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ARTICLES

"That's the Way We've Always Done It": A Social Practice Analysis of Farm Animal Welfare in Alberta

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Abstract
Although beef and dairy production in Alberta, Canada, enjoys strong public support, there are enduring public concerns, including farm animal welfare. Evolving codes of practice and animal care councils prescribe changes and improvements to many areas of farm management, and may be seen by farmers as an appropriate response to public animal welfare concerns. However, codes of practice do not address every animal welfare concern, and new concerns can arise over time. Drawing on social practice theory and in-depth field research with 36 cattle and dairy farmers, this paper explores the materials, competencies, and meanings of four animal husbandry practices: branding, dehorning, weaning, and on-farm handling and moving. Findings show that branding and dehorning are evolving slowly with attention to pain management, but remain firmly rooted in ranching tradition and communities of practice. Weaning and animal handling practices are evolving more quickly with attention to changing materials, attitudes, and values that are more prevalent within producer communities.

Keywords Animal welfare · Animal husbandry · Farm animals · Beef · Dairy · Social practices

Introduction

Alberta is the largest beef cattle-producing province in Canada (Statistics Canada 2017). Canada's beef industry is characterized by the development of large-scale feeding operations and slaughtering facilities with significant ownership by known agribusiness giants including JBS and Cargill (Stull and Broadway 2013). Similarly, the dairy industry is a large part of the Canadian (and Albertan) agri-food economy. In 2017, Alberta ranked third among Canadian provinces in dairy

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production (Statistics Canada and Canadian Dairy Commission 2017). Alongside the cultural and economic significance of the beef and dairy industries, there remain a set of enduring concerns about farm animal welfare (MacDowell 2012; Ventura et al. 2015; CCFI 2018), environmental sustainability (McMichael 2009), and food safety (Davidson et al. 2016).

In response to animal welfare concerns, recent efforts by farm groups, market-based firms (i.e., processors and retailers), and regulatory agencies are evident. Two notable examples are the Code of Practice for the Care and Handling of Beef Cattle (Canadian Cattlemen's Association [CCA] and National Farm Animal Care Council [NFACC] 2013), and the Code of Practice for the Care and Handling of Dairy Cattle (Dairy Farmers of Canada [DFC] and National Farm Animal Care Council [NFACC] 2009). These multi-stakeholder policies aim to provide documentation about farm animal welfare that is useful for all stakeholders and simultaneously connect practices with science, ensure transparency, include representation from multiple stakeholders, contribute to improvements in farm animal care, identify research priorities, and ensure ease of on-farm implementation (CCA and NFACC 2013). While these Codes of Practice articulate comprehensive recommendations for the best animal husbandry practices, it is not clear that there is alignment with animal welfare practices at the farm level (for example, Winder et al. 2016; Moggy et al. 2017a). Moreover, it is also not clear whether farm animal welfare practices are changing because of pressure from external forces (such as consumers or animal rights activists) or from changing norms and practices at the farm level.

A common approach to scholarship on animal welfare involves critical analysis of current animal husbandry practices, such as recent work by Lamey (2019) addressing the strengths and shortcomings of Grandin's systems of humane slaughter. In contrast, this study addresses questions of animal husbandry from within the industry by taking a closer look at the actual day-to-day practices of cattle ranchers and dairy farmers. In portions of this study, we shed light on the contrast between recommendations in the codes of practices and producer narratives. These narratives are also contrasting between dairy producers and cow/calf producers. With this bottom-up approach, we offer additional insight into the tensions and the processes by which changes in animal husbandry take place. Furthermore, to provide a sharper lens of analysis and to clarify what we mean by a 'day-to-day practice' we draw on social practice theory developed by Shove et al. (2012).

Specifically, this study has two objectives. First, we outline four production-based practices including branding, dehorning, weaning, and the on-farm handling and moving of cattle. With respect to these practices, we explore how farmers implement farm animal welfare considerations. Second, we seek deeper insight into the persistence of some practices and the evolution of other practices at the farm level while taking into account the structures and social construct of their choices and actions. Ultimately, we aim to answer the following question: How do these empirical findings contribute to an understanding of continuity and change in animal welfare practices? Reviewing key tensions within the animal welfare literature offers a first step in achieving these objectives.

Sociological Perspectives on Animal Welfare

Social scientists share an understanding of animal welfare as a socially constructed concept that is imbued with human values (Fraser 1995, 2008; Rushen 2003). Bock and Buller (2013), for example, claim that notions of farm animal welfare shift depending on societal values. This includes a recent shift from a biological and physiological focus to a concern for animals as conscious beings who experience stress. Bock and Buller (2013: 393) also claim this shift has resulted in a complex social construction of farm animal welfare, described as:

> [t]he formation of new constitutions of actors, knowledges, practices and 'evidence', each speaking, in different ways, for the materially and semiotically reconstituted animals themselves. Each also constructs animal welfare as a different problem, with responsibility for its solution shifting between farmers, animal scientists, and, finally, society more broadly.

Societal definitions and values impact those scientific measures of animal welfare that are promoted in codes of practice, especially as the social acceptability of farm animal suffering changes over time (Bock and Buller 2013). Adding further complexity to notions of animal welfare, scholars such as McGlone (2001) and Bock and Buller (2013) maintain that defining and gauging 'good' farm animal welfare can only be achieved if the concept is perceived of and coupled with other public goods including human health and environmental sustainability. Coupling farm animal welfare with other public goods, however, creates tensions between often competing goals, and highlights why societal definitions of farm animal welfare remain complex, contested, and endlessly evolving.

The expansion of animal welfare science as an interdisciplinary field has facilitated the development of welfare assessment methods (Lund et al. 2006). Arguably the most historically recognized framework is the Brambell Committee's Five Freedoms established by the Farm Animal Welfare Council in Britain (Thompson 2013: 137; see also Martin 2012: 63). Although the framework proves useful as a method for evaluating whether animal production is morally acceptable, it is not without controversy. The Five Freedoms are heavily critiqued from scholars of various disciplines for ignoring nuance and context in favor of absolute criteria (Rollin et al. 2012; McCulloch 2012; Thompson 2013). Additionally, they do not adequately reflect the causes and consequences of stresses (Webster 2016) and many of the criteria are not met due to the ambiguity of farm animal welfare issues (Bock and Buller 2013). For example, freedom from discomfort can be particularly ambiguous as many social practices carried out in the beef and dairy industries including castration, branding, weaning, calving, and medical treatments offer solutions to practical production issues on the farm, yet are also associated with some level of discomfort.

