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Caring for calves: Canadian public perspectives of calf handling methods during spring processing

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In North American beef production, handling and restraint of young calves is integral to animal welfare and management practices. This study used a mixed-method approach to gather public perceptions of three handling and restraint methods common in western Canada during spring processing (TT—tilt table, RW—roping and wrestling, and NF—roping and NordFork). Canadians (*n* = 551) participated in an online survey that included videos of each handling method to ascertain preferences and acceptability. Participants were given industry information about handling and restraint or generic information regarding hay as a control information statement within the topic of agriculture. The survey also collected information about knowledge of the beef industry, animal welfare, and empathy toward animals. The reasons for preferences for specific handling methods were described as the presence of a perceived positive attribute and the absence of a perceived negative for most preferred methods, and inversely when explaining the least preferred method. The main themes focused on the calf's experience, perception of handler actions, and pragmatic balancing of needs for a good life for the calf. All methods were rated as more acceptable for participants that ate meat consistently, knew more about the beef industry, and, to a lesser extent, if the individual had a lower animal empathy score. Acceptability was not affected by providing information about the practices; however, information did elicit more pragmatic reasoning. Most participants preferred TT over NF and RW (*p* < 0.001) and found TT more acceptable as well (*p* < 0.001). The TT was the most preferred method due to calf experience and human handling—notably the absence of dragging a calf, which was predominant in why participants selected NF or RW as their least preferred method. Consistency of themes highlights that regardless of method or acceptability, the fundamental expectation of the public focuses on the perception of the calf's quality of life, humane handling, and pragmatism, which are values aligned with beef sustainability initiatives.

KEYWORDS

beef production, public perspective, calf, welfare, restraint methods

1 Introduction

Various perspectives can influence societal expectations and regulations. People grouped as the generic term "public" often acts as a duality of both consumers and citizens, with consumers being a large target market for animal protein production. There has been an increase in the response to real or perceived public expectations influencing livestock production practices globally within the last 10 years. Much of this influence is exerted through dynamic discourse involving private corporations, scientists, animal advocacy organizations, and the government, resulting in campaigns, corporate animal welfare policies, and, in some jurisdictions, legislative requirements (Vanhonacker and Verbeke, 2014).

In North America, most beef cattle originate from extensive production systems (Greenwood, 2021). Calves have historically been handled in the spring for identification purposes (MacLachlan, 2006), creating an ideal time for integration of health and production technologies such as vaccinations, implants, and castrations. Over time, many unique ways of handling calves for these interventions have been developed and safe restraint of calves is the recommended best practice (National Farm Animal Care Council, 2013). Recently, Moggy et al. (2017) identified that the most common methods of calf restraint in Western Canada for calves 1–3 months old included squeeze chute or table, manual restraint with or without roping, and NordForks. At this time, it is unknown if these methods are also popular in other beef-producing regions of Canada. While all methods involve separation of the dam and calf for handing, restraint, and processing, each method varies in how this is achieved. The squeeze chute or table method involves calves needing to walk into a metal chute where they are restrained by chute sides closing and restricting the movement of their body, while a head gate closes around their necks. Additionally, when using the table method, the chute rotates 90°; thus, the side of the calf is perpendicular to the ground and accessible for processing procedures, effectively converting the chute into a table. For manual restraint, the force for restraint comes from two humans physically restricting the movement of the front and rear of the calf while the calf is stretched in lateral recumbency on the ground. NordForks represent a replacement of one of the humans on the front of the calf with a metal loop placed over the calf's neck and tied to a stake in the ground (Geisler Ranch & Livestock Center, n.d.; Winters, 2007). Both manual restraint and NordForks often involve the use of horses and riders in the early stage of handling to restrain calves by using a loop of rope tightened around the calf's hind legs to extract them from a group of animals and remove them to where the restraint can be applied. Despite their necessity for restraint for essential production practices, there is no research evaluating these methods from the perspectives of the animals, the people that use them, or the public.

Research on public perceptions of agriculture has shown that providing information can influence perceptions and trust (Coleman, 2010; Robbins et al., 2016; Tonkin et al., 2020; Coleman et al., 2022). Making meaningful connections in small moments over time and choosing to make something important vulnerable to the actions of others is the definition of building trust (Brown, 2018). Trust is rooted in expectations, with those

expectations relating to the trustor's perceptions and values, and is integral between consumers and those producing food (Tonkin et al., 2020), such as beef producers or allied industry members. A common theme in interacting with the public about animal production practices is the knowledge deficit model (Weary et al., 2016; Ventura et al., 2023) leading to educational efforts focused on providing information to improve agricultural literacy (Coleman, 2010; Reilly et al., 2022). Yet, providing information to educate any group of individuals without connecting to their perceptions and values is unlikely to succeed (Coleman, 2010; Weary and Von Keyserlingk, 2017). Thus, understanding public perspectives of calf handling and restraint methods and the role of information about these methods can support interactions to become opportunities for building trust and community knowledge.

Therefore, the objectives of the study were to evaluate the public preferences and perceptions of popular calf restraint and handling methods for processing beef calves in western Canada (TT, RW, and NF) and the influence of providing information about calf handling.

2 Materials and methods

This study was approved by the University of Calgary research ethics board (REB21-1566).

2.1 Participant recruitment

Participants were recruited using CloudResearch survey recruitment service (CloudResearch, Prime Research Solutions, London, England) to provide a demographic representative of the Canadian population based on age and province of residence. Members of the PrimePanels group (CloudResearch, n.d.), an opt-in approach to recruitment of targeted populations for surveys, within CloudResearch population were able to see the study length and incentive prior to selecting to enter the study. Upon entering, participants were directed to the online survey where they were required to review the consent form and either provide written consent, after which they were directed to the survey, or decline consent and exit the survey.

