Educated Choices Program

An Impact Evaluation of a Classroom Intervention to Reduce Animal Product Consumption

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January 2020

Note: The researchers were contracted by ECP to carry out this impact assessment, but ECP had no input on the analysis and reporting of the data.

Executive Summary

In this comprehensive evaluation of Educated Choices Program's educational intervention, we report on our analysis of 95,241 student survey responses. We are excited to share these findings for a number of reasons. First and foremost, our analysis clearly demonstrates the effectiveness of this educational intervention in positively impacting student attitudes, behavioral intentions and self-reported behaviors in regard to their food choices. The scale of the dataset and the comprehensive nature of the analyses conducted provides a strong basis for funding considerations for educational interventions. This is particularly heartening because similar impacts have been difficult to find in other consumer-facing advocacy interventions. As will be highlighted later in the report, ECP's model of intervention is both high quality and cost effective, allaying some fears about the feasibility of deploying effective interventions of this nature on a large scale.

Our key findings include:

Overall Effectiveness

- 1. Watching an ECP presentation reduced students' intended and subsequent self-reported animal product consumption.**
- 2. Watching an ECP presentation increased students' rates of vegetarianism and veganism.**

Motivations & Barriers

- 3. Health was the most commonly cited motivation, but those who cited animal welfare as their main motivation were most likely to change their diets.**
- 4. Taste was by far the most commonly cited barrier, and those who cited taste as their main barrier were least likely to change their diets.**

Additional Findings

- 5. A presentation on animal product alternatives increased willingness to consume alternatives and decreased intentions to consume animal products.**
- 6. Many students reported making other changes after seeing an ECP presentation, including increasing vegetable consumption, trying to reduce their impact on the environment, and sharing information about food-related issues with others.**

Strategic Observations

- 7. Presentations were effective for males and females, for all age groups, and for students in all US states as well as Canada.**
- 8. Presentations focused on animal ethics lead to fewest people intending to reduce animal products, but most people intending to eliminate animal products altogether.**

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1. Introduction

The Educated Choices Program (ECP) is a USA non-profit which aims to reduce animal product consumption through educational classroom presentations. The organisation develops and delivers high quality presentations to educate middle school, high school, and college students in the USA and Canada about the impacts of their food choices, in particular the ethical, environmental, and health impacts of animal agriculture. The presentations are well-sourced, regularly updated, and delivered by educators who are employed and trained specifically to deliver consistent presentations without bias or judgement.

Animal Charity Evaluators (2014) has highlighted a paucity of evidence around the effectiveness of classroom education, deeming it 'a promising intervention and worth further investigation.' Existing studies on the effectiveness of similar programs are very limited: many are outdated, they often have small sample sizes, focus exclusively on elementary school age children, and have very limited follow-ups (Animal Charity Evaluators, 2014; O'Brien, 2003). Most of these studies do not evaluate education programs focused on the benefits of plant-based eating, and do not use animal product consumption as an outcome measure, instead focusing on wild or companion animals (O'Brien, 2003).

The research that has been done on educational interventions regarding farm animals is largely limited to examining changes in knowledge and attitudes rather than food choice. Aguirre and Orihuela (2010) found that at a 10 week program in rural Mexican schools aimed at six-year-olds could lead to increased knowledge and some positive changes in attitudes towards farm animals. Another study of a shorter intervention in Mexico, a two week program, also resulted in increased knowledge and slight changes in attitudes (Orihuela, Aguirre & Lakestani, 2015). Limited research in the United Kingdom on an educational event related to chicken welfare demonstrated a short-term increase in knowledge and minimally impacted attitudes (Jamieson et al., 2012). Finally, Samuels, Meers and Normando (2016) found that, after participation in an 11 week program student attitudes towards a variety of animal types, including farm animals, were more positive than those in a control group.

The most relevant research, according to Animal Charity Evaluators (2014), is from a 2013 study conducted in collaboration with other organisations. The study compared attitudes and behaviors of students who attended in-class presentations by several animal advocacy organizations to those from the same schools who did not. The surveys were sent out roughly two months after the presentations were given to measure longer term impacts. This study did not find significant reductions in animal product consumption for a group exposed to an educational intervention compared to a control group, and in fact found that consumption of some products was higher in the treatment

group (Animal Charity Evaluators, 2013). However, as with previous studies, the sample size was very limited (169 in the treatment group, 60 in the control group) which meant it was relatively unlikely to detect an effect.

Crucially, an important consideration for effective animal advocates is cost effectiveness; Animal Charity Evaluators (2013) concluded that classroom interventions are unlikely to be particularly effective, partly because they are considerably more expensive to deliver compared to other interventions such as leaflets and online adverts. However, ECP is able to deliver their presentations at a cost of just \$2.68 per student (Educated Choices Program, 2019), meaning that they could be cost-effective if they encourage many more students to reduce animal product consumption compared to other interventions.

