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A Glimpse of University of Montana  
Students' Opinions on Beef Production and Consumption

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Davidson Honors College Capstone

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**Abstract:**

This study looks at University of Montana (UM) students' opinions on the topics of beef production and consumption. Investigating students' opinions on beef production and consumption will provide a better understanding of student beliefs regarding local, grass-finished beef. This information will be useful to beef producers in Western Montana. This study collected data via dot survey. The survey included four questions with five to six prescribed answers for participants to choose from. In total, 198 beef-eating UM students of varying ages participated in the survey. All data was collected at the same time, over the duration of two hours, in front of the UM cafeteria. The results show that taste and pricing are among the most important factors for students when considering which beef to eat. These results indicate that college students care about more than just eating what is cheap. Additionally, results show that animal care is another facet of beef production that students are curious about when selecting beef. Finally, a question about meat substitutes showed UM students did not support meat alternatives more than real beef. Understanding UM students' interests could be helpful to Western Montana beef producers when they are deciding where and to whom they should market their products.

**Introduction:**

This study investigates University of Montana students' opinions on local, Montana-raised, grass-finished beef production and consumption. The focus on beef production and consumption was selected for a couple reasons. First, I have personally worked with Western Montana beef producers and think that information on students' opinions could help ranchers connect better with a younger market base. Second, U.S. beef disappearance, the total amount of beef used in the domestic market, has been steadily increasing since 2014

(USDA 2020). In 2019, total beef disappearance was more than 27 billion pounds (USDA 2020). The large quantity of beef used in the U.S. every year makes it an area worth investigating.

While researching prior to conducting this study, I found that articles about consumers' opinions on grass-finished beef were readily available (Pirog 2004, Cox et. al 2006, Lozier et. al 2008). Similarly, articles about the driving factors that influence the food college students purchase were also easily found (Dhillon et. al 2019, Giannetti 2016, Howse et. al 2018). However, what did not come up during research were articles that looked specifically at college students opinions on beef production and consumption. This led to the belief that this area of study was yet to be heavily explored. Additionally, information about UM students specifically could be more useful to the grass-finished beef producers in Western Montana than studies focusing on the opinions of students in different states.

Initially, I planned to focus the questions primarily on beef purchasing habits of students. Later the focus shifted to students' consumption of beef instead. This switch was important for a couple of reasons. First, there is a chance that people who are consumers of beef, therefore eligible to take the survey, are not always the primary shoppers in their household. Any information about purchasing habits coming from people who are not primary shoppers would not be as insightful as the person making the purchase. Second, the survey was conducted outside of the UM cafeteria, the Food Zoo. It was assumed that most of the students entering the cafeteria did not shop for food, particularly meat, since they were eating at a dining hall. To combat these potential problems, three of the four survey questions focus on consumption of beef. The one question that asks about buying beef was based on a hypothetical situation, and therefore did not require that the survey participant buy meat in their day to day life.

## Methods:

In this study, 198 University of Montana students were surveyed via dot survey to gather data on their opinions regarding beef production and consumption. Dot surveys produce quantitative data quickly and provide a glimpse into the target sample over a short time frame (OSU 2008). Initially developed for data collection at bustling farmers' markets, dot surveys consist of easels set up in a public place that is expected to receive high levels of traffic from the target sample population. On each of these easels is one question, below which is a set of prewritten answers. The participants are given stickers (often circular, hence the name dot survey) to stick beneath the answer they want to vote for on each easel.

Dot surveys must focus on “‘need to know’ questions” since they cannot ask as many questions as a traditional survey. Usually, dot surveys ask no more than four or five questions per survey (OSU 2008). In this survey, four specific questions were asked on the topic of beef production and consumption. The four questions asked during the survey include:

1. Which of the following is most important to you when selecting beef?
2. Montana ranchers can produce cattle grown entirely on grass.  
What would encourage you to buy local, grass-finished beef?
3. What information would be useful to you when considering which beef to eat?
4. Do you prefer eating meat substitutes (ie. Tofurkey, Beyond Burger) to eating beef?