2.2 Survey tool

The survey was created using published survey tools for each section where available and utilizing heuristics from authors' experience in survey development and market research. Survey organization and wording were discussed between authors to achieve the study objectives while minimizing survey fatigue (e.g., placing demographic questions at the end of the survey). A pilot of the survey was conducted using 137 participants that opted-in for participation during a 1-day period of the survey being available on the CloudResearch PrimePanels platform. This allowed the evaluation of the responses received and functionality of the survey; however, it was deemed that no changes to the survey

were necessary to achieve the study objectives. The target sample size was based on previously published research regarding public perceptions of agricultural practices (Robbins et al., 2016; Ventura et al., 2013; Vigors, 2019).

The survey consisted of six sections: information statement, calf handling preferences, perceived and factual knowledge about the beef industry (Coleman et al., 2014), views of animal welfare (Proudfoot and Ventura, 2021), empathy toward animals (Paul and Podberscek, 2000), and demographics. Overall, there were 47 questions using six question styles: yes/no (4), sorting preference (1), multiple choice (9), five-point Likert scale (30), short answer (1), and long answer text (2). The survey took, on average, 15 min to complete. Language and flow of the survey tool are available in the Supplementary Materials. The sections of the survey, in the order they were asked, and the aim of each section are briefly described below.

2.2.1 Information statement

To evaluate the influence of information about handling and restraint on preferences and acceptability of methods, participants were randomly allotted to one of two information statements—information vs. control—similar to Robbins et al. (2016) after consenting to participation in the study. The information statement was created to be similar to publicly available statements from industry websites focused on public education through describing animal care practices in the North American beef industry but was not associated with any specific organization. The control statement was a generic statement about hay that remained aligned with the topic of agriculture and was of similar length and cognitive load required for reading. Both statements are available in the Supplementary Materials.

2.2.2 Calf handling preferences

To evaluate preferences of handling methods, this section of the survey focused six questions on the ranking acceptability of each method, overall preferences, and providing responses regarding their selection of the most and least preferred methods. Following the reading of the information statement, participants were asked to watch video clips of calf handling using tablet, RW, and NF techniques that were approximately 2 min each. These videos were captured in the same handling environment with the same handlers and type of cattle and were presented in random order to participants with no sound. Videos were filmed by a professional videographer under routine calf handling and restraint operations for calf processing during a study evaluating the animal response to the three methods of handling and restraint. All the staff members had 4+ years of experience with the handling methods, as well as completing animal handling and care training. To protect the identities of the staff, videos were embedded in the survey tool utilizing a remote hosting software that disabled screenshots or sharing of videos. As such, video clips are not provided in the Supplementary Materials for this paper; however, a detailed description of each handling method is provided.

2.2.2.1 Tilt table

From the indoor dirt holding pen, calves were individually moved through a narrow alley leading to a calf tilt table. Once the calf entered the tilt table and its head passed the head gate, the head gate was closed around the neck of the calf using a manual lever by a trained ranch staff member. The tilt table was then tipped 90° to the left, resulting in a lateral position, with the right side of the table being used to squeeze the calf. Following tipping, smaller panels on the top half of the table toward the rear of the calf were opened, and a rope was used to restrain one rear leg during castration. The tilt table remained tipped over for the duration of the processing event, and once all processing procedures were completed, the table was returned to its original upright position. Once the table was upright, the right side of the table was released from squeezing the calf and the head gate was opened, allowing the calf to exit the table. It was then moved to an outdoor post-processing pen by staff members on foot.

2.2.2.2 Roping and wrestling

From the group of calves in the grass corral, both hind feet of a calf were roped using a single loop around the pasterns by the ranch staff on horseback. If only one leg or a different part of the body (e.g., the head) was caught in the rope, the calf was allowed to escape the loop and another attempt was made to catch the calf. The calf was then dragged out of the grass corral and away from the other calves to the designated grass processing area. The calf was then manually restrained in a standardized lateral position with their left side on the ground by two trained staff members while processing took place. One staff member restrained the head and front leg against the ground in a semi-seated position. The other handler was seated on the ground at the rear of the calf and restrained the hind legs by placing their heel on the caudal aspect above the hock joint of the hind limb on the ground side of the calf and manually holding the distal aspect of the other leg in posterior extension. The calf was restrained on the ground for the duration of the processing event and was released upon completion of all processing procedures. Release involved coordination of the handlers releasing the head hold and hind legs, after which the calf was moved to the outdoor post-processing pen by staff members on foot.

2.2.2.3 Roping and NordForks

From the group of calves in the grass corral, calves were caught by rope as with RW. As the calf was being dragged, the head loop of the NordFork (dimensions: 71.1 × 30.5 × 15.2 cm; weight: 0.45 kg) was placed over their neck behind their ears with the handle placed along the spine of the calf. The NordFork was secured to a rubber inner tube tied to a metal stake that was secured into the ground. The calf was dragged by the roper until the rope between the NordFork and the pole was tight. Once this was done, the calf was tipped over and restrained in a standardized lateral position with their left side on the ground by the NordFork and rope while processing took place. The calf was restrained on the ground for the duration of the processing event and released upon completion of all processing procedures. All calves were restrained with the same

side of their body against the ground. Release involved coordination from the rider to loosen the tension of the rope around the calf's legs and another handler moving the handle of the NordFork forward over the calf's head to pull it off of the calf as it rose from being restrained, after which the calf was moved to the outdoor post-processing pen by staff members on foot.

After watching the videos, participants were asked to rank the acceptability of each method on a five-point Likert scale. At the end of the videos and ranking, participants were directed to a page with a photo of each handling method taken from the video previously viewed and asked to rank them in descending order of preference for the handling of calves. Participants were then asked open-ended questions about why they chose their most and least preferred handling method.

2.2.3 Factual knowledge of beef production

To assess factual knowledge of beef production, five questions were asked about common terminology, assigning one point for each correct answer. After answering the knowledge questions, participants were asked if they did their own research to answer the previous questions.

