public attitudes towards vaccine refusal form the social ecology in which refusal occurs, and are likely to shape how vaccine refusing groups behave, how hard-line they are, and how they can be best engaged with. It has long been recognised that determinants of vaccine confidence are important to identify, measure, understand, and account for in vaccine promotion [50]. Known global determinants of vaccine confidence were systematised and published in 2014 [51]. But in that research, lay discourses about vaccine refusal were not included as a determinant of vaccine confidence.

Our and other research implies that lay discourses about vaccine refusal should be reconsidered as a determinant of vaccine distrust. Other research has highlighted how media discourses and cultural contexts shape vaccine confidence [1,32], silence people with limited vaccine concerns, and marginalise people with pronounced concerns [1,22]. Harsh, stigmatising discourses about vaccine refusal are likely to matter [31]. The research presented in this paper shows that highly negative views of refusal to vaccinate are prevalent among the Australian public, other research suggests such stigma shapes vaccine-refusing groups [29]. But more research is needed. So far, research has provided only fragmentary insights into pro-vaccine lay discourses about vaccine refusal, and how they might impact vaccine-refusing people's health, identity and responsiveness to belief change campaigns. Systematic research across multiple contexts focusing on the effect of lay discourses in determining vaccine confidence is required.

5. Limitations

The convenience sample, and the use of social media to recruit part of the sample, may be limitations of this study. The convenience sample means that, despite our large sample (N = 2666), we are unsure to what extent our participants' views represent pro-vaccine Australians' views in general. We used Facebook adverts as part of recruitment. This may have exposed a particular subset of the Australian pro-vaccine population to this study. It may have also increased the likelihood that our participants expressed vitriolic views, which are common on social media [22]. To reduce the likelihood of recruiting participants who had particularly strong opinions about vaccination, Facebook adverts were targeted broadly, towards people interested in wellbeing and health. They were also complemented by advertising outside of social media. Nevertheless, both social media recruitment and the use of convenience sampling mean the sample cannot be considered representative.

The question wording may have influenced responses. The label ‘anti-vaccination movement’ was chosen because pro-vaccine people are familiar with it. But the label carries negative connotations [1], and may have elicited stronger responses than if other labels were used. It may also have been interpreted as referring to the extreme fringe of vaccine refusal, or to high-profile vaccine-refusal proponents. However, in the dataset, it was clear that many respondents interpreted the question broadly: some wrote about the ‘formal’ movement, some about all people who question vaccines. Some distinguished between different ‘types’ of vaccine refusal (which became TA theme 1), and many did not draw a distinction. Overall, the wording may have affected responses, and this should be considered when interpreting the results. Using a reflexive method like interviews, during which question meaning can be clarified, could be considered for future research.

6. Conclusion

This research examined the ways that Australians with pro-vaccine beliefs viewed the vaccine-refusal movement. The research concluded that pro-vaccine respondents had negative and stigmatising views about the vaccine-refusal movement. They believed that the movement was misinformed and dangerous, and that people who had concerns about vaccines were unintelligent, overly emotional, conspiratorial, selfish and scientifically illiterate. The vaccine-refusal movement was seen as a threat to social order, which attacked mainstream values and institutions and spread disease. Our findings suggest that greater attention should be given to lay beliefs about vaccine refusal. Stigmatising people who refuse vaccines may affect their wellbeing, strengthen their vaccine refusal, and act as a barrier to promoting vaccine confidence. We suggest that less hostile, more nuanced public discourses about vaccination may aid vaccine promotion. Furthermore, we suggest that lay discourses about vaccination should be systematically examined as a determinant of vaccine confidence.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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