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Analysis Report of EcoBite Survey

Introduction:

As the world continues to address the increasingly escalating climate crisis, Americans often question what they can individually do to contribute to global mitigation efforts. For many, one of the most significant efforts they can make is an adjustment to their diet. About a fourth of the world's total greenhouse gas emissions can be attributed to food systems (Ritchie, 2024). Based on current trends, food production will emit about 1,360 billion tonnes of greenhouse gasses between 2020 and 2100 which is over double the carbon budget of 500 billion tonnes across all sectors to keep global warming below 1.5℃ (Ritchie, 2024). Meat is inefficient at turning animals into calories; the ratio of input to output calories is much higher than plant based protein sources (Poore, 2018). Therefore, targeting consumer attitudes surrounding excessive meat consumption is an essential piece of a greener future.

Our goal with the EcoBite project was to spread awareness surrounding the climate impact of meat consumption and gauge the general attitude Americans have towards their diets' climate impacts. We created the EcoBite website that allowed users to input estimates of their weekly intakes of various protein sources and see the carbon emissions of their dietary choices. The goal was not to shame or persuade individuals to adjust their lifestyles, but instead present them with more factual information about their own diet and allow them to do what they desired with the facts. We believe most Americans do not have an understanding of their diet's impact

and the purpose of EcoBite is to dispel any misconceptions that individual actions do not have a large impact.

Methods:

We surveyed participants before and after using the EcoBite website. Before using the EcoBite website, we gave them a series of statements and asked them to agree or disagree with the statements on a spectrum from “Strongly Agree” to “Strongly Disagree.” The pre-website questions revolved around what feelings they already had regarding their diet’s impact and how willing they were to change their dietary habits for environmental purposes. Meanwhile, the post-website questions focused on how the participants' results from the EcoBite calculator caused their responses to change. We anticipated that responses would change because we believed not many Americans have easy and accurate access to data surrounding their diet’s climate impact.

Results/Discussion:

“My climate impact is much lower than the average American”, was the first prompt in our survey. We intended to use this as a metric to gauge our participants’ attitude towards their climate impact. Generally, the results were consistent with what we were expecting; most people were unsure, but slightly more people agreed than disagreed with the statement. We also found that no participants strongly agreed or strongly disagreed. This indicated that, while participants may have had a general idea of what their climate impact was, they weren’t confident in their beliefs. Upon reflection, we should have reworded the question to be more specifically directed towards the impact of their diet compared to the average American. While our question asked about their overall climate impact, we believe it would have been more relevant for our study to inquire about their impact solely in terms of their dietary choices.

“My climate impact heavily influences my dietary choices” was the second prompt in our survey. We expected that most people would either be neutral or disagree with this statement because most people consider climate impact to be a secondary concern when it comes to diet (Sanchez-Sabate & Sabate, 2019). Our data was consistent with what was expected, as 18 of the 23 participants were either neutral or stated that their climate impact didn’t heavily influence their dietary choices. To improve upon this prompt in future trials, we could have omitted “heavily” from the question, as this may have influenced participants’ answers.

The next prompt participants answered was, “I would consider changing my diet for environmental purposes”. While we hypothesized that the responses would be similar to the previous prompt, 12 of our participants agreed that they would consider changing their diet for environmental purposes. This is significantly more than the 5 people who answered that climate impact already influences their diets in the previous prompt. Many people would consider changing their diets for environmental purposes, but only a few have actually done so–this difference could be attributed to rising prices of groceries, negative opinions of alternative diets, or simply enjoying certain foods over others (Sanchez-Sabate & Sabate, 2019).