In response to these critiques of the Five Freedoms, an alternative approach is proposed based on insights from multiple stakeholders involved in the agriculture industry and animal welfare debate. Developed by food ethicist Thompson (2013), the Bodies–Minds–Natures Rubric consists of three broad and interconnected

categories: first, the 'bodies' component, recognizing the biological indicators of health as a major component of welfare (Thompson 2013). Therefore, animals of any species suffering from illness or mortality as a result of disease, injury, or other conditions have compromised welfare (Thompson 2013). Second, the 'minds' component is a category for dimensions of welfare that derive from the way an animal feels (Thompson 2013). Affective states such as pleasure or more complex emotionally charged experiences (such as fear) are acknowledged within this framework (Thompson 2013). The third category is 'natures,' referring to the ability to perform some of the behaviour regarded as typical for the species (Thompson 2013). Results from a qualitative study show that producers in western Canada understand animal welfare inclusive of the affective states of animals, animal health and body condition, as well as, the ability to exhibit and experience some 'natural' qualities (Spooner et al. 2012). These findings by Spooner et al. highlight the Bodies–Minds–Natures Rubric, as discussed by Thompson (2013). While not an absolute criteria for welfare, this literature provides a practical framework that Canadian producers have come to describe as important to livestock production practices (SpI worry that this last sentence Spooner et al. 2012).

Notwithstanding these considerations within the social sciences, we also acknowledge broader concerns within this literature related to the exploitation of farm animals. Ellis (2013) argues that terms of 'stewardship' and 'animal husbandry' serve to distract from the reality that ranching is inherently based on using "nonhuman animal bodies and the environment for their own ends" (Ellis 2013: 429). In taking a sociological approach, we recognize such agricultural work as rooted in power dynamics and the dominion of nonhuman animals who have come to be viewed as commodities by western society, particularly by people outside livestock production.

Persistent Challenges in Farm Animal Welfare

Despite industry improvements and the recognition of farm animal welfare protocols, several studies from the field of veterinary science identify persistent farm animal welfare issues. In a study of dairy operations in Québec, Canada, Vasseur et al. (2010) find that despite frequent recommendations from industry experts, many dairy producers continue to use management practices that increase the health risks for calves. Similarly, a study of dairy cattle in Alberta and Ontario suggests that hock, knee, and neck injuries continue to persist despite the development of animal welfare assessment schemes (Zaffino et al. 2014). Furthermore, there is increasing evidence of social practices that contribute to stress and poor mental health of farm animals. Research exploring stress-associated practices on western Canadian cow/calf operations finds that most producers perform the stress-associated practice of abrupt weaning despite other alternatives being available and accessible (Moggy et al. 2017a). These accounts from cow/calf and dairy operations highlight that farm animal welfare issues are persistent despite improvements in animal welfare assessment and industry-led development of codes of practice.

In examining the persistence of animal welfare issues, a relatively small amount of literature reviews farmers' decisions with regard to animal husbandry and farm

animal welfare concerns (Wikman et al. 2016). A variety of external constraints can hinder a farmer's decision to implement better animal husbandry practices (Whay 2007; Gocsik et al. 2014). Some external constraints are related to inadequate infrastructure (Zaffino et al. 2014), financial costs of implementing best practices, social pressures against making changes (Whay 2007), the structure of the agricultural industry, and the characteristics of the innovation to be adopted (Edwards-Jones 2006). For example, Moggy et al. (2017a) find that western Canadian producers are less likely to adopt current less-stressful practices of weaning due to associated costs and logistics. Inadequate space and on-farm infrastructure, such as pasture availability and facilities, are also viewed as constraining towards the adoption of less-stressful practices from the perspective of producers. In addition, Moggy et al. (2017b) find that many producers may not even know about the codes of practice, therefore limiting the adoption of less-stressful practices.

In addition to external constraints, barriers to the on-farm implementation of best animal husbandry practices are inseparable from internal influences, such as personal goals and values (Gocsik et al. 2014; Zaffino et al. 2014). In a review of literature from the social sciences with theoretical interpretations derived from psychology, Edwards-Jones (2006) suggests that farmers' decisions are influenced by a range of internal factors, such as socio-demographic characteristics, farmer personality, and the overall characteristics of the farm household. Moggy et al. (2017b) also emphasize that many western Canadian producers express reluctance to change due to the risks of adopting new practices. The success of standards depends in part on the perceived legitimacy by producers, helping to determine whether voluntary code systems are adopted, implemented, and accepted by producers (Bradley and MacRae 2011). However, legitimacy also depends on whether the standards accurately represent producers' expectations (Bradley and MacRae 2011). While assessment schemes can increase farmer awareness of the benefits of implementing certain practices, ensuring welfare initiatives are practical, affordable and relevant for future on-farm implementation is also important (Dwane et al. 2013).

This review of the interdisciplinary literature on farm animal welfare and producer decision-making tends to focus on structural constraints and producer demographics, rather than social practices and associated rationales. As such, this study uses the lens of social practices to explore contemporary perspectives and approaches to beef and dairy farm animal welfare issues.

Defining Social Practices

Social practice theory provides an innovative lens to interpret how practices are reproduced and transformed in Alberta's beef and dairy producing industries. This research builds on a conceptual framework put forth by Shove et al. (2012) that positions social practices as consisting of three interconnected elements. The three elements are conceptualized as: (1) materials, encompassing things, technologies, the body, objects, and other tangible physical entities; (2) competences, including skill, practical know-how, and techniques; (3) meanings, consisting of symbolic meanings, emotions, ideas, and the embodied understanding of the

social significance of a practice (Shove et al. 2012). Moreover, Shove et al. (2012) suggest that social practices are diffused; that is, they circulate across the world through the transportation and access of materials, the geographic migration of competences, and through the association and classification of meanings. With regards to conceptualizing the manifestation of social reproduction and social change, Shove et al. (2012: 14) explicitly argue, "practices emerge, persist, shift and disappear when connections between elements of these three types are made, sustained, or broken."

The shared character of social practices within networks, institutions, and personal relationships is the focus of many theorists who wrestle with understanding how society has come to be organized (Schatzki 2001; Nicolini 2012; Sahakian and Wilhite 2014). Conceiving of social practices as "a composite patchwork of variously skilled, variously committed performances enacted and reproduced by beginners and by old-hands alike" (Shove et al. 2012: 71) highlights the passed-down and deeply socialized nature of practices where individuals learn about the materials, competences, and meanings that are integrated when practices are enacted. While most contemporary practice theorists are careful to not reduce social practices to the actions of individuals (Nicolini 2012), Barnes (2001) argues that social practices are still more closely associated with micro-level actions than of macro, order-stabilizing structures. Barnes' (2001) argument is centered on the assertion that social practices manifest in shared settings, earning their conceptualization as 'social' practices.

