# Final report

## Identifying public and producer attitudes to sheep and cattle animal welfare to inform education strategies


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**Abstract**

Public attitudes to farm animal welfare have the capacity to influence purchasing behaviour as well as community behaviours and thus can affect the sustainability of the livestock industries. Limited research has indicated that views of what is important for livestock welfare often differ widely between the public and producers. The research focus of this project was (1) an examination of public and producer attitudes towards livestock welfare issues in the red meat industry and (2) development and testing of communication and engagement strategies between the public and red meat producers to reduce this polarization in attitudes.

There were marked differences between public and producer attitudes to husbandry practices in the red meat industry. Furthermore, communication strategies using facilitated deliberated forums that provided opportunities for members of the public to engage and discuss welfare issues with producers, either directly or indirectly, resulted in convergence in attitudes between the two groups. There was also a greater understanding of each groups' perspective on the issues and improved public trust in livestock industry people.

It is recommended that this deliberative forum approach is used to engage producers and the general public in detailed discussions about contentious animal welfare issues in the red meat industry

# Executive summary

## Background

Public attitudes towards farm animal welfare and associated issues are multi-faceted and are studied with a view to understanding consumer and community behaviour, the polarisation in views between animal activists and those who farm animals and to gauge community perceptions regarding the uses of animals. Public attitudes have the capacity to influence purchasing behaviour as well as community behaviours which in turn can impact on the sustainability of the livestock industries, yet these attitudes come from beliefs that are not always founded in actual knowledge. To address both the mismatch between the public's perceived and actual knowledge of livestock practices and animal welfare concerns, there needs to be accurate and reciprocal communication between the livestock industries and the community. Industry-initiated community communication programs, changes to national standards and guidelines, best industry practice and changes to livestock housing and husbandry practices can all be guided by an understanding of trends in community attitudes towards animal welfare.

## Objectives

The overall aim of the project was to achieve some degree of convergence in attitudes between the general community and red meat producers, leading to a greater awareness of each group's concerns, improved trust and an improved social sustainability of the red meat industry. In doing so, this project aimed to:

i. identify both producer and community knowledge of and attitudes towards livestock welfare issues in the red meat industry, and their relationships with relevant outcome variables that can impact on the sustainability of the red meat industry,
ii. identify key opinion leaders, that is, influential individuals or groups, and the role of various sources (media, social networks, etc.) in informing the community regarding livestock welfare issues in the red meat industry, and
iii. develop and evaluate communication (education) strategies targeting the general community and, where appropriate, red meat producers.

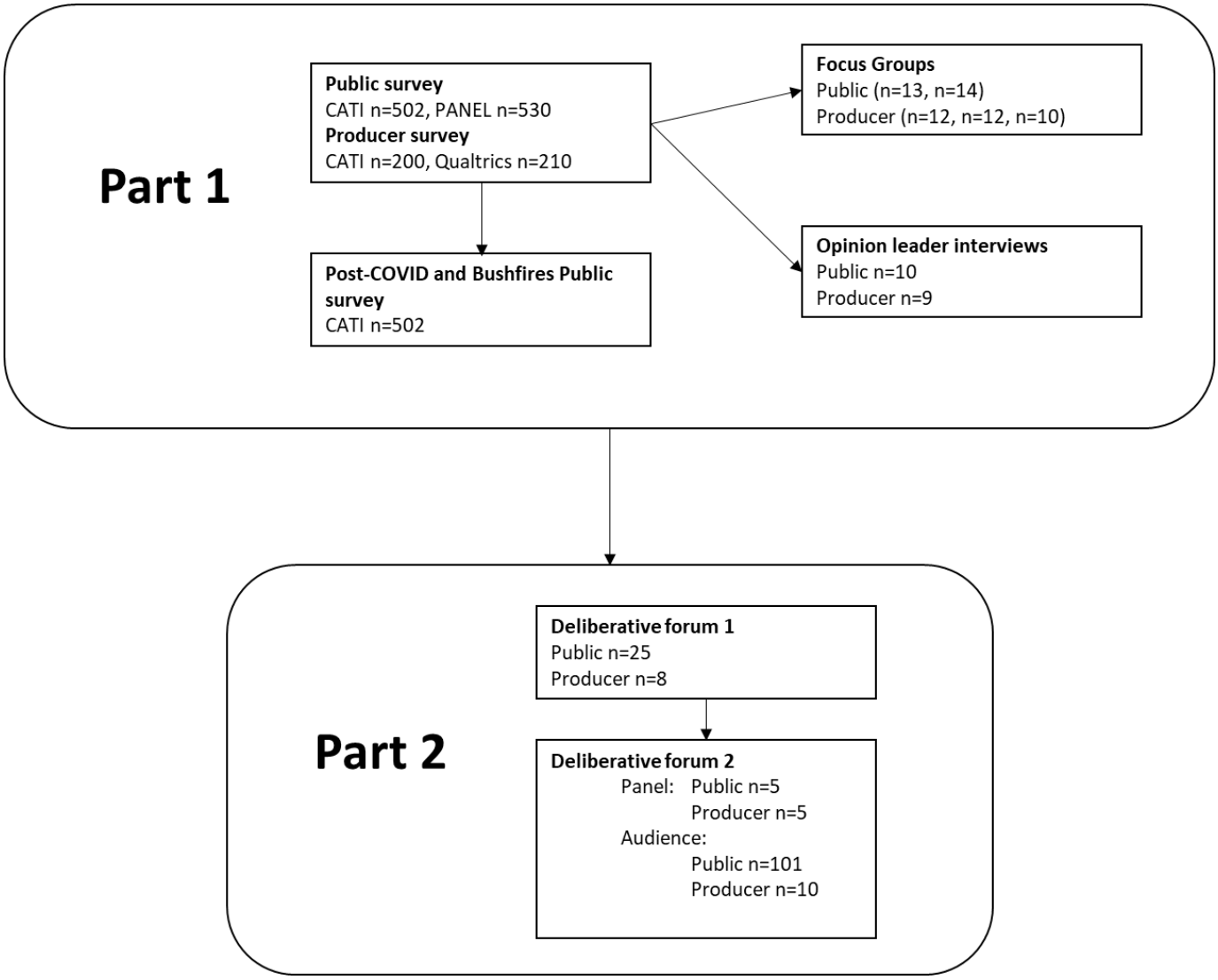
## Methodology

The project consists of two research components (Fig. 1.):

Part 1: The first research component addressed the first two project aims, investigating producer and community knowledge of and attitudes towards sheep and beef cattle welfare via the use of questionnaires, focus group discussions and one-on-one interviews, with both the general public and red meat producers.

Part 2: The second research component addressed the final project aim and involved the development and evaluation of communication strategies using both an in-person and an online deliberative forum addressing contentious animal welfare issues surrounding routine husbandry practices (such as lamb castration, lamb mulesing, lamb tail docking, calf castration and dehorning) using balanced messages outlining the facts (why and how the procedure is performed), the science (with regard to animal welfare implications) and the different stakeholder perspectives (MLA, a beef cattle producer, a sheep producer, RSPCA Victoria and Animals Australia). These deliberative forums provided opportunities for members of the general public to engage and discuss the issues with red meat producers either directly or indirectly. The communication messages and engagement between producers and members of the general public (i.e., communication strategies) were evaluated in the deliberative forums by examining changes in participants' salient beliefs, knowledge and levels of trust and the participants' perceptions of the strengths and weaknesses of the approaches. Pre and post questionnaires were used to assess any shift in public attitudes as a result of the forums, and interviews were conducted with the producers to obtain further insights into their experience participating in the forums.

**Figure 1. Schematic representation of project methodology**




## Results/key findings

Part 1: There were marked differences between public and producer respondents in 20 of the 27 attitude, trust and knowledge variables studied with producers reporting more positive beliefs in the conditions provided for sheep and beef cattle during sea and land transport, the husbandry practices used in the red meat industry, and red meat attributes regarding human health, environmental impact, animal use and animal welfare.

The public and producers reported similar beliefs about animal rights, prevention of animal cruelty and balancing the welfare of people and animals. In comparison to the public, producers reported more use of conventional media, but reported lower levels of trust in social and internet media and less use of commercial and social and internet media.

A subset of both the general public and producer samples were identified as 'opinion leaders' on the basis that within the questionnaire they reported that they were used as sources of information about farm animal welfare and provided such information to the people that they encountered; a total of 29% of the public sample and 64% of the producer sample were identified as opinion leaders. Public opinion leaders, compared to non-opinion leaders, held more negative perceptions of the red meat industry, perceived they had more knowledge about the industry but in fact, their actual knowledge about animal husbandry practices was not different from non-leaders. Opinion leaders in the public sample were more likely to use all kinds of media for information, but used and trusted social and internet media more than non-opinion leaders. They also engaged in more behaviours to express dissatisfaction with the red meat industry. In the producer group, there were fewer clear differences in attitudes between opinion leaders and non-leaders. Producer opinion leaders used conventional media more than social and internet media and had quite low trust in all types of media. They also engaged in more active discussions with friends and family compared to non-leaders. Both public and producer opinion leaders expressed a need for increased communication between the industry and the community.

Part 2: The findings from the two deliberative forums, based on data from questionnaires conducted before and after each forum, provide evidence that the opportunity to meet and participate in a facilitated discussion between the general public and producers, led to a greater understanding of each groups' perspective on the issues, improved trust and some degree of convergence in attitudes between the two groups. The opportunity to participate either directly or indirectly (via a chat or polling platform) in a facilitated discussion between the general public and producers, increased public trust in the red meat industry, improved perceived and actual knowledge of husbandry procedures and increased approval of red meat husbandry practices. In order words, there was evidence of reduced polarisation between the two groups following each forum indicating that both 1) some degree of convergence between the two groups is possible and 2) a deliberative forum approach may be a viable communication approach which could be employed by MLA to engage producers and the general public in detailed discussions about specific or contentious welfare issues.

While this approach could be scaled up to include larger audiences, and even filmed and broadcast to a wider community, such mass communication strategies tend to affect changes in attitude over a longer time frame than a more targeted approach. A combined approach, using smaller more targeted forums which allow more engagement between the producers and the general public and are filmed and broadcasted on websites, social media or on national television, may provide opportunities to produce change over a shorter time frame for the targeted communities and continue to produce change more slowly in the broader community.

## Benefits to industry

Social licence to farm, or the freedom within which society allows farmers to operate, is largely built on trust of farming practices within the community, and the current research demonstrates that there are marked differences in the attitudes, knowledge and trust amongst both producers and the general public which could impact negatively on the red meat industry's social licence. Public opinion leaders believe they know more than they actually do and have more negative views of the red meat industry than do non-leaders. These people (public opinion leaders) could be targeted with more active communication strategies to first improve both their knowledge of and attitudes towards the red meat industry, and second potentially increase dissemination of factual information within the broader community by these opinion leaders.

Creating opportunities for members of the general public and red meat producers to interact resulted in increased awareness of each group's concerns, and improved trust. In order words, there was evidence of reduced polarisation between the two groups following engagement. These findings provide a basis for scalable communication strategies to reduce polarisation between the red meat industry and the community.

- The immediate practical application of the research reported in this project is to incorporate the substantive findings on public and producer attitudes into communications designed to increase convergence in attitudes between the public and producers. Recommended ways to achieve this have been outlined, as have recommendations for future research.
- There are opportunities to broaden the scope of this project by addressing issues of public concern such as live export of sheep and beef cattle by sea, road transport, abattoirs, etc.

## Future research and recommendations

It is recommended that:

- This project highlights how communication strategies could be used as an educational tool to increase convergence in attitudes between the public and producers. This strategy requires ongoing support from MLA and other livestock industry peak bodies to directly provide and/or fund the extension infrastructure necessary to implement the recommendations and continue to maintain, update and build on the strategy in the future. This would be likely to have a halo effect across the entire red meat supply chain as well as in the wool industry.

- The deliberative forum approach could be used to engage producers and the general public in detailed discussions about other contentious animal welfare issues in the red meat industry. Opportunities to use field days and Royal Agricultural Society Shows as venues for this should be explored. The efficacy of using video recordings of facilitated forums that address the key issues of public concern disseminated to both producers and the general public on platforms including social media, YouTube, ABC documentaries, etc, should be evaluated.
- Producers reported higher levels of trust in conventional and commercial media and made more use of conventional media when compared to members of the general public. Future research could evaluate the efficacy of different media to disseminate material such as recorded deliberative forums about other contentious issues in the red meat industry (producers and the general public engaged in facilitated discussions), to examine if trust in media source is a determinant of effectiveness in achieving attitude change.
- Because the focus of our research was on husbandry practises in the red meat industry, we have few insights into how deliberative forums might be used to address other concerns in the red meat industry, for example, live animal export. Our research showed that mere media coverage of an adverse event (Live sheep transport mortality) did not have a general effect on attitudes to the red meat industry, however it did increase public concerns of transport conditions for sheep at sea (Rice et al., 2020). As such, it would be useful to commission a deliberative forum to address live transport in order to develop strategies to deal with perceived welfare issues associated with live transport.
- Adverse public commentary is a risk for producers even when following best practice. Future research should investigate the ways in which producer concerns about possible adverse public commentary especially on social media might be addressed. For example, provision of training in public engagement, the development of support networks, engaging trained mediators to monitor and deflect adverse commentary if required, etc.
- Although this was not addressed within this project, the comments from the focus groups warrant further consideration. For example, clearer labelling and accreditations, more effective use of use of media (including positive social media campaigns) to promote farmers and increase familiarity in the public with farming practices, more active roles from national and state bodies in relation to responding to negative events, education in schools and farms visits were all suggested actions raised in both the public and producer focus groups which could be taken to improve public perception and allow greater convergence between producers and public

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# 1. Background

Public attitudes towards farm animal welfare and associated issues are multi-faceted and are studied with a view to understanding consumer behaviour, the polarisation in views between animal activists and those who farm animals and to gauge community perceptions regarding the uses of animals. These attitudes have the capacity to influence purchasing behaviour as well as community behaviours which in turn can impact on the sustainability of the livestock industries. A number of studies have investigated both public and livestock producer attitudes toward the welfare of livestock (Coleman and Toukhsati 2006; Coleman et al. 2016; Coleman et al. 2018). Beliefs about what is important for livestock welfare often differ widely between the public and producers, with intensification of animal production, freedom to move, and social concepts common themes in community concerns (e.g., Sørensen and Fraser (2010); Coleman et al. (2016)). Understanding both public and producers' attitudes toward the welfare of livestock is clearly important. For example, understanding of producers' attitudes can be used by governments and industries in developing animal welfare policy, while understanding public attitudes can assist in developing strategies for managing public perception in the broader community (Coleman et al. 2016). Furthermore, industry-initiated community education/communication programs, changes to national standards and guidelines, best industry practice and changes to livestock housing and husbandry practices may all be guided by an understanding of trends in community and producer attitudes towards animal welfare.

Attitudes are learned dispositions that are used to explain human behaviour. They are made up of beliefs, affect (emotional responses), and behavioural tendencies (Coleman 2010). Attitudes have a role in determining how people behave as consumers and as citizens (Coleman 2010). Their behaviour in turn affects commercial viability and even the sustainability of animal industries. The public is often a key driver of animal welfare change since public views affect decision makers at the political, regulatory, retail and industry levels (Vanhonacker et al. 2012; Coleman 2018). Consequently, a failure to meet the expectations of the public may hamper the success of the livestock industries through increased litigation, increased regulations, increasing consumer demands, and impacting on the livestock industry's social licence to practice (Arnot 2009).

Public concerns about animal welfare are well documented worldwide (e.g., European Commission (2007); Parbery and Wilkinson (2012); Gracia (2013); Coleman et al. (2015)). However, the effect of these concerns on the livestock industries remains unclear because there is limited evidence to directly attribute purchasing behaviour to public attitudes about animal welfare (Coleman et al. 2018). While consumers report thinking about animal welfare when they purchase meat and meat

products (European Commission 2007; Department for Environment Food and Rural Affairs 2011), concerns specifically about welfare do not appear to be major drivers of peoples' purchasing decisions (Coleman *et al.* 2005; Coleman and Toukhsati 2006) although this may be progressively changing over time as indicated by, for example, the increasing market share of free-range eggs (Campbell et al. 2021).

There is however, increasing evidence that public attitudes to animal welfare may be more relevant to community behaviours performed in opposition to the livestock industries than they are to purchasing and consumption behaviours. Coleman and Toukhsati (2006) suggest that community behaviours that do not require public expression or public identification are common in relation to livestock issues and 'involve taking advantage of situational opportunities to express an attitude through action'. These behaviours may include signing petitions, donating money, and speaking to people about animal welfare issues. Community behaviours and the public opinions determining them can have a considerable influence on how Governments either react to publicised 'animal welfare events' or regulate contentious management practices in industry (Coleman et al. 2018). Consequently, animal welfare concerns have the potential to threaten farmers' social licence to farm. Social licence to farm is defined by Martin and Shepheard (2011) as 'the latitude that society allows to its citizens to exploit resources for their private purposes'. Social licence is granted when industries behave in a manner that is consistent, not just with their legal obligations but also with community expectations (Gunningham et al. 2004; Williams et al. 2007; Arnot 2009).

There is evidence to suggest that within the community, 'opinion leaders' may lead debate on social issues and provide a path for information from various sources to reach their social groups. Opinion leaders are generally more engaged individuals, characterized by the high interest and engagement with news and high tendency to share content (Barberá et al., 2015). They are not necessarily the ones that propose new ideas or are the earliest adopters of innovations. Instead, they tend to investigate and monitor what is happening with certain topics and exercise their influence when they perceive that the advantages of certain ideas/innovations are apparent (Valente et al., 2007). According to the two-step flow theory (Katz and Lazarsfeld 1955), which was later modified to a multi-step flow theory (Weimann, 1982), information flows from a range of sources (e.g., television, newspapers, social media) to opinion leaders in the community, who then disseminate it to less engaged individuals. Intervention strategies that include opinion leaders, such as The Popular Opinion Leader Intervention Model, have been largely used in the medical field to drive positive behavioural change in the community (Kelly et al., 1992; National Institute of Mental Health & Collaborative HIV/STD Prevention Trial Group, 2007; Theall et al., 2015). For example, Theall et al.

(2015) recruited and trained 65 opinion leaders to diffuse intervention messages related to HIV-risk behaviour. Opinion leaders-followers were surveyed one year later, and the results showed significant behavioural and knowledge changes. The use of opinion leaders, as facilitators of targeted information, may be a cost-effective strategy, that is adaptable, and can reach many people in a short amount of time.

Surprisingly, there has been little research to identify the possible role of opinion leaders in disseminating factual and balanced information about animal welfare in the community. There is some evidence that opinion leaders can be identified in the livestock welfare domain (Coleman et al. 2015); however, their characteristics are yet to be clearly established. Coleman et al. (2018) was able to identify a group of people (opinion leaders) who self-reported being used as a source of animal welfare information by those around them. The only demographic variable that distinguished this group was age, with younger people more likely to consider themselves opinion leaders. Opinion leaders were differentiated from non-leaders by their attitudes towards the livestock industries and their perceived, but not actual, knowledge of the livestock industries. Opinion leaders have typically been identified using self-report measures (Childers 1986; Coleman et al. 2018), however in future research it would be advantageous to seek corroboration from their social groups. This type of research is necessary to confirm that they are also perceived as opinion leaders by others within their social networks and assess the degree to which they are able to influence individuals within their social groups.

Societal concerns dictate the need for animal welfare standards and animal welfare legislation (Vanhonacker and Verbeke 2014). However, public attitudes about animal-use and animal welfare are often based on limited knowledge and are largely acquired from the mass media and opinion leaders (Coleman et al. 2015). Coleman (2010) concluded that to address both the mismatch between the public's perceived and actual knowledge of livestock practices and public welfare concerns, there needs to be accurate and reciprocal communication between the livestock industries and the community.

For ongoing sustainability of the livestock industries, it is important that there be transparency about farming techniques to the public and a clear articulation of the implications for both food quality on the one hand and animal welfare on the other (Coleman et al. 2016). In addition, Coleman et al. (2016) suggest that purely economic arguments in defence of current farming practices are unlikely to be sufficient if the public cannot be reassured about animal welfare concerns. This is essential for a well-informed community able to make rational choices and if industry is to respond appropriately to community expectations. Therefore, research is needed to identify the relevant factors that

influence community attitudes and behaviours that oppose aspects of livestock production and the way in which stakeholders within the livestock industries respond to community concerns. Once these factors are understood strategies can be developed and implemented to provide appropriately targeted dispassionate and factual information to the community regarding the red meat industry and appropriately targeted advice to producers to address public concerns about farm animal welfare. This will facilitate alignment between industry and government policies and consumer and community perceptions.

Community education strategies have been employed in a range of areas, including health and disease, environment and energy, to bring about knowledge, attitude and behavioural change within the general community. Within the social science literature, community-based education programs most commonly concern health and disease prevention strategies, as outlined in the review by Merzel and D'Afflitti (2003). A community-based approach to health promotion and disease prevention has been emphasised in modern public health initiatives. However, the results from the literature over the last 20 years indicates that, for a range of reasons, many community-based education programs have had only moderate impact on public health and disease prevention, with the notable exception of HIV prevention programs (Ebrahim and Smith 1997; Merzel and D'Afflitti 2003).

In a classical sense, education refers simply to the didactic imparting of knowledge and is generally considered to be unidirectional, whilst communication entails information that can be both shared and received (Coleman, 2010). The aims of this project were to investigate differences in the attitudes between the general public and red meat producers and the role of opinion leaders in informing the community (aims 1 and 2), and then use communication strategies as an educational approach to achieve a degree of convergence between public and producer attitudes towards animal welfare and husbandry in the red meat industry (aim 3). For convergence to occur, it is not sufficient to assume that changes in attitudes need only occur on one side, thus a communicative approach whereby information flows both ways is likely to have a more positive educational outcome through developing trust and understanding between the two parties (Coleman, 2004).

One potential means of evaluating a communication strategy in its capacity to educate is a deliberative forum, which can enable a number of messages to be tested. Deliberative forums consist of facilitated, democratic conversations during evaluative inquiry, and can range from large-scale technologically enabled forums to smaller format workshops depending on the required outcomes. Common to all deliberative methods are exchange of information, discussion of alternate choices/options, and consensus building. A deliberative forum(s) is likely to enable both an

evaluation of the effectiveness of the communication strategy in modifying participants salient beliefs and the assessment of strengths and weaknesses of each potential strategy using a deliberative process. The literature indicates that to be effective a communication strategy will need to be both integrated and comprehensive, comprising multiple interventions and different methods of delivery, and systematically involving community leaders, social networks, mass-media communication campaigns, and direct education of the general population.

The overall aim of this project is to achieve some degree of convergence in attitudes between the general community and red meat producers, leading to a greater awareness of each group's concerns, improved trust and an improved social sustainability of the red meat industries. To achieve the overall aim, the project set out to:

I. identify both producer and community knowledge of and attitudes towards livestock welfare issues in the red meat industry, and their relationships with relevant outcome variables that can impact on the sustainability of the red meat industry,

II. identify key opinion leaders, that is, influential individuals or groups, and the role of various sources (media, social networks, etc.) in informing the community regarding livestock welfare issues in the red meat industry, and

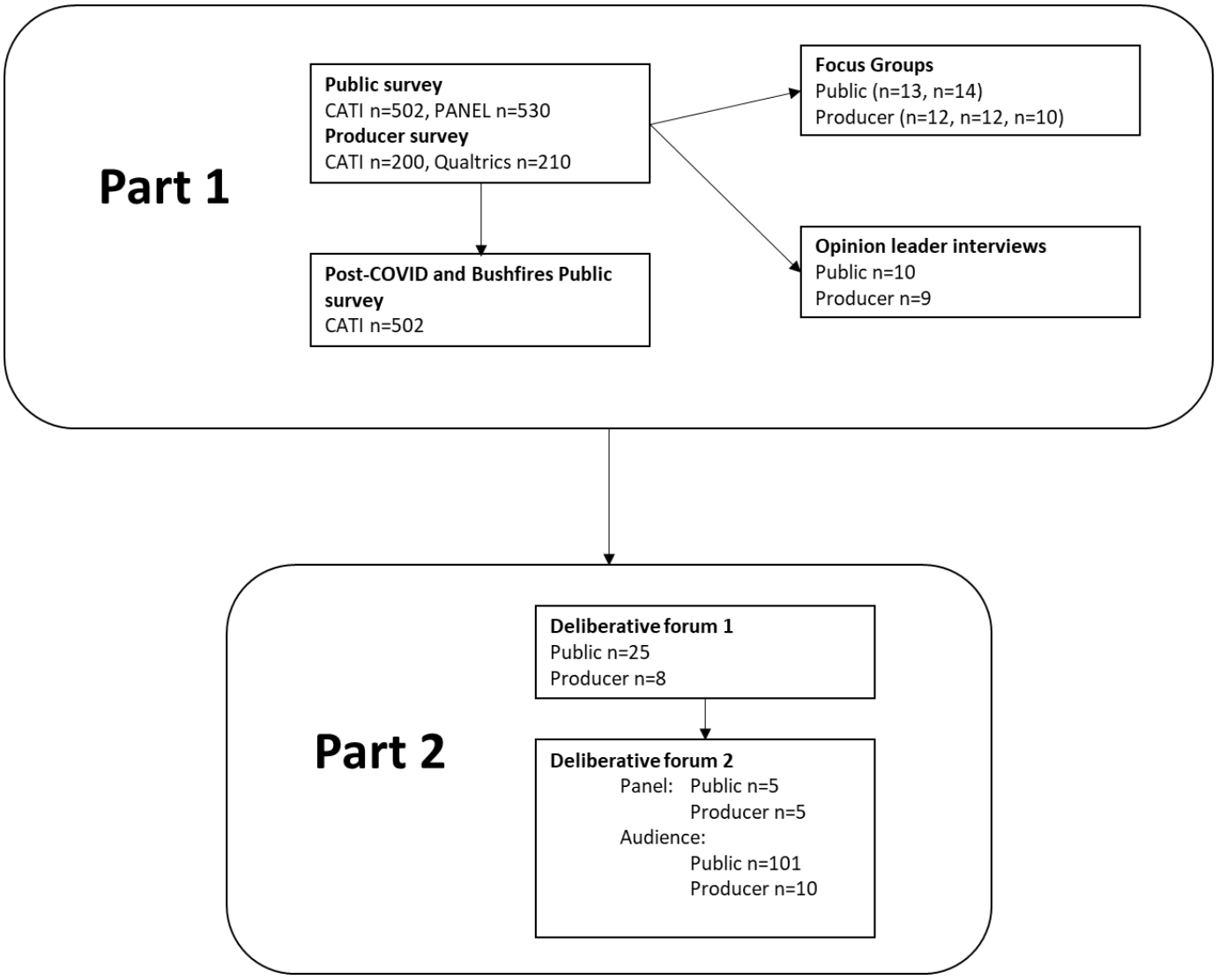
III. develop and evaluate communication (education) strategies targeting the general community and, where appropriate, red meat producers.