Participants were then prompted to, “Please select all of the dietary efforts you think are most helpful in combating climate change: Being vegetarian, being vegan, eating less red meat, buying food locally, being pescatarian, keto diet”. The most popular responses, selected by 18 of the 23 participants, were eating less red meat and buying food locally. It is easy to understand why most participants chose eating less red meat as the first option; red meat is expensive and is more commonly known to have high carbon emissions. Despite this knowledge displayed by our participants, a previous study found that reducing red meat consumption was one of the least popular methods for lowering carbon impact in the US (Sanchez-Sabate & Sabate, 2019). It is

important to note that many of our participants said that buying food locally was helpful in climate change which is a common misconception. While there are positive aspects to purchasing locally (lower transportation emissions, less monopolization by larger corporations), the less efficient resource usage necessary to grow non-native foods results in disproportionately higher emissions (Ritchie, 2024). Furthermore, while vegetarianism and veganism also received some agreement from participants at 9 and 6 votes respectively, we expect that societal bias caused by perceived extremist attitudes of vegetarians and vegans may have made these less popular choices. The Keto diet received 0 votes which would be expected since it is meat-intensive which reflects our participants' preliminary connection between meat and high carbon emissions.

After using the EcoBite tool, participants were asked to answer the prompt, “My previous expectations about my climate impact were correct”. As was anticipated 47.8% of participants disagreed, finding their expectations to be inaccurate. However, more participants than we expected found their expectations to be completely correct (8.7%), correct (26.1%), or partially correct (17.4%). This is likely because the participants in our survey were not an accurate representation of the general American population as they were aware that EcoBite was done as a project for a climate action class, ultimately creating a bias in their answers.

Our next post-calculator question asked, “Approximately how many kilograms CO2/week did EcoBite calculate for you?”. For this question, we received a wide range of answers as displayed in Figure 1 below. Omitting the outlier that responded 418 kg of CO2 which we attributed to user error, the vast majority of our participants answered between 30-100 kg CO2/week with a mean of 63 kg CO2/week. With the average American’s emissions being

around 24 kg CO2/week, our participants on average consume more heavily emitting foods, such as red meat, than the average American (Bassi, 2022).

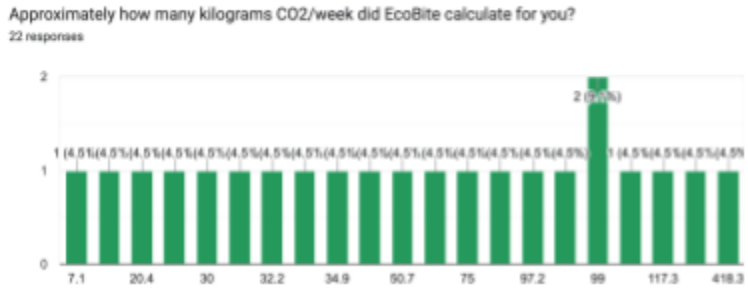

Figure 1: Participant responses to how many kilograms of CO2/week EcoBite Calculated their diet emits.

Our final question was, “If your previous expectations were inaccurate, why?”. We anticipated that most people would find their assumptions to be incorrect due to underestimating the impact of their diets. As evidenced by the previous results, 45.5% of participants said they underestimated the negative effects of their diet, with just 9.1% responding that their incorrect estimate was due to overestimating how effective their existing diet is at combating carbon emissions.

Conclusion:

It’s important to acknowledge that there are several possible flaws in how our survey was conducted that may have skewed our results. Firstly we had a biased sample of participants, as each of us surveyed our friends and family who were aware that this was a climate action project. While some of them came from more diverse demographics, we understand that a majority of them are likely more wealthy, climate aware, and educated than the average American. In an ideal scenario, we would have been able to reach out to more people to get more statistically significant results. Our data may have looked different with a larger sample size. Also, if we

were to do the survey again, some questions could have been reworded to better accommodate our specific research question.

Overall, the EcoBite survey and calculator achieved our goal of spreading awareness about the impact of individual dietary choices on carbon emissions. For many participants the EcoBite calculator revealed that their diet has a much higher carbon footprint than they initially expected. This indicates that while many college educated people were acutely aware of the impact of certain foods on the climate, they were unaware of the true carbon footprint of their own diet. The EcoBite calculator helped to quantify these participants' dietary carbon footprints not only in kg of CO2, but also more palatable metrics such as miles driven in a car (Staff, Oxford University 2022; Staff, United States EPA 2014). We hope that the EcoBite calculator will continue to enlighten more people on the carbon footprint of their diets, and the changes they can make to mitigate their personal impact on climate change.

References:

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EcoBite Website

EcoBite Survey Form