Furthermore, there is reason to think that classroom education may be more effective than other consumer-facing interventions. A meta-analysis found that leafleting has limited or no effects on animal product consumption (Animal Charity Evaluators, 2017). Likewise, Animal Charity Evaluators' (2016) review of online adverts argued that this type of short impersonal interaction can be expected to have limited impacts. Similarly, Bryant (2019) points to evidence suggesting that leaflets and online adverts have limited impact on behaviour. A long classroom session with high quality interactive material delivered by a trained educator can reasonably be expected to have more impact on an individual than a leaflet or an online advert.

This impact evaluation sought to determine the effectiveness of ECP's classroom presentations for reducing animal product consumption. This evaluation's major strength is the size of the dataset compared to previous studies - data has been collected from tens of thousands of students over the course of several years. We conduct a variety of analyses to assess different program outcomes, and report findings and recommendations.

2. Methods

2.1 Procedure

Students were exposed to a classroom education intervention which aimed to reduce their consumption of animal products. Students saw one of five different presentations. The first four of these were ECP's primary presentations which had run for several years. The fifth was a newer presentation developed to inform students about animal-free food technology.

Table 1: Five different ECP presentations shown to students.

Presentation	Focus
The Environment and Modern Agriculture	The negative environmental impacts of animal agriculture
Modern Animal Agriculture	The animal suffering involved in animal agriculture
Healthful Eating	The negative health impacts of consuming animal products
The Ethics of Eating	A combination of environmental, animal welfare, and health issues
The Future of Meat and Dairy	Animal product replacements including plant- and cell-based meat and dairy

After watching the presentation, students privately answered an online survey for the chance to win a \$100 Amazon voucher. Students were made aware that the prize would be allocated in a random draw without regard to the content of survey responses.

Separately, a different set of students answered an online survey before being exposed to the classroom presentation. This set of students would act as a control group, against which the responses of the treatment group could be compared.

Finally, students who were over 18, had seen the presentation between 3-30 months ago, and had consented to be contacted for a follow-up, were contacted via email to take part in a follow-up survey for the chance to win a \$500 Amazon voucher.

2.2 Materials

The online surveys were designed in Survey Monkey, and contained questions about:

- a) Demographics (age, gender, country of residence)
- b) Diet prior to the presentation
- c) Intended future consumption of animal products
- d) Barriers and motivations regarding adopting a plant-based diet
- e) Opinions of cell-based meat
- f) Educator knowledgeability and respectfulness
- g) Novelty, importance, and reliability of the presentation subject matter
- h) Previous exposure to ECP presentations
- i) Additional information including school name, contact details, and written feedback

The exact wording of key questions can be found in **Appendix A**. We analysed data from four different datasets:

Dataset 1 includes 84,182 student responses to an in-class survey with records from 2017 until the end of October 2019.

Dataset 2 includes 7,634 responses to an in-class survey. Of these, 1,525 are from a control group, and 6,109 are from groups who had seen ECP presentations since the beginning of November 2019.

Dataset 3 includes 261 responses to a follow-up survey which was sent to students by email between 3-30 months after they saw the presentation, including 190 matched to the original responses of those students to the in-class survey.

Dataset 4 includes 3,164 responses to a survey about new food technologies, including plant-based and cell-based meat and dairy. Of these, 595 are from a control group, and 2,569 are from groups who saw an ECP presentation about future food technologies.

2.3 Participants

Participants (total n = 91,816) were students at schools and colleges in the USA and Canada. The overall age and gender makeup of the sample is shown in Graph 1:

3. Findings

3.1. Overall program effectiveness

Key takeaways:

- 1. Viewing an ECP presentation leads to a large significant increase in intentions to reduce animal product consumption.**
- 2. Viewing an ECP presentation leads to a significant increase in vegetarianism and veganism.**
- 3. Viewing an ECP presentation leads to a reduction in animal product consumption in the long term behavior of most students.**

We assessed the overall effectiveness of ECP presentations on students who saw them using three approaches. First, we compared the intended future diets of those who had seen an ECP presentation to a control group who had not seen the presentation. Second, we compared the rates of vegetarianism and veganism between students who had seen an ECP presentation before and those who had not. Third, we conducted a follow-up survey to assess how many students actually changed their diets, and how reliable their intended changes were.

3.1.1 Intentions: treatment vs. control

Using **Dataset 2**, we compared the responses of 5,710 students who saw an ECP presentation to a control group of 1,210 students who had never seen an ECP presentation. Both groups answered the same question about their intended future consumption of meat and animal products.