The project consists of two research components, with a total project time of four years (Fig. 1).

Component 1 - Producer and community knowledge of and attitudes towards sheep and beef cattle welfare: the first research component addressed the first two project aims, using questionnaires, focus groups and one-on-one interviews to survey both the general public and red meat producers.

Component 2 - Development and evaluation of education strategies for the red meat industry: the second research component addressed the final project aim by developing communication strategies that could be used as educational tools addressing animal welfare issues of concern to the general public by targeting the general community and, where appropriate, red meat producers. The communication strategies were evaluated using deliberative forums.

**Figure 1. Schematic diagram of research steps**




# 2. Part 1: Producer and community knowledge of and attitudes towards sheep and beef cattle welfare

## 2.1 Objectives

This research component will (1) identify both producer and community knowledge of and attitudes towards welfare issues in the red meat industry, the behaviours that people engage in that impact on the red meat industry and (2) identify key opinion leaders both in the red meat industry and in the community, and the role of the media in informing the community of welfare issues within the red meat industry.

## 2.2 Rationale for Part 1

The public is often a key driver of animal welfare change since public views affect decision makers at the political, regulatory, retail and industry levels. Failure to meet the expectations of the public, can lead to increased litigation, increased regulations, and increasing consumer demands all of which hamper the success of the livestock industry (Arnot 2009).

Research is needed to identify the relevant factors that influence community actions, other than purchasing, that oppose aspects of red meat production and the way in which stakeholders within the red meat industry respond to community concerns. Once these factors are understood we can begin to develop and implement education strategies which provide targeted dispassionate and factual information to producers and the community regarding the red meat industry. Beliefs form a major component of public or community attitudes, and attitudes have a role in determining how people behave as consumers and as citizens (Coleman 2010). Their behaviour in turn affects commercial viability and even the sustainability of animal industries. A range of strategies can be based on theories of mass communication (e.g., Bandura (2001); Dillard and Shen (2013)) which avoid didactic persuasion and emphasise transparency, trust and relevant facts (Coleman 2010). Attitudes to animal welfare issues in the red meat industry and behavioural beliefs obtained from a questionnaire that targets attitudes towards animal welfare relevant behaviours can be used develop content for education strategies (Yzer 2013).

The approach taken is to use questionnaires, focus groups and interviews to survey public and producer views and to use the information gathered to develop appropriate interventions. Human ethics approval was obtained from The University of Melbourne's Human Ethics Advisory Group (Ethics ID: 1750676.3).

## 2.3 Methodology:

### 2.3.1 Questionnaires

The questionnaires were developed using an iterative process that began with questionnaires that had been developed by the Animal Welfare Science Centre (AWSC) for livestock industries including the pork, egg and red meat industries (see Coleman and Toukhsati (2006); Coleman *et al.* (2016); Coleman *et al.* (2017)). These questionnaires were adapted to target attitudes towards the red meat industry, animal welfare and husbandry practices. The questionnaires also assessed the participant's knowledge of farm animals and farm animal welfare, the frequency with which they accessed

information on animal welfare, the source of information they most frequently used and trusted and the extent to which they engaged in community behaviours such as calling talk-back radio and writing to a politician to express dissatisfaction towards the red meat industry. The final questionnaire comprised five sections (see Table 1)

**Table 1. Questionnaire structure**

| Section | Type of information gathered |
|---|---|
| A. Demographics | Age, gender, education, location, dietary preferences and farm demographics (in producer questionnaire) |
| B. Animal welfare | General attitudes towards animal welfare, trust of people involved in farm animal production, normative and control beliefs in relation to animal welfare |
| C. Knowledge of farm animals and farm animal welfare | Perceived and actual knowledge of beef cattle and sheep production practices (e.g. ear tagging, mulesing, vaccination, crutching etc.) |
| D. Attitudes towards red meat farming | Approval of red meat farming practices, importance of social contact, nutrition, shelter, medications etc., concern about land and sea transport conditions. |
| E. Behaviour in relation to farm animal welfare | Membership to Animal rights groups, community behaviours (e.g. volunteering, writing letters to politicians), sources of information about animal welfare, conversations about animal welfare |

#### 2.3.1.1 Recruitment

##### 2.3.1.1.1 Public

I-View, a specialised market and social research data collection agency, were contracted to deliver the questionnaire to 1000 members of the Australian general public, using two 'random' participant recruitment methods; 502 participants were surveyed using a RDD telephone recruitment (CATI) and a further 530 participants from a probability internet panel (PANEL). Both samples were subjected to a 50:50 gender split and an age distribution consistent with Australian census data. The average duration of the CATI survey was 33.3 min and the response rate was 15%. For the PANEL sample, the median duration was 19 min (median used because of occasional outliers caused by respondents being logged on for very long periods) and the response rate estimated to be 10% based on the

number of respondents emailed who clicked on the survey link. Data collection for CATI commenced on 21st March 2018 and was completed on the 16th April 2018, while the PANEL commenced on 29th March 2018 and was completed on the 16th April 2018.

CATI involved dialling random fixed-line (n=246) and mobile telephone numbers (n=256) and inviting potential respondents to complete the questionnaire by telephone. Recent research (Kennedy *et al.* 2018) has suggested that using both fixed-line and mobile telephone numbers provides the most demographically representative sample and does not bias data collected. In each call, the consultant requested the youngest male in the household (over the age of 18 years) in order to counteract the expected bias for older female participants commonly encountered in telephone surveys. This was used as a first step after which any available person was interviewed if they met the quota requirements. The PANEL "MyView" was originally recruited by recruitment service providers, conducting email marketing campaigns, social media marketing campaigns and traditional marketing campaigns using a points-rewards based system for incentives where participants are awarded points by completing surveys. All panelists undergo a comprehensive validation process to ensure no duplication and are screened for IP address within Australia and age groups over 14 years old. Email confirmations are also used to ensure that the email is valid and belongs to the person that completed the recruitment questionnaire. MyView panel participants over the age of 18 were invited via email to participate in the current survey for a payment of 300 points (AUD $3.00). If a respondent accessed the survey and was in an age or gender group that had met the quota requirements, they were screened out of the survey. The survey was then displayed on their Panel dashboard and appeared as a notification on their mobile device if they had downloaded the application.

Using the PANEL recruitment method, a further 500 members of the general public were recruited post bushfires in 2020 and during the coronavirus pandemic to investigate any impacts of these events on the public attitudes (values and priorities) towards animal welfare in the red meat industry.

#### 2.3.1.1.2 Producers

Project leaders of both Better Beef and Best Wool Best Lamb were contacted and enlisted to assist with producer recruitment, which was achieved by sending the link to the online survey (Qualtrics, University of Melbourne) via their mailing lists, local coordinators and newsletter. MLA advertised the project and circulated the link in their "Friday Feedback" newsletter, and Birchip Cropping Group also distributed the link to their members as many of them also farm sheep. In addition, the project and survey link were advertised by the researchers via a stand and flyers at the Best Wool Best Lamb

and Better Beef Conference 2018. Data collection on Qualtrics commenced on 3rd May 2018 and was closed on 6th September due to lack of activity. During the data collection period, 210 producers had responded to the questionnaire, 17 of which were only partially completed and not included in the subsequent analyses.

A specialist agriculture market research company, Kg2, was contracted to deliver the questionnaires to red meat producers. The questionnaires were delivered using the CATI method to producers randomly selected within a curated database of up to 200,000 contacts covering 80 farm types. The questionnaire was delivered to 200 producers over 30 days in September–October.

### 2.3.2 Focus groups

Five focus groups were conducted in total. Two focus groups with members of the general public, held in Melbourne (n= 13 and n=14), and three producers focus groups, one with sheep producers held in Harrow (n=12) and two with beef cattle producers in Kiewa (n=12) and Omeo (n=10). These focus groups were conducted to continue investigating the underlying reasons for opposition of the red meat industry and what is needed to achieve convergence between public attitudes and those of producers.

#### 2.3.2.1 Recruitment

The participants for the general public focus group were selected from the participants in the questionnaire that have given consent to be contacted again for further participation in the research. Further public participants were recruited using an advertisement in a university newsletter. Producer participants for the focus groups were recruited through the BESTWOOL/BESTLAMB and BetterBeef coordinators. All participants were offered an incentive of $50 to participate in the focus group.

The general semi-structured protocol for both focus groups consisted of:

- General discussion about public attitudes
- What do you think about animal welfare in livestock production?
- Does this vary according to the livestock industry?
- What do you think about animal welfare in sheep and beef cattle production?
- What are you most concerned about in sheep and beef cattle production?
- What about droughts, and the challenges producers face?

- What about other environmental challenges, for example fires and floods?
- Do you think these opinions are consistent with the general publics?
- How would you rate your knowledge of the livestock production?
- Of sheep and beef cattle production?

• General discussion about producer attitudes

- What do you think producers think about welfare issues in the red meat industries?
- What do you think they would consider their biggest challenges to be?
- Do you think that producers and the general public differ in terms of what they think? (if not already clear)
- Why do you think they differ?

• Possible actions/solutions

- Do you think that any of the issues discussed are a problem for the red meat industry?
- What might the impact on the red meat industries be?
- Why do you think some members of the public have negative views about some aspects of red meat production?
- Do they oppose the red meat industry in general or particular aspects of red meat production?
- What do you think would be needed to change the publics' opinion?
- Is it possible to change the publics' opinion/attitudes?
- What if anything can/should farmers do?

• Wrap up

- Are there any other important issues related to sheep and beef cattle welfare and possible impacts on the industry that we have not discussed today?

### 2.3.3 Interviews

#### 2.3.3.1 Recruitment

Opinion leaders who were identified from the national questionnaires based on their responses to three specific questions (adapted from Childers (1986), see Table 1) and who has indicated a willingness to participate further in the research, were invited to participate in a one-on-one phone interview.

#### 2.3.3.2 Protocol

The phone interviews aimed to obtain further insights into the motivations behind opinion leaders' views of the red meat industry. The average duration of the interviews was 40 to 60 mins, and they were conducted by the same researcher (CM). The questions included in the phone interviews to opinion leaders from the general public and from the producer sample are presented below:

**General public:**

What is your opinion of the red meat industry and why?

What actions do you take in opposition to the red meat industry?

Why are you motivated to take these actions?

What outcomes do you want to achieve?

What changes would you like to see that would change your view on the red meat industry?

**Producers:**

Do you actively promote the red meat industry? Why? If yes, how?

What do you think the public thinks about animal welfare in red meat production? (Any difference between sheep and beef cattle?)

Do you think there is enough transparency between producers and the general public on general practices in livestock production?

What do you think could be done to improve public perception, to allow greater convergence in views between producers and public?

Responses to these questions were probed further if the interviewer needed to seek clarification of the responses.

## 2.4 Statistical analyses

Statistical analyses were performed using the statistical package SPSS 25.0 (SPSS Inc., Chicago, IL, United States). The attitude, trust and knowledge questionnaire data for the combined public and producer respondents were analysed using Principal Components Analysis (PCA) followed by either a Varimax or an Oblimin rotation to identify commonalities amongst the questionnaire items. The Varimax or Oblimin rotations were performed on component solutions of more than one component to provide the best simple structure (Tabachnick and Fidell 2012). The suitability of the data for the analysis was assessed using criteria outlined by Pallant (2013); the correlation coefficients were all above the required 0.3, the Kaiser-Meyer-Olkin (KMO) values exceeded the recommended value of 0.6, and Bartlett's Test of Sphericity reached statistical significance. Before conducting the PCAs, items were recoded where appropriate so that high scores reflected positive attitudes, high trust, etc. Items that were established as belonging to a common underlying component were then averaged to produce a composite score for that component. Before conducting the PCAs, items were recoded where appropriate so that high scores reflected positive attitudes, high trust, etc

Scale reliabilities were measured using Cronbach's α coefficients with an α >=0.70 as the criterion for acceptable reliability (DeVellis 2003). Items were included in a scale if their loading on the relevant component exceeded 0.33 (Tabachnick and Fidell 2012) and if, on the basis of face validity, they could be summarised by just one construct. A summary of the details of the component structures and Cronbach's α coefficients are reported in Table 2. As can be seen in this table, most Cronbach α coefficients exceeded 0.7 with the exception of five components labelled Animal welfare people/animals, Red meat animal rights, Difficult to act, Commercial media, and Social and internet media. In three of the five components, only two items comprised the composite score and Cronbach α coefficients are generally low where there are few items in the scale (Nunnally *et al.* 1967) p223.

There were two sets of questions relating to knowledge of the red meat industry. Perceived knowledge was measured by asking respondents "How much do you feel you know about beef cattle and sheep production?". Actual knowledge was assessed through a series of 13 multiple choice questions in relation to some common farming practices (e.g., mulesing, de-horning, castration,

curfew, pre-slaughter stun, etc.). Respondents were then given a score (knowledge score) based on the proportion of correctly answered questions.

Analysis of covariance was used to examine the effects of type of respondent (public and producer) and gender, with age as a covariate, on the composite variables. In this analysis of each composite variable, if the dependant variable failed the test of homogeneity of variance (based on Levene's test), a more stringent test of the main effects was adopted, that is, $p<0.01$ instead of $p<0.05$ (Tabachnick and Fidell 2012). A series of independent t-tests were conducted comparing the responses from the survey collected prior to the 2020 Bushfires and the COVID 19 pandemic, with those collected post these events across a range of variables. Similarly, a series of independent t-tests were conducted comparing the responses from the survey collected using the CATI method with the those from PANEL sample. Further a comparison was made between survey responses before and after the reporting of sheep mortality during live sea transport. The aim was to determine whether these factors impacted public attitudes and behaviour. For both the analyses of covariance and t tests, effect sizes were reported to permit assessment of the potential practical impact of any significant effects.

**Table 2. Components from the questionnaire grouped into composite scores, with a high score indicative of a positive attitude to or strong agreement with the statements (questionnaire items). Cronbach's α was calculated using the full sample.**

| Topic | Assigned attitude component label | Cronbach's Alpha | Questionnaire item | Loadings |
|---|---|---|---|---|
| Meaning of animal welfare | Animal welfare - humane | 0.76 | Preventing animal cruelty | 0.98 |
| | | | Humane treatment of animals | 0.77 |
| | Animal welfare - handling | 0.77 | Farmers and farm animal handlers using best practice | -0.93 |
| | | | Farmers and farm animal handlers caring for their animals | -0.84 |
| | Animal welfare - people vs animals | 0.49 | Balancing the needs of animals and people | 0.92 |
| | | | Caring for our pets | 0.66 |
| Acceptability of animal uses | Red meat attributes | 0.84 | I believe beef and lamb are healthy foods | 0.83 |
| | | | It is appropriate to use sheep and beef cattle to produce food for humans | 0.81 |
| | | | Sheep and beef cattle farming is environmentally sustainable | 0.82 |
| | | | Sheep and beef cattle are raised in a humane and animal friendly manner | 0.79 |
| | Red meat animal rights | 0.59 | Sheep and beef cattle have the same right to life as domestic animals | 0.84 |
| | | | Sheep and beef cattle have the same feelings as domestic animals | 0.83 |
| Trust of livestock industry people | Trust livestock people | 0.92 | I trust farm animal handlers to properly care for their sheep and beef cattle | 0.92 |
| | | | I trust those responsible for transporting sheep and beef cattle by land to properly care for them | 0.90 |
| | | | I trust abattoir workers who work with sheep and beef cattle to properly care for them and use humane slaughter methods | 0.89 |
| | | | I trust farmers to properly care for their sheep and beef cattle | 0.88 |

| | | | | |
|---|---|---|---|---|
| Attitudes towards red meat farming practices | Approval of husbandry practices | 0.89 | Castration | 0.81 |
| | | | Crutching | 0.76 |
| | | | Tail docking | 0.75 |
| | | | Dehorning | 0.74 |
| | | | Ear tagging | 0.74 |
| | | | Feedlotting | 0.68 |
| | | | Curfew | 0.65 |
| | | | Hot iron branding | 0.61 |
| | | | Pre-slaughter stunning | 0.62 |
| | | | Spaying | 0.53 |
| | | | Mulesing | 0.52 |
| Importance of farming attributes | General welfare | 0.80 | Regular exercise | 0.73 |
| | | | Freedom to roam outdoors | 0.81 |
| | | | Social contact with animals of the same species | 0.73 |
| | | | Good nutrition | 0.65 |
| | | | Fresh air | 0.71 |
| | | | Access to water | 0.55 |
| | | | Contact with their young | 0.57 |
| | | | Shelter | 0.53 |
| | | | Protection from predators | 0.46 |
| | | | Pain relief during painful husbandry procedures | 0.34 |
| | Medication | 0.73 | Medications (i.e., antibiotics) for health | 0.84 |
| | | | Vaccinations for health | 0.87 |
| Comfort of beef cattle | Land beef transport conditions | 0.94 | Space per animal | 0.90 |
| | | | Journey length | 0.90 |
| | | | Road/truck conditions (e.g. sound, vibration, braking levels | 0.90 |
| | | | Provision of food and water | 0.79 |
| | | | Ventilation | 0.86 |
| | | | Loading of animals onto vehicles (e.g. use of handling aids, human handling) | 0.79 |

| | | | | |
|---|---|---|---|---|
| | Sea beef cattle transport conditions | 0.96 | Space per animal | 0.94 |
| | | | Ventilation | 0.94 |
| | | | Boat conditions (e.g. sounds, vibration, unsteady ground) | 0.92 |
| | | | Provision of food and water | 0.91 |
| | | | Journey length | 0.90 |
| | | | Loading of animals onto boats (e.g. use of handling aids, human handling) | 0.88 |
| Comfort of sheep | Land sheep transport conditions | 0.96 | Space per animal | 0.94 |
| | | | Journey length | 0.94 |
| | | | Road/truck conditions (e.g. sound, vibration, braking levels | 0.94 |
| | | | Provision of food and water | 0.83 |
| | | | Loading of animals onto vehicles (e.g. use of handling aids, human handling) | 0.91 |
| | | | Ventilation | 0.91 |
| | Sea sheep transport conditions | 0.97 | Space per animal | 0.95 |
| | | | Ventilation | 0.95 |
| | | | Boat conditions (e.g. sounds, vibration, unsteady ground) | 0.95 |
| | | | Journey length | 0.91 |
| | | | Provision of food and water | 0.92 |
| | | | Loading of animals onto boats (e.g. use of handling aids, human handling) | 0.89 |
| Accessing information | Conventional media | 0.74 | Print media (e.g., magazines, newspapers, scientific papers) | 0.77 |
| | | | Radio | 0.76 |
| | | | Television (e.g., TV news, documentaries) | 0.66 |
| | | | Industry bodies | 0.64 |
| | | | Government advertisements/promotions | 0.55 |
| | Social and internet media | 0.69 | Social network sites, related social media (e.g., Facebook, YouTube, Twitter, blogs) | 0.83 |
| | | | Internet | 0.85 |
| | | | Friends, relatives or colleagues | 0.50 |
| | | | Animal welfare organizations e.g. RSPCA | 0.55 |
| | | 0.63 | Supermarkets (e.g. Coles, Woolworths, IGA) | 0.82 |

| | | | | |
|---|---|---|---|---|
| | Commercial media | | Celebrity chef/cook | 0.69 |
| | | | Labels (product labels) | 0.63 |
| Trust of information sources | Trust social and internet media | 0.80 | Television (e.g., TV news, documentaries) | 0.76 |
| | | | Animal welfare organizations e.g. RSPCA | 0.76 |
| | | | Internet | 0.74 |
| | | | Radio | 0.71 |
| | | | Social network sites, related social media (e.g., Facebook, YouTube, Twitter, blogs) | 0.67 |
| | | | Print media (e.g., magazines, newspapers, scientific papers) | 0.64 |
| | Trust conventional and commercial media | 0.77 | Industry bodies | 0.83 |
| | | | Supermarkets (e.g. Coles, Woolworths, IGA) | 0.80 |
| | | | Labels (product labels) | 0.69 |
| | | | Government advertisements/promotions | 0.59 |
| | | | Celebrity chef/cook | 0.46 |

From the questionnaire data, opinion leaders were identified using a two-step cluster analysis of their responses to the three questions adapted from Childers (1986). ANOVAS, t-tests and Chi-square analyses were then conducted to investigate differences in meat consumption, age and education levels between non-leaders and opinion leaders. Interviews on opinion leaders were recorded, transcribed and coded using NVivo10 qualitative data analysis software (QSR International Pty Ltd.). Thematic analysis was used to analyse the transcripts. Analysis was conducted using a grounded theory approach; thus, codes were identified as they arose from the data (Glaser and Strauss 1967).

## 2.5 Results

A comparison of the CATI and the Panel recruited participants in the public sample showed were differences between the two samples in both attitudes and behaviour toward the red meat industry after controlling for education levels. The PANEL respondents gave generally more conservative responses than did the CATI respondents in the sense that they were more positive towards the livestock industries and animal welfare within these industries. Full details of this comparison have been published in the scientific journal "Frontiers in Psychology" (Hemsworth *et al.* 2021) and are available in appendix II. In addition, a comparison of CATI vs Qualtrics producer data showed that there were also clear differences between the two methods used for recruitment of the producers for the questionnaire. As a result of these differences, the decision was made to use only the CATI data in the main analyses.

### 2.5.1 Comparison of the public and producers

#### 2.5.1.1 Details of the public and producer samples

The average duration of the CATI survey for the public was 36 min and for the producers 31 min, and response rates were 15% and 18% respectively. A summary of the age/gender demographics from the survey is presented in Table 3. In relation to the 200 producers surveyed, there were 52 sheep producers, 81 beef producers, 65 sheep and beef producers and 2 other producers (one dairy producer selling calves for meat, and one sheep/goat producer).

**Table 3. Age/gender demographics of the public and red meat producer respondents (*Census data in italics where available*)**

| | Public | | | Producer | | |
|---|---|---|---|---|---|---|
| Age | % Male | % Female | Total | %Male | %Female | Total |
| 18-24 | 40 | 60 | 48 | 50 | 50 | 4 |
| 25-34 | 47 *(49)* | 53 *(51)* | 75 | 86 | 14 | 7 |
| 35-44 | 54 *(49)* | 46 *(51)* | 84 | 86 | 14 | 14 |
| 45-54 | 39 *(49)* | 61 *(51)* | 96 | 73 | 28 | 40 |
| 55-64 | 53 *(49)* | 47 *(51)* | 94 | 74 | 26 | 65 |
| 65+ | 43 *(46)* | 56 *(54)* | 104 | 76 | 24 | 70 |
| Overall | 46 *(49)* | 54 *(51)* | 501 | 75 | 25 | 200 |

### 2.5.1.2 Comparison of public and producer attitudes, trust and knowledge

As shown in Table 4, there were marked differences (at $p<0.01$) between public and producer respondents in 20 of the 29 attitude, trust and knowledge variables studied. In relation to attitudes, producers reported more positive beliefs in the conditions provided for sheep and beef cattle during sea and land transport, the husbandry practices used in the red meat industry, and red meat attributes regarding human health, environmental impact, animal use and animal welfare, and that animal welfare involves livestock people caring for their animals and using best practice. Based on the adjusted mean attitude responses, these producer attitudes in general were more positive than those of the public, with the public attitudes in general being negative towards transport of sheep and beef cattle. Producers generally reported less concern about beef cattle and sheep welfare than the public.

Producers reported that it was easier to lobby and promote animal welfare than the public, with female producers and female members of the public reporting more positive beliefs in this respect than males. Furthermore, the public reported that it was less difficult to purchase red meat produced under good welfare standards and to lobby governments to promote farm animal welfare than producers. However, producers reported that people that matter to them expected them to both purchase lamb and beef produced with good welfare, support animal welfare causes and lobby governments to improve animal welfare than the public.

In comparison to the public, producers reported higher levels of trust in livestock people (farmers and handlers) caring for their animals, and reported more use of conventional media, but reported

lower levels of trust in social and internet media and less use of commercial and social and internet media. Producers also placed more importance on the use of health-related medications (e.g., antibiotics) and had greater perceived and actual knowledge (score) of sheep and cattle production.

The public and producers reported similar levels of trust in conventional and commercial media. Furthermore, the public and producers had similar beliefs about protecting the rights of animals, preventing animal cruelty and balancing the welfare of people and animals, and that sheep and beef cattle have similar rights and feelings as domestic animals.

