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Introduction / Need for Research

Public perception significantly shapes farming practices, underscoring the need to understand consumer behavior and attitudes (Widmar et al., 2017). Dairy producers view public opinion as a key driver of change in livestock agriculture, recognizing its influence on decision-making and the importance of aligning with societal expectations (Saraceni, 2022). Public scrutiny and attention have recently increased on livestock production operations (Wolf et al., 2016). Visual and emotional framing of procedures in mainstream media, such as videos and photographs, significantly influences public opinion, particularly when the procedures are portrayed as painful (Fonseca & Sanchez-Sabate, 2022; Rice et al., 2020).

Texas, the second-largest state in the United States (StatsAmerica, 2023), has 25 percent of its agricultural land designated for farming (Sallet, 2021). Lately, dehorning and disbudding practices have come under public scrutiny, emphasizing the importance of understanding public views on these practices (Gottardo et al., 2011). Increasingly, the public calls for food produced in operations following strict animal welfare guidelines (Placzek et al., 2020). Despite the increased public attention, many consumers remain unfamiliar with the technical aspects of disbudding methods such as caustic paste (CP) and hot iron (HI), as evidenced by the responses in this study. This knowledge gap highlights the critical need for science-based educational outreach. This study advances the AAAP's mission by educating the public on disbudding practices and animal welfare by evaluating public perceptions and preferences regarding two disbudding methods: caustic paste (CP) and hot iron (HI).

Four main objectives guided the research: (1) compare participants' preferences for disbudding methods (CP vs. HI) based on demographic factors, personal preferences, perceptions of public preferences, and the impact of scientific information; (2) determine how meat products could influence participants' preferences for disbudding; (3) determine how dairy products could influence participants' preferences for disbudding; and (4) compare the likelihood purchasing, consuming, and serving beef before and after viewing two images of disbudding techniques.

Theoretical Framework

Based on the theory of planned behavior (TPB), this study applied TPB's predictors of behavioral intention: attitudes toward the behavior (ATB), subjective norms (SN), and perceived behavioral control (PBC) (Ajzen, 1991). ATB reflects an individual's positive or negative evaluation of behavior, which is integral to examining how public perception and demographic factors shape preferences for disbudding techniques. SN considers the influence of social factors on behavioral intentions, emphasizing the media's significant role in shaping public opinion and societal attitudes (Buddle & Bray, 2019). PBC addresses how an individual's perception of the hardness of performing a behavior is influenced by personal experiences (Ajzen, 1991). This study investigates how consumer perceptions and choices regarding disbudding practices affect agricultural sustainability and support the humane treatment of dairy calves.

Methodology

This quantitative, cross-sectional, correlational study collected data from 514 participants selected through convenience sampling following approval from the Texas Tech Human Research Board (IRB2024-4). A 44-item survey was designed in Qualtrics® and distributed across Texas via the Centiment platform. Data coding was performed in Excel®, and analyses

were conducted using SPSS® software, version 29. Descriptive and inferential statistical methods were applied: chi-square tests addressed objective 1, binary logistic regressions were used for objectives 2 and 3, and paired sample t-tests were conducted for objective 4.

Results/Findings

Three hundred seventy-two participants reported favoring CP for calf disbudding, while 139 preferred HI. Three participants were not erased during data cleansing. Gender distribution was nearly equal; most participants had a college or high school diploma. Education and gender were significantly related to disbudding preferences: females and college-educated participants leaned towards CP. Age and income distributions were relatively even, with most participants earning between \$1,000 and \$3,000 monthly. Chi-square tests indicated a modest association between gender ($X^2 = 10.57$, $p = 0.01$, Cramer's $V = 0.12$) and educational level ($X^2 = 14.81$, $p = 0.02$, Cramer's $V = 0.17$) with disbudding preferences. A strong association was found between participants' personal preferences and their perceptions of public preference ($X^2 = 264.57$, $p = .05$, Cramer's $V = 0.72$), with most believing the public favors CP. Participants were more willing to consider CP after receiving scientific information ($X^2 = 9.81$, $p < 0.05$, Cramer's $V = 0.14$), and their preferences shifted slightly. Binary logistic regression revealed that seafood ($\text{Exp}(B) = 0.89$; $p < 0.01$) and cheese consumption ($\text{Exp}(B) = 0.71$; $p < 0.01$) significantly impacted disbudding preferences, with higher seafood and cheese consumption correlating to decreased HI preference. Paired t-tests showed significant decreases ($p < .001$) in participants' willingness to purchase, consume, and serve beef after viewing images of calves disbudded by CP and HI. HI elicited a stronger reaction, reducing participants' willingness to engage with beef products associated with disbudding practices, as shown in significant pre- and post-image scores.