As shown in Graph 2, 69.4% of those who had seen an ECP presentation intended to reduce their consumption of meat and other animal products, whilst 5.2% intended to give them up altogether. In the control group, just 34.0% said they would reduce their consumption of animal products, and 3.7% said they would give them up altogether. The difference between the treatment and control groups was statistically significant ($\chi^2=630.227$, $p<0.001$).

The large difference in intended animal product consumption between students who had seen an ECP presentation and those who had not indicates that seeing an ECP presentation caused many students to intend to reduce their animal product consumption.

3.1.2 Vegetarianism and veganism: repeat viewers vs. first time viewers

In **Dataset 1**, some students ($n = 14,387$) answered a question about whether they had seen an ECP presentation before. Those who had already seen an ECP presentation answered the same survey again, and can be seen as a 'natural follow-up' group. Observing the rates of vegetarianism and veganism in students who had seen an ECP presentation before compared to those who had not enables us to assess the effectiveness of the program from another angle.

As shown in Graph 3, 6.8% of those who had seen an ECP presentation before were vegetarian, and 5.6% were vegan - this compares to just 5.9% vegetarians and 3.9% vegans in the group who had not seen an ECP presentation before. This difference was also statistically significant ($\chi^2=13.067$, $p=0.001$).

The difference in rates of vegetarianism and veganism between those who had already seen an ECP presentation compared to those who had not indicates that seeing an ECP presentation caused some students to become vegetarian or vegan.

3.1.3 Long term changes: follow up surveys

We sent out a follow-up survey to students who (a) were now over 18, (b) consented to be contacted for a follow-up, and (c) had seen the ECP presentation between 3-30 months ago. Of the 3,778 students we contacted via email, 261 (6.9%) responded to the survey (see **Dataset 3**). Of these, 224 were meat-eaters before seeing the presentation.

Of these 224 students, the majority agreed that seeing the ECP presentation had caused them to decrease their consumption of animal products, as shown in Graph 4.

Additionally, we asked about students' consumption of specific animal products compared to before they saw the presentation.

As shown in Graph 5, 62.9% said they had reduced or eliminated their consumption of beef, while 71.9% reduced or eliminated their consumption of pork. 40.2% said they had reduced or eliminated their consumption of chicken and 46.0% said they had reduced their consumption of fish - this is compared to just 10.7% and 12.1% who increased their consumption of these foods respectively.

Importantly, this offers evidence that meat reducers did not tend to replace red meat with more white meat. This is an important concern for animal advocates, because whilst health and environmental arguments favour reducing red meat consumption, white meat is associated with more animal suffering and therefore a replacement effect could actually increase animal suffering (Bryant, 2019). No such replacement effect is observed here.

Of the follow-up respondents, we could link 190 to their original in-class survey responses using their email address; 172 of these ate meat before seeing an ECP presentation. Comparing these responses allows us to observe whether reporting an intention to reduce animal product consumption predicted an actual (self-reported) decline in consumption.

As shown in Graph 6, a much higher proportion of those who intended to reduce their animal product consumption actually did reduce their consumption compared to those who did not intend to. An even higher proportion of those who intended to eliminate their animal product consumption managed to cut down. This tells us that, while intentions are not enough, they do at least predict self-reported behaviour to a considerable extent.

3.2 Motivations and barriers

Key findings:

1. Health was the most common motivator, followed by animals, followed by the environment.
2. However, selecting health as the main motivator was associated with lower intentions to reduce animal product consumption.
3. Selecting animals as the main motivator was associated with higher intentions to stop consuming animal products altogether.
4. Taste was by far the most common barrier, followed by finding enough plant-based options and convincing parents.
5. Selecting taste as the main barrier was associated with lower intentions to reduce animal product consumption.

3.2.1 Motivations

In **Dataset 1**, students were asked about their main motivations for wanting to follow a plant-based diet.

As shown in Graph 7, health was the most common motivator amongst all students, followed by animals, followed by the environment. We can also see that, for girls, animals were almost as common a priority as health, whereas for boys, the environment was more common a concern than animals. There were few notable differences in age groups. Interestingly, respondents who were vegetarian most often said animals were their main motivation, whilst meat-eaters more commonly chose health.

As shown in Graph 8, those who said animals were their main motivation were far more likely to say they would not just reduce, but eliminate animal product consumption. On the other hand, those who said health was their main motivation were far more likely to say they would change nothing. These differences were statistically significant ($\chi^2=1611.82$, $p<0.001$).

3.2.2 Barriers

In **Dataset 1**, students were asked about their most pressing barriers to eating a plant-based diet.