2.2.4 Views of animal welfare

To evaluate perspectives of animal welfare, participants were asked a single question, using the model of biological function, mental state, and natural living (Proudfoot and Ventura, 2021).

2.2.5 Empathy toward animals

The Animal Empathy Scale (AES), 22 questions developed by Paul and Podberscek (2000), was used with an additional 5 questions from studies specifically addressing empathy toward livestock or cattle for use in another study. These studies used language specific to cattle or farm animals and targeted empathy-related elements of empathetic concern (Norring et al., 2014), perspective taking (Norring et al., 2014), and connectedness (Leon et al., 2020; Minarchek et al., 2021).

2.2.6 Demographics

The final section of the survey included five questions related to the demographic information of participants to ascertain the sample population being representative of national population statistics for Canada. These questions included province of current residence, if meat is a part of their regular diet, highest level of education, year of birth, and income level.

Disclosure of the use of two different information statements, but not their specific statement group, was provided at the end of the survey, and participants could withdraw their consent at that point.

2.3 Analysis

Data collection was carried out in December 2021 through January 2022, using CloudResearch recruitment of 1,143 participants for an online survey tool hosted using the Qualtrics survey platform. Participants were compensated based on their agreement with CloudResearch for surveys of similar design and length. Of the initial 1,143 participants, 137 were recruited early as a pilot test of functionality, 138 were incomplete, 27 did not provide consent (8 of whom withdrew consent after disclosure of the reading treatments), 39 had technical issues, and 79 had data quality issues. Data quality filters included straight lining Likert scale questions, speed checks (less than 5 min, the minimum time required to watch videos), and nonsense long form answers. Because of a technical issue with the platform used to host the videos, an additional 172 surveys were removed. The final dataset consisted of 551 respondents for analysis.

Animal empathy score was calculated according to the methods used by Paul and Podberscek (2000). Beef knowledge score was calculated by determining the percentage of the five beef knowledge questions that were answered correctly.

Quantitative data were analyzed using R (R Core Team, 2023). Spearman rank correlations were used to evaluate the relationship between acceptability of a method and preference rankings. Ordered logistic regression models were used to evaluate the relationship between fixed effects of information statement, beef knowledge score, animal empathy score, meat consumption, and the factor most important to animal welfare on the acceptability ranking of each handling method. As the interest of the study was the direct influence of each fixed effect, no interactions were analyzed.

A thematic analysis process based on the methods discussed by Braun et al. (2022) and Braun and Clarke (2006) was used to determine main concepts within the reasons for selecting their most and least preferred method. The process was conducted for each question of the reason for the most/least preferred method selection independent of all other survey data. The reasons for the most preferred method selection were analyzed first, following the flow of the survey tool. All responses to a question were initially read through for familiarization and developing ideas of potential concept codes using a mix of semantic analysis for very literal language (e.g., "violence" and "harmful") as well as latent analysis (e.g., "gentle with calves" relating to the concept of humane handling). After reflection on potential codes, a list of codes was created and used to assign codes to responses, with some codes developing and being modified throughout this stage. Then, the results were reflected upon for consistency and relation to underlying concepts. Cluster analysis of codes by word similarity and co-coding matrices was used in NVivio Version 14 (Lumivero, 2023) to help in the reflection on connection between codes and inherent semantic similarities between codes. An inductive method was then used to conceptualize from codes to general themes. Thematic maps of candidate themes and relations were created by reviewing codes and responses within codes. Thematic maps with representative quotes from participants for each theme and related coding for each theme were sent to each author for individual reflection. After individual reflection, authors discussed as a group to compare perceptions of themes and their relations, finalizing the thematic maps. At a subsequent meeting, two authors (CA and CG) discussed theme nomenclature that captured the core concept of participant

responses within a theme, which were then reviewed by the third author (EP) and are presented with explanation of the theme in the results.

3 Results

3.1 Demographics

The demographics of respondents were similar to the Canadian population (Table 1) based on recent Canadian survey data on age (Statistics Canada, 2022), geography (Statistics Canada, 2023a), and income levels (Statistics Canada, 2023b).

3.2 Quantitative results

3.2.1 Acceptability ratings of calf handling methods

More respondents selected TT as an acceptable method than NF and RW [χ^2 (8, N = 551) = 153.13, p < 0.001] (see Figure 1).

3.2.2 Preference ranking of calf handling methods

More respondents selected TT as a preferred method than NF and RW, with RW more often being the least preferred method and NF in the middle [χ^2 (4, N = 551) = 587.67, p < 0.0001] (see Figure 2).

TABLE 1   Demographics of respondents (n = 551).

Demographic	Response categories	Number of respondents	Percentage of survey responses (%)	Percentage of the total Canadian population (%)
Age[1]	18–24	39	7	8
	25–34	79	14	18
	35–44	94	17	17
	45–54	86	16	16
	55+	253	46	41
Province of residence[2]	NB, NS, PEI, NF	35	6	6
	PQ	103	19	23
	Ont	230	42	39
	AB, SK, MB	104	19	18
	BC	79	14	14
	YK, NWT, NVT	0	0	0
Income bracket[3]	<$20,000	83	15%	28%
	$20,000–$40,000	147	27	25
	$40,000–$60,000	113	21	19
	$60,000–$100,000	124	23	18
	>$100,000	83	15	9
Education level	College degree or equivalent	298	54	
	High school	172	31	
	Masters	63	11	
	PhD	7	1	
	Other[4]	11	2	
Meat consumption	No	74	13	
	Yes	477	87	

[1](Statistics Canada, 2022).
[2](Statistics Canada, 2023a). NB, New Brunswick; NS, Nova Scotia; PEI, Prince Edward Island; NF, Newfoundland; PQ, Quebec; Ont, Ontario; AB, Alberta; SK, Saskatchewan; MB, Manitoba; BC, British Columbia; YK, Yukon; NWT, North West Territories; NVT, Nunavut.
[3](Statistics Canada, 2023b). Values represent Canadian dollars. One respondent chose not to answer this question, but the remainder of the survey was complete.
[4]Other responses included some high school, trades, and associate diplomas.