The concept of competences highlights the 'know-how' and skills needed to carry out a social practice (Shove et al. 2012). Drawing attention to the significance of the socialization process of competences, Nicolini (2012) highlights literature that references the importance of learning through tradition. Nicolini defines practical knowledge as "a form of tradition sustained by a community and inscribed in the body and/or mind" (2012: 77). One can surmise that individuals learn about the integrated elements of materials, competences, and meanings through a process of socialization. This school of thought places social practices within communities and traditions, highlighting "the process of handing down institutionalized ways of doing" and "the social bonding or communitarian dimension that may result from it" (Nicolini 2012: 77).

The performance of social practices also facilitates social reproduction. Shove et al. (2012) argue that researchers often focus on practices-as-entities, rather than on practices-as-performances, and those individuals who carry out the performances. As such, the preservation of any single practice depends on dedicated carriers (Shove et al. 2012). The concept of 'monitoring' highlights how carriers of social practices are provided with feedback needed on their performance of social practices (Shove et al. 2012). From the perspective of Shove and co-authors, social practices become entities when "streams of consistently faithful and innovative performances intersect" (2012: 101). However, becoming the carrier of a practice is considered closely associated with two criteria. Primarily, the social and symbolic significance an individual experiences when participating in a practice, also conceptually referred to as meanings (Shove et al. 2012). In addition, the ability to accumulate different types of capital required to participate in a practice is also significant

using Shove et al.'s (2012) framework, highlighting how often-intersecting inequalities can impact the ability to participate in social practices.

The shared nature of practices also highlights the potential for evolution and transformation. For Barnes (2001), social reproduction and social change stem from the same shared setting in which social practices flourish, through learning. In their research, Sahakian and Wilhite (2014) highlight how changes in behaviour occur by identifying opportunities and spaces for learning within communities of practice. However, individuals who carry out practices simultaneously change as well. Scheer (2012) highlights emotions as a kind of practice that has undergone historical transformations of emotional norms and expectations, but also acknowledges that there is a record of change in actual feelings experienced. Scheer (2012) therefore argues that as a social practice, emotions change over time not only because what shapes them has changed (such as norms and language), "but also because the practices in which they are embodied, the bodies themselves, undergo transformation" (2012: 220).

Research Methods

Our research methodology is influenced by ethnography. Traditionally the domain of anthropology, ethnographic research focuses on the entirety of a culture-sharing group (Creswell 2013). However, a focused ethnography allows for a more detailed exploration of actions, practices, or interactions within a culture-sharing group (Creswell 2013). A focused ethnography guides this study in an effort to explore the actions, practices, and interactions within the culture-sharing groups of cow/calf producers and dairy producers in Alberta.

Predominately, data collection relies on in-depth interviews with cow/calf producers and dairy producers in Alberta. In addition, data collection included short-term field visits captured through field notes and photographs. In-depth interviews allow for learning about actions, practices, and interactions based on the experiences, perceptions, and perspectives of the cow/calf and dairy producers (Maxwell 2013). A total of 30 semi-structured interviews were conducted with 36 participants. Seven interviews were conducted over the phone at the request of the participant, while the remaining 23 interviews were conducted in-person and were accompanied by a farm tour. Interviews ranged between 1 h and an entire day in length.

Participants were selected on the basis of purposeful selection. Information about the project and contact information were given to industry contacts and dispersed through the Alberta Beef Producer's Newsletter, the Western Producer, the Northern Horizon, and at Alberta Milk meetings. Referral sampling was used in some cases, mostly with dairy producers who were particularly challenging to access with these methods. In total, 20 of the interviews were conducted with beef producers, and 10 of the interviews were conducted with dairy producers. All the beef producers identified as running cow/calf operations. The cow/calf operations ranged in size from 13 to 1400 cows. Additionally, some participants operate a backgrounding operation, defined as an intermediary stage between the cow/calf operation and feedlot where calves are raised to a heavier weight (three participants), mixed cattle and

crop farms (11 participants), certified organic, grass fed/finishing, and direct marketing (three participants), purebred operation (two participants), and grass fed/finishing direct marketing (not organic) (one participant). The 10 dairy farms ranged from 50 to 350 milking cows, with five identified as mixed cattle and crop farm. All 10 dairy farms described their operations as free-stall designed housing. To ensure anonymity of the producers, all of the interviewees are addressed using pseudonyms.

The interviews were conducted in a semi-structured format to allow for an informal conversation on topics related to production practices and how each individual participant and farm perceive of themselves as contending with farm animal welfare issues. The interview guide covered the sequential process of cow/calf and dairy production practices entirely (from birth to slaughter/transport off farm) and was formed on the basis of 'materials, competences, and meanings' (Shove et al. 2012) used in their social practices and their considerations for farm animal welfare issues. The interviews were transcribed, managed, and organized using Nvivo 11 for Mac software. Sequential and descriptive coding methods identify passages that illustrate a description of the specific social practices of branding, dehorning, weaning, and on-farm low-stress handling and moving (Gibbs 2007). We also used analytical coding to understand the 'materials, competences, and meanings' highlighted in the social practice theoretical framework to explore the motivations for reproduction and transformation of these social practices and the subsequent implications for the agricultural industry, animal welfare, and society more broadly.

Social Practices of Animal Husbandry and Welfare

In each section below, we highlight four social practices regularly carried out by cow/calf and dairy producers, including branding, disbudding and dehorning, weaning, and on-farm low-stress handling and moving. We further highlight how cow/calf and dairy producers perceive of themselves as mitigating farm animal welfare issues through these social practices, while paying attention to elements of competences, meanings, and materials, as is highlighted in Shove et al.'s (2012) social practice framework for understanding processes of social reproduction and transformation.

Branding

Branding is considered a contentious practice that allows for permanent identification of livestock. "According to the 2010–2011 *National Beef Quality Audit* (30), fewer than 10% of Canadian cattle were branded, compared to 25% in 1999. However, branding remains a necessary form of permanent identification in some parts of Canada. Brands provide proof of ownership and easy identification of cattle at a distance, and may be required in some situations (e.g. some community pastures, in remote locations, for export, and by some lending institutions)." Out of the 30 producers interviewed, 20 cow/calf producers stated that they brand, while no dairy producers practice branding, since dairy cows are not kept on communal lands and identification is not an issue. Branding is considered

the only permanent proof of ownership for cattle, especially important for those who, as commercial cow/calf producer Tyler describes, let their cattle "go into pastures in the summer where [there are] vast grasslands, different neighbours, and other producers [who] are also putting their cattle in that area. It is for identification." Many cow/calf producers justify branding as an acceptable social practice that ensures beef cattle need not be kept in confined space and can be identified at a distance. The practice of branding is described in two approaches. The first approach is described as a traditional cattle branding, succinctly outlined by commercial cow/calf producer, Brendon:

> We'll do a branding in May… We will bring them into a pen and we do the traditional rope and wrestle branding where [the calf is] roped by their back feet, and brought into the central area, not too far but probably about fifteen feet. And then there will be two people that are restraining the calf, and typically we'll do all procedures at once … We will [brand] them typically between two and a half weeks old to usually around six weeks old.