Each question was accompanied with five to six responses from which survey participants could select. Because survey participants are not allowed to write in their own responses, the answers provided were not overly focused on any one facet of meat consumption such as economics or environmental impact. The variety of answers hopefully provided all participants with an answer that matched their opinion. Additionally, as was

mentioned in the introduction, due to the high number of participants who lived in the dorms, both questions and answers focused primarily on beef consumption, as opposed to purchasing.

Data for this study were collected on Wednesday September 2nd, 2020 on the UM campus. All easel question boards were set up outside the UM dining hall, the Food Zoo. Gathering data outside the Food Zoo made the most sense due to the high levels of student traffic and because of the food themed questions asked in the survey. The spot did, in fact, work out as a good spot for data collection, and in two hours 198 participants had completed the survey. To attract the attention of potential survey participants, survey conductors asked those passing by if they wanted to help with data collection. For this survey the participant needed to be a person who eats beef, so it was first established if the potential participant ate beef before allowing that person to participate. If s/he did eat beef and indicated interest in participating, s/he was given the following information:

Thank you for agreeing to participate in my capstone research. For my project I am studying University of Montana students' opinions on Montana grass-finished beef production. There are four questions on that topic on the easel boards, one question per board. Please read the questions and the answers that follow immediately below. After reading the question and answers, please vote for the answer you most agree with by placing your sticker in the column below that answer. One sticker per question/answer, and the color of the sticker does not matter.

After hearing background and instructions for the project, researchers gave participants a collection of four dot stickers and asked them to begin the survey. While all participants took the survey, both survey conductors kept an eye on their progress to ensure that all directions were followed and that no participant questions arose. Inevitably dot surveys fall prey to two main weaknesses. The first weakness is that the questions rarely ever end up with the exact same number of answers (OSU 2008). Although each answer should theoretically have the same number of answers at the end of the survey, some participants forget to answer a question or answered a question more than once. Survey monitors can help reduce the severity

of this first weakness. The second weakness is the potential for bias. If one column has an overwhelming number of dots, participants might feel pressure to also place their dot under that column. To reduce this, seeded responses were placed in each column before the easel was placed out for participants. Additionally, at one hour the question sheets were changed so the second hour participants had the same clean board, with the same seeded responses, as the first hour participant. The seeded responses were removed before the data was analyzed.

Due to the unusual circumstance of COVID-19, extra precautions were required before going forward with data collection. First, the easel question boards were spread out farther than they most likely would have been in a traditional farmers' market dot survey. Second, strips of dot stickers were distributed to participants with the correct number of stickers to limit contact between participants and survey conductors. Third, although data collection took place outside, participants were asked to put on a face mask before taking part in the survey. Finally, hand sanitizer and gloves were provided for all participants.

## Results:

The table below shows the first and second most frequently picked answers to all four questions in the survey.

Table 1

Questions	1st most frequently picked	2nd most frequently picked
1. Which of the following is <u>most</u> important to you when selecting beef?	Taste (45.45%)	Enviro Impact (22.22%)
2. Montana ranchers can produce cattle grown entirely on grass. What would encourage you to buy local, grass-finished beef?	Reasonable pricing (62.63%)	Sold in a wider variety of stores (20.20%)

3. What information would be useful to you when considering which beef to eat?	How the animals are raised and fed (57.58%)	Enviro benefits of practices used (16.16%)
4. Do you prefer eating meat substitutes (ie. Tofurkey, Beyond Burger) to eating beef?	No - they are too synthetic (47.98%)	I don't prefer one or the other (40.40%)

The four tables below show the number of participants that selected each answer choice and the rank of the answer choice.

Table 2: Which of the following is most important to you when selecting beef?