There were some significant gender effects on the attitude, trust and knowledge variables as well as some significant interactions. Some of the notable gender effects were that males reported more positive beliefs in the conditions provided for sheep and beef cattle during sea and land transport and the husbandry practices used in the red meat industry, while females placed more importance on general welfare attributes. In addition, female respondents reported more concern about beef cattle and sheep welfare than male respondents. There was a marked interaction between type of respondent and gender, with male producers particularly using conventional media more than female members of the general public.

**Table 4. The effects of type of respondent (public and producer) and gender, with age as a covariate, on the composite variables.**

| | Adjusted Mean (St Error) | | | | | | p-Value | | | Covariate |
|---|---|---|---|---|---|---|---|---|---|---|
| | Public | | | Producer | | | Type | Gender | Interaction | p-Value |
| **Composite variable** | Overall | Male | Female | Overall | Male | Female | | | | |
| Sea beef transport conditions | 2.12 (0.05) | 2.28 (0.07) | 1.96 (0.06) | 3.65 (0.09) | 3.8 (0.09) | 3.5 (0.15) | <0.01[c] | <0.01[a] | 0.94 | 0.42 |
| Land sheep transport conditions | 2.37 (0.05) | 2.53 (0.07) | 2.21 (0.06) | 3.91 (0.09) | 3.98 (0.09) | 3.85 (0.15) | <0.01[c] | 0.02 | 0.31 | 0.23 |
| Sea sheep transport conditions | 2.03 (0.05) | 2.17 (0.07) | 1.89 (0.07) | 3.48 (0.09) | 3.66 (0.09) | 3.29 (0.15) | <0.01[c] | <0.01[a] | 0.62 | 0.57 |
| Beef cattle welfare concern | 2.54 (0.06) | 2.76 (0.08) | 2.32 (0.08) | 4.22 (0.1) | 4.41 (0.1) | 4.02 (0.18) | <0.01[c] | <0.01[a] | 0.86 | 0.06 |
| Land beef transport conditions | 2.53 (0.04) | 2.68 (0.07) | 2.37 (0.06) | 3.87 (0.08) | 3.93 (0.08) | 3.81 (0.14) | <0.01[c] | 0.02 | 0.29 | <0.01[a] |
| Sheep welfare concern | 2.56 (0.05) | 2.74 (0.08) | 2.37 (0.07) | 4.17 (0.1) | 4.31 (0.1) | 4.02 (0.17) | <0.01[c] | <0.01[a] | 0.71 | <0.01[a] |
| Approval of husbandry practices | 3.06 (0.04) | 3.23 (0.05) | 2.9 (0.05) | 4.05 (0.07) | 4.07 (0.07) | 4.03 (0.12) | <0.01[c] | 0.02 | 0.06 | 0.03 |
| Knowledge Score | 72.77 (0.72) | 72.82 (1.05) | 72.71 (0.97) | 92.02 (1.32) | 92.45 (1.32) | 91.59 (2.25) | <0.01[c] | 0.74 | 0.80 | <0.01[a] |
| Red meat attributes | 3.69 (0.04) | 3.78 (0.06) | 3.59 (0.05) | 4.63 (0.07) | 4.6 (0.07) | 4.66 (0.12) | <0.01[c] | 0.43 | 0.10 | <0.01[a] |
| Trust | 3.39 (0.05) | 3.53 (0.07) | 3.24 (0.06) | 4.4 (0.09) | 4.32 (0.09) | 4.48 (0.15) | <0.01[b] | 0.49 | 0.02 | 0.12 |
| Perceived Knowledge beef | 3.21 (0.05) | 3.34 (0.07) | 3.09 (0.07) | 4.19 (0.09) | 4.23 (0.09) | 4.14 (0.15) | <0.01[b] | 0.10 | 0.44 | 0.04 |
| Trust social and internet media | 2.96 (0.03) | 2.89 (0.05) | 3.04 (0.04) | 2.48 (0.06) | 2.45 (0.06) | 2.51 (0.1) | <0.01[b] | 0.12 | 0.45 | <0.01[a] |
| Perceived Knowledge sheep | 3.1 (0.05) | 3.2 (0.08) | 3 (0.07) | 3.82 (0.1) | 3.94 (0.1) | 3.71 (0.17) | <0.01[a] | 0.05 | 0.88 | <0.01[a] |
| Conventional media | 2.63 (0.04) | 2.6 (0.06) | 2.66 (0.06) | 3.2 (0.08) | 3.25 (0.08) | 3.15 (0.13) | <0.01[a] | 0.74 | 0.33 | <0.01[a] |
| Behaviour | 2.34 (0.08) | 1.88 (0.12) | 2.79 (0.11) | 1.47 (0.15) | 1.34 (0.15) | 1.6 (0.25) | <0.01[a] | <0.01[a] | 0.05 | <0.01[a] |
| Commercial media | 1.99 (0.03) | 1.87 (0.05) | 2.12 (0.04) | 2.28 (0.06) | 2.35 (0.06) | 2.22 (0.1) | <0.01[a] | 0.09 | <0.01[a] | <0.01[a] |
| Animal welfare handling | 4.28 (0.04) | 4.21 (0.06) | 4.35 (0.05) | 4.63 (0.07) | 4.59 (0.07) | 4.66 (0.12) | <0.01[a] | 0.20 | 0.68 | 0.28 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Difficult to act | 2.83 (0.05) | 2.89 (0.07) | 2.78 (0.06) | 2.46 (0.09) | 2.6 (0.09) | 2.32 (0.15) | <0.01[a] | 0.04 | 0.41 | 0.12 |
| Medication | 4.55 (0.03) | 4.46 (0.04) | 4.63 (0.04) | 4.75 (0.06) | 4.67 (0.06) | 4.83 (0.1) | <0.01[a] | 0.01[a] | 0.98 | 0.57 |
| General welfare | 4.77 (0.02) | 4.68 (0.02) | 4.85 (0.02) | 4.67 (0.03) | 4.56 (0.03) | 4.78 (0.05) | <0.01[a] | <0.01[a] | 0.48 | 0.20 |
| Easy to act | 3.09 (0.05) | 2.97 (0.08) | 3.2 (0.07) | 3.33 (0.1) | 3.29 (0.1) | 3.36 (0.16) | 0.03 | 0.17 | 0.45 | <0.01[a] |
| Positive normative beliefs | 3.3 (0.05) | 3.15 (0.07) | 3.44 (0.07) | 3.5 (0.09) | 3.54 (0.09) | 3.47 (0.15) | 0.04 | 0.28 | 0.07 | 0.08 |
| Trust conventional media | 2.57 (0.04) | 2.44 (0.05) | 2.71 (0.05) | 2.71 (0.07) | 2.72 (0.07) | 2.69 (0.11) | 0.07 | 0.10 | 0.04 | <0.01[a] |
| Public engagement beliefs | 3.5 (0.05) | 3.22 (0.07) | 3.77 (0.07) | 3.31 (0.09) | 3.36 (0.09) | 3.27 (0.16) | 0.08 | 0.03 | <0.01[a] | 0.51 |
| Social and internet media | 2.65 (0.04) | 2.46 (0.06) | 2.85 (0.05) | 2.53 (0.07) | 2.41 (0.07) | 2.65 (0.12) | 0.14 | <0.01[a] | 0.35 | <0.01[c] |
| Animal welfare humane | 4.52 (0.04) | 4.42 (0.05) | 4.62 (0.05) | 4.58 (0.07) | 4.63 (0.07) | 4.54 (0.11) | 0.40 | 0.44 | 0.04 | 0.71 |
| Animal welfare people animals | 4.06 (0.04) | 3.87 (0.06) | 4.25 (0.06) | 4.12 (0.08) | 4.08 (0.08) | 4.15 (0.13) | 0.52 | 0.01[a] | 0.07 | 0.15 |
| Red meat animal rights | 3.97 (0.05) | 3.72 (0.07) | 4.21 (0.06) | 3.91 (0.08) | 3.81 (0.08) | 4.01 (0.14) | 0.53 | <0.01[a] | 0.12 | 0.40 |
| Negative normative beliefs | 2.9 (0.05) | 3.04 (0.07) | 2.77 (0.07) | 2.84 (0.09) | 2.75 (0.09) | 2.93 (0.16) | 0.56 | 0.65 | 0.03 | 0.77 |

[a]Partial ETA squared <0.06

[b]Partial ETA squared 0.06-0.14

[c]Partial ETA squared >0.14

#### 2.5.1.3 The impacts of 2020 Bushfires and COVID 19 on public attitudes towards animal welfare

The comparison between respondents surveyed prior versus post the bushfires and the start of the COVID 19 pandemic is presented in Table 5. Prior to the bushfires and pandemic, respondents more strongly agreed that animal welfare involved best practice handling and caring for and balancing the needs of both pets and people when compared to post these events. In addition, prior to the bushfires and pandemic, respondents more strongly agreed that sheep and beef cattle have the same rights to life and the same feelings as domestic animals. Although there was no difference between the two cohorts in actual knowledge of red meat production, respondents post the bushfires and pandemic felt that they knew less about beef cattle production, but not sheep production. In addition, approval of husbandry practices was greater in respondents post bush fires and pandemic than prior to these events. These results suggest a slight shift in the general public's attitudes in relation to animal welfare in the red meat industry post natural disasters and nationwide emergencies. A possible interpretation is that the emergence of personal life challenges may have led to a decrease in less immediate more ethically-based concerns.

**Table 5. Independent t-tests comparing the beliefs of the respondents pre and post COVID-19 in relation to the meaning of animal welfare, concern for sheep and beef cattle welfare, acceptability of animal use, behavioural normative and control beliefs, perceived knowledge of sheep and beef cattle production, actual knowledge, attitudes towards red meat farming practices, beliefs on the comfort of sheep and beef cattle during transport and trust in farmers.**

| Topic | Variable | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
|---|---|---|---|---|---|---|
| Meaning of animal Welfare* | Humane treatment | 1.68 | 1048 | 0.09 | 0.08 | 0.05 |
| | Best practice handling | 2.29 | 1048 | **0.02**[a] | 0.12 | 0.05 |
| | Caring for and balancing the needs of pets and people | 2.76 | 1048 | **0.01**[b] | 0.15 | 0.05 |
| Concern for | Sheep welfare | -0.84 | 1048 | 0.40 | -0.06 | 0.07 |
| | Beef cattle welfare | -0.66 | 1048 | 0.51 | -0.05 | 0.07 |
| Acceptability of animal uses* | Red meat attributes | 1.83 | 1048 | 0.07 | 0.09 | 0.05 |
| | Red meat animal rights | 2.95 | 1048 | **0.003**[b] | 0.17 | 0.06 |
| behavioural, normative and control beliefs* | Public engagement beliefs | 1.21 | 1048 | 0.23 | 0.07 | 0.06 |
| | Negative normative beliefs | 0.85 | 1048 | 0.40 | 0.05 | 0.05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Positive normative beliefs | -0.62 | 1048 | 0.53 | -0.04 | 0.06 |
| | Easy to act | 0.95 | 1048 | 0.34 | 0.05 | 0.05 |
| | Difficult to act | 0.52 | 1048 | 0.60 | 0.03 | 0.06 |
| Perceived knowledge | Beef cattle production | 2.14 | 1048 | **0.03**[a] | 0.14 | 0.06 |
| | Sheep production | 1.52 | 1048 | 0.13 | 0.10 | 0.06 |
| Actual knowledge | Knowledge Score | 0.87 | 1048 | 0.39 | 1.02 | 1.18 |
| Attitudes towards red meat farming practices* | Approval of husbandry practices | -2.04 | 1048 | **0.04**[a] | -0.09 | 0.05 |
| Importance of farming attributes* | General welfare | -0.37 | 1048 | 0.71 | -0.02 | 0.05 |
| | Medication | -1.50 | 1048 | 0.14 | -0.08 | 0.05 |
| Comfort of beef cattle* | Land beef transport conditions | 0.41 | 1048 | 0.89 | 0.01 | 0.07 |
| | Sea beef transport conditions | 1.47 | 1048 | 0.14 | 0.11 | 0.07 |
| Comfort of sheep* | Land sheep transport conditions | 0.67 | 1048 | 0.50 | 0.05 | 0.07 |
| | Sea sheep transport conditions | 1.83 | 1048 | 0.07 | 0.13 | 0.07 |
| Trust of farmers* | Trust | -0.67 | 1048 | 0.50 | -0.04 | 0.06 |

[a]Partial ETA squared <0.06

[b]Partial ETA squared 0.06-0.14

*Responses based on composite scores.

#### 2.5.1.4 Focus groups

A summary of the main findings from the focus groups is presented in Table 6. The general public focus groups showed generally positive attitudes towards animal welfare in the red meat industry (i.e., mean scores >3.0 on a 5-point scale). Concern for animal welfare was focused on abattoirs (domestic and international), land transport and sea transport and increasing size of farming enterprise (company/corporation) – the general feeling was however that the farmers had no control over these issues. The public voiced a desire for more information but also voiced a lack of trust in the information provided by the stakeholders and difficulties differentiating between marketing and "real information".

Producers generally felt that public opinion is based on the information provided to them by the media and that the negative media reports get more play time than do positive reports. While the

public express concern for animal welfare, producers felt that they did not seem to appreciate the full impact of elements out of the producers' control (e.g., drought, rain, extreme weather). For example, the public was concerned about the effect of drought on livestock but still wished for fine weather on the weekend and were more interested in what they could do socially.

**Table 6. Summary of key findings from focus groups**

| General public | Producers |
|---|---|
| Generally, a positive attitude towards farmers and animal welfare. | Farmers perceived that the general public has positive views towards farmers, but don't like certain farming practices. |
| Public concerns seemed to be focused on abattoirs, land transport and sea transport and increasing size of farming enterprises (company/corporation). | Main welfare concerns for farmers related to managing animals during drought, avoidable deaths, animal handling at transport and husbandry procedures such as tail docking. |
| The majority of the population are generally unaware of farming practices; very little knowledge | Farmers perceived that the public doesn't have a real understanding of farming practices. |
| Perceptions that mainstream media have a negative focus on the livestock industries. | Farmers believed that social media promotes negative industry image. |
| People don't actively seek for information but would like clear standards that are managed by independent groups (e.g., farm audits). | There is an opportunity to reduce the gap between consumers and farmers through education and marketing e.g., awareness of strategies used to address welfare issues (maybe through Meat & Livestock Australia (MLA), Victorian Farmer's Federation (VFF) or self-promotion), Animal Welfare certifications by a third party, easy and clear labelling, education strategies at primary schools. |

Several possible solutions were suggested to improve the level of knowledge, trust and understanding between the two groups (see Table 7). Of note, clearer labelling and accreditations, more effective use of use of media to promote farmers and increase familiarity in the public with farming practices, more active roles from VFF and MLA in relation to responding to negative events,

education in schools and farms visits were all suggested actions which could be taken to improve public perception and allow greater convergence between producers and public.

**Table 7. Summary of possible solutions/actions raised in the focus groups (general public and producer focus groups combined)**

| |
|---|
| Communicate/visible assurance; accreditation with labelling that the public can understand. The information must be delivered by someone with credibility. Supermarkets, RSPCA, VFF or MLA may be perceived as biased |
| The industry is not working properly with the media; '*we don't go to farms, so we don't know*' |
| The VFF or MLA need to take part in responding to negative events or being proactive in delivering positive messages. *'Producers are too busy farming and trying to improve their farming practices to deal with the public concerns'* |
| Promote farmers on social media e.g., post photos of young healthy animals, etc. |
| Opening up farms to the public is too risky, and farmers don't have the time or resources to manage it |
| Educate in primary schools |

#### 2.5.1.5 Identification of Opinion Leaders

*The general public*

The three questions adapted from Childers (1986) were used in a two-step cluster analysis to identify those respondents who were used within their social group as a local source of information regarding farm animal welfare. The order of cases was first sorted into random order. Two groups were identified, those who showed a high level of activity as measured by these questions, and those who did not. The cluster analysis of the responses from the general public identified 146 opinion leaders (29.1%) and the remaining 355 respondents were in the non-leader group. Cluster means for the three items are given in Table 8. The Silhouette coefficient for these clusters was 0.6 which reflects a good fit (Kaufman and Rousseeuw 1990).

*Red meat producers*

Based on the same three questionnaire items, 128 opinion leaders (64.0%) were identified within the producer respondents as opinion leaders and the remaining 72 respondents were in the non-leader group. The Silhouette coefficient for these clusters was also 0.6, indicating a good fit. The

proportion of producers that were identified as opinion leaders was significantly higher than for the public sample (29.1% of the public sample vs 64.0% of the producer sample).

**Table 8. Group means for the two clusters identified among the general public and the red meat producers, non-leaders and opinion leaders, standard deviations are provided in brackets.**

| Questionnaire Items | General public | | Producers | |
|---|---|---|---|---|
| | Non-leaders (n=355) | Opinion leaders (n=146) | Non-leaders (n=72) | Opinion-leaders (n=128) |
| During the past six months, how many people have you told about farm animal welfare? | 1.70 (1.01) | 3.87 (1.14) | 2.19 (1.26) | 4.54 (0.94) |
| Compared with your friends, how likely are you to be asked about farm animal welfare? | 1.64 (0.87) | 3.74 (1.00) | 2.06 (1.05) | 4.05 (1.01) |
| In all of your discussions with friends and neighbours how often are you used as a source of advice on farm animal welfare? | 1.35 (0.59) | 3.15 (0.94) | 1.88 (0.87) | 3.66 (0.88) |

### 2.5.1.6 Comparison between Non-Leaders and Opinion Leaders

*Meat consumption, age and education level*

Amongst the general public respondents, while there was a tendency for more opinion leaders to be vegetarian or vegan (17.1% opinion leaders and 7.9% non-leaders), the majority in both groups were meat-eaters (82.9% opinion leaders and 92.1% non-leaders). Overall, females predominated amongst the opinion leaders of the general public respondents compared to non-leaders (65.1% vs 49.3; $\chi^2_1$=10.36, P < 0.01%), however, there were no significant differences disclosed between public opinion-leaders and non-leaders in age distribution ($\chi^2_5$=8.56, $p$ =0.13) or education level ($\chi^2_5$=9.43, $p$ =0.09). Producers all described themselves as “Meat and vegetable eaters”. For this group, there were no significant differences between opinion leaders and non-leaders in age distribution ($\chi^2_5$=7.26, $p$ =0.20), education level ($\chi^2_5$=4.12, $p$ =0.52), or gender ($\chi^2_5$=1.04, $p$ =0.31).

*Perceived and actual knowledge about the red meat industry*

Amongst the general public, survey respondents perceived that their knowledge about the red meat industry was moderate (Sheep: mean 3.06, Beef: mean 3.19 on a 5-point scale). Overall, the actual knowledge of survey participants (in terms of percentage of correct answers) ranged from 15.38% to 100% with an average score of 72.34% correct answers. Opinion leaders in the general public perceived that their knowledge about beef cattle and sheep production was higher than did non-leaders (beef, 3.63 vs 3.01 $t_{499}$=5.69, $p$<0.01 and sheep, 3.51 vs 2.87, $t_{499}$=5.71, $p$<.01). However, when actual knowledge (knowledge score) was compared between opinion leaders and non-leaders, there was no difference (72.18 vs 72.41%). In the producer group, knowledge of husbandry practices ranged from 46.15% to 100% correct answers, with an average of 93.27% and the majority scoring 100%. Not surprisingly, this is considerably higher than for the public sample. Producer opinion leaders perceived that their knowledge about beef cattle husbandry practices was not different from non-leaders (4.31 vs 4.13, $t_{198}$=1.45 $p$=0.15) but perceived that their know ledge about animal sheep husbandry practices was higher than that of non-leaders (4.13 vs 3.65, $t_{198}$=2.82 p<.01). When actual knowledge was compared between producer opinion leaders and non-leaders, opinion leaders' knowledge about husbandry practices was higher than that of non-leaders (95.01 vs 90.17; $t_{198}$=3.64, p<.01).

*General attitudes towards the red meat industry*

Attitude results comparing opinion leaders and non-opinion leaders for the general public sample are given in Table 9. In general, both groups, opinion leaders and non-opinion leaders, tended to hold somewhat positive views towards the red meat industry. For example, survey statements in relation to trust in the red meat industry and red meat attributes were all scored 3+ out of a maximum score of 5. However, comparisons between the two samples showed that opinion leaders tended to hold more negative views of the red meat industries than did non-opinion leaders. For instance, compared with non-leaders, opinion leaders considered red meat less healthy (referred in the table as Red meat attributes), had lower approval levels for husbandry practices (Approval of husbandry practices), rated sheep and cattle rights as more similar to domestic animals (Red meat animal rights) and had lower approval levels for sheep and cattle transport conditions (Sea beef transport conditions, Land sheep transport conditions, Sea sheep transport conditions).

Opinion leaders in the general public sample also more strongly believed in the need to actively promote sheep and cattle welfare (Public engagement beliefs), more strongly believed that friends and relatives would expect them to actively support animal welfare (Positive normative beliefs) and

that it was easy to engage in community actions (Easy to act). They also were more likely to use all kinds of media for information, but significantly used and trusted social and internet media more than non-opinion leaders.

**Table 9. Comparisons between the general public non-leaders and opinion leaders on attitudes towards red meat farming practices and community behaviour df=499.**

| | Non-leaders | Opinion leaders | | | |
|---|---|---|---|---|---|
| **PCA Components*** | Mean score | Mean score | **t** | **Sig** | **Cohen's D** |
| Animal welfare humane | 4.48 | 4.62 | 1.60 | .11 | .14 |
| Animal welfare handling | 4.29 | 4.27 | -.20 | .84 | -.02 |
| Animal welfare people animals | 4.01 | 4.20 | 2.08 | **.04** | **.19** |
| Red meat attributes | 3.76 | 3.35 | -4.25 | **.00** | **-.38** |
| Red meat animal rights | 3.90 | 4.17 | 2.66 | **.01** | **.24** |
| Public engagement beliefs | 3.31 | 4.00 | 6.46 | **.00** | **.58** |
| Negative normative beliefs | 3.07 | 2.45 | -5.66 | **.00** | **-.51** |
| Positive normative beliefs | 3.14 | 3.67 | 5.11 | **.00** | **.46** |
| Difficult to act | 2.92 | 2.57 | -3.47 | **.00** | **-.31** |
| Easy to act | 2.86 | 3.76 | 8.40 | **.00** | **.75** |
| Trust in the red meat industry | 3.49 | 3.06 | -3.86 | **.00** | **-.35** |
| Approval of husbandry practices | 3.08 | 2.95 | -1.46 | .15 | -.13 |
| General welfare | 4.75 | 4.81 | 1.50 | .13 | .13 |
| Use of medication on animals | 4.57 | 4.51 | -.83 | .41 | -.07 |
| Land beef transport conditions | 2.57 | 2.29 | -2.61 | **.01** | **-.23** |
| Sea beef transport conditions | 2.23 | 1.79 | -4.23 | **.00** | **-.38** |
| Land sheep transport conditions | 2.46 | 2.07 | -3.52 | **.00** | **-.32** |
| Sea sheep transport conditions | 2.17 | 1.68 | -4.77 | **.00** | **-.43** |
| Commercial media | 1.94 | 2.20 | 3.84 | **.00** | **.34** |
| Social and internet media | 2.51 | 3.30 | 8.90 | **.00** | **.80** |
| Conventional media | 2.51 | 2.82 | 3.44 | **.00** | **.31** |
| Trust social and internet media | 2.92 | 3.16 | 3.35 | **.00** | **.30** |
| Trust conventional media | 2.61 | 2.58 | -.38 | .71 | -.03 |
| Community behaviour | 1.98 | 3.46 | 8.27 | **.00** | **.74** |

*Label definitions – see Table 1 for details

Attitude results comparing opinion leaders and non-opinion leaders for the producer sample are given in Table 10. Comparisons between the two groups, producer opinion leaders and non-opinion leaders, showed that both groups tended to share similar views of the red meat industry and animal welfare. Producers tended to hold positive views about the industry and low trust of commercial and social media. Main differences between opinion leaders and non-opinion leaders were in relation to normative beliefs and community behaviour. That is, opinion leaders in the producer group more strongly believed that friends and relatives would expect them to actively support animal welfare (Positive normative beliefs) and that it was easy to engage in community actions (Easy to act). This

agrees with results from the public opinion leader sample. However, unlike the public respondents, opinion leaders in the producer group used conventional media more (score 3.37) than social and internet media (score 2.46) or commercial media (score 2.4). Levels of trust also differed from the public group as levels of trust by producers in all kinds of media were relatively low, ranging from 2.39 to 2.70 out of 5.