Many participants describe the branding itself as holding down a hot iron on the hip or rib area of a calf for several seconds which, as Carl describes, "kills the hair cells so you just have bare skin and you cause scarring." Further, what Brendon describes as 'all the procedures,' generally consists of, "[giving calves] vaccines and checking them for different horns, dehorning them, castrating them, stuff like that, those are crucial points" that occur during a traditional branding, dually noted by Bryan.

Alternatively, Tim describes another form of branding that utilizes cattle handling systems, rather than the traditional 'rope and wrestle' method:

> We've got a calf cradle so they come in [the cradle] and they flip over so they're just in this little head gate basically, tipped over on their side… [We use] a hot iron in a fire because real hot is the best, and it honestly takes 3 s and it's done. And that I find works the best. It makes good brands, it's quick, and it's as ethical as it can be. Unfortunately like I don't know another way you could really identify animals.

While nearly all the cow/calf producers acknowledge branding as a painful practice, they also describe benefits to the welfare of their cattle. Aaron, a commercial cow/calf producer contends that from when a calf is roped to after all the procedures are completed "if everything goes right, I would say, I don't know, [it takes] about 30 s." Tyler shares similar sentiments: "the reason we have so many people and why we like to do it that way is it's done so quickly that the calves get back to their mothers." Many of the cow/calf producers also stress the importance of having their cattle graze in unconfined, vast community pastures as only possible by the practice of branding.

While permanent identification of cattle (with no better alternative) is the main reason for branding, many producers who brand also stress the importance of maintaining western tradition that brings together their community. During fieldwork, a cow/calf producer presented me with a book that documented their

community branding. The producer beamed with pride as he celebrated his children learning the technical skills of roping and wrestling calves. Another cow/calf producer, Grant, outlines the importance branding once held for his family: "Back when the kids were home, and they would get their high school buddies to come out. Well it actually started in Junior High, it was more a party." Once Grant's children moved away from home, Grant stopped branding practices. Similarly, Brendon draws attention to the importance of carrying out the tradition: "A little bit is part of western tradition, family tradition, and our area traditions. Everybody kind of coming together and doing it on horses with ropes as kind of carrying—you know it is a bit of a community, western tradition."

Despite many producers still carrying out the social practice of branding, many describe the practice as changing or adapting to societal influences. Brendon notes that "[branding is] trying to be reduced as much as possible." However, the change and adaptation with regards to branding is mostly occurring within the realm of pain mitigation, as Richard describes: "We started to recognize as an industry that we should be doing something to alleviate the pain, not only for the sake of the animal, but also because it is economic. As I said before, healthy, happy animals will perform better." Mark describes what pain mitigation looks like: "We use Medicam [pain medication] at branding which a lot of people don't do." Sam also describes the benefits of administering pain mitigation strategies during branding practices: "Even seeing the calves after we gave them Medicam this year, after branding, like the next day was cold, it was raining, and those calves were just like, (laughing) they just felt so good! And it feels good to go out there and see that rather than seeing calves walking around you know, shivering, cold, and in pain and it's just so nice to go out there and see that. You know that it was the Medicam that did it for them."

Disbudding and Dehorning

Disbudding and dehorning are considered vital practices described by Brendon as "mostly for animal and human welfare." Nearly all the participants describe discontent around the practice of dehorning or disbudding, however, it is considered better than the alternative. For example, Donna describes the pros and cons: "if they think that [dehorning] is terrible they should see what an animal can do to another animal with those horns if you don't dehorn them. So it's the lesser of two evils, it's not something you like to do; it's something you try to prevent. But still you get horns sometimes." When Donna refers to dehorning as 'something you try to prevent' she is referring to how the beef producing industry is marked by change through a shift towards polled genetics. Polled genetics refers to selecting and breeding cattle without horns to avoid the practice of dehorning. Nearly all cow/calf producers interviewed described breeding decisions evolving towards polled genetics. However, sometimes horned calves do appear in the herd, as Brendon describes: "If we had 300 head come in, I bet you we would probably have maybe 15 calves with horns, and we used to have a lot more, but we moved into using more polled genetics in our herd."

When horns do appear in a herd, there are three methods used, respectively. Donna describes disbudding and the use of caustic paste that prevents a bud from forming into a horn: "we put on the dehorning paste so that we don't have any horns." However, if the paste does not work then the producer has to perform a dehorning. Donna further describes the practice of dehorning on her operation:

> When we have to dehorn, you give them [a pain killer] before, which we never had that kind of thing before…[then] you would put a band around where there horn is, tight, and then you use a saw wire to cut the horn off. If you do it when they're young, it doesn't take much. If we get it right, it presses against the blood [vessel] and it doesn't bleed.

Given the genetic links between being polled and milk yield (Windig et al. 2015), practices of disbudding and dehorning in the dairy industry are more common. Justin laments, "they have had polled for hundreds of years in the beef industry, and they're just starting to get going now with the dairy industry." Hank explains why there is a slow shift towards polled cattle in the dairy industry: "We cannot use a bull only because it's polled. There has got to be different aspects of production, like conformity, that has priority. If they happen to be polled, that's great and we like it. And I can see maybe 50 years from now we have all polled bulls." Interestingly, the dairy industry does require all dehorning practices to use pain control and tranquilizer, unlike the beef industry. Justin describes what this practice entails: "We tranquilize the calf so they're knocked out, we freeze, we put localized freezing, same as at the dentist kind of idea, [the localized freezing] gets put in around the horn, or the horn bud. And then we use a burning dehorner that dehorns the calf, and we give them a general painkiller."

