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Article

Do Political Attitudes Affect Consumer Choice? Evidence from a Large-Scale Field Study with Genetically Modified Bread in Switzerland

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Abstract: Independent of the left-right model of ideological structure, genetically modified organisms (GMOs) in food and agriculture are resented across the political spectrum in Switzerland. In the absence of any real experience with genetically modified (GM) food but faced with continuous exposure to warning messages in the media, conditioned feelings related to such a politically sensitive product may have a significant influence on revealed consumer choice. In our large-scale field study, we examined this assumption by selling three types of bread labeled as 'made with organic corn', 'made with genetically modified corn' and 'made with conventional corn' respectively in five locations across Switzerland using different price scenarios and selling groups. Customers who decided to buy bread also received an envelope containing a questionnaire about their prior political attitude expressed through their voting decision in a national referendum on a five-year ban on GMOs in 2005. The results demonstrate that consumer purchase decisions are determined by contextual factors not captured by general political attitudes. Surprisingly, the mere presence of GM food did have a positive impact on overall sales. The assumption that consumers would feel turned off by the mere presence of GM food for political reasons can therefore be safely discarded.

Keywords: field study; GM food; revealed consumer behavior; political preference; freedom of choice; mental construal; conditioned feelings

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1. Introduction

1.1. Public Resistance to Genetically Modified Organisms (GMOs) in Europe

In 2009, genetically modified (GM) crops were cultivated on an area of 134 million hectares worldwide and had been consumed as food and animal feed since 1996 [1]. Yet, many European governments including those of France and Germany have imposed a *de-facto* ban on the cultivation of GM crops; and, with a few exceptions, European retailers are not selling GM food products, even though many of these products would be approved for human consumption as long as they are properly labeled as such [2]. These restrictions are largely (but not only) due to the negative public perception of genetic engineering in agriculture in Europe [3]. The technology is almost exclusively associated with risk for human health and the environment, corporate power and threats to traditional farming [4]. Some of these concerns are strongly emphasized by stakeholders on the left (e.g., corporate power assuming control over food and agriculture) and some by those on the right of the political spectrum (industrial agriculture as a threat to national identity preservation and traditional values and norms) [5].

Switzerland is no exception. Swiss people have expressed their negative attitudes towards genetically modified organisms (GMOs) in many national surveys and opinion polls [6-9]. They consider the technology to be morally unacceptable, risky and not useful, and therefore think it should not be encouraged [6].

In 2005, Swiss voters confirmed the prevailing negative view by approving a national referendum to ban GMOs from Swiss agriculture for five years. This was despite the fact that the Swiss legislature had already passed a law on genetic engineering in agriculture (Genlex) in 2004, which is regarded as one of the most restrictive in the world.

But how strong is this political preference against genetic engineering in food and agriculture in Switzerland? After all, most Swiss people do not have any concrete experience with GM products since labeled GM food is not available in retail stores (and hardly ever sold directly to consumers), GM crops are not grown in the field, the modern tools of genetic engineering are hardly ever examined in school laboratories. In the absence of any experience, people largely rely on information given to them by organizations they presume to be acting in the public interest [5]. These organizations have gained power in the GMO debate in Switzerland by portraying genetic engineering as a threat to sustainable agriculture and food safety [10]. The mass media has largely embraced this view by linking the term GMO to corporate power and potential large-scale technological accidents [4]. This all stands however in contrast to the verdict of the WTO dispute panel in the EU biotech case, which agreed with the plaintiff countries (USA, Canada, Argentina) that there is no hard evidence that would justify the EU's ban on the import of GM foods and therefore declared it as a non-tariff trade barrier [11].

1.2. Evaluative Conditioning and Stated Political Preferences

Political preferences are socially constructed [12]. They are largely influenced by the social environment and the mass media, particularly when the issue at stake (e.g., GMOs) is characterized by weak involvement and lack of direct experience. As a result, GM food may be strongly associated with images of unhealthy and dangerous substances inserted into daily food [13,14]. The lack of awareness

of the processes that shape perceptions nevertheless leads people to view their own political opinions as objective while they regard those of others as biased by self-interest [15,16].