Distribution of acceptability rankings for handling methods.
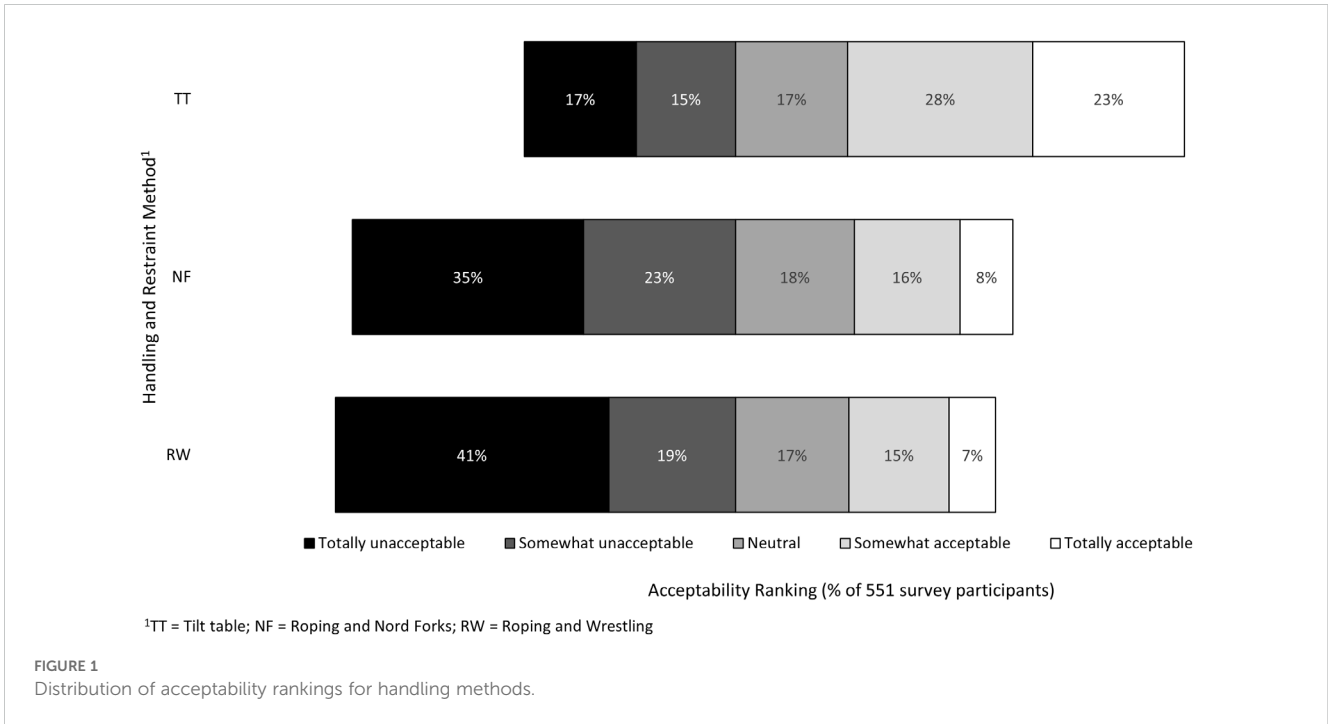
3.2.3 Relationship between acceptability rating and preference ranking

Acceptability and preference ranking were significantly positively correlated within each method, although the relationship was weak particularly for NF and RW (r_s = 0.12, 0.11, and 0.32 for NF, RW, and TT, respectively; p < 0.01 for each method).

3.2.4 Knowledge of the Canadian beef industry

Most respondents (83%) reported that they did not do their own research for any of the questions regarding their knowledge of Canadian beef industry terminology. Nine percent of the

respondents answered one or no questions correctly, 63% of respondents answered two or three questions correctly, and 28% answered four or more questions correctly. The questions that posed the most challenge to respondents was regarding the meaning of "Belly Dump" (34% answered correctly) and "Backgrounding" (25% answered correctly).

3.2.5 Views toward animals

Most respondents (65%) selected natural living as the factor considered most important to animal welfare, followed by mental state (17%), undecided (12%), and biological functioning (7%). The

Distribution of preference rankings for handling methods.
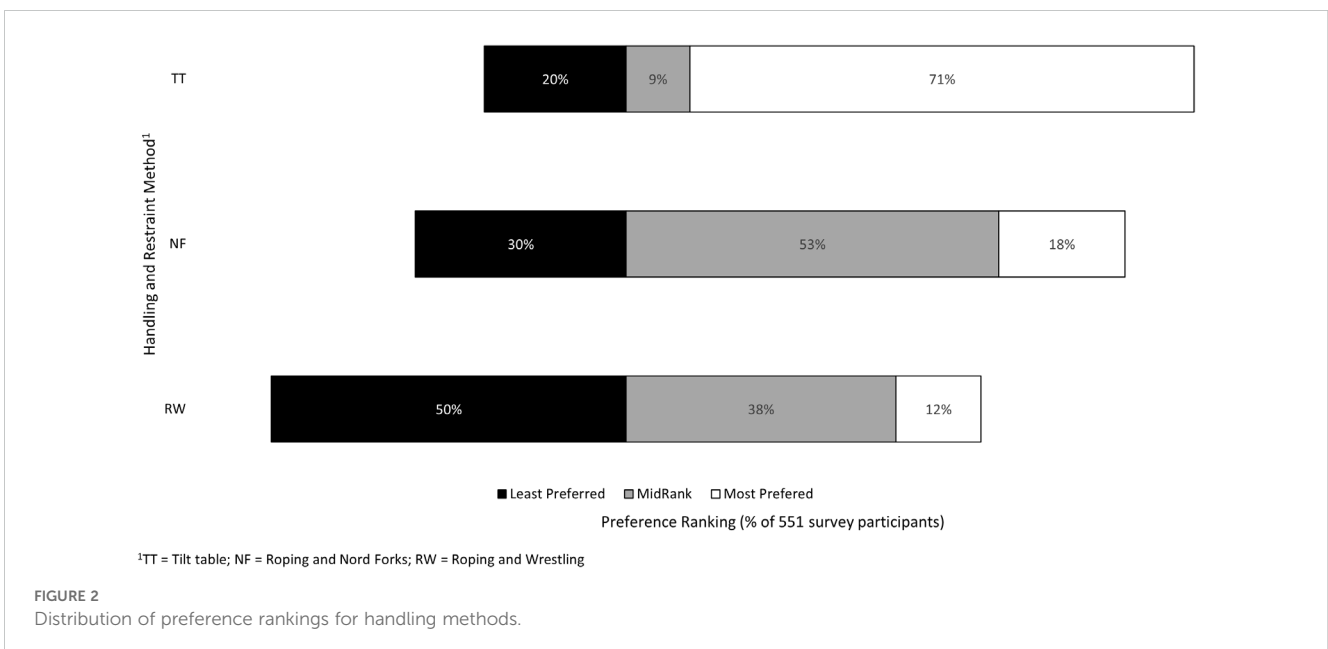
total AES could range from 27 (all low empathy responses) to 243 (all high empathy responses), and participants' scores ranged from 115 to 183.