Nearly all of the dairy producers describe pain mitigation strategies during disbudding and dehorning as a positive step towards improving social practices. For example, Hank describes: "we let them go, they go right back to eat or to lay down, there's no physical discomfort on the calf at all. And that of course is a change from prior, when we did not use local freezing, a good change." Further, the influence of implementing pain mitigation strategies has largely been brought about by industry-led assessment schemes, such as the Code of Practice. For example, Andrew describes the influence:

> Painkiller with dehorning calves is something new. We do that because of Alberta Milk and we're supposed to try and set an example. It is in our ProAction [program], and well, it is in the code of practice, and ProAction has basically adopted the code of practice. So it is something we've started doing. And we actually noticed less stress in the animals afterwards. Giving them Medicam lasts a few days, and you see them back eating again instead of all standing in the corner after they're dehorned.

Weaning

The practice of weaning is defined as removing milk from a calves' diet (CCA and NFACC 2013). Weaning is a practice that must occur eventually on all cow/calf

and dairy producing operations; however, how weaning is carried out varies across operations and between cow/calf and dairy farmers. Many cow/calf producers reflect on the historical and conventional practice of weaning that they were taught often referred to as abrupt-weaning. Out of 20 beef producers, nine describe using the abrupt-weaning practice. Bryan describes the conventional practice of abrupt weaning that he was taught and that continues to occur on his father's ranch:

> You bring the cows and calves in at six in the morning. Then you sort all the cows away from the calves. Then you sort the calves into males and females. And then you select any ones that you want to keep. The truck arrives maybe at 9 o'clock. You load it up with the cattle and you take it to the auction mart. They sit at the auction mart for a day. It's a pre-sort sale they sort them into with other groups of animals. They haven't eaten anything, they haven't drunk anything. The next day they go through the sale. Then they'll spend the night at the sale barn. And the next day they'll be loaded into trucks and shipped.

Many of the participants describe implementing the practice of abrupt weaning because it is less labour intensive, a tradition that is justified because "that's the way we've always done it!" While weaning is widely acknowledged by all the participants as a stressful practice, many producers draw upon different low-stress methods of weaning that are now available and practical. Many cow/calf producers expressed discontent with the practice of abrupt-weaning and maintained that they have adopted new practices that they believe improve the general welfare of their cattle, namely, fence-line weaning and two-stage weaning. In describing these less stressful approaches, Tyler offers this description: "So you put those [the nose tags] in, you put the cow back with the calf on pasture for 3 or 4 days with that in. They can't suck the cow anymore but they can still graze, and it essentially breaks the bond of the mother and the calf without an abrupt break." Producers are increasingly recognizing this strategy as a better practice that achieves the need for weaning but has perceived farm animal welfare benefits based on the reduction of stress for both cow and calf.

Eight beef producers described the use of fence-line weaning. Grant succinctly describes the practice: "There are ways to wean that you can reduce [stress levels], like there's a steel fence between the cows and the calf when we wean. They can walk up and down the fence and see mom and bawl to her, but they can't suck." Anthony describes the benefits to fence-line weaning and why he chooses to adopt the low-stress practice: "We found that it's better if the cow still sees them, but where you want them to see them." Graham shares the importance of his calves and cows expressing less stress: "Fence-line, it seems to reduce the bawling, and the crying, and that's how I like to do it. And then get them started on feed, and you know two or three days of crying, and pretty soon mom's gone, and they forget about each other…"

On dairy farms, the practice of weaning occurs differently. A calf is almost always abruptly separated from the cow immediately after birth, a highly contentious practice and animal welfare issue. However, the Code of Practice for the Care and Handling of Dairy Cattle suggests the calf should spend a longer period of time with the cow, allowing for health benefits to both calf and cow (DFC and NFACC

2009). Interestingly, most of the dairy producers we spoke to referred to weaning within the context of weaning from bottle-fed milk. Marco describes how the practice of weaning in the dairy industry is carried out: "We first give them just milk, or just water instead of the milk. And then we give them more calf starter, and then within a couple days then they're over it." While many dairy producers acknowledge that it is stressful when the calves are first weaned, some have moved towards a less abrupt method. For example, as Justin describes: "They get taken off milk and we do that really slowly. Some guys move quickly to take them off milk but I think it's healthier for them to slowly get off of milk. I think it helps for better transition. There's no shock to them." While the practice is considered stressful, it is adopted to ensure calves start feeding themselves and continue to grow.

On-Farm Low-Stress Handling and Moving

A social practice that is marked by change and is thought to have drastic farm animal welfare benefits is the on-farm handling and moving of cattle. During short field visits, we observed the movement of cattle from a vast community pasture to the farm of origin for winter. During this process, the cow/calf producer demonstrated on-farm low-stress handling and moving which consisted of remaining quiet, and using the natural herding nature of the cattle with the horse to calmly direct them. Many producers reflect on how their current practices of handling and moving differ from some of the traditional handling and moving techniques used in the farming community. Tyler summarizes the traditional way of moving and handling cattle that he has observed growing up in a cow/calf producing family: "The traditional way [is] you ride right behind them and you're yelling at them. Sometimes whipping them and that stresses the cow out." Bryan echoes similar sentiments that he observes on his father's ranch:

> My dad moves his with a quad, or with his truck, so he just drives behind them, and the traditional way on our ranch to do it, one thing they told everyone [is] 'if you don't know anything about working cows, you've got to make lots of noise' which is actually totally wrong, but lots of places do that. Lots of screaming and yelling, whistling, honking the horn, or revving the engine, and that scares the animals a lot but that's the way we would work cows, chasing, running, and noise.

In addition to holding similar experiences regarding long-standing traditions of cattle handling and moving, nearly all participants characterized their current practices as evolving to low-stress methods. For low-stress handling and moving, many participants highlight learning to control their own bodies, rather than trying to control their cattle. For example, Carl highlights the importance of quiet, calm, and slow techniques that reduce stress for the producer and cattle: "You just do it nice and easy, slow, and move and you make them move in the way that they're used to moving. You try and eliminate bright lights and shadows; like they can't differentiate [because] they have poor depth perception. And you try to keep the place as quiet as possible." Echoing similar sentiments is Tyler, who

refers to the positioning of his own body when implementing low-stress handling and moving of his cattle: "It's all about how you position yourself in a way that the cow feels comfortable moving in the direction… Like, you're trying to make the cow feel good about going where you want it to." To achieve this practice as a skill, many cow/calf and dairy producers reference regularly working with their cattle in handling and moving in an effort to train themselves and their cattle. For example, Malcolm actively practices heavy rotational grazing:

> I advocate people to, not to chase cows, but to lead them. And my dad used to say this, and I think it's quite correct, but a cow was born to be led, not to be chased. And they are really, really easy to train. And once they have been trained to do something, they'll do it quite voluntarily.

