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Recipient Type and the Effectiveness of Informational Campaigns: The Case of Meat

While global population growth has been accelerating during the last decades, the number of humans currently living on the planet is dwarfed by the amount of farm animals alive at any time, and even more by the quantity we slaughter for meat every year. According to the latest FAO statistics, this latter number is estimated around 75 billion. Even ignoring animal welfare, this is severely affecting the health of the planet and our own. What should be done about this?

Externalities of Meat Consumption

Mankind has been butchering and eating animals for at least 3,4 million years (McPherron et al., 2010). Evolutionary biology theories claim that complementing our diet with meat contributed to the spectacular growth of our brain (Fonseca-Azevedo et al., 2012). Anthropological theories suggest that the necessity of hunting drove the development of tool building, language and social structures. The domestication of animals (and plants) around 10,000 years ago led to a jump in the history of civilization. In other words, eating meat is a large part of what made us human. However, during the last century we took this to unsustainable levels. All in all, the agricultural sector accounts for 25 to 30% of global CO2 emissions, second only to the energy and transport sector, and 60% of non-CO2 emissions, in particular methane, which is much more efficient than CO2 at warming up the planet. A third to half of these emissions, depending on whether or not we include the share related to land use, comes from livestock production. Large scale factory farms, which cater to the ever-increasing global demand for cheap meat, are also responsible for other externalities, including distorted resource use (in particular of water and fertile land); local pollution of air and waterways, with consequences for neighboring ecosystems and human health; abuse of antibiotics, which threatens their effectiveness with dramatic implications for the whole spectrum of modern medicine. The cheap and overabundant animal products with worsened nutritional properties, which result from these production methods are also behind the epidemic of "welfare diseases" such as diabetes, cardiovascular conditions and some types of cancer (Mozaffarian, 2016).

So, what should we do about this? Economics is very clear on this point. In the presence of externalities, market prices do not reflect social costs; therefore, the market mechanism fails, and decisions taken on the basis of these prices are suboptimal. If applied to meat consumption, this principle implies that, first of all, consumers and producers must pay for the emissions (and other externalities) they cause. Today's carbon pricing systems, whether in the form of a tax like in Sweden or tradable emission permits like in EU, exempt the agricultural sector for various reasons. Moreover, as already mentioned there is more to meat than carbon emissions. Another FREE brief (Perrotta, 2011) makes the case for a meat (consumption) tax. Multiple teams of researchers (Wirsenius, Hedenus, and Mohlin, 2011; Edjabou and Smed, 2013; Gren, 2015; Andersson, 2019) have come as far as to compute the optimal level of such a tax, in different contexts and under different assumptions. There are also drawbacks to this approach, though. Climate-change curbing policy is in general an area where policy makers at all levels find it hard to converge to policies of strong incentives, such as taxes and regulation. Interventions targeting food production or dietary choices, in particular, are likely to face strong opposition from producers and consumers alike. It is therefore worth considering the alternative - or at least complementary - strategy of information and awareness campaigns.

The Power of Information

Given that a climate policy agenda of strong incentives is so fraught with obstacles, the potential for information to spark voluntary action would be very valuable. There is a catch here, however. Information about the benefits of an action often fails to encourage that action. Consider the case in point: for decades now, we have observed a persistence and increase of meat eating despite mounting evidence and widespread information on the ills of meat production and consumption. Indeed, this well-known weakness of informational interventions has contributed to the rising importance and application of alternative approaches. One example is the popularity of the so-called *nudges* (Thaler and Sunstein, 2009), modifications in the choice architecture that can subtly push agents towards an action without actually limiting the available alternatives. There is ample research on where and why the chain from information to action might get interrupted, and established evidence that the effectiveness of information depends on a variety of factors such as recipients' prior beliefs, the sender's credibility, and the non-informative content of the message, such as the emotional evocativeness of imagery (see a survey in DellaVigna and Gentzkow, 2010). Taking a step back to the stage before, namely the question whether information does reach the intended beneficiaries in the first place, at least three aspects of this have been investigated: limited attention, active avoidance, and selective retaining of information on the part of the recipients. In a new working paper (Berlin and Mandl, 2020), we investigate the role of individual type for selective information retention. We ask whether certain types of agents, in our case vegetarians, retain more of the information they are exposed to, even when exposed to a similar context and the same incentives to retain information as everyone else (so that hopefully the competing channels of limited attention and active avoidance can be neutralized). This has relevance for the possibility of tailoring the policy message, similar to the marketing theories of market segmentation. In contrast to well-developed marketing practices in the private sector, this potential has so far not been exploited in policy design. To the best of our knowledge, this mechanism has not been investigated in a real-life incentivized setting outside the lab before.

Natural Experiment in Class

We exploit a natural experiment in the context of higher education. A class of college students was assigned an essay about their plan for a Christmas dinner menu, after being exposed to a lecture and reading materials on the externalities of meat production, so that they could decide to make use of this information. The essays were to be written in randomly assigned groups of three, making the *type combination*, i.e. the presence of one or more vegetarian group members, a random group characteristic. We hypothesize that there is a difference in how carnivores and vegetarians deal with the provided information about the food industry. In particular, we test whether groups that include a vegetarian student recall a larger share of the information than groups made up only of carnivores. The essay was mandatory, and moreover it awarded study credits toward the final grade of the course (10/100 points). This constitutes a sizeable incentive, and possibly provides a stronger motivation for information retention as compared to the average monetary rewards which lab experiments rely on. To measure the share of information retained, we preregistered a list of 30 words in both English and Swedish

related to the learning outcomes of the lecture. We then used a script to measure how many of the 30 words appear in each essay. We call this number the essay's *score*, separate and independent from the teacher's assigned *grade*, which is of relevance for the student. The teacher-assigned grade, reflecting general comprehension of the topic rather than just the presence of keywords, is expected to be correlated with the score, but not perfectly. We also expect the grade to capture the ability of the students to a higher degree compared to the score, as the automatized word count fails to consider the context in which the words are mentioned.