Judgments about GM food made in front of a market stand may therefore be based primarily on evaluative conditioning (in a non-technical sense). A transfer of affect might occur from the political aversion felt towards genetic engineering in agriculture to the market stand and the people who sell food derived from this technology [17-19]. The aversion felt in Switzerland is happening through the mass media framing of the technology as risky and hazardous, the broad rejection of GMOs across the political spectrum, and the national education system whose textbooks have almost an exclusive focus on the potential risks of genetic engineering in agriculture. Due to the highly political nature of the use of genetic engineering in agriculture a radical cognitive distinction has occurred separating food products derived from one form of genetic modification (rDNA technology) as a unique and novel category called GMOs from all other types of food technology that are framed, by default, as natural [2,4]. At the same time, the public understanding of genes and genetic engineering has decreased in the past ten years or simply become irrelevant in Europe [3,20,21].

The low economic priority of using the rDNA technology in the heavily subsidized Swiss agricultural system [10], the limited knowledge about the technology and the fact that most Swiss people had never been confronted with a real GMO product is an indication of weak public involvement. According to insights from previous research [22,23], this would suggest a weak attitude-behavior consistency among Swiss food consumers. On the other hand, the Swiss are said to express their political views and cultural values in the supermarket by showing a willingness to pay a premium price for organic food [24]. This would be in line with the argument that people can receive 'value from fit' by consuming a product that makes them 'feel right' about what they are doing [25,26]. This represents a shift from consuming food to consuming concepts and therefore from mere physical consumption to conceptual consumption [27].

Some scholars found a willingness among European consumers to pay a premium price for a ban on labeled GM food products in supermarkets [28]. This would indicate that the mere presence of GM products in the supermarket would put people off and thus represent a negative externality for consumers. However, these surveys are based merely on stated political and stated consumer preferences and ignore the negative externality that results from not giving consumers the freedom of choice between clearly labeled GM and non-GM food products [29,30].

1.3. Objective and Methodological Approach

In this study, we want to investigate to what extent the mere presence of labeled GM food represents a negative externality for consumers, as claimed by previous research [28,31]. This can be tested by giving individuals the opportunity to reveal their preference on genetic engineering in agriculture at the polls and the market stand alike. Switzerland is the ideal country to do such a field experiment since a few GM food products are officially approved for human consumption (even though not sold anywhere) and the majority of the Swiss revealed their political preference for a five-year ban on GMOs in a national referendum in 2005.

We examined the consistency between revealed political preference and revealed consumer preference towards GM food by setting up market stands in five locations across the German and

French-speaking parts of Switzerland in summer 2008. We chose corn (maize) as the distinctive ingredient of our bread. The bread was labeled as made with organic, conventional or genetically modified corn, respectively. Bread itself is a very personal product with cultural and religious connotations in Europe. GM corn bread might therefore be politically provocative for food purists. The experiment tests if that also applies to Swiss consumers that buy food at open market stands. The revealed political preferences of our customers were identified by means of an ex-post survey that asked them about their voting decision in the 2005 national referendum on the temporary ban of GMOs in agriculture. Unlike a general question about their personal view towards GMOs, the recall of their prior voting decision is unlikely to be influenced by the choice at the market stand and therefore more reliable as an indicator of their prior political attitude.

Such a field study with GMOs can therefore test attitude strength in a society where the formation of one's view of genetic engineering in agriculture may be a result of conditioned feelings [32,33] generated by negative images, associations, and feelings about genetic engineering in the mass media and the education system.