As shown in Graph 9, the most common barrier to a plant based diet by far was concerns about taste.; second was finding enough plant-based options, and third was convincing parents. We can compare the prevalence of these most common barriers across different groups:

Graph 10 shows that, although taste was the most commonly cited barrier for all omnivorous groups, boys were relatively more likely to consider taste the primary barrier, whilst girls were relatively more likely to consider practical factors like finding plant-based options and convincing their parents. Interestingly, older students tended to be less concerned about taste or convincing their parents, and more concerned about finding plant-based options relative to younger students. Of those who were already veg*n, the most common barrier was finding enough plant-based options - they were far less concerned about taste than meat-eaters.

As shown in Graph 11, those who considered taste to be the most significant barrier were much more likely to say they would not change their diet compared to those who gave other common barriers. They were far less likely to say they would eliminate their animal product consumption, also. It appears that those who gave practical barriers like finding enough plant-based options and convincing their parents were more likely to intend to reduce or eliminate their animal product consumption compared to those who said taste was the primary barrier.

3.3 Future food technologies

Key findings:

- 1. Viewing a presentation about future foods including plant-based and cell-based meat and dairy led to more positive attitudes towards these foods.**
- 2. This presentation also led to more negative attitudes towards animal products, and an increased willingness to reduce animal product consumption.**
- 3. Plant-based alternatives were most appealing to girls and to older students.**
- 4. Food safety was considered the most important issue with regards to cell-based meat.**

3.3.1 Impact of 'Future of Meat and Dairy' presentation

In **Dataset 4**, students ($n = 3,164$) were asked about their views of new cell-based and plant-based meat and dairy products. This included a treatment group ($n = 2,569$) who had seen an ECP presentation about future food technologies, and a control group ($n = 595$) who had not seen the presentation. Participants rated their interest in trying various foods and the importance of different food characteristics on a 1-5 scale.

First, we observed statistically significant ($p < 0.05$) differences between the treatment and control groups with respect to their attitudes towards future food technologies, as shown in Graph 12.

While the major differences were in attitudes towards plant-based and cell-based food products, we also detected differences in attitudes towards conventional meat and dairy also changed, which were significantly more negative in the treatment group compared to control. For the control group, conventional meat and dairy were the most appealing foods, followed by plant-based dairy. For the treatment group, cell-based and plant-based meat were the most appealing foods, while conventional meat and dairy were the least appealing.

We also wanted to test whether this presentation affected students' intended consumption of animal products. Whilst the presentation highlighted the major issues with animal agriculture, it also presented alternative products (some of which are not

yet commercially available) as a viable solution, and could therefore reduce the urgency to change.

As shown in Graph 13, viewing the presentation about future food technologies actually increased intentions to reduce animal product consumption compared to a control group. This was a statistically significant difference ($\chi^2=578.18$, $p<0.001$), and indicates that viewing this presentation caused students to intend to reduce their animal product consumption.

3.3.2 Demographic differences

We also observe demographic differences in the interest towards these products.

As shown in Graph 14, plant-based meat and dairy tended to be more appealing to girls compared to boys, whereas the reverse was true for conventional meat and dairy. Additionally, plant-based products appeared to be more appealing to older students, whereas conventional animal products were more appealing to younger students.

Predictably, vegetarians and vegans were more interested in plant-based products and less interested in conventional animal products compared to omnivores.

Additional data from **Dataset 1** provides further insight onto some demographic trends with respect to attitudes towards cell-based meat. Students (n=70,572) were asked about their willingness to eat 'clean meat', a term sometimes used to refer to cell-based meat (see Bryant & Barnett, 2019).

As shown in Graph 15, most students said they would be very or extremely interested in eating cell-based meat. Older students were more likely to say they found cell-based meat appealing. We also see higher interest amongst omnivores compared to veg*ns, a trend which is consistent with survey data from elsewhere (Wilks & Phillips, 2017). There is very little difference between the genders.

3.3.3. Barriers and motivations

Additionally, students were asked about the importance of various motivators, barriers and conditions for trying cell-based meat specifically:

As shown in Graph 16, participants rated food safety as the most important concern by far, followed by taste and texture. Health was rated as the most important motivator, though all reasons were considered to be important. Interestingly, data from **Dataset 1** provides an alternative view on the matter of motivations, as shown in Graph 17.

When participants who saw one of the main four presentations (i.e. not the Future of Meat and Dairy presentation) were asked to choose one motivation for trying cell-based meat, the largest choice for all groups was animals. This could indicate that viable alternatives to animal products could open the door to stronger consideration of animal welfare in general. Indeed, this idea is in line with experimental research which has demonstrated that eating meat causes a people to consider animal suffering less important (Loughnan, Haslam & Bastian, 2010).

3.4 Other program outcomes

In **Dataset 3** (the follow up survey, n = 261), we also asked about a range of other outcomes.

