final report

Project code: B.AHW.0093

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Date published: June 2006

ISBN: 1741910676

PUBLISHED BY
Meat & Livestock Australia Limited
Locked Bag 991
NORTH SYDNEY NSW 2059

Consumer attitudes and behaviour relevant to the red meat industry

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

Abstract

This study examined industry-specific and general public attitudes toward animal welfare, health, and environmental issues in the red meat industry to determine the importance of these attitudes for consumer behaviours (i.e. red meat purchasing), and community behaviours (e.g. petitioning, lobbying politicians). It was found that, while welfare issues predict consumer behaviour slightly, they strongly predict other community behaviours, such as the likelihood of making donations to welfare organisations in support of, or opposition to, livestock practices. Industry should use this information to brief regulators, legislators and the community on the state the livestock industries and provide education to the community from early school age onwards about food sources, current best practice, proposed industry improvements in practice and the role of the livestock industries in providing economical and quality food for the community.

Executive Summary

This study examined industry-specific and general public attitudes toward animal welfare, health, and environmental issues in the red meat industry to determine the importance of these attitudes on consumer behaviours (eg. buying red meat), and community behaviours (e.g. petitioning, membership of animal welfare groups, lobbying politicians). The aim was to identify factors that predict consumer and community behaviours relevant to red meat production and identify areas of interest which can be used to inform research investments.

- There were no significant differences in the number of community behaviours or *per capita* self reported or POS beef and lamb purchases across the different places of residence ($p > .05$). In other words, there were no differences between country and city respondents on these measures. There were also no significant differences in community behaviours and *per capita* self-reported or point-of-sale purchases across the different educational levels ($p > .05$).

- There was no significant difference in the *per capita* **self-reported** monthly purchase of lamb across different age levels ($p > .05$). In contrast, a significant difference in the *per capita* self-reported monthly purchase of beef products was observed such that individuals aged 30 to 39 reported purchasing significantly less beef that those aged between 50-59 ($p < .05$) and those aged 60 or more ($p < .05$).

- There were no significant differences in the *per capita* amount of lamb purchased at the **point-of-sale** aspect in relation to the age of the individual. In contrast, there was a significant difference in the *per capita* amount of beef purchased at the point-of-sale aspect in relation to the age of the individual such that individuals aged 30 to 39 reported purchasing significantly less beef that those aged 60 or more ($p < .01$).

- There was a general consensus that “quality”, being “produced in Australia”, “appearance”, “not genetically modified” and the ”humane treatment” of animals were amongst the top six of thirteen food attributes in ranked importance. Product attributes that were correlated with self-reported beef and lamb purchases, included ”value”, “cut”, “appearance”, “quality” and “packaging”. In addition, lamb purchases were negatively correlated with “humane treatment of animals” which implies that people who were less concerned about humane treatment tended to purchase more lamb. Only “leanness” and “health indications such as Heart Foundation” were correlated with lamb and beef point-of-sale purchases.

- The demographic variables that were found to be predictors of purchasing included the number of household occupants, gender, education, age, and having visited a commercial abattoir. A variety of welfare attitudes were also found to be significant purchasing predictors including “beliefs about carers’ concerns for the animals”, “welfare attributes of food choice for beef and sheep”, “concerns about welfare” and “importance of meeting welfare needs of livestock in general". “Beliefs about the positive attributes of sheep/beef meat” was also a consistent predictor.

- Community behaviours relating to the lamb and beef industries occurred with much lower frequency than those relating to livestock industries in general. Somewhat surprisingly, people who engaged in any kind of community behaviour, tended to do so regardless of whether the behaviour was in support of, or in opposition to, various aspects of livestock farming. This suggests that there are some members of the community who have a “social conscience” and who actively engage in expressing their views in the various forums that are available to them.

- The predictors of community behaviours were gender, having visited a commercial abattoir, positive attitudes towards activism, opposition to welfare activism, importance of meeting health needs for livestock in general, attitudes towards animals as a source of food and beliefs about cholesterol in meat. When a structural model of community behaviour is constructed, it can be seen that there are three broad categories of variables that predict such behaviour. In the first category are gender, having visited a commercial abattoir and knowledge of farming practices. In the second category are several welfare variables including attitudes towards activism, attitudes to animals as a source of food, importance of meeting health needs of livestock and attitudes towards sea transport. The final category is beliefs about cholesterol in meat. In sum, five of the nine variables are welfare related. Further, these variables are generic in the sense that they relate to livestock in general, rather than specifically to the fact that community behaviours are determined largely by concerns about welfare, taken in conjunction with the hypothesis that people who engage in many community behaviours may be community opinion leaders, suggests that animal welfare is one of the principal drivers for community responses to the extensive animal industries.

- In general, a cautious conclusion revealed from a comparison between the Roy Morgan (2000) study and the current project is that the community is showing a progressive increase in concern about animal welfare issues. The questionnaires that were used in this project can form the basis for monitoring changes in community attitudes and behaviour over time.

- It is important for industry to carefully analyse community views and to develop both short term and long term responses. These responses would include the use of the information to brief regulators and legislators and the community on the true nature of the livestock industries. Such a response would also include informing the livestock industries of these results as a mechanism for instituting changes where appropriate. Finally, such a response would also include seeking opportunities to provide education to the community from early school age onwards about food sources, best practice and the role of the livestock industries in providing economical and quality food for the community.

- Given the results of this study that show that community attitudes can predict community behaviours, the relevant attitudes should be monitored in the future so that community trends can be identified. Also, because there is an indication that there may be community opinion leaders that mediate information transfer on welfare issues, research should be conducted to explicitly test this hypothesis and, if confirmed, to identify the characteristics of such people so that effective, targeted communication strategies can be developed.

In general, there is always a risk of polarization between the community on the one hand and industry on the other. This has the potential to lead to a reactive and relatively intractable stance by one or both groups. For a sustainable livestock industry, the community and the livestock industries need to have a common view. This requires good communication and a willingness to strike a balance between creating an informed community on the one hand and a flexible industry on the other that is willing to respond to community values.

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Background

There is a complex set of economic, political, social, and personal factors which impact on livestock production and marketing. Facets of public perception that influence livestock production practices as well as consumer and community behaviours need to be understood to ensure industry sustainability. In particular, attitudes of the general public towards animal welfare, food quality, health risks, environmental factors and farm intensification, may affect future livestock production practices directly through consumer buying behaviour, and indirectly through public and consumer influences on regulatory legislation. This, in turn, may impact on international trade policies set by governments, and the standards set for products by processors and retailers. Many of these influences currently are outside the control of the livestock industry, however, a sustainable industry is one which can proactively identify key community issues and respond in a measured way to changes in community values and expectations.

There has been a reported decline in red meat consumption per capita in a number of countries, including Ireland (McCarthy, de Boer, O'Reilly, & Cotter, 2003), New Zealand (Klinsukon, Gan & Bicknell 2002), Spain (Bernabeu & Tendero, 2005), Australia (Baghurst, Record, & Leppard, 2000), the U.S.A (Breidenstein, 1988), Belgium (Verbeke & Viaene, 1999), Germany (Pennings, Wansink, & Meulenberg, 2002) and the UK (Prynne, Paul, Mishra, Greenberg, & Wadsworth, 2005). According to the Australian Bureau of Statistics (ABS) Australians' annual consumption of beef and veal peaked during the 1970's at 70kg per capita, but by the 1980's this amount had fallen to 39kg per person. Between 2002-2003 the per capita annual beef and veal consumption in Australia was reported to be 37kg. In contrast, Australians' consumption of chicken has increased from 24kg per person in 1988-89 to 35kg per person in 2002-03 (ABS, 2006). More recently, however, The Food and Agriculture Organisation (FAO) has predicted a worldwide increase in both ovine and bovine meat consumption over the coming years, with the greatest demands extending from developing countries (FAO, 2006; Tarrant, 1998). Clearly, however, over the past number of decades, there has been a global reduction in red meat consumption. Whether there will be a resurgence remains something of a matter of conjecture. Despite this, Harrington (1994) notes that there remains a lack of international market research that has comprehensively assessed the relative importance of various consumer concerns in relation to red meat consumption.

The last two decades have seen a number of outbreaks of Bovine spongiform encephalopathy (BSE) or 'mad cow disease', and foot and mouth disease. These outbreaks are believed to have contributed to a decline in meat consumption (McCarthy et al., 2003). In 2002, BSE was estimated to have cost the UK over $1 billion (AUD) annually (Smith, Clayton, Stuart, Myers, & Seng, 2005). For example, Richardson, MacFie, and Shepherd (1994) surveyed 1018 people from the UK on their attitudes towards meat and meat eating. They found that 28% of respondents reported that they were reducing their meat consumption, the extent of which was strongly influenced by taste, price, and health concerns. The researchers also examined the impact of hypothetical future events on meat consumption and found that the majority of respondents reported that they would pay more for meat that had had any 'microorganisms' removed in order to make it safer.

McCarthy et al. (2003), however, argue that declines in red meat consumption cannot be solely attributed to outbreaks of BSE. Gaining momentum is the argument that negative attitudes toward contemporary meat production processes, including animal welfare, environmental and health issues, and positive attitudes towards vegetarianism, are important contributing factors to the decline in meat consumption. The use of chemical additives, antibiotics, growth hormones, and genetic modification has seen biotechnology become an important issue for consumers. Concerns include residues which may be left in meat from genetically engineered agents, which are currently used to prevent disease in livestock (Harrington, 1994). There are also concerns for the potential environmental effects of livestock farming, including water usage, the treatment of effluence, and the pollution associated with nitrogen and phosphorous emissions (Milne,

2005). Health concerns may have also prompted consumers to decrease their red meat consumption. Indeed, red meat has been targeted as one of the major sources of saturated fat in Western diets (Kampman, Verhoeven, Sloots, & Veer, 1995), such that some health professionals have been encouraging people to reduce their intake of red meat (Mann, 2000). To this end, studies have reported that decreased consumption of red meat may reduce the risk of prostrate cancer (Michaud et al., 2001), colon cancer (Cronin, Krebs-Smith, Feuer, Troiano, & Ballard-Barbash, 2001; Kampman et al., 1995), and diabetes in women (Schulze, Manson, Willet, & Hu, 2003). To the contrary, research also suggests that a diet high in lean red meat is a good source of iron and zinc, and can also help lower plasma cholesterol (Mann, 2000). The poor health related outcomes associated with the consumption of red meat may be relate more to the manner in which it is cooked and accompanied by other foods, rather than related to red meat in and of itself.

Public concerns regarding animal welfare are generally focused on livestock production methods used to produce the food they buy (Hobbs, Hobbs, Isaac, & Kerr, 2002). Consumers appear to be increasingly concerned with these production methods, and the care and management of farm animals (Petherick, 2005). Consumers are known to place a high premium on the quality of a product – this is a multi-dimensional construct which recently includes factors such as safety/hygiene, nutrition, quality of the production environment, and a social component (Jago, Fisher, & Neindre, 2000, Harper & Henson, 1999, Harper & Makatouni, 1999). While attitudes towards animal welfare may account for some aspects of buying behaviour, research findings remain varied and inconclusive. How these variables influence consumer buying behaviours is even less certain.

In a recent survey of Queenslanders' attitudes towards buying meat, Smith (2001) reported humane treatment of animals ranked near the middle of issues. Taste was considered the most important, while packaging least important. Ngapo et al. (2003) examined consumer perceptions of pork and pig production in four European countries. In contrast to the findings of Smith (2001), they found evidence to suggest that knowledge of animal production systems was not important in consumers' purchase of pork products. Rather, participants considered fat cover, price, country of origin, and place of purchase to be indicators of good quality. Although pig production processes were viewed negatively, with participants revealing they had little first hand knowledge of such processes and that their views were mostly influenced by media images and reports. Interestingly, however, while participants commented that modern production processes were inhumane, their self-reported buying behaviour was not influenced by such views. English urban women were reported as adopting an 'ignorance is bliss' attitude, and didn't want to know about meat production processes. While interesting insights into consumer decision making were made, as the researchers note, quantitative data on actual pork purchases is required.

In relation to the importance of welfare issues, Bennett (1997) surveyed 2000 people (of which only 591 people responded) in the UK on farm animal welfare and food policy, to assess attitudes towards the use of battery cages in egg production, and their support of legislation banning such a practice. A total of 41% of respondents stated they were 'very concerned' that farm animals may suffer or be maltreated in the process of food production, 45% were 'somewhat concerned', while only 1% stated they were 'not concerned'. When rating the acceptability of battery hen cages, 58% of respondents deemed them 'very unacceptable'. Nearly 79% of respondents supported legislation which would phase out the use of battery hen cages in egg production in the EU. People were then asked to show their willingness to pay to support the legislation, in terms of an increase in the current cost of eggs. The mean that respondents were willing to pay was £0.43, per dozen eggs, with approximately 86% of respondents overall indicating they would be willing to pay more for non-battery cage eggs. It is regrettable that only 30 percent of people surveyed responded, and it is possible that those who responded may not be representative of the population. In addition, concerns about animal welfare were not compared to attitudes of other aspects of animal production, such as quality. It

is therefore difficult to determine the relative importance of animal welfare issues in overall food choices.

It is worthwhile noting that whilst it appears that concern for animal welfare may not always translate into buying behaviours, Harper and Hensen (1999) suggest that consumers may be unwilling to pay more for animal products based on an expectation that products available should already satisfy minimum acceptable standards of welfare. Accordingly, consumers' 'willingness to pay' may not be the most appropriate index of consumer concerns for animal welfare. Rather, as suggested by Blanford, Bureau, Fulponi and Henson (2001), demand for change to legislation of government regulations may be more indicative of consumer concerns regarding animal welfare.

Research suggests that concerns about animal welfare issues seem to be particularly salient amongst young people. For example, a population survey conducted by the Meat & Livestock Australia (Animal Welfare Issues Survey, 2000) demonstrated higher levels of interest in animal welfare in young people, compared to older adults. This finding is consistent with Worsley and Skrzypiec's (1997) study on vegetarianism, wherein the welfare of farm animals was a significant factor determining food choices of teenagers. Environmental and animal welfare issues may have an effect on food choices even in preadolescents, as indicated in a recent survey conducted by Hay and Coleman (2004) on 616 Grade 5 and 6 Victorian urban and rural children. The majority (68%) of children surveyed believed that protecting the environment was more important than producing food, while the effect of farming on the environment was an important factor in the choice of foods for 42% of respondents. A further 66% said they 'often' or at least 'sometimes' thought about the effects of farming on the environment. Regarding farm animal welfare, 'that farm animals have been treated well' was an important factor in the choice of food for 42% of the participants, while the majority (85%) said they 'often' or at least 'sometimes' thought about the treatment of farm animals. A further 72% thought about the everyday life of farm animals. Finally, 96% of children surveyed assisted with the family food shopping. This is an important finding, highlighting the potential influence children may have over the family food choices and, thus, consumer buying behaviour.

Holm and Mohl (2000) interviewed 20 consumers from Denmark regarding their views on food and food quality, and found that negative attitudes towards meat were more frequently expressed than towards any other food. Negative comments were focused around four themes: 1) meat production processes; 2) meat is derived from farm animals; 3) cultural and social aspects, and 4) health. While four central consumer concerns emerged, it is not clear which aspect was most influential to buying behaviour. The welfare and living conditions of farm animals was seen to lower the healthiness and gastronomic quality of meat. However, as respondents had little knowledge about the production process, such assertions were based on anecdotes and supposition. With regard to animal welfare issues, most negative comments were made with reference to poultry or pork. The welfare of cattle was never discussed, and the welfare of lambs was generally discussed in positive terms (e.g., "Sheep are not that industrialized. I think they are treated better than pigs"). Although positive comments were made with regard to lean meat, in general meat was considered unhealthy by respondents, especially when compared to vegetables (e.g. "We eat ordinary things but I pin my faith on the vegetables we eat with it."). Since the interviewees had limited knowledge about production processes, much of their reported concerns were in the form of suspicions about what occurs rather than fact. Most importantly, while consumers raised the above concerns, meat was still reportedly consumed on a daily basis, indicating negative attitudes had little impact on their behaviour. Caution should, however, be exercised when drawing inferences from this study, given the small sample size and lack of quantitative data.

Much of the research that has examined the impact of animal welfare concerns on consumer choices has involved participants rating the importance they place on certain product and production attributes (e.g. taste, packaging, health concerns, animal welfare concerns). This

produces a hierarchy of attributes, considered to be most influential in the consumers' choice of product. The problem with such an approach is that all attributes are considered different from each other, where there may in fact be similarities, allowing certain attributes to be grouped together. For example, attributes such as 'healthy', 'animal friendly' and 'environmentally friendly' may represent one dimension that reflects 'environmental' concerns. If this is the case, then the impact of animal welfare concerns may indeed have been overlooked in past research. Using factor analytic techniques is one way to empirically test the notion of grouping variables. Factor analytic techniques such as Principle Components Analysis (PCA) are used to reduce the number of variables and also determine structure in the relationships between variables (www.statsoft.com, 2006). Given that a range of attitudes may impact on buying behaviour, it is necessary to distinguish those attitudes which have a strong determining effect on behaviour from those which have a lesser impact. The limited number of studies that have examined attitudes towards meat eating using such techniques will be examined in turn.

Verbeke and Viaene (1999) examined consumer concerns regarding meat (including beef, poultry, and pork), safety issues and animal welfare. Over one quarter (26%) of the sample (N=320) claimed to have reduced their total intake of meat over a year. In cases where consumption of a specific fresh meat type had decreased, 63% of cases mentioned beef, 20% mentioned pork. In contrast, poultry was nominated in 69% of cases as the meat which would be consumed instead of beef or pork. Almost one third (32%) of the sample indicated their intention to further decrease their total consumption of meat in the following year. Of these, a specific intention to decrease beef consumption was mentioned by over half of the participants and just over a quarter intended to decrease pork consumption. For fresh meat in general, attributes considered most important by respondents were quality, taste, freshness, freedom from hormones, and healthiness. Animal friendliness was considered most important with regard to poultry, but not for beef. Using factor analysis, Verbeke and Viaene (1999) found 'consumer perception of safety' to be the most important factor in beef consumption and concluded that safety issues would likely influence future patterns of beef consumption.

Bernues, Olaizola, and Corcoran (2003) surveyed and interviewed 2288 consumers from five European countries, and asked participants to report on the importance of seven extrinsic attributes needed to achieve quality in beef/lamb. These attributes included origin of meat/region of production, environmentally friendly production, animal welfare concerns, animal feeding, animal breed, processing and packaging, and storage. For both beef and lamb respectively, the most important attribute was animal feeding (83.2% and 82.6% rated this as 'very important' or 'important' for beef and lamb respectively), followed by origin of meat (85.7% and 79.9%), environmentally friendly production (72.0% and 75.9%), and animal welfare (78.8% and 76.7%). Processing/packaging and animal breed were considered the least important attributes. Using PCA the authors revealed that the above attributes loaded on three main factors for both beef and lamb: an Ethical factor, an Origin factor, and an Animal feeding factor (relating to animal production – what and how animals are fed). Meat consumption data (either self-reported or at the point of sale) were not collected, in view of which, the extent to which such attitudes relate to consumer behaviour is unknown.

Worsley and Skrzypiec (1998) surveyed the extent to which attitudes could be used to predict red meat consumption in 903 young Australians, aged 19 to 32. Respondents were asked their opinions of red meat, and the frequency of consumption of a number of foods (meats and non-meat foods). Using PCA, two dominant factors emerged: an 'Appreciation' factor (a positive attitude factor, and involved a general liking or red meat) accounted for 16% of the red meat consumption variance, and: an 'Animal Welfare' factor (a negative attitude factor that involved a concern with the well-being of animals), accounted for 10% of the red meat consumption variance. Further, Worsley and Skrzypeic (1998) found attitudes to be significant predictors of red meat consumption, accounting for 28% of the variance. Attitudes were stronger predictors than demographic variables which only accounted for 4% of the variance. The authors also

noted that apart from the Appreciation factor, the other factors all appeared to reflect attitudes which represented underlying personal values (Worsley & Skrzypiec, 1998).

Coleman, Hay, and Toukhsati (2004) recently examined consumer and community behaviours relevant to pork production. They surveyed 508 consumers on their opinions of purchasing meat products. Of these, 141 were also interviewed at the point-of sale on their pork purchases, giving the researchers a direct measure of consumer behaviour. Interestingly, attitude variables were found to predict approximately 23% of the variance in community behaviours, while they only predicted around 8% of the variance in self-reported pork consumption. While consumers rated traditional aspects of pork such as quality, shelf life and appearance as most important and animal welfare ranked fifth, these variables only accounted for 1% of variance related to pork purchases. Community behaviours considered to be in opposition to livestock farming, included 'attending a rally', 'writing to a politician' 'signing a petition', 'donating money', or 'speaking to colleagues'. Approximately one third of respondents reported having participated in each of these types of behaviours, while overall 55% of respondents reported having engaged in at least one of these types of behaviour. Coleman et al. (2004) concluded that consumer attitudes were more likely to translate into community behaviours than they were to influence consumer buying behaviour.

Market research and consumer behaviour form but one part of the broader picture of public behaviours that affect the sustainability of livestock industries. As consumer health, environmental and animal welfare issues gather momentum, so too does their impact on livestock production. This is through behaviours ranging from active lobbying for change to the more general enhancement of community awareness of these issues. Lobbying behaviour involves deliberately agitating and campaigning politicians and regulatory bodies for change. Community behaviour on the other hand is less deliberate, and involves taking advantage of situational opportunities to express an attitude through action. This may include signing a petition or donating money to a charity (Coleman et al., 2004). Accordingly, local and international consumer and public concerns are likely to place increasing pressure, either directly or indirectly, on practices in the livestock industries, with the use of such strategies. For example, Animals Australia, a federation of animal welfare groups in Australia, recently launched a 'Save Babe' campaign to agitate against and raise public awareness about the containment of sows in farrowing crates that the organization consider to contravene welfare standards (Animals Australia, 2006). Similarly, in 2005, the Australian wool industry came under scrutiny when the People for the Ethical Treatment of Animals (PETA) launched an international campaign targeting mulesing. Policy changes have already been seen in the European Union (EU) and America for example in 2002, residents of Florida voted on an amendment banning the use of sow crates, which were deemed as a farming practice that is cruel to pigs (Videras, 2006). While, in an effort to increase public confidence, the EU recently introduced mandatory traceability reference codes, on beef and beef products, detailing the origin of the animal (Verbeke & Ward, 2006).

With the exception of Coleman et al. (2004), there is virtually no research on the antecedents of community behaviours, such as petition signing or expressions of public opinion. Assessing consumer and public attitudes and knowledge of livestock industries in these areas is important, as the lack of such information makes it difficult to respond appropriately or to develop targeted strategies to proactively influence industry practices, the direction of community opinion and government regulation. Education programs informing the public on such issues need to be developed, as do industry strategies that proactively influence industry practices, the direction of community opinion and government regulation. In a recent study, Napolitano, Caporale, Carlucci, and Monteleone (2006) found evidence to suggest that providing information on animal welfare to consumers (that indicated the welfare and safety of the farm animals used to produce their meat was high), increased positive perceptions and acceptability of meat.

Using attitudes as a basis for understanding people's values, their behaviour and the processes that may modify that behaviour, provides a direct framework within which to study consumer and community behaviour on the basis of an affective (emotional) response to a behavioural choice situation (Fishbein, 1967). Fishbein proposed the Theory of Reasoned Action which stated that "as a general rule, we intend to behave in favourable ways with respect to things and people we like and to display unfavourable behaviours towards things and people we dislike. And, barring unforeseen events, we translate our plans into actions" (Ajzen & Fishbein, 1980). Therefore, an understanding of attitudes towards livestock production and their influence on the behaviours of consumers and the public in general, together with an on-going awareness of the potential for attitude change, will provide an appreciation of the likely impact that these may have on the livestock industry. It will also provide a platform from which strategies to modify public attitudes that may impact on the livestock industry can be developed. Identification of the range and relative importance of these attitudes in influencing consumer behaviour is required to ensure the sustainability of the livestock industry. The studies reviewed here have revealed the emerging importance of animal welfare as a key consumer concern. What remains critical for stakeholders in terms of industry sustainability relates to existing consumer attitudes and knowledge, and the relationship between these factors and consumer behaviours. The current study seeks to address this question and overcome many of the limitations of past research.

1 Project Objectives

This study examined industry-specific and general public attitudes toward animal welfare, health, and environmental issues in the red meat industry, to determine the importance of these attitudes on consumer behaviours (eg. buying red meat), and community behaviours (e.g. petitioning, membership of animal welfare groups, lobbying politicians). The aim of this research was to identify factors that will predict consumer and community behaviours relevant to red meat production. Specific aims were:

1. To identify industry-specific and generic public perceptions and attitudes towards the red meat industry that predict consumer and community behaviours.

2. To compare current perceptions and attitudes towards animal welfare with those held by Australians in 2000 (Roy Morgan Research).

3. To measure general and industry-specific attitudes towards the most commonly raised animal welfare, health, and environmental issues in the red meat and livestock industries. Further, these data will be used to explore the relationship between these attitudes and consumer behaviour in community members, such as purchasing behaviours, membership to animal welfare groups, petitioning, and lobbying politicians, processors and retailers.

4. To develop a methodology that can be used for routine monitoring of community attitudes towards the red meat industry and red meat products, and to inform the development of educational programs by government, red meat industry, and regulatory bodies.

It was hypothesised that attitudes and knowledge will be useful predictors of consumer lobbying, and community behaviours of the general public in relation to the red meat industry.

2 Methodology

2.1 Participants

Participants involved in the phone survey were randomly recruited from metropolitan and rural regions of all Australian states and territories. Participants recruited at the point-of-sale were recruited from metropolitan Victoria. Human ethics approval for the project was obtained from the Monash human ethics committee (SCERH).

2.2 Materials

Knowledge of livestock farming practices and public opinions regarding the purchase of livestock derived produce (including beef and lamb products) were surveyed using the generic "Farming and the Community" survey. Knowledge and public opinions regarding red meat farming were surveyed using the industry specific "Beef and Lamb Farming and the Community" survey. Digitised versions of the questionnaires were constructed using the Computer-Assisted Telephone Interviewing (CATI) software (http://www.sawtooth.com, 2006).

The questionnaires were developed using an iterative process beginning with questionnaires that had been developed for the pork and egg industries. These questionnaires were modified to target specific issues in the red meat industries. Subsequent discussions with representatives from MLA were used to refine the questionnaire content.

The final draft version of the questionnaire was pilot tested on a random sample of 103 respondents. Further revisions were based on the results obtained from the pilot data, and on the input obtained from a final meeting of key relevant personnel.

The final generic questionnaire comprised five sections (Appendix A):
Demographics
Farming Practices in Agriculture and Food Production
Eating & Shopping Habits
Farm Animals & Food
Animals & Animal Welfare

The final Industry specific questionnaire comprised three sections (Appendix B)
Sheep & Beef Cattle Farming Practices in Agriculture and Food Production
Sheep & Beef Cattle Eating & Shopping Habits
Sheep & Beef Cattle Activities & Animal Welfare

2.3 Data collection: Point-of-sale

Participants at the point-of-sale were recruited from a large supermarket chain. After having finalised their purchases, shoppers were approached by researchers and asked whether they would be interested in participating in a survey on public opinions regarding the purchase of beef and sheep products. Shoppers were informed that participation involved the completion of a two-minute assessment of their beef and sheep purchases ('Point-of-sale' aspect) to be followed by a more detailed survey at a later date. Shoppers were not required to have purchased any beef or lamb to be included in the point-of-sale survey. Where consent for participation was obtained, shoppers were asked a series of questions regarding their beef and sheep purchases (refer Appendix C). Of those recruited, 37 percent had purchased beef, and 16 percent had purchased lamb. In total, 44 percent of the point-of-sale participants had purchased either beef or lamb or both.

2.4 Data collection: Telephone Recruitment

Participants were recruited over the telephone by experienced interviewers from I-View (data collection and management company) during daytime and early evening hours, using randomly generated telephone numbers, and asked if they would be prepared to participant in a survey on public opinions regarding the purchase of beef and sheep products. If they agreed, all participants (including those recruited at the point-of-sale) were surveyed using both the generic questionnaire and the beef and sheep industry-specific questionnaire. Responses were entered directly into a digitised version of the questionnaires. Participants were thanked for their time.

2.5 Variables

Data were collected on people's self-reported beef and sheep purchases as well as their actual purchases at the point-of-sale. In addition, data were collected on knowledge and attitudes relating to the livestock industries in general and to beef and sheep production in particular. Principal components analyses using Varimax rotation and Kaiser normalization (Tabachnick & Fidell, 2001) were conducted on the questionnaire data so that those questions which could be grouped together to form a single scale were able to be identified (see Appendix D). Those questions which could be grouped together were averaged to produce the variables used for subsequent analysis. These variables are briefly described in Table 1.

Table 1. Variables derived from the questionnaire. High score = high agreement

VARIABLE	EXAMPLE QUESTIONS
Importance of meeting welfare needs livestock in general	“Freedom to roam outdoors”, “Fresh air”, “regular exercise”
Importance of meeting health needs livestock in general	“Medications (i.e., antibiotics) for animal health”, “Vaccinations for animal health”
Importance of meeting welfare needs sheep/beef	“Fresh air”, “Good nutrition”, “Access to water”
Importance of meeting health needs sheep/beef	“Shelter”, “Medications (i.e., antibiotics) for health”, “Vaccinations for health”
Approval of husbandry procedures	“Mulesing”, ”Induced moulting”, “Pre-slaughter stunning”
Beliefs about the positive attributes of meat in general	“Meat is part of a balanced diet”, “Meat is a healthy food”, “People have a right to eat meat”
Beliefs about animal rights in general	“Farm animals should be treated in the same way as domestic animals”, “Farm animals have the same right to life as humans”
Beliefs about cholesterol in meat	“Meat is high in fat”, “Meat is high in cholesterol”
Attitude to animals as a source of food	“No animal should die so that I have food”, “Farm animals have the same right to life as humans”
Beliefs about carers' concerns for their animals	“Beef cattle farmers”, “Sheep farmers”, “Pig farmers”, “Dairy cattle farmers”
Attitudes towards intensive farming practices	“Intensive poultry (chicken meat) farming”, “Intensive pig farming”, “Intensive egg farming”
Attitudes towards free-range farming practices	“Free range poultry farming”, “Free range egg farming”, “Free range pig farming”
Attitude to land transport comfort for livestock	“Space per animal”, “Journey length”, “Ventilation”
Attitude to sea transport comfort for livestock	“Space per animal”, “Journey length”, “Ventilation”
Positive attitudes towards activism	“People should encourage their family and friends to be actively involved in the promotion of animal welfare”, “It is important for me to be actively involved in the promotion of the welfare of native animals”
Concerns about welfare	“The welfare of farm animals is an important consideration to me”, “People should make the effort to buy food that is produced with regard to good animal welfare practices”

Table 1 (cont.). Variables derived from the questionnaire. High score = high agreement (continued)

VARIABLE	EXAMPLE QUESTIONS
Opposition to welfare activism	"There are too many people actively involved in promoting native animal welfare", "Too many people are actively involved in promoting domestic pet welfare"
Beliefs about the positive attributes of sheep/beef meat	"Beef and lamb is an essential part of a healthy diet", "Children need beef and lamb as part of a balanced diet", "I believe beef and lamb is healthy"
Beliefs about beef/sheep rights	"Sheep and cattle have the same right to life as humans", "Sheep and cattle should be treated in the same way as domestic animals", "Sheep and cattle have the same feelings as domestic animals"
Beliefs about cholesterol in beef/lamb	"I believe beef and lamb could cause cholesterol or heart problems"
Beliefs about additives in beef and lamb	"The use of food additives in beef and lamb requires closer regulation", "It bothers me that beef and lamb may contain traces of chemicals or hormones, used in rearing the animals"

3 Results

3.1 Characteristics

3.1.1 The sample

Consistent with other research in this area (Verbeke, 2002; Verbeke & Vackier, 2004), approximately two thirds of the sample comprised females and one third males. The total sample of 516 respondents (326 females, 190 males) completed the generic and sheep and beef cattle industry specific questionnaires. Of these, 116 respondents (78 females, 38 males) were also interviewed at the point-of-sale. In the Roy Morgan survey of 2000, gender split was set to Australian population proportions (male:49%, female:51%).