Answer Choice	# of selections per choice	Percent of answers	Answer ranking
Taste	90	45.45	1
Environmental Impact	44	22.22	2
Price	39	19.70	3
Supporting Montana ranchers	15	7.58	4
Convenience	10	5.05	5
Total:	198	100%	

Table 3: Montana ranchers can produce cattle grown entirely on grass.

What would encourage you to buy local, grass-finished beef?

Answer Choice	# of selections per choice	Percent of answers	Answer ranking
Reasonable pricing	124	62.63	1
Sold in a wider variety of stores	40	20.20	2
Clearly labeled as local & grass-finished	24	12.12	3
Knowing about the	7	3.53	4



ranchers			
Not interested	3	1.52	5
Delivered to my door	0	0	6
Total:	198	100%	

Table 4: What information would be useful to you when considering which beef to eat?

Answer Choice	# of selections per choice	Percent of answers	Answer ranking
How animals are raised and fed	114	57.58	1
Environmental benefits of practices used	32	16.16	2
Health benefits of beef raised on grass	17	8.59	3
Where to purchase	15	7.57	4
Economic benefits of buying local	12	6.06	5
Who the beef producers are and their story	8	4.04	6
Total:	198	100%	

Table 5: Do you prefer eating meat substitutes (ie. Tofurkey, Beyond Burger) to eating beef?

Answer Choice	# of selections per choice	Percent of answers	Answer ranking
No - they are too synthetic	95	47.98	1
I don't prefer one or the other	80	40.40	2
Yes - they are better	9	4.55	3

for the environment			
No - they harm the environment	8	4.04	4
Yes - they are more ethical	6	3.03	5
Total:	198	100%	

**Discussion:**

As is seen in the tables above, most of the questions resulted with a clear favorite answer among participants. Table 1 shows the first and second most frequently picked answer choices, along with the percentage of participants who picked them. For question one, taste was the most frequently picked answer as it was selected by 45.45% of participants. Environmental impact was selected 22.22% of the time, making it the distant second choice. I am not surprised that taste pulled almost 50% of votes for the most important factor when selecting beef because taste is often important to people when selecting food. It is encouraging to see that students selected environmental impact as the second most important factor because it indicates that they are conscious food habits impact the environment.

For question two, reasonable pricing was by far the most popular way that students would be encouraged to buy more local, grass-finished beef. As will be discussed later, this answer did not come as a surprise. Although the second most frequently picked answer “sold in a wider variety of stores” received over 40% less votes, it is still important to note that more availability would appeal to students.

Question three shows that nearly 60% of participants are curious about how cows are raised and fed before they are processed for food. Sixteen percent of survey participants are curious about how the production practices that beef producers use benefit, or generally affect,

the environment. There were no expected or hoped for answers in question three. Any information about students' curiosities is valuable to grass-finished producers because it gives them a glimpse into students' minds and shows where their knowledge is lacking.

Finally, question four shows that roughly 50% of students do not prefer meat substitutes and roughly 40% of students are neutral to them. In total, only about 7.5% of students preferred eating meat substitutes to real beef. Later discussion will talk about how improving the fourth question might shed more light on students' opinion of meat substitutes, however for the purpose of this study, learning that nearly half of the participants did not support meat substitutes was very encouraging.

The remaining tables go into greater details of what is summarized in Table 1. In addition to the first and second most frequently selected answers and their percentages, Tables 2 through 5 show the number of students that selected each answer, the percentage each answer was selected, and the ranking of the answer choice. The greater depth of Tables 2 through 5 help show the areas that students were not as interested in regarding beef production and consumption. For example, only 3.5% of students would be encouraged to buy more local, grass-finished beef if they knew more about the ranchers who produced said beef. Similarly, only 4% of students said knowing the stories of who produced the beef would be useful when considering which beef to eat. Knowing that students are not as interested in the ranchers themselves allows producers to focus their marketing and informative campaigns on different, more accurate subjects such as animal care or health benefits of grass-finished beef.