In front of our market stand, an affectively neutral stimulus (a market stand with three types of bread on offer) is paired with the 'genetically modified' label that may produce a negative stimulus among consumers due to the recollection of the last media scandal about this type of food. This process of evaluative conditioning occurs without awareness of the conditioned stimulus. It can shape the formation of an attitude toward the market stand and its choice selection, following its pairing with the negatively valenced stimuli [19,34].

2 Theory and Method

2. 1. Theory

2.1.1. Political Ideology, Political Preferences and Political Attitudes Towards GM Food

Political preferences are linked to an individual's political attitude, which is again guided by a political ideology defined as a broad set of beliefs about the proper order of society and how it can be achieved [35,36]. These beliefs are shaped by considerations related to the social environment (sociotropic considerations) rather than personal economic circumstances, especially when the political issue at stake does not directly affect one's daily business [37-39]. Sociotropic considerations largely reflect the values of an identifiable group, class, constituency or society [40] and contribute to the shaping of a political ideology that "endeavors to describe or interpret the world by making assumptions about human nature, historical events, present realities, and future possibilities—and to envision the world as it should be" [41].

The dimensional structure and attitudinal contents of a political issue such as GMOs in agriculture may be also shaped by basic psychological orientations concerning uncertainty and threat [41]. Fear of loss of traditional ways associated with technological change in agriculture may play a crucial role in shaping political attitudes—understood as an evaluative judgment that integrates and summarizes the cognitive and affective reactions to possible change [42].

Even though fear of loss and intolerance of ambiguity are normally associated with conservatism [43,44], political resistance towards GMOs is found across the whole political spectrum

in Switzerland [6]. This may be due to the especially good fit of the general need to reduce complexity and uncertainty with conservative and liberal superstructures that give cause to resist the introduction of GMOs in food and agriculture [41,45]; right-wing conservatives in Europe fear socio-cultural change, especially when it comes to potential loss of rural culture and habits, while leftists fear risk and uncertainty resulting from technological change [10]. Moreover, the language used to express ethical concern about protecting the natural environment from 'contamination' by GMOs is based on concepts of purity that used to be applied to justify the prohibition of interracial marriage (on the right wing of the political spectrum) and to protect indigenous tribes from the corrupting forces of economic globalization (on the left wing) [46].

2.1.2. The Link Between Political Preference and Consumer Behavior

In modern democracies people feel obliged, as responsible citizens, to have an opinion on all possible political issues. However, it is impossible to study each topic in depth. As a consequence, the likelihood that people will simply adopt an opinion from the preferred source of information is very high. At the same time, people do not like to be seen as mere followers but prefer to emphasize the authenticity of their opinion by referring to their inner feelings about the issue being debated [47,48]. In other words, political opinions are increasingly seen as an expression of a personal life-style rather than the result of an in-depth analysis of the issue at stake [49]. In view of the weak involvement of people in politics as well as the growing aspiration by retailers to improve their public image, product marketing and political marketing have moved closer together by making instrumental use of affect heuristics [10,50,51]. Food retailers effectively blend product and polit-marketing by portraying themselves in advertising campaigns as advocates for safe and sustainable farming practices. This represents a shift from promoting what you probably want to buy to what you should buy [52] as well as what you want to vote for and what you should vote for [53,54]. In this shift toward conceptual consumption people experience a regulatory fit from 'feeling right' when they pursue a goal they consider to be in line with social values [25,26]. It sustains their regulatory or political orientation (e.g., agriculture ought to be GMO-free).

This focus is reflected in the decision of many retailers in Europe to promote organic food while banning GM food from their stores. This works well because 'organic' enjoys positive emotional tags such as 'natural' and 'fair', while agribusiness-derived GM products are given negative tags such as 'unnatural' and 'unfair' ('putting profit before people') [16,51]. Without having to search for more information, consumers pick an organic food product and feel certain of expressing a life-style that is in line with their political preference in favor of safe and sustainable farming practices [10]. Information that contradicts the beliefs that GMOs are harmful and that organic products are beneficial for farmers and the environment is considered to be a minority view that is held by people with vested interests and by those who are sufficiently naïve to trust these people. In accordance with attribution theory, it lacks source credibility [52].