3.2.6 Respondent factors influencing acceptability rating

For all methods, individuals were more likely to rate the method as acceptable with higher scores of beef industry knowledge, lower AES, and if they responded "Yes" to consuming meat as a part of their diet (Table 2). The magnitude of the increase in the odds of rating a method as acceptable with the increase in AES was low compared to the effect of increasing knowledge of the beef industry or meat consumption. For all methods, there was no effect of information statements or what factors the individual rated as most important to animal welfare.

3.3 Qualitative results

3.3.1 General themes in preference ranking reasoning

Themes in reasoning for the most preferred method were discussed in context of the absence of a perceived negative or presence of a perceived positive aspect (Figure 3). For the least preferred method (Figure 4), the inverse was found, in that reasoning was most often discussed as the presence of perceived negative aspects and the absence of perceived positive aspects. The consistency of themes across reasoning for the most and least preferred methods indicates that similar factors were considered when evaluating the different calf handling methods, which likely relates to fundamental expectations regarding animals (Tonkin et al., 2020). The predominant themes will be presented, followed by notable concepts and interesting individual statements.

3.3.2 Through the eyes of the calf: is it a good life?

A predominant theme in reasoning for preferences was that people were trying to evaluate how the calf experienced the handling methods, and if there were factors present or absent that related to a good life for the calves. A good life for animals is often considered a balance of having positive experiences and minimizing negative experiences (Fraser et al., 1997; Keeling et al., 2021; Beausoleil et al., 2023). The experiences people evaluated crossed both the mental and physical domains of animal welfare (Mellor et al., 2020). For example, positive experiences made mention of the calves being calm, comfortable, or resilient in their response to handling and restraint (e.g., "As each of the treatments were applied, the animal seemed more tolerant of each application. After the completion and release, the animal seems to casually walk away"; "The calf is nice and calm and doesn't seem to be in discomfort"). Negative experiences mentioned aspects such as pain, suffering, fear, upset, injury, and/or harm ("The poor calf is definitely stressed and scared! But not physically hurt…"; "It must be quite scary and painful for the calf to be treated in this manner"). The presence of positive experiences and/or the absence

of negative experience was a reason to prefer a method, while inversely, the presence of negative experience or the absence of positive experience was a reason to prefer a method as the least.

3.3.3 Rough and tough, do not care enough: human action matters

Another major theme across reasoning for preference related to how people perceived the actions of the handlers. Negative perceptions of handling were that methods used were rough, violent, cruel, and indicated a lack of care or compassion for the calves by the handlers ("Why is it so violent? They could not do it more softly?"; "It is violent and shows no regard for the care and wellbeing of the animal"). Specifically, within negative perceptions, the practice of handling by ropes to drag calves was mentioned ("There is nothing acceptable about dragging a poor calf by its legs"; "Dragging a defenseless animal is cruel although may be required"). The perception that these negative handling characteristics were present or absent was reasoning for least or most preferred selections, respectively. Alternatively, people mentioned actions of handlers as being humane, calm, and/or gentle ("Seems the most humane and as comfortable as the animal can be"; "Seems gentler, calf does not appear to be too distressed after procedure"), indicating a perception of positive handling within a method, with the presence or absence being in the most and least preferred selections, respectively.

3.3.4 Life has its ups and downs: balancing good outcomes as the end goal

Some respondents highlighted a consideration of the importance of the handling and restraint to achieving good health and safety outcomes for both humans and animals. These responses indicated a pragmatic approach to evaluating calf handling, featuring a mix of focus on human or animal needs, balancing them together, and trade-offs. For example, one respondent mentioned "totally built for the ease of the workers … no thought for the calf's mental or physical welfare" as a reasoning for preferring a method as the least, while another respondent mentioned "to make sure animals are safe, recorded for health concerns, and given medical attention that is as quick and painless as possible" as a reason for the most preferred method. Within these types of responses, some questioned the necessity of a method in reasoning for the least preferred methods, often referencing either the whole process or amount of force being unnecessary. While potentially a combination or interaction between the other themes of a good life for the calf and how rough and tough a method was perceived to be, this theme represents a distinct mindfulness connected to the purpose of the method, the calf, and the human labor that touched on concepts related to One Welfare (Pinillos et al., 2016; McBride and Baugh, 2022) and sustainability approaches to assessing animal production practices.

3.3.5 My big fat zero

Although not predominant within the dataset, this theme represents a distinct cluster in responses that were strongly emotional in their reasoning, particularly for their most preferred method. These respondents chose to respond to the questions of

TABLE 2 Odds ratios by handling method for significant factors affecting acceptability rating.