As shown in Graph 18, most students who responded to the follow-up survey said they had engaged more in other positive behaviours such as eating more healthy plant-based foods, sharing information about the impact of animal agriculture on animals, the environment, and human health, and trying to reduce their environmental impacts in other ways.

Respondents said they discussed things they had learned in the presentation with an average of 15 other people. Interestingly, they were more likely to share information about the environment and animal welfare than health.

3.5. Effectiveness of different presentations

Key finding: The animal-focused presentation resulted in the smallest proportion intending to reduce animal product consumption, but it also resulted in the highest proportion intending to give up animal products altogether.

Using **Dataset 1**, we compared the future dietary intentions of omnivorous students (n=79,241) who saw four different ECP presentations (see Table 1).

As shown in Graph 19, the outcomes for each of the four presentations were overall fairly similar. However, compared to the other presentations, a notably lower proportion of those who saw the Modern Animal Agriculture presentation said that they would reduce their consumption of animal products, and a higher proportion said they would change nothing. Interestingly, a higher proportion also said they would cut out animal products altogether. This difference was statistically significant ($\chi^2=185.05$, $p<0.001$). This likely reflects that animal suffering is a more ‘all or nothing’ issue compared to the incremental approach one could take to reducing environmental impact or caring for ones health.

It is worth noting that the Future of Meat and Dairy data is not included here, and that this presentation appeared to be much more effective in reducing intended animal product consumption compared to the other 4 presentations (see Graph 13). However,

the students who saw this presentation answered a different questionnaire, which may have primed them differently, so responses are not necessarily comparable. It is also possible that, in the Future of Meat and Dairy survey, more students interpreted the question about future consumption of animal products in the context of evolving food technology, and thought they would consume fewer animal products by default in the future rather than intending to consciously reduce their animal product consumption. This is less likely to have been the case in the main four presentations. In any case, it seems this comparison is not as relevant as comparing the four primary ECP presentations.

We also compared various other ratings given to the four presentations by all students who saw them (n=84,182):

As shown in Graph 20, all of the presentations were rated very well in terms of their importance, reliability, novelty of information, and the knowledgeability and respectfulness of educators. Although by a small margin, Modern Animal Agriculture was fairly consistently rated the poorest on average on most of these measures. This might reflect the stronger dissonance associated with the subject matter compared to the other presentations.

Notably, boys were especially put off by the discussion of animal ethics - they were significantly less likely to reduce their meat consumption not only in the Modern Animal Agriculture presentation, but also in the Ethics of Eating presentation compared to the other two ($\chi^2=93.853$, $p<0.001$), suggesting that the addition of animal ethics to otherwise persuasive material might undermine the effectiveness of the presentation for some boys.

3.6. Receptiveness of different students

Key findings:

- 1. The impact of the ECP presentation on intentions to consume animal products was not significantly different for male and female students, nor for students of different age groups.**
- 2. After viewing an ECP presentation, most students in both the USA and Canada intended to reduce their consumption of animal products.**
- 3. After viewing an ECP presentation, most students in all US States for which we could collect data intended to reduce their consumption of animal products, including those in conservative and agricultural states.**

3.6.1 Gender differences

In the preceding analysis, the students were randomly allocated to the presentations, and observing the differences in intended diet could tell us which presentations were most effective. However, observing the difference in effectiveness for different demographic groups is more complicated, because we know that future dietary intentions are likely to be different for different demographic groups. For example, girls may be *a priori* more likely than boys to intend to reduce their animal product consumption. Therefore, to measure the impact of watching an ECP presentation on these different groups, we must use a ‘difference in differences’ approach. We observe the difference in intended diets for each demographic group between a treatment and control group.

As shown in Graph 21, females were more likely than males to say they would reduce or eliminate animal product consumption after viewing an ECP presentation (C vs. D). However, females were also more likely than males to intend to reduce animal product consumption in the control group (A vs. B). We can also see that, for both males and females, the presentation substantially increased intentions to reduce animal product consumption (A vs. C and B vs. D). The question we want to answer for strategic purposes is whether the presentation made more of a difference for females (B vs. D) than it did for males (A vs. C). We can see from simple subtractions that the differences between control and treatment groups was about 2 percentage points larger for females than for males¹.

¹ The difference in those intending to change nothing = $(55.7 - 17.3) - (71.5 - 35) = 1.9$.

The difference in those intending to eliminate animal product consumption = $(6.6 - 4.2) - (3.2 - 2.8) = 2$.

To test whether this difference was statistically significant, we used an ordinal logistic regression model. The dependent variable was dietary intentions: responses are coded as 0 (they do **not** intend to reduce their animal product consumption), 1 (they intend to reduce their animal product consumption), or 2 (they intend to eliminate their animal product consumption). The independent variables were the experimental condition (control vs. treatment), gender (male vs. female), and an interaction term (condition x gender). We already know that experimental condition and gender account for substantial differences in intentions to reduce animal product consumption, so we expect these to be significant predictors in the regression. If the regression also identifies the interaction term as significant, we can say that the presentation had more impact on one gender than the other.