2.1.3. Combining the Minority Position of the Selling Group with Positive Local Attributes

Normally, the use of genetic engineering in agriculture is discussed in abstract high-level terms in Switzerland. People tend to speculate about its unpredictable impact on biodiversity and possible

long-term food safety risks. As such, they wrap their arguments in a higher moral language that shows concern for mankind in general and apparent detachment from one's own interests. These higher-level construals transcend the here and now and are often limited to schematic and decontextualized representations [55]. The discussion on that level is further focused on the presumed motives of the advocates of GM food which are associated with an out-group described as 'profit-oriented' rather than 'people-oriented' and therefore presumably indifferent toward moral reservations [56,57]. In front of a market stand, consumers are however confronted not by anonymous corporate advocates but by local lay people (linked to one's own in-group) who sell a real genetically modified product, which they have so far only conceived in abstract terms. As a consequence, contextual and situational factors of the lower-level construal associated with the choice in daily purchases overlap with the more schematic high-level view of the issue.

2.2. Method

2.2.1. Prior Field Experiments and Research Gap

Experiments and field studies on revealed consumer preferences in Europe and elsewhere [58-62] suggest that there might indeed be an inconsistency between the largely negative attitude towards GMOs revealed in public opinion surveys [3] and actual purchasing behavior of European consumers when confronted with a choice that includes labeled GM food. However, there is also a strong indication that most people who bought food in the supermarket that contained a labeled GMO ingredient were not aware of having done so because they did not look at the label [63-65]. A study by Knight *et al.* [66] addressed this problem by designing a natural quasi-experiment with road-side stalls selling fresh organic, conventional and 'fictitious' GM pest-resistant cherries (positively advertised as a 'spray-free GM product'); the products were sold by students in New Zealand and four different European countries. The study showed that consumers tended to buy more GM cherries when they were cheaper.

Yet, none of these previous surveys were able to compare prior political preferences of consumers with their individual product preferences as revealed by their purchasing decisions. Furthermore, none of the previous studies registered the emotional response of consumers when confronted with a labeled GM food product. The explicit question of whether consumers value freedom of choice at market stands (low level construal) more than they dislike the fact that GM food is on sale (high level construal) could also not be addressed with the existing survey and experimental designs.

2.2.2. Innovative Aspects

The present field study follows the design of Knight *et al.* [66] but addresses its limitations by combining the registration of revealed consumer preferences at the market stand with an ex-post questionnaire that reveals the prior political preference of the customer. Instead of a fictitious GM cherry variety, we used genuine GM corn as an ingredient of our corn bread. The chosen transgenic corn variety was Bt-11 corn, a product of Syngenta Inc., approved for human consumption in Switzerland since 1998 and grown on a limited scale in Spain for several years. In addition, it was ensured that every consumer was able to make a conscious decision between organic, conventional and

GM corn bread. The locally recruited selling groups at the market stands introduced each consumer to the choice on offer (each product was also clearly labeled in accordance with Swiss law). For the sake of having a counterfactual scenario, it is argued that, field interventions should also contain a control run [67]. We did so by starting with a control sale in which only conventional and organic corn bread was on offer. This allowed us to test whether the mere presence of GM food would put off consumers and represent a negative externality [28]. This is an argument often used by retailers to justify their decision not to offer approved GM food. In addition, the electronic cash register (with touch screen) was programmed in a way that forced the salesperson to assess the consumer's age category, nationality and sex as well as his or her emotional response to the choice on offer ('negative', 'positive' or 'neutral') prior to the completion of any purchasing transaction.