	NordFork				Wrestling				Tilt table			
	OR	Low CI (2.5%)	Upper CI (97.5%)	p	OR	Low CI (2.5%)	Upper CI (97.5%)	p	OR	Low CI (2.5%)	Upper CI (97.5%)	p
Beef knowledge score	2.26	1.07	4.82	0.03	3.12	1.48	6.84	0.03	5.22	2.52	10.89	<0.001
Animal empathy score	0.95	0.94	0.96	<0.001	0.95	0.93	0.96	<0.01	0.97	0.96	0.98	<0.001
Meat consumption[1]	2.18	1.35	3.58	0.001	1.81	1.12	2.98	0.01	2.77	1.78	4.36	<0.001

[1]Odds ratio is the increase in acceptability ranking of those responding "Yes" to consuming meat as part of their regular diet.

ranking the most and least preferred method; however, they indicated that they perceived all methods to be negative and that they selected the "best of the worst" for their most preferred method or "worst of the worst" in the case of selecting their least preferred methods. Negative experience of the calf or negative human actions were sometimes cited, although these responses more typically had a more generalized perception of the whole process (e.g., "all are equally horrible"). The respondent that exemplified this theme stated in their reasoning for selecting their most preferred method that "I had no choice but to rank them! I would give each of them a big fat zero my heart hurt every second watching them treat calves like that! So horrible!"

3.3.6 Notable concepts

There was a small number of respondents (<5%) that connected their reasoning to concepts of naturalness or tradition. Naturalness

in reasoning for the most preferred cited the outside environment. Inversely, for the least preferred, naturalness was cited as a dislike of calves not being in their natural outside environment or the presence of machines. A more traditional and natural method was seen as a reason for selecting it as their most preferred method, but interestingly, a traditional method was also seen as a reason to be least preferred as it was perceived to be outdated, "old school", or that there are "more recent technologies to accomplish the task at hand". Some respondents also indicated a desire to know more about what was being done to the calves to evaluate their selection, whether selecting their most or least preferred method.

Across responses, there were a few respondents that stood out in mentioning factors that influenced their reasoning. Two respondents mentioned either Temple Grandin teachings on squeeze restraint methods or watching vet shows as influencing their reasoning for selecting their most preferred method. In
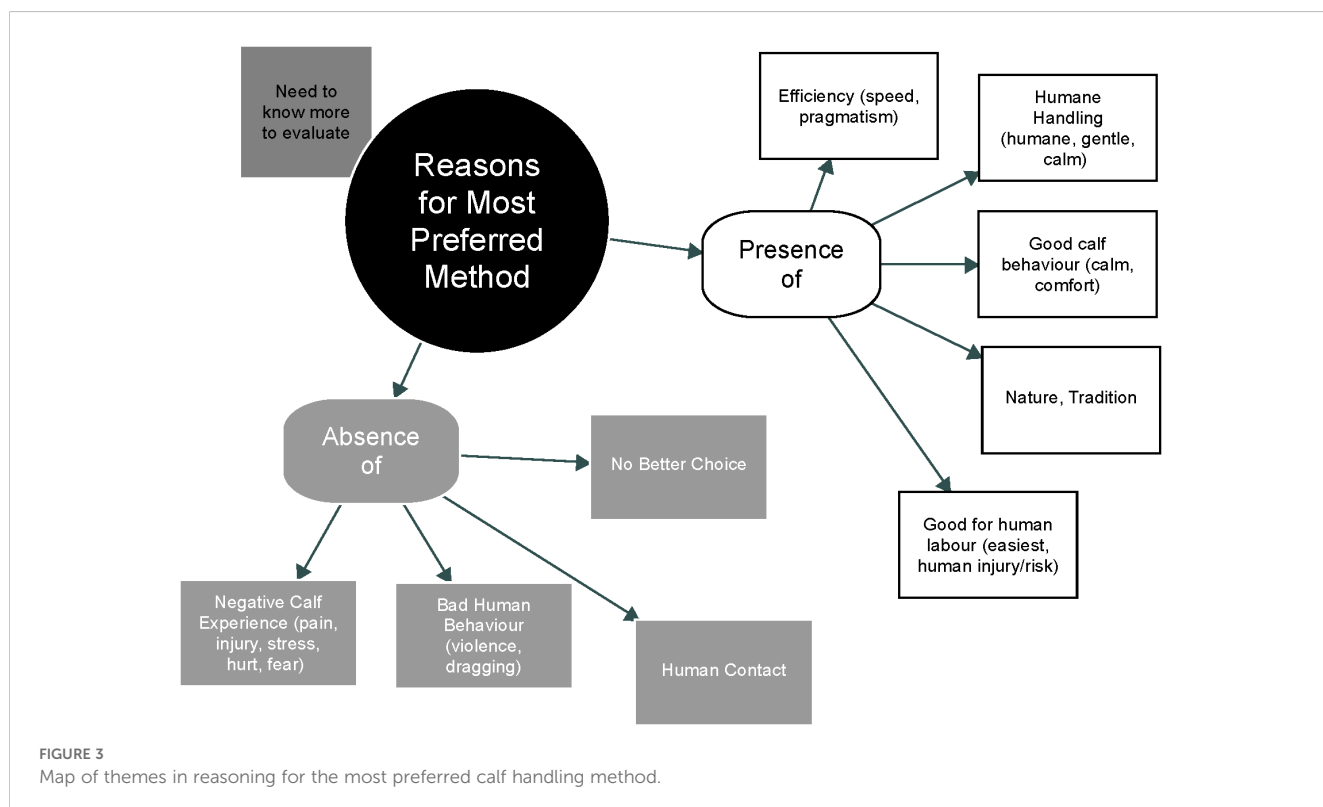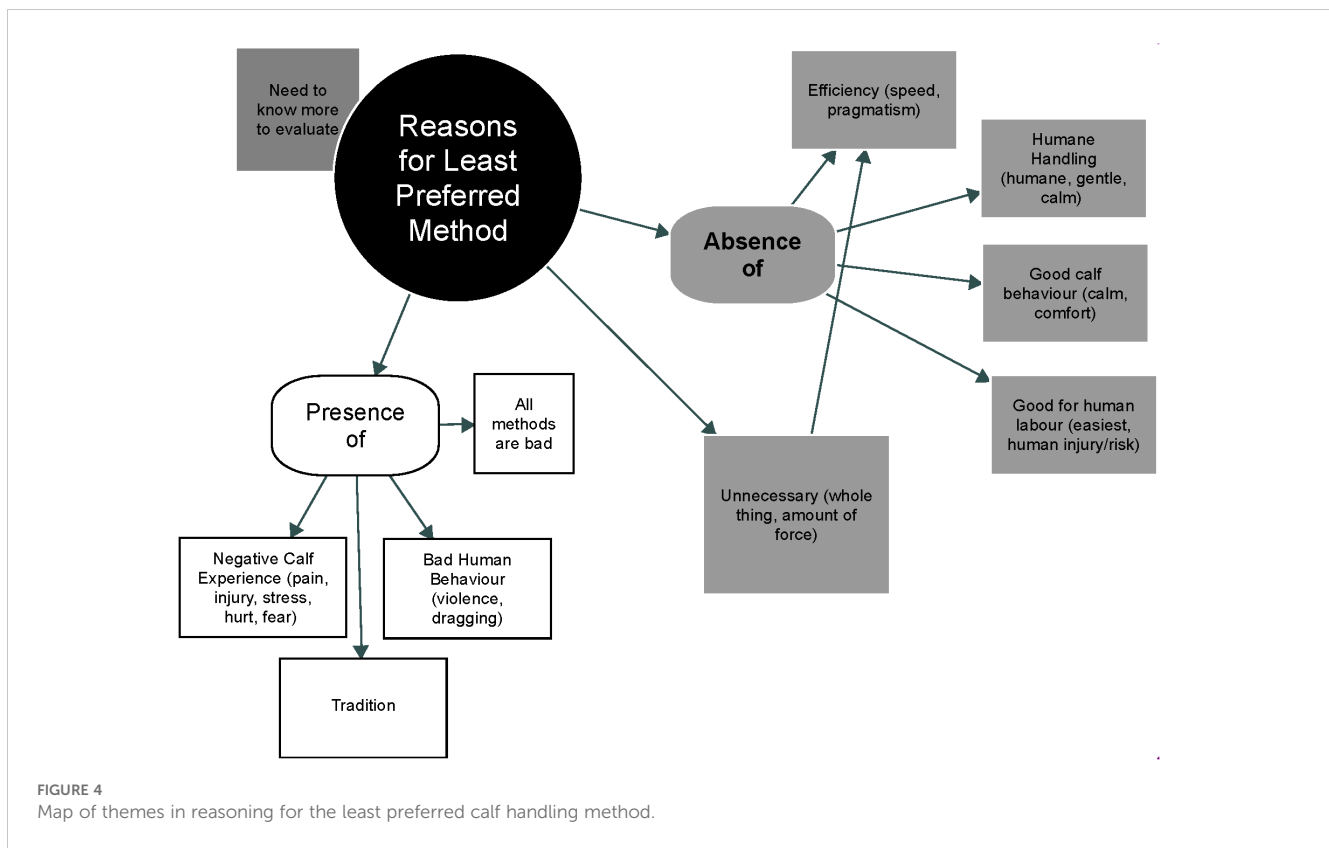