**Table 10. Comparisons between producer non-leaders and opinion leaders on attitudes towards red meat farming practices and community behaviour (df=198).**

| | **Non-leaders** | **Opinion leaders** | | | |
|---|---|---|---|---|---|
| **PCA Components** | Mean score | Mean score | **t** | **Sig** | **Cohen's D** |
| Animal welfare humane | 4.53 | 4.65 | 1.25 | .21 | .03 |
| Animal welfare handling | 4.62 | 4.63 | .05 | .96 | .01 |
| Animal welfare people animals | 4.01 | 4.18 | 1.31 | .19 | .19 |
| Red meat attributes | 4.64 | 4.74 | 1.85 | .07 | .26 |
| Red meat animal rights | 3.99 | 3.80 | -1.21 | .23 | -.17 |
| Public engagement beliefs | 3.23 | 3.41 | 1.17 | .24 | .17 |
| Negative normative beliefs | 2.86 | 2.77 | -.65 | .51 | -.09 |
| Positive normative beliefs | 3.35 | 3.67 | 2.05 | **.04** | **.29** |
| Difficult to act | 2.71 | 2.47 | -1.60 | .11 | -.23 |
| Easy to act | 2.90 | 3.43 | 3.13 | **.00** | **.44** |
| Trust in the red meat industry | 4.29 | 4.44 | 1.56 | .12 | .22 |
| Approval of husbandry practices | 4.08 | 4.10 | .23 | .82 | .03 |
| General welfare | 4.66 | 4.60 | -1.13 | .26 | -.16 |
| Use of medication on animals | 4.68 | 4.74 | .75 | .46 | .11 |
| Land beef transport conditions | 3.99 | 3.94 | -.42 | .68 | -.06 |
| Sea beef transport conditions | 3.70 | 3.76 | .42 | .68 | .06 |
| Land sheep transport conditions | 3.98 | 3.96 | -.22 | .82 | -.03 |
| Sea sheep transport conditions | 3.47 | 3.61 | .84 | .40 | .12 |
| Commercial media | 2.05 | 2.40 | 3.35 | **.00** | **.47** |
| Social and internet media | 2.01 | 2.46 | 3.70 | **.00** | **.53** |
| Conventional media | 3.19 | 3.37 | 1.32 | .19 | .19 |
| Trust social and internet media | 2.49 | 2.39 | -.97 | .34 | -.14 |
| Trust conventional media | 2.56 | 2.70 | 1.27 | .20 | .18 |
| Community behaviour | 1.03 | 1.46 | 2.05 | **.04** | **.29** |

*Label definitions – see Table 1 for details

*Behaviours performed to express dissatisfaction with the red meat industry*

Opinion leaders in the general public group reported engaging in twice as many behaviours/activities to express dissatisfaction with the red meat industry compared with non-leaders (means 3.46 vs 1.98 respectively, $t_{499}$=8.27, $p < 0.01$). The most common behaviours/activities performed by opinion

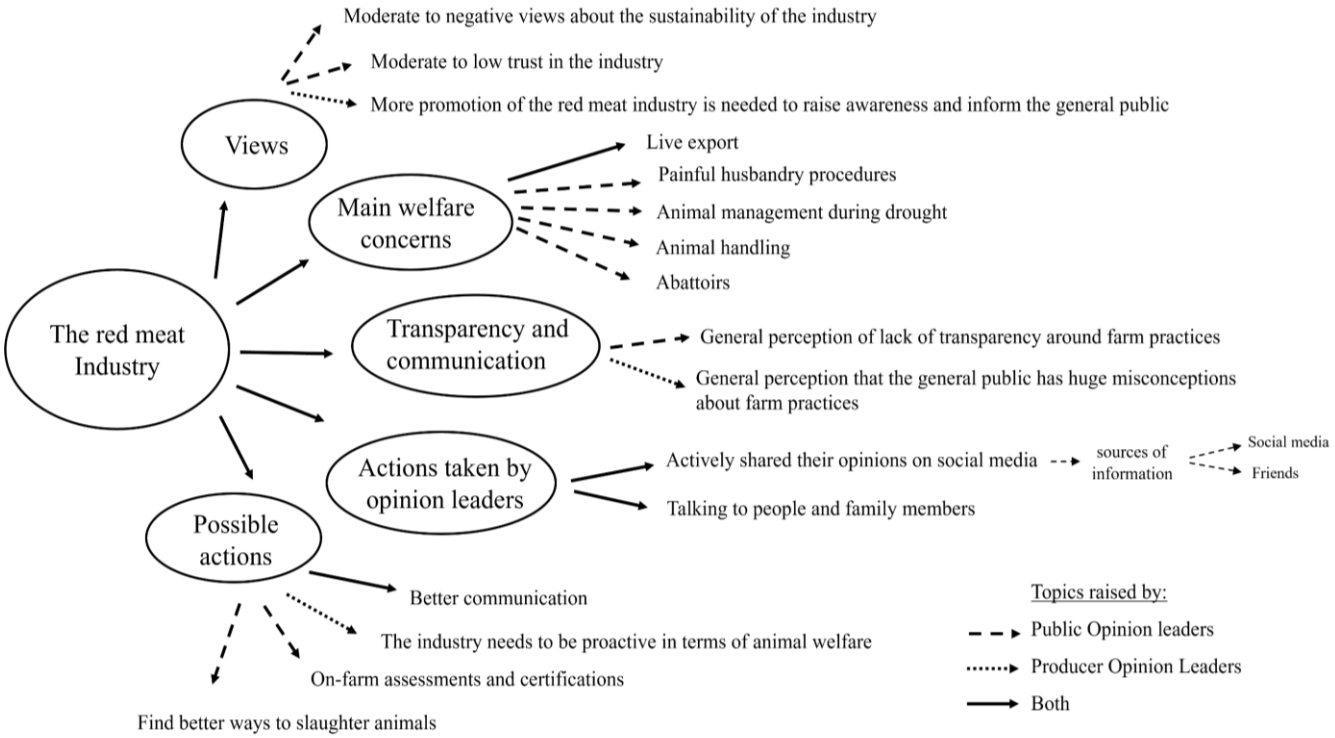
leaders were: “spoken to colleagues, family members or friends”, “donated money to animal welfare organisations”, “signed petitions” and “posted/shared information about an issue on social media such as Facebook, Twitter, Instagram”. Overall, the prevalence of memberships to animal welfare groups was low, with only 15.1% of the opinion leaders and 5.6% of the non-opinion leaders reporting being members of a particular animal welfare group. When the groups were compared, there were significantly more opinion leaders who reported being current members of an animal welfare group ($\chi^2_2$=12.04, $P < 0.01$) that non-opinion leaders.

Similar to the public group, producer opinion leaders reported engaging in more behaviours/activities to express dissatisfaction with the red meat industry than non-opinion leaders (means 1.46 vs 1.03 respectively, $t_{198}$=2.05, $P$<0.05). However, the frequency of most behaviours/activities performed was low. The only common behaviour/activity performed by opinion leaders in the producer group was “spoken to colleagues, family members or friends”. All of the other activities occurred with a prevalence of less than 15%. Overall, there was no significant difference between opinion leaders and non-leaders in the producer group in membership to animal welfare group, but again, the prevalence was low, 4.7% of the opinion leader group and 0% of the non-leader group reported to be members of an animal welfare groups.

#### 2.5.1.7 One-on-one interviews with Opinion Leaders

Followed the questionnaires, a total of 19 phone interviews were conducted, 10 interviews with the general public and nine interviews with red meat producers. For both groups, participants were recruited for interview until the researchers were satisfied with the level of data saturation (repetition) obtained from the discussions. Main themes identified were 1) general views of the red meat industry, 2) main welfare concerns, 3) transparency and communication, 4) actions taken by opinion leaders and 5) possible actions to improve public perceptions towards the red meat industry (Fig. 2).

**Figure 2. The hierarchy of themes generated using a grounded theory approach**




*General views of the red meat industry*

Opinion leaders from the general public held moderate to negative views toward the red meat industry. The main reasons for their opposition to the red meat industry were related to sustainability, animal welfare concerns and ethical views. Some relevant quotes from the interviewees included '*I think the Australian industry is somewhere in the middle, probably doing better things than other countries but I'm sure there are more humane ways of doing things*', *'I used to have a fair opinion, but recently I read about animal welfare concerns during drought, and I am not impressed', 'For me, sustainability is an important issue. I think Australian farmers have adopted management practices from England that suited England climate but not Australian climate'* and *'We have used the land with no thought of what the aboriginals needed, or what the animals needed… what the land itself needs'.* Producer opinion leaders, on the other hand, had positive views towards the red meat industry and strongly believed that the public has *'huge'* misconceptions around farm practices such as poor understanding of the differences between shearing, crutching and mulesing and the importance /justification of these practices.

*Main welfare concerns*

Both public and producer opinion leaders expressed great concerns about the welfare of animals exported to other countries. On this topic, producer opinion leaders recognised that *'the reputation*

*of the red meat industry has been terribly damaged by the live export industry'.* In addition to live export, other main welfare concerns for the public opinion leaders were related to painful husbandry procedures (e.g. dehorning, mulesing), the size of the production (e.g. large farm enterprises), feedlots, animal handling at transport, sale yards and abattoirs, and farming animals in dry areas (e.g. northern Australia). Producer opinion leaders perceived that consumers' awareness about sheep and beef cattle production is increasing, but they also believed that the public' views and opinions are mostly influenced by supermarkets. Overall, producer opinion leaders perceived that the general public is more concerned about beef cattle welfare than sheep welfare. However, most producers also recognised that they do not know what the general public think about the industry.

*Transparency and communication*

Both public and producer opinion leaders believed that there is a lack of communication between the general public and the red meat industry. Some relevant quotes from the public opinion leaders included *'I am worried about the abattoir industry. It is far too secretive, and I wonder why. Is it such a bad process to kill an animal that we have to keep it as a secret? If it is bad, I would like to see a change!'* and *"the industry is not very transparent with consumers. For example, what are the management practices that they do?"*. Producer opinion leaders, in contrast, stated that they provide a lot of information about the welfare and management of their animals for assurance proposes but that information is not communicated easily to consumers or the general public. Some other relevant quotes made by the producer opinion leaders included: *'I think some producers are not prepared to be transparent'* and *'the industry not only needs to be transparent but also needs to be seen as transparent'.*

*Actions taken by opinion leaders in opposition to or favour of the red meat industry*

In general, public opinion leaders engaged in the range of community behaviours because they are trying to raise awareness or drive policy change around sustainability and animal welfare issues. Most public opinion leaders believed that people should eat less meat or ensure their products are sourced from sustainable farms. Moreover, all the opinion leaders stated that they buy their meat products from local butchers and they always encourage their friends and family to do the same. Some relevant quotes included *'I am happy to vocalise how I feel about the industry, I am quite vocal around my friends and on social media. I try to educate people'* and *'I just discuss my ideas with people, I suppose that I am trying to change their opinions'*. Similarly, producer opinion leaders actively promote the industry mainly by engaging in a conversation with people. The main reasons to promote the industry were to raise awareness/inform people and to *'show the other side of*

*the coin'.* They also acknowledged that they like performing those activities as it is a *'social thing to do'*.

*Possible actions to improve trust towards the red meat industry*

Both groups of opinion leaders want to see a more proactive industry. Public opinion leaders, for example, would like to see more actions towards the sustainability of the industry and more communication pathways between the public and the red meat industry. Specific changes/actions that the public opinion leaders would support included: 1) increased on-farm monitoring of animals (e.g. development of certification schemes by a third party such as Animals Australia), 2) improvements in food labelling, 3) improvements in legislation and law enforcement (e.g. penalties to those farmers/stockpeople that do not follow animal welfare standards), 4) increased transparency between abattoirs and the public and 5) government support to fund the changes/actions mentioned above.

Producer opinion leaders believed the industry needs to be more proactive in communicating *'good stories'* to the general public, with one interviewee commenting '*The industry needs to send a clear message that it is a proactive industry in terms of animal welfare, instead of a reactive industry'.* Specific actions mentioned by producer opinion leaders included: 1) industry field days or expo shows could be used as opportunities to increase communication between the parties, and 2) better industry marketing, with a consistent and clear message (e.g. the industry needs to work with retailers and processors to send the same message). While some possible actions were mentioned by producers, this group also expressed concerns about consumers' reaction to the information and the use of adequate messengers to deliver information about the industry. Some relevant quotes on this topic included *'the challenge is that people have to be receptive to that information'* and *'promoting good stories through documentaries may be possible. However, you need to get adequate people to send those messages'.*

## 2.6 Discussion

Of all the attitude variables studied, the most marked differences between the general public and producers were found in the attitudes towards the conditions under which sheep and beef cattle were transported, particularly during sea transport. In general, the attitudes of the public towards transport of sheep and beef cattle were clearly negative, while producers were more positive. This finding is not surprising as there have been several recent public media campaigns in Australia calling for bans to live export of Australian farm animals (Petrie 2016; Buddle and Bray 2019).

Indeed, during this project we found that wide-spread media coverage on live export of sheep by sea resulted in increased community discussion and social media activity, together with an increase in the perceived importance of conditions aboard boats used for live sheep transport (Rice *et al.* 2020). Furthermore, high community concern regarding the transport of livestock has been previously reported in Australia and Europe (Vanhonacker *et al.* 2009; Vanhonacker *et al.* 2010; Coleman *et al.* 2015).

With regard to routine husbandry practices used in the red meat industry, producers also reported more positive beliefs when compared to members of the general public. In general, producers held more positive beliefs, while general the public neither agreed nor disagreed with the use of the main red meat husbandry practices. Similarly, producers generally had more positive beliefs that animal welfare involves both livestock people caring for their animals and using best practice, when compared with the general public. Livestock producers had been found to have both greater perceived and actual knowledge of livestock production practices than the general public (Te Velde *et al.* 2002; Coleman *et al.* 2015). These more positive producer attitudes to transport of sheep and beef cattle, the husbandry practices commonly used in the red meat industry and the welfare implications of both livestock people caring for their animals and using best practice may reflect their greater knowledge of scientific and industry advice on livestock management, first-hand experience and a commitment to appropriately be managing their livestock and safeguarding their welfare. They are also likely to have a better knowledge than the public of the current Australian welfare standards and guidelines underpinning these practices (Anon 2012, 2016b, 2016a, 2020). Furthermore, there may be elements of self-interest and defensiveness influencing the responses of some of these producers. Similarly, it is not unexpected that producers reported more positive beliefs about red meat attributes regarding human health, environmental impact, animal use and animal welfare than the public.

Producers were found to have higher levels of trust in livestock people (farmers and handlers) caring for their animals than the general public. Coleman *et al.* (2015) found the Australian public had some level of trust in livestock workers to properly care for their animals, however they held a lower level of trust in sea and land transport workers. When compared with the general public, producers reported less concern for the welfare of sheep and beef cattle. Producers having higher levels of trust in livestock people and less concern for the welfare of sheep and beef cattle may again be due to their greater knowledge of the management practices of other farmers, as well as recommendations derived from industry meetings and extension activities relating to safeguarding livestock welfare.

Differences were also found between the public and producers in several control and normative beliefs. While respondents generally reported that it was easy to support or promote positive animal welfare, producers reported greater ease than members of the general public, which may be a consequence of them having a greater knowledge and approval of the husbandry practices in the industry, believing that they safeguard animal welfare in their routine management of animals and/or feeling that they need to defend their industry. This finding would be expected and may also explain why producers were less concerned about animal welfare in the red meat industry when compared to the general community. Interestingly though when considering gender, both female producers and members of the public reported a greater ability to lobby and promote animal welfare when compared to male respondents. This finding indicates that females in general may feel more comfortable expressing their views on animal welfare.

Although there is evidence that attitudes to farm animal welfare is only one of the predictors of purchasing behaviour with price, healthiness, and local production being more important for consumers (Coleman *et al.* 2005; Coleman and Toukhsati 2006), members of the general public reported a greater ease in purchasing lamb and beef produced with good welfare than producers. Public respondents also reported a greater ease in lobbying governments to improve animal welfare in comparison to producers, however, producers reported that people that matter to them expect them to do so more than public respondents. The general public's more positive control beliefs may reflect their greater concern about sheep and beef cattle welfare. Perhaps somewhat surprisingly, producers reported more positive normative beliefs when compared with the general public. That is, producers reported that people that matter to them expected them to purchase lamb and beef produced with good welfare, support animal welfare causes and lobby governments to improve animal welfare than the public. The more positive normative beliefs reported by producers may arise because their family and friends are closely associated with the red meat industry and potentially more active in expressing their beliefs than the family and friends of general public respondents.

There were some similarities between producers and members of the general public, regarding attitudes to protecting the rights of animals, preventing animal cruelty, balancing the welfare of people and animals, and the rights and feelings of sheep and beef cattle and those of domestic animals.

When considering the use and level of trust in different sources of information, producers had higher levels of trust in conventional and commercial media and made more use of conventional media when compared to members of the general public. In contrast, producers reported lower levels of trust in social and internet media than the public and consequently, made less use of social

and internet media. Producers also reported less use of commercial media than the general public. This finding may reflect producers concerns that they may be confronted with criticism when using social media to discuss farming topics (Dürnberger 2019).

In addition to the gender effects discussed earlier, some notable gender effects were that males reported more positive beliefs about the conditions provided for sheep and beef cattle during sea and land transport and the husbandry practices used in the red meat industry, while females placed more importance on general welfare attributes. Recent surveys of the Australian general public have found that females engage in more community behaviours to display dissatisfaction with the way livestock animal are treated than males (Coleman *et al.* 2015; Coleman *et al.* 2017).

A subset of both the general public and producer samples were identified as 'opinion leaders' on the basis that they reported being used as sources of information about farm animal welfare and provided such information to the people that they encountered; a total of 29% of the public sample and 64% of the producer sample were identified as opinion leaders. Opinion leaders were defined by three questions adapted from Childers (1986), where respondents were asked about their role as sources of farm animal welfare information rather than their attitudes to farm animal welfare, and as such, they are attitude neutral. The clusters of opinion leaders identified in this study were not unique, but the fit was good (Silhouette values of 0.6) and there were clear differences between the clusters with regard to both attitudes and knowledge. Within the community, opinion leaders' attitudes differed from those of non-leaders. However, within the producer group, there were no significant differences in attitudes between opinion leaders and non-leaders.

There were some clear characteristics of opinion leaders identified in this study. Public opinion leaders held more negative views about the red meat industry and had higher levels of trust in social and internet media than non-leaders. They perceived they have higher knowledge about the industry compared to non-opinion leaders. However, their actual knowledge of animal husbandry practices was not different from the rest of the sample. Meat consumption was not significantly different between public opinion leaders and non-opinion leaders, and the overall prevalence of memberships to animal welfare groups was low. Unlike the general public, producer opinion leaders were not that active on social media, although those that were interviewed reported using social media to post positive images of the industry. Producer opinion leaders and non-leaders held similarly positive attitudes to farm animal welfare, similar levels of high trust in the red meat industry, and similarly low levels of trust in the media. Both public and producer opinion leaders engaged in more community behaviours to express dissatisfaction with the red meat industries when compared to non-leaders. However, the average number of these behaviours performed were

much lower in producers (means 1.03 and 1.46) than the general public (means 1.98 and 3.46). A possible interpretation of these findings is that public opinion leaders use multiple means to express their concerns about animal welfare in the red meat industry. The source of dissatisfaction amongst producers appears to relate to concerns about how the red meat industry is perceived and a desire to improve its image.

Opinion leaders may be used to inform the public about farm practices and their animal welfare implications. Opinion leaders in the community want to educate people, raise awareness of animal welfare issues and want to drive change in the red meat industry. However, if the information that they are sharing/discussing with their social networks is not accurate, they may present a risk to the industry. These findings are consistent with Coleman *et al.* (2017), and highlight the need to educate public opinion leaders if they are going to be considered a reliable source of information. The fact that public opinion leaders are motivated to communicate a message and drive awareness may present an opportunity to develop an opinion leader intervention strategy in the red meat industry. The use of trained/educated opinion leaders is not a new concept, and it has been successfully applied in different fields to drive positive behavioural change in the community. Some examples of programs that have used opinion leaders include promotion of mammography screening (Earp et al., 2002), tobacco prevention in schools (Perry et al., 2003; Valente et al., 2007) and HIV/STD risk reduction (Kelly et al., 1991; Latkin, 1998; Sikkema et al., 2000).

Overall, these results and those from studies such as Coleman and Toukhsati (2006), Coleman *et al.* (2016) and Coleman *et al.* (2018) suggest a polarisation between the general public and livestock producers in their attitudes towards animal welfare, knowledge of husbandry practices and trust in each other. These findings are useful in developing and testing the use of communication and engagement strategies between the public and red meat producers to reduce this polarization. Furthermore, our expanded understanding of opinion leaders can further inform the development of communication approaches. For example, while social media is one tool currently used by opinion leaders to express their views and opinions, particularly in the general public group, producers' low levels of trust in this information source/communication platform needs to be considered when developing communication and engagement strategies.

# 3. Part 2

## 3.1 Objectives

The aim of this research was to develop and evaluate communication strategies targeting the general community and red meat producers to achieve some degree of convergence in attitudes between the two groups, leading to a greater awareness of each group's concerns, and improved trust in each other.

## 3.2 Introduction

Deliberative forums enable social change strategies to be tested. They consist of facilitated, democratic conversations during evaluative inquiry, and depending on the outcomes, can range from large-scale technologically enabled forums to smaller format workshops. Common to all deliberative methods are exchange of information, discussion of alternate options, and consensus building (Siegel *et al.* 2013). Exposure to a diversity of views is most likely to lead to attitude change (Zhang 2019).

Traditionally, deliberative processes (including forums) have been used to obtain public input or participation (Abelson *et al.* 2003; Cheney *et al.* 2018), most commonly around policy development or reform, due largely to their ability to enable two-way interaction between decision makers and the public as well as deliberation amongst participants (Cheney *et al.* 2018).

Despite the intuitive appeal of deliberative processes and their relatively wide-scale adoption, several limitations have been reported, including ensuring accurate representation of the population and accurate interpretation of outcomes (Pateman 2012; Felicetti *et al.* 2016). These types of limitations may be reduced by ensuring that deliberation is authentic, inclusive and consequential (deliberation-making needs to be made to occur, it cannot just be assumed) (Pateman 2012; Curato and Böker 2016; Felicetti *et al.* 2016). Furthermore, there remains a need to make sure that the participant sample created in a deliberative process is representative of the greater public through random participant recruitment to reduce representative bias and further ensure their legitimacy (Parkinson 2006; French and Laver 2009).

Recently, a study by Zhang (2019) examined individuals' policy preference changes in response to views that are different from their own in democratic deliberation. Findings from this study suggest that engaging a diversity of viewpoints in a deliberative manner nurtures well-reasoned public opinion. Zhang (2019) proposes a difference-driven model that suggests exposure to dissimilar views in democratic deliberation fosters reconsideration of policy preferences and that the mechanism of

change varies by individual predispositions. There is evidence that although well-grounded strong opinions remain stable, individuals with well-grounded moderate opinions are likely to change after they reflect on alternative arguments (Zhang 2019). The salutary effect of a diverse opinion environment can be particularly pronounced for less informed voters who hold strong opinions. Uninformed *strong* opinions can be highly responsive to new messages; an individual's strong opinion becomes more likely to change than *moderate* opinions after they reflect on alternative arguments. The finding urges deliberative forums to convene and facilitate dialogues between different perspectives, which may eventually rejuvenate democracy and create more enlightened public opinion (Zhang 2019).

The aim of this research was to develop and evaluate communication strategies targeting the general community and red meat producers to achieve a convergence in attitudes between the two groups, leading to a greater awareness of each group's concerns, and improved trust in each other. Part 2 of the project used deliberative forums to evaluate the communication strategies.

## 3.3 Materials and Methods

The findings from Part 1 informed the development of communication messages and strategies targeting the general public and producers in order to achieve some degree of convergence in attitudes between the two groups, leading to a greater awareness of each group's concerns, improved trust and an improved social sustainability of the red meat industries. The communication messages and opportunities for engagement between producers and members of the general public (i.e., communication strategies) were evaluated in Part 2 using two deliberative forums: the first deliberative forum was conducted on a small number of public and red meat producers and was used to inform the methodology of the second, online forum. Both deliberative forums evaluated the communication approaches by examining changes in participants' attitude, knowledge and levels of trust following the forums (delivery of communication messages) and participants' perceptions of the forums.

### 3.3.1 Deliberative Forum 1: In person forum

The first deliberative forum was developed to provide an opportunity for members of the general public and red meat producers to meet in person to discuss their opinions and perspectives on a number of animal welfare issues concerning the red meat industry. During the forum participants were also asked to address the question "How can we improve communication between the community and the red meat industry about animal welfare?". Human ethics approval was obtained from The University of Melbourne's Human Ethics Advisory Group (Ethics ID:1954967.1).

The deliberative forum was held in Albury, NSW on a Saturday from 09:00 – 16:30 h. It comprised 33 participants: 25 members of the general public and eight red meat producers. The forum was facilitated by MosaicLab (https://www.mosaiclab.com.au/), a team of community engagement consultants and facilitators specialising in deliberative engagement. The research team in consultation with MosaicLabs developed the content of the deliberation, which included key stakeholders' opinion on and rationale for some of the common animal husbandry practices which have welfare implications for sheep and beef cattle, which was then considered during a facilitated discussion between the public and producers during forum. The forum was split into two parts: the delivery of the communication messages and some facilitated discussion in the morning session (Part A) and a deliberative workshop in the afternoon session (Part B) as follows:

A. Delivery of communication messages (information) from key stakeholders (see later) and a facilitated discussion between participants on the information received. After watching the first set of videos, participants received coaching on critical thinking, deliberative processes, social styles and bias. They then watched the second set of videos before participating in small group discussions.
B. Deliberative research: information delivered in Part A was considered during a facilitated discussion. MosaicLab then guided participants to address the forum's remit "How can we improve communication between the community and the red meat industry about animal welfare?". Throughout this session participants worked towards a set of recommendations in relation to this question (see Appendix V and VI).

Upon arrival, participants registered for the forum and were randomly allocated into groups of 4-5 (3-4 public and 1 producer per group) for Part A group discussions. The forum commenced with a 'meet and greet' where introductions were made to several staff of MosaicLabs and the Animal Welfare Science Centre, and an explanation of the purpose of the forum and introduction of the remit were provided. A concluding session was held at the end of the forum, consisting of participants and members of MosaicLab and the AWSC, where participants presented their recommendations, and everyone outlined what they would take away from the experience.

#### 3.3.1.1 Participant recruitment

Members of the general public aged 18 years or older were recruited by Deliberately Engaging (https://www.deliberatelyengaging.com.au/), a commercial recruitment company which specialises in forming participant samples for deliberative forums. Members of the general public were randomly contacted via a mailout using the Vox Pop Labs database and by letterbox drop. Red meat producers aged 18 years or older were recruited via a coordinator of the industry group Better Beef;

a recruitment advertisement was sent to members of a database of sheep and beef producers. Those people interested in participating were asked to complete a SurveyMonkey registration form managed by Deliberately Engaging. During the registration process participants answered a number of demographic questions to allow the sample to be compared with the wider population.