Many of the cow/calf and dairy producers perceived of this change as directly connected to strong emotional attachments to their cattle. For cow/calf producer, Joanne, building trust is imperative to achieving low-stress handling and moving techniques:

> We have a trust. It's really evident I find during calving… A lot of times, if you're around them, they know to put their trust in you because they don't know what's going on. So you bring them in and a lot of times you know, we'll bring them into our chute if we have to pull a calf, but a lot of times you know, if you go out there and you talk calm and quietly, and we use all those low-stress handling methods, we can bring them up, and we can make that animal calm and quiet. Rarely do we have wrecks. So the animals trust us I find because we handle them and treat them with respect.

While many of the producers highlight how on-farm low-stress animal handling and moving benefits their operation, they also provide insights for why they believe this practice has undergone a drastic transformation. Many of the producers recall a change in knowledge about cattle behaviour and a change in perception about agricultural animals more broadly. As Malcolm highlights, "… attitudes [of producers] are changing for sure." Malcolm further elaborates, "more and more guys get into rotational grazing, and moving their cattle every three, four, or five days, that is going to improve the psychology of these cows." Many of the cow/calf and dairy producers were quick to describe knowing an improvement by observing calmer behaviour among their cattle. Participants often described an evolution of knowledge and attitudes as accredited to other producers in their community, veterinarians, education, and animal handling experts including Dr. Temple Grandin. For example, Brendon describes the importance of community and other industry representatives: "We really try to make it a low-stress kind of system as possible with using, whether it's you know, it's kind of all taking courses from experts as we've just kind of done like a family thing, or you know, the neighbours."

Dairy producers share similar sentiments about the emergence of improved infrastructure and technology as a perceived benefit to farm animal welfare. As Marco notes: "The milking system has definitely changed drastically, and the barn, the ventilation is a lot better. We didn't have automatic scrapers, the mattresses are better, wider, and [there are] bigger stalls… Technology has definitely advanced for sure."

Discussion

How do these narratives from cow/calf producers contribute to an understanding of continuity and change in animal welfare practices? In this study, we offer insights into the practices of branding, disbudding and dehorning, weaning, and on-farm low-stress handling and moving of cattle. The theoretical framework proposed by Shove et al. (2012) emphasizes that social reproduction and transformation stem from similar arenas and can be captured within the interconnected foundations of materials, competences, and meanings. We build on these concepts by highlighting the importance of the construction and transformation of materials, competences, and the meanings associated with the social practices. We find that all of the social practices, even those that appear relatively stagnant are in a state of transformation as the interconnected foundations are also evolving and changing from within. Drawing on ideas from Shove et al. (2012) we examine the process of continuity and change in more detail below.

The Continuity of Welfare Practices

The narratives behind the social practices of branding, weaning, disbudding and dehorning, and on-farm low-stress handling and moving demonstrate 'routinized types of behaviour' that contribute to the social order of beef and dairy production. Our findings emphasize the persistence and continuity of these practices. This reproduction of social practices is embedded within the use of materials. Materials are highlighted in all the social practices as infrastructure, tools (branding tools, dehorning tools, nose tags for two-stage weaning), pain medication, horses, and the body of the producer. The continued use of these materials as interconnected with sustained competences and meaning contributes to the reproduction and the social practices. In some instances, the findings demonstrate that reproduction also occurs due to the evolution (or lack thereof) within one of the foundations. For example, many cow/calf producers reproduce the practice of branding due to a lack of other permanent identification options and materials. On the other hand, the development of pain medication as a tool also contributes to the reproduction of branding as it makes the practice more socially acceptable.

The concept of competences is useful in highlighting the dissemination of knowledge about the social practices that occurs through networks, institutions, and personal relationships (Lave and Wenger 1991; Nicolini 2012). Theorists suggest that practices are learned within the confines of communities and traditions where networks, institutions, and personal relationships are structured (Nicolini 2012). "That's the way we've always done it!" and similar sentiments are frequently mentioned throughout the interviews as a way to express knowledge gained about social practices learned simply through observing. Many of the producers refer to the importance of family, community, veterinarians, and industry experts in establishing the knowledge needed to carry out social practices. For example, some of the producers refer to cattle branding as important to bringing together family and community in an effort to not only carry out the practice, but to carry out the tradition

and 'know-how' of rope and wrestle branding. As the findings show, branding differs from the social practices of weaning and dehorning that have undergone more substantive transformations. Aside from the development of pain mitigation strategies, branding remains comparatively more continuous which could be associated with the traditional and cultural importance of passing down branding knowledge, a traditional knowledge with significance that weaning and dehorning lack. Moreover, branding holds economic significance in circumstances where animals from different owners may be mixed or share pasture. Although genotyping all animals may provide a painless alternative in the future, it is currently not widely applied across the beef industry. This lack of uptake is potentially related to lack of familiarity or trust as is shown in a similar study on using genotyping to select dairy heifers with mastitis resilience (Hailu et al. 2016).

Moreover, the willingness to continue circulating social practices of beef and dairy production also draws attention to the faithfulness of the individuals highlighting Shove et al.'s (2012) notion of meanings. In many ways, the cow/calf and dairy producers reference "the social and symbolic significance of participation [in a practice]" that characterizes the social practices as meaningful (Shove et al. 2012: 23). The producers often reference branding, weaning, dehorning, and low-stress handling and moving as more than a production-based social practice. For example, the findings demonstrate discontent among the producers regarding the social practices of disbudding and dehorning. However, many of the producers stress that the practice is also important for both human and animal welfare concerns. These findings demonstrate that these social practices are not just carried out to ensure the reproduction of beef and dairy production, but because of the embodied social and symbolic significance associated with human and animal welfare (Shove et al. 2012).

The Evolution of Animal Welfare

Branding and dehorning are historically significant practices that are enduring. But even within these long-standing practices, things are changing through the development of new materials (pain medication), competences (knowledge about pain mitigation strategies/polled genetics), and meanings (embodied social significance of de-stressing and reducing pain). The practice of weaning is also in a state of transformation as producers increasingly adopt methods that reduce stress for cows and calves, such as the practices of fence-line and quiet weaning. The drivers of change are often explained through changes in the accessibility of materials (fence/two-stage weaning objects), competences (the know-how of perceived stress associated with weaning), and meanings (the meaningfulness associated with a less-stressful practice). The practice of low-stress handling and moving is characterized by change through the development of quiet moving materials (flags, one's own body, horses), competences (knowledge about cattle psychology), and meanings (the embodied significance of implementing low-stress handling and moving). Mechanisms of social transformation are often discussed within the context of the evolution and adoption of new materials, tools, and objects that improve animal husbandry. Producers highlight the importance of new and improved infrastructure and the development of

new materials to carry out their social practices. For example, the transformation of weaning is explained by the availability of two-stage weaning tools. Likewise, changes in disbudding, dehorning, and branding are associated with the development of pain medication. Therefore, viable material changes and options allow for the evolution of these practices.