3.1.2 Place of residence

As shown in Figure 1, over half the sample (53.5%) resided in suburban locations, with approximately 10% residing in regional cities and rural areas. Slightly more of the participants lived in country towns (13%) and urban areas (14%). The Roy Morgan survey (2000) did not report this.

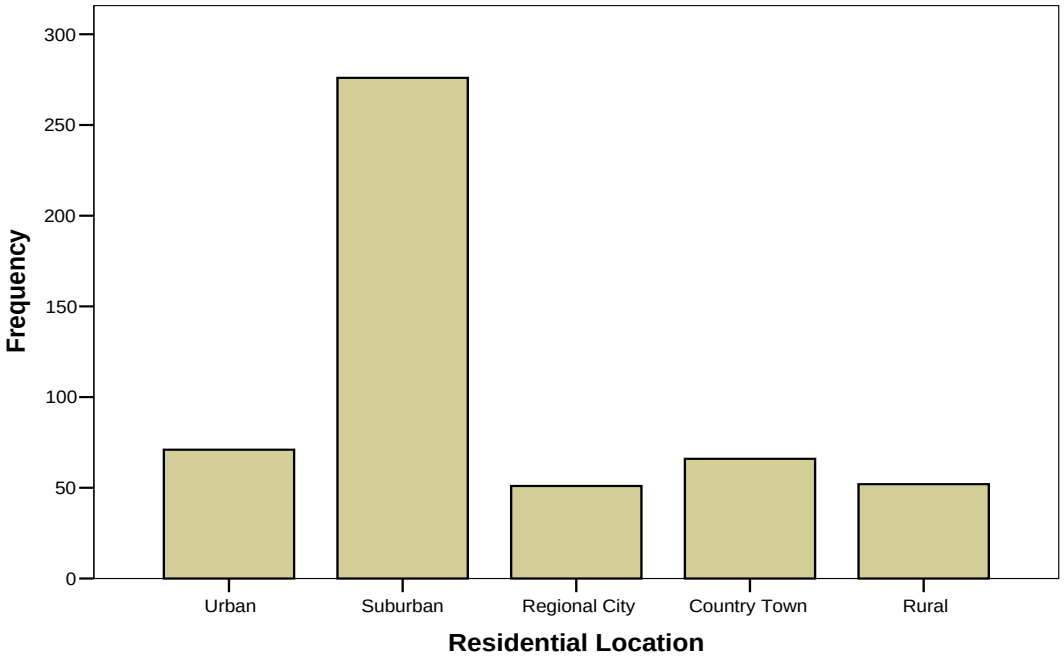


Figure 1. Distribution of current residential location of respondents

3.1.3 Age

The age distribution of respondents is presented in Table 2. The age range of the sample was relatively evenly distributed, with relatively fewer younger people (19-29 years of age). Most of the sample was aged between 30 and 59 years (see Table 2). The Roy Morgan survey (2000) did not report this.

Table 2. Age distribution of respondents

	Frequency	Percent
<30	60	11.6
30-39	114	22.1
40-49	104	20.2
50-59	110	21.3
60+	114	22.1
Missing	14	2.7
Total	516	100.0

3.1.4 Education

As shown in Table 3, just under half of the sample had a secondary school level of education, with almost one-quarter (23%) completing an undergraduate university degree. Seventeen percent of the sample had completed TAFE College, with approximately 9% also completing a university post-graduate degree. Relatively few (3.5%) had limited or no formal schooling.

Table 3. Highest level of education attained by respondents. The Roy Morgan (2000) figures are in parentheses.

	Frequency	Percent
Primary School (5%)	18	3.5
Secondary School (41%)	232	45.0
TAFE College	86	16.7
University Degree (23%)	119	23.1
University Post-graduate Degree	46	8.9
Other	15	2.9
Total	516	100.0

3.1.5 Socio-economic status

Figure 2 displays the socio-economic status of respondents, as indicated by household income. As the results show, most household incomes ranged from $30,000 to $120,000 per annum, with few households earning more than $150,000 per annum.

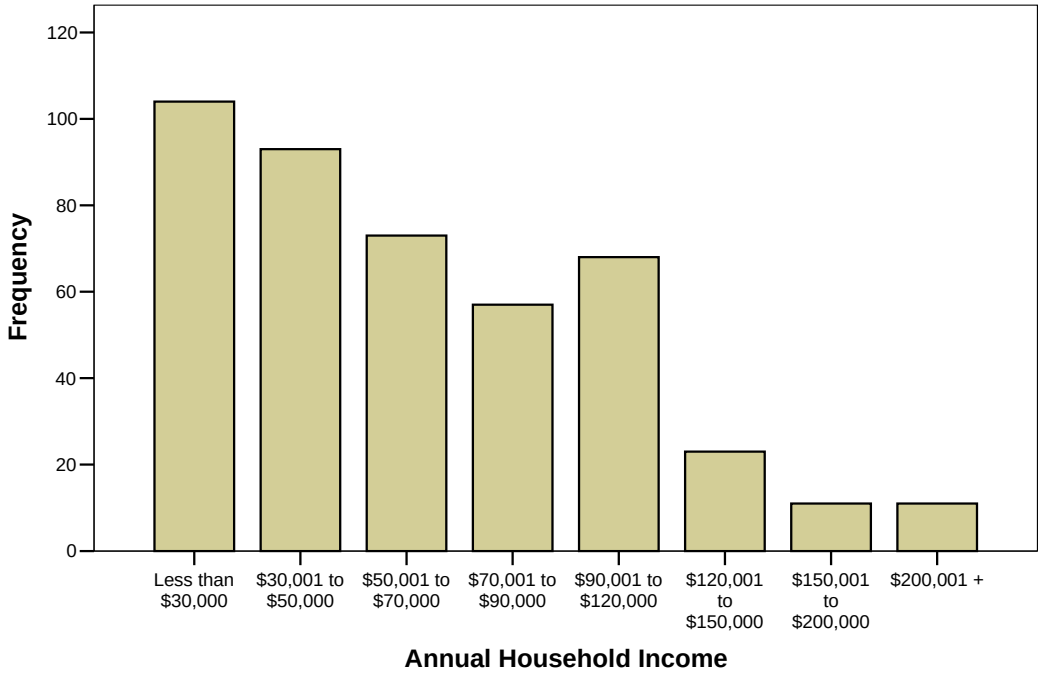


Figure 2. Socio-economic status for household income

No meaningful comparison between this distribution and that of Roy Morgan (2000) could be made because of the substantial changes in income that have occurred over the past six years and the fact that the Roy Morgan survey had a no response rate of 33%.

3.1.6 Household characteristics

Figure 3 displays the number of occupants in households. Most households had fewer that 5 occupants. The distribution is similar to that of Roy Morgan (2000).

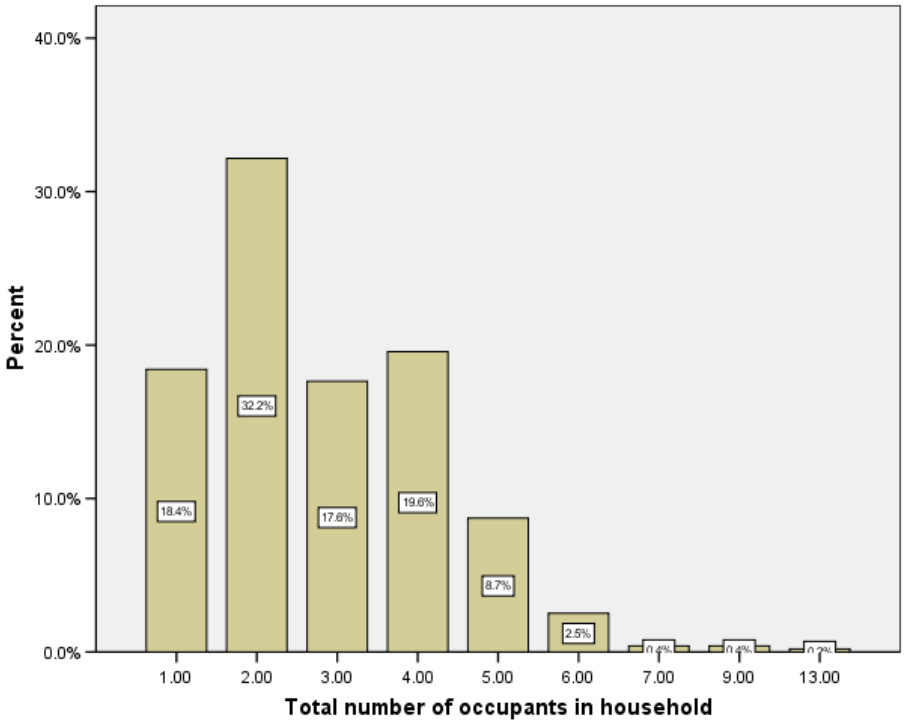


Figure 3. Total number of occupants in the household.

3.1.7 Dietary habits

As shown in Table 4, the majority of respondents (93%) described themselves as being primarily meat eaters, with 6% describing themselves as primarily vegetarian, and 1% describing themselves as vegan. (Comparable national average figures of Australian dietary habits are unavailable at the present time.)

Table 4. Dietary habits of respondents

	Frequency	Percent
Meat Eater	481	93.2
Vegetarian	30	5.8
Vegan	5	1.0
Total	516	100.0

3.2 Purchasing patterns and community behaviours

3.2.1 Actual and self-reported assessment of purchases

Two measures of purchasing behaviour were used in this study. For the total sample, respondents were asked to report the amount of beef and lamb products that they had purchased in the preceding month. In addition, a subset of respondents (n=116) were approached at a point-of-sale (POS) location and their actual beef and lamb purchases on that occasion were recorded. These measures were not correlated for lamb ($r=.073$, $p > .05$, $n=116$) but were found to be significantly associated for beef ($r=.20$, $p < .05$, $n=115$).

3.2.2 Community behaviours

Table 5 shows the inter-correlations amongst the frequencies of each kind of community behaviour and of the sum total of all behaviours. It is clear from Table 5 that there was a high positive correlation between each kind of behaviour listed and the total number of community behaviours. As a result, subsequent analyses used the total number of behaviours as a measure of community activity rather than each individual type of community behaviour.

Table 5. Correlations between different community behaviours and the total number of such behaviours.

	Behaviour to oppose farming	Behaviour to support farming	Behaviour to oppose sheep/beef farming	Behaviour to support sheep/beef farming	Total number of community behaviours
Behaviour to oppose farming	1	.497	.716	.388	.843
Behaviour to support farming		1	.503	.635	.786
Behaviour to oppose sheep/beef farming			1	.574	.871
Behaviour to support sheep/beef farming				1	.748
Total number of community behaviours					1

All correlations $p<.01$, $n=516$

3.2.3 Beef and Lamb consumption

Tables 6 and 7 contain the self-reported frequency with which respondents consume beef and lamb products during an average week.

Table 6. Average weekly consumption of beef products

		Frequency	Percent
Valid	Never	12	2.3
	Less than once a week	38	7.4
	Once a week	138	26.7
	2-3 times a week	226	43.8
	More than 3 times a week	67	13.0
	Total	481	93.2
Missing		35	6.8
Total		516	100.0

Table 7. Average weekly consumption of lamb products

		Frequency	Percent
Valid	Never	36	7.0
	Less than once a week	140	27.1
	Once a week	177	34.3
	2-3 times a week	113	21.9
	More than 3 times a week	15	2.9
	Total	481	93.2
Missing	System	35	6.8
Total		516	100.0

Overall, 431 respondents claimed to make a beef purchase at least once a week, and 305 respondents claimed to make a lamb purchase at least once per week. Average self-reported purchases were 7.68kg per month for beef (N=511), and 3.31kg per month for lamb (N=516) (see Tables 8 and 9). Of the respondents who were surveyed at the point-of-sale, the average amount purchased per person on a single occasion was 305.65gms for beef (N=116), and 138gms for lamb (N=116). The average amount of each beef and lamb product is also presented in Tables 8 and 9, respectively.

Table 8. Average monthly self-reported and point-of-sale (POS) purchase of beef products (in grams)

	N	Mean	Standard Deviation	Range
Beef cuts	476	2604.10	3567.63	0 – 30000
Beef steak	488	1919.59	2395.71	0 – 20000
Ground (i.e. minced) beef	497	1647.24	2096.60	0 – 20000
Beef sausages	496	854.60	1409.58	0 – 10000
Beef roast	495	785.66	1379.95	0 – 10000
Other beef	504	231.57	1079.10	0 - 20000
Total beef products purchased each month	511	7680.00	8015.05	0 - 55000
POS ground beef	116	151.14	368.43	0 - 2000
POS diced beef	116	8.62	92.85	0 - 1000
POS scotch fillet	116	4.98	38.63	0 - 350
POS T-bone steak	116	22.41	156.78	0 - 1350
POS Sirloin steak	116	4.31	46.42	0 - 500
POS Rib eye	116	9.05	56.18	0 - 400
POS Porterhouse steak	116	10.60	65.53	0 - 450
POS other beef	116	94.53	271.14	0 - 1500
POS Total beef purchased	116	305.65	491.45	0 - 2000

Table 9. Average monthly self-reported and point-of-sale (POS) purchase of lamb products

	N	Mean	Standard Deviation	Range
Lamb cuts (chops)	495	1379.63	1995.13	0 – 15000
Lamb steak	499	293.03	830.83	0 – 10000
Ground (i.e. minced) lamb	514	171.40	595.11	0 – 1000
Lamb sausages	514	132.63	446.15	0 – 1000
Lamb roast	514	1246.41	2130.82	0 – 30000
Other lamb	516	163.57	721.69	0 - 10000
Total lamb products purchased each month	516	3314.86	4474.94	0 – 40000
POS lamb cutlets	116	18.05	109.61	0 – 900
POS lamb chops	116	34.66	202.44	0 - 1500
POS leg lamb	116	25.97	196.89	0 - 1512
POS other lamb	116	59.36	221.32	0 - 1000
POS Total lamb purchased	116	138.03	358.63	0 – 1512

Figures 4 and 5 provide a schematic representation of the self-reported average monthly purchase and point-of-sale purchase of beef, respectively. While the total amount of beef

purchased at the point-of-sale was found to be correlated with self-reported beef purchases, there were some differences between the amount of various beef products purchased at point-of-sale and the self-reported amount of beef purchased per month. The sample purchased proportionally more minced beef at the point-of-sale than was self-reported. In contrast, participants self-reported the purchase of more beef cuts than were observed to be purchased at the point-of-sale. A similar amount of 'other' products and beef steaks were self-reportedly purchased and observed to have been purchased at the point-of-sale.

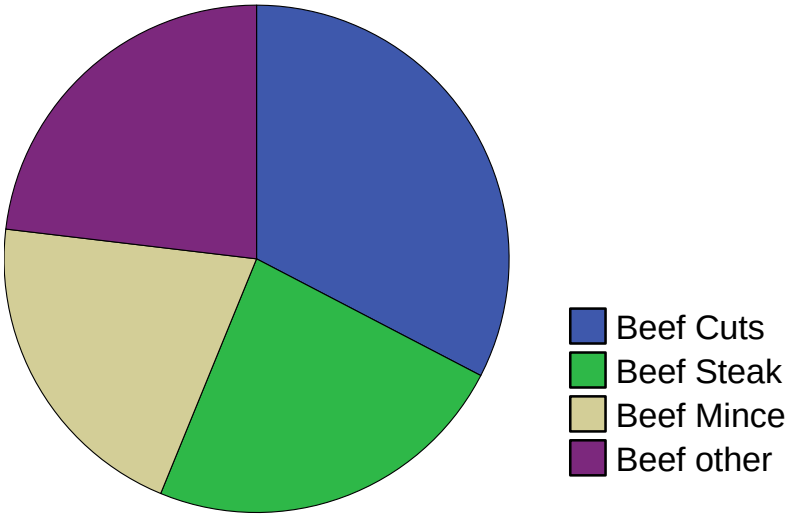


Figure 4. The average proportion of beef products that respondents self-reported to purchase monthly

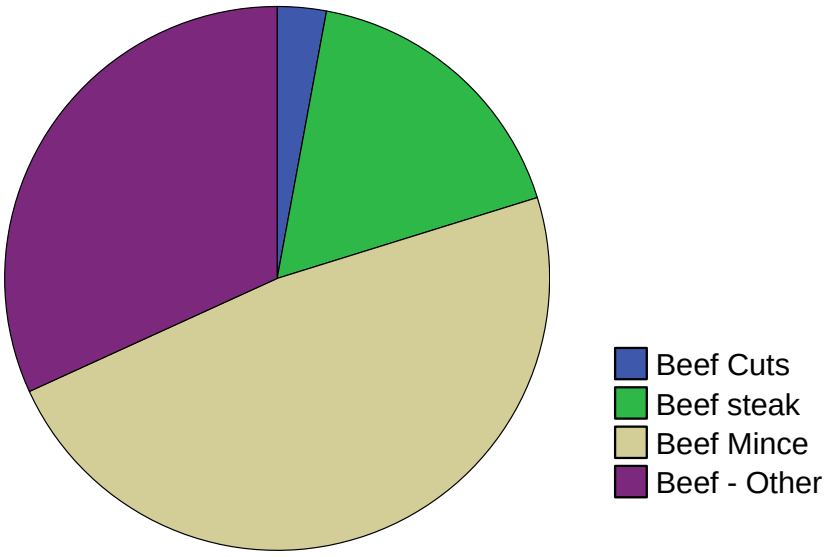


Figure 5. The average proportion of beef products that respondents purchased at the point-of-sale

Figures 6 and 7 display the average self-reported and point-of-sale purchase lamb products, respectively. As can be seen, the sample purchased proportionally less 'Roast Lamb' at point-of-sale than was self-reported. Moreover, the purchase of 'Other' lamb products was proportionally greater at the point-of-sale than was self-reported. These results indicate that there may be some variation between the *type* of self-reported and actual beef and lamb purchases.

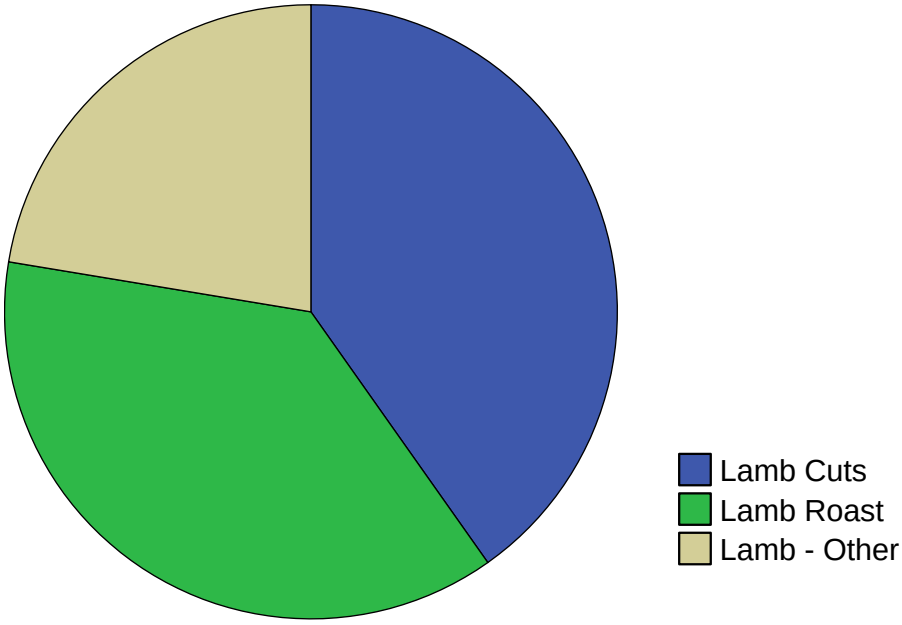


Figure 6. The average proportion of lamb products that respondents self-reported to purchase monthly

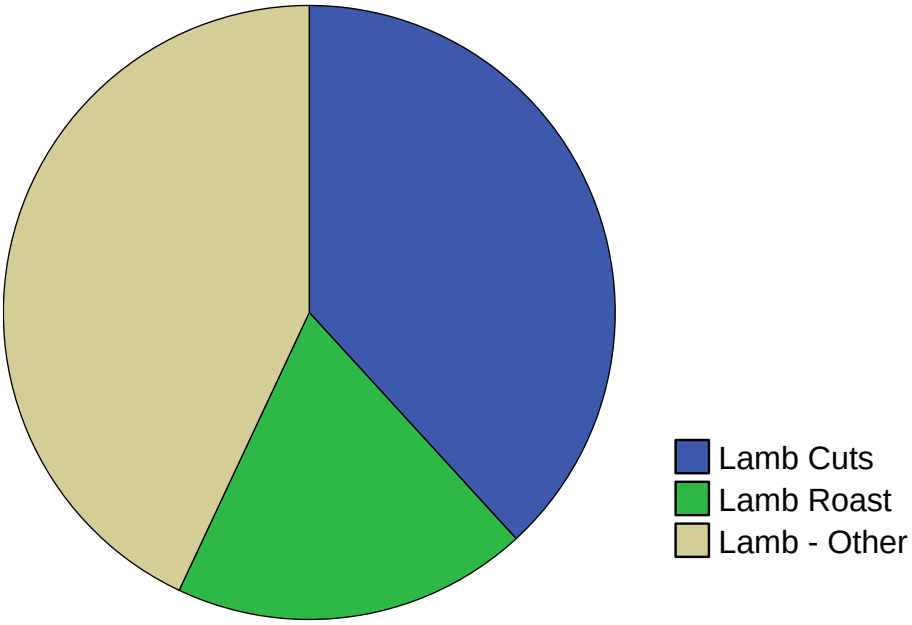


Figure 7. The average proportion of lamb products that respondents purchased at the point-of-sale

3.2.4 Community and purchasing behaviours

Means and standard deviations in community and self-reported purchasing behaviours across age groups are provided in Table 10, and the means and standard deviations for POS purchasing behaviours are provided in Table 11. Across the age groups, the average number of community behaviours ranged from 3.54 to 4.32. Although the mean number of community

behaviours appeared higher for the 30-39 age group compared to the other age groups, one-way Analysis of Variance (ANOVA) revealed no significant differences in community behaviours across age groups (F(4, 497), = .42, p > .05).

ANOVA revealed no significant difference in the *per capita* self-reported monthly purchase of lamb products across age groups ($F(4, 497) = 1.94$ p>.05), but did reveal a significant difference in the *per capita* self-reported monthly purchase of beef products depending upon the age of the individual ($F(4, 492) = 3.65$, p < .001). Post hoc Sheffe's test revealed that individuals aged 30 to 39 reported purchasing significantly less beef that those aged between 50-59 (p <.05) and those aged 60 or more (p <.05).

Table 10. Means and standard deviations in community and *per capita* self-reported purchasing behaviours across age groups.

		N	Mean	Std. Deviation
Total number of community behaviours	<29	60	3.77	4.64
	30 - 39	114	4.32	4.75
	40-49	104	3.54	4.27
	50-59	110	3.82	4.29
	60>	114	3.80	5.07
	Total	502	3.86	4.61
Per capita self-reported lamb purchase	<29	60	988.82	1232.01
	30 - 39	114	1093.89	1795.40
	40-49	104	1294.16	1451.85
	50-59	110	1455.67	1550.99
	60>	114	1617.75	2383.91
	Total	502	1321.06	1787.02
Per capita self-reported beef purchase	<29	60	2981.39	4126.03
	30 - 39	114	2088.04	2128.73
	40-49	104	3162.62	2491.32
	50-59	108	3461.84	3150.78
	60>	111	3366.40	3496.02
	Total	497	3004.79	3077.61

One-way ANOVA revealed a significant difference in the *per capita* amount of beef purchased at the point-of-sale aspect in relation to the age of the individual ($F(4, 110) = 4.24$, p < .01). Post hoc Sheffe's test revealed that individuals aged 30 to 39 reported purchasing significantly less beef that those aged 60 or more (p <.01). In contrast, there were no significant differences in the *per capita* amount of lamb purchased at the point-of-sale aspect in relation to the age of the individual $F(4, 110) = 2.07$, p >.05).

Table 11. Means and standard deviations in *per capita* POS purchasing behaviours across age groups.

		N	Mean	Std. Deviation
Beef POS per capita	<29	14	50.07	107.44
	30 - 39	27	47.45	109.61
	40-49	17	118.40	207.00
	50-59	31	108.35	155.08
	60>	26	253.12	317.28
	Total	115	121.17	210.71
Lamb POS per capita	<29	14	35.71	133.63
	30 - 39	27	18.67	96.99
	40-49	17	67.16	127.15
	50-59	31	39.76	141.84
	60>	26	138.42	259.59
	Total	115	60.67	168.88

Females engaged in significantly more community behaviours than did males (means = 4.37 and 2.93 respectively, $F(1,514) = 11.95$, $p<.01$). There were no significant differences between the mean self-reported monthly purchase of lamb products for males and females ($F(1,514) = 1.87$, $p>.05$), but there was a significant difference in the amount of self-reported monthly beef purchases across gender ($F(1,509) = 8.59$, $p<.01$). Males self-reported the purchase of significantly more beef than did females (means = 9026.19 and 6889.85 gms per month, respectively). There were no significant differences in the amount of beef and lamb purchased at point-of-sale according to gender, ($F(1,114) = 1.89$, $p>.05$ for beef, $F(1,114) = 3.56$, $p>.05$ for lamb).

There were no significant differences in number of community behaviours or per capita self reported or POS beef and lamb purchases across the different places of residence. In other words, there were no differences between country and city respondents on these measures. There were also no significant differences in community behaviours and self-reported or point-of-sale purchases across the different educational levels.

3.3 Food attributes and purchasing

3.3.1 Product attributes and food choices

The importance of certain product attributes on respondents' choice of foods that are produced from livestock in general and sheep and beef in particular, were explored.

Fifteen attributes were rated by respondents (Table 12) on a scale ranging from 'very unimportant' (1) to 'very important' (7). Data from 508 respondents were analysed using Principal Components Analysis (PCA) followed by a Varimax rotation was performed in order to determine major 'themes' within the relative importance data. Since PCA derives groupings of variables through an analysis of the variance each item has in common with other items in a data set, the groupings (or components) are derived from the data itself and not by a pre-determined listing of single items. As such, and in relation to the current study, any groupings of the individual product attributes into components would provide some insight into the underlying dimensions that may mediate consumers' food choices. From Table 12 it can be seen that respondents

rated the attributes on two distinct dimensions (or themes) for livestock products in general and for beef and sheep products specifically. (The number noted in the table reflects the relative weighting on the dimension.)

As shown in Table 12a, the first of the two dimensions relating to attributes for livestock products in general focused on clean, green and humane aspects of food production. In particular, this dimension included the 'no hormones', 'antibiotics' the 'not genetically modified', a 'free-range', the 'humane treatment', being 'produced in Australia', and 'quality'. The second factor related to attributes of the actual product including 'size', 'packaging', 'appearance', 'shelf life', 'brand', 'produced locally' and 'price'.

From Table 12b it can be seen that the ratings of product attributes in relation to beef and sheep purchases were best characterised by two dimensions. The first included aspects relating to the actual product, such as 'value', 'size of pieces', 'price', 'cut', 'shelf life' and 'packaging'. The second dimension was similar to the clean, green and humane aspect observed in the previous table and included 'produced with concern for the environment', 'humane treatment', 'free-range' and 'no hormones/antibiotics'.

Table 12. Principal components analyses (Varimax rotation) of importance of attributes for the purchase of a) Livestock products in general and b) sheep and beef products.

	1	2
No hormones	.852	
No antibiotics	.832	
No artificial additives or preservatives	.771	
Free-range	.669	
Not genetically modified	.652	
Humane treatment	.622	
Produced in Australia	.519	.363
Quality	.508	.433
Size		.705
Packaging		.688
Appearance		.625
Shelf life		.573
Brand		.495
Produced locally	.328	.488
Price		.395

a) Livestock products in general

	1	2
Value	.745	
Size of piece/s	.716	
Price	.704	
Cut/type of lamb product	.686	
Shelf life	.613	
Appearance	.607	.331
Packaging	.605	
Consistent quality	.601	.447
Nutrient rich	.558	.421
Leanness	.488	.418
Health indications	.426	.390
Humane treatment		.844
Produced with concern for the environment		.784
Free-range		.780
No hormones/antibiotics		.699
Produced in Australia	.320	.579

b) Sheep and Beef

In order to obtain an estimate of the relative importance of these attributes to the purchase of livestock produce generally, and beef and sheep produce specifically, variables were ranked on the basis of the mean importance ratings for each attribute (that is the raw importance rating means). These results are provided in Table 13. In each case, 'quality', 'appearance' and 'Australian production' were rated as most important, although the relative order for 'quality' and 'Australian production' were swapped. 'Humane treatment of animals' ranked fifth for livestock products in general and sixth for sheep and beef products specifically. In each case, amongst the least important attributes were 'size' and 'packaging'.

Table 13. Ranked means of importance of attributes for the purchase of a) Livestock products in general and b) Sheep and beef products.

	Mean
Quality	6.49
Produced in Australia	6.36
Appearance	6.04
Not genetically modified	6.00
Humane treatment	5.85
No artificial additives or preservatives	5.69
Produced locally	5.68
Free-range	5.68
No antibiotics	5.52
No hormones	5.48
Shelf life	5.45
Price	5.29
Size	4.69
Packaging	4.11
Brand	3.41

a) Livestock products in general

	Mean
Produced in Australia	6.32
Consistent quality	6.27
Appearance	6.09
Produced with concern for the environment	6.02
Leanness	5.95
Humane treatment	5.93
Free-range	5.91
No hormones/antibiotics	5.91
Nutrient rich	5.74
Value	5.65
Shelf life	5.60
Price per kilo of cut	5.49
Cut of lamb product	5.34
Size of piece/s	4.79
Packaging	4.40

b) Sheep and beef

Correlations between the importance of attributes of sheep and beef products to actual (POS) and self-reported sheep and beef purchases, including the amount of sheep and beef purchased (at POS and self-report), are presented in Table 14. In general, the importance of sheep and beef attributes were generally correlated with self-reported purchases of both sheep and beef. The highest correlations were for ‘price per kilo’ (r=.18 for beef and r=.14 for lamb), ‘appearance’ (r=0.15 for beef and r=.14 for lamb) and ‘value’ (r=.15 for beef and r=.13 for lamb). In contrast, with only two exceptions (see Table 14), the importance of sheep and beef attributes were generally uncorrelated with amount of point-of-sale purchases of both sheep and beef. The only attributes correlated were for ‘leanness’ (r=.22 for beef and r=.20 for lamb) and ‘health indications’ (r=.19 for beef and r=.20 for lamb).

Table 14. Correlations between rated importance of sheep and beef attributes and consumption (POS n=116, Self-reported n=512-513).