#### 3.3.1.2 Communication message

The communication messages, delivered in 5-6 min videos, targeted four routine husbandry practices which have welfare implications for sheep and beef cattle: lamb castration, lamb mulesing, calf castration and dehorning. The aim of each video was to deliver a balanced message outlining the facts (why and how the procedure is performed), the science (with regard to animal welfare implications) and the different stakeholder perspectives on each of the four husbandry practices: Meat and Livestock Australia (Industry body), a beef cattle producer, a sheep producer, RSPCA Victoria (Animal welfare organisation) and Animals Australia (Animal rights organisation).

#### 3.3.1.3 Data collection

Participants completed an attitude questionnaire pre- and post-forum (post-Part A), delivered on the survey platform Qualtrics. The questionnaire, developed during Part 1 of the project, targets attitudes toward the red meat industry, animal welfare and husbandry practices. It also assessed participant's knowledge of farm animals and farm animal welfare, their levels of trust, the frequency and source of information accessed and the extent to which they engaged in community behaviours. On average, each questionnaire took participants 15 min to complete. Further information on the development and structure of the questionnaire are reported in Part 1 of the report and papers Rice *et al.* (2020), Hemsworth *et al.* (2021). During Part A of the forum, after participants had watched each of the videos, they were polled using Poll Everywhere (https://www.polleverywhere.com/), an online polling platform, to survey their attitudes and knowledge of each husbandry procedure. At the end of Part A, participants completed a sociometric questionnaire which assessed the flow of information between themselves and their group members. The questionnaire asked participants about their own 'activity' during the discussion as well as that of the other group members. The groups were made up three types of participants: producers, general public opinion leaders and general public non-leaders. On average, the sociometric questionnaire took 5 min to complete and was developed from Grimshaw *et al*. (2006). During Part B, participants worked as a group to formulate a response to the overarching question, which resulted in the group delivering a set of recommendations.

#### 3.3.1.4 Data analysis

Statistical analyses were performed using the statistical package SPSS 26.0 (SPSS Inc., Chicago, IL, United States). The attitude and trust sections of the attitude questionnaire data were analysed using Principal Components Analysis (PCA), followed by either a Varimax or an Oblimin rotation, to identify commonalities amongst the questionnaire items (see Part 1, Rice *et al.* (2020) and Hemsworth *et al.* (2021) for details). The suitability of the data for the analysis was assessed using criteria outlined by Pallant (2013); the correlation matrix coefficients were all above the required 0.3, the Kaiser-Meyer-Olkin (KMO) values exceeded the recommended value of 0.6, and Bartlett's Test of Sphericity reached statistical significance. Items that were established as belonging to a common underlying component were then averaged to produce a composite score for that component. Before conducting the PCAs, items were recoded where appropriate so that high scores reflected positive attitudes, high trust, etc. Scale reliabilities were measured using Cronbach's α coefficients with an a > D 0.70 as the criterion for acceptable reliability (DeVellis 2003). Items were included in a scale if their loading on the relevant component exceeded 0.33 (Tabachnick and Fidell 2012) and if, on the basis of face validity, they could be summarized by just one construct. A summary of the details of the component structures are reported in Table 2. and Rice *et al.* (2020) and Hemsworth *et al.* (2021).

Perceived knowledge was measured by asking the respondent "How much do you feel you know about beef cattle and sheep production?". Actual knowledge was assessed through a series of 13 multiple choice questions in relation to some common farming practices (e.g., mulesing, de-horning, castration, curfew, pre-slaughter stun, etc.). Respondents were then given a knowledge score (actual knowledge) based on the proportion of correctly answered questions.

Repeated measures analysis of covariance (ANCOVA) with type as the independent factor and time the repeated factor was conducted to compare participants' response to the attitude questionnaire prior to the forum, during the forum and after the forum across a range of attitude, knowledge and trust variables. Analysis of variance (ANOVA) was conducted to compare participants' response to the sociometric questionnaire. In addition, repeated measures of covariance (ANCOVA) with survey type as the repeated factor was used to compare the forum sample with the CATI sample from Part 1 (a random sample representative of the Australian general public) across a range of attitude, knowledge and trust variables.

### 3.3.2 Deliberative Forum 2: Online forum

Deliberative forum 1 informed the methodology of the large second deliberative forum, which continued to evaluate the communication approach designed to achieve some degree of convergence in attitudes between the general community and red meat producers, as well as a greater awareness of each group's concerns, and improved trust in each other. This second forum was conducted online and again provided an opportunity for members of the general public and red meat producers to meet and discuss their opinions and perspectives on a number of animal welfare issues concerning the red meat industry. Human ethics approval was obtained from The University of Melbourne's Human Ethics Advisory Group (Ethics ID:20741).

The online forum was held on a weekday from 17:00 – 19:30 h. It was hosted by the Animal Welfare Science Centre (AWSC) using the proprietary video teleconferencing software program Zoom and facilitated by MosaicLabs. The forum comprised 135 participants, including both members of the general public (n=106) and red meat producers (n=15).

The format of the online forum was a panel discussion on the topic of lamb marking (that is, the practices of tail docking, castration and mulesing generally performed when lambs are 8-12 weeks of age) between a selected group of red meat producers (n=5) and recruited members of the general public (n=5). This panel discussion was viewed by an online audience (n=111; 101 and 10 public and red meat producers, respectively) in the format of a webinar (observed Q and A).

At 16:30 h participants began to signed-in to the online forum and registered as either members of the focus group or audience. At 17:00h the forum began, with introductions made by the facilitator (MosaicLabs) and the researchers (AWSC), followed by an explanation of the purpose of the forum and how it would run. All participants then received 15 min of coaching on critical thinking, deliberative processes, social styles and bias, and instruction on how to use polling platforms to ask and vote for questions and comment throughout the forum. Panel participants were then activated/unmuted and given an opportunity to introduce themselves and give an impression of what they were hoping the forum would achieve. A 30 min mini documentary focusing on the practices of lamb tail docking, castration and mulesing techniques in the Australian red meat industry (communication messages) was then shown. A written summary of the information delivered in the documentary was also available for participants to download. Following the viewing of the documentary, a facilitated discussion was held between the panel participants on the topic of lamb tail docking, castration and mulesing. Only members of the panel were permitted to participate verbally in the discussion to assist with managing both time and the direction of the discussion. To assist with facilitation, the discussion followed a set of overarching topic headings set by the

researchers. These topics were discussed until exhaustion of new material, or time restrictions required the facilitator to move the discussion along. Online polling platforms (Mentimeter and the Zoom chat function) were used throughout the forum to allow a degree of interaction from the online audience, enabling them to submit and vote for questions they would like to see discussed by the panel. This also permitted the researchers to keep a record of the content of audience discussion points and the time course. The questions answered were selected by the facilitator based on the direction of the discussion and the number of votes a question received. The forum concluded with members of the panel, MosaicLab and the researchers briefly outlining their evaluation of the online forum, and the audience was able to leave comments in the Zoom chat.

#### 3.3.2.1 Participant recruitment

Members of the general public were recruited from all regions of Australia by I-view, a professional market and social research data collection agency, using a probability internet panel. The panel "MyView" was originally recruited by recruitment service providers, conducting email marketing campaigns, social media marketing campaigns and traditional marketing campaigns using a points-rewards based system for incentives where participants are awarded points by completing surveys. All panellists underwent a comprehensive validation process to ensure no duplication and were screened for IP address within Australia and age groups over 14 years old. Email confirmations are also used to ensure that the email is valid and belongs to the person that completed the recruitment questionnaire. MyView panel participants over the age of 18 were invited via email to participate in the online forum. Producer participants aged 18 years and over were recruited through researcher contacts with red meat organisations including Better Beef, Best Wool: Best Lamb, and Meat and Livestock Australia.

All participants received $40 AUD for completing the pre-task (questionnaire). Participants involved in the panel received $240 AUD as compensation for their time and participation in the discussion and all audience participants received $150 AUD as compensation for their time and participation. Monetary incentives were paid to participants on receipt of the completed post-forum questionnaire.

#### 3.3.2.2 Communication message

The communication message, delivered in a 30 min documentary, addressed the topics of the husbandry practices of lamb tail docking, castration and mulesing (why the husbandry practice is performed, the different techniques and the positives and negatives implications of each). The documentary included a combination of information on these common husbandry practices and the

different techniques used, scientific evidence of the relative welfare impacts of the husbandry practices and the different techniques, and perspectives of stakeholders including red meat producers, a livestock veterinarian (science), the public and NGOs (animal welfare). The documentary also included images and video footage of each practice discussed. The stakeholder perspectives were presented in the format of talking heads. Handouts summarising the information provided were also provided to the participants, available for download after the documentary was shown in the online forum.

#### 3.3.2.3 Data collection

Participants completed the same attitude questionnaire as that used in the previous deliberative forum, and this was delivered before and after the forum, via the survey platform Qualtrics (Qualtrics, Provo, Utah, USA). In addition, the pre-forum questionnaire included a number of questions on participants expectations regarding the online forum, while the post-questionnaire asked a number of questions evaluating the forum. The online polling platforms used during the online forum, including Mentimeter and the Zoom chat function, collected a range of qualitative data related to participants interaction with the discussion.

#### 3.3.2.4 Data analysis

Statistical analyses were performed using the statistical package SPSS 26.0 (SPSS Inc., Chicago, IL, United States). The attitude, knowledge and trust sections of the attitude questionnaire data were analysed using the same method reported for the first deliberative forum, to create the composite variables for analysis. In addition, a perceived knowledge of lamb marking was created based on participants' perceived knowledge of tail docking, castration and mulesing, and participants' actual knowledge of lamb marking was based on the proportion of correctly answered questions on tail docking, castration and mulesing.

Repeated measures analysis of covariance (ANOVA) with gender and opinion leader as covariates were conducted to compare public participants' response to the attitude questionnaire prior to and after the forum across a range of attitude, knowledge and trust variables. In addition, repeated measures of covariance (ANCOVA) with survey type as the repeated factor was used to compare the online forum sample with the CATI sample from Part 1 (a random sample representative of the Australian general public) across a range of attitude, knowledge and trust variables. Qualitative data were analysed using thematic analysis using NVIVO (QSR International Pty Ltd. (2020)).

# 3.4 Results

## 3.4.1 Deliberative Forum 1: In person forum

### 3.4.1.1 Participant demographics

When considering dietary preferences, 94% of participants considered themselves a meat and vegetable eater, 3% a vegetarian and 3% a vegan. Participants' weekly lamb and beef consumption is reported in Table 11.

**Table 11. Deliberative forum participants' weekly lamb and beef consumption.**

| | Never | Less than once a week | Once a week | 2-3 times a week | More than 3 times per week |
|---|---|---|---|---|---|
| **Lamb consumption** | 19% | 42% | 32% | 7% | 0% |
| **Beef consumption** | 9% | 29% | 16% | 32% | 13% |

### 3.4.1.2 Examining changes in participants' attitudes: pre- and post-deliberative forum

**Table 12. Effects of time (pre-DF1 and post-DF1) and participant type (Public vs Producer) on a range of attitude and knowledge variables. Dfs=1,30. 25 general public and 8 red meat producers were surveyed.**

| | Time*Type | | Time | | Type | |
|---|---|---|---|---|---|---|
| **Composite variable** | **F** | **P** | **F** | **P** | **F** | **P** |
| Perceived knowledge | 0.12 | 0.72 | **17.52*** ** | **0.00** | **15.25*** ** | **0.00** |
| Actual knowledge | 2.60 | 0.08 | 0.07* | 0.80 | 1.30 | 0.27 |
| Concern about sheep welfare | **6.02*** ** | **0.02** | **10.2*** ** | **0.00** | 0.20 | 0.70 |
| Concern about beef welfare | **6.50*** ** | **0.02** | **5.60*** ** | **0.03** | 0.27 | 0.61 |
| Trust | 1.80 | 0.20 | 0.71 | 0.41 | 0.83 | 0.40 |
| Approval of castration in sheep | 0.35 | 0.70 | 0.13 | 0.87 | 0.51 | 0.48 |
| Approval of castration in beef cattle | 2.06 | 0.14 | 0.92 | 0.40 | 0.22 | 0.64 |
| Approval of mulesing in sheep | 0.15 | 0.90 | 2.50 | 0.09 | 0.03 | 0.90 |
| Approval of dehorning in beef cattle | 0.04 | 0.96 | 1.80 | 0.18 | 0.30 | 0.60 |
| Animal welfare people animals | 1.74 | 0.20 | 0.54 | 0.47 | **7.70*** ** | **0.01** |
| Animal welfare humane | **8.14*** ** | **0.01** | 2.33 | 0.14 | **8.14*** ** | **0.03** |
| Animal welfare handling | **5.99*** ** | **0.02** | 0.55 | 0.46 | 0.09 | 0.80 |
| Approval of husbandry practices | 0.00 | 0.95 | 0.02 | 0.90 | 2.44 | 1.3 |
| Importance of castration for sheep | 1.10 | 0.35 | 0.42 | 0.66 | 0.50 | 0.50 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Importance of castration for beef cattle | 0.63 | 0.54 | 1.20 | 0.31 | 0.34 | 0.60 |
| Importance of mulesing for sheep | 0.30 | 0.74 | 1.22 | 0.31 | 0.10 | 0.75 |
| Importance of dehorning for beef cattle | 0.94 | 0.40 | 2.76 | 0.07 | 0.24 | 0.63 |

* $0.01< \eta^2 <.06$; ** $.06< \eta^2 <.14$; *** $\eta^2 >.14$

Results from repeated measures ANOVAs on attitudes and knowledge are given in Table 12.

In comparing participants' perceived knowledge of the red meat industry, there was a significant ($p<0.01$) effect of time but no interaction between Time and Type, indicating that perceived knowledge for both the general public and producers increased post-forum (from 2.7 to 3.4 and from 3.9 to 4.5, respectively). There was a significant effect of type, with producers reporting greater perceived knowledge than members of the general public.

Regarding actual knowledge of the red meat industry, there was no effect of time and no interaction between Time and Type. These findings indicate no change in actual knowledge following the forum, for either the general public (scores of 82 and 86) or producers (scores of 94 and 89). There was also no effect of type, suggesting no significant difference between the general public and producers with regard to actual knowledge.

When considering participants' concern for sheep welfare, a significant ($p<0.01$) effect of time and a significant ($p<0.05$) interaction between Time and Type were found. While the public and producers' concern about sheep welfare were reasonably similar before the forum, producer concern after the forum decreased (scores changed from 3.00 to 4.33) while public concern remained largely unchanged (scores changed from 3.43 to 3.61). For beef cattle, there was a significant ($p<0.05$) effect of time and a significant ($p<0.05$) interaction between Time and Type. Public and producers' concern about beef welfare were similar before the forum, however after the forum producer concern decreased (scores changed from 3.22 to 4.33) while community concern remained largely the same (scores changed from 3.61 to 3.57).

For participants' level of trust in livestock industry people, there was no effect of time and no interaction between Time and Type, indicating no change in trust for either the community (scores of 3.0 and 2.93) or producers (scores of 3.2 and 3.4). Furthermore, there was no significant difference between the community and producers with regard to trust.

Participants' approval of four common red meat husbandry practices was measured pre-, during and post-forum. Regarding participants' approval of castration in sheep, there was no effect of time (pre-, during and post forum) and no interaction between Time and Type. This result indicates no change

in approval of castration in sheep following the forum, for either the community (scores of 3.5, 3.8 and 3.7) or producers (scores of 4.0, 3.9 and 4.0). There was also no significant difference between the general public and producers (scores of 3.45 and 4.00, respectively) with regard to approval of castration in sheep. For castration of beef cattle, there was no effect of time, and no interaction between Time and Type. This indicates that there was no change in approval of castration in beef cattle following the forum by the public (scores of 3.4, 3.6 and 3.6) or producers (scores of 4.0, 3.3 and 4.0). There was also no difference between the public and producers (scores of 3.46 and 4.00, respectively) regarding approval of castration in beef cattle. With regard to participants' approval of mulesing, there was no effect of time with no interaction between Time and Type (scores of 2.5, 3.0 and 2.7 for the public, and 2.5, 2.9 and 2.5 for producers). There was no difference between the general public and producers (scores of 2.45 and 2.50, respectively) with regard to approval of mulesing in sheep. For approval of dehorning in beef cattle, there was no effect of time and no interaction between Time and Type, indicating no change in approval of dehorning for either the community (scores of 3.1, 2.9 and 2.7) or producers (scores of 3.3, 3.2 and 3.0). There was also no difference between the general public and producers (scores of 3.13 and 3.33, respectively) with regard to approval of dehorning in beef cattle.

There were no differences in the attitude variables relating to the meaning of animal welfare following the forum, however there were a number of significant Time by Type interaction effects. With regard to the attitude variable *animal welfare humane*, there was a significant ($p<0.01$) interaction between Time and Type indicating that when compared with the general public (scores of 4.5 and 4.7), there was a decrease in producers' agreement with the attitude variable (scores changed from 4.5 to 3.6). For the variable *animal welfare handling*, there was a significant ($p<0.05$) interaction between Time and Type indicating that when compared with the general public (scores of 4.1 and 4.5,) there was a decrease in producers' agreement with the attitude variable (scores changed from 4.6 to 3.9) following the forum. For *importance of castration for beef cattle* there was a significant ($p<0.05$) interaction between Time and Type indicating that producers' attitudes became more negative following the forum (scores changed from 4.5, to 4.0 to 3.8) when compared to the general public (scores changed from 3.4, to 3.7 to 3.9).

In addition, there was a significant difference between community and producers regarding the variable *animal welfare humane*, with members of the general public placing greater importance on the belief that animal welfare involves humane animal care/treatment when compared to producers (scores of 4.74 and 3.62, respectively). There was a significant difference between the general public and producers with regard to the attitude variable *animal welfare people animals*, with the general

public reporting a more positive attitude towards the belief that animal welfare involves positive human-animal interaction when compared to producers (scores of 4.10 and 2.90, respectively).

Furthermore, there was no difference between the general community and producers regarding the variables *animal welfare handling*, *approval of husbandry practices*, *the importance of castration for sheep*, *the importance of mulesing for sheep*, *importance of castration for beef cattle*, and *importance of dehorning for beef cattle*.

### 3.4.1.3 Sociometric analysis

The sociometric questionnaire assessed the role of group members (participation) in the discussion, for example, who was asking questions and who was answering them. There were 8 small group discussions, comprising 8 producers, 9 general opinion leaders and 13 general public non-opinion leaders; on average each group consisted of 1 producer, 1 opinion leader and 2 non-leaders.

There was a significant difference between opinion leaders and non-leaders with regard to who answered questions ($F_{2, 32}$, 32=3.52, p=0.04) but not who asked the questions ($F_{2, 32}$, 32=2.13, p=0.14). Producers (M=2.88, SD=0.84) answered more questions than non-opinion leaders (M=1.54, SD=0.97) but not opinion leaders (M=1.80, SD=1.60); there was no difference in the number of questions asked by opinion leaders compared with non-leaders. Members of the general public, including both opinion leaders (M=2.70, SD=1.64) and non-leaders (M=2.77, SD=0.83), tended to ask more questions than producers (M=1.74, SD=1.20), however the difference was not significant. When participants were asked to identify members of the group who seemed knowledgeable on the topics discussed, there was a significant difference between participant type ($F_{2, 32}$, 32=5.20, p=0.01). Producers (M=3.13, SD=0.35) were identified as 'knowledgeable' significantly more than non-leaders (M=1.62, SD=0.96) but not opinion leaders (M=2.22, SD=1.48), and there was no difference between opinion leaders compared with non-leaders.

There was a significant difference between participant type with regard to their self-reported contribution to the discussion ($F_{2, 32}$=3.35, p=0.05). Non-leaders (M=2.86, SD=0.18) believed they contributed significantly less than producers (M=3.63, SD=0.92) but not opinion leaders (M=3.38; SD=0.52); there was no difference between opinion leaders and producers regarding their perceived contribution to the discussion. There was also a significant difference in participant type with regard to how often they believed they provided information ($F_{2, 32}$, 32=8.89, p<0.01), with producers (M=4.25, SD=0.71) reporting that they provided significantly more information than members of the general public, including both opinion leaders (M=3.33, SD=0.50) and non-leaders (M=2.80,

SD=0.94); there was no difference between opinion leaders and non-leaders. Additionally, there was a significant difference between participant type regarding their perceived use as a source of information during the discussion ($F_{2, 32}$, 32=15.65, p=0.00). Producers (M=2.57, SD=0.54) reported being used as a source of information more frequently than members of the public, including both opinion leaders (M=1.56, SD=0.53) and non-opinion leaders (M=1.29, 0.46); there was no difference between opinion leaders and non-leaders.

An overall activity score was created, based on the questions asked and the questions answered, and there were significant differences between all participant types ($F_{2, 32}$, 32=10.73, p=0.00). Producers (M=21, SD=2.51) had a significantly higher activity score than members of the general public, and opinion leaders (M=17.4, SD=4.70) had a significantly higher activity score when compared to non-leaders (M=14.10, SD=3.01).

#### 3.4.1.4 Comparing deliberative forum 1 participants with participants from the CATI survey (Part 1)

The in-person forum sample was compared with the CATI survey sample from Part 1, which was a randomly recruited sample representative of the wider Australian population, across a range of attitude, knowledge and trust variables (Table 13).

**Table 13. Comparison of the CATI participant responses and the in-person forum (DF1) participants in relation to attitudes towards animal welfare, trust of livestock industry people, approval of husbandry practices, sources of information and trust of information sources.**

| | | | Mean | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Dependent Variable** | **Mean** | **Std. Error** | **CATI** | **DF1** | **df** | **F** | **Sig.** | **Partial $\eta^2$** |
| Animal welfare humane | 4.34 | 0.08 | 4.41 | 4.27 | 1 | 0.71 | 0.40 | 0.00 |
| Animal welfare handling | 4.16 | 0.09 | 4.28 | 4.04 | 1 | 1.80 | 0.18 | 0.00 |
| Animal welfare people animals | 3.93 | 0.09 | 4.07 | 3.79 | 1 | 2.27 | 0.13 | 0.00 |
| How concerned are you about sheep welfare? | 3.04 | 0.12 | 2.60 | 3.50 | 1 | 14.07 | **0.00** | 0.03 |
| How concerned are you about beef cattle welfare? | 3.10 | 0.13 | 2.54 | 3.64 | 1 | 18.80 | **0.00** | 0.03 |
| I trust farmers to properly care for their sheep and beef cattle | 3.60 | 0.12 | 3.80 | 3.40 | 1 | 2.50 | 0.12 | 0.00 |
| I trust farm animal handlers to properly care for their sheep and beef cattle | 3.40 | 0.12 | 3.60 | 3.14 | 1 | 3.30 | 0.07 | 0.01 |
| I trust abattoir workers who work with sheep and beef cattle to | 2.65 | 0.13 | 3.10 | 2.21 | 1 | 11.00 | **0.00** | 0.02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| properly care for them and use humane slaughter methods | | | | | | | | |
| Knowledge Score | 77.62 | 1.75 | 72.30 | 82.97 | 1 | 9.32 | **0.00** | 0.02 |
| Approval of husbandry practices | 3.05 | 0.09 | 3.04 | 3.06 | 1 | 0.01 | 0.91 | 0.00 |
| Trust social and internet media | 3.12 | 0.07 | 2.99 | 3.24 | 1 | 3.20 | 0.07 | 0.01 |
| Trust conventional media | 2.70 | 0.08 | 2.61 | 2.75 | 1 | 0.80 | 0.40 | 0.00 |
| Commercial media | 2.10 | 0.07 | 2.02 | 2.18 | 1 | 1.40 | 0.24 | 0.00 |
| Social and internet media | 2.75 | 0.09 | 2.74 | 2.78 | 1 | 0.04 | 0.84 | 0.00 |
| Conventional media | 2.83 | 0.09 | 2.61 | 3.05 | 1 | 5.98 | **0.01** | 0.01 |

Participants in the in-person deliberative forum had less concern for the welfare of both sheep and beef cattle when compared to participants in the CATI survey, as well as lower levels of trust in abattoir workers to properly care for sheep and beef cattle and use humane slaughter methods. Forum participants also had a higher knowledge score when compared with participants in the CATI survey, suggesting a greater actual knowledge of the red meat industry. Participants in the forum accessed more information via conventional media (i.e., television, radio and print media) than CATI participants.

The participants from the first deliberative forum differ from the CATI survey participants on a number of key variables, and as such, may not be representative of the general population. These findings indicate that the general public deliberative forum participants may be more conservative and more informed on the red meat industry when compared to the members of the general public from the CATI survey.

It should be noted that the effect sizes for all of the significant differences reported here were small to medium, that is $\eta^2$ <.06.

## 3.4.2 Deliberative Forum 2: Online forum

### 3.4.2.1 Participant demographics

Participants in the second deliberative forum resided in all states of Australia, with the breakdown of participants across each state (Figure 3). For the second deliberative forum, 51% of participants were female and 49% were male. When considering dietary preferences, 96% of participants considered themselves a meat and vegetable eater, 3% a vegetarian and 1% a vegan. A range of additional participant demographics are reported in Figs. 4-6, and participants' weekly lamb and beef consumption is reported in Table 14.