FIGURE 3
Map of themes in reasoning for the most preferred calf handling method.

FIGURE 4
Map of themes in reasoning for the least preferred calf handling method.

responses to their least preferred selection, individual responses of note stated that "this looks like when cops use too much force against innocent people", and "looks cruel but I'm sure they have a standard".

3.3.7 Themes in preference ranking reasoning by method

When asked to explain their thinking regarding their most preferred selection, evaluating through the eyes of the calf, human actions, and balancing outcomes was more prevalent among those who select TT. Not surprisingly, reasoning for RW being the least preferred often included the dislike of how calves perceived the experience and human actions as rough and tough. Within the theme of rough and tough human behaviors was the perceived negative aspect of the dragging of a calf by rope. The absence of dragging was a reason for preferring TT, while its presence was a reason for preferring RW and NF the least.

3.3.8 Theme differences between information statements

The theme of balancing needs and outcomes was more often mentioned in reasoning for the most preferred method when respondents were exposed to information about industry practices prior to viewing videos. Reasoning evaluating through the eyes of the calf, specifically the pain experience by the calf, was lower in the information statement group as well. The theme of needing to know more did not appear differently between information or control groups. Rough and tough human behavior, particularly the reasoning of perceiving handler actions as violent or cruel, was

present slightly more often in the reasoning for the least preferred method in the control statement group.

4 Discussion

This study's objectives were to (1) evaluate the public preferences and perceptions of common calf handling and restraint methods for processing beef calves in western Canada and (2) determine the influence of providing information about these practices. In general, the public wants to know if farm animals have a good life consisting of comfort, good health, being pain-free, and being treated well (Vigors, 2019). These concepts align well with respondents focusing reasoning for their evaluation of handling method through the eyes of the calf and on human behaviors, which were consistent and reflexive across the most and least preferred selections regardless of the specific method selected. A similar study reported that participants in TT, RW, and NF for calf handling and restraint considered similar themes of calf stress, efficiency, and human safety when evaluating their most and least preferred methods (Arkangel, 2023). The themes of animal experience and humane human actions were also present in moral concepts identified in an interview study of members of the Canadian public not involved with agriculture (Spooner et al., 2014), which also identified natural living as a dominant factor when considering animal welfare.