The results confirmed that experimental condition ($\beta = 1.693, p < 0.001$) and gender ($\beta = 0.892, p < 0.001$) both had significant effects on the outcome. However, the interaction term was not significant ($\beta = 0.179, p = 0.193$). This indicates that the ECP presentation was not significantly more likely to change females' behaviour compared to males.

3.6.2 Age differences

Similarly to gender differences, in order to assess whether the ECP presentation had a different impact on different age groups, we must compare the treatment vs. control groups in **Dataset 2** using a difference in differences approach.

As shown in Graph 22, older students tended to have slightly higher intentions to reduce animal product consumption compared to younger students in the control group. There is a somewhat similar pattern in the treatment group, though this is less clear.

To test whether these differences were statistically significant, we used a similar ordinal logistic regression model. The dependent variable was dietary intentions: responses are coded as 0 (they do not intend to reduce their animal product consumption), 1 (they intend to reduce their animal product consumption), or 2 (they intend to eliminate their animal product consumption). The independent variables were the experimental condition (control vs. treatment), age group (12-13 vs. 14-15 vs. 16-17 vs. 18+), and an interaction term (condition x age group). We already know that experimental condition accounts for substantial differences in intentions to reduce animal product consumption, so we expect this to be a significant predictor in the regression. If the regression also identifies age group as significant, we can say that there are significant differences in the intentions of different age groups. If the regression identifies the interaction term as significant, we can say that the presentation had more impact on some age groups than on others.

The results confirmed that experimental condition ($\beta = 1.369, p < 0.001$) had a significant outcome on dietary intention. However, there were no significant differences between outcomes for different age groups (all β s $\leq .325$, all p s ≥ 0.051). Furthermore, the interaction terms were also non-significant (all β s $\leq .278$, all p s ≥ 0.277). This indicates that the ECP presentation had a similar impact on all age groups.

3.6.3 Countries and states

We can also look at the program outcomes for students in different geographical areas. In **Dataset 1**, more recent respondents indicated the country they live in (since ECP started in Canada). As shown in Graph 23, the students in the USA and Canada had similar intentions after viewing a presentation. This difference was not statistically significant ($\chi^2=0.836$, $p=0.658$)².

We can also look at dietary intentions after viewing an ECP presentation across states. As shown in Graph 24, ECP presentations led to significant intentions to reduce and eliminate animal products in all US states where they were given, making it an effective intervention in all regions of the country. It is particularly interesting to note that this impact can be seen even in states which are generally considered to be more conservative like Georgia and South Carolina, as well as in states highly associated with animal agriculture like Texas and Indiana.

² This analysis is different from the difference in differences approach above, since we do not have control data for Canada or all US states.

Graph 24: Outcomes by state (for states with n>100)

4. Discussion & Recommendations

4.1 Summary

Overall, we found compelling evidence that ECP presentations are an effective intervention to reduce consumption of animal products amongst adolescents and young adults. The majority of students who saw an ECP presentation intended to reduce or eliminate their animal product consumption. Those who saw ECP presentations were significantly more likely to reduce their animal product consumption compared to a control, and those who had seen an ECP presentation before were significantly more likely to be vegetarian or vegan than those who had not. Moreover, evidence from a follow-up survey indicates that most of those who intended to reduce their animal product consumption followed through, and many increased their consumption of plant-based alternatives.

Given that the available evidence suggests that other consumer-facing interventions including leafleting and online advertisements are of limited impact, the results of this study are hugely encouraging for animal advocates. Until now, there has been very limited evidence on the effectiveness of classroom education interventions aimed at reducing animal product consumption. Much of the available evidence is based on small and limited samples, and often addresses general animal issues rather than animal product consumption. The scale of the datasets used in this study have allowed us to observe patterns previously unknown to advocates, and provide good evidence of the effectiveness of classroom education interventions.

4.2 Recommendations

Based on these findings, we can make the following recommendations to improve the effectiveness of ECP presentations overall.