**Figure 3. Density map showing the number of participants in each state**

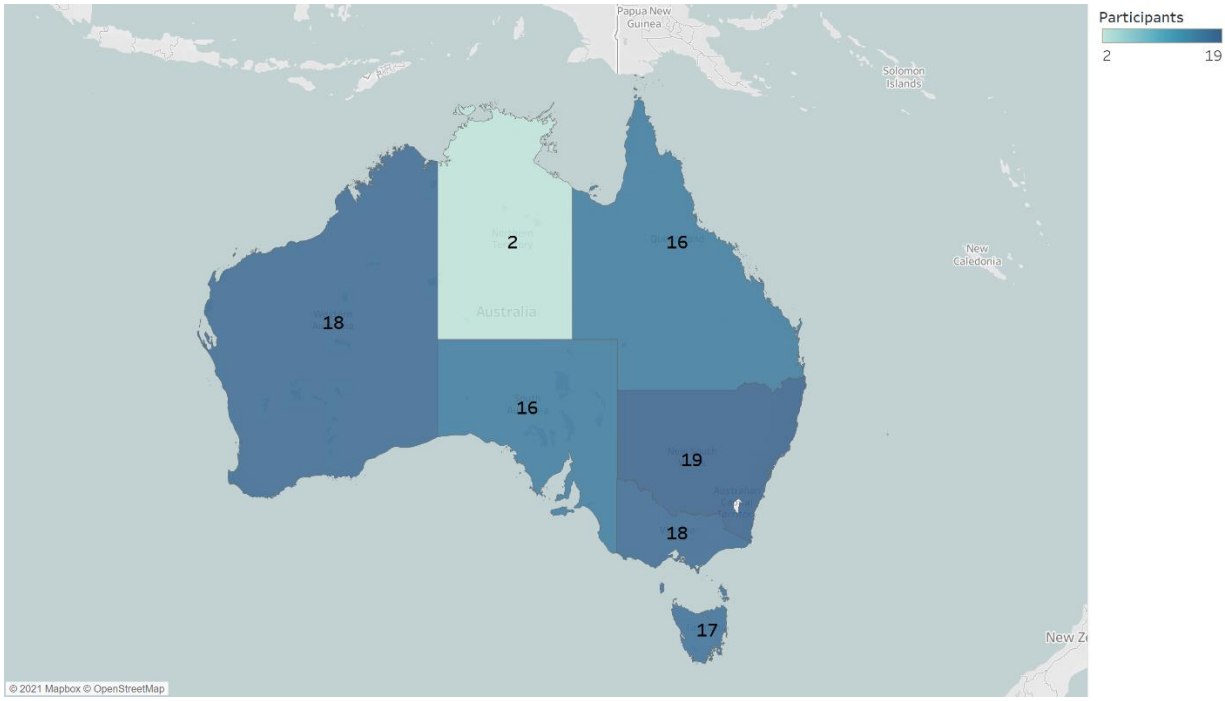



**Figure 4. Deliberative forum participants' age range**

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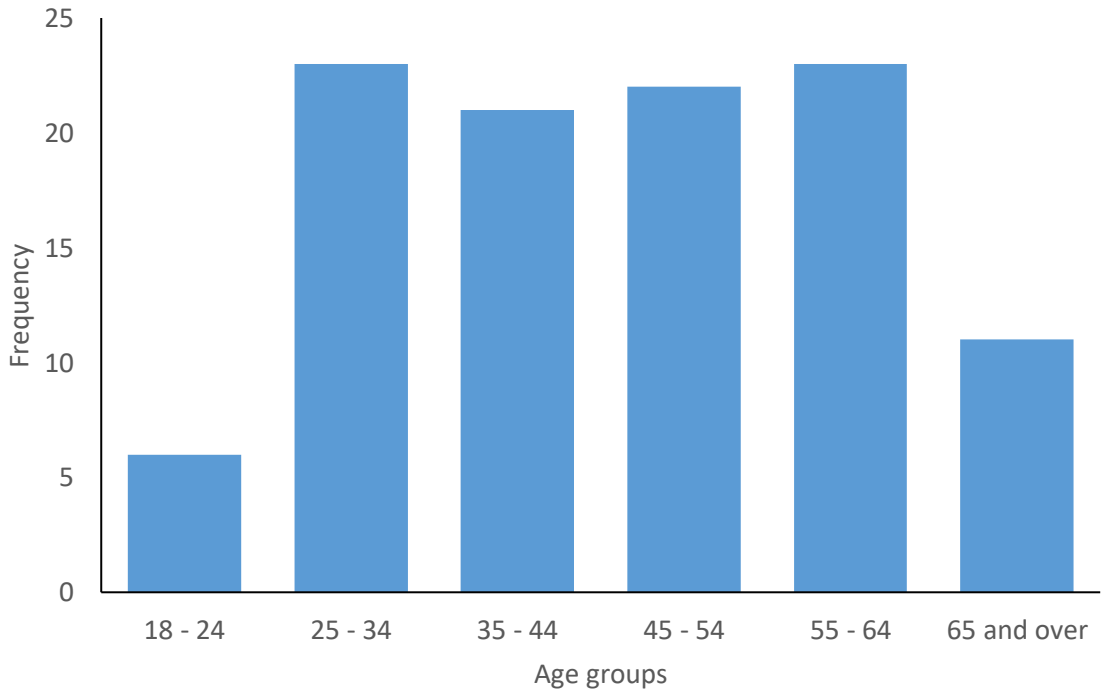


**Figure 5. Deliberative forum participants' highest level of education**

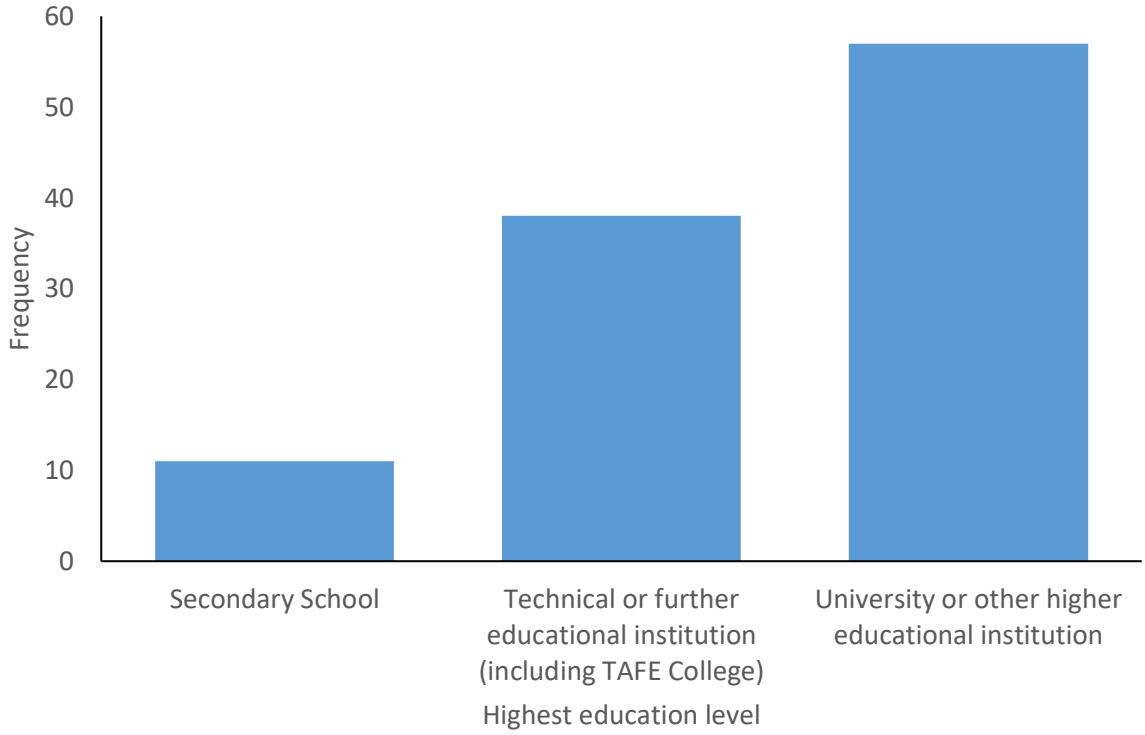



**Figure 6. Factors affecting participants' choice of red meat product.**

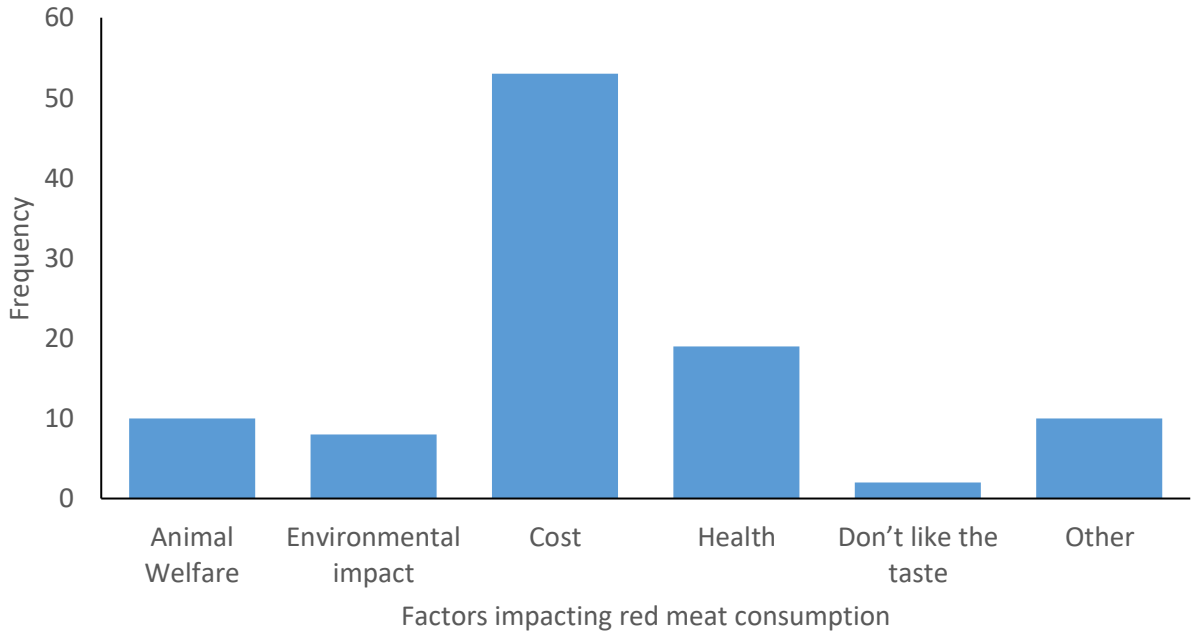


**Table 14. Deliberative forum participants' weekly lamb and beef consumption.**

| | Never | Less than once a week | Once a week | 2-3 times a week | More than 3 times per week |
|---|---|---|---|---|---|
| **Lamb consumption** | 9% | 55% | 26% | 8% | 1% |
| **Beef consumption** | 1% | 20% | 17% | 51% | 12% |

### 3.4.2.2 Examining changes in participants' attitudes: pre- and post-deliberative forum

Results from repeated measures ANOVAs on attitudes and knowledge are given in Table 15. Only data from general public participants were analysed quantitatively because of the small number of participating producers. The results reported are for main effects and two-way interactions.

**Table 15. Effects of Time (pre-DF2 and post-DF2), Gender (male and female) and Opinion leader (opinion leader and non-opinion leader) on a range of attitude and knowledge variables.**

| | Time*Gender | | Time*OL | | Time | | Gender | | OL | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Composite variable** | **F** | **P** | **F** | **P** | **F** | **P** | **F** | **P** | **F** | **P** |
| Knowledge score | 0.36 | 0.55 | 3.52 | 0.06 | 1.79 | 0.18 | 0.41 | 0.52 | 0.06 | 0.80 |
| Knowledge Score DF2 | 0.01 | 0.93 | **7.47**** | **0.01** | 9.43** | **0.00** | 0.35 | 0.55 | 0.57 | 0.45 |
| Perceived knowledge | **4.10*** | **0.05** | **7.96**** | **0.01** | 133.82*** | **0.00** | **3.85*** | **0.05** | **4.60*** | **0.03** |
| Perceived knowledge DF2 | 2.36 | 0.13 | **5.67*** | **0.02** | 46.62*** | **0.00** | **5.31*** | **0.02** | **3.78*** | **0.05** |
| General public is poorly informed | 0.04 | 0.85 | 0.04 | 0.98 | 13.94** | **0.00** | 0.08 | 0.77 | 1.26 | 0.26 |
| Trust | **5.82*** | **0.02** | 0.07 | 0.80 | 7.17** | **0.01** | 1.11 | 0.30 | 0.18 | 0.66 |
| Approval of husbandry practices | 0.93 | 0.34 | 1.40 | 0.24 | 5.60** | **0.02** | **5.20*** | **0.02** | 0.63 | 0.43 |
| Animal welfare people animals | 0.36 | 0.55 | 0.97 | 0.33 | 3.81* | **0.05** | 0.00 | 0.97 | 0.76 | 0.38 |
| Animal welfare humane | 0.14 | 0.71 | 0.42 | 0.52 | 0.84 | 0.36 | 0.96 | 0.33 | 0.42 | 0.52 |
| Animal welfare handling | 3.54 | 0.06 | 0.34 | 0.56 | 0.67 | 0.41 | 0.78 | 0.38 | 2.21 | 0.14 |
| Public concerns | 0.20 | 0.67 | 0.08 | 0.80 | 2.76 | 0.10 | 3.10 | 0.08 | 0.20 | 0.70 |

* $0.01 < \eta^2 < .06$; ** $.06 < \eta^2 < .14$; *** $\eta^2 > .14$

There was no effect of time on actual knowledge of animal husbandry and welfare in the red meat industry and no interactions between Time and Gender and Time and Opinion leader. These findings indicate no change in participants' knowledge following the online forum, for either males (scores of 83.11 and 84.31) or females (scores of 77.66 and 82.99) and opinion leaders (scores of 81.97 and 81.25) or non-opinion leaders (scores of 79.63 and 84.72). With regard to participants' knowledge of the husbandry practices performed at lamb marking (tail docking, castration and mulesing), there was a significant ($p<0.01$) effect of time and a significant ($p<0.01$) interaction between Time and Opinion Leader, indicating an increase following the forum in the public's knowledge of lamb

marking practices (scores changed from 78.15 to 90.53), in non-opinion leaders (scores changed from 75.00 to 92.25) but not opinion leaders (scores changed from 85.15 to 86.71).

For perceived knowledge of animal husbandry and welfare in the red meat industry, there was a significant ($p<0.01$) effect of time and significant ($p<0.05$) interactions between Time and Gender and Time and Opinion Leader, indicating an increase following the forum in participants' perceived knowledge (scores changed from 2.22 to 3.11), and a greater increase in females (scores changed from 1.97 to 3.05) compared to males (scores changed from 2.50 to 3.20) and in non-opinion leaders (scores changed from 2.10 to 3.10) compared to opinion leaders (scores changed from 2.60 to 3.20). There was also a significant effect ($p<0.05$) of gender and opinion leader, with male respondents and opinion leaders having a greater perceived knowledge than female respondents and non-opinion leaders. Regarding perceived knowledge of the lamb marking practices (tail docking, castration and mulesing), there was a significant ($p<0.01$) effect of time and significant ($p<0.05$) interactions between Time and Gender and Time and Opinion Leader, indicating an increase following the forum in participants' perceived knowledge of the lamb husbandry practices of tail docking, castration and mulesing (scores changed from 2.08 to 3.53), and a greater increase in females (scores changed from 1.87 to 3.55) compared to males (scores changed from 2.30 to 3.50) and in non-opinion leaders (scores changed from 1.90 to 3.50) compared to opinion leaders (scores changed from 2.50 to 3.60). There was also a significant effect ($p<0.05$) of gender and opinion leader, with male respondents and opinion leaders reporting a greater perceived knowledge of the lamb husbandry practices of tail docking, castration and mulesing when compared to female respondents and non-opinion leaders.

With regard to the attitude variable *public informed*, there was a significant ($p<0.01$) effect of time and no interaction between Time and Gender and Time and Opinion Leader, indicating that the belief that the general community is poorly informed about husbandry and animal welfare in the red meat industry increased following the forum in both males (scores changed from 3.8 to 4.17) and females (scores changed from 3.93 to 4.22) and in opinion leaders (scores changed from 3.77 to 4.09) and non-opinion leaders (scores changed from 3.92 to 4.24).

For trust of red meat industry people there was a significant ($p<0.01$) effect of time and a significant ($p<0.05$) interaction between Time and Gender, but not between Time and Opinion Leader. These findings indicate an increase following the forum in participants' trust (scores changed from 3.50 to 3.74), that was greater in females (scores changed from 3.28 to 3.76) compared to males (scores changed from 3.67 to 3.72).

Regarding the attitude variable *approval husbandry practices*, there was a significant ($p<0.05$) effect of time and no interaction between Time and Gender and Time and Opinion Leader. This finding

indicates an increase post-forum in participants' approval of red meat husbandry practices (scores changed from 3.04 to 3.18). There was also a significant ($p<0.05$) difference between males and females regarding *approval husbandry practices*, with male participants reporting greater approval of husbandry practices when compared with female participants (scores of 3.24 and 2.83, respectively).

For the attitude variable *animal welfare people animals*, there was a significant ($p<0.05$) effect of time and no interaction between Time and Gender and Time and Opinion Leader, indicating an increase following the forum in participants' belief that animal welfare involves positive human-animal interaction (scores changed from 3.74 to 3.91).

### 3.4.2.3 Comparing deliberative forum 2 participants with participants from the CATI survey (Part 1)

**Table 16. Comparison of the CATI participant responses and the online forum (DF2) participants in relation to attitudes towards animal welfare, trust of livestock industry people, approval of husbandry practices, sources of information and trust of information sources.**

| | | | Mean | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Dependent Variable** | **Mean** | **Std. Error** | **CATI** | **DF2** | **df** | **F** | **Sig.** | **Partial $\eta^2$** |
| Animal welfare humane | 4.58 | 0.04 | 4.52 | 4.64 | 1 | 1.88 | 0.17 | 0.00 |
| Animal welfare handling | 4.27 | 0.05 | 4.28 | 4.26 | 1 | 0.05 | 0.82 | 0.00 |
| Animal welfare people animals | 3.90 | 0.05 | 4.07 | 3.74 | 1 | 11.12 | **0.00** | 0.02 |
| How concerned are you about sheep welfare? | 2.80 | 0.06 | 2.57 | 3.03 | 1 | 13.23 | **0.00** | 0.02 |
| How concerned are you about beef cattle welfare? | 2.81 | 0.07 | 2.54 | 3.08 | 1 | 16.93 | **0.00** | 0.03 |
| I trust farmers to properly care for their sheep and beef cattle | 3.75 | 0.06 | 3.76 | 3.74 | 1 | 0.05 | 0.83 | 0.00 |
| I trust farm animal handlers to properly care for their sheep and beef cattle | 3.59 | 0.06 | 3.58 | 3.60 | 1 | 0.02 | 0.89 | 0.00 |
| I trust abattoir workers who work with sheep and beef cattle to properly care for them and use humane slaughter methods | 3.05 | 0.07 | 3.09 | 3.02 | 1 | 0.27 | 0.60 | 0.00 |
| Knowledge Score | 76.77 | 0.88 | 72.28 | 81.26 | 1 | 25.84 | **0.00** | 0.04 |
| Approval of husbandry practices | 3.04 | 0.05 | 3.04 | 3.04 | 1 | 0.00 | 0.97 | 0.00 |
| Trust social and internet media | 3.11 | 0.04 | 2.99 | 3.24 | 1 | 11.38 | **0.00** | 0.02 |
| Trust conventional media | 2.87 | 0.04 | 2.61 | 3.13 | 1 | 39.72 | **0.00** | 0.06 |
| Commercial media | 2.07 | 0.04 | 2.02 | 2.12 | 1 | 2.07 | 0.15 | 0.00 |
| Social and internet media | 2.68 | 0.05 | 2.74 | 2.63 | 1 | 1.22 | 0.27 | 0.00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Conventional media | 2.46 | 0.05 | 2.61 | 2.32 | 1 | 9.51 | **0.00** | 0.02 |

The online forum sample was also compared with the CATI survey sample reported in Part 1, a randomly recruited sample representative of the wider Australian population, across a range of attitude, knowledge and trust variables (Table 16).

Participants in the online forum had less concern for the welfare of both sheep and beef cattle when compared to participants in the CATI survey, but less agreement with the view that animal welfare involves positive human-animal interactions. Forum participants also had a higher knowledge score when compared with participants in the CATI survey, suggesting a greater actual knowledge of the red meat industry. With regard to trust of media sources, forum participants reported greater trust in social, internet and conventional media than CATI participants.

The online forum participants also differ from the CATI survey participants on a number of key variables, and as such, may not be representative of the general population. These findings indicate that the general public participants in the second forum may be more conservative and more informed on the red meat industry than general public participants from the CATI survey.

It should be noted that the effect sizes for all of the significant differences reported here were small to medium, that is $\eta^2 < .06$.

#### 3.4.2.4 Participants expectations and evaluations of the online deliberative forum

The pre-forum questionnaire included a question on participants' expectations regarding the online forum and another on their motivation for participating in the forum. Examples of participants' responses to the two questions are reported in Table 17.

**Table 17. Examples of participants' responses to their expectations of the online forum and their motivation to participate in the online forum, measured pre-forum.**

| Expectations of online forum | Motivation for participation |
|---|---|
| "what's general public's opinions about animal welfare, and how this opinion can be conveyed to producers. Also consider public-producer communication" | "I have 2 hens at my backyard, and my whole family love them. Naturally we care about issue of animal cruelty and animal welfare. So, this forum attracts me" |
| "expect to be educated and informed about animal practices and hear a variety of opinions" | "interested in something that doesn't usually come up on my radar" |

| | |
|---|---|
| “learn more about meat farming practices and what the industry is considering to improve the public's perception of meat farming and how this can be better communicated to change the communities misconceptions” | “the forum seemed interesting and as a red meat eater I hope to learn more about the industry especially what is done to treat the animals humanely. Also, as an outcome hopefully the participants can help the industry educate the community around what their meat comes from and what is done to ensure the animals are treated well” |
| “really unsure” | “$$$” |
| “to hold respectful, frank and open discussion about animal welfare” | “I really enjoy making a contribution to important issues. Animal welfare is certainly a 'hot' topic, and I imagine there is a fair amount of misinformation out at the moment. I am very interested in being correctly informed and providing a balanced view on the topic” |
| “I expect the industry wants to learn how to maximise acceptance of their practices and perhaps what minimal changes can be done to maximise profits” | “I enjoy food and also care about animals. However, as a business owner and meat eater I respect the rights of the meat industry and wish them well” |
| “to hear information about animal husbandry practices and people's responses to those in animal welfare context” | “my ignorance of this issue, despite an emotional reaction when hearing of animal welfare issues (along with the financial incentive, sadly)” |
| “to help cattle and sheep farmer have a fair go and get on about their business without protests or sabotage from vegan activists” | “all the vegan activists protesting about treating animals humanely, yet they have no problem killing flys or pest, just because sheep and cattle have eyes and fur makes them human apparently that’s what these activists think anyway more rights for animals than humans” |
| “to gauge reactions about the meat industry practices” | “I am vegetarian and am concerned about the meat industry and general animal cruelty and environmental effects” |
| “I realise how little I know! I'm sure I'll mainly be educated about many things I'm unaware of - | “I completed an initial survey from the research company but had no idea that this would be the |

| | |
|---|---|
| many terms, practices and (perhaps) regulations. I realise after doing this survey how much I actually want to learn more. I just haven't given this sector much attention for most of my life" | topic. The initial motivation would have been money, but now I'm more aware of the subject matter, the bigger motivation is gaining a better understanding of these industries and putting forward my voice as a member of the public" |
| "to share my opinion and listen to others respectfully on the topic of cattle and sheep farming in Australia" | "I'm interested in animal welfare and environmental issues that stem from it. I also like sharing my opinions with others and learning from others when I listen to them" |
| "open discussion about animal welfare in the meat industry - pros and cons of various practices for farmers and consumers" | "I have become increasingly more interested in animal welfare in the context of the meat industry as more and more people I know have become vegetarian or vegan" |
| "I think it should work to educate both the general public and the producers of meat" | "I was raised on a farm so understand why a lot of the practices are undertaken, although I'm sure a lot of the practices have been changed or outlawed in the last 35 years" |

The post-forum questionnaire included a number of questions evaluating the forum. When asked if the online forum met their expectations, 98% of participants (102 of 104 respondents) responded in the affirmative. Those participants who reported that the forum did not meet their expectations, provided the following reasoning:

- "it [the online forum] was quite one sided and there wasn't much interaction from the audience really"
- "the forum was educational and informative, but I think a lot more time was needed to fully cover all the issues. I think the video was out of step with current farmer's practices in regard to mulesing"

When asked if '*there was information raised and/or discussed by the following groups that I did not expect*', participants most commonly responded 'agree' for each of stakeholders considered in the forum (5-point scale, strongly disagree to strongly agree); general public (36%), producers (41%), science (37%), veterinarian (40%) and RSPCA (36%). Similarly, when asked if '*there were viewpoints raised and/or discussed by the following groups that I did not expect*', participants again most commonly responded 'agree' for each of stakeholders considered in the forum (5-point scale,

strongly disagree to strongly agree); general public (40%), producers (40% agree and 35% strongly agree), science (30%), veterinarian (30%) and RSPCA (35%).