Once the transaction was completed the corn bread was handed over in a bread bag that contained an envelope with a one-page questionnaire. If the customer did not need a bread bag, the envelope was given to him or her together with a napkin. The completed questionnaires (in German and French) were returned by mail. Besides personal information and site of purchase, the questionnaire, respondents were asked to indicate their political preference towards genetic engineering in agriculture, prior to the purchase, by indicating how they voted on a five-year ban on GM crops in Swiss agriculture in the national referendum in 2005. Since we could not follow up the questionnaires, we added an incentive to complete and mail the questionnaire by attaching a lottery ticket number on the top and the bottom of the page. A prize of roughly US$400 was offered if the winning number in the lottery draw that was announced to be published on our institute website corresponded to the number on the slip that consumers tore off and kept for themselves.

Unlike in previous experiments and field studies, where the members of the research team were selling the product [66], we recruited the selling groups in the region where the bread was sold. These selling groups could not easily be linked to the media stereotype of industry-supporting GMO advocates or of people conducting a scientific experiment (perceived as out-groups). Instead the people behind the market stand shared many attributes with the people in front of it (the local consumers).

A sales protocol was designed to give the selling groups detailed instructions about their behavior at the market stand. For example, in response to critical consumer inquiries, they were asked to admit that there is public controversy over GM food but also to point out that consumers should have the right to make their own choice. The resulting transparency and freedom of choice may lead the consumer to a more lenient and open-minded evaluation of the minority position [68-71] and make him or her more interested in the product since the selling group is associated with the in-group rather than the out-group [66]. The experience of ambivalence that can result from this incongruent pairing of higher and lower mental construals may motivate the search for corrective information [41].

As with all natural experiments, the field study contains a small selection bias, which is related to the fact that an intervention is always carried out with 'something'. In our case, this 'something' was corn bread; this meant that only consumers who felt a need to buy a loaf of bread and considered corn bread an option became part of this type of quasi-experiment [72]. Consumers were however unable to find out that GM corn bread was also on offer, unless they approached the market stand and read the labels (or were introduced to the different types of bread by the sales group). This ensured that the selection bias was not related to the GM product. In fact, the selection bias resulting from the sale of corn bread at an open market stand is to be expected to result in lower sales of the GM variant because

people who tend to buy corn bread at open markets are also representing the food-conscious type of consumers that prefers to avoid food that is perceived to be 'unnatural'.

Despite the selection bias, natural large-scale field experiments have significantly improved in quality of field research over the past decades thanks to the evidence-based practice movement in medicine, public health and economics. Crucial aspects for successful experimentation are a large number of participants (customers), the coordination of multisite trials that cover all relevant settings in the area of investigation, the constant monitoring of the implementation of the intervention (including the strict adherence to the designed protocol) and the effective use of information technology to ensure that the data collected is digitized rapidly and accurately [73]. All these criteria were successfully met in the present field study.

As for our comparison of revealed political preference on the use of GMOs in Swiss agriculture and the revealed consumer preference, one could object that being against GMOs in agriculture does not necessarily mean that one would not buy a labeled GM product at the market stand. Rejection of GMOs in agriculture is related to a mental and normative concept of what modern agriculture should look like, whereas the labeled transgenic ingredient of a food product may not be one of the salient features determining physical consumption. In consideration of this objection we ensured that consumers at our market stand faced a choice related to conceptual consumption rather than mere physical consumption [27]. The physical qualities were less relevant at our market stand because the different types of corn bread were all made according to the same recipe and also looked the same because they were prepared by the same baker. The only difference was the way the corn was produced; for many consumers organic production represents a certain life-style comprising social and cultural values related to agricultural practices [61]. Buying organic may therefore be considered by many consumers as a vote in favor of agricultural policies that support organic farming practices and protect these practices from being 'contaminated' by new technologies, such as genetic engineering [10]. In other words, it may express a political preference—in our case a 'referendum preference'. Choosing 'conventional' products, in turn, signals that the consumer does not put great emphasis on the way food is produced, as long as the quality and the price are right.