- 1. Continue to reach all groups of students.** We found evidence that the majority of students who watched an ECP presentation intended to reduce their animal product consumption, irrespective of age, gender, country and state. In fact, analyses indicate that the presentations had similar impacts across genders and age groups. Therefore, the optimal strategy to pursue in educational interventions is reaching as many students as possible without discriminating based on demographics.
- 2. Use the most impactful materials.** There is reasonably good evidence that fewer students will intend to reduce their animal product consumption in presentations focused on animal suffering compared to presentations focused on the environment or health. However, more students in this group intend to eliminate animal product consumption altogether. Moreover, students who say animals are their main motivation are more likely to reduce or eliminate animal product consumption. Therefore, evidence on overall presentation effectiveness is mixed: a focus on animals leads to more commitment from fewer students, whereas a focus on other issues leads to less commitment from more students.
- 3. Address the major barriers.** The three most common barriers to adopting a plant-based diet are taste (by far the most common), finding enough plant-based options, and convincing parents. Students who listed the latter two as their main concern were more likely to reduce their animal product consumption than those who said taste was most important, indicating that taste is the major barrier. Advocacy groups could consider offering samples of high quality vegan food to help overcome this barrier, although this is likely to be expensive, and may be impractical in a classroom setting.
- 4. Highlight the major benefits.** Health was the most common motivation given for all groups, but was also associated with the lowest rate of intended action - animal welfare was the motivation corresponding to the highest rate of intended action. Girls are especially likely to be receptive to animal suffering messages, whilst boys generally find this argument the least compelling. Since an animal message corresponds to the highest rate of intended action, advocates should not shy away from this message.

4.3 Limitations

There are some limitations to this evaluation which we must acknowledge.

Firstly, all of these results are based on self-reported behaviour. This is known to be less than perfectly accurate, as participants might not accurately forecast/remember their behaviour. This is likely to be compounded by the presence of social desirability bias - the tendency to give answers that reflect positively on oneself, particularly with respect to moralised issues.

Secondly, the sample in **Dataset 3**, the follow-up, was predictably skewed towards those who were more positive about the ECP presentation - those who intended to eliminate their animal product consumption were over-represented, while those who intended to change nothing were under-represented. This could mean the results of the follow-up were more positive than would be the case for all students.

Thirdly, all survey respondents were offered the opportunity to win an Amazon voucher worth at least \$100 - it is possible that some respondents interpreted this as being more likely to be awarded to people who gave positive responses to the survey. That said, it is standard practice to offer incentives in exchange for survey completion in research of this kind. Additionally, there is no reason to think that this effect would be bigger in the treatment group than in the control.

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Appendices

Appendix A: Key question wording

A1: Dataset 1: Dietary intentions

The following question was used to assess dietary intentions in Dataset 1:

As a result of this presentation, you plan to (please read ALL the choices and choose the BEST answer for your situation):

- 1. Eat less meat (but not less dairy/eggs)***
- 2. Eat less dairy/eggs***
- 3. Eat less meat AND dairy/eggs***
- 4. Never eat meat again***
- 5. Never eat dairy/eggs again***
- 6. Never eat meat AND dairy/eggs again***
- 7. Keep the same eating habits (eating meat AND dairy) you had prior to the presentation because you did not find the information compelling enough to change your eating habits***
- 8. Continue eating dairy/eggs because you are happy with your current VEGETARIAN diet***
- 9. Continue eating only plant-based foods because you are happy with your current PLANT-BASED diet***

Participants who selected options 1-3 were coded as intending to reduce animal product consumption. Participants who selected options 4-6 were coded as intending to eliminate animal product consumption. Participants who selected option 7 were coded as intending to make no changes. Participants who selected options 8-9 were excluded from the analyses.

It has been pointed out that the inclusion of the phrase ‘because you did not find the information compelling enough to change your eating habits’ for option 7 is an unnecessary qualifier which could put people off choosing this option, since it is socially awkward and potentially insulting to the presenter. Our analysis indicates that removing this qualifier increased the selection of this option by 4.3 percentage points. This was considered a small enough difference to keep the large amount of data collected using the original question wording. Nonetheless, we changed the question wording to exactly match the wording in the control group (see A7).

A2: Dataset 1: Current diets

The following question was used to assess current diets in Dataset 1:

Prior to this presentation, you regularly ate:

- 1. Meat and dairy/eggs (meat = beef, chicken, pork, fish, etc) (dairy milk, cheese, yogurt, ice cream, etc)*
- 2. Dairy/eggs but no meat*
- 3. Plant-based foods only*

A3: Dataset 1: Clean meat

The following question was used to assess attitudes towards cell-based meat in Dataset 1:

How interested are you in trying cell-based meat?

- 1. Not at all interested*
- 2. Not very interested*
- 3. Somewhat interested*
- 4. Very interested*
- 5. Extremely interested*

A4: Dataset 1: Cell-based meat motivations

The following question was used to assess the most important benefits of cell-based meat in Dataset 1:

Which of the following benefits of cell-based meat are most appealing to you?