	Self-reported Beef	Self-reported Lamb	POS Beef	POS Lamb
Value	.15**	.13**	.09	.12
Price per kilo of cut	.18**	.14**	.05	-.01
No hormones/antibiotics	.03	-.03	.02	.03
Produced in Australia	.10*	.07	.16	.13
Free-range method of production	.00	.01	-.09	.04
Appearance	.15**	.14**	-.02	.03
Shelf life	.09*	.08	-.06	.14
Consistent quality	.12**	.12**	.13	-.02
Packaging/presentation	.09*	.09	.07	.12
Humane treatment of animals	-.01	-.09*	-.07	.06
Concern for the environment	.01	-.06	-.12	.04
Size of piece/s	.07	.08	-.05	.09
Cut/type of lamb product	.09*	.13**	.14	.18
Nutrient rich	.06	.07	.10	.09
Leanness	.03	.02	.22*	.20*
Health indications such as Heart Foundation	.02	.08	.19*	.20*

* p < .05; ** p < .01

Correlations between the importance of attributes of livestock products in general to actual (POS) and self-reported purchases for both sheep and beef, are presented in Table 15. The importance of livestock product attributes was generally uncorrelated across both point-of-sale and self-reported purchases for both sheep and beef. For self-reported purchases, the only attributes correlated were for ‘appearance’ (r=.13 for beef and r=.12 for lamb), ‘contains no hormones’ for beef (r=.09) and ‘shelf life’ and ‘produced locally’ for lamb (r=.09 and r=.13 respectively). For actual purchases, ‘produced in Australia’ for beef (r=.22) and ‘produced locally’ for lamb (r=.19) were the only significantly correlated attributes.

Table 15. Correlations between rated importance of general livestock product attributes and sheep and beef consumption (POS n=116, Self-reported n=512-513).

	Self-reported beef	Self-reported lamb	POS Beef	POS Lamb
Brand	.05	.08	-.07	-.07
Price	.09*	.06	.11	-.01
Contains no hormones	-.06	-.05	.02	.17
Contains no antibiotics	-.06	-.08	-.01	.17
No artificial additives or preservatives	-.03	-.05	-.06	.03
Produced in Australia	.07	.06	.22*	.17
Free-range method of production	-.02	-.01	-.20*	.04
Appearance	.13**	.12**	.12	.05
Shelf life	.06	.09*	.04	.11
Quality	.00	.02	.05	.07
Packaging	.05	.06	.03	.09
Humane treatment of animals	-.01	-.08	-.10	-.03
Not genetically modified	.08	.02	-.09	.03
Size	.04	.07	.01	.10
Produced locally	.08	.13**	.04	.19*

* $p < .05$; ** $p < .01$

3.4 Attitudes and behaviour

3.4.1 Community attitudes and knowledge

Knowledge about various livestock farming procedures typically showed over 60% of individuals having correctly defined most procedures (Table 16), which exceeds the chance level of 50%. Of the fifteen knowledge questions, the majority of participants answered between 9 and 14 questions correctly (Figure 8). In relation to the percentage correct for individual items, the most well-known procedures were ‘hot iron branding’ (96%), ‘tail docking’ (94%), ‘growth hormones’ (89%), ‘dehorning’ (88%) and ‘confinement’ (86%). The majority of participants also knew what was involved in ‘captive bolt stunning’ (80%), ‘beak trimming’ (70%), ‘clipping teeth’ (69%), ‘pre-slaughter stunning’ (67%), ‘feedlotting animals’ (66%), ‘mulesing’ (66%), ‘crutching’ (63%), and ‘lairaging’ (55%). In contrast, few participants knew what was involved in ‘curfewing’ (35%) and ‘induced moulting’ (28%). In general, these figures are substantially higher than the familiarity figures obtained by the Roy Morgan (2000) survey. For example, in the Roy Morgan survey, 58% of respondents indicated familiarity with tail docking whereas in this project, 94% correctly identified it. Similarly, in the Roy Morgan survey only 12% indicated familiarity with teeth clipping in pigs whereas 69% correctly identified it in this project. These differences indicate an increase in knowledge of such practices in the general population. This may be due to increased campaigns and publicity of such procedures (for example, mulesing) in recent years.

Table 16. Percentage of correct knowledge of procedures involved in various livestock farming

	Total N	Percentage Correct
Mulesing	516	66%
Crutching	516	63%
Induced moulting	516	28%
Dehorning	516	88%
Pre-slaughter stunning	516	67%
Curfew	516	35%
Confinement	516	86%
Tail docking	516	94%
Feedlotting animals	516	66%
Bbeak trimming	516	70%
Clipping teeth	516	69%
Hot iron branding	516	96%
Growth hormones	516	89%
Captive bolt stunning	516	80%
Lairaging	516	55%

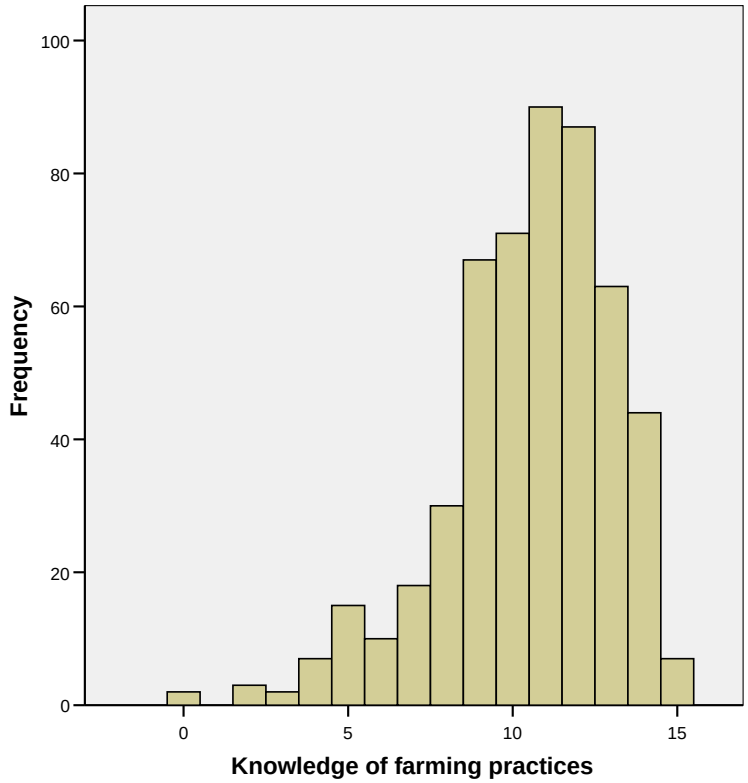


Figure 8. Distribution of respondent total knowledge scores for 15 livestock farming procedures

(More detailed examination of the distributions of approval and disapproval of each livestock farming procedure for those who were able to correctly identify the characteristics of each procedure compared with those who were unable to do so can be viewed in Appendix E - Community Attitudes and Knowledge.)

The results of this survey revealed that the majority of vegetarian/vegans indicated that ‘moral reasons’ and ‘health reasons’ were the primary reasons for their diet choices (Figure 9).

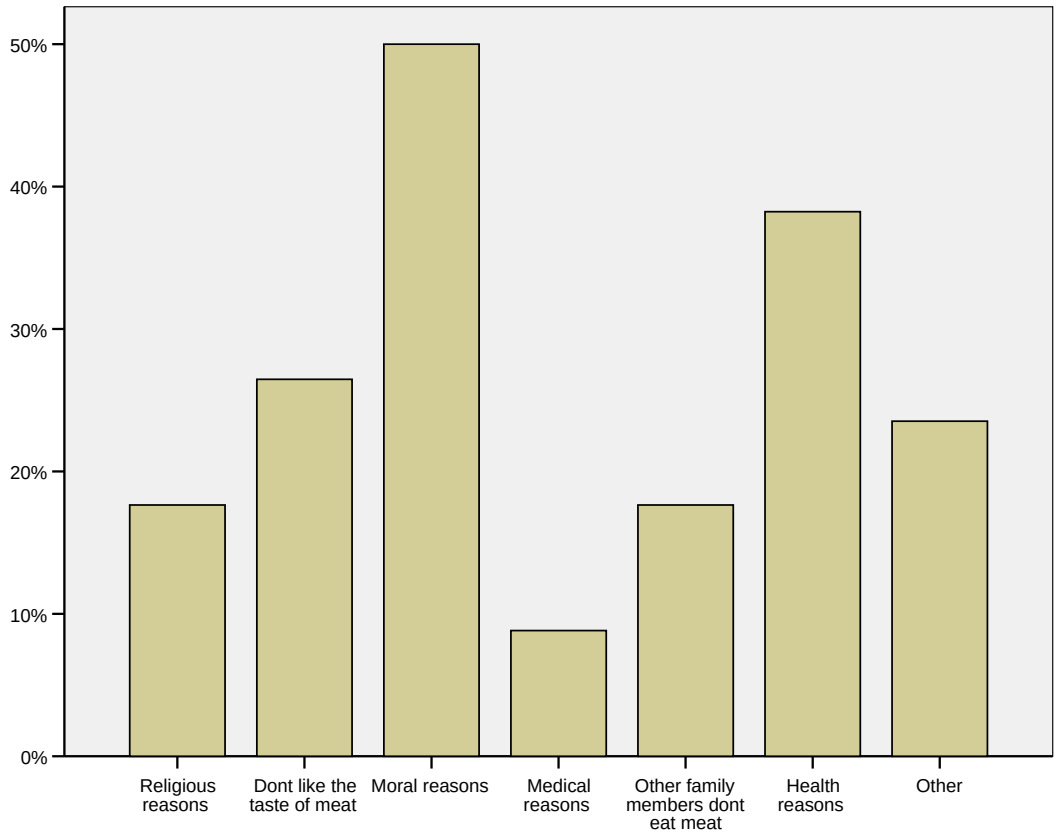


Figure 9. Relative frequency of reason for being a vegetarian or vegan

In relation to community behaviours, the findings revealed that the majority of participants did not belong to an animal welfare group or organisation (88%) (Table 17). Approximately 9.5% of the sample comprised current animal welfare group or organisation members and 2.5% were past members. Similarly, the findings revealed that the majority of participants did not subscribe to an animal welfare magazine (94%) (Table 18). Approximately 5% of the sample comprised current subscribers and 1% were past subscribers. Finally, the findings revealed that the majority of participants did not subscribe to a nature or wildlife publication (87%) (Table 19). Approximately 12% of the sample comprised current subscribers and 1% were past subscribers.

Table 17. Frequency of respondent animal welfare group or organisation membership

	Frequency	Percent
Yes	49	9.5
Past member	13	2.5
No	454	88.0
Total	516	100.0

Table 18. Frequency of respondent subscription to any animal welfare magazine

	Frequency	Percent
Yes	25	4.8
Past subscriber	5	1.0
No	486	94.2
Total	516	100.0

Table 19. Frequency of respondent subscription to any nature or wildlife publications

	Frequency	Percent
Yes	60	11.6
Past subscriber	5	1.0
No	451	87.4
Total	516	100.0

In relation to the mean level of concern (where 1=not concerned at all and 7=very concerned) perceived to be expressed by various people for the welfare of animals under their control, the findings revealed that abattoir workers, poultry farmers (meat and egg), rodeo organisers and participants, and people involved in animal research (psychological researchers, medical researchers etc.) were perceived as having less concern for the welfare of animals under their care than veterinarians, zoo keepers, domestic pet owners, horse trainers, dairy cattle farmers, sheep farmers and beef farmers (Figure 10).

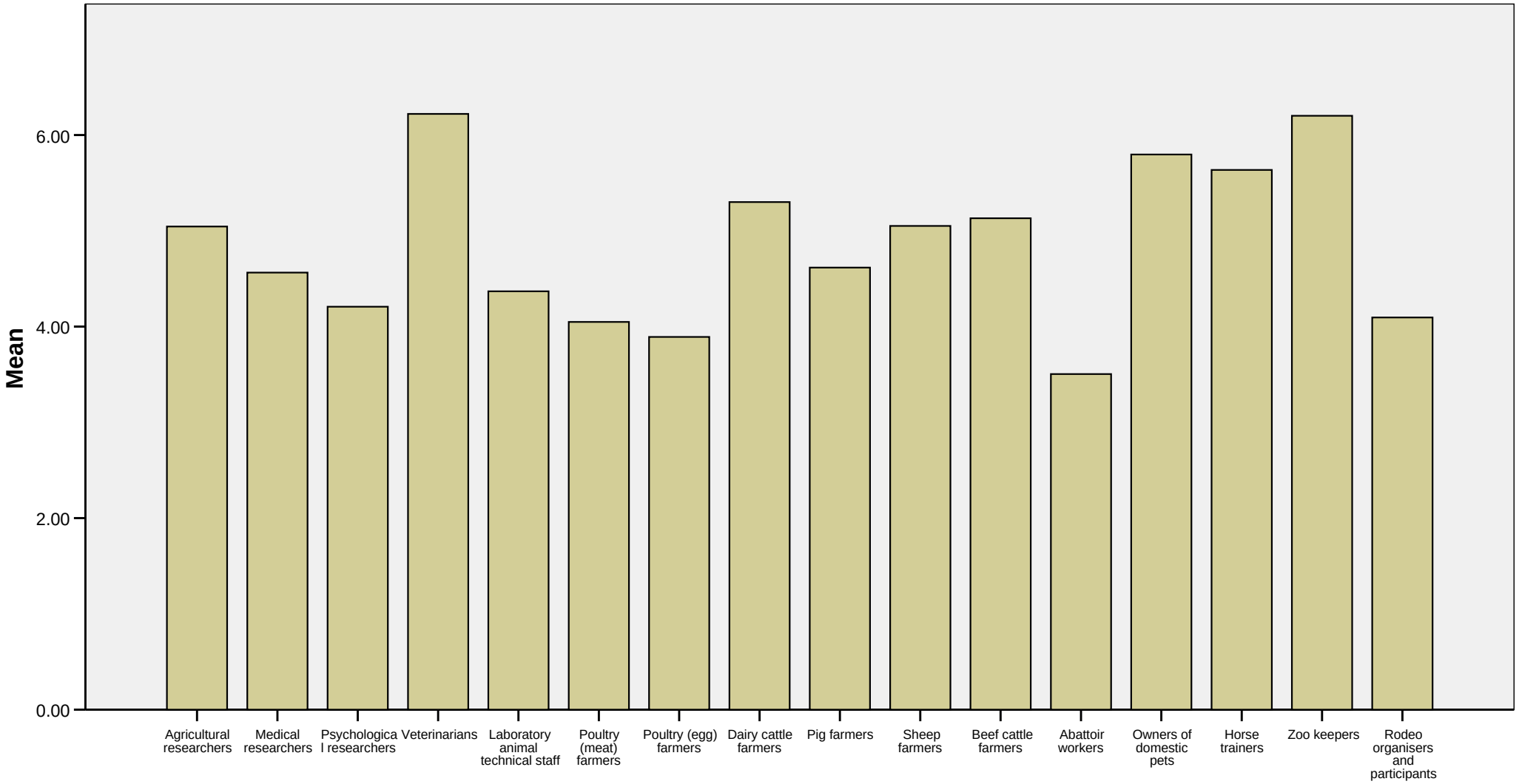


Figure 10. Mean perceived level of concern of various people for the welfare of animals under their control (1 – not concerned at all, 7 – very concerned)

(Concern for the welfare of animals under various conditions is further discussed in Appendix F – Community Attitudes and Knowledge continued.)

The ranked level of agreement with statements relating to community behaviours and animal welfare is presented in Table 20. As can be seen, the highest level of agreement was in relation to statements that addressed the importance of domestic, native and farm animal welfare. A high level of agreement was also seen in relation to support for participation in community behaviours that promote animal welfare. In general, participants disagreed with the statement that there are too many people involved in the promotion of animal welfare. In the Roy Morgan survey, the average agreement to the item "the welfare of animals is a major concern" was 3.88 on a five point scale. In the current project, there were three items targeting farm animals, pets and native animals. The mean response to these items was between 5.7 and 6.0 on a seven point scale. If rescaled to a five point style, this would give an average level of agreement of 4.1 to 4.3.

Table 20. Ranked agreement of specific statements (1 – strongly disagree, 7 – strongly agree)

	N	Mean
The welfare of domestic pets is an important consideration to me	516	5.97
People should make the effort to buy food that is produced with regard to gooc animal welfare practices	516	5.84
The welfare of native animals is an important consideration to me	516	5.78
The welfare of farm animals is an important consideration to me	516	5.72
Governments should provide funding for industry to help them improve animal welfare outcomes	516	5.19
People should lobby‡ governments to improve the welfare of farm animals	516	5.05
People should be more public in their support for farm animal welfare	516	4.60
It is important to me that I sign a petition in support of animal welfare	516	4.42
It is important for me to be actively involved in the promotion of the welfare o native animals	516	4.31
All people should encourage their friends to support animal welfare causes	516	4.29
Animal rights activists† are too radical in their protection of animals	516	4.13
It is important for me to be actively involved in the promotion of the welfare o domestic pets	516	4.07
People should encourage their family and friends to be actively involved in the promotion of animal welfare	516	4.02
It is important for me to be actively involved in the promotion of farm animal welfare	516	3.92
The welfare of farm animals is not an important consideration to my shopping choices	516	3.80
Governments should not provide funding for animal welfare lobby‡ groups	516	3.34
Too many people are actively involved in promoting domestic pet welfare	516	3.34
There are too many people actively involved in promoting native animal welfar	516	3.05

†*Activism* involves the use of direct, often confrontational action, such as a demonstration or strike, in opposition to practices that are deemed cruel to animals, or in support of animal welfare.

‡*Lobbyists* are people engaged in trying to influence legislators or other public officials in favour of animal welfare concerns.

As can be seen in Figure 11, the findings showed that most of the information regarding animal welfare issues had been obtained from television, animal welfare organisations, magazines, radio talkback, friends and family and newspapers. Substantially less information was obtained from formal education, government advertisements and the internet. In general, respondents reported that they obtained information from the various media with a frequency 20 to 30% higher than had been reported in the Roy Morgan survey. The one exception was newspapers which showed a slight decrease of 3% from the most recent Roy Morgan survey.

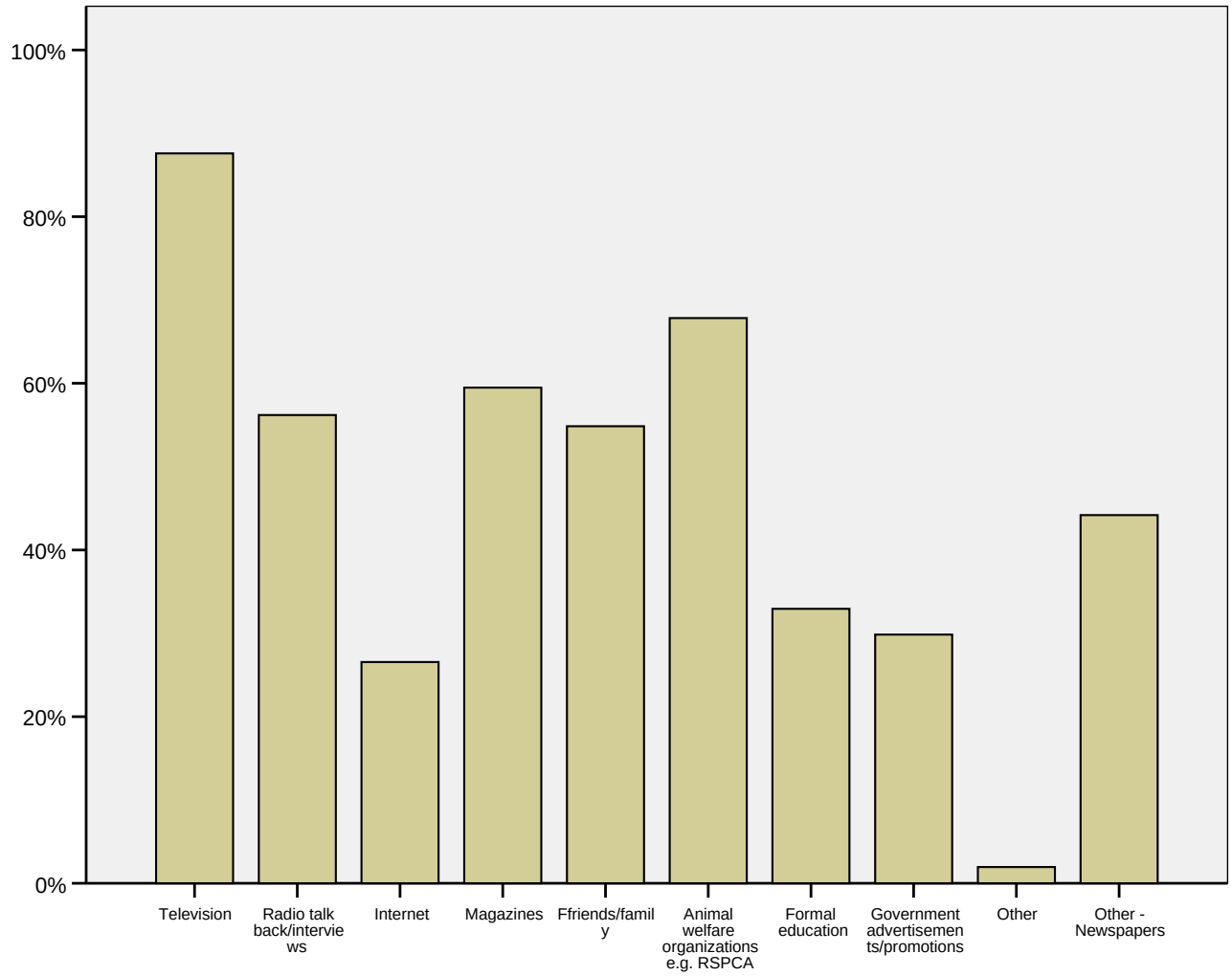


Figure 11. Relative frequency of sources from which information regarding animal welfare issues has been heard about or obtained

In assessing community behaviours, the frequency with which people engaged in a variety of behaviours in support of and in opposition to animal farming in general as well as the sheep and beef industries in particular was assessed. As a first step, the frequency of these kinds of behaviour is reported.

3.4.2 Behaviours in opposition to livestock farming

Tables 21 to 24 provide the frequency with which respondents engaged in a range of behaviours relevant to livestock farming in general (Table 21 and 22) and to the sheep and beef farming industries (Tables 23 and 24). As can be seen in Table 21, behaviours in **opposition** to livestock farming in general which do not involve high levels of public exposure occur with relatively high frequency. These include ‘signing petitions’, ‘donating money’ and ‘speaking to colleagues’. Approximately one fifth of respondents reported having engaged in these types of behaviours. Overall, 20% of respondents had engaged in at least one of these behaviours.

Table 21. Proportion of reported engagement in behaviours to oppose livestock farming in general

	dissatisfaction: Actually written a letter to a newspaper	dissatisfaction: Actually called a radio talk back segment	dissatisfaction: Actually written a letter to a politician	dissatisfaction: Actually volunteered your services to animal welfare organisations	dissatisfaction: Actually attended a public rally or demonstration	dissatisfaction: Actually donated goods other than money to animal welfare organisations	dissatisfaction: Actually signed a petition	dissatisfaction: Actually spoken to colleagues, family members, or friends	dissatisfaction: Actually donated money to animal welfare organisations
Have never done	499	497	492	485	479	435	397	287	286
	96.7%	96.3%	95.3%	94.0%	92.8%	84.3%	76.9%	55.6%	55.4%
Have done	17	19	24	31	37	81	119	229	230
	3.3%	3.7%	4.7%	6.0%	7.2%	15.7%	23.1%	44.4%	44.6%

Table 22. Proportion of reported engagement in behaviours to support livestock farming in general

	support: Actually written a letter to a politician	support: Actually called a radio talk back segment	support: Actually written a letter to a newspaper	support: Actually attended a public rally or demonstration	support: Actually volunteered your services to animal welfare organisations	support: Actually donated money/ goods to the farming industry	support: Actually donated goods other than money to animal welfare organisations	support: Actually signed a petition	support: Actually donated money to animal welfare organisations	support: Actually spoken to colleagues, family members, or friends
Have never done	512	510	510	501	497	485	477	467	422	382
	99.2%	98.8%	98.8%	97.1%	96.3%	94.0%	92.4%	90.5%	81.8%	74.0%
Have done	4	6	6	15	19	31	39	49	94	134
	0.8%	1.2%	1.2%	2.9%	3.7%	6.0%	7.6%	9.5%	18.2%	26.0%

3.4.3 Behaviours in support of livestock farming

It can be seen from Table 22, respondents reported engaging in similar activities in **support** of livestock farming in general as they do in opposition, that is, those behaviours for which there is minimal public exposure. While behaviours such as 'signing petitions', 'donating money' and 'speaking to colleagues' occur with relatively high frequency, they are only half as prevalent as the behaviours that are expressed in opposition to livestock farming. Overall, 19% of respondents had engaged in at least one of these behaviours.

3.4.4 Behaviours in support of and in opposition to sheep and beef farming

In Table 23 it can be seen that reported engagement in behaviours in opposition to **sheep and beef** farming which do not involve public exposure occurred at a higher rate than other behaviours, however, unlike behaviours in opposition to livestock farming in general, a smaller proportion of the sample engaged in these behaviours in opposition to sheep and beef farming. Overall, 22% (compared to 20% that engaged in behaviours in opposition to livestock farming in general) of respondents had engaged in at least one of these behaviours.

As shown in Table 24, respondents engaged in similar behaviours in support of sheep and beef farming relative to those behaviours nominated in opposition of sheep and beef farming. Overall, however, these behaviours occurred at a lower frequency again with only 16% (compared to 19% that engaged in behaviours in support of livestock farming in general) of respondents engaging in at least one of these behaviours.

Table 23. Proportion of reported engagement in behaviours to oppose sheep and beef farming

	1 dissatisfaction: Actually called a radio talk back segment	2 dissatisfaction: Actually written a letter to a newspaper	3 dissatisfaction: Actually written a letter to a politician	4 dissatisfaction: Actually volunteered your services to animal welfare organisations	5 dissatisfaction: Actually attended a public rally or demonstration	6 dissatisfaction: Actually donated goods other than money to animal welfare organisations	7 dissatisfaction: Actually signed a petition	8 dissatisfaction: Actually donated money to animal welfare organisations	9 dissatisfaction: Actually spoken to colleagues, family members, or friends
Have never done	507	507	505	497	496	473	431	393	320
	98.3%	98.3%	97.9%	96.3%	96.1%	91.7%	83.5%	76.2%	62.0%
Have done	9	9	11	19	20	43	85	123	196
	1.7%	1.7%	2.1%	3.7%	3.9%	8.3%	16.5%	23.8%	38.0%

Table 24. Proportion of reported engagement in behaviours to support sheep and beef farming

	support: Actually written a letter to a politician	support: Actually called a radio talk back segment	3 support: Actually written a letter to a newspaper	support: Actually attended a public rally or demonstration	5 support: Actually volunteered your services to animal welfare organisations	6 support: Actually donated goods other than money to animal welfare organisations	7 support: Actually signed a petition	8 support: Actually donated money to animal welfare organisations	9 support: Actually spoken to colleagues, family members, or friends
Have never done	513	510	509	507	506	494	474	464	386
	99.4%	98.8%	98.6%	98.3%	98.1%	95.7%	91.9%	89.9%	74.8%
Have done	3	6	7	9	10	22	42	52	130
	0.6%	1.2%	1.4%	1.7%	1.9%	4.3%	8.1%	10.1%	25.2%

3.5 Attitudes and behaviours in relation to livestock farming

Correlational analyses were undertaken to determine those demographic and public attitude factors relevant to livestock farming that might be related to **total** community behaviours (see 3.6) and purchasing behaviour. There was a significant difference in the total number of community behaviors engaged in by women compared to men (means equal 4.37 and 2.93 respectively, t_{514}=3.46, p< 0.01).

Table 25 displays the relationships between demographic variables, generic, sheep-specific and beef-specific knowledge and attitudes towards farming on the one hand and community behaviour on the other. As can be seen in Table 25, a number of variables correlated significantly with community behaviours. Amongst the demographic variables, 'gender' was significantly correlated with community behaviours (r=.15), indicating that females were more likely to engage in these behaviours than males. Conversely, whether or not people had 'visited a commercial abattoir' was correlated with community behaviours (r=.09), indicating that those who had visited an abattoir were more likely to engage in community behaviours. Knowledge of farming practices was found to be positively correlated with community behaviours (r=.12), such that more knowledge of farming practices was associated with a higher level of engagement in community behaviours. With the exception of 'attitudes towards free-range farming', all of the generic attitude variables significantly correlated with community behaviours. That is, the 'importance of meeting welfare needs in livestock in general' (r=.18), 'beliefs about animal rights in general' (r=.23), 'attitude to animals as a source of food' (r=.33), 'attitudes towards intensive farming practices' (r=.26), 'positive attitudes towards activism' (r=.46), 'concerns about welfare' (r=.24) were positively correlated with community behaviours. These findings indicate that beliefs regarding the importance of meeting welfare needs of livestock, beliefs about animal rights, negative attitudes towards animals as a source of food, concerns regarding intensive farming practices, positive attitudes towards activism and concerns about welfare were associated with a higher level of engagement in community behaviours. In contrast, 'approval of husbandry procedures' (r=-.24), 'beliefs about carers' concerns for their animals' (r=-.12), 'opposition to welfare activism' (r=-.28), 'attitude to land transport comfort for livestock' (r=-.22) 'attitude to sea transport comfort for livestock' (r=-.25) were each negatively correlated with community behaviours. These findings indicated that individuals who approved of husbandry procedures, held positive 'beliefs about carers' concerns for their animals, opposed welfare activism, and held positive attitudes towards the comfort afforded to livestock during land and sea transport were less likely to engage in community behaviours.