Results

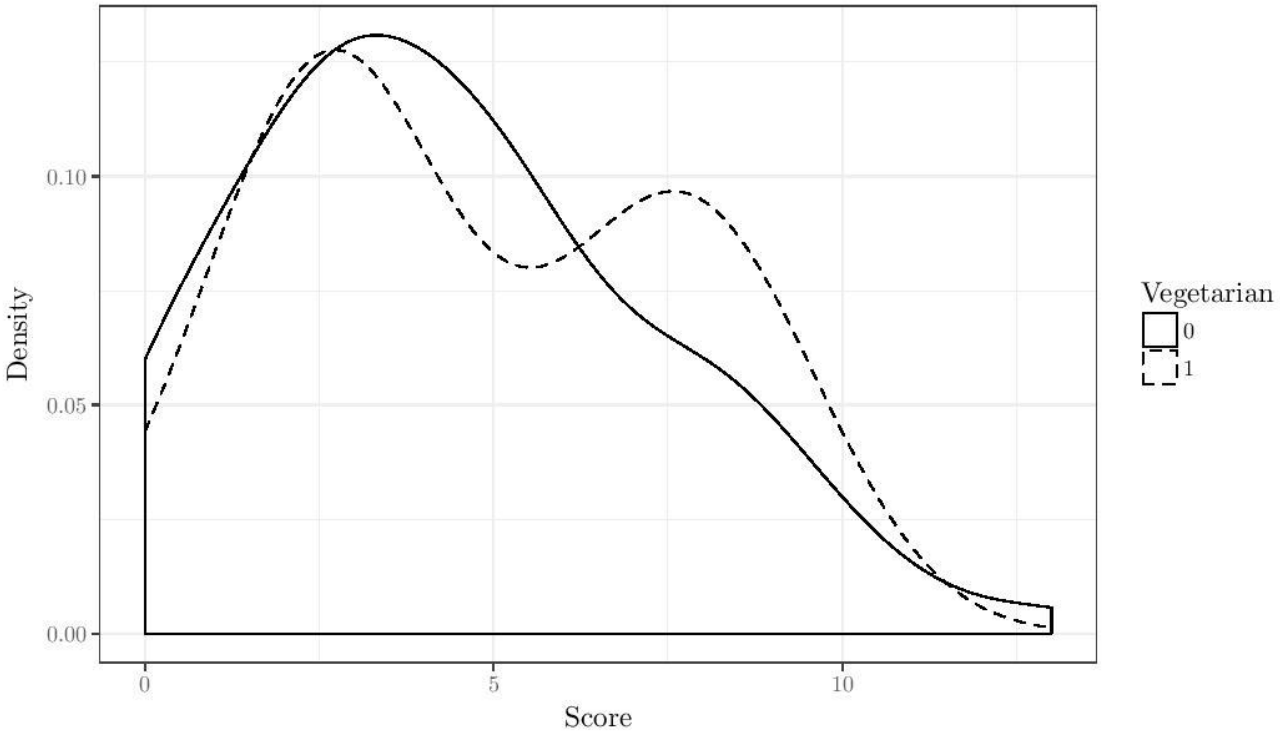

Figure 1. Group score by treatment status

Source: Berlin and Mandl (2020).

On average, groups including a vegetarian student scored higher (4.8) than groups with all meat-eaters (4.3), but not significantly so. The estimated Cohen's d (0.347), a standard measure of effect size used to indicate the standardized difference between two means, is much smaller than the minimum detectable effect in our sample, which we estimated at 0.8. In other words, we do not have the statistical power to either accept or reject the null hypothesis. The reason is that the treated group displays larger variation in score outcomes, possibly due to the smaller than anticipated sample size: only 11 students out of almost 300 identified themselves as vegetarians or vegan (non meat-eaters), which is a much smaller proportion than what the latest survey of young adults in Sweden estimates (17%, Djurens Rätt, 2018).

Looking beyond the mean at the details of our data reveals an interesting pattern. As the Figure shows, the distribution of achieved scores among the vegetarian groups is bimodal: a lower-level concentration of scores is close to the mode of the control distribution, but there is an almost as large

mass at a higher level. This might suggest that, quite understandably, (attention and) performance, in terms of recall, is affected by several factors beyond the *type*. In other words, not all the individuals with the relevant type display increased retention of information. While many vegetarians remain close to the mode for the meat-eating type, a large fraction obtains double the score, suggesting a substantial though heterogenous increase in the retention of information.

We also use regression analysis in order to control for potential omitted variables and net out some of the variation in the score data that is not related to our variable of interest (such as group size and ability). Robustness checks were performed with different specifications and alternative outcome variables, but the main conclusion remains the same: mean performance, in terms of information retention, is higher for the vegetarian type but not significantly so. However, these results should not be interpreted as a rejection of our original hypothesis about the importance of type for information retention, as our analysis is empirically underpowered due to the low number of vegetarians in the sample. More importantly, the method we propose is highly appropriate, easily replicable and cheap.

Conclusion

Information interventions are low-cost and can be effective. Understanding how they can be tweaked for best effect is an area of crucial research interest, in particular for such an area as climate-change curbing policy. We provide an easy and cheap method to investigate this further and hope that more future research will pursue this avenue.

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