- 1. Environment*
- 2. Animal welfare*
- 3. Health*

A5: Dataset 1 & 2: Motivations

The following question was used to assess motivations in Datasets 1 and 2:

IF you were going to consider eating only a plant-based diet, which of the following would be your most important REASON for doing so? (If you are already a plant-based eater, what was your most important reason?):

1. *The environment*
2. *Your health*
3. *The animals*

A6: Dataset 1 & 2: Barriers

The following question was used to assess barriers in Datasets 1 and 2:

IF you were going to consider eating only a plant-based diet, which of the following would be your greatest OBSTACLE to success? (If you are already a plant-based eater, what was your greatest obstacle?):

1. *Convincing my parents*
2. *Dealing with my friends*
3. *Finding enough plant-based food choices*
4. *Giving up the taste of meat and dairy*
5. *Giving up holiday traditions*
6. *No obstacles*
7. *Other (please specify): _____*

A7: Dataset 2: Dietary intentions

The following question was used to assess dietary intentions in Dataset 2.

In the future, you plan to (please read ALL the choices and choose the BEST answer for your situation):

1. *Eat less meat (but not less dairy/eggs)*
2. *Eat less dairy/eggs*
3. *Eat less meat AND dairy/eggs*
4. *Never eat meat again*
5. *Never eat dairy/eggs again*
6. *Never eat meat AND dairy/eggs again*
7. *Keep the same eating habits (eating meat AND dairy)*
8. *Continue eating dairy/eggs because you are happy with your current VEGETARIAN diet*
9. *Continue eating only plant-based foods because you are happy with your current PLANT-BASED diet*

This question was shown to students in the control group and students who had just watched an ECP presentation (since November 2019).

A8: Dataset 3: Overall animal product consumption

The following question was used to assess the overall change in animal product consumption in Dataset 3:

To what extent do you agree with the following statements? The ECP presentation(s) I saw caused me to reduce my consumption of animal products.

- 1. Strongly disagree***
- 2. Disagree***
- 3. Neither agree nor disagree***
- 4. Agree***
- 5. Strongly agree***

Participants who selected 1 or 2 were coded as disagreeing; participants who selected 4 or 5 were coded as agreeing; participants who selected 3 were coded as neither.

A9: Dataset 3: Specific animal product consumption

The following question was used to assess the change in consumption of specific animal products in Dataset 3:

Compared to your behavior before the presentation, how often are you now eating EACH of the following: [Beef, Chicken, Pork, Lamb, Fish, Eggs (including as an ingredient in other foods), Dairy (e.g. cheese, milk, yogurt), Plant-based meat alternatives, Plant-based dairy alternatives]

- 1. Not at all***
- 2. Much less often***
- 3. Slightly less often***
- 4. About the same***
- 5. Slightly more often***
- 6. Much more often***

Participants who selected 1 or 2 were coded as disagreeing; participants who selected 4 or 5 were coded as agreeing; participants who selected 3 were coded as neither.

A10: Dataset 4: Interest in trying animal product alternatives

The following question was used to assess students' interest in consuming animal product alternatives in Dataset 4:

How interested are you in eating/drinking each of the following? [Not at all interested, not very interested, somewhat interested, very interested, extremely interested]

- 1. Plant-based meat***
- 2. Plant-based dairy alternatives***
- 3. Cell-based meat***
- 4. No-cow dairy***
- 5. Conventional meat***
- 6. Conventional dairy***

A11: Dataset 4: Importance of motivations for cell-based meat

The following question was used to assess the importance of different motivations to try cell-based meat in Dataset 4:

How important are each of the following factors in motivating you to try cell-based meat? [Not at all important, not very important, somewhat important, very important, extremely important]

- 1. Cost***
- 2. Taste/texture***
- 3. New process/technology***
- 4. Naturalness***
- 5. Food safety***

A12: Dataset 4: Importance of barriers for cell-based meat

The following question was used to assess the importance of different barriers to try cell-based meat in Dataset 4:

Please indicate the importance of each of these issues in any decision to try cell-based meat? [Not at all important, not very important, somewhat important, very important, extremely important]

- 1. Cost***
- 2. Taste/texture***
- 3. New process/technology***
- 4. Naturalness***
- 5. Food safety***

Appendix B: Author biographies

Christopher Bryant

Christopher Bryant is a PhD candidate at the University of Bath in the United Kingdom. His research has focused primarily on consumer perceptions of cell cultured meat, and additionally on strategies for reducing animal product consumption generally. He is aligned with effective altruism, and has worked on research projects for several pro-animal charities.

Courtney Dillard

Courtney Dillard has a PhD in Communication Studies from the University of Texas-Austin. Her research agenda has largely focused on social change and animal advocacy efforts from 1980 to the present. She taught for close to two decades in the Civic Communication & Media Department at Willamette University in Salem, Oregon before recently accepting a position as the Social Change Researcher at Mercy for Animals (MFA).