After analyzing the data and noting the general observations made above, a few results merit extra examination. Two of the results that will be discussed below stood out because the answers selected did not match expectations. The first unexpected result was participants' inconsistent answers regarding the topic of price. A second surprise was students' opinions of

meat substitutes. Another area of the study that merits discussion is students' selection of taste as an answer choice for one of the questions. Finally, a few words to address using a dot survey will be mentioned.

In this survey, two questions included answers about price. Question one, which asked survey participants what factor they considered most important when selecting beef, and question two, which asked what would encourage participants to pick local, grass-finished beef. Although the two questions did not have identical answer choices, when price was included in both questions it was only the highest picked answer on one of these two questions.

Because college students tend to be very money conscious and place great importance on the price of food (Howse 2018), I anticipated that whenever a question included low price as an answer choice it would be the most frequently selected. For this reason, when taste and environmental impact ranked higher than price as the most important factor students consider when selecting beef, it was surprising. Initially this led me to believe that I might have underestimated how UM students value their food.

The first question is not the only time UM students indicated that they care about more than just price and the economic side of beef production. Question three, which asked what information would be useful when making the decision of which beef to eat, had the most frequent answer choice "how the animals are raised and fed." This answer choice was by and far the most popular, selected by 57.58% of participants and picked roughly 40% more often than the next most popular answer. The second most frequent answer choice was "environmental benefits of practices used." The answer choice "economic benefits of buying local for the community" ranked fifth out of six, receiving only about 6% of votes.

Despite students' low ranking of price for questions one and three, question two showed a more anticipated answer regarding price. When asked what would encourage more local,

grass-finished beef consumption, students most frequently picked the answer reasonable pricing. Forty percent of students picked reasonable pricing over the second most popular choice. After a little bit of thought, the discrepancy between when price was selected as most important versus when it was not might not be as surprising as I initially thought. Just because price is not the top, utmost important factor in selecting beef does not mean it cannot be the factor that would encourage more students to change their consumption habits. In other words, since students already value other factors over price, but are still cash motivated enough to demand reasonable pricing, there is the possibility that students would start buying local, grass-finished beef if it fell within a price range they felt was reasonable.

While students' answers about pricing might be explained, their preference for reasonable pricing as a motivator to buy grass-finished beef could be a potential roadblock for producers to reach student markets. Even with the information that students are encouraged to buy grass-finished beef based on price, how producers and students quantify the term "reasonable" might be very different. There might still be a price gap between what producers of local, grass-finished beef think is a reasonable price and what students think is a reasonable price. Further study could shed light on if, or by exactly how much, these price points might differ. Should they in fact be different, producers might consider offering a student discount or some sort of payment plan that could make local, grass-finished beef products more accessible to students.

In an attempt to gauge student's beliefs on meat alternatives, one question asked if students preferred eating meat substitutes to eating beef. This question also resulted in unexpected answer selection. Five answers were provided, two were votes in favor of substitutes, two were votes against, and one indicated a lack of preference between the two. Attached to all five answer choices were justifications for making that selection. For example,

one of the justifications for answering in favor of meat substitutes was because meat substitutes were better for the environment. The reason the answers had a justification, and were not simply for and against alone, was to better understand not only what students preferred to eat but why they preferred that choice.

Given Missoula and the University of Montana's liberal reputation within the state (University of Minnesota School of Public Health 2016), it was predicted that the two yes answers would be the top choices among students. This prediction was made because meat substitutes are frequently advertised as more environmentally friendly. However, "No - they are too synthetic" (a vote against) followed closely by "I don't have a preference" were the top two answers by a landslide. The fact that students voted against meat alternatives in this survey is important for grass-finished beef producers to know. Because the majority of participants disapproved of artificial meat as being too synthetic, grass-finished beef producers could potentially target student groups by emphasizing that their beef products are entirely natural. Showcasing their animals' lives, production methods, and environmentally driven practices in advertising or communication with younger markets might speak to the students who care about the environment but understand meat substitutes are not the answer.