Table 25. Correlations between demographics, generic, sheep-specific and beef-specific knowledge and attitudes towards farming and behaviour

	Total number of community behaviours	Self-reported Beef	Self-reported Lamb	Per capita self-reported Beef	Per capita self-reported lamb	POS Beef	POS Lamb	Per capita POS Beef	POS per capita Lamb
Gender	.15**	-.13**	-.06	-.12**	-.06	.13	.17	.04	.12
Age	-.02	-.10*	-.04	.09*	.12**	.20*	.11	.35**	.20*
Education	.05	-.11*	-.08	-.11*	-.09*	-.01	-.02	-.05	-.13
Total number of occupants in household	-.07	.29**	.24**	-.17**	-.14**	.14	.08	-.17	-.16
Household annual income	-.04	.09*	.13**	-.04	.04	.01	.15	-.11	-.03
Currently live on an animal farm	.04	-.04	-.04	-.05	-.05	.	.	.	.
Ever lived in a rural setting	-.08	.00	.00	-.04	.01	-.12	-.03	.01	-.01
Ever visited a commercial abattoir	.09*	.12**	.10*	.12**	.12**	-.04	.07	-.02	.04
Knowledge of farming practices	.12**	.09*	.00	.06	-.02	-.01	.06	.01	-.04
Importance of meeting welfare needs livestock in general	.18**	-.07	-.16**	-.06	-.17**	-.09	-.06	-.08	-.12
Beliefs about animal rights in general	.23**	.01	-.03	.00	-.03	-.06	-.16	-.03	-.10
Approval of husbandry procedures	-.24**	.09	.07	.13**	.12**	.17	.10	.23*	.15
Attitude to animals as a source of food	.33**	-.05	-.06	-.04	-.05	-.06	.03	-.07	.14
Beliefs about carers' concerns for their animals	-.12**	.11*	.07	.13**	.09*	.10	.10	.14	.24**
Attitudes towards intensive farming practices	.26**	.00	-.04	.02	-.03	-.10	-.06	-.07	-.01
Attitudes towards free-range farming practices	-.01	.04	.01	.10*	.06	.06	-.06	.14	.06
Positive attitudes towards activism	.46**	.04	.02	.00	-.01	-.19*	-.03	-.21*	.04
Concerns about welfare	.24**	.03	-.05	.05	-.04	-.16	-.16	-.16	-.08
Opposition to welfare activism	-.28**	.08	.04	.11*	.09	.04	.07	.08	.19*
Attitude to land transport comfort for livestock	-.22**	-.01	.01	.05	.03	.12	.13	.21*	.23*
Attitude to sea transport comfort for livestock	-.25**	.07	.06	.11*	.06	.14	.05	.19*	.12
Importance of meeting health needs livestock in general	.00	.03	.04	-.01	.02	-.15	.13	-.16	.16
Beliefs about the positive attributes of meat in general	-.21**	.13**	.12**	.15**	.14**	.21*	.11	.22*	.09
Beliefs about cholesterol in meat	.02	-.05	.00	-.01	.01	-.11	-.07	-.13	.05
Welfare attributes of food choice	-.03	.12**	.14**	.08	.12**	.05	.10	.07	.25**
Clean/green aspects of food choice	.17**	-.01	-.04	-.02	-.04	-.04	.12	.00	.19*
Importance of meeting welfare needs sheep/beef	.15**	-.01	-.06	-.02	-.10*	-.01	.06	-.02	.10
Beliefs about beef/sheep rights	.27**	-.04	-.04	-.04	-.05	-.15	-.10	-.12	.05
Welfare attributes of food choice beef/sheep	-.11*	.16**	.16**	.14**	.14**	.07	.12	.12	.24**
Clean/green aspects of food choice beef/sheep	.17**	.03	-.03	.05	.00	-.02	.09	-.02	.13
Importance of meeting health needs sheep/beef	.08	.02	.06	.00	.02	-.05	.03	-.03	.15
Beliefs about the positive attributes of sheep/beef meat	-.20**	.20**	.21**	.25**	.23**	.21*	.13	.22*	.20*
Beliefs about cholesterol in beef/lamb	.06	-.03	-.08	-.03	-.08	.07	.13	.06	.16
Beliefs about additives in beef and lamb	.19**	.01	-.08	.03	-.03	.04	.05	.06	.04

* $p < .05$; ** $p < .01$

Only two of the food attribute variables were significantly correlated with community behaviours; 'clean/green aspect of food choice' positively correlated with community behaviours (r=.17), demonstrating that concerns regarding clean/green aspect of food choice were correlated with engagement in community behaviours. In contrast, 'beliefs about the positive attributes of meat in general' were negatively correlated with community behaviours (r=-.21), indicating that individuals holding these beliefs were less likely to engage in community behaviours. All of the industry specific variables were significantly correlated with community behaviours, including 'importance of meeting welfare needs sheep/beef' (r=.15), 'beliefs about beef/sheep rights' (r=.27), 'clean/green aspects of food choice beef/sheep' (r=.17), indicating that concerns relating to industry specific welfare needs, rights and clean/green aspects of food choices were associated with greater engagement in community behaviours. In contrast, beliefs regarding 'welfare attributes of food choice beef/sheep' were associated with fewer community behaviours (r=-.11). Finally, only two of the health related issues for sheep and beef variables were significant, specifically, 'beliefs about additives in beef and lamb' positively correlated with community behaviours (r=.19), indicating that this belief was associated with greater engagement in community behaviours. In contrast, those who held 'beliefs about the positive attributes of sheep/beef meat' were less likely to engage in community behaviours (r=-.20).

3.5.1 Self-reported beef purchases

In relation to the **total** amount of self-reported beef purchases, significant negative correlations were obtained for three of the demographic variables: 'gender' of the respondent (r=-.13), their 'age' (r=-.10) and their level of 'education' (r=-.11). These findings indicate that males, those with lower levels of education, and those who were younger were likely to self-report the purchase of more beef. Further, the 'total number of occupants in household' (r=.29), 'household annual income' (r=.09) and having 'visited a commercial abattoir' (r=.12) were also significantly correlated with the total amount of self-reported beef purchases, indicating that households with greater numbers of occupants, those with greater income and individuals who had visited an abattoir self-reported the purchase of more beef. Knowledge of farming practices was also correlated with the total amount of self-reported beef purchases (r=.09), indicating that greater knowledge was related to higher self-reported purchases. In relation to attitudes towards livestock in general, only 'beliefs about carers' concerns for their animals' was significantly correlated with the total amount of self-reported beef purchases (r=.11). Similarly, 'beliefs about the positive attributes of meat in general' (r=.13), 'welfare attributes of food choice' (r=.12), 'welfare attributes of food choice beef/sheep' (r=.16), and 'beliefs about the positive attributes of sheep/beef meat' (r=.20) were significantly correlated with the total amount of self-reported beef purchases. These findings indicate that the above beliefs and attitudes were associated with the self-reported purchase of more beef.

3.5.2 Self-reported lamb purchases

The 'total number of occupants in household', 'household annual income' and whether the respondent had 'visited a commercial abattoir' were the only demographic variables significantly correlated with the **total** amount of self-reported lamb purchases (r=.24, r=.13, and r=.10, respectively). These findings indicate that households with greater numbers of occupants and higher annual incomes self-reported the purchase of more lamb. Moreover, those who had visited an abattoir were more likely to self-report the purchase of more lamb. Knowledge of farming practices was not correlated with the total amount of self-reported lamb purchases. In relation to attitudes towards livestock in general, the total amount of self-reported lamb purchases was inversely correlated with 'importance of meeting welfare needs of livestock in general' (r=-.16), indicating that placing low levels of importance on the welfare of livestock in general was associated with the self-reported purchase of more lamb. The total amount of self-reported lamb purchases were significantly correlated with 'beliefs about the positive attributes of meat in general' (r=.12), 'welfare attributes of food choice' (r=.14), 'welfare attributes of food choice beef/sheep' (r=.16), and 'beliefs about the positive attributes of sheep/beef meat' (r=.21).

These findings indicate that beliefs regarding positive attributes of lamb and welfare were associated with the self-reported purchase of more lamb.

3.5.3 Self-reported *per capita* beef purchases

For self-reported **per capita** beef purchases, significant correlations were obtained for five of the demographic variables, including 'gender' (r=-12), 'age' of the respondent (r=.09), their level of 'education' (r=-.11), the number of 'occupants in the household' (r=-.17) and if they had 'visited a commercial abattoir' (r=.12). These findings indicate that males, older individuals, those with lower levels of education and fewer household occupants, and those that had visited an abattoir self-reported the purchase of more beef per capita. Knowledge of farming practices was not correlated with self-reported per capita beef purchases. In relation to attitudes towards livestock in general, 'approval of husbandry procedures' and 'beliefs about carers' concerns for their animals' were significantly correlated with self-reported per capita beef purchases (r=.13 and r=.13, respectively), indicating that approval of husbandry procedures and positive beliefs about carers' concerns for their animals were associated with the self-reported purchase of more beef per capita. In addition, 'attitudes towards free-range farming practices', 'opposition to welfare activism', and 'attitude towards sea transport comfort for livestock' were each correlated with self-reported per capita beef purchases (r=.10, r=.11 and r=.11, respectively), indicating that concerns regarding free-range farming practices, opposition to welfare activism and positive attitudes towards sea transport comfort for livestock were associated with the self-reported purchase of more beef per capita. In relation to food attributes variables, only 'beliefs about the positive attributes of meat in general' were positively correlated with self-reported per capita beef purchases (r=.15). With regard to industry specific variables, only 'welfare attributes of food choice beef/sheep' was significantly correlated with self-reported per capita beef purchases (r=.14). Finally, in relation to health related issues, only 'beliefs about the positive attributes of sheep/beef meat' was significantly correlated with self-reported per capita beef purchases (r=.25), indicating that industry specific beliefs about the positive attributes of sheep/beef meat were associated with the self-reported purchase of more beef per capita.

3.5.4 Self-reported *per capita* lamb purchases

For self-reported **per capita** lamb purchases, significant correlations were obtained for four of the demographic variables, including: 'age' of the respondent (r=.12), their level of 'education' (r=-.09), the number of 'occupants in the household' (r=-.14) and if they had 'visited a commercial abattoir' (r=.12). These findings show that older individuals, those with lower levels of education and fewer household occupants, and those that had visited an abattoir self-reported the purchase of more lamb per capita. Knowledge of farming practices was not correlated with self-reported per capita lamb purchases. In relation to attitudes towards livestock in general, the 'importance of meeting welfare needs for livestock in general', 'approval of husbandry procedures' and 'beliefs about carers' concerns for the animals' were significantly correlated with self-reported per capita lamb purchases (r=-.17, r=.12 and r=.09, respectively), indicating that low levels of concern regarding the importance of meeting welfare needs and approval of husbandry procedures were associated with the self-reported purchase of more lamb, per capita. In relation to food attributes variables, 'beliefs about the positive attributes in general' and 'welfare attributes of food choices' were correlated with self-reported per capita lamb purchases (r=.14 and r=.12, respectively), indicating that these beliefs were associated with the self-reported purchase of more lamb, per capita. With regard to industry specific variables, only 'welfare attributes of food choices beef/sheep' was significantly correlated with self-reported per capita lamb purchases (r=.14), indicating that industry specific concern regarding the welfare attributes of food choices was associated with the self-reported purchase of more lamb per capita. Finally, in relation to health related issues, only 'beliefs about the positive attributes of sheep/beef meat' was significantly correlated with self-reported per capita lamb purchases (r=.23), demonstrating that these beliefs were associated with more self-reported lamb purchases per capita.

3.5.5 Actual point-of-sale lamb purchases

For actual point-of-sale lamb purchases, no significant correlations across any of the variables were observed.

3.5.6 Point-of-sale *per capita* lamb purchases

In relation to demographic variables, point-of-sale **per capita** lamb purchases were significantly correlated with the 'age' of the respondent (r=.20), indicating that older individuals were more likely to purchase lamb at the point-of-sale, per capita. Knowledge of farming practices was not correlated with point-of-sale per capita lamb purchases. In relation to attitudes towards livestock in general, 'beliefs about carer's concerns for their animals', 'opposition to welfare activism' and 'attitude to land transport comfort for livestock' were significantly correlated with point-of-sale per capita lamb purchases (r=.24, r=.19, and r=.23, respectively). These findings show that positive beliefs about carers' concerns for their animals, opposition to welfare activism and positive attitudes towards livestock comfort during land transport were associated with more point-of-sale lamb purchases per capita. In relation to food attributes variables, 'welfare attributes of food choice' and 'clean/green aspects of food choice' were significantly correlated with point-of-sale per capita lamb purchases (r=.25 and r=.19, respectively). With regard to industry specific variables, only 'welfare attributes of food choice beef/sheep' was significantly correlated point-of-sale per capita lamb purchases (r=.24). Finally, in relation to health related issues, only 'beliefs about the positive attributes of sheep/beef meat' was significantly correlated with self-reported per capita lamb purchases (r=.20). These findings indicate that each of the above mentioned beliefs were associated with more point-of-sale lamb purchases, per capita.

3.5.7 Actual point-of-sale beef purchases

In relation to demographic variables, actual point-of-sale beef purchases were significantly correlated with the 'age' of the respondent (r=.20), indicating that older individuals were more likely to purchase beef at the point-of-sale. Further, 'positive attitudes towards activism', 'beliefs about the positive attributes of meat in general' and 'beliefs about the positive attributes of sheep/beef meat' correlated with such purchases (r=-.19, r=.21, r=.21, respectively). These findings indicate that positive attitudes towards activism were associated with fewer point-of-sale beef purchases. In contrast, older respondents and beliefs regarding the positive attributes of meat in general and beef/sheep in particular were associated with more point-of-sale beef purchases.

3.5.8 Point-of-sale *per capita* beef purchases

In relation to demographic variables, point-of-sale **per capita** beef purchases were significantly correlated with the 'age' of the respondent (r=.35), indicating that older individuals were more likely to purchase beef at the point-of-sale, per capita. Knowledge of farming practices was not correlated with point-of-sale per capita beef purchases. In relation to attitudes towards livestock in general, 'approval of husbandry procedures', 'attitude to land transport comfort for livestock' and 'attitude to sea transport comfort for livestock' were positively correlated with point-of-sale per capita beef purchases (r=.23, r=.21, and r=.19, respectively). These findings show that approval of husbandry procedures and positive attitudes towards livestock comfort during land and sea transport were associated with more point-of-sale beef purchases, per capita. Further, 'positive attitudes towards activism' was negatively correlated with point-of-sale per capita beef purchases (r=-.21), indicating that these attitudes were associated with fewer point-of-sale beef purchases, per capita. In relation to food attributes variables, 'beliefs about the positive attributes of meat in general' were significantly correlated with point-of-sale per capita beef purchases (r=.22). None of the industry specific variables were correlated with point-of-sale per capita beef purchases. Finally, in relation to health related issues, only 'beliefs about the positive attributes of sheep/beef meat' were significantly correlated with self-reported per capita beef purchases (r=.22). These findings indicate that beliefs regarding the positive attributes of meat in general and beef/sheep in particular were associated with more point-of-sale beef purchases, per capita.

3.6 Predicting consumer and community behaviours

In order to determine which combination of variables best predicted consumer and community behaviours, a hierarchical linear regression was carried out with the consumer variables and the community behaviour as the dependent variables.

The structure of the regression model is given in Table 26. Within each level of the model, variables which did not contribute to predicting the dependent variable where removed using the forwards stepwise procedure (Tabachnick & Fidell, 2001).

Table 26. Hierarchical regression model used for predicting behaviour

LEVEL	VARIABLE TYPE	VARIABLES
1	Demographic	Gender
		Age
		Education
		Number of occupants in household
		Annual Household income
		Live on an animal farm
		Ever lived in a rural location
		Ever visited a commercial abattoir
2	Knowledge	Knowledge of farming practices
3	Attitudes towards welfare in general	Importance of meeting welfare needs livestock in general
		Beliefs about animal rights in general
		Approval of husbandry procedures
		Attitude to animals as a source of food
		Beliefs about carers' concerns for their animals
		Attitudes towards intensive farming practices
		Attitudes towards free-range farming practices
		Positive attitudes towards activism
		Concerns about welfare
		Opposition to welfare activism
		Attitude to land transport comfort for livestock
		Attitude to sea transport comfort for livestock
		Importance of meeting health needs livestock in general
4	Food Attributes	Beliefs about the positive attributes of meat in general
		Beliefs about cholesterol in meat
		Welfare attributes of food choice
		Clean/green aspects of food choice
5	Industry Specific	Importance of meeting welfare needs sheep/beef
		Beliefs about beef/sheep rights
		Welfare attributes of food choice beef/sheep
		Clean/green aspects of food choice beef/sheep
		Importance of meeting health needs sheep/beef
6	Health related issues for sheep and beef	Beliefs about the positive attributes of sheep/beef meat
		Beliefs about cholesterol in beef/lamb
		Beliefs about additives in beef and lamb

3.6.1 Predicting self-reported beef purchases

In Table 27 it can be seen that five variables accounted for 17% of the variance in self-reported monthly beef purchase ($F(5, 441) = 19.21$, $p < .001$). Four demographic variables were significant predictors of self-reported monthly beef purchase. These included 'total number of occupants in household' (β = 0.33), 'ever having visited a commercial abattoir' (β = 0.09), 'education' (β = -0.09) and 'gender' (β = -0.09). These findings indicate that male participants self-reported more beef purchases with greater numbers of household occupants, and having visited a commercial abattoir. In contrast, higher education was associated with fewer self-reported beef purchases. In relation to food attribute variables, 'Beliefs about the positive attributes of meat in general' was positively predicted self-reported beef purchases (β = 0.19).

Table 27. Hierarchical regression of variables predicting self-reported total beef purchases

	Beta	t	Sig.
(Constant)		-.73	.46
Total number of occupants in household	.33	7.61	.00
Ever visited a commercial abattoir	.09	2.02	.04
Education	-.09	-2.07	.04
Gender	-.09	-1.96	.05
Beliefs about the positive attributes of sheep/beef meat	.19	4.37	.00

N=446 Adjusted R^2= .17

3.6.2 Predicting self-reported lamb purchases

In Table 28 it can be seen that five variables accounted for 12% of the variance in self-reported monthly lamb purchases ($F(5, 445) = 13.78$, $p < .001$). In relation to demographic predictors, the 'total number of occupants in household' (β = 0.29) and 'ever having visited a commercial abattoir' (β = -0.08), were significantly associated with self-reported lamb purchases. These findings indicate that participants with greater numbers of household occupants and those who had visited a commercial abattoir self-reported more lamb purchases. The 'importance of meeting welfare needs of livestock in general' and 'positive attitudes towards activism' were the only generic attitudes variable that significantly predicted self-reported lamb purchases (β = -0.18 and β = 0.10, respectively). These findings revealed that those who were more concerned about welfare needs of livestock in general self-reported the purchase of less lamb. Conversely, those who held positive attitudes towards activism self-reported the purchase of more lamb. In relation to food attributes variables, 'welfare attributes of food choice' significantly predicted self-reported lamb purchases (β = 0.12), indicating that these attitudes were associated with greater self-reported lamb purchases.

Table 28. Hierarchical regression of variables predicting total lamb purchases

	Beta	t	Sig.
(Constant)		2.12	.03
Total number of occupants in household	.27	6.09	.00
Ever visited a commercial abattoir	.09	2.13	.03
Importance of meeting welfare needs livestock in general	-.18	-3.74	.00
Positive attitudes towards activism	.10	1.98	.05
Welfare attributes of food choice	.12	2.67	.01

N=450, Adjusted R^2= .12

3.6.3 Predicting self-reported per capita beef purchase

In Table 29 it can be seen that four variables accounted for 6% of the variance in per capita self-reported monthly beef purchase ($F(4, 442) = 8.16$, $p < .001$). Two demographic variables were related to per capita self-reported beef purchases. These included 'total number of occupants in household' (β = -0.18) and 'education' (β = -0.13). These findings show that participants' self-reported fewer beef purchases per capita with greater numbers of household occupants and having a higher education. In relation to knowledge variables, 'knowledge of farming practices' was related to per capita self-reported beef purchases (β = 0.11), indicating that greater knowledge predicted more per capita self-reported beef purchases. In relation to attitudes towards welfare in general, 'attitude to sea transport comfort for livestock' was a significant predictor for per capita self-reported beef purchases (β = 0.11).

Table 29. Hierarchical regression of variables predicting per capita beef purchases

	Beta	t	Sig.
(Constant)		4.08	.00
Total number of occupants in household	-.18	-3.88	.00
Education	-.13	-2.91	.00
Knowledge of farming practices	.11	2.36	.02
Attitude to sea transport comfort for livestock	.11	2.28	.02

N=446, Adjusted R^2= .06

3.6.4 Predicting self-reported per capita lamb purchases

In Table 30 it can be seen that four variables accounted for 9% of the variance in self-reported monthly lamb purchases ($F(4, 446) = 12.47$, $p < .001$). In relation to demographic predictors, 'total number of occupants in household' (β= -0.13) and 'education' (β = -0.09) were each significantly associated with self-reported per capita lamb purchases. These findings indicate that participants with more occupants and higher education self-reported the purchase of less lamb per capita. Beliefs regarding the 'importance of meeting welfare of livestock in general' were inversely related to self-reported per capita lamb purchases (β = -0.13), such that greater concerns were associated with fewer per capita self-reported lamb purchases. Finally, 'beliefs about the positive attributes of sheep/beef meat' (β = 0.21) were positively related to the per capita self-reported purchase of lamb, indicating that holding such attitudes was related to more self-reported lamb purchases, per capita.

Table 30. Hierarchical regression of variables predicting per capita lamb purchases

	Beta	t	Sig.
(Constant)		2.27	.02
Total number of occupants in household	-.13	-2.79	.01
Education	-.09	-1.95	.05
Importance of meeting welfare needs livestock in general	-.13	-2.82	.01
Beliefs about the positive attributes of sheep/beef meat	.21	4.60	.00

N=450, Adjusted R^2= .09

3.6.5 Predicting point-of-sale lamb purchase

The model that was used to predict point-of-sale lamb purchases was not significant.

3.6.6 Predicting point-of-sale beef purchases

Table 31 shows that a three variables accounted for 10% of the variance in actual beef purchases at the point-of-sale ($F(3, 111) = 5.39$, $p < .01$). The findings show two demographic variables were related to actual beef purchases at the point-of-sale; namely 'age' ($\beta = 0.29$) and 'the 'total number of occupants in household' ($\beta = 0.21$). These findings indicate that more beef was purchased at the point-of-sale by older participants with more household occupants. Finally, 'positive attitudes towards activism' were inversely related to point-of-sale beef purchases ($\beta = -0.20$), such that participants who held such attitudes were less likely to purchase beef at the point-of-sale.

Table 31. Hierarchical regression of variables predicting point-of-sale beef purchase

	Beta	t	Sig.
(Constant)		.09	.93
Age	.29	3.02	.00
Occupants in household	.21	2.22	.03
Positive attitudes towards activism	-.20	-2.30	.02

N=115, Adjusted R^2= .10

3.6.7 Predicting point-of-sale lamb purchases per capita

Table 32 shows that two variables accounted for 8% of the variance in per capita lamb purchase at the point-of-sale ($F(2, 113) = 5.95$, $p < .01$). The findings showed that 'beliefs about carers' concerns for their animals' and 'welfare attributes of food choice' were related to per capita point-of-sale purchase ($\beta = 0.18$ and $\beta = 0.20$, respectively), suggesting that stronger beliefs in relation to these issues were related to more point-of-sale lamb purchases, per capita.

Table 32. Hierarchical regression of variables predicting point-of-sale lamb purchase per capita

	Beta	t	Sig.
(Constant)		-2.72	.01
Beliefs about carers' concerns for their animals	.18	1.97	.05
Welfare attributes of food choice	.20	2.18	.03

N=115, Adjusted R^2= .08

3.6.8 Predicting point-of-sale beef purchases per capita

Table 33 shows that three variables accounted for 21% of the variance in per capita beef purchases at the point-of-sale ($F(3, 111) = 10.80$, $p < .001$). Of the demographic variables, only 'age' was significantly related to point-of-sale beef purchases per capita ($\beta = 0.39$), such that those who were older were more likely to purchase more beef per capita at the point-of-sale. The findings showed that 'positive attitudes towards activism' were inversely related to per capita point-of-sale beef purchases ($\beta = -0.24$), such that participants who held such attitudes purchased less beef at the point-of-sale, per capita. Finally, the 'importance of meeting health needs of livestock in general' was inversely related to per capita point-of-sale beef purchases ($\beta = -0.21$), such that those participants who held this belief purchased less beef at the point-of sale, per capita.

Table 33. Hierarchical regression of variables predicting point-of-sale beef purchase per capita

	Beta	t	Sig.
(Constant)		2.63	.01
Age	.39	4.66	.00
Positive attitudes towards activism	-.24	-2.81	.01
Importance of meeting health needs livestock in general	-.21	-2.48	.01

N=114, Adjusted R^2= .21

3.6.9 Predicting self-reported community behaviours

In Table 34 it can be seen that seven variables accounted for 28% of the variance in self-reported community behaviours ($F(7, 443) = 26.04$, $p < .001$). Two demographic variables were significantly related to self-reported community behaviours; these were 'gender' and 'ever having visited a commercial abattoir' ($\beta = 0.14$ and $\beta = 0.19$ respectively). These findings demonstrate that females and those who had visited a commercial abattoir were more likely to engage in community behaviours. Of the generic attitude variables, 'positive attitudes towards activism' and 'opposition to welfare activism' and 'importance of meeting health needs for livestock in general' were also related to community behaviours ($\beta = 0.37$, $\beta = -0.16$, and $\beta = -0.14$ respectively). These findings indicate that a positive attitude towards activism was related to higher levels of engagement. Conversely, those who opposed welfare activism and were unconcerned about meeting health needs for livestock in general were less likely to engage in community behaviours. Finally, 'attitude to animals as a source of food' ($\beta = 0.13$) and 'beliefs about cholesterol in meat' ($\beta = -0.08$) were also associated with community behaviours. This is discussed on page 74 and 75.

Table 34. Hierarchical regression of variables predicting total number of community behaviours

	Beta	t	Sig.
(Constant)		1.45	.15
Gender	.14	3.30	.00
Ever visited a commercial abattoir	.19	4.44	.00
Positive attitudes towards activism	.37	7.53	.00
Opposition to welfare activism	-.16	-3.98	.00
Importance of meeting health needs livestock in general	-.14	-3.38	.00
Attitude to animals as a source of food	.13	2.55	.01
Beliefs about cholesterol in meat	-.08	-1.98	.05

N=450, Adjusted R^2= .28

3.7 Structural representation of the regression models

3.7.1 Structural equation modelling permits the models to be developed using regression analyses

The models depicted in Figures 12 and 13 represent summary models following an extraction of the main predictors from the regression models that were developed from the generic and industry specific variables to predict community behaviour and consumption respectively. It can be clearly seen that when the welfare variables are the principal drivers for community behaviour, a moderately well-fitting model can be established. The model fits with a RMSEA of .077 and accounts for 30% of the variance in community behaviour. This is a substantial amount of the variance and suggests that community behaviours are able to be predicted well from demographic and welfare-related variables.

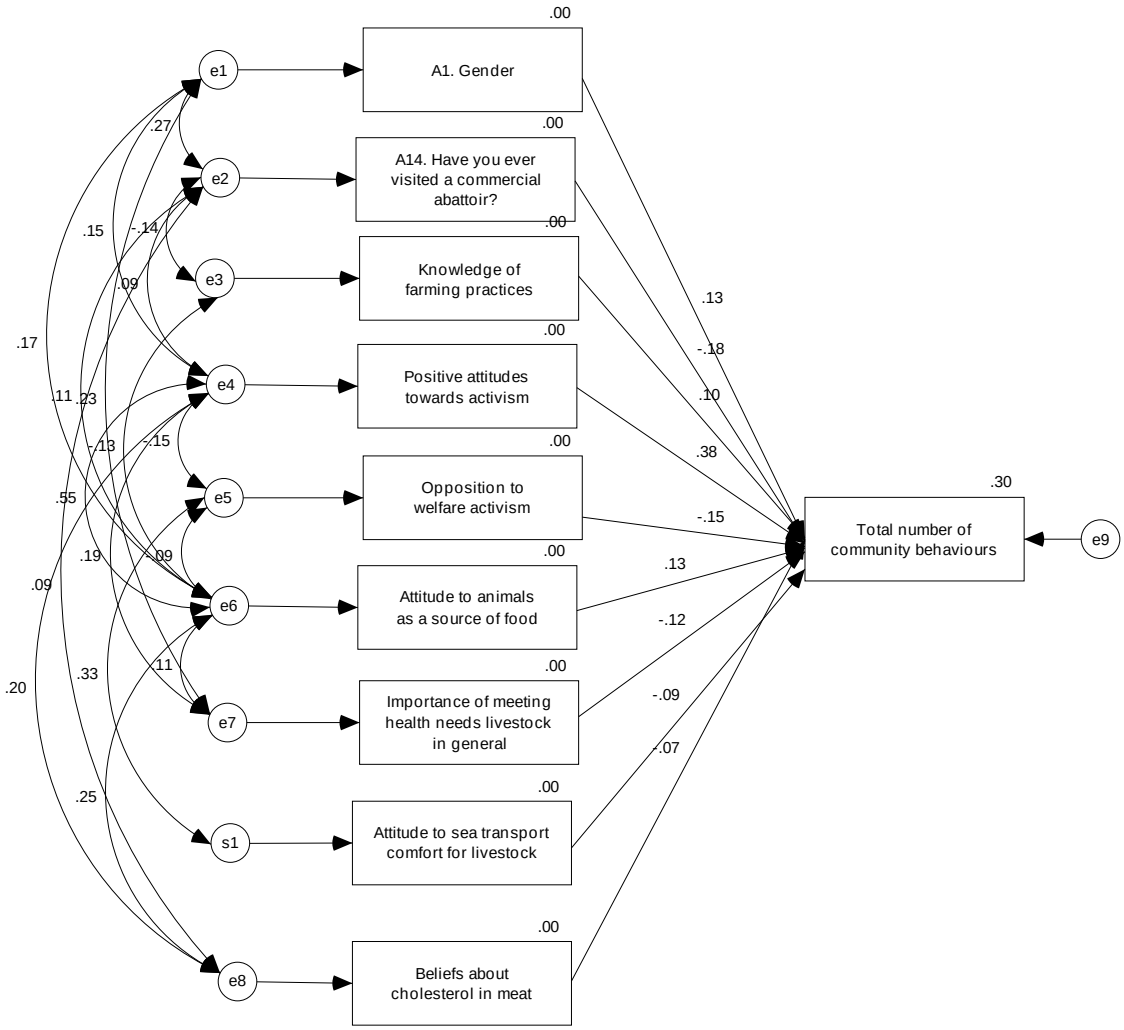


Figure 12. A structural model of background variables and generic attitudes towards welfare issues as predictors of community behaviour in relation to animal welfare
Specifically, the significant predictors of community behaviour include being female, having visited a commercial abattoir, having a greater knowledge of husbandry practices, having a positive attitude towards being an animal welfare advocate, being in favour of welfare activism, having negative attitudes to animals as a source of food, believing that medication, vaccinations, etc of livestock are relatively *unimportant*, believing that meat is high in fat and cholesterol and being concerned about the conditions under which animals are transported by sea.

The addition of industry-specific variables to the model have a negligible effect on the amount of variance accounted for in community behaviour (Table 35). The variable “Beliefs about beef/sheep rights” while significant (p<.05) only accounted for an additional 3% of the variance in community behaviour.

Table 35. Effects of adding industry-specific predictors to the model for community behaviour

VARIABLE	TOTAL R^2	p
Importance of meeting welfare needs sheep/beef	0.31	0.48
Importance of meeting health needs sheep/beef	0.31	0.08
Beliefs about the positive attributes of sheep/beef meat	0.30	0.97
Beliefs about beef/sheep rights	0.34	0.03
Beliefs about cholesterol in beef/lamb	0.30	0.53

Beliefs about additives in beef and lamb	0.29	0.23

It can be seen that welfare variables do not account for any variance in self-reported red meat consumption; a well-fitting model can be established that includes only, number of occupants in the household, education, having visited a commercial abattoir, a belief in the importance of meeting welfare needs of livestock and the belief that beef and lamb have positive attributes. The model fits with a RMSEA of .02 and accounts for 21% of the variance in red meat purchasing (Figure 13). Not only did other generic and industry-specific variables not add to the prediction of self reported consumption, neither did the importance on food attributes such as quality or being locally produced.