Fundamental expectations drive anticipatory expectations of what those participating in food production should do (Tonkin et al., 2020). In the current study, the fundamental expectations of

quality of life was perceived by their perception of calf experience and human actions—when met, this can reinforce beliefs about the system and support the development of trust (Tonkin et al., 2020), but when not met, it creates negative experiences and lost opportunities for building trust, ultimately contributing to squandering resources (Weary et al., 2016). Although it is critical that the actions taken during calf handling and restraint events align with fundamental expectations of care for the calves and humans, there are also opportunities for aligning expectations and values through communications at the individual and organizational levels.

In this study, the more acceptable a method was, the more likely respondents were to rank it as their most preferred method. The relationship indicates internal consistency in responses, despite binding preference rankings. The magnitude of the relationship between acceptability and preference rankings was weak, likely due to forcing a ranking of preference among methods, while acceptability was a Likert scale response with many respondents ranking NF and RW and totally unacceptable or somewhat unacceptable.

The responses in the current study indicate that people considered both human and animal factors in their evaluation of the specific production practice presented, aligned with the One Welfare concept (Pinillos et al., 2016; McBride and Baugh, 2022). Calf experience and human actions are also present in the current Codes of Practice for Beef Cattle (National Farm Animal Care Council, 2013), the national Canadian beef sustainability program (Canadian Roundtable for Sustainable Beef, n.d.), and the perspectives of participants in these calf handling methods (Arkangel, 2023). While details on expectations for calf experience and human actions during handling events are sparse in the Codes and sustainability programs, this does indicate that calf experience and human actions are shared values among industry initiatives, participants in the events, and public perceptions of beef cattle handling (Weary et al., 2016).

While participants in calf processing events prefer to use RW and NF methods, most assumed that the public would prefer TT (Arkangel, 2023). Public participants in the current study did have a clear preference for TT, with a common reasoning for this preference being the absence of dragging the calf by rope to the restraint. Indeed, there are public news stories covering cases where individuals were charged with animal cruelty due to harm caused by dragging other species (e.g., Hristova, 2023; Davis, 2023). One study of animal behavior associated with RW, NF, and TT reported elevated foot stomping when calves were restrained using ropes on their rear legs for processing at levels associated with minor discomfort or irritation, but no association with indicators of severe leg pain or prolonged compromised welfare (Arkangel, 2023). Arkangel (2023) provides the only experimental evidence of the calves' experience of rope restraint, and further studies are required to assess if harm is experienced by the calf. Regardless, it is understandable that the public would have a negative perception of this practice given the societal context.

Information can play a role in how people think about industry practices and animal welfare. Information on the necessity of painful mutilations for farm animals has previously influenced acceptability in an online survey of UK participants (Connor and Cowan, 2020). Studies of industry information on castration and pasture access for

dairy cows found no effect on public acceptability of these practices (Lemos Teixeira et al., 2018). While the information statements in this study did not directly affect the acceptability rating of calf handling methods, it did elicit pragmatic reasoning for selecting a method as most preferred. The language of the statement was created based on publicly available industry sources for educating about beef industry practices, which followed a relatively pragmatic tone. The outcome of education efforts, correct knowledge of beef industry practices, did have a positive effect on acceptability of calf handling methods. Educational intervention involving scientific evidence with laying hen housing changed how these housing systems were discussed by the Australian public, becoming more positive and open to animal welfare (Nolan et al., 2022). With a large shift to social media platforms for communication (Rice et al., 2020), video formats have shown to be positive for engaging in animal welfare with specific preference for emotional connection to information versus cognitive appeal through statement of facts (Locke et al., 2023). Notable responses in this survey cited a carry-over effect of information from media sources on other aspects of beef production in their frame of reference for evaluating the calf handling methods. The current results support further investigation of Coleman and Toukhsati (2006) recommendations that an online educational approach connected to emotional themes, such as those identified in this study, may have longer-term implications to the understanding and acceptability of production practices.

While the sample population in this study is representative demographically, it does not mean that results will extend to the entire Canadian population or at other periods in time. While not a focus of the current study, factors such as age or gender of individuals may also influence perspectives of animal handling methods and/or the influence of factual information on their perspectives and preferences. The online format of the survey did not allow for further investigation of reasons for preferences. The ability to engage dynamically with participants may help in the further understanding of their preferences, as well as the role of information about handling and restraint practices. Of interest would be work that more directly evaluates the effect of beef industry stakeholders integrating public perspectives, such as those identified in this study, into everyday communications in dynamic environments such as focus groups, online forums, or social media interactions (Weary et al., 2016; Locke, 2022; Ventura et al., 2023).

5 Conclusion

Specific calf handling methods common in Western Canada present a highly valuable practice for the care and management of calves in the current beef production system. These practices have yet to become a widely debated or highly publicized topic as compared to other animal production topics, which presents an opportunity for understanding societal perspectives and informing socially sustainable production practices in advance of polarization (Weary et al., 2016). While there was a clear preference for the tilt table, the themes in reasoning were consistent and reflexive across all methods and among the most and least preferred selections. The predominant fundamental expectations of quality of life as

expressed in people's discussion of calf experience and human actions highlight values aligned with the concepts of One Welfare and sustainability in the beef industry, as well as with values of the participants in these calf handling events. Providing information about handling and restraint immediately prior to watching videos shifted reasoning for perceptions to include more pragmatic considerations but did not affect acceptability rating of the methods. General knowledge of the industry, however, did increase the acceptability of the handling methods presented. This study highlights fundamental content to integrate into everyday interactions that influence trust in the food system.

Data availability statement

The datasets presented in this article are not readily available because confidentiality of data is required due to human participants. Requests to access the datasets should be directed to christy.goldhawk@ucalgary.ca.

Ethics statement

The studies involving humans were approved by University of Calgary Research Ethics Board (REB21-1566). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

CG: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. CA: Writing – review & editing, Formal analysis, Methodology, Visualization. EP: Conceptualization, Funding acquisition, Resources, Supervision, Writing – review & editing, Project administration, Visualization.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fanim.2024.1429323/full#supplementary-material

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