Conclusions

The CP was reported as the preferred disbudding method among Texas consumers, particularly female and higher-educated participants. Viewing images of the disbudding techniques led to declining beef consumption, purchasing, and serving habits. Seafood and cheese consumption were significant predictors of CP preference, with higher consumption of these products correlating with decreased preference HI. Scientific data influenced participants' willingness to change disbudding preferences, notably among CP supporters, highlighting the role of education in shaping public views on animal welfare. Findings suggest CP is perceived as more humane than HI, and education backed by scientific data can significantly influence consumer preferences and industry practices.

Implications / Recommendations / Impact on Profession

Developing scientifically based educational tools is essential for communicating disbudding methods and addressing animal welfare. Since the public is open to adjusting views based on scientific and visual information, multimedia resources can effectively illustrate the implication of CP and HI methods, guiding informed consumer preferences. Tailored educational campaigns can also leverage insights about consumer dietary preferences. For instance, individuals who consume more seafood and cheese may be particularly receptive to messaging that aligns humane practices with ethical food production values. Clear information about the purpose of disbudding dairy cattle helps consumers make informed choices and reduce biases about the dairy industry. Understanding consumer expectations also encourages dairies to adopt welfare-oriented practices, potentially boosting consumer confidence and preference for dairy products.

References

- Ajzen, I., J. & University of Massachusetts at Amherst. (1991). The Theory of Planned Behavior. In *Organizational Behavior and Human Decision Processes* (Vol. 50, pp. 179–211). Academic Press, Inc. <https://www.sciencedirect.com/science/article/pii/074959789190020T?via%3Dihub>
- Buddle, E. A., & Bray, H. J. (2019). How Farm Animal Welfare Issues are Framed in the Australian Media. *Journal of Agricultural and Environmental Ethics*, 32(3), 357– 376. <https://doi.org/10.1007/s10806-019-09778-z>
- Fonseca, R. P., & Sanchez-Sabate, R. (2022). Consumers' Attitudes towards Animal Suffering: A Systematic Review on Awareness, Willingness and Dietary Change. *International Journal of Environmental Research and Public Health*, 19(23), 16372. <https://doi.org/10.3390/ijerph192316372>
- Gottardo, F., Nalon, E., Contiero, B., Normando, S., Dalvit, P., & Cozzi, G. (2011). The dehorning of dairy calves: Practices and opinions of 639 farmers. *Journal of Dairy Science*, 94(11), 5724–5734. <https://doi.org/10.3168/jds.2011-4443>
- Placzek, M., Christoph-Schulz, I., & Barth, K. (2020). Public attitude towards cow-calf separation and other common practices of calf rearing in dairy farming—a review. *Organic Agriculture*, 11(1), 41–50. <https://doi.org/10.1007/s13165-020-00321-3>
- Rank list: states in profile.* (n.d.). https://www.statsamerica.org/sip/rank_list.aspx?rank_label=pop1
- Rice, M., Hemsworth, L. M., Hemsworth, P. H., & Coleman, G. J. (2020). The impact of a negative media event on public attitudes towards animal welfare in the red meat industry. *Animals*, 10(4), 619. <https://doi.org/10.3390/ani10040619>
- Sallet, L. (2021, April 21). *Texas Farmland is the Most Threatened in the Nation - American Farmland Trust*. American Farmland Trust. <https://farmland.org/texasfarmland/>
- Saraceni, J., Renaud, D. L., Nelson, E., Van Os, J. M. C., Miltenburg, C., & Winder, C. B. (2022). Ontario Dairy producers' perceived barriers and motivations to the use of pain control for disbudding and dehorning calves: *A Qualitative study*. *Animals*, 12(8), 973. <https://doi.org/10.3390/ani12080973>
- Widmar, N. O., Morgan, C. J., Wolf, C. A., Yeager, E. A., Dominick, S. R., & Croney, C. C. (2017). US resident perceptions of dairy cattle management practices. *Agricultural Sciences*, 08(07), 645–656. <https://doi.org/10.4236/as.2017.87049>
- Wolf, C., Tonsor, G., McKendree, M., Thomson, D., & Swanson, J. (2016). Public and farmer perceptions of dairy cattle welfare in the United States. *Journal of Dairy Science*, 99(7), 5892–5903. <https://doi.org/10.3168/jds.2015-10619>