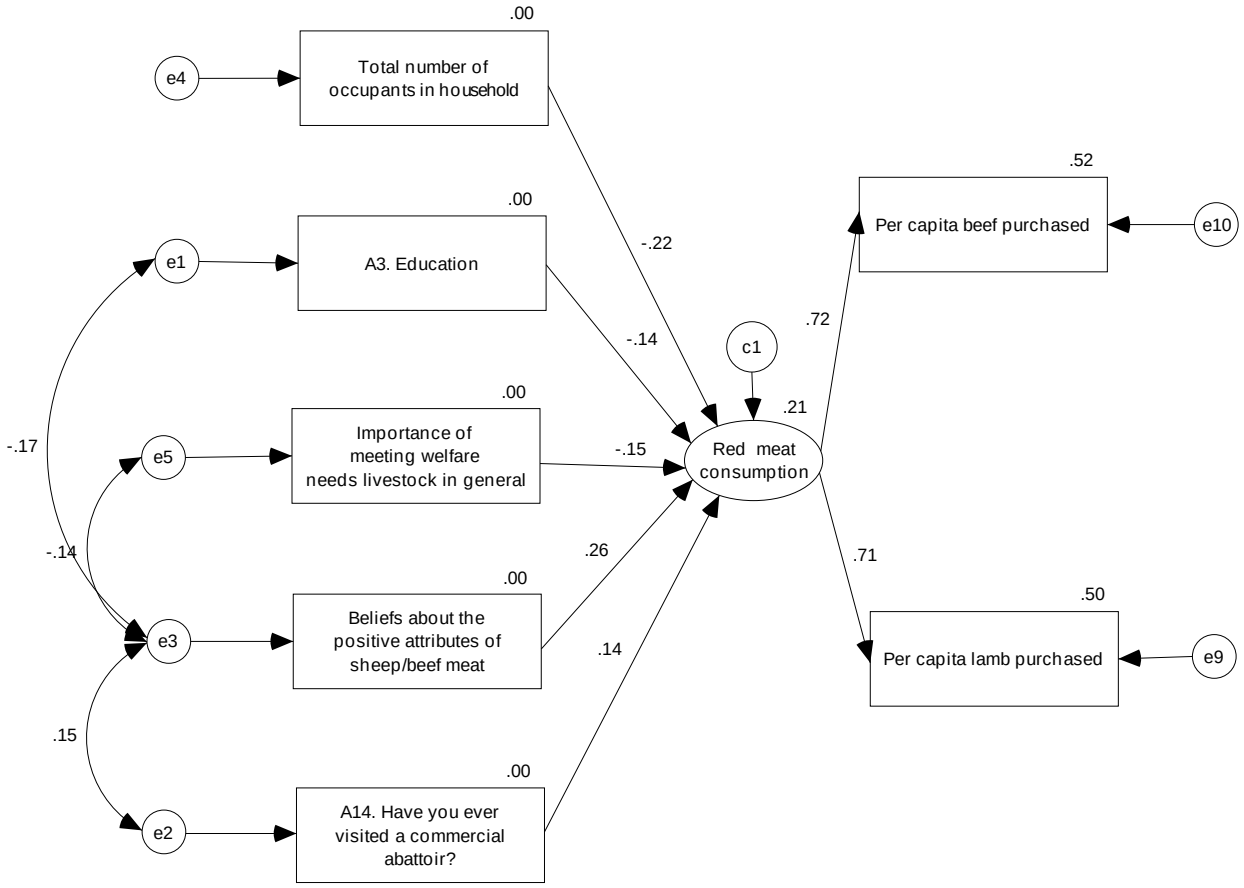


Figure 13. A structural model of background variables and generic attitudes towards welfare issues as predictors of red meat consumption.

4 Discussion

The sample of 516 respondents was obtained from all states and territories in Australia. Approximately two thirds of the respondents in this study were female. Thus, the results will tend to be biased in favour of female attitudes and behaviours. However, females are predominantly responsible for food purchases (Harnack, Story, Maritinson, Neumark-Sztainer, & Stang, 1998) and research into behaviour relating to animal welfare issues shows that there is a predominance of females who engage in these behaviours also (for example, Eldridge & Gluck, 1996; Verbeke, 2002; Verbeke & Vackier, 2004). Consistent with this, in this study, females engaged in significantly more community behaviours than did males.

Approximately 54% of the sample was derived from suburban locations with the remainder distributed approximately evenly amongst urban, regional city, country town and rural locations. The findings reported in this study revealed a non-significant trend for individuals from country towns to report higher beef and lamb consumption *per capita* than individuals from other regions. There were insufficient numbers to compare these groups in terms of point-of-sale purchases. There was no significant difference in beef consumption across the different age levels, however, those aged 60 or more consumed significantly more lamb and a similar trend was evident in beef consumption.

Community knowledge of many procedures in the livestock industries substantially exceeded the 50% correct that would be expected by chance. Nevertheless, for many procedures (clipping teeth' (69%), 'pre-slaughter stunning' (67%), 'feedlotting animals' (66%), 'mulesing' (66%), 'crutching' (63%), and 'lairaging' (55%)), the percentage of people who correctly identified a particular procedure was only 10 to 20% above chance levels. For some procedures ('curfewing' (35%) and 'induced moulting' (28%)), the percentage correct was substantially less than 50% indicating that there may be some mis-information in the community about these procedures. This strongly suggests that the community needs to be educated about the various procedures that are used in the livestock industries and the rationale for their use.

The aim of this project was to identify those attitudes which predict consumer behaviour as well as community behaviours, for which several interesting results were observed. First, and somewhat surprisingly, people who engaged in any kind of community behaviour, tended to do so regardless of whether the behaviour was in support of, or in opposition to, various aspects of livestock farming. This suggests that there are some members of the community who have a "social conscience" and who actively engage in expressing their views in the various forums that are available to them. This is consistent with the notion of an opinion leader introduced by Katz and Lazarsfeld (1955). Such people tend to lead the debate on social issues and provide a conduit for the information from various sources to reach their social group.

The first objective of this project was to determine the relationship between attitudes and consumer behaviour toward red meat products. Two percent of respondents reported never eating beef, while 7% reported never eating lamb. An additional 7.4% reported that they consumed beef less than once per week, while 27.1% ate lamb less than once a week. The majority of respondents self-reported the consumption of beef and lamb at least once a week. The findings revealed that self-reported lamb purchase was not correlated with point-of-sale lamb purchase. In contrast, self-reported beef purchase was significantly correlated with point-of-sale beef purchase. This suggests that point of sale purchases, as a "snapshot" of purchasing behaviours at a specific time, may be a reliable indicator of beef, but not lamb, consumption.

The importance of product attributes to consumers' choices of livestock produce could be best described as a two factor model, suggesting that the reliance on a hierarchical ranking of single product attributes is open to question. The derived factor of 'lean and green' aspects of food production (defined as attributes such as: no hormones; no antibiotics, and; not genetically modified) reported here is generally consistent with the 'safety' factor obtained by Verbeke (2001,

p494) for egg attributes. The second factor related mainly to the physical attributes of livestock products including packaging and appearance, etc. Similarly, a two-factor model was obtained for the importance of product attributes of beef and lamb products. This model showed some consistency with that associated with livestock products in general in that the 'lean and green' aspects were also prominent. However, this model is much less clear than was the case for livestock products in general. That is, several attributes showed substantial loadings on both factors. Nevertheless, it does seem that there is a cluster of attributes that includes environmental and welfare attributes that people appear to conceptualize as related to each other. As will be discussed later, these attributes tend to be ranked as more important than the physical attributes and this suggests that, as a constellation of attributes, environmental and welfare attributes may be more relevant to consumer choice than physical attributes.

When product attributes were ranked according to the mean importance rating that respondents gave, there was a general consensus that "quality", being "produced in Australia", "appearance", "not genetically modified" and the" humane treatment" of animals were amongst the top six. This ranking is consistent with the rankings for animal welfare obtained by Verbeke (2002) and Hutchins (2003). However, while product attributes such as brand and packaging were rated within the three least important attributes for both livestock and beef and lamb purchases in the current sample, these attributes ranked toward the top in the Hutchins (UK) and Verbeke (Belgium) samples, indicating possible cultural differences.

Several of the importance ratings of product attributes in relation to beef and lamb were correlated with self-reported beef and lamb purchases, including "value", "cut", "appearance", "quality" and "packaging". In addition, lamb purchases were correlated with "free range method of production" and "shelf life". Similarly, beef purchases were negatively correlated with "humane treatment of animals" and "produced with concern for the environment" which implies that people who were less concerned about humane treatment and environmental issues tended to purchase more beef. Only "leanness" and "health indications such as Heart Foundation" were correlated with lamb and beef point of sale purchases. Few of the *generic* attributes of livestock products correlated with purchasing behavior. "Appearance" and "produced locally" correlated with self-reported lamb and beef purchases while "price" correlated with lamb purchases and "no antibiotics" and "humane treatment of animals" correlated negatively with beef purchases. Again, this implies that people who were less concerned about humane treatment and environmental issues tended to purchase more beef. For point of sale purchases, few *generic* attributes correlated with purchasing behaviour; only "produced locally" correlated with lamb point-of-sale purchases while "produced in Australia" correlated positively and " free range method of production" correlated negatively with beef purchases.

The occurrence of community behaviours varied widely. Community behaviours relating to the lamb and beef industries occurred with much lower frequency than those relating to livestock industries in general. There are several possibilities for this result. One possibility is that the red meat industries are not of high priority in relation to community behaviours. A second possibility is that people's concerns are distributed across the range of livestock industry issues such as farrowing systems for pigs and cage issues in the egg industry. A more in-depth comparative analysis would be necessary to determine if this is the case. In addition, community behaviours directed at livestock farming in general such as signing petitions, engaging in discussions with colleagues or friends, donating money or goods to a welfare organisation, occurred with frequencies ranging from 23 to 46% while community behaviours such as writing to a politician or a newspaper or attending a rally occurred with frequencies of less than eight percent. Although the absolute proportions were lower, these patterns were also evident in community behaviours relating to the beef and lamb industries. These results imply that there is a relatively high occurrence of community behaviours that do not require public expression or public identification. On the other hand, those behaviours which require an individual to the make a public statement occur with much lower frequency. People appear to be reluctant to engage in community behaviours or activities which involve substantial public exposure.

Attitude variables predicted 17% of the variability in self-reported total beef purchases, and 12% of the variance in self-reported total lamb purchases. In relation to self-reported per capita purchases, these figures were 6% and 9% respectively. There were no significant predictors of point-of-sale lamb purchases, however, 10% of the variability of beef point-of-sale purchases was accounted for. For per capita point-of-sale purchases, 8% of the variance in lamb purchases was accounted for and 21% of the variance in per capita beef point-of-sale purchases was obtained. The demographic variables that were found to be predictors included the number of household occupants, gender, education, age, and having visited a commercial abattoir. .A variety of welfare attitudes also were found to be significant predictors including “beliefs about carers’ concerns for the animals”, “welfare attributes of food choice for beef and sheep”, “concerns about welfare” and “importance of meeting health and welfare needs of livestock in general". “Beliefs about the positive attributes of sheep/beef meat” was also a consistent predictor.

When these variables were entered into a structural model of per capita beef and lamb consumption, the principle predictors were number of occupants in the household, education, having visited a commercial abattoir, a belief in the importance of meeting welfare needs of livestock and the belief that beef and lamb have positive attributes. It therefore seems likely that, while the other variables, including those relating to welfare, may account for some of the variability in consumption, depending on the way in which it is assessed, these variables are probably the best predictors. Of interest was the finding that, when red meat consumption was examined in this structural model, a good fitting model that accounted for 21% of self-reported per capita red meat consumption was obtained. Of note was the fact that higher per capita consumption was associated with lower education level and smaller households. Thus presumably larger households cannot afford to buy as much meat per person as can small households or, perhaps, wastage is higher in smaller households.

The second objective of this project was to determine the relationship between attitudes and community behaviours toward the red meat industry. Attitude variables predicted 28% of the variability in people’s community behaviours. The predictors of community behaviours were gender, having visited a commercial abattoir, positive attitudes towards activism, opposition to welfare activism, importance of meeting health needs for livestock in general, attitudes towards animals as a source of food and beliefs about cholesterol in meat. Thus, it appears that people’s attitudes are likely to translate into consumer and community behaviours which are duly responded to by the media and perhaps by politicians. It should be noted that community behaviours were self-reported and this may have led to high attitude behaviour relationships because of common method variance. When a structural model of community behaviour is constructed, it can be seen that there are three broad categories of variables that predict such behaviour. In the first category are gender, having visited a commercial abattoir and knowledge of farming practices. In the second category are several welfare variables including attitudes towards activism, attitudes to animals as a source of food, importance of meeting health needs of livestock and attitudes towards sea transport. The final category is beliefs about cholesterol in meat. In sum, five of the nine variables are welfare related. Further, these variables are generic in the sense that they relate to livestock in general, rather than specifically to the red meat industries. In fact, variables specific to the red meat industries added little to the model.

The third objective of this project was to develop a methodology that can be used for routine monitoring of community attitudes towards the red meat industry and red meat products, and to inform the development of educational programs by government, red meat industry, and regulatory bodies. The fact that community behaviours are determined largely by concerns about welfare (see Figure 12 which shows that at least five of the predictors for community behaviours related to welfare issues), taken in conjunction with the hypothesis that people who engage in many community behaviours may be community opinion leaders, suggests that animal welfare may be one of the principal drivers for community responses to the extensive animal industries.

Industry and government responses to community concerns need to take this into account. In part, this may mean ensuring that there is reliable and accurate information on industry practices available to the community and in part, it may mean that government and industry should monitor both attitudes towards welfare issues and their relation to community responses on an ongoing basis. The questionnaires that were used in this project can form the basis for monitoring changes in community attitudes and behaviour over time.

The fourth objective of this project was to identify the relative importance of the attitudes of the Australian consumer and the general public towards the most commonly raised welfare, health, and environmental issues in red meat production and, where possible, to compare these with those obtained in the Roy Morgan (2000) study. In general, with the exception of gender, the demographics of this survey were similar to those of the Roy Morgan surveys. However, where a comparison could be made, this survey produced some different results.

Substantially fewer respondents in the Roy Morgan survey indicated familiarity with a variety of farming practices than were able to correctly identify those practices in this study. The distinction between familiarity and knowledge may explain this discrepancy. Respondents in the Roy Morgan survey may have interpreted familiarity as more or less direct exposure whereas those who knew what the procedure was may not have had such exposure. Similarly, a much larger percentage of respondents disapproved of the various farming practices in this study compared with the Roy Morgan survey. It is not entirely clear why this should be the case. It would be surprising if such a marked change would have occurred in just six years. One difference between the current study and the Roy Morgan survey is that the Roy Morgan survey asked for agreement or disagreement of a practice whereas the current survey asked about approval or disapproval. This suggests that people may accept the inevitability of certain farming practices but actually oppose them. In subsequent surveys it would be important to assess both agreement and approval.

Respondents in this survey indicated a rate of usage of all media sources, with the exception of newspapers, substantially higher than did respondents in the Roy Morgan survey. Again, a methodological difference may account for this. In the Roy Morgan survey, respondents were asked to nominate their sources of information whereas in the current survey, respondents were given each source and asked to indicate whether or not they used it.

In general, a cautious conclusion that may be drawn from a comparison between the results of the Roy Morgan (2000) study and the current project is that the community is showing a progressive increase in concern about animal welfare issues. There was some limited evidence of this in the comparison of two survey outcomes, six years apart, in the Roy Morgan (2000) report. In this much more extensive survey, there is some evidence for the trend continuing.

5 Success in Achieving Objectives

Conclusions in relation to each of the objectives of this project have been discussed in some detail in the previous section. There is every indication that the current project has permitted each of those objectives to be met.

6 Impact on Meat and Livestock Industry – now & in five years time

One of the key implications of the results reported here is that community attitudes, particularly those relating to farm animal welfare, are related to a range of community behaviours that have substantial potential to impact on the red meat industry. As indicated in the introduction to this report, there have been several examples of community responses driving industry changes via a cascade of demands for welfare accountability up through the supply chain.

In the short term, it is likely that through both direct community action and through feedback via newspapers, talk-back radio, etc. to regulators and legislators that the livestock industries may be obliged to make changes of a scale and in a timeframe that will place considerable pressure on the livestock industries.

In the longer term, if the current trends in community attitudes continue, there is some risk to the sustainability of the livestock industries. There is already considerable community resistance to the corporatisation of agriculture, the intensification of agriculture and the environmental demands and welfare concerns that follow from these industry trends. In the U.S., moratoriums have, from time to time, been placed on the development of intensive farms in some states. A sustained community opposition to livestock industry practices will surely lead to restrictions that may not be necessary if the livestock industries take a proactive approach.

Given the results of this study that show that community attitudes can predict community behaviours, the relevant attitudes should be monitored in the future so that community trends can be identified. Also, because there is an indication that there may be community opinion leaders that mediate information on welfare issues, research should be conducted to explicitly test this hypothesis and, if confirmed, to identify the characteristics of such people so that effective, targeted communication strategies can be developed.

7 Conclusions and Recommendations

Overall, this study provides good evidence to suggest that community attitudes should be taken into account both in developing marketing and communication strategies as well as in developing industry policy and, that the focus of on-going monitoring strategies should extend beyond food quality issues to include community concerns about animal welfare.

It is therefore important for industry to carefully analyse these community views and to develop both a short term and a longer term response. The short term response would include the use of the information obtained from this and other surveys to brief regulators and legislators and the community on the true state of affairs regarding community views of the livestock industries. Such a response would also include informing the livestock industries of these results as a mechanism for instituting changes where appropriate. Finally, such a response would also include the seeking of opportunities to provide education to the community from early school age onwards about food sources, about best practice and about the role of the livestock industries in providing economical and quality food for the community.

In the longer term, the livestock industries need to address the issue of community concerns about many routine industry practices. On the one hand this requires strategic research to target alternatives to those practices that are of major concern and on the other requires the development of strategies to address community concerns by providing an adequate response to the community. The finding in this study that opinion leaders may play a key role in the propagation of information through the community indicates that further research needs to be carried out to establish the validity of this hypothesis and, if valid, to identify the characteristics of these opinion leaders. Through this process, it may be possible to direct information in a more targeted way.

In general, there is always a risk of polarization between the community on the one hand and industry on the other. This has the potential to lead to a reactive and relatively intractable stance by one or both groups. For a sustainable livestock industry, the community and the livestock industries need to have a similar view. This requires good communication and a willingness to strike a measured balance between creating an informed community on the one hand and a flexible industry on the other side willing to respond to community values.

8 Bibliography

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Prentice-Hall, Englewood Cliffs, New Jersey.

Animals Australia (2006). Save Babe Campaign. Retrieved May 25, 2006 from http://www.savebabe.com/

Australian Bureau of Statistics (2005). Year Book Australia, 2005 (No. 1301.0). Canberra, Australian Capital Territory. Retrieved May 15, 2006, from AusStats database.

Baghurst, K., Record, S., & Leppard, P. (2000). Red meat consumption in Australia: intakes, nutrient contribution and changes over time. Australian Journal of Nutrition and Dietetics, 57(4), S3-S36.

Bennet, R. M. (1997). Farm animal welfare and food policy. *Food Policy, 22(4),* 281-288.

Bernabeu, R., & Tendero, A. (2005). Preference structure for lamb meat consumers: a Spanish case study. *Meat Science, 71*, 464-470.

Bernues, A., Olaizola, A., & Corcoran, K. (2003). Extrinsic attributes of red meat as indicators of quality in Europe: an application for market segmentation. *Food Quality and Preference, 14*, 265-276.

Bland, D., Bureau, J.C., Fulponi, L., & Henson, S. (2001). Potential implications of animal welfare concerns and public policies in industrialised countries for International Trade. In M. Bohman, J. Caswell, B. Krissoff, B. (Eds.), *Global Food Trade and Consumer Demand for Quality.* New York: Kluwer Academic/ Plenum Publishers.

Breidenstein, B. C. (1988). Changes in consumer attitudes towards red meat and their effects on marketing strategy. *Food Technology, 42*, 112 – 116.

Coleman, G. J., Hay, M., & Toukhsati, S. R. (2004). Effects of consumer attitudes and behaviour relevant to pork production. Final report to Australian Pork Limited.

Computer-Assisted Telephone Interviewing (CATI) softward. Retrieved May 25, 2006, from http://www.sawtooth.com

Cronin, K. A., Krebs-Smith, S. M., Feuer, E. J., Troiano, R. P., & Ballard-Barbash, R. (2001). Evaluating the impact of population changes in diet, physical activity, and weight status on population risk for colon cancer (United States). Cancer Causes and Control, 12, 305-316.

Eldridge, J.J. & Gluck J.P. (1996). Gender differences in attitudes toward animal research. *Ethics and Behavior, 6*, 239-256.

Fishbein, M. (1967). Attitude and the prediction of behaviour. In Fishbein, M. (Ed), Readings in Attitude Theory and Measurement. (pp 477-492). New York, Wiley.

Food and Agriculture Organization of the United Nations. (2006). September 2005 meat market assessment: recovering demand and strong trade prospects supporting high meat prices in 2005. Retrieved May 3, 2006, from http://www.fao.org/es/esc/en/20953/21014/highlight_27269en.html

Harnack, L., Story, M., Maritinson, B., Neumark-Sztainer, D., & Stang, J. (1998). Guess who's cooking? The role of men in meal planning, shopping, and preparation in US families. *Journal of the American Dietetic Association, 98*(9), 995-1000.

Harper, G. C., & Makatouni, A. (2002). Consumer perception of organic food production and farm animal welfare. *British Food Journal, 104(3/4/5)*, 287-299.

Harper, G.C. and Henson, S.J. (1999). *The nature of consumer concerns about animal welfare - the comparative report.* The University of Reading. United Kingdom.

Harrington, G. (1994). Consumer demands: major problems facing industry in a consumer-driven society. *Meat Science, 36*, 5-18.

Hay, M., & Coleman, G. J. (2004). Education in agriculture: livestock farming , food production and food choices in pre-adolescence: Final report to the William Buckland Foundation.

Hobbs, A. L., Hobbs, J. E., Isaac, G. E., Kerr, W. A. (2002). Ethics, domestic food policy and trade law: assessing the EU animal welfare proposal to the WTO. *Food Policy, 27*, 437-454.

Holm, L., & Mohl, M. (2000). The role of meat in everyday food culture: an analysis of an interview study in Copenhagen. *Appetite, 34*, 277-283.

Hutchins, R. (2003). Factors influencing purchase decision. Report Series: Consumer Watch. London. IGD International. *The Whole Hog, 82*(2), 2.

Jago, J., Fisher, A., & Le Neindre, P. (2000). Animal Welfare and Product Quality. In E. Balázs, E. Galante, J.M. Lynch, J.S. Schepers, J-P. Toutant, D. Werner and P.A Th. (Eds). Biological Resource Management. Connecting Science and Policy. J. Werry. Springer-Verlag, Berlin. 163-171.

Kampman, E., Verhoeven, D., & Sloots, L. (1995). Vegetable and animal product as determinants of colon cancer risk in Dutch men and women. *Cancer Causes and Control, 6*, 225-234.

Katz, E., & Lazarsfeld, P. (1955). *Personal Influence.* New York: The Free Press.

Klinsukon, T., Gan, C. E. C., & Bicknell, K. (2002). An analysis for meat in New Zealand: a linear approximate almost ideal demand system approach. *Indian Journal of Economics & Business, 1*, 86-110.

Mann, N. (2000). Dietary lean red meat and human evolution. *European Journal of Nutrition, 39(2),* 71-79.

McCarthy, M., de Boer, M., O'Reilly, S., & Cotter, L. (2003). Factors influencing intention to purchase beef in the Irish market. *Meat Science, 65*, 1071-1083.

Michaud, D. S., Augustsson, K., Rimm, E. B., Stampfer, M. J., Willet, W. C., & Giovannucci, E. (2001). A prospective study on intake of animal products and risk of prostate cancer. *Cancer Causes and Control, 12*, 557-567.

Milne, J. A. (2005). Societal expectations of livestock farming in relation to environmental effects in Europe. *Livestock Production Science, 96*, 3-9.

Napolitano, F., Caporale, G., Carlucci, A., & Monteleone, E. (2006). Effect of information about animal welfare and product nutritional properties on acceptability of meat from Podolian cattle. *Food Quality and Preference*, in press.

Ngapo, T. M., Dransfield, E., Martin, J. F., Magnusson, M., Bredahl, L., & Nute, G. R. (2003). Consumer perceptions: pork and pig production. Insights from France, England, Sweden and Denmark. *Meat Science, 66*, 125-134.

Pennings, J. M. E., Wansink, B., & Meulenberg, M. T. G. (2002). A note on modeling consumer reaction to a crises: the case of the mad cow disease. *Internal Journal of Research in Marketing*, 577*, 19(1),* 91-100.

Petherick, J. C. (2005). Animal welfare issues associated with extensive livestock production: the northern Australian beef cattle industry. *Applied Animal Behaviour Science, 92*, 211-234.

Prynne. C. J., Paul. A. A., Mishra, G. D., Greenberg, D. C., & Wadsworth, E. J. (2005). Changes in intake of key nutrients over 17 years during adult life of a British birth cohort. *Journal of Nutrition, 94*, 368-376.

Richardson, N. J., MacFie, H. J. H., & Shepherd, R. (1994). Consumer attitudes to meat eating. *Meat Science*, *36*, 57-65.

Roy Morgan Research (2000). Animal Welfare Issue Survey. Meat and Livestock Australia Ltd.

Schulze, M. B., Manson, J. E., Willet, W. C., & Hu, F. B. (2003). Processed meat intake and incidence of Type 2 diabetes in younger and middle-aged women. *Diabetologia, 46*, 1465-1473.

Smith, A. (Ed) (2001). Queenslanders' attitudes towards everyday food items. Rural. Ind. Bus. Serv. Grp. News. 2

Smith, K. R., Clayton, P., Stuart, B., Myers, K., & Seng, P. M. (2005). The vital role of science in global policy decision-making: an analysis of past, current, and forecasted trends and issues in global red meat trade and policy. *Meat Science, 71*, 150-157.

StatSoft – Electronic Textbook. Principal components and factor analysis (1984-2003). Retrieved May 3, 2006, from http://www.statsoft.com/textbook/stfacan.html

Tabachnick, B. G., and Fidell, L. S. (2001). *Using Multivariate Statistics* (4th ed). Boston: Allyn and Bacon.

Tarrant, P. V. (1998). Some recent advances and future priorities in research for the meat industry. *Meat Science, Suppl. 1,* S1-S16

Verbeke, W. (2001). Beliefs, attitudes and behaviour towards fresh meat revisited after the Belgian dioxin crisis. *Food quality and preference, 12*(8), 489-498.

Verbeke, W. (2002). A shift in public opinion. *Pig Progress, 18*(2), 25-27.

Verbeke, W., & Vackier, I. (2004). Profile and effects of consumer involvement in fresh meat. *Meat Science, 67*(1), 159-168.

Verbeke, W., & Viaene, J. (1999). Beliefs, attitude, and behaviour towards fresh meat consumption in Belgium: empirical evidence from a consumer survey. *Food Quality and Preference, 10*, 437-445.

Verbeke, W., & Ward, R. W. (2006). Consumer interest in information cues denoting quality, traceability and origin: an application of ordered probit models to beef labels. *Food Quality and Preference, 17*, 453-467.

Videras, J. (2006). Religion and animal welfare: evidence from voting data. *The Journal of Socio-Economics, in press.*

Worsley, A., & Skrzypiec, G. (1998). Do attitudes predict red meat consumption among young people. *Ecology of Food and Nutrition, 37*, 163-195.

Worsley, A., & Skrzypiec, G. (1998). Teenage vegetarianism: prevalence, social, and cognitive contexts. *Appetite, 30*, 151-170.

9 Appendices

9.1 Appendix A - Generic Questionnaire

MONASH University

ANIMAL WELFARE SCIENCE CENTRE

Farming & the Community Survey

Thank you for agreeing to complete this survey. Your input is most valuable.

All information you provide will remain confidential. Your identity will be anonymous and your responses will be referred to by code number only.

This survey is being answered by 600 adults nationally to determine their attitudes towards a range of issues around the production of food from livestock farming. The information gained from this survey may be published in a scientific journal.

The survey is in two parts. Part 1 (sections A to E) contains questions about your opinions and behaviours regarding various issues around farming, farm produce and farm animals. You will also be asked some specific questions about your purchase of livestock produce, and other more general questions such as your knowledge of and attitudes towards various practices within livestock industries. Part 2 (sections F to H) contains questions specific to the sheep and beef cattle industries. Please complete **both** sections.

The survey is totally confidential and anonymous

- Please do **not** write your name on the survey. We will assign you a code number
- The survey results will **only** be reported for groups so individual responses **cannot** be identified

How to answer the questions

- Please read each question carefully
- The questions are about your opinions and behaviours regarding various issues around farming, farm produce and farm animals
- There are no “right” or “wrong” answers to any of the questions, just answer what is true for you
- Some questions require you to nominate or tick a box corresponding to the best answer for you. Others require you to nominate or circle a number that most closely represents your opinion, while others require you to tell the researcher or write your answer in the space provided.

In accordance with Monash University policy, all data is securely stored in locked filing cabinets and accessible only to researchers working directly on this project. Data is aggregated and analysed as a group and no findings that could identify any individual will be published. Your responses will be identified by a code number only. You can withdraw at any time and request that your information be withdrawn. If you have any questions about this research, please contact Dr Samia Toukhsati (Ph 03 9903 2367) or Professor Grahame Coleman (Ph 03 9903 1524) at the Department of Psychology, Monash University, Caulfield.

Any complaints?

Should you have any complaints concerning the manner in which this research is conducted, please contact The Secretary, Standing Committee on Ethics in Research on Humans on 03 9905 2052. Quote the Project Number **2002/061**. You can also write to the following address: The Secretary, The Standing Committee on Ethics in Research Involving Humans (SCERH), Research Grants and Ethics Branch, PO Box 3A, Monash University, Clayton, Victoria, 3800

Section A: Questions about you and your family

This section contains questions about yourself and your family. Your individual responses will remain **strictly confidential**. Only summary results for the entire sample will be used.
*For each question, please **select** the response that best answers the question for you.*

A1. Are you? (tick)
1 ☐ Male
2 ☐ Female

A2. How old are you? (write) _____ years

A3. What is your highest level of education? (tick)
1 ☐ Primary School
2 ☐ Secondary School
3 ☐ TAFE College
4 ☐ University Degree
5 ☐ University Post-graduate Degree
6 ☐ Other (write) _____
7 ☐ No Formal Schooling

A4. What is your current residential address postcode? (write) ___ ___ ___

A5. Would you describe your current residential location as? (tick appropriate box)

Urban	☐ 1
Suburban	☐ 2
Regional City	☐ 3
Country Town	☐ 4
Rural	☐ 5

A6. How many people of the following ages currently live in your household?

Age	Number	Regular household member
Under 2 years	_____	☐ (tick if yes)
2 – 6 years	_____	☐ (tick if yes)
7 – 12 years	_____	☐ (tick if yes)
13 – 17 years	_____	☐ (tick if yes)
18+ years	_____	☐ (tick if yes)

A7. What is your *household* annual income from all sources, before taxes? (tick)

Income range	Tick
Less than $30,000	☐ 1
$30,001 to $50,000	☐ 2
$50,001 to $70,000	☐ 3
$70,001 to $90,000	☐ 4
$90,001 to $120,000	☐ 5
$120,001 to $150,000	☐ 6
$150,001 to $200,000	☐ 7
$200,001 +	☐ 8

A8. What (if any) domestic animals live at your current home?

Animal	Number
1 Dog(s)	_____
2 Cat(s)	_____
3 Fish	_____
4 Other (write) _____	_____
5 Other (write) _____	_____
6 Other (write) _____	_____

A9. Do you currently *live* on an *animal farm*?
1 ☐ Yes 2 ☐ No (if no go to A11)

A10. What type of animal farm(s) do you live on?
1 ☐ Poultry (meat)
2 ☐ Poultry (egg)
3 ☐ Dairy
4 ☐ Pig
5 ☐ Beef
6 ☐ Sheep
7 ☐ Other (write) _____

A11. Have you ever lived in a rural setting?
1 ☐ Yes 2 ☐ No (if no go to A14)

Answer the next questions **only** if you currently live in a **town** or **suburb**. If you live in a rural area, go to Section B.

A12. Did you live on an animal farm in your rural home?

1 ☐ Yes 2 ☐ No (if no go to A14)

A13. What type of animal farm(s) did you live on?

1 ☐ Poultry (meat)
2 ☐ Poultry (egg)
3 ☐ Dairy
4 ☐ Pig
5 ☐ Beef
6 ☐ Sheep
7 ☐ Other (write) _____

A14. Have you ever visited a commercial abattoir?

1 ☐ Yes 2 ☐ No

Section B: Questions about farming practices in agriculture and food production

This section contains questions about various farming practices in Australian agriculture and processes in Australian food production. For each question, please **select** the number that most closely represents your knowledge or opinion for each aspect.