When asked if '*this forum has improved my knowledge of*', participants most commonly responded 'agree' or 'strongly agree' about a number of factors considered in the forum (5-point scale, strongly disagree to strongly agree); husbandry practices routinely performed in the red meat industry (39% agree, 56% strongly agree), animal welfare in the red meat industry (42% agree, 48% strongly agree), viewpoints of general public (47% agree, 33% strongly agree), viewpoints of producers (39% agree, 54% strongly agree), and the science (46% agree, 23% strongly agree). Similarly, when asked if '*this forum has improved my perception of*', participants most commonly responded 'agree' or 'strongly agree' about a number of factors considered in the forum (5-point scale, strongly disagree to strongly agree); husbandry practices routinely performed in the red meat industry (39% agree, 37% strongly agree), animal welfare in the red meat industry (41% agree, 40% strongly agree), viewpoints of general public (48% agree, 23% strongly agree), viewpoints of producers (42% agree, 48% strongly agree), and the science (44% agree, 20% strongly agree).

Participants were asked if they thought their behaviour in relation to animal welfare would change, with 66% of participants responding in the affirmative and 34% of participants reporting that their behaviour would not change. If they answered yes, participants were asked to provide some information on how they thought their behaviour might change. Some examples representative of those given by respondents are reported in Table 18.

**Table 18. Examples of participants' responses to ways their behaviour may change post-forum**

| **Information seeking behaviour** |
|---|
| "I want to do more research into the practices and look into supporting local producers" |
| "I will respect the challenges faced by farmers even more now, I will search for answers to questions on content and production of meat products" |
| "I will follow up on research being conducted into alternatives to painful practices, and sign petitions (when presented) to support pain relief and alternatives such as genetic selection" |
| **Discussion and communication** |
| "I will be more supportive of local farms / producers, and encouraging them to explore best practice by having open dialogue" |
| "having open conversations with family and peers about the issues surrounding animal welfare" |
| "I'll be talking about what I saw and talked about with others and be interested in their views and thoughts" |

| |
|---|
| "I will now express the viewpoint of the producers a bit more than I would have previously when the topic of red meat production comes up" |
| "my understanding has changed even if my viewpoint hasn't. I would be happy to at least have a more informed conversation now with others" |
| **Consumption and purchasing behaviour** |
| "I will eat less meat and be on the lookout for ethically raised meat" |
| "I was quite confronted by some of the husbandry practices, so I will try and eat less meat, or buy higher quality meat to support farmers who spend extra on animal welfare" |
| "reluctant to eat meat and wear merino" |
| "I feel more inclined to support our farmers by purchasing closer to direct to help farmers financially, avoiding big supermarkets where possible to purchase meat" |
| "I will be looking to see what retail outlets are doing to address this issue" |
| **Advocacy** |
| "farmers have my full support and faith in how much they care for the welfare of their animals after this forum" |
| "following the topic in the future, creating discussion, trusting farmers, the industry and producers" |
| "I would passionately get involved with ensuring adequate pain relief. I have so much more respect for the farmers who really cared about their animals" |

Finally, participants were given the option share further comments about the forum. Of the 111 respondents, 69 participants chose to leave further comment (62%), including the examples reported in Table 19.

**Table 19. Examples of participants' responses when offered the opportunity to leave further comment post-forum.**

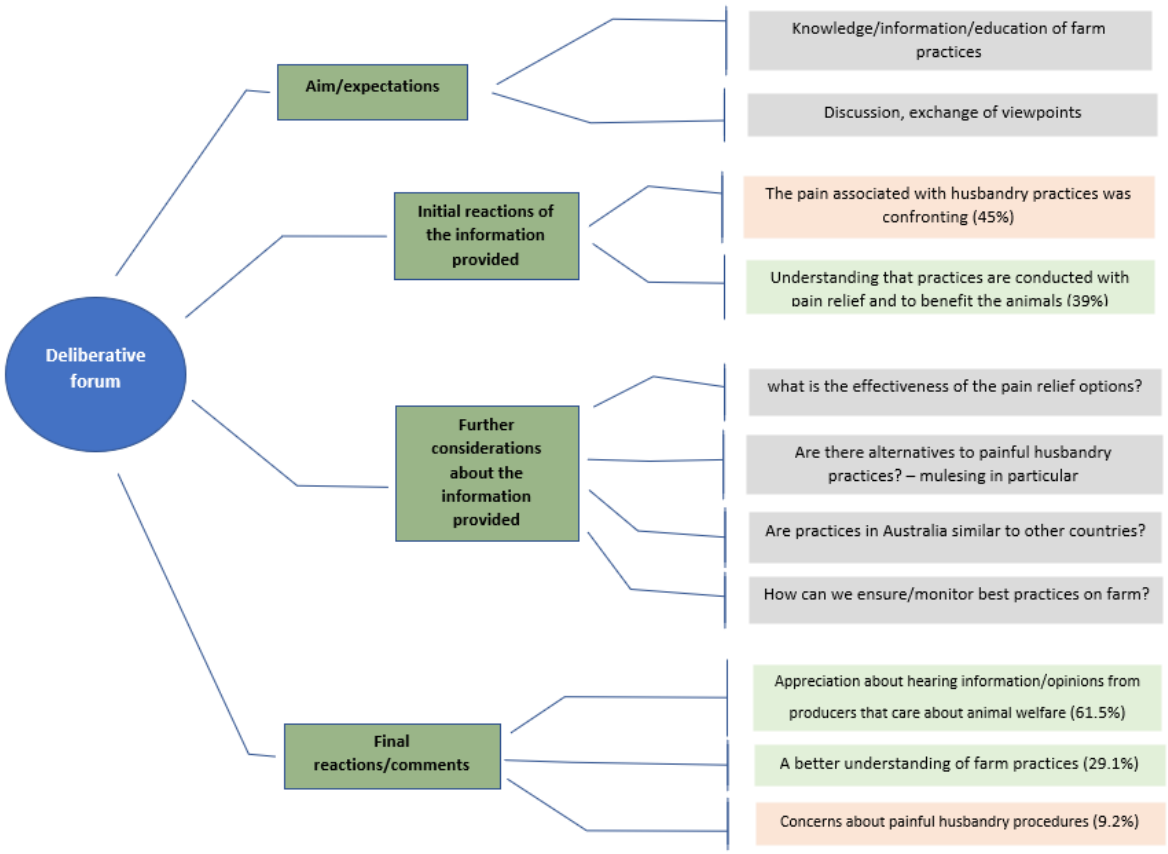
| **General comments on the online forum** |
|---|
| "it was amazing! I'm so impressed by the way it was handled and carried out. So wildly informative. Thank you so much for this opportunity" |
| "well worth doing, not an easy situation as you have to understand both sides begore making any judgements" |
| "one of the best forums I've ever been a part of, it was well run and informative, with everyone being respectful" |
| "it was well run, well-paced, there was no 'information overload', all parties were given equal opportunity to express their views and opinions" |

| |
|---|
| “I feel that the forum was informative. I would have liked more opportunity to put questions directly as an audience member; but I appreciate the time constraints” |
| “very well organised and a great range of speakers. Facilitation was excellent” |
| “more time was needed. The video parts on mulesing dominated the discussion but 4/5 producers said they don't do it anymore” |
| “it was slightly biased toward the perceived 'public' view, the film was obviously outdated and concentrated on sheep for wool not meat production giving a less than favourable view of lamb meat” |
| “I felt the video should have been more up to date showing best practices used today” |
| “need more public discourse on all TV channels and especially ABC and SBS” |
| “this needs to be on Insight or something. Get out to the whole public” |
| “thank you I really enjoyed the forum and listening to everyone’s opinions and getting a chance to have my say” |
| “A very interesting and thought-provoking discussion. Thank you! I learned a lot” |
| **Producer-focused comments** |
| “It was such educating experience. Hearing first had from the producers gave me an insight into their practices, and restrictions” |
| “I found the producers/farmers to be the most interesting. Having a couple of vets would have been good. I didn't find the other panel members added much as the comments from the audience covered all this already” |
| “I really enjoyed the forum and would honestly like to hear more from the producers / farmers as to why the do what they do and the changes they have implemented or would like too” |
| “I was shocked by some of the information provided during the forum especially around Mulesing and thought that a lot could be done to advance in this area. I however was also very impressed how most of the producers came across as genuinely caring for their animals and where possible they have moved away from some practices that caused animals pain and stress. I am certainly more supportive of farmers now having heard from them in this forum” |
| “please thank the producers as they all seemed to care for their animals whilst trying to make a living in a very challenging and ever-changing industry” |
| “I was so impressed hearing from the farmers. I was also pretty shocked at what the animals go through and hope that there may be changes in this in the future” |

### 3.4.2.5 Qualitative analysis of data collected during the online forum

A range of qualitative data related to participants engagement with the discussion was collected using the online polling platforms during the online forum. There were four main questions asked of participants during the online forum; 1) what are your aims/expectations of the day?, 2) Any initial reactions to the video? Any surprises, concerns, frustrations or things that comforted you?, 3) Any further considerations to the topics discussed? and 4) Tell us about your experience. The main themes generated from these questions are presented in Fig. 7.

**Figure 7. Main themes raised by delivery forum participants. Topics presented in grey were classed as neutral, topics presented in orange were classed as more negative and topics presented in green were categorised as more positive.**




Overall, the questions raised during the online forum (questions in relation to expectations, initial reactions, further considerations, final remarks) were largely responded to by the public sample. Immediately after the documentary was shown, comments made by the public were mostly negative (45% negative vs 39% positive). However, it is important to note that the final remarks made by the

general public at the end of the forum were in fact, mostly positive (61%). The majority of the attendees expressed appreciation for the opportunity to learn more about farm practices and interact with producers. These findings are consistent with comments reported in the post-forum questionnaire.

In terms of aims and expectations for the day, participants reported two main reasons for participating in the online forum. First to increase their knowledge. Second, to listen directly from producers and exchange ideas and concerns. These findings are in agreement with the participants' responses to questions on expectation and motivation to participate that were asked in the pre-forum questionnaire. Some direct quotes from participants included:

- *"[I want to gain] clarity on how meat is produced from both sides of the fence"*
- "*gain a better understanding of industry practice and community messaging"*
- *"[To get] a balanced view of public and producers"*

After the documentary was viewed, participants were asked about their initial thoughts and concerns. The majority of comments made by the respondents suggest that some of the information and footage presented was confronting, 45% of the comments made by the public reflected concerns about the pain involved in the husbandry practices presented, particularly in relation to castration and mulesing. Some common responses from members of the general public included:

- *"I felt ill watching the castration and mulesing, I had to look away"*
- *"didn't realise mulesing was still so prevalent"*
- *"mulesing was particularly hard to watch and the one that makes the least sense"*

Although 45% of the comments received immediately after the documentary tended to be negative, a further 39% of the comments were more positive towards the information received, with specific comments including:

- *"that's been well put together - getting the three perspectives was great"*
- *"it is a little confronting with the way the procedure is undertaken, however the reasons for the procedures are understandable from a health perspective"*
- "*I felt like all the procedures portrayed in lamb marking were justified and done in the best interests of the sheep except for the castration. It was interesting that there are alternatives such as genetic breeding - I was unaware of this"*

Participants were also given the opportunity to further consider and comment on issues raised during the forum, and most comments received were in relation to the effectiveness of pain relief,

alternatives to painful procedures, commonalities and differences between countries and on-farm monitoring. Some relevant quotes/questions raised by the public included*:*

- *"what kind of pain relief is offered and how effective is it in limiting the pain to the animal?'*
- *"how can we be sure pain relief is used?"*
- "*what informs the farmer's decision-making re. what pain relief they use?"*
- *"how do other countries deal with this?"*
- *"how do you make sure ALL producers utilise best practices?"*

Finally, participants were asked to provide final comments and shared concerns with the research team. Overall, the majority of these comments were made by the members of the general public and were of a positive nature. Again, these responses were consistent with those reported in the post-forum questionnaire. Some of the final comments included:

- "*[I have] been inspired by the passion shown by the producers and the respect shown by both sides"*
- "*I have learned so much about what happens during the husbandry process and although very confronting, I can see why farmers do engage in this process. I think there needs to be further knowledge to the general public about what happens to animals"*
- *"very insightful discussion. I think more conversations like this one, calm and respectful, between farmers and consumers would be fabulous. The more we can listen to people different to ourselves the more we can learn and understand"*

### 3.4.2.6 Producers' comments on the deliberative forum

Producers' recruitment was conducted over two weeks by the research team. More than 40 producers were reach out either by phone, email and social media and invited to participate in the online deliberative forum. Twenty producers accepted the invitation, but only 12 participated in the online event (five producers as panellists and seven as part of the audience).

Approximately 2-6 weeks after the forum, producers that participated on the day, either as a panellist or the audience, were invited to provide further comments about their experience by completing a post-forum questionnaire and a follow up phone conversation.

When asked about their experience, all participants expressed positive views. Overall, producers believed that the online forum was well executed, balanced and well facilitated. They appreciated the different points of views presented by the other producers and the constructive and respectful exchange of ideas. Some producers expressed preference for in person forums

rather than online events, and others expected more time during the forum to engaged in conversations with the general public but appreciated the time constraints. Some producers also expressed issues with engaging in the online conversations (via chat box) as comments in the chat happened 'too fast', and most producers struggled with participating in the other online platforms provided to raised questions and provide further comments during the forum.

Some comments made by the producers in relation to their experience with the forum included:

- *"It was a really good experience for me, it was eye opening. I didn't realise how little people knew"*
- "*I understand why public wish to be better informed on what producers do, and why"*
- *"Really interesting experience... especially watching the comments in the chat box where there were some very strong opinions expressed by someone who had a very fixed position on livestock farming. Although this person was busy in the chat box, their views didn't appear to reflect the majority of those at the forum. Thank you for the opportunity to be involved".*

When asked about how to engage more producers to these types of activities, most participants acknowledged that producer engagement is a difficult task. Main barriers to engage more producers included:

- Producers are reluctant to participate due to the risk of criticism
- Lack of skills with engaging with the community and expressing opinions
- Lack of time, activities need to be conducted at a good time of the day/year
- Lack of motivation

Overall, producers believed that these types of activities are good ways to interact with the public, although concerns were raised in terms of the practicalities of communicating with the public more broadly (as the forum included less than 200 people). Most producers considered that the industry should lead these activities, with clear messages, using producers as case studies to directly engage with the community.

## 3.5 Discussion

Mass communication strategies are generally unable to provide a level of detail required to address individual differences in attitudes and knowledge that we are considering in the current project. Although these types of communication strategies may be a suitable way to provide the general community with balanced information on animal welfare and associated issues, and to broadly

sensitise the community about important issues, they are not suited to changing beliefs, especially when also managing opposing influences from social media. The main reason for this is that mass communication is unidirectional and does not allow dialogue between the groups of interest, in this case, producers and the general public. Therefore, the target audiences (red meat industry and general community) need to hear the perspectives of all stakeholders to get a full understanding of the perspectives of producers on the one hand and the public on the other. Coleman (2018) suggests that this will inevitably involve a greater emphasis on engagement and transparency and less on a public relations approach. It will also require a transition from defensiveness by the livestock industries to engagement and a willingness to treat public discourses as a communication exercise rather than just dismissing public concerns as reflections of a lack of community knowledge or understanding (Coleman 2018).

### 3.5.1 First deliberative forum

The first deliberative forum provided an opportunity for a small number of red meat producers and members of the general public to meet in person and discuss their opinions and perspectives on a number of animal welfare issues concerning the red meat industry. During this forum, they were also asked to work as a group to consider the question "How can we improve communication between the community and the red meat industry about animal welfare?" and develop and report a set of recommendations in relation to this question (see appendix V).

Group discussion can be a powerful experience (Gastil *et al.* 2007), which has been shown to have tangible social (Anderson *et al.* 1999) and educational (Allen and Plax 2002) effects. Furthermore, public deliberation has been found to elicit informed perspectives on complex issues that are values-laden and lack technical solutions (Carman *et al.* 2015). Anecdotal observations by the researchers during the first forum suggested that the opportunity for direct engagement and discussion between red meat producers and members of the general public appeared to facilitate a greater understanding of each groups' perspective on the issues considered and to some degree, a convergence in attitudes between the two groups.

The opportunity for direct discussion between producers and the public, and the subsequent implications for awareness of each group's concerns/perspectives were investigated by examining changes in participants' attitudes, knowledge and trust using pre- and post-forum questionnaires. These findings provide some evidence that the opportunity to participate in a facilitated discussion between the general public and producers, afforded a greater understanding of each groups'

perspective on the issues and, to some degree, improved trust and some degree of convergence in attitudes (i.e., less polarisation) between the two groups.

In conducting the sociometric questionnaire, we aimed to examine the small group discussions, in particular the 'activity' of the group members during the discussions and the relative contributions of the three types of participant: producers, general public opinion leaders and general public non-leaders. When considering overall 'activity', producers were found to be more active in the group discussions than members of the general public, and opinion leaders were more active than non-leaders.

These findings suggest that when given the opportunity, producers and members of the general public will actively engage in group discussions on topics associated with animal welfare in the red meat industry. They also demonstrate the differences in contribution to group discussions by the three types of participant. Producers were found to actively participate in discussions with the general public, engaging in both providing information and asking questions of other group members. They were also considered 'knowledgeable' by other members of the group. While all members of the general public were active in the group discussions, opinion leaders reportedly sought more information than non-leaders. Opinion leaders were identified as 'knowledgeable' on the topics discussed, however no more than non-leaders. Both producers and opinion leaders reported a high contribution to the discussion, however, non-leaders reported contributing less to the discussion than producers but not opinion leaders. Producers reported providing significantly more information during the discussions than members of the general public, however there was no difference between opinion leaders compared and non-leaders. This finding is interesting because opinion leaders are identified on the basis that they report being used as sources of information about farm animal welfare and provide such information to the people that they encounter, i.e., provide more information on these types of topics than non-leaders.

It is important to note that although the sociometric questionnaire was able to identify who was asking questions and who was providing the answers in general, it was not possible to identify who the answers were directed towards or the context. The high level of engagement demonstrated by general public opinion leaders, together with previous literature (e.g., Theall et al., 2015) indicates they could be targeted in a communication strategy. Furthermore, opinion leaders' trust in social media (findings from Part 1) suggests this may be an appropriate method of reaching them. The results from the sociometric questionnaire suggest further investigation of group discussions between producers and members of the general public is warranted; in particular the way in which the different types of participants provide, seek and interpret information.

The results from the first deliberative forum suggest that an important aspect of any future communication approach is providing opportunities for direct engagement between red meat producers and the general public. Previous research has shown that participating in deliberation may not only improve participant knowledge, but also provide opportunity to change beliefs and attitudes. For example, Carman *et al.* (2015) found that participating in deliberation increased participants' knowledge and changed participants' attitudes regarding the role of evidence in decision-making. They concluded that deliberation offers unique potential for those seeking informed input on complex, values-laden topics affecting broad public constituencies (Carman *et al.* 2015).

### 3.5.2 Second deliberative forum

The outcomes of the first deliberative forum informed the development of the second deliberative forum. This forum was a larger online event (webinar) which provided an opportunity for members of the general public (audience) to observe a facilitated discussion between a smaller group of general public and producers on their opinions and perspectives on lamb marking and associated welfare issues.

The quantitative and qualitative findings from the online forum indicate that the opportunity to observe and participate in a facilitated discussion between the general public and producers, increased public trust in the red meat industry, improved perceived and actual knowledge of lamb marking and associated husbandry procedures, increased approval of red meat husbandry practices and changed some beliefs regarding animal welfare in the red meat industry.

There were some marked gender and opinion leader effects that are worth noting. Following the forum there was an increase in both the publics' perceived and actual knowledge of lamb marking practices, and a greater increase in non-opinion leaders compared to opinion leaders. In addition, increased perceived knowledge was greater in female compared to male respondents. There was also a significant effect of gender and opinion leader, with male respondents and opinion leaders having a greater perceived knowledge than female respondents and non-opinion leaders. The increase in trust of red meat industry people was greater in female compared to male respondents. There was also a significant gender effect on approval of red meat husbandry practices, with male respondents reporting greater approval of husbandry practices when compared with females. These gender and opinion leader effects support those reported in Part 1 and demonstrate the importance of considering both gender and opinion leaders when implementing communication strategies in the future.

In follow up interviews, producers reported that the online forum, which involved reporting of key stakeholder perspectives on the issue under consideration, non-confrontational exchanges and rational discussion, (1) met or exceeded their expectations, (2) that they were comfortable expressing their opinions and (3) felt that it was an important activity that helped them educate the public. When asked about increasing producer engagement with the general, most participants acknowledged that producer engagement is a difficult task, with the main barriers appearing to include a reluctant to participate due to the risk of criticism, a lack of skills necessary to engage with the community and express opinions, a lack of time, and a lack of motivation. Most producers suggested that the industry should lead these engagement activities, with clear messages, using producers as case studies to directly engage with the community. This producer feedback is important to consider when developing and implementing future communication strategies in order to increase engagement.

It is also important to note that the participants from the first and second deliberative forum differed from the CATI survey participants on a number of key variables, suggesting that the general public deliberative forum participants may be more conservative and more informed on the red meat industry when compared to the members of the wider general public. Although effect sizes were small, it is still an important consideration when recruiting public participants for future engagement activities.

The outcomes of the second deliberative forum will enable the communication approach to be scaled up in the same setting (e.g., online forum) or to other similar settings, such as agricultural shows, farm visits, and field days, in which forums on specific contentious or emerging animal welfare issues in the red meat industry are conducted in which public and producers participate or pre-recorded forums are shown. Furthermore, this strategy was chosen because it provides an approach that can be delivered online or face to face (or combination) and provides a level of engagement between members of the general public and producers that cannot be obtained through conventional media, has better control of information than can be promulgated compared to social media and accesses people that may not be motivated to seek out information of their own accord.

## 3.6 Part 2 conclusions

The findings from these two deliberative forums indicate that this communication strategy targeting the general community and red meat producers improved both the public knowledge on husbandry procedures and public approval of red meat husbandry practices. Furthermore, there was also

evidence that there was increased awareness of each group's concerns, and improved trust in each other. In order words, there was evidence of reduced polarisation between the two groups.

Therefore, it is recommended to MLA that the deliberative forum approach used in this research be used to engage producers and the general public in detailed discussions about specific or contentious welfare issues. Recommendations on the content, operation and platforms for deliberative forums are provided in the subsequent section on Recommendations.

# 4. Discussion

The key insights gained from this project relate to a clearer understanding of the attitudes and knowledge of the general public and producers, the differences between these groups, the role of opinion leaders within these groups in disseminating information and the nature of the information they disseminate, and the ways in which all of this understanding can be used to develop communication strategies to increase shared insights and reduce polarisation. Some clear differences in attitudes were found between the general public and producers regarding aspects of red meat farming.

With regard to routine husbandry practices used in the red meat industry and animal welfare, producers generally were found to hold more positive beliefs when compared to members of the general public. Producers were also found higher levels of trust in livestock people (farmers and handlers) caring for their animals than the general public. Coleman *et al.* (2015) found the Australian public had some level of trust in livestock workers to properly care for their animals, however they held a lower level of trust in sea and land transport workers. Consistent with previous research, the current study found producers had both greater perceived and actual knowledge of livestock production practices than the general public (Te Velde *et al.* 2002; Coleman *et al.* 2015). These more positive producer attitudes to the husbandry practices commonly used in the red meat industry, sheep and beef cattle welfare and trust in livestock people may reflect their greater knowledge of scientific and industry advice on livestock management, current Australian welfare standards and guidelines, first-hand experience and a commitment to appropriately managing their livestock and safeguarding their welfare. Similarly, it is not unexpected that producers reported more positive beliefs about red meat attributes regarding human health, environmental impact, animal use and animal welfare than the public. However, based on qualitative feedback from producers, there is a belief that the general public merely needs to be informed in order to reduce negative public attitudes. The deliberative forums indicate that both increasing transparency about husbandry practises and providing stakeholder perspectives and the opportunity for discussion between the

public and producers on these husbandry practices have the effect of not merely rendering public attitudes less negative but also of providing more realistic insights to producers. Therefore, as recommended below, deliberative forums can be used both as a primary intervention to achieve some degree of convergence between the public and producers while suitable recordings of deliberative forum proceedings may be able to be distributed by other media to inform both groups. Thus, the efficacy of using video recordings of deliberative forums that address the key issues of public concern disseminated to both producers and the general public on platforms including social media, YouTube, ABC documentaries, etc should be evaluated in future research.

Of all the attitudes investigated, one the most marked differences between the two groups were found in the attitudes towards the conditions under which sheep and beef cattle were transported, particularly during sea transport. In general, the attitudes of the public towards transport of sheep and beef cattle were clearly negative, while producers were more positive. High community concern regarding the transport of livestock has been previously reported in Australia (Coleman et al., 2015) and there has been a series of recent public media campaigns calling for bans on live export of Australian farm animals (Petrie 2016; Buddle and Bray 2019). Additionally, we found that wide-spread media coverage on live export of sheep by sea resulted in increased community discussion and social media activity, together with an increase in the perceived importance of conditions aboard boats used for live sheep transport (Rice *et al.* 2020). Because the focus of our research was on husbandry practises in the red meat industry, we have few insights into how deliberative forums might be used to address concerns about live animal export. It would be useful, as a future research endeavour, to commission one or more deliberative forums to address this in order to develop strategies to deal with the issue.

Differences were also found between the public and producers in several control and normative beliefs. Respondents from both groups generally reported that it was easy to support or promote positive animal welfare. However, producers reported greater ease than members of the general public, which may be a consequence of their greater knowledge and approval of industry husbandry practices. Public respondents reported a greater ease in lobbying governments to improve animal welfare in comparison to producers, however, producers reported that people that matter to them expect them to do so more than public respondents. The general public's more positive control beliefs may reflect their greater concern about sheep and beef cattle welfare.

Producers reported higher levels of trust in conventional and commercial media and made more use of conventional media when compared to members of the general public. In contrast, producers reported lower levels of trust in social and internet media than the public and consequently, made

less use of social and internet media. Producers also reported less use of commercial media than the general public. This finding may reflect producers concerns that they may be confronted with criticism when using social media to discuss farming topics (Dürnberger 2019), and this finding is an important consideration when developing and implementing communication strategies. Future research could evaluate the efficacy of different media to disseminate the material identified in this project to determine if trust is a determinant of effectiveness in achieving attitude change.