In the future, should this survey be repeated, two changes would benefit the quality of data collected on the meat alternatives questions. First, it would be useful to provide for and against answer choices without a supplied justification. Second, a "I am not familiar with meat substitutes" answer choice should be added. To address the first recommended change, instead of a provided reason for the yes or no vote, either allow participants to write in why they voted as they did, or accept the results without an understanding why the participant chose that answer. Although allowing participants to write in their own reason would make data analysis less streamlined, it would provide better insight into their beliefs. The recommendation for this

change follows from observing the participants in this study vote for “I don’t have a preference” solely because they did not align with any of the provided reasonings for selecting yes or no.

Initially, the “I don't have a preference” answer choice was meant to be the answer for those people who genuinely did not care which product they consumed. However, it quickly became a catchall for participants who either did not fit into one of the two yes or two no choices, or, who were very unfamiliar with meat substitutes in general. This is the reasoning behind the second recommendation of adding a “I am not familiar with meat substitutes” answer choice. Survey participants who are not familiar with meat substitutes cannot know if they have a preference to which they eat until they know more about the products. Such people mistakenly claiming they do not mind one way or the other what they consume skews the data and creates an image of indifference toward meat substitutes when there might not be.

Moving on to a question without a surprising answer, in survey question one the most frequently picked answer was taste. The answer of taste in response to a question asking what is most important when selecting beef makes sense. Obviously, people want their food to taste good. However, knowing that students place a high level of importance on the taste of the beef they eat might be cause for further investigation. While one of the participants placed his sticker under the “taste” answer column, he remarked something along the lines of how taste matters most and a steak with good marbling is the only way to go. Although knowing that students care most about taste can be useful to grass-finished producers, further study into what students consider a good tasting steak would provide useful insight for producers. Although grass-finished beef is tasty in its own way, it is traditionally associated with leaner products (Cox et. al 2006). Cox et. al found that in a taste-comparison consumers preferred the taste of fattier grain-finished beef to leaner grass-finished beef (2006). Given this fact, students who selected

taste as the most important factor in selecting which beef to eat might not have grass-finished beef as their taste standard.

One final consideration, as is often the case with dot surveys, some minor discrepancies were discovered when tallying the responses. Two of the four questions (questions one and four) had 198 total responses. In a dot survey, all questions ideally end up with the same number of responses. However, questions two and three had slightly different tallies. Question two had 202 responses, four over expected. Question three had 199 responses, one over expected.

It is still unclear how these discrepancies came to be. Regardless, because the variation was so minimal and both questions erred on the slightly high side, the extra responses were noted, then removed from the data before evaluation. Removing these extra responses was important so that calculations for all questions could be completed based on 198 responses. The extra responses from both questions were removed from the answer choice with the highest number of responses. Removal from the answer choices with the highest number of responses was deemed the best option because both questions had answers that were significantly more popular than the others, so removing the extra did not greatly affect the overall distribution of answers.

### **Conclusion:**

This study investigated University of Montana students' opinions regarding beef production and consumption. Overall, the results show that students care about a wide variety of issues surrounding beef with a desire to know about certain areas of production. Additionally, students' opinions on meat alternatives are not as supportive as some might think. The deeper understanding of how UM students think about beef production and consumption that resulted



from this study goes beyond other studies that investigate college students' eating habits. Not only is this study Montana focused, it also sheds light on college students' opinions on one specific facet of environmentally minded food production. The specific focus of this study allows the results to be useful to Western Montana producers of grass-finished beef products in a way general studies on food preferences would not be. What students eat and choose to purchase has huge potential for supporting Montana raised, grass-finished beef. If researchers and ranchers better understood what students look for, consider when consuming, and what might encourage them to change their habits, doors between students and producers could be opened. This study gave just a glimpse into the minds of students on these subjects, but it is a good start at gathering important information. Hopefully, more specific information can be collected that helps better understand and breakdown the data collected in this study.

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