B1. Taking into consideration that there are some differences in the needs of farm animals of various species, how **important** are each of the following attributes to the **well being** of animals **in general** living in **farming** situations?

*For each item, **select** the number on a scale of 1 to 7 that most closely represents your answer where 1 = very unimportant and 7 = very important.*

		Very Unimportant			Neither Important nor Unimportant			Very Important
1	Social contact with animals of the same species	1	2	3	4	5	6	7
2	Contact with offspring	1	2	3	4	5	6	7
3	Freedom to roam outdoors	1	2	3	4	5	6	7
4	Good nutrition	1	2	3	4	5	6	7
5	Regular exercise	1	2	3	4	5	6	7
6	Fresh air	1	2	3	4	5	6	7
7	Medications (i.e., antibiotics) for animal health	1	2	3	4	5	6	7
8	Good waste/effluent disposal	1	2	3	4	5	6	7
9	Vaccinations for animal health	1	2	3	4	5	6	7
10	Protection from predators	1	2	3	4	5	6	7

B2. What do the following **livestock farming procedures** involve?

*For each item, **select** the option that you believe to be the correct answer.*

1 Mulesing……

a) shearing of the fleece around the rear end of a sheep ☐

b) cutting and removal of skin around the rear end of a sheep ☐

2 Crutching ……....

a) shearing of fleece around the tail and udder of a sheep ☐

b) cutting and removal of skin around the rear end of a sheep ☐

3 Induced moulting ……..

a) withholding of food and water from hens to create feather moult ☐

b) administration of drugs to hens to create feather moult ☐

4 Dehorning…….

a) used as a means of identification in cattle ☐

b) removal of the horns to prevent bruised meat ☐

5 Pre-slaughter stunning……..

a) paralyses an animal immediately prior to slaughter by using a tranquilizer ☐

b) renders an animal unconscious immediately prior to slaughter by using an electrical current ☐

6 Curfew……

a) deprivation of food and water before transport ☐

b) a time during which stock must be moved into a sheltered area due to the risk of predation ☐

7 Confinement……..

a) allowing animals to roam freely within the boundaries of the property ☐

b) holding an animal in a relatively small pen/enclosure to restrict it's movement ☐

8 Tail docking……

a) cutting and removal of skin around the rear end of a sheep ☐

b) removal of a sheep's tail by cutting it off or using a band ☐

9 Feedlotting animals……

a) management strategy to fatten animals ☐

b) grazing animals on fodder crops ☐

10 Beak trimming……..

a) removal of a portion of the upper beak in chickens which are intensively farmed ☐

b) removal of a portion of the beak to prevent overeating ☐

11 Clipping teeth……

a) carried out on intensively farmed pigs to prevent injury ☐

b) prevents the formation of cavities in pigs teeth ☐

12 Hot iron branding…….

a) use of a hot iron brand when training livestock ☐

b) use of a hot iron to brand for identification purposes ☐

13 Growth hormones……

a) routinely used to increase growth ☐

b) routinely used to boost the immune system of livestock ☐

14 Captive bolt stunning……

a) a method used to render an animal unconscious immediately prior to slaughter by causing concussion ☐

b) a method used to render an animal unconscious immediately prior to slaughter by restraint in a gas chamber ☐

15 Lairaging ……....

a) the guiding of livestock to the slaughter area ☐

b) the holding of livestock in an area of an abattoir, prior to slaughter ☐

B3. To what extent do you **approve or disapprove** of the following **procedures** carried out in the **livestock farming industries**?

Indicate your level of **approval or disapproval** *for each procedure by* ***selecting*** *the number on a scale from 1 to 7 that most closely represents your opinion* where 1 = strongly disapprove and 7 = strongly approve.

		Strongly Disapprove			Neither Approve nor Disapprove			Strongly Approve
1	Mulesing ……	1	2	3	4	5	6	7
2	Crutching……	1	2	3	4	5	6	7
3	Induced moulting……	1	2	3	4	5	6	7
4	Castration……	1	2	3	4	5	6	7
5	De-horning……	1	2	3	4	5	6	7
6	Pre-slaughter stunning……..	1	2	3	4	5	6	7
7	Curfew ……..	1	2	3	4	5	6	7
8	Confinement……	1	2	3	4	5	6	7
9	Tail docking……	1	2	3	4	5	6	7
10	Beak trimming……	1	2	3	4	5	6	7
11	Feedlotting animals…….	1	2	3	4	5	6	7
12	Euthanasia of sick/dying/injured animals……	1	2	3	4	5	6	7
13	Clipping teeth……..	1	2	3	4	5	6	7
14	Hot iron branding……	1	2	3	4	5	6	7
15	Live sheep and cattle sea transport (export)…….	1	2	3	4	5	6	7
16	Live sheep and cattle ground transport (domestic) ……	1	2	3	4	5	6	7

B4. These questions are about various **health** and **welfare** considerations that might be associated with **farm produce.**

Indicate your level of ***agreement*** *or* ***disagreement*** *for each statement by* ***selecting*** *the number on a scale from 1 to 7 that most closely represents your opinion*, where 1 = strongly disagree and 7 = strongly agree

		Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	Meat is a healthy food……	1	2	3	4	5	6	7
2	It is appropriate to use animals to produce food for humans..…….	1	2	3	4	5	6	7
3	Meat is high in cholesterol……..	1	2	3	4	5	6	7
4	Farm animals should be treated in the same way as domestic animals……..							

		1	2	3	4	5	6	7
5	People have a right to eat meat……	1	2	3	4	5	6	7
6	Meat is high in protein……..……..	1	2	3	4	5	6	7
7	Farm animals have the same right to life as humans……..…..	1	2	3	4	5	6	7
8	Meat is part of a balanced diet……..……	1	2	3	4	5	6	7
9	Farm animals have the same feelings as domestic animals……	1	2	3	4	5	6	7
10	Free range foods taste better than intensively farmed foods……...	1	2	3	4	5	6	7
11	Meat is high in fat……	1	2	3	4	5	6	7
12	The nourishment value of meat is high……	1	2	3	4	5	6	7

Section C: Questions about your eating and shopping habits

This section contains questions about your general eating and shopping habits. For each question, please **select** the option or the number that most closely represents your situation or behaviour.

C1. Who in your household is most responsible for grocery shopping?

1 ☐ Myself
2 ☐ Share Equally
3 ☐ Someone Else

C2. Would you describe yourself primarily as a?

1 ☐ Meat eater *(red & white meat)*
2 ☐ Vegetarian *(A vegetarian is a person who eats no meat at all, including chicken and fish)*
3 ☐ Vegan *(A vegan is a person who eats no animal products at all)*

C3. If you are vegetarian or vegan, please select the reason why from the following options

1. ☐ Religious reasons
2. ☐ Don't like the taste of meat
3. ☐ Moral reasons
4. ☐ Medical reasons
5. ☐ Other family members don't eat meat
6. ☐ Health reasons
7. ☐ Other

C4. How often would you **eat** the following foods in an **average week**?

Select *the number on a scale from 1 to 5 that most closely represents your average weekly intake of each food type where 1 = never, 2 = less than once a week, 3 = once a week, 4 = 2-3 times a week and 5 = more than 3 times a week.*

	Never	Less than once a week	Once a week	2 – 3 times a week	More than 3 times a week
1 Beef……	1	2	3	4	5
2. Chicken……	1	2	3	4	5
3 Fish……..……	1	2	3	4	5
4 Shellfish…….	1	2	3	4	5
5 Lamb…….	1	2	3	4	5
6 Pork……..	1	2	3	4	5
7 Game (e.g. rabbit)……..	1	2	3	4	5
8 Eggs……..…….	1	2	3	4	5
9 Dairy Products (excluding milk in coffee or tea) …	1	2	3	4	5
10 Native Animals (e.g., kangaroo/emu)……...	1	2	3	4	5

C5. How much of each **beef** product do you usually purchase in an average month?

Type of beef product	**per month**
1☐ Beef Cuts	_____ gms
2☐ Beef Steak	_____ gms
3☐ Ground (i.e., minced) Beef	_____ gms
4☐ Beef Sausages	_____ gms
5☐ Beef Roast	_____ gms
6Other (write) _____	_____ gms

C6. How much of each **lamb** product do you usually purchase each month?

Type of lamb product	**per month**
1☐ Lamb Cuts (i.e., chops)	_____ gms
2☐ Lamb Steak	_____ gms
3☐ Ground (i.e., minced) Lamb	_____ gms
4☐ Lamb Sausages	_____ gms
5☐ Lamb Roast	_____ gms
6Other (write) _____	_____ gms

C7. For each of the following attributes can you indicate its **importance** in your **choice of foods** produced by and from animals.

***Select** the number on a scale from 1 to 7 that best indicates the level of importance **you** place on each attribute, where 1 = very unimportant and 7 = very important.*

		Very Unimportant			Neither Important nor Unimportant			Very Important
1	Brand……	1	2	3	4	5	6	7
2	Price……	1	2	3	4	5	6	7
3	Contains no hormones.....	1	2	3	4	5	6	7
4	Contains no antibiotics……..	1	2	3	4	5	6	7
5	Contains no artificial additives or preservatives……	1	2	3	4	5	6	7
6	Produced in Australia……..	1	2	3	4	5	6	7
7	Free-range method of production……	1	2	3	4	5	6	7
8	Appearance……..	1	2	3	4	5	6	7
9	Shelf life……	1	2	3	4	5	6	7
10	Quality……...	1	2	3	4	5	6	7
11	Packaging……	1	2	3	4	5	6	7
12	Produced with the humane treatment of animals……...	1	2	3	4	5	6	7
13	Is not genetically modified……..	1	2	3	4	5	6	7
14	Size……	1	2	3	4	5	6	7
15	Produced locally……..	1	2	3	4	5	6	7

Section D: Questions about farm animals as a food source for humans

This section contains various questions about the use of animals as a source of food for humans.

D1. For each of the following statements, please **select** the number on a scale from 1 to 7 that most closely represents your level of **agreement** or **disagreement** with each statement, where 1 = strongly disagree and 7 = strongly agree.

		Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	It upsets me that farm animals must sacrifice their life to produce my food……....	1	2	3	4	5	6	7
2	Farm animals have the same rights as domestic pets…….	1	2	3	4	5	6	7
3	Humans should not eat meat…….	1	2	3	4	5	6	7
4	No animal should die so that I have food…….	1	2	3	4	5	6	7
5	Farm animals have the same right to life as humans……....	1	2	3	4	5	6	7
6	I would be happier if animals were not used for food……..	1	2	3	4	5	6	7
7	The welfare of animals is a major concern to me……..	1	2	3	4	5	6	7

Section E: Questions about animals and animal welfare

This section contains questions about your general behaviour with regard to various aspects of animal welfare. For each question, please **select** the option or the number that most closely represents your situation or behaviour.

E1. Are you currently a member of an animal welfare group or organisation?

1☐ Yes 2☐ Past Member 3☐ No

E2. Do you currently subscribe to any type of animal welfare magazine?

1☐ Yes 2☐ Past Subscriber 3☐ No

E3. Do you currently subscribe to any nature or wildlife publications, other than those concerned with animal welfare, hunting or fishing?

1☐ Yes 2☐ Past Subscriber 3☐ No

E4. Have you ever done any of the following activities to express your **dissatisfaction** with any aspect of **livestock farming**?

1☐ written a letter to a politician

2☐ called a radio talk back segment

3☐ attended a public rally or demonstration

4☐ signed a petition

5☐ donated money to animal welfare organisations

6☐ donated goods other than money to animal welfare organisations

7☐ volunteered your services to animal welfare organisations

8☐ spoken to colleagues, family members, or friends

9☐ written a letter to a newspaper

10 Other (write) _____

E5. Have you ever done any of the following activities to express your **support** of any aspect of **livestock farming**?

1☐ written a letter to a politician

2☐ called a radio talk back segment

3☐ attended a public rally or demonstration

4☐ signed a petition

5☐ donated money to animal welfare organisations

6☐ donated goods other than money to animal welfare organisations

7☐ volunteered your services to animal welfare organisations

8☐ spoken to colleagues, family members, or friends

9☐ written a letter to a newspaper

10 ☐ donated money/goods to the farming industry

11 Other (write) _____

E6. In your opinion, how **concerned are** the following people for the **welfare** of **animals** under their control?

*To answer this question **select** the number on a scale from 1 to 7 that most closely represents your opinion, where 1 = not at all concerned and 7 = very concerned.*

		Not at all Concerned			Neither Concerned nor Unconcerned			Very Concerned
1	Agricultural researchers……	1	2	3	4	5	6	7
2	Medical researchers……	1	2	3	4	5	6	7
3	Psychological researchers……	1	2	3	4	5	6	7
4	Veterinarians……	1	2	3	4	5	6	7
5	Laboratory animal technical staff……	1	2	3	4	5	6	7
6	Poultry (meat) farmers……	1	2	3	4	5	6	7
7	Poultry (egg) farmers……	1	2	3	4	5	6	7
8	Dairy cattle farmers……	1	2	3	4	5	6	7
9	Pig farmers……	1	2	3	4	5	6	7
10	Sheep farmers……	1	2	3	4	5	6	7
11	Beef cattle farmers……	1	2	3	4	5	6	7
12	Abattoir workers……	1	2	3	4	5	6	7
13	Owners of domestic pets……	1	2	3	4	5	6	7
14	Horse trainers……	1	2	3	4	5	6	7
15	Zoo keepers……	1	2	3	4	5	6	7
16	Rodeo organisers and participants……	1	2	3	4	5	6	7

E7. How **concerned** are **you** about the following practices?

*To answer this question **select** the number on a scale from 1 to 7 that most closely represents your level of **concern** for each **practice**, where 1 = not at all concerned and 7 = very concerned.*

		Not at all Concerned			Neither Concerned nor Unconcerned			Very Concerned
1	Poultry housed in cages……	1	2	3	4	5	6	7
2	Artificial rearing of calves in pens……	1	2	3	4	5	6	7
3	Pigs raised in pens (i.e., smaller areas within sheds)……	1	2	3	4	5	6	7
4	Free range egg farming……	1	2	3	4	5	6	7
5	Free range poultry farming……	1	2	3	4	5	6	7
6	Free range pig farming……	1	2	3	4	5	6	7

7	Care of zoo animals…….……..	1	2	3	4	5	6	7
8	Use of animals in indoor farming……..	1	2	3	4	5	6	7
9	Care of marine park animals…..…….	1	2	3	4	5	6	7
10	Care of circus animals…….……..	1	2	3	4	5	6	7
11	Loss of young animals from livestock production systems……..	1	2	3	4	5	6	7
12	Intensive egg farming...……	1	2	3	4	5	6	7
13	Intensive poultry (chicken meat) farming…..……..	1	2	3	4	5	6	7
14	Intensive pig farming…..…….	1	2	3	4	5	6	7
15	Livestock transported overseas…….	1	2	3	4	5	6	7

E8. In your opinion, how comfortable do you believe **land transported livestock** to be with regard to the following conditions?

*For each item, **select** the number on a scale from 1 to 7 that represents livestock comfort level, where 1 = extremely uncomfortable and 7 = extremely comfortable.*

		Extremely uncomfortable			Neither comfortable nor uncomfortable			Extremely comfortable
1	Space per animal …….	1	2	3	4	5	6	7
2	Provision of food and water ……...	1	2	3	4	5	6	7
3	Ventilation ……...	1	2	3	4	5	6	7
4	Journey length …….	1	2	3	4	5	6	7
5	Road conditions (e.g. sound, vibration, braking levels)……	1	2	3	4	5	6	7
6	Transfer of animals onto vehicles (e.g. use of equipment, human handling)	1	2	3	4	5	6	7

E9. In your opinion, how comfortable do you believe **sea transported livestock** to be with regard to the following conditions?

*For each item, **select** the number on a scale from 1 to 7 that represents livestock comfort level, where 1 = extremely uncomfortable and 7 = extremely comfortable.*

		Extremely uncomfortable			Neither comfortable nor uncomfortable			Extremely comfortable
1	Space per animal …….	1	2	3	4	5	6	7
2	Provision of food and water ……..	1	2	3	4	5	6	7
3	Ventilation ……..	1	2	3	4	5	6	7
4	Journey length …….	1	2	3	4	5	6	7

5	Sea conditions (e.g. sound, movement)……..	1	2	3	4	5	6	7
6	Transfer of animals onto ships (e.g. use of equipment, human handling)…….	1	2	3	4	5	6	7

E10. For each statement below, please **select** the number on a scale from 1 to 7 that most closely represents your level of **agreement** or **disagreement** with each statement, where 1 = strongly disagree and 7 = strongly agree.

		Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	The welfare of farm animals is not an important consideration to my shopping choices…….	1	2	3	4	5	6	7
2	People should make the effort to buy food that is produced with regard to good animal welfare practices……..	1	2	3	4	5	6	7
3	Governments should not provide funding for animal welfare lobby‡ groups……..…….	1	2	3	4	5	6	7
4	The welfare of farm animals is an important consideration to me…..	1	2	3	4	5	6	7
5	People should lobby‡ governments to improve the welfare of farm animals……..……	1	2	3	4	5	6	7
6	The welfare of domestic pets is an important consideration to me.....	1	2	3	4	5	6	7
7	It is important for me to be actively involved in the promotion of the welfare of domestic pets……..……..	1	2	3	4	5	6	7
8	The welfare of native animals is an important consideration to me.…	1	2	3	4	5	6	7
9	It is important to me that I sign a petition in support of animal welfare……...	1	2	3	4	5	6	7
10	Too many people are actively involved in promoting domestic pet welfare……..……...	1	2	3	4	5	6	7
11	All people should encourage their friends to support animal welfare causes……..	1	2	3	4	5	6	7
12	Animal rights activists† are too radical in their protection of animals……..	1	2	3	4	5	6	7
13	It is important for me to be actively involved in the promotion of the welfare of native animals...……..……..……	1	2	3	4	5	6	7
14	People should be more public in their support for farm animal welfare……..	1	2	3	4	5	6	7
15	It is important for me to be actively involved in the promotion of farm animal welfare……..	1	2	3	4	5	6	7
16	People should encourage their family and friends to be actively involved in the promotion of animal welfare……..……..…	1	2	3	4	5	6	7
17	There are too many people actively involved in promoting native animal welfare……...…….	1	2	3	4	5	6	7

18	Governments should provide funding for to industry to help them improve animal welfare outcomes……..	1	2	3	4	5	6	7

†*Activism* involves the use of direct, often confrontational action, such as a demonstration or strike, in opposition to practices that are deemed cruel to animals, or in support of animal welfare.
‡*Lobbyists* are people engaged in trying to influence legislators or other public officials in favour of animal welfare concerns.

E11. From which **sources** have you heard about or obtained **information** regarding animal welfare issues?

*To answer this question, select any **relevant sources from the following list.***

1☐ television

2☐ radio talk back/interviews

3☐ internet

4 ☐ magazines

5☐ friends/family

6☐ animal welfare organizations e.g. RSPCA

7☐ formal education

8☐ government advertisements/promotions

9Other (write) _____

Sheep and Beef Cattle Farming and the Community

These final sections contain questions that are specific to **sheep and beef cattle farming**. Some of the questions are very similar to those you have already answered for farming in general. We now want your opinions about these aspects as they specifically relate to **sheep and beef cattle farming**.

Section F: Questions about sheep and beef cattle farming practices and production

This section contains questions about various processes in Australian sheep and beef cattle farming and production. For each question, please **select** the number or response that most closely represents your knowledge or opinion for each aspect.

F1. How **important** are each of the attributes listed below to the **well being** of **sheep and beef cattle** living in farming situations?

*For each item, **select** the number on a scale from 1 to 7 that most closely represents your answer, where 1 = very unimportant and 7 = very important.*

		Very Unimportant			Neither Important nor Unimportant			Very Important
1	Social contact with animals of the same species……....	1	2	3	4	5	6	7
2	Contact with offspring…..……..…….....	1	2	3	4	5	6	7
3	Shelter……..	1	2	3	4	5	6	7
4	Access to water...……	1	2	3	4	5	6	7
5	Freedom to roam outdoors…….....	1	2	3	4	5	6	7
6	Social contact with animals of a different species…….…….	1	2	3	4	5	6	7
7	Good nutrition……..	1	2	3	4	5	6	7
8	Regular exercise…….	1	2	3	4	5	6	7
9	Fresh air……...	1	2	3	4	5	6	7
10	Medications (i.e., antibiotics) for health…….……..…...	1	2	3	4	5	6	7
11	Vaccinations for health..……..…….	1	2	3	4	5	6	7
12	Protection from predators…….……..……..	1	2	3	4	5	6	7

13	Outdoor housing ……..……..…….	1	2	3	4	5	6	7

F2. These questions are about various **health** and **welfare** considerations that might be associated with **sheep and beef cattle products.**

*Indicate your level of agreement or disagreement for each statement by **selecting** the number on a scale from 1 to 7 that most closely represents your opinion, where 1 = "strongly disagree" and 7 = "strongly agree"*

		Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	I believe beef and lamb is healthy ……	1	2	3	4	5	6	7
2	It is appropriate to use sheep and cattle to produce food for humans…….	1	2	3	4	5	6	7
3	I believe beef and lamb could cause cholesterol or heart problems..	1	2	3	4	5	6	7
4	Sheep and cattle should be treated in the same way as domestic animals…….	1	2	3	4	5	6	7
5	People have a right to eat beef and lamb……	1	2	3	4	5	6	7
6	Beef and lamb provides a wide range of vitamins and minerals…..	1	2	3	4	5	6	7
7	Sheep and cattle have the same right to life as humans……	1	2	3	4	5	6	7
8	Children need beef and lamb as part of a balanced diet……	1	2	3	4	5	6	7
9	The use of food additives in beef and lamb requires closer regulation.....	1	2	3	4	5	6	7
10	Sheep and cattle have the same feelings as domestic animals……	1	2	3	4	5	6	7
11	Most beef and lamb we buy in Australia today is lean ……	1	2	3	4	5	6	7
12	Beef and lamb is more nutritious than other meats….....	1	2	3	4	5	6	7
13	The way they rear the animals to produce beef and lamb bothers me……..	1	2	3	4	5	6	7
14	Sheep and cattle farming is environmentally sustainable…..……	1	2	3	4	5	6	7
15	Beef and lamb is an essential part of a healthy diet……	1	2	3	4	5	6	7
16	It bothers me that beef and lamb may contain traces of chemicals or hormones, used in rearing the animals……	1	2	3	4	5	6	7
17	Sheep and cattle are raised in a humane and animal friendly manner…….	1	2	3	4	5	6	7

Section G: Questions about your eating and shopping habits for lamb and beef

This section contains questions about your eating and shopping habits with regard to lamb and beef products. For each question, please **select** the number that most closely represents your situation or behaviour.

G1. For each of the following attributes, indicate its importance in your **choice of lamb and beef products.**

*To answer this question **select** the number on a scale from 1 to 7 that best indicates the level of importance you place on each attribute when purchasing lamb, where 1 = "very unimportant" and 7 = "very important"*

		Very Unimportant			Neither Important nor Unimportant			Very Important
1	Value……	1	2	3	4	5	6	7
2	Price per kilo of cut……..……..	1	2	3	4	5	6	7
3	Contains no hormones/antibiotics/artificial additives/preservatives…	1	2	3	4	5	6	7
4	Produced in Australia……..	1	2	3	4	5	6	7
5	Free-range method of production…….	1	2	3	4	5	6	7
6	Appearance/colour of meat……	1	2	3	4	5	6	7
7	Shelf life…….....	1	2	3	4	5	6	7
8	Consistent quality……..	1	2	3	4	5	6	7
9	Packaging/presentation ……	1	2	3	4	5	6	7
10	Produced with the humane treatment of animals……	1	2	3	4	5	6	7
11	Produced with concern for the environment……	1	2	3	4	5	6	7
12	Size of piece/s……	1	2	3	4	5	6	7
13	Cut/type of product……	1	2	3	4	5	6	7
14	Nutrient rich……	1	2	3	4	5	6	7
15	Leanness……..	1	2	3	4	5	6	7

16	Health indications such as Heart Foundation Tick……	1	2	3	4	5	6	7

Section H: Questions about your activities in relation to sheep and beef cattle farming and welfare

This section contains questions about your activities in relation to sheep and cattle farming and welfare. For each question, please **select** the option or **number** that most closely represents your situation or behaviour.

H1. Have you ever done any of the following activities to express your **dissatisfaction** with any aspect of **sheep and beef cattle farming**?

1 ☐ written a letter to a politician
2 ☐ called a radio talk back segment
3 ☐ attended a public rally or demonstration
4 ☐ signed a petition
5 ☐ donated money to animal welfare organisations
6 ☐ donated goods other than money to animal welfare organisations
7 ☐ volunteered your services to animal welfare organisations
8 ☐ spoken to colleagues, family members, or friends
9 ☐ written a letter to a newspaper
10 Other (write) _____

H2. Have you ever done any of the following activities to express your **support** of any aspect of **sheep and beef cattle farming**?

1 ☐ written a letter to a politician
2 ☐ called a radio talk back segment
3 ☐ attended a public rally or demonstration
4 ☐ signed a petition
5 ☐ donated money to animal welfare organisations
6 ☐ donated goods other than money to animal welfare organisations
7 ☐ volunteered your services to animal welfare organisations
8 ☐ spoken to colleagues, family members, or friends
9 ☐ written a letter to a newspaper
10 Other (write) _____

Thank you for completing this survey. Your contribution is most valuable to our research.

9.3 Appendix C - Record of Purchase for Point-of-Sale Consumers

Point of Sale Recruitment - Record of Purchases

ID:

P0S1. Details of Commercial Premises?

Type of store	Type of store
1 ☐ Supermarket	5 ☐ Delicatessen
2 ☐ Fresh food Market	6 ☐ Green grocer
3 ☐ Convenience Store	7 ☐ Take away food outlet
4 ☐ Butcher	8 ☐ Other (write) _____

POSB1. **Beef** produce purchased.

Type of beef product	Amount	Type of beef product	Amount
1 ☐ Mince	_____ gms	9 Other (write) _____	_____ gms
2 ☐ Diced	_____ gms	10 Other (write) _____	_____ gms
3 ☐ Scotch fillet	_____ gms	11 Other (write) _____	_____ gms
4 ☐ T-bone steak	_____ gms	12 Other (write) _____	_____ gms
5 ☐ Sirloin steak	_____ gms	13 Other (write) _____	_____ gms
6 ☐ Rib eye	_____ gms	14 Other (write) _____	_____ gms
7 ☐ Porterhouse steak	_____ gms	15 Other (write) _____	_____ gms
8 Other (write) _____	_____ gms	16 Other (write) _____	_____ gms

POSL1. **Lamb** purchased

	Size		
1 ☐ Lamb cutlets	_____ gms	4 Other (write) _____	_____ gms
2 ☐ Lamb chops	_____ gms	5 Other (write) _____	_____ gms
3 ☐ Leg lamb	_____ gms	6 Other (write) _____	_____ gms
		7 Other (write) _____	_____ gms
		8 Other (write) _____	_____ gms
		9 Other (write) _____	_____ gms
		10 Other (write) _____	_____ gms
		11 Other (write) _____	_____ gms

9.4 Appendix D - Principle Components Analysis

Data from 508 respondents were analysed using Principal Components Analysis (PCA) followed by a Varimax rotation to determine major 'themes' within the data. Since PCA derives groupings of variables through an analysis of the variance each item has in common with other items in a data set, the groupings (or components) are derived from the data itself and not by a pre-determined listing of single items. The following tables show the items that comprise each of the variables used to predict purchasing and community behaviours. (The number noted in the table reflects the relative weighting on the dimension.)

Importance of meeting welfare needs of livestock in general

Variables	Factor loadings
Freedom to roam	.795
Regular exercise	.792
Fresh air	.653
Social contact with animals of the same species	.645
Good nutrition	.588
Contact with offspring	.564

Importance of meeting health needs of livestock in general

Variables	Factor loadings
Vaccinations for animal health	.817
Medications for animal health	.783
Protection from predators	.654
Good waste/effluent	.611

Importance of meeting welfare needs of beef and sheep

Variables	Factor loadings
Fresh air	.882
Good nutrition	.807
Access to water	.767
Freedom to roam outdoors	.766
Regular exercise	.747
Social contact with animals of the same species	.662
Contact with offspring	.611
Shelter	.599

Importance of meeting health needs of beef and sheep

Variables	Factor loadings
Medications for health	.872
Vaccinations for health	.835
Outdoor housing	.663
Protection from predators	.520
Socials contact with animals of a different species	.465

Approval of husbandry procedures

Variables	Factor loadings
Mulesing	.481
Crutching	.402
Induced moulting	.277
Castration	.462
De-horning	.543
Pre-slaughter stunning	.248
Curfew	.354
Confinement	.436
Tail docking	.542
Beak trimming	.375
Feed-lotting animals	.432
Euthanasia of sick/dying/injured animals	.050
Clipping teeth	.377
Hot iron branding	.320
Live sheep and cattle sea transport	.355
Live sheep and cattle ground transport	.392

Beliefs about the positive attributes of meat in general

Variables	Factor loadings
Meat is part of a balanced diet	.863
It is appropriate to use animals to produce food for humans	.826
Meat is a healthy food	.795
The nourishment value in meat is high	.777
People have a right to eat met	.741
Meat is high in protein	.728

Beliefs about animal rights in general

Variables	Factor loadings
Farm animals have the same feelings as domestic animals	.770
Farm animals should be treated in the same way as domestic animals	.751
Farm animals have the same right to life as humans	.745
Free range foods taste better than intensively farmed foods	.438

Beliefs about cholesterol in meat

Variables	Factor loadings
Meat is high in cholesterol	.855
Meat is high in fat	.801

Attitude to animals as a source of food

Variables	Factor loadings
No animal should die so that I have food	.824
Farm animals have the same right to life as humans	.820
I would be happier if animals were not used as a source of food	.800
Humans should not eat meat	.768
It upsets me that farm animals sacrifice their life to produce my food	.750
Farm animals have the same rights as domestic pets	.685
The welfare of animals is a major concern to me	.499

Beliefs about carers' concerns for their animals

Variables	Factor loadings
Beef cattle farmers	.852
Sheep farmers	.846
Pig farmers	.824
Dairy cattle farmers	.822
Poultry meat farmers	.789
Poultry egg farmers	.750
Abattoir farmers	.667
Laboratory animal technical staff	.652
Medical researchers	.649
Agricultural researchers	.636
Horse trainers	.476
Psychological researchers	.464
Rodeo organisers and participants	.463
Veterinarians	.413
Owners of domestic pets	.312

Attitudes towards intensive farming practices

Variables	Factor loadings
Intensive poultry (chicken meat) farming	.876
Intensive pig farming	.865
Intensive egg farming	.832
Pigs raised in pens	.809
Artificial rearing of calves in pens	.786
Poultry housed I cages	.758
Livestock transported overseas	.722
Loss of young animals from livestock	.634
Use of animals in indoor farming	.609

Attitudes towards free-range farming practices

Variables	Factor loadings
Free range poultry farming	.925
Free range egg farming	.924
Free range pig farming	.917
Care of zoo animals	.810
Care of marine park animals	.661
Care of circus animals	.491

Attitude to land transport comfort for livestock

Variables	Factor loadings
Journey length	.908
Ventilation	.903
Road conditions	.890
Provisions of food and water	.887
Transfer of animals onto vehicles	.869
Space per animal	.862

Attitude to sea transport comfort for livestock

Variables	Factor loadings
Ventilation	.925
Journey length	.909
Space per animals	.907
Provision of food and water	.901
Sea conditions	.890
Transfer of animals onto ships	.845

Positive attitudes towards activism

Variables	Factor loadings
People should encourage their family and friends to be actively involved in the promotion of animal welfare	.876
It is important for me to be actively involved in the promotion of animal welfare	.864
All people should encourage their friends to support animal welfare causes	.772
People should be more public in their support for farm animal welfare	.771
It is important for me to be actively involved in the promotion of the welfare of native animals	.759
It is important for me that I sign a petition in support of animal welfare	.748
It is important for me to be actively involved in the promotion of the welfare of domestic pets	.736
People should lobby governments to improve the welfare of farm animals	.525
Governments should provide funding for industry to help them improve animal welfare outcomes	.490

Concerns about welfare

Variables	Factor loadings
The welfare of farm animals is an important consideration to me	.758
People should make the effort to buy food that is produced with regard to good animal welfare practices	.752
The welfare of domestic pets is an important consideration to me	.742
The welfare of native animals is an important consideration for me	.680

Opposition to welfare activism

Variables	Factor loadings
There are too many people actively involved in promoting native animal welfare	.766
Too many people are actively involved in promoting domestic pet welfare	.754
Governments should not provide funding for animal welfare lobby groups	.633
Animals rights activists are too radical in their protection of animals	.617
The welfare of farm animals is not an important consideration for my shopping choices	.466

Beliefs about the positive attributes of sheep/beef meat

Variables	Factor loadings
Beef and lamb is an essential part of a healthy diet	.818
Children need beef and lamb as part of a balanced diet	.799
I believe beef and lamb is healthy	.761
It is appropriate to use sheep and cattle to produce food for humans	.727
Beef and lamb provides a wide range of vitamins and minerals	.686
Sheep and cattle farming is environmentally sustainable	.674
People have a right to eat beef and lamb	.667
Sheep and cattle is raised in a humane and animal friendly manner	.576
Beef and lamb is more nutritious than other meats	.531
Most beef and lamb we buy in Australia today is lean	.474

Beliefs about sheep/beef rights

Variables	Factor loadings
Sheep and cattle have the same right to life as humans	.822
Sheep and cattle should be treated in the same way as domestic animals	.797
Sheep and cattle have the same feelings as domestic animals	.685
The way they rear the animals to produce beef and lamb bothers me	.559

Beliefs about sheep/beef rights

Variables	Factor loadings
Sheep and cattle have the same right to life as humans	.822
Sheep and cattle should be treated in the same way as domestic animals	.797

Beliefs about additives in beef

Variables	Factor loadings
The use of food additives in beef and lamb produce requires closer regulation	.760
It bothers me that beef and lamb may contain traces of chemicals or hormones, used in rearing animals	.708

Welfare attributes of food choice

Variables	Factor loadings
Contains no hormones	.852
Contains no antibiotics	.832
Contains no artificial additives or preservatives	.771
Free-range method of production	.669
Is not genetically modified	.652
Produced with the humane treatment of animals	.622
Produced in Australia	.519
Quality	.508

Clean/green aspects of food choice

Variables	Factor loadings
Size	.705
Packaging	.688
Appearance	.625
Shelf life	.573
Brand	.495
Produced locally	.488
Price	.395

Clean/green aspects of food choice beef/sheep

Variables	Factor loadings
Value	.745
Size of pieces	.716
Price per kilo of cut	.704
Cut/type of lamb product	.686
Shelf life	.613
Appearance/colour of meat	.607
Packaging/presentation	.605
Consistent quality	.601
Nutrient rich	.558
Leanness	.488
Health indications such as Heart Foundation Tick	.426

Welfare attributes of food choice beef/sheep

Variables	Factor loadings
Produced with the humane treatment of animals	.844
Produced with concern for the environment	.784
Free-range method of production	.780
Contains no hormones/antibiotics/artificial additives/preservatives	.699
Produced in Australia	.579

9.5 Appendix E – Community Attitudes and Knowledge

The distributions of approval and disapproval (1 = strongly disapprove, 7 = strongly approve) of livestock farming procedures were examined separately for those who were able to correctly identify the characteristics of each procedure compared with those who were unable to do so.