Moreover, the development of new materials does not occur in isolation. The drivers of change are often discussed within the context of competences that are also evolving. This study demonstrates that many producers highlight a change in knowledge through formal education, attending workshops, listening to cattle-handling experts, consulting with veterinarians, and by learning about new research dispersed through their affiliated producer represented organizations. Many of the producers narrate a story of how their knowledge about their cattle and best social practices is continuously evolving. For example, implementing on-farm low-stress handling and herding practices are considered relatively new and perceived by many of the producers as contrary to the traditional method that they were taught. Low-stress handling and herding is also a practice that filters into other practices of branding, disbudding and dehorning, and weaning, to name a few, as it changes the way that the producer interacts with their cattle to ensure low-stress handling in any given social practice that includes human–animal interactions.

The mechanisms of change evident in branding, weaning, disbudding and dehorning, and handling are perceived to improve the welfare of their cattle, highlighting the concept of meanings; in other words, there is an embodied symbolic and social significance for nearly all of the producers who perceive of themselves as mitigating farm animal welfare issues through their transformed social practices. The social practices are often described by the producers through "mental activities, emotions, and motivational knowledge," as elements of practices that could be examined through various meaning concepts which represent one's values and beliefs (Shove et al. 2012: 23). For example, while many of the producers refer to a disruption to one or more of the interconnected foundations, such as the development of new materials as driving change (i.e., pain medication), the producers also refer to these practices as deeply meaningful because they improve the lives of their cattle. In this way, emotions are crucial for making sense of the social and symbolic significance of a social practice (Scheer 2012; Weenink and Spaargaren 2016).

Conclusion

This paper seeks to describe and explain the processes of continuity and change within four production-based social practices, from a producer perspective. While branding still occurs on cow/calf operations, many identify a change through the adoption of pain mitigation strategies and low-stress herding and handling. Disbudding and dehorning occur on both cow/calf and dairy farms, however, cow/calf producers describe a change towards the use of polled genetics with the goal of outright eradicating the social practice, while dairy producers highlight the significance of pain mitigation strategies. Although the social practice of weaning ensues differently on cow/calf and dairy operations, many cow/calf producers describe incremental

change towards low-stress methods of fence-line and two-stage weaning, while dairy producers also describe the importance of easing the stress associated with weaning off of milk. Finally, low-stress handling and moving is a relatively new social practice that filters into all other production-based social practices where there is some degree of human–animal interaction. Low-stress handling and moving signals a shift in thinking regarding how producers perceive of themselves as carriers of social practices and animal husbandry that can have grander animal welfare implications. Both cow/calf and dairy producers outline the reproduction of social practices as occurring through the interconnections of materials, competences, and meanings. However, the evidence from this research also demonstrates that all social practices are in a state of change as the materials, competences, and meanings are not solely 'made, sustained, or broken' but are also evolving.

While nuances are evident in the perspectives of producers with regards to sustaining and transforming social practices, future research could build upon other social practices of production, such as castration, calving, or milking, that were not captured within this study. In addition, future research could explore dairy production in more detail and social practices at other stages of the beef and dairy production chain, such as transportation, veal operations, feedlots, and slaughtering facilities. Industry stakeholders and farm animal welfare advocates can build on this research by considering the narratives behind social practices and how producers perceive of themselves as contending with farm animal welfare issues in an effort to further clarify knowledge about how food is produced. Animal welfare efforts can look to the evolution of materials, competences, and meanings as a way of facilitating change in the beef and dairy production systems and encouraging farm animal welfare improvements.

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References

Barnes, B. (2001). Practice as collective action. In T. R. Schatzki, K. K. Cetina, & E. von Savigny (Eds.), *The practice turn in contemporary theory*. New York: Routledge.

Bock, B., & Buller, H. (2013). Healthy, happy and humane: Evidence in farm animal welfare policy. *Sociologia Ruralis, 53*(3), 90–411.

Bradley, A., & MacRae, R. (2011). Legitimacy & Canadian farm animal welfare standards development: The case of the national farm animal care council. *Journal of Agriculture and Environmental Ethics, 24*(1), 9–47.

CAA & NFACC. (2013). *Code of practice for the care and handling of beef cattle.* Canadian Cattlemen's Association & National Farm Animal Care Council. https://www.nfacc.ca/pdfs/codes/beef_code_of_practice.pdf. Accessed May 3, 2019.

Canadian Centre for Food Integrity (CCFI). (2018). 2018 public trust research: Insights to action, downloadable from https://www.foodintegrity.ca/research/download-new-public-opinion-research-online-on-food-farming/. Accessed May 9, 2019.

Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches*. Los Angeles: Sage Publications.

Davidson, D., Jones, K. E., & Parkins, J. R. (2016). Food safety risks, disruptive events and alternative production: A case study of agricultural transition in Alberta. *Agriculture and Human Values, 3*(2), 359–371.

DFC & NFACC. (2009). *Code of practice for the care and handling of dairy cattle.* Dairy Farmers of Canada & National Farm Animal Care Council. https://www.nfacc.ca/codes-of-practice/dairy-cattle. Accessed August, 2017.

Dwane, A. M., More, S. J., Blake, M., McKenzie, K., & Hanlon, A. J. (2013). Farmers' self-reported perceptions and behavioural impacts of a welfare scheme for suckler beef cattle in Ireland. *Irish Veterinary Journal, 66,* 1–12.

Edwards-Jones, G. (2006). Modelling farmer decision-making: Concepts, progress and challenges. *Animal Science, 82*(6), 783–790.

Ellis, C. (2013). The symbolic ideology: Stewardship, husbandry, and dominion in beef production. *Rural Sociology, 78*(4), 429–449.

Fraser, D. (1995). Science, values and animal welfare: Exploring the inextricable connection. *Animal Welfare, 4*(2), 103–116.

Fraser, D. (2008). *Understanding animal welfare: A science in its cultural context*. Ames: Wiley.

Gibbs, G. R. (2007). *Qualitative research kit: Analyzing qualitative data*. London: Sage Publications.

Gocsik, E., Saatkamp, H. W., de Lauwere, C. C., & Oude Lansink, A. G. J. M. (2014). A conceptual approach for a quantitative economic analysis of farmers' decision-making regarding animal welfare. *Journal of Agriculture and Environmental Ethics, 27*(2), 287–308.

Hailu, G., Cao, Y., & Yu, X. (2016). Risk attitudes, social interactions, and the willingness to pay for genotyping in dairy production. *Canadian Journal of Agricultural Economics, 65*(2), 317–341.