There were some notable gender effects, with male respondents reporting more positive beliefs about the conditions provided for sheep and beef cattle during sea and land transport and the husbandry practices used in the red meat industry, while females placed more importance on general welfare attributes. Female respondents from both groups also reported a greater ability to lobby and promote animal welfare when compared to male respondents. This finding indicates that females in general may feel more comfortable expressing their views on animal welfare. These findings support recent surveys of the Australian community that have found that females engage in more community behaviours to display dissatisfaction with the way livestock animal are treated than males (Coleman *et al.* 2015; Coleman *et al.* 2017). Given that females are also more likely to be opinion leaders, this suggests that communication strategies to target females might be an appropriate means of achieving attitude change in the general public.

There were clear differences between opinion leaders in the general public and producer samples. Producer opinion leaders and non-leaders held similarly positive attitudes to farm animal welfare, similar levels of high trust in the red meat industry and similarly low levels of trust in the media. In contrast, public opinion leaders held significantly more negative views about the red meat industry and had higher levels of trust in social and internet media than non-leaders. Unlike the general public, producer opinion leaders were not active on social media. While both public and producer opinion leaders engaged in more community behaviours to express dissatisfaction when compared to non-leaders, the average number of these behaviours performed were much lower in producers than the general public. This suggests that opinion leaders from the general public use multiple means to express their concerns about animal welfare in the red meat industry. Furthermore, the source of dissatisfaction amongst producers appears to relate to concerns about how the red meat industry is perceived and a desire to improve its image. This implies that messages to change producer attitudes need to explicitly address concerns about image and public “push back” before the substantive issues about farm animal welfare can be addressed. Producers reported that the online forum, which involved reporting of key stakeholder perspectives on the issue under consideration, non-confrontational exchanges and rational discussion, (1) met or exceeded their expectations, (2) that they were comfortable expressing their opinions and (3) felt that it was an

important activity that helped them educate the public. Future research should investigate the ways in which producer concerns about possible adverse public commentary especially on social media might be addressed.

Public opinion leaders report a desire to educate people, raise awareness of animal welfare issues and drive change in the red meat industry. However, if the information that they are sharing is inaccurate they are likely to pose a risk to the industry. Public opinion leaders tended to be females, held more negative views about the red meat industry, and engaged in twice as many community behaviours to express dissatisfaction, but their actual knowledge of animal husbandry and welfare in the red meat industry was not different from non-leaders. These findings are consistent with Coleman *et al.* (2017) and demonstrate the need to appropriately educate public opinion leaders if they are going to be considered a reliable source of information for the wider community. Furthermore, trained/educated opinion leaders have been successfully applied in different fields to drive positive behavioural change in the community (Kelly et al., 1992; Theall et al., 2015), indicating their potential to be used as a part of future communication approaches.

The need for increased transparency and greater communication between industry and the general community was raised by both public and producer opinion leaders. However, public opinion leaders believe there is a lack of information about husbandry practices and welfare in the red meat industry, while producer opinion leaders believe they provide too much information about animal welfare and practices for farm assurance purposes. This finding appears to suggest that information is not currently being communicated effectively to the community. It also indicates that more direct communication strategies, such as targeted field days or forums that enable direct engagement between both groups, may be an appropriate first step to improve communication and trust between the general community and the red meat industry. Also, the efficacy of using video recordings of deliberative forums that address the key issues of public concern disseminated to both producers and the general public on platforms including social media, YouTube, ABC documentaries, etc should be evaluated.

The outcomes of the second deliberative forum will enable the communication approach to be scaled up in the same setting (e.g., online forum) or to other similar settings, for example, agricultural shows, farm visits, and field days, in which facilitated forums where public and producers participate or pre-recorded forums are shown. In addition, this strategy was chosen because it provides an approach that can be delivered online or face to face (or combination) and provides a level of engagement between members of the general public and producers that cannot be obtained through conventional media, has better control of information than can be promulgated

compared to social media and accesses people that may not be motivated to seek out information of their own accord.

The findings from the two deliberative forums indicate that this communication strategy, targeting the general community and red meat producers, improved both the public knowledge on husbandry practices in the red meat industry and public approval of these red meat husbandry practices. Furthermore, there was also evidence of an increased awareness of each group's concerns, and improved trust in each other. In order words, there was evidence of reduced polarisation between the two groups. Therefore, it is recommended that the deliberative forum approach employed in this research be used going forward to engage producers and the general public in detailed discussions about specific or contentious welfare issues. Recommendations on the content, operation and platforms for deliberative forums are provided in the subsequent section on recommendations.

Concern for animal welfare in the livestock industries remains high (Coleman 2018) and although this concern for animal welfare in the red meat industry appears lower than other more intensive livestock industries (Coleman *et al.* 2018), the findings from Part 1 of the current project demonstrate a polarisation in attitudes when comparing the general public and red meat producers, which represents a potential threat to social licence to farm. Furthermore, the broad range of potential welfare risks to livestock farmed in Australia means that there will be on-going scrutiny of the livestock industries by the general public as well as by governments (Coleman 2018). How this is managed to maintain a balance between competing factors such as changing community values and demands, changes in domestic consumption, and the increasing export demand will remain an ongoing challenge (Coleman 2018). Previously, this was addressed/dealt with by initiatives such as the Australian Animal Welfare Strategy (**AAWS**), which provided a national forum where stakeholders including industry, researchers, animal welfare organizations, and government could develop strategies to manage animal welfare for livestock, companion animals, animals used in research and wildlife. As a forum, AAWS is no longer active and there remains a need to provide all stakeholders with the opportunity to consider the major issues and to develop strategies to address them (Coleman 2018).

According to Martin and Shepheard (2011), the most successful means to addressing threats to social license are working with the community and understanding their opinions toward important issues like animal welfare and the environment, in a manner indicative of cooperation rather than working against them in a defensive manner. It is recognised that mass communication strategies are generally unable to provide a level of detail required to address the individual differences in

attitudes and knowledge that we are considering in the current project. In this case to reduce the polarisation in attitudes between the two groups, the target audiences (red meat industry and general community) need to hear the perspectives of all stakeholders to get a full understanding of the perspectives of producers on the one hand and the public on the other. Facilitating discourse among the various stakeholders is likely to achieve a degree of convergence in opinions and in agreed approaches to livestock farming in the future (Coleman 2018), as was evident from the findings from the deliberative forums conducted in Part 2 of the current project.

# 5. Recommendations

These are specific recommendations on achieving some degree of convergence between public and producers' attitudes to specific industry practices, and improved trust between these stakeholders and understanding of each other's perspectives on these contentious or emerging animal welfare issues in the red meat industry issues.

There are two elements to any plan to achieve this aim – 1) identification of the relevant content of any communications and 2) identification of suitable platforms to deliver this content. This latter element also entails identification of suitable agencies to deliver the content.

The content needs to be aligned with the target audience. Target groups include producers, post farm gate handlers including transport drivers and abattoir workers, legislators and regulators, retailers as well as the general community. Each of these target groups may not be entirely homogeneous and we have identified some of the correlates that differentiate individuals within the producer group and the general public. Further work is needed to identify the relevant characteristics of the other groups. Outcomes will depend, to some extent, on the target group.

In the case of producers, there is a need to address the fact that there are significant differences in perceptions between them and the general public, and the fact that producers recognise the need for, but have a reluctance to participate in, communicating directly with the general public.

In the case of the general public, there is limited awareness of farming practises or the reasons for their use and available alternatives. While there are reasonable levels of trust in producers, there is limited understanding of how producers justify their practices and producers' willingness to adapt to the changing demands of society.

Generally speaking, mass communication strategies cannot provide a level of detail sufficient to address individual differences in attitudes and knowledge (Coleman 2010). Thus, while mass communication may be a useful way to provide the general community with balanced information on welfare issues, and to broadly sensitise the community about important issues, it is not especially well suited to changing beliefs, especially in the face of counter influences from social media. This is largely because mass communication is unidirectional and does not permit discourse between producers and the general public. Therefore, the target audiences need to hear the perspectives of all stakeholders to get a full understanding of the perspectives of producers on the one hand and the public on the other. An example from the current research was the investigation of the effect of a negative event on public attitudes (Rice *et al.* 2020). There was increased community discussion, increased social media activity and an increase in the perceived importance of conditions aboard boats used for live sheep transport but no change in general attitudes.

## Recommendations

Broadly speaking, it is **recommended** that the deliberative forum approach used in our research be used to engage producers and the general public in detailed discussions about the issues. Whenever practicable this approach can be used to engage producers and the general public directly because our research has shown this to be very effective. However, because this may not always be practical for reasons such as accessibility of the relevant participants as well as the considerable cost, it is **recommended** that video recordings of facilitated forums that address the key issues of public concern also be disseminated to both producers and the general public on several platform including social media, YouTube, documentaries, ABC Landline, etc. The presentation of these forums would be in the form of a "Q&A". Feedback from these could be moderated by appropriate individuals/experts, such as specialist deliberative engagement facilitators. It is also **recommended** that MLA investigate ways to get greater engagement of producers in the whole process, given the reluctance experienced in recruitment in deliberative forum 2 (the online forum). Suggestions for greater producer engagement include demonstrating the positive effects of this format of communication on community attitudes or providing more public engagement training for producers.

### Appropriate platforms

A number of opportunities have been identified for which the communication strategies could be used to educate producers and the public. These include utilising agricultural shows or farm field days as venues for the facilitated discussions in the form of in-person events (although these would

have limitations in size and reach) to a much larger scale using professional recordings of deliberative forums in a similar style to television programs such as Q&A on the ABC, and broadcasting this either on television networks, streaming networks, or simply sharing it on social media (Table 20). The underlying recommendation is that whatever communication approach is used, it should include a discussion between both the producers and the general public in which each can express and discuss their views on the topics in a facilitated manner. Additional advice is required from MLA in terms of what is possible in regard to available resources and consistency with existing MLA marketing strategies.

**Table 20.** Proposed options for education using communication strategies

| Communication Strategy | Platform | Description | Resources | Level of interaction | Expected Penetration | Advantages | Limitations | Roll out strategy |
|---|---|---|---|---|---|---|---|---|
| Live deliberative forum (in person) | Agricultural Shows, food and wine shows | Local agricultural shows are advantageous in that they are events which both producers and the general public attend naturally. Run a deliberative forum/facilitated discussion between producers and the general public. | Professional facilitators, Video message, glossy paper handouts | High | Low | Producers and public are already in the same location which assists with recruiting participants | Potentially low penetration, limited time available (i.e., participants still want to see the show). May be difficult to get large enough space | MLA runs a regular segment within Agricultural shows |
| Live deliberative forum (online) | Webinar | Run a deliberative forum/facilitated discussion between producers and the general public online, using a panel made up of a small number of both public and producers and a | Professional facilitators, Video message, pdf handouts | High | Medium | Not location specific, accessible to a broad range of people | Actively recruiting participants will require substantial marketing or incentives | MLA runs regular webinar style deliberative forums online |

| Communication Strategy | Platform | Description | Resources | Level of interaction | Expected Penetration | Advantages | Limitations | Roll out strategy |
|---|---|---|---|---|---|---|---|---|
| | | live audience (also including both the general public and producers) of an unlimited number. Enable a live chat function | | | | | | |
| On-demand deliberative forum (online) | Pre-recorded webinar | Record a deliberative forum and post it on a website with public access. | Video message, pdf handouts | Low | Medium | Cost effective once the forum is recorded, unlimited number of viewers | Low interaction, will require substantial marketing to increase penetration | MLA posts professionally recorded and produced deliberative forum style documentaries online for on-demand viewing |
| Farm visit/open day | Commercial farms | Facilitated discussions and demonstrations on selected farms. Participants can converse directly with the farmer and see husbandry practices being performed | Live demonstrations, paper handouts | High | Low | Potentially cost effective, No need for special multimedia skills (e.g. developing video materials etc), good demonstration of | Low penetration, biosecurity and insurance may be complicated | MLA enlists a number of farms nationwide and facilitates them in conducting farm field days. |

| Communication Strategy | Platform | Description | Resources | Level of interaction | Expected Penetration | Advantages | Limitations | Roll out strategy |
|---|---|---|---|---|---|---|---|---|
| | | | | | | transparency. Eco-tourism | | |
| Television programs e.g., Insight (SBS) Q & A (ABC) | National television | Utilise a format similar to Insights or Q&A programs to discuss | Television producer, Television host, Video message | Med | High | Nationwide exposure, higher passive exposure | High cost, requires broadcasting network approval | MLA produces or works with a broadcasting network to produce a Q&A style program on a particular topic |
| Q & A stall | Farmer's Markets | MLA stall for question and answer | Producers willing and available to supervise the stall, Paper handouts | High | Low | Easily accessible, small scale producers often attending | On-going feasibility, potentially low penetration, limited demographic | |

**Other considerations**

1. In terms of running the deliberative forums, it is **recommended** that the following be implemented where possible:

    a. Critical thinking training is included to facilitate rational and polite engagement between the members of industry and general public.

    b. An additional 30 minutes of discussion with the panel would be valuable in ensuring a wide-ranging discussion between panel and audience as well as time for the audience to submit additional comments.

    c. Ensure diversity in the panel members (representative of both the industry and general community).

    d. Allow a platform for on-line chat comments.

    e. Provide participants with access to self-directed learning before joining the panel. There is opportunity to provide SMS material on the topic(s) of the deliberative forum, particularly to public and producers that indicate early in the recruitment phase that they are interested in participating, which would facilitate learning.

2. Funding support could be sought through National Animal Welfare RD & E Strategy and the Animal Welfare Collaborative, since the approach has implications for other livestock industries. Indeed, the topic of animal welfare is part of the sustainability discussion and this discussion is bigger than animal welfare in the red meat industry, and therefore MLA could consider a collaboration using deliberative forums with the other livestock industries (although some topics will be industry-specific and others inter-industry, with sustainability topics such as animal welfare, as well as animal health, food safety and environmental impact).

3. The research team is available to help with any future questions that could be answered using the extensive data collected in the project.
4. Finally, the team would be willing to organise a Q&A session with the appropriate MLA managers/representatives to clarify any queries about this project and provide further details about the aforementioned recommendations and considerations.

**The way forward:**

As a first step, the research team strongly recommends that MLA conduct a brainstorming session with key people from MLA marketing, communication and extension teams and members of the University of Melbourne research team. The aim of the brainstorming session would be to generate, or develop further, ideas for a strategy(s) that is feasible within MLA's current capabilities and/or identify gaps in the current capabilities which may need to be addressed for adequate rollout of the proposed communication strategy.

# 6. Benefits to industry

The immediate practical application of the research reported in this project is to incorporate the substantive findings on public and producer attitudes into communications designed to improve shared knowledge about beef cattle and sheep welfare issues between the public and producers and improve trust between the public and producers.

Recommended ways to achieve this have been outlined as have recommendations for future research.

There are opportunities to broaden the scope of this project by addressing issues of public concern such as live export of livestock by sea, road transport, abattoirs etc.

# 7. Future research and recommendations

The current project highlights how communication strategies could be used as an educational tool to reduce polarisation in attitudes between the public and producers. This strategy requires ongoing support from MLA and other livestock industry peak bodies to directly provide and/or fund the extension infrastructure necessary to implement the recommendations and continue to maintain, update and build on the strategy in the future. This may also have a halo effect across the entire red meat supply chain as well as in the wool industry.

The deliberative forum approach could be used to engage producers and the general public in detailed discussions about other contentious animal welfare issues in the red meat industry. Opportunities to use field days and Royal Agricultural Society Shows as venues for this should be explored. The efficacy of using video recordings of facilitated forums that address the key issues of public concern disseminated to both producers and the general public on platforms including social media, YouTube, ABC documentaries, etc, should be evaluated.

The focus of our research was on husbandry practises in the red meat industry, we therefore have few insights into how deliberative forums might be used to address other concerns in the red meat industry, for example, live animal export. Our research showed that mere media coverage of an adverse event (Live sheep transport mortality) did not have a general effect on attitudes to the red meat industry, however it did increase public concerns of transport conditions for sheep at sea (Rice et al., 2020). It would be useful to commission one or more deliberative forums to address live export of livestock and road transport of livestock in order to develop strategies to deal with perceived welfare issues associated with livestock transport.

Producers reported higher levels of trust in conventional and commercial media and made more use of conventional media when compared to members of the general public. Future research could evaluate the efficacy of different media to disseminate material such as recorded forums about other contentious issues in the red meat industry (producers and the general public

engaged in facilitated discussions), to examine if trust in media source is a determinant of effectiveness in achieving attitude change.

Adverse public commentary remains a risk for producers even when following best practice. Future research should investigate the ways in which producer concerns about possible adverse public commentary especially on social media might be addressed. For example, provision of training in public engagement, the development of support networks, engaging trained mediators to monitor and deflect adverse commentary if required, etc.

Although not addressed within this study, the comments from the focus groups warrant further consideration. For example, clearer labelling and accreditations, more effective use of media (including positive social media campaigns) to promote farmers and increase familiarity in the public with farming practices, more active roles from livestock industry national and state bodies in relation to responding to negative events, education in schools and farms visits are all consistent suggested actions from both the public and producers which could be taken to improve public perception and allow greater convergence between producers and public.

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# 9. Appendix I – Publications:

## The Impact of a Negative Media Event on Public Attitudes Towards Animal Welfare in the Red Meat Industry

Rice, M, Hemsworth, LM, Hemsworth, PH, Coleman, GJ (2020) The Impact of a Negative Media Event on Public Attitudes Towards Animal Welfare in the Red Meat Industry. *Animals* **10,** 619.

Full publication: https://doi.org/10.3390/ani10040619

**Abstract:** Public perception of livestock industries and consumer trust in farmers can affect consumer behaviour and impact on social license to farm. Coincidental with a large random telephone survey of Australian public attitudes and behaviour towards the red meat industry, a media campaign exposing animal cruelty in live export of sheep by sea, occurred. Data collected from the nationwide survey of the public attitudes immediately before (n = 278 respondents) and after (n = 224 respondents) this media campaign was utilised in the present study to examine the effects of the media campaign on the public. In general, respondents' attitudes towards the red meat industry were positive. Independent t-tests revealed no significant differences between those respondents that completed the survey before or after the 60 Minutes programme in their concern for sheep or beef cattle welfare, attitudes to red meat farming, acceptability of the red meat industry or their trust in farmers in the red meat industry. However, prior to the media campaign, respondents believed sheep to be more comfortable when transported by boats than did respondents who completed the survey after the media campaign. More respondents after the 60 Minutes programme cited social and internet media as a source of information. Therefore, despite the wide media coverage associated with the 60 Minutes programme, these results indicate little effect on the public's attitudes towards farm animal welfare and the red meat industry. The significant impacts of the programme were reflected in increased community discussion, increased social media activity and an increase in the perceived importance of conditions aboard boats used for live sheep transport.

# Telephone versus panel samples assessing knowledge, attitudes and behaviour regarding animal welfare in the red meat industry in Australia

Hemsworth, LM, Rice, M, Hemsworth, PH, Coleman, GJ (2021) Telephone Survey Versus Panel Survey Samples Assessing Knowledge, Attitudes and Behavior Regarding Animal Welfare in the Red Meat Industry in Australia. *Frontiers in Psychology* **12**

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**Abstract:** Surveys are used extensively in social research and, despite a lack of conclusive evidence of their 'representativeness', probability internet panel surveys are being increasingly used to make inferences about knowledge, attitude and behaviour in the general population regarding a range of socially relevant issues. A large-scale survey of Australian public attitudes and behaviour towards the red meat industry was undertaken. Samples were obtained using a random digit dialing telephone survey (Computer-Assisted Telephone Interviewing-CATI, n=502 respondents) and a probability internet panel survey (PANEL, n=530 respondents) to examine differences between the two samples regarding attitudes and behaviour relating to livestock use and welfare. There was little difference in demographics between the CATI and the PANEL surveys apart from highest level of education, however there were differences between the two samples in both attitudes and behaviour toward the red meat industry after controlling for education levels. The PANEL respondents gave generally more conservative responses than did the CATI respondents in the sense that they were more positive towards the livestock industries and animal welfare within these industries. Differences were also found between the respondents of the two samples regarding behaviour that relates to the red meat industry, both community and consumer behaviour. PANEL respondents were less engaged in community behaviours performed in opposition of the red meat industry when compared with the CATI sample. The majority of CATI and PANEL respondents were red meat eaters and there was no difference between respondents of the two samples in relation to red meat consumption, however there were fewer vegetarians and vegans in the PANEL survey. Possible reasons for the observed differences are discussed

however, a definitive answer will depend on further research to identify the specific psychological factors that differ between samples derived from different survey methodologies.

# Differences in public and producer attitudes towards animal welfare in the red meat industries

Coleman, G.J., Hemsworth, P.H., Hemsworth, L.M., Munoz, C.A., and Rice, M.

*Manuscript in preparation*

**Abstract:** Societal concerns dictate the need for animal welfare standards and animal welfare legislation and failure to meet the expectations of the public may threaten the social licence to farm. The public and livestock producers often differ on their views of what is important for livestock welfare. The present study examines public and producer attitudes towards common practices and animal welfare issues in the Australian red meat industry, knowledge of these practices, and public and producer trust in people working the red meat industry. A large Australia-wide survey of both the general public (n = 501) and red meat producers (n = 200) was conducted to examine these attitudinal, knowledge and trust differences between the public and red meat producers. Public participants were recruited using a random digit dialing telephone survey (Computer-Assisted Telephone Interviewing) while the red meat producers were randomly selected within a curated database of up to 200,000 contacts covering 80 farm types. After controlling for gender and age, there were marked differences (at $p<0.01$) between public and producer respondents in 20 of the 27 attitude, trust and knowledge variables studied with producers reporting more positive beliefs in the conditions provided for sheep and beef cattle during sea and land transport, the husbandry practices used in the red meat industry, and red meat attributes regarding human health, environmental impact, animal use and animal welfare. The public and producers reported similar levels of trust in conventional and commercial media and had similar beliefs about animal rights, prevention of animal cruelty and balancing the welfare of people and animals. These results and others indicate a polarisation between the public and livestock producers in their attitudes towards animal welfare, knowledge of husbandry practices and trust in livestock people.

# Public and producer opinion leaders and their attitudes towards animal welfare and the red meat industry

Munoz, C.A., Hemsworth, L.M., Rice, M., Hemsworth, P.H. and Coleman, G.J.

*Manuscript in preparation*

**Abstract:** Opinion leaders within the community may lead debate on animal welfare issues and provide a path for information to their social networks. However, little is known about opinion leaders' attitudes, knowledge and activities conducted to express their views about animal welfare in a livestock industry and whether they are well informed, or not, about farm practices. Furthermore, there are no previous studies identifying the role of producer opinion leaders in disseminating information within the community. To address these knowledge gaps, this study aimed to 1) identify opinion leaders in the community and among producers and 2) compare opinion leaders and non-opinion leaders' attitudes, knowledge and actions to express their views about the red meat industry. Two questionnaires, one for the Australian general public (n=501) and one for Australian red meat producers (n=200), were developed to identify general attitudes. From these questionnaires, opinion leaders were identified using a two-step cluster analysis. Subsequently, a sub-sample of 19 opinion leaders (including public and producer opinion leaders) were invited to participate in a follow-up phone interview. A total of 29.1% opinion leaders within the public sample were identified. Main results indicated that the public tended to hold positive views towards the red meat industry. However, when opinion leaders and non-opinion leaders were compared, public opinion leaders held more negative perceptions of the red meat industry, perceived they had more knowledge about the industry, but their actual knowledge was not different from non-opinion leaders. They also were more likely to use all kinds of media for information\ and used and trusted social and internet media more than did non-opinion leaders. Main reasons given by public opinion leaders for disseminating information in the community were related to the need to educate people, raise awareness of animal welfare issues and wanting to drive change in the red meat industry. In the producer group, a larger percentage of opinion

leaders were identified (64.0% compared to 29.1% in the public group). Producer opinion leaders had more actual knowledge about animal husbandry practices and engaged in more behaviours to express dissatisfaction with the industry than non-leaders (dissatisfaction in relation to the image of the red meat industry rather than husbandry practices). Motivations to engage with the community were related to their willingness to educate the public and to 'show the other side of the coin'. Unlike the public respondents, this group of opinion leaders used conventional media more than social and internet media, and their levels of trust in all kinds of media were low. The main point of agreement between the public and producers was that both groups believed it is important to increase communication and educate the public about farm practices. This may present an opportunity to develop an opinion leader intervention strategy in the red meat industry, including both public and producer opinion leaders. To develop intervention strategies, key differences between the groups of opinion leaders need to be considered. For example, social media was one tool commonly used by opinion leaders within the community, but the producer group expressed low levels of trust in all kinds of media. Considering this, a potential intervention strategy may consist of a combination of social media and face-to-face interactions, such as a series of facilitated online sessions and field days. These informed opinion leaders could later disseminate accurate information to their social networks. Further studies should test if sustained and facilitated educational sessions between public and producer opinion leaders can assist in increasing knowledge, communication, and perhaps, assist in achieving convergence of concerns and expectations between the community and livestock producers.

# *10. Appendix II – Deliberative Forum 1 Participant Report*

Double click on the image below to view the full report

The Animal Welfare Science Centre
(University of Melbourne)

**Deliberative Forum**

Participant Report

**31 November 2019**

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OUR CHALLENGE:

***How can we improve communication between the community and the red meat industry about animal welfare?***

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# *11. Appendix III – Deliberative Forum 1 Mosaic Lab report*

Double click on the image below to view the full report