The findings showed that overall the mean level of approval was similar for those who correctly (M=3.72, SD=1.95) and incorrectly (M=3.69, SD=1.79) defined 'mulesing' (Figures I and II). For both groups, the most frequent response was 'neither approve nor disapprove' of the procedure, second to which a large proportion expressed 'strong disapproval'. Overall, some 39% of respondents showed some disapproval of mulesing compared to just 3% in the Roy Morgan survey.

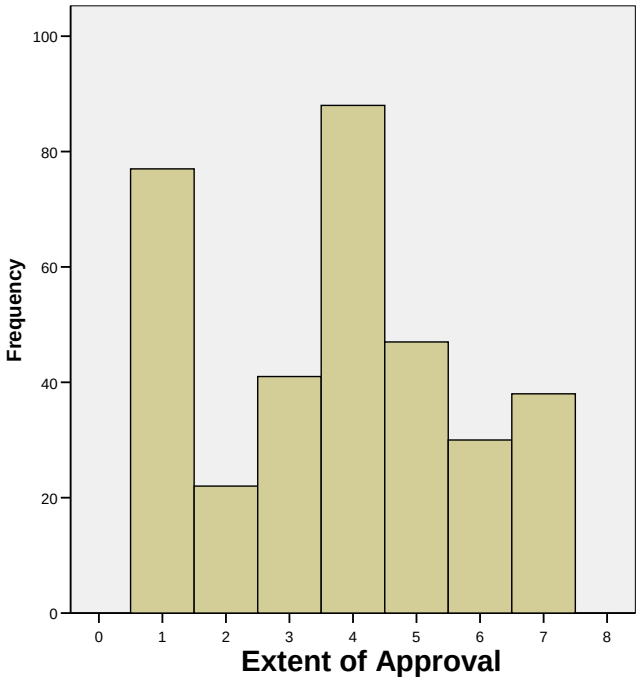


Figure I. Distribution of approval toward Mulesing of respondents with correct knowledge of Mulesing (1 – strongly disapprove, 7 – strongly approve).

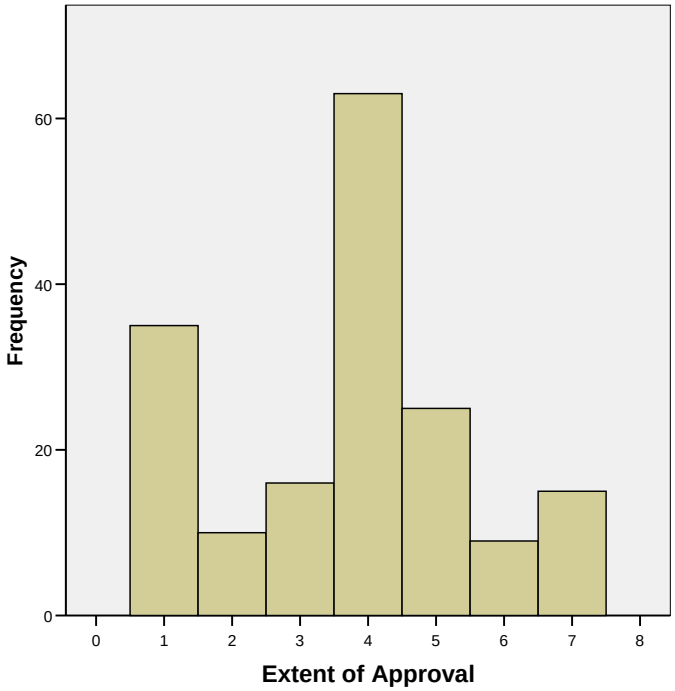


Figure II. Distribution of approval toward Mulesing of respondents with incorrect knowledge of Mulesing (1 – strongly disapprove, 7 – strongly approve)

The findings showed that overall, those who had correctly identified ‘crutching’ expressed strong approval for the procedure (M=5.19, SD=1.86) (Figure III). In contrast, the most frequent response of those who had incorrectly defined ‘crutching’ was ‘neither approve nor disapprove’ of the procedure (M=4.16, SD=1.88) (Figure IV). Overall, 23% of respondents showed some disapproval of crutching compared with 3% in the Roy Morgan survey.

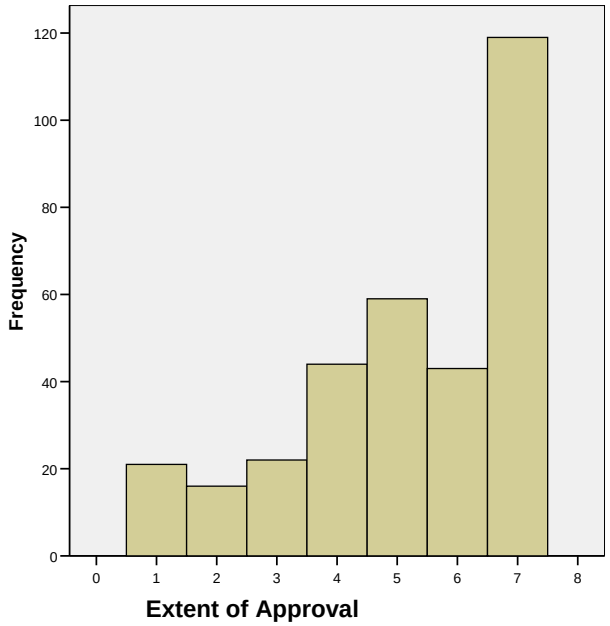


Figure III. Distribution of approval toward Crutching of respondents with correct knowledge of Crutching (1 – strongly disapprove, 7 – strongly approve)

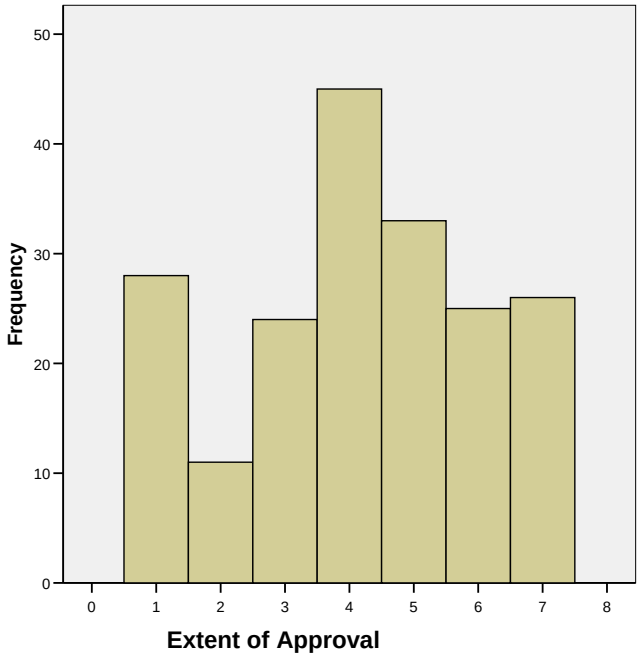


Figure IV. Distribution of approval toward Crutching of respondents with incorrect knowledge of Crutching (1 – strongly disapprove, 7 – strongly approve)

In general, those who had correctly defined ‘induced moulting’ expressed strong disapproval for the procedure (M=2.87, SD=1.61) (Figure V). Similarly, the most frequent response of those who had incorrectly defined this procedure ‘neither approved nor disapproved’ or expressed ‘strong disapproval’ for it (M=2.94, SD=1.53) (Figure VI). Overall, 60% of respondents showed some disapproval of this practice.

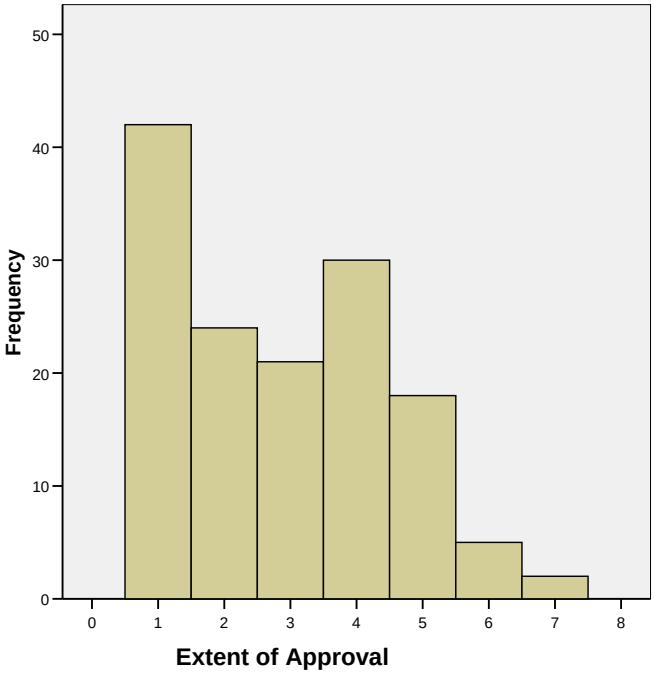


Figure V. Distribution of approval toward Induced moulting of respondents with correct knowledge of Induced moulting (1 – strongly disapprove, 7 – strongly approve)

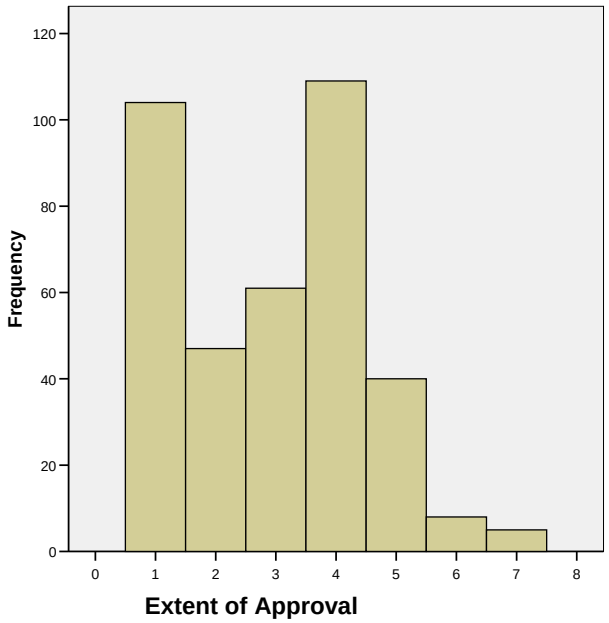


Figure VI. Distribution of approval toward Induced Moulting of respondents with incorrect knowledge of Induced moulting (1 – strongly disapprove, 7 – strongly approve)

The findings demonstrated that participants who correctly defined ‘de-horning’ were fairly evenly spread across the scale, with the most frequent response being ‘strong disapproval’ (M=3.96. SD=2.02) (Figure VII). Similarly, the largest proportion of those who incorrectly defined ‘de-horning’ ‘neither approved nor disapproved’ or expressed ‘strong disapproval’ (M=3.36, SD=1.81) (Figure VIII). Overall, 40% of respondents expressed some disapproval of dehorning compared with 10% in the Roy Morgan survey.

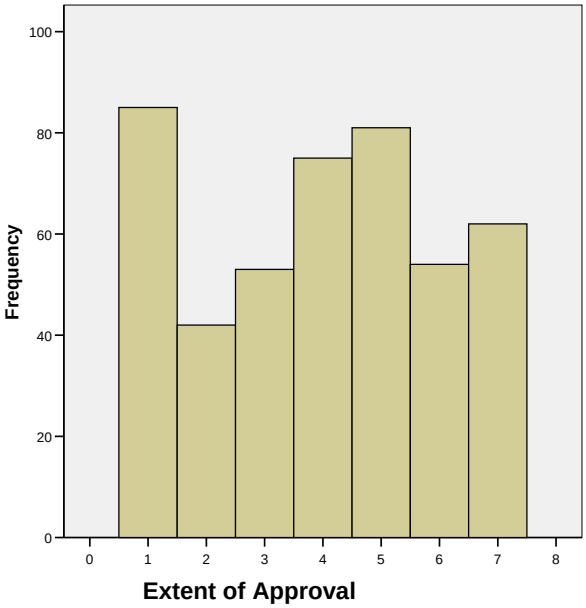


Figure VII. Distribution of approval toward De-horning of respondents with correct knowledge of De-horning (1 – strongly disapprove, 7 – strongly approve)

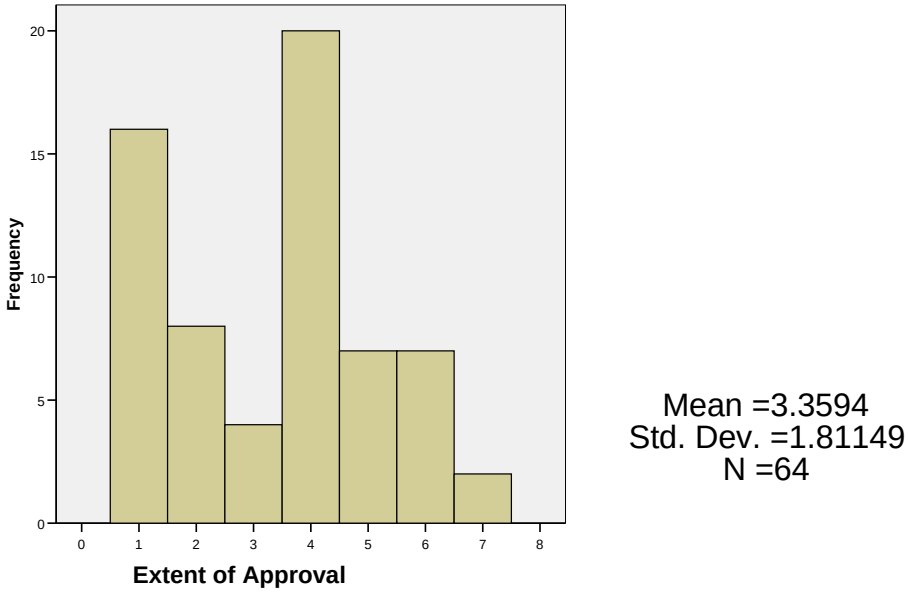
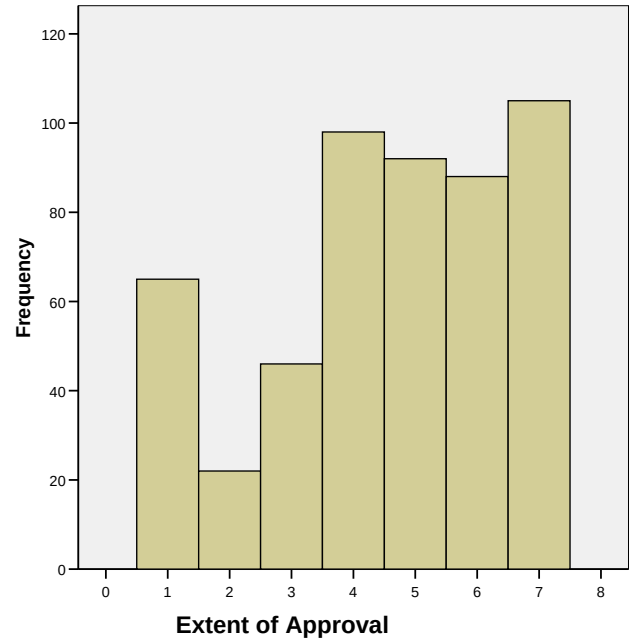


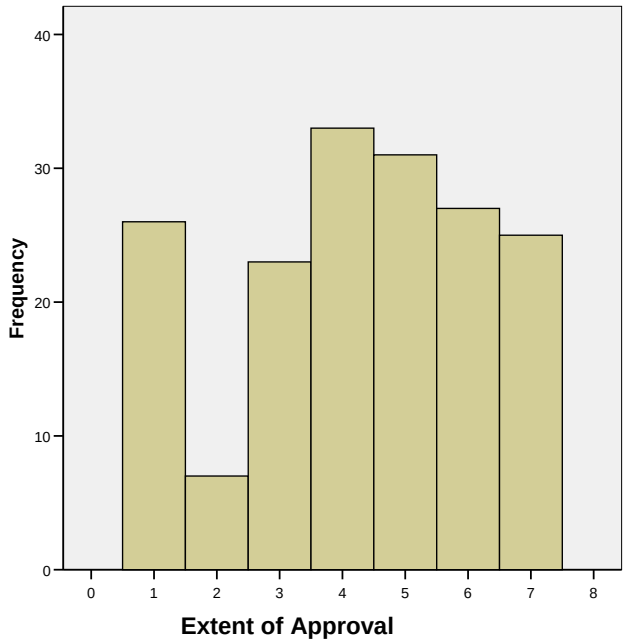
Figure VIII. Distribution of approval toward De-horning of respondents with incorrect knowledge of De-horning (1 – strongly disapprove, 7 – strongly approve)

In general, there was approval for 'pre-slaughter stunning' by those who correctly defined this procedure (M=4.58, SD=1.93) and by those who incorrectly defined it (M=4.26, SD=1.93) (Figures IX and X). Overall, only 26% of respondents showed some disapproval of this practice.



Mean =4.5775
Std. Dev. =1.93882
N =516

Figure IX. Distribution of approval toward Pre-slaughter stunning of respondents with correct knowledge of Pre-slaughter stunning (1 – strongly disapprove, 7 – strongly approve)



Mean =4.2616
Std. Dev. =1.93041
N =172

Figure X. Distribution of approval toward Pre-slaughter stunning of respondents with incorrect knowledge of Pre-slaughter stunning (1 – strongly disapprove, 7 – strongly approve)

In general, the majority of participants 'neither approved nor disapproved' of 'curfewing', whether they had correctly defined this procedure (M=3.82, SD=1.61) or incorrectly defined it (M=4.19, SD=1.59) (Figures XI and XI). As can be seen in the difference between the means, those who did not correctly define curfewing expressed somewhat higher approval for the procedure overall. In general, only 28% of respondents disapproved of this practice.

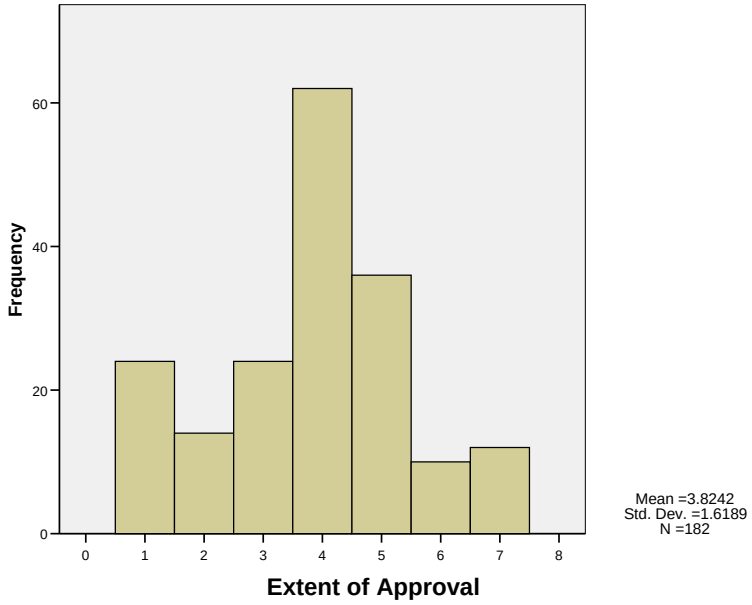


Figure XI. Distribution of approval toward Curfew of respondents with correct knowledge of Curfew (1 – strongly disapprove, 7 – strongly approve)

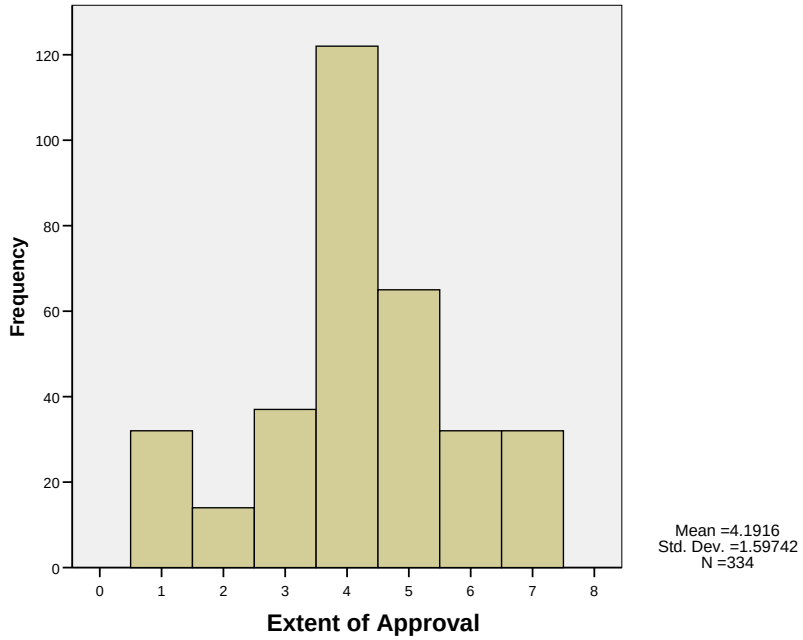


Figure XII. Distribution of approval toward Curfew of respondents with incorrect knowledge of Curfew (1 – strongly disapprove, 7 – strongly approve)

Overall, the distribution of scores was somewhat skewed to the left such that there was general disapproval for 'confinement' by those who correctly defined this procedure (M=3.25, SD=1.79) and by those who incorrectly defined it (M=3.34, SD=1.99) (Figures XIII and XIV). Overall, 53% of respondents showed some disapproval of this practice.

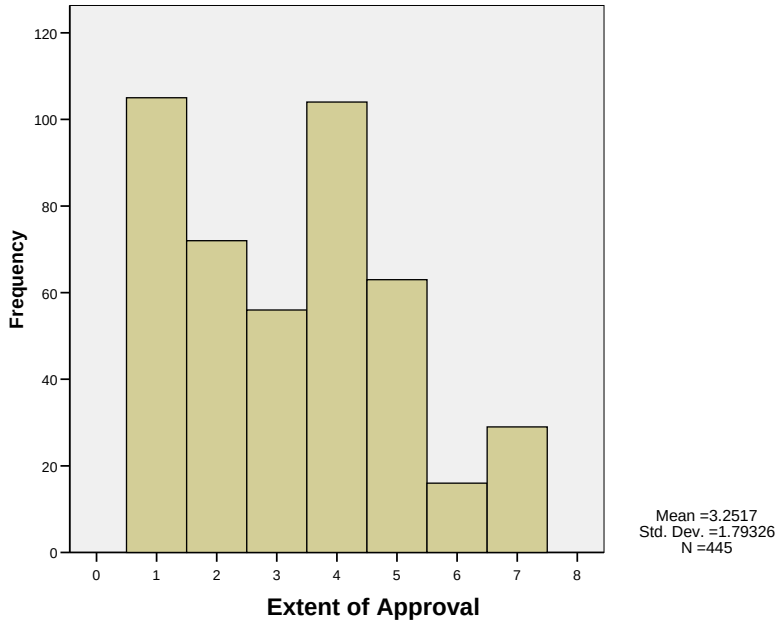


Figure XIII. Distribution of approval toward Confinement of respondents with correct knowledge of Confinement (1 – strongly disapprove, 7 – strongly approve)

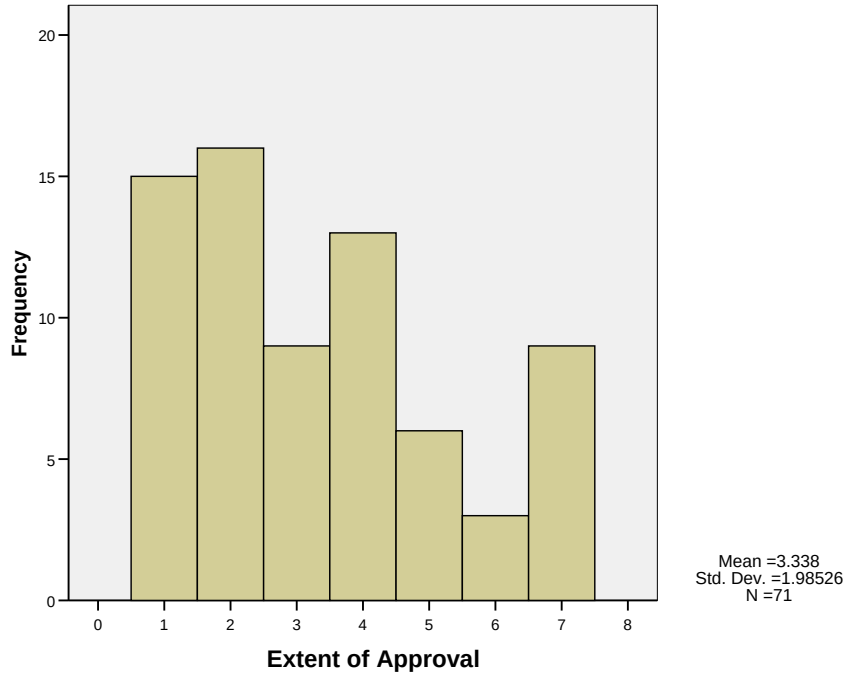


Figure XIV. Distribution of approval toward Confinement of respondents with incorrect knowledge of Confinement (1 – strongly disapprove, 7 – strongly approve)

The findings demonstrated that opinions regarding 'tail-docking' were fairly evenly spread across the scale. While the means for both groups were similar, interestingly, however, a higher proportion of those who correctly defined it expressed 'strong disapproval' (M=3.89. SD=2.02) whereas a higher proportion of those who incorrectly defined it expressed 'approval' (M=3.81. SD=1.96) (Figures XV and XVI). Overall, 42% of respondents should some disapproval of tail docking compared with 18% in the Roy Morgan survey.

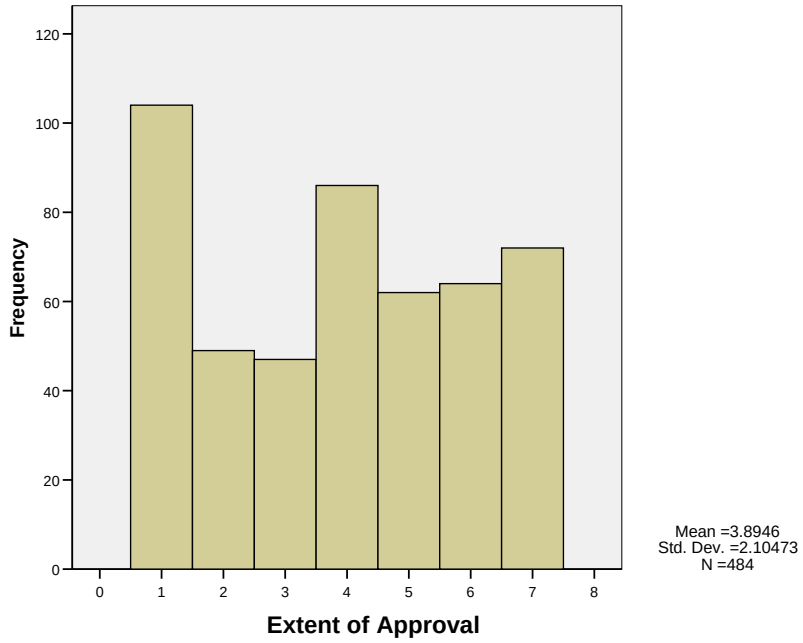


Figure XV. Distribution of approval toward Tail docking of respondents with correct knowledge of Tail docking (1 – strongly disapprove, 7 – strongly approve)

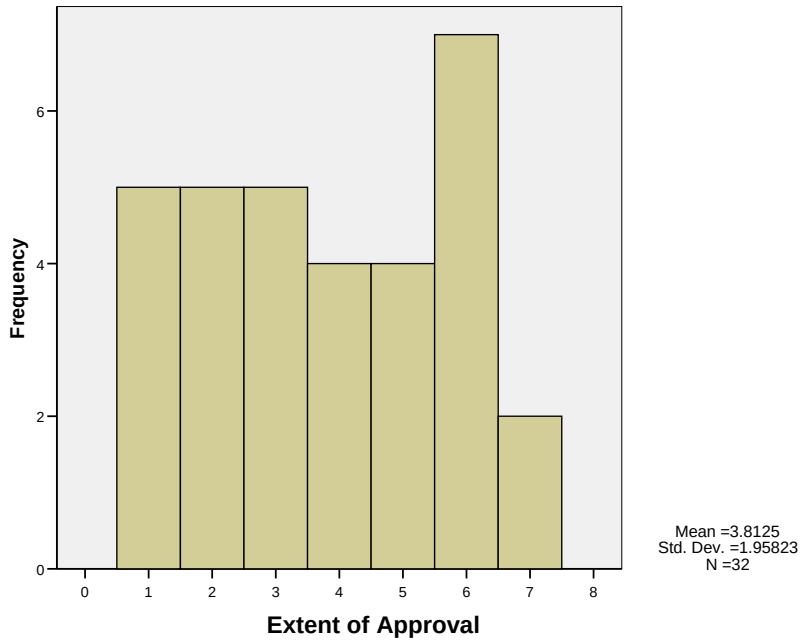


Figure XVI. Distribution of approval toward Tail docking of respondents with incorrect knowledge of Tail docking (1 – strongly disapprove, 7 – strongly approve)

The findings showed that the most frequent responses for those who had correctly defined 'feedlotting in animals' was to 'neither approve nor disapprove' or 'strongly disapprove' of the procedure (M=3.48, SD=1.85) (Figure XVII). Similarly, those who were unfamiliar with this procedure tended to 'neither approve nor disapprove' of it (M=3.86, SD=1.70) (Figure XVIII). Overall, 43% disapproved of feedlotting compared with 12% in the Roy Morgan survey.