Lamey, A. (2019). The animal ethics of Temple Grandin: A protectionist analysis. *Journal of Agricultural and Environmental Ethics, 32,* 1–22.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.

Lund, V., Coleman, G., Gunnarsson, S., Appleby, M. C., & Karkinen, K. (2006). Animal welfare science—Working at the interface between the natural and social sciences. *Applied Animal Behaviour Science, 97*(1), 37–49.

MacDowell, L. S. (2012). *An environmental history of Canada*. Vancouver: UBC Press.

Martin, R. P. (2012). The opinions and recommendations of one particular study group: The pew commission on industrial farm animal production. In W. G. Pond, F. W. Bazer, & B. E. Rollin (Eds.), *Animal welfare in animal agriculture: Husbandry, stewardship, and sustainability in animal production*. Boca Raton: Taylor & Francis Group.

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach*. Thousand Oaks: Sage Publications.

McCulloch, S. P. (2012). A critique of FAWC's five freedoms as a framework for the analysis of animal welfare. *Journal of Agriculture and Environmental Ethics, 26*(5), 959–975.

McGlone, J. J. (2001). Farm animal welfare in the context of other society issues: Toward sustainable systems. *Livestock Production Science, 72*(1–2), 75–81.

McMichael, P. (2009). Contemporary contradictions of the global development project: Geopolitics, global ecology, and the 'development climate'. *Third World Quarterly, 30*(1), 247–262.

Moggy, M. A., Pajor, E. A., Thurston, W. E., Parker, S., Greter, A. M., Schwartzkopf-Genswein, K. S., et al. (2017a). Management practices associated with stress in Cattle on western Canadian cow–calf operations: A mixed methods study. *American Society of Animal Science, 95*(4), 1836–1844.

Moggy, M. A., Pajor, E. A., Thurston, W. E., Parker, S., Greter, A. M., Schwartzkopf-Genswein, K. S., et al. (2017b). Attitudes of western Canadian cow-calf producers towards the code of practice for the care and handling of beef cattle. *The Canadian Veterinary Journal, 58*(11), 1209–1211.

Nicolini, D. (2012). *Practice theory, work, and organization: An introduction*. Oxford: Oxford University Press.

Rollin, B. E., Broom, D. M., Fraser, D., Golab, G. C., Arnot, C., & Shapiro, P. (2012). Defining agricultural animal welfare: Varying viewpoints and approaches. In W. G. Pond, F. W. Bazer, & B. E. Rollin (Eds.), *Animal welfare in animal agriculture: Husbandry, stewardship, and sustainability in animal production*. Boca Raton: Taylor & Francis Group.

Rushen, J. (2003). Changing concepts of farm animal welfare: Bridging the gap between applied and basic research. *Applied Animal Behaviour Science, 81*(3), 199–214.

Sahakian, M., & Wilhite, H. (2014). Making practice theory practicable: Towards more sustainable forms of consumption. *Journal of Consumer Culture, 14*(1), 25–44.
Schatzki, T. R. (2001). Introduction: Practice theory. In T. R. Schatzki, K. K. Cetina, & E. von Savigny (Eds.), *The practice turn in contemporary theory*. New York: Routledge.
Scheer, M. (2012). Are emotions a kind of practice (and is that what makes them have a history)? A Bourdieuian approach to understanding emotion. *History and Theory, Studies in the Philosophy of History, 51*(2), 193–220.
Shove, E., Watson, M., & Pantzar, M. (2012). *The dynamics of social practice: Everyday life and how it changes*. Thousand Oaks: Sage Publications.
Spooner, J. M., Schuppli, C. A., & Fraser, D. (2012). Attitudes of Canadian beef producers toward animal welfare. *Universities Federation for Animal Welfare, 21*(2), 273–284.
Statistics Canada. (2017). *Alberta has the most beef cattle in Canada and the second largest total farm area.* Catalogue no. 95-640-X. https://www150.statcan.gc.ca/n1/pub/95-640-x/2016001/article/14808-eng.htm. Accessed June 29, 2017.
Statistics Canada & Canadian Dairy Commission. (2017). *Number of farms, dairy cows and heifers.* http://dairyinfo.gc.ca/index_e.php?s1=dff-fcil&s2=farmferme&s3=nb. Last Accessed June 28, 2017.
Stull, D. D., & Broadway, M. J. (2013). *Slaughterhouse blues: The meat and poultry industry in North America*. Belmont, CA: Wadsworth.
Thompson, P. B. (2013). *From field to fork: Food ethics for everyone*. New York: Oxford University Press.
Vasseur, E., Borderas, F., Cue, R. I., Lefebvre, D., Pellerin, D., Rushen, J., et al. (2010). A survey of dairy calf management practices in Canada that affect animal welfare. *Journal of Dairy Science, 93*(3), 1307–1315.
Ventura, B. A., von Keyserlingk, M. A. G., & Weary, D. M. (2015). Animal welfare concerns and values of stakeholders within the dairy industry. *Journal of Agriculture and Environmental Ethics, 28,* 109–126.
Webster, J. (2016). Animal welfare: Freedoms, dominions and "a life worth living". *Animals, 6*(6), 1–6.
Weenink, D., & Spaargaren, G. (2016). Emotional agency navigates a world of practices. In D. Weenink, G. Spaargaren, & M. Lamers (Eds.), *Practice theory and research: Exploring the dynamics of social life*. New York: Routledge.
Whay, B. (2007). The journey to animal welfare improvement. *Animal Welfare, 16,* 117–122.
Wikman, I., Hokkanen, A. H., Pastell, M., Kauppinen, T., Valros, A., & Hänninen, L. (2016). Attitudes of beef producers to disbudding and perception of pain in cattle. *Animal Welfare, 25,* 429–438.
Winder, C. B., LeBlanc, S. J., Haley, D. B., Lissemore, K. D., Godkin, A., & Duffield, T. F. (2016). Practices for the disbudding and dehorning of dairy calves by veterinarians and dairy producers in Ontario, Canada. *Journal of Dairy Science, 99*(12), 10161–10173.
Windig, J. J., Hoving-Bolink, R. A., & Veerkamp, R. F. (2015). Breeding for polledness in Holstein cattle. *Livestock Science, 179,* 96–101.
Zaffino, H., Jessica, C., LeBlanc, S. J., DeVries, T. J., Nash, C. G. R., Gibbons, G. J., et al. (2014). Prevalence of and factors associated with hock, knee, and neck injuries on dairy cows in freestall housing in Canada. *Journal of Dairy Science, 97*(1), 173–184.