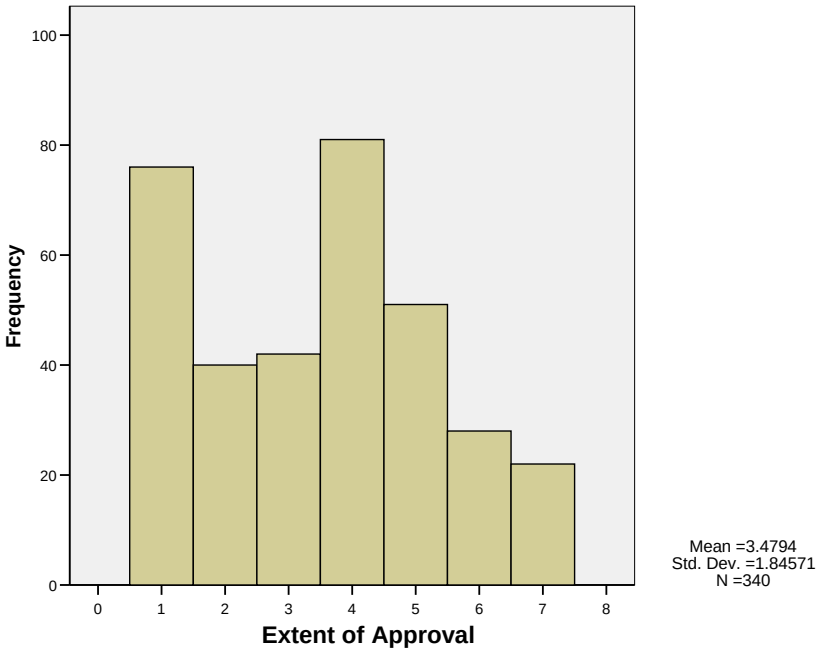


Figure XVII. Distribution of approval toward Feedlotting animals of respondents with correct knowledge of Feedlotting animals (1 – strongly disapprove, 7 – strongly approve)

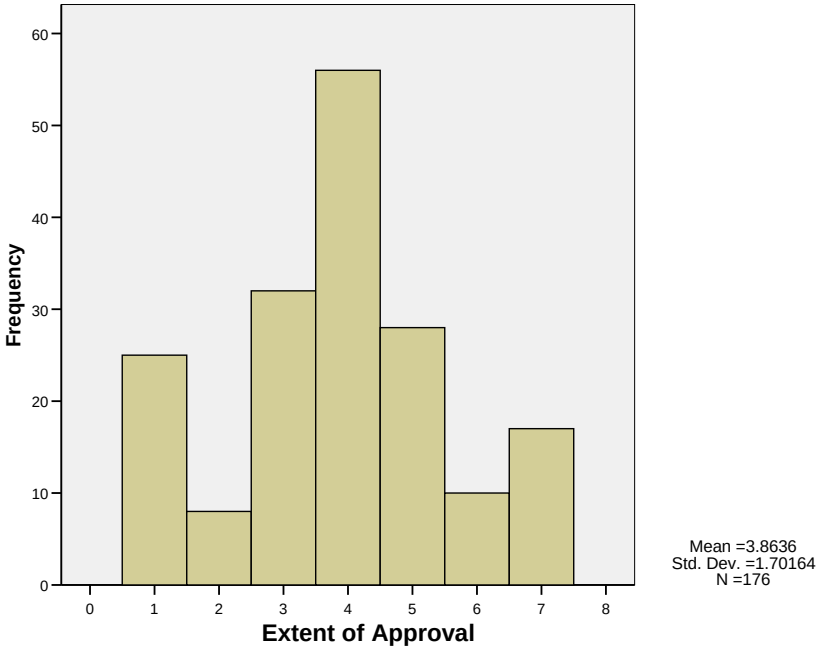


Figure XVIII. Distribution of approval toward Feedlotting animals of respondents with incorrect knowledge of Feedlotting animals (1 – strongly disapprove, 7 – strongly approve)

In general, the findings showed that participants who correctly defined 'beak trimming' expressed 'strong disapproval' for this procedure (M=2.75, SD=1.75) (Figure XIX). Similarly, most of those who did not correctly define this procedure expressed 'strong disapproval' or 'neither approved nor disapproved' (M=2.90, SD=1.68) (Figure XX). Overall, 63% of respondents disapproved of beak trimming compared with 13% in the Roy Morgan survey.

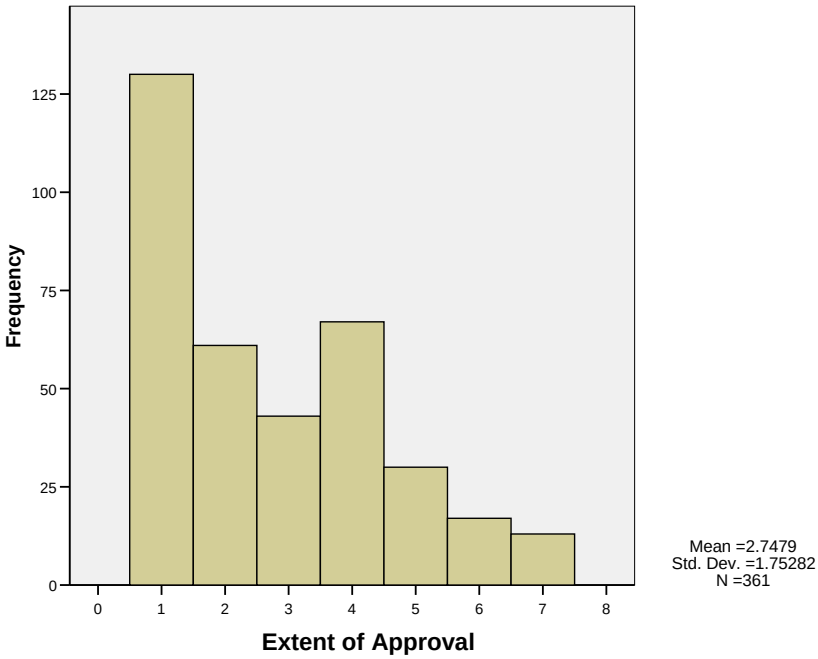


Figure XIX. Distribution of approval toward Beak trimming of respondents with correct knowledge of Beak trimming (1 – strongly disapprove, 7 – strongly approve)

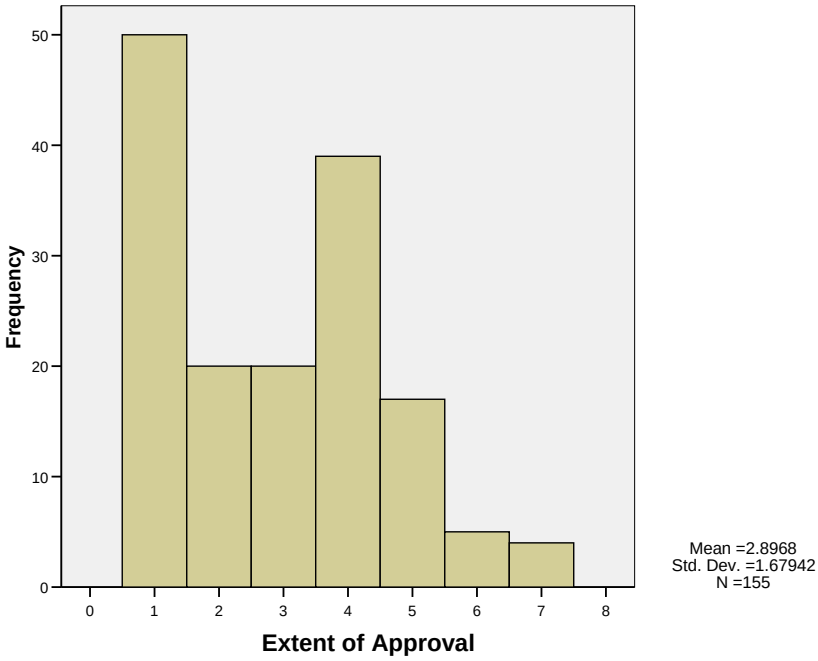


Figure XX. Distribution of approval toward Beak trimming of respondents with incorrect knowledge of Beak trimming (1 – strongly disapprove, 7 – strongly approve)

In relation to 'teeth clipping', overall the findings showed that the participants who correctly defined this procedure tended to disapprove of it (M=3.26, SD=1.70) (Figure XXI). While the overall means are similar, the most frequent response to this question from those who did not correctly identify the procedure was 'neither approve nor disapprove' of it (M=3.57, SD=1.79) (Figure XXII). Overall, 49% of respondents showed some disapproval of teeth clipping compared with 5% in the Roy Morgan survey.

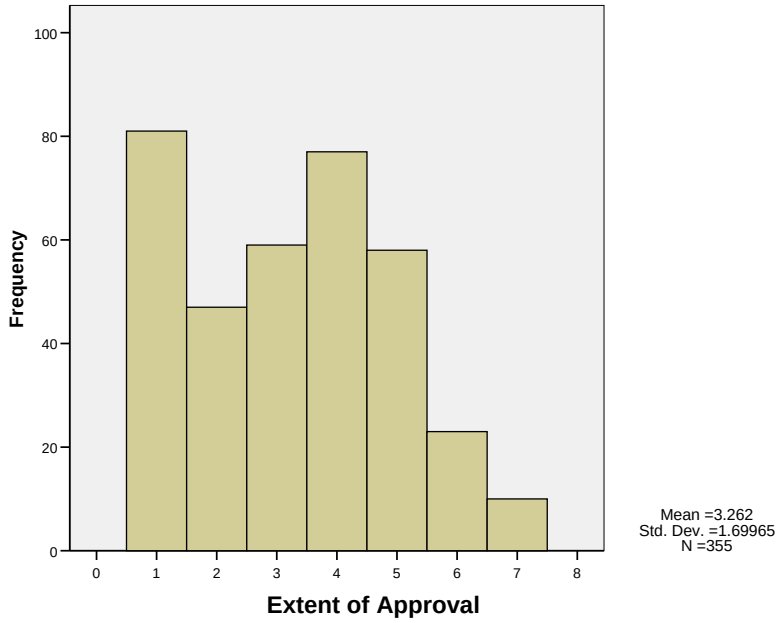


Figure XXI. Distribution of approval toward Clipping teeth of respondents with knowledge of Clipping teeth (1 – strongly disapprove, 7 – strongly approve)

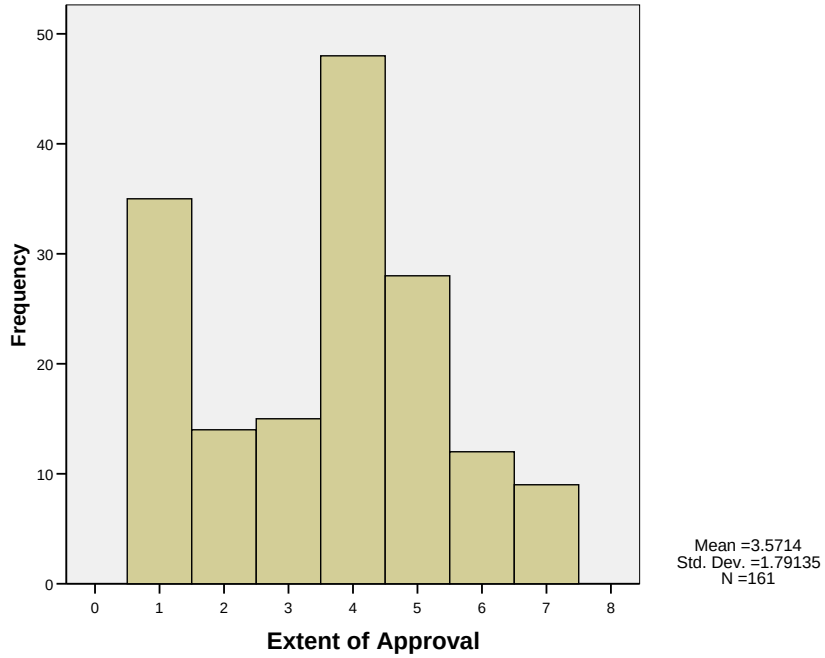


Figure XXII. Distribution of approval toward Clipping teeth of respondents with incorrect knowledge of Clipping teeth (1 – strongly disapprove, 7 – strongly approve)

The findings demonstrated that the opinions of participants who correctly defined 'hot iron branding' were fairly evenly spread across the scale, with the highest proportion of individuals expressing 'strong disapproval' for this procedure (M=3.65. SD=1.98) (Figure XXIII). Similarly, the most frequent response of those who incorrectly defined 'hot iron branding' was 'strong disapproval' towards the procedure (M=3.14, SD=2.03) (Figure XXIV). Forty seven percent of respondents disapproved of this practice compared with 17% in the Roy Morgan survey.

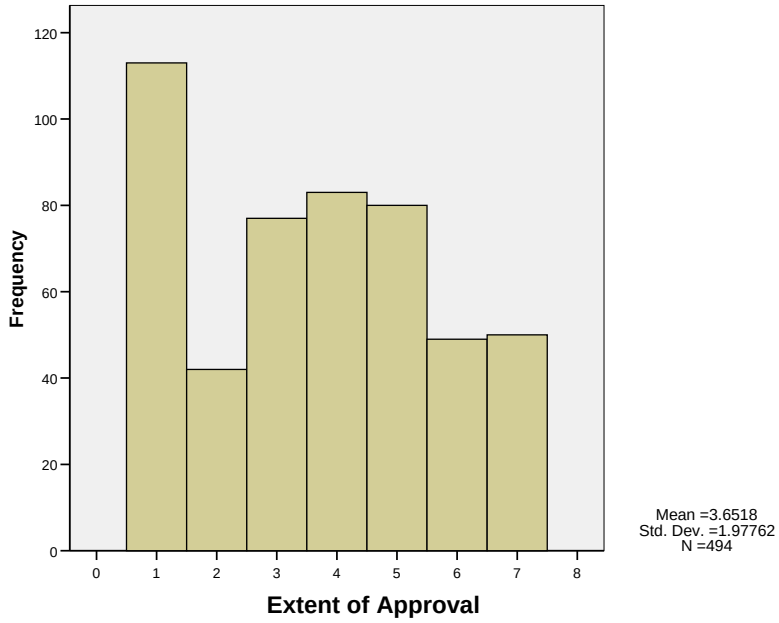


Figure XXIII. Distribution of approval toward Hot iron branding of respondents with correct knowledge of Hot iron branding (1 – strongly disapprove, 7 – strongly approve)

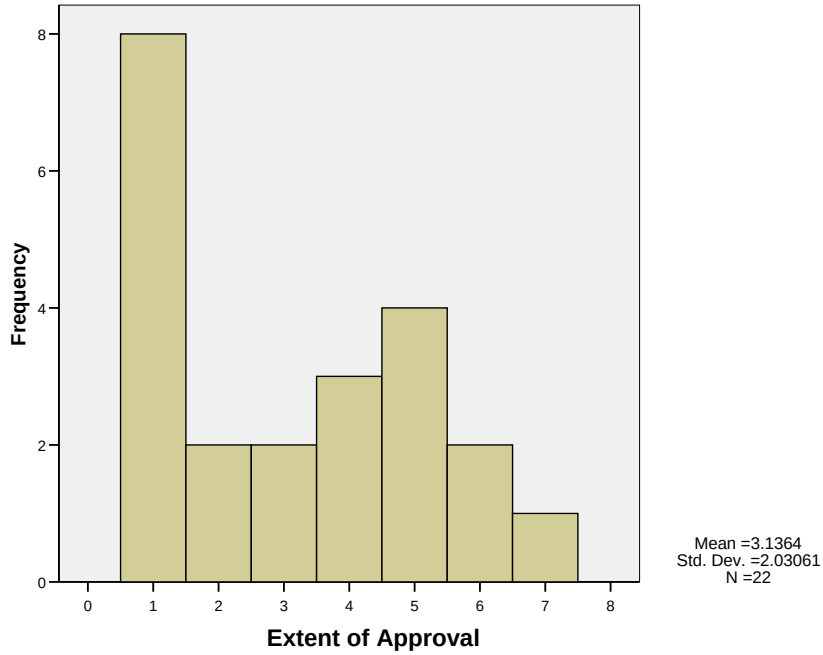


Figure XXIV. Distribution of approval toward Hot iron branding of respondents with incorrect knowledge of Hot iron branding (1 – strongly disapprove, 7 – strongly approve)

Discussion

In general, there is a negative response bias with respect to all of the husbandry procedures that were surveyed. This appears to be the case regardless of whether the respondents were able to correctly identify the nature of the procedure. It is also particularly noticeable that there was a trend for a substantial number of people to strongly disapprove of all the procedures (that is, scored “1”), again regardless of whether they were able to correctly identify that procedure. This suggests that, in the community, there is a negative view of husbandry practices in agriculture regardless of the nature of the procedure.

While it would be a difficult exercise to provide information to the community on many of these procedures in a way that cast them in a positive light, there may be a need to improve the overall image of the livestock industries in the community. This indicates that there is a need for the livestock industries to seek opportunities to provide education to the community from early school age onwards about food sources, best practice and the role of the livestock industries in providing economical and quality food for the community. Such a strategy is not without risk because of the credibility problems that arise when an industry overtly seeks to promote itself in a positive way, particularly when there is a negative perception in the community. Nevertheless, some of the materials that have been developed as resource materials for children in schools comprise good examples of ways in which this can be done. It may be that, for some practices that are prevalent in the livestock industries, public debate and dissemination of factual information may produce better long term industry outcomes than would defensive and reactive strategies to deal with public concern when it is expressed. From a research and development perspective, it would be possible to pilot a communications strategy in a fairly non-contentious area and to evaluate the outcomes in terms of changes to public perception.

Because there are generally minimal differences in the distribution of public approval or disapproval of most husbandry procedures regardless of whether an individual has knowledge of the procedure, it is unlikely that dissemination of information only about the procedure would be of any value. It is more likely that a communication strategy that improved the public image of the livestock industries would be effective.

9.6 Appendix F – Community Attitudes and Knowledge (continued)

As can be seen in Figure XXV, in relation to the mean level of concern for the welfare of animals under various conditions, participants expressed the lowest level of concern for free range egg farming, free range poultry farming and free-range pig farming. Each of the other conditions (eg. poultry housed in cages, care of circus animals, livestock transported overseas) attracted high levels of concern.

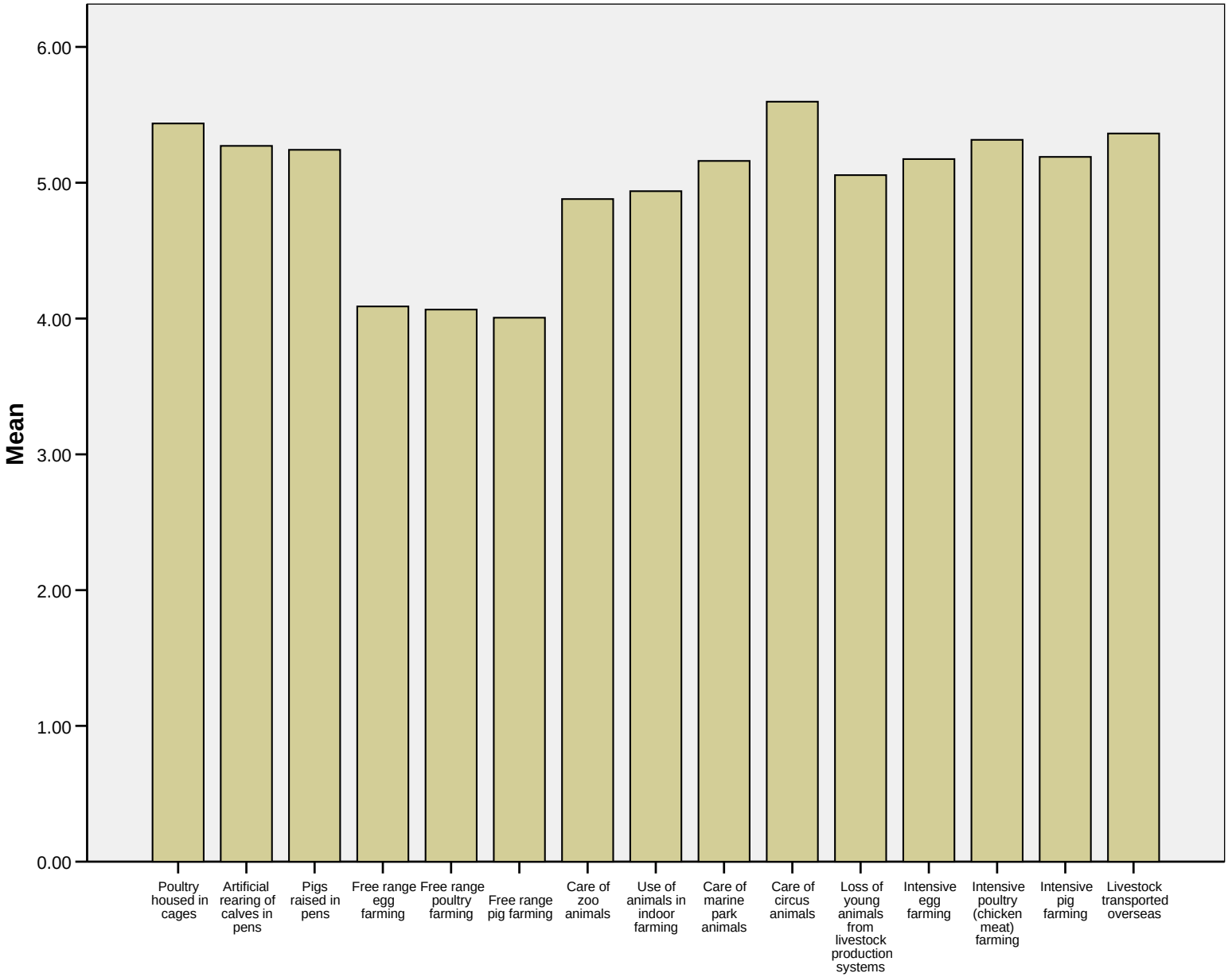


Figure XXV. Mean level of concern for the welfare of animals under the above conditions (1 – not concerned at all, 7 – very concerned)

Using a scale of 1 = extremely uncomfortable and 7 = extremely comfortable, participants rated the perceived level of comfort for land transported livestock in relation to various conditions (eg. space, ventilation, etc) (Figure XXVI). Overall, mean scores ranged between 2.9 and 3.7, indicating that participants perceive animals to be somewhat on the uncomfortable side of the scale. Further, the findings indicated that the lowest level of comfort was associated with the space afforded to each animal and the greatest level of comfort was associated with the provision of food and water.

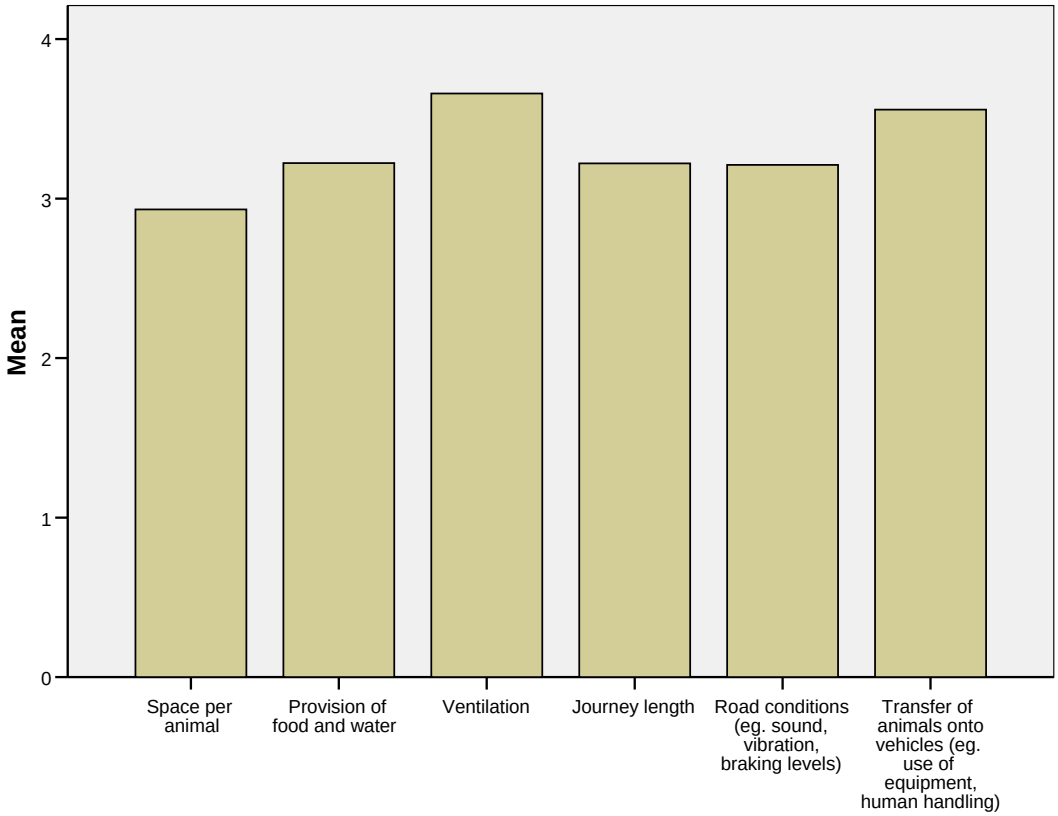


Figure XXVI. Distribution of perceived level of comfort for land transported livestock across different conditions (1 – extremely uncomfortable, 7 – extremely comfortable) all numbers are just above the average comfort level.

Using a scale of 1=extremely uncomfortable and 7= extremely comfortable, participants rated the perceived level of comfort for sea transported livestock in relation to various conditions (eg. space, ventilation etc) (Figure XXVII). Overall, mean scores ranged between 2.4 and 3.2, indicating that participants perceive animals to be somewhat uncomfortable in general. Further, the findings indicated that the lowest level of comfort was associated with journey length and the space afforded to each animal and the greatest level of comfort was associated with the provision of food and water.

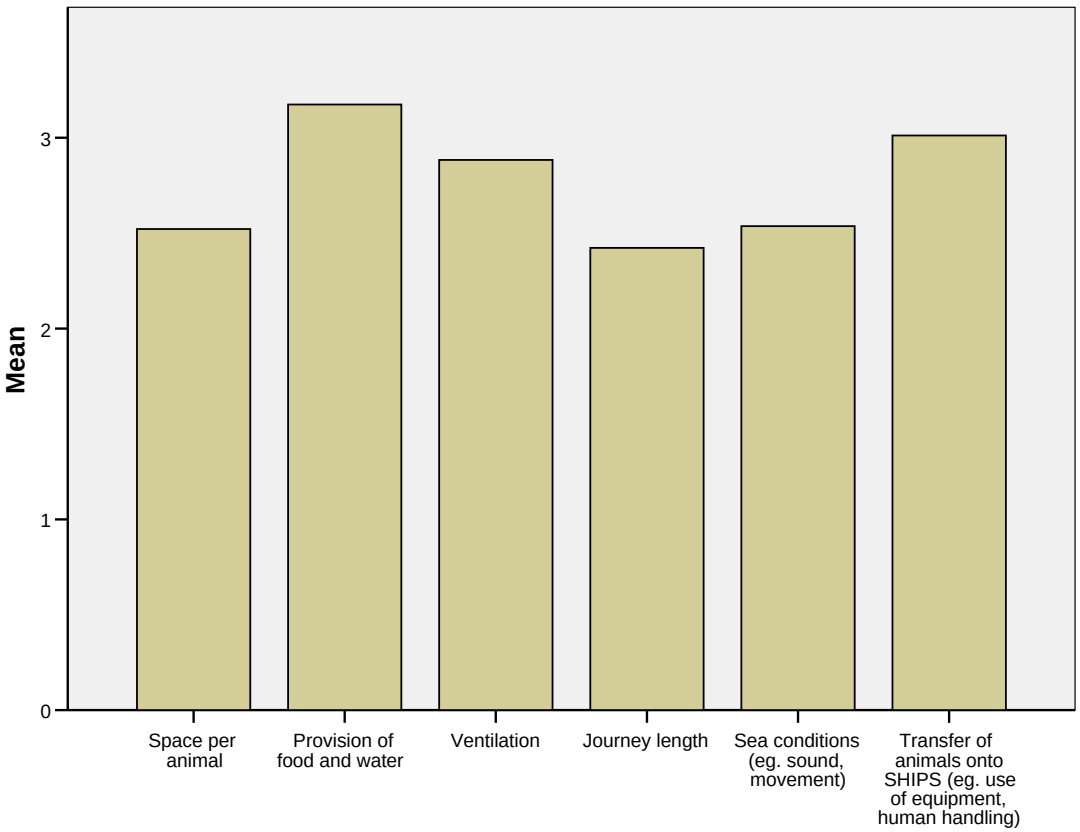


Figure XXVII. Distribution of perceived level of comfort for sea transported livestock across different conditions (1 – extremely uncomfortable, 7 – extremely comfortable)

Discussion

It is evident that public perceptions of the conditions under which animals are transported are not positive. The comparison of welfare concerns across a range of industries shows that livestock transport is a major issue, only just behind caged hens and care of circus animals and similar to pigs raised in pens and calves raised in pens. For both land and sea transport, all issues relating to comfort are perceived negatively, with issues such as space and journey length being of particular concern.

This suggests that research and development should focus on identifying the welfare status of livestock during transport with respect to each of the area's canvassed. The outcomes of such research will provide an opportunity either to alter industry practice to improve welfare, if welfare is compromised, or to inform the public on the positive welfare status of livestock under these conditions if the results support this.

If further research into public perceptions is undertaken, it would be important to ascertain the reasons for the public's concern about livestock transport. Concerns could include such things as a perceived prevalence of high or low temperatures, shortage of food and or water, insufficient bedding material, inappropriate handling, to name a few. Depending on which of these are prevalent, the appropriate actions in terms of physical improvements to transport facilities, appropriate education of livestock handlers and dissemination of information to the community can be taken.