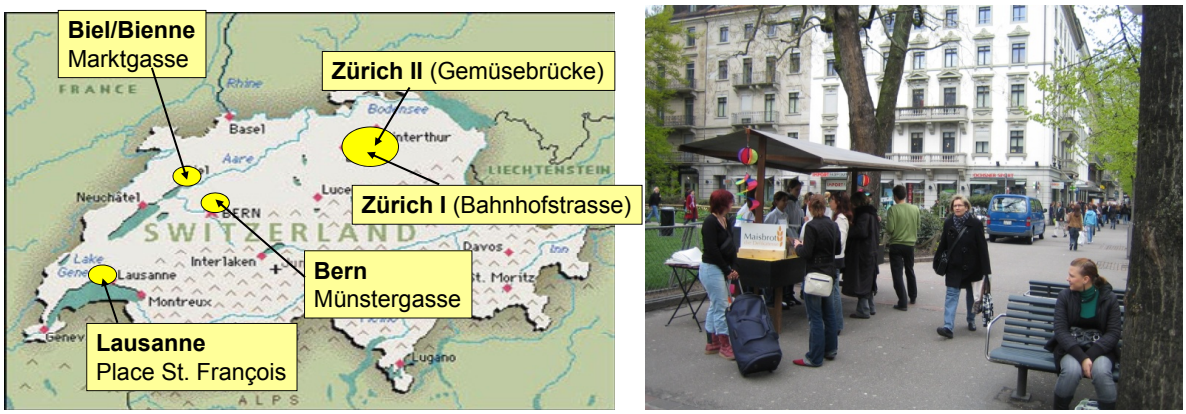
2.3. Experimental Design

We started the field experiment in the third week of April 2008 with control experiments in five locations: (1) Zürich I, Bahnhofstrasse, the busiest and most cosmopolitan shopping street in Switzerland; (2) Zürich II, Gemüsebrücke, a small farmer's market in the old part of the city; (3) Bern, Münstergasse, a well-known food specialty market in the Swiss capital, (4) Biel, Neumarktgasse, a street in the pedestrian zone of a bilingual mid-sized town; and (5) Lausanne, Place St. Francois, a popular site in the old town of the second largest French-speaking city (for the exact location of the market stand and their prototype design see Figure 1).

The design of the market stand was identical in every location and the wares on offer consisted of three types of corn bread: corn bread made with: (1) organic; (2) conventional; and (3) GM corn. We applied three price scenarios in which only the price of the GM corn varied. In the expensive scenario GM corn bread had the same price as organic corn bread (30% more expensive than conventional corn bread), in the average scenario the GM corn bread was equal in price to the conventional corn bread,

and, in the cheap scenario, the price of the GM corn bread was 30% lower than the price of conventional corn bread.

Figure 1. Location and design of the market stands in Switzerland.



All types of bread were freshly prepared every morning by bakers in the region. While bakers were free to buy the conventional corn, the organic corn was bought from a Swiss mill that only accepts certified organic crops (Bio Knospe). The transgenic corn variety 'Bt-11' was imported from Spain (where it was approved for cultivation in a pilot project) and subsequently milled in a special Swiss mill. 'Bt 11' corn has the advantage of not containing an antibiotic marker gene, allegedly a major concern for Swiss consumers. It has also a significantly lower amount of mycotoxins than conventional or organic corn [74]. Furthermore, the Bt toxin is not expressed in the pollen, which prevents beneficial non-target insects from being affected. An information sheet that contained all the legal, economic and scientific details about Bt 11 corn was offered to consumers at the market stand in case they wanted to know more about it. No deception of the consumer was necessary and the sale complied with all legal requirements.

Lay people were recruited locally for each market stand to sell the bread. Each salesperson was paid around US$40 for selling over a period of four hours. After conducting the initial control experiment in each location, all bread types were offered eight times in all five locations (40 runs) from April 26 to July 24, 2008. Five project leaders were appointed, one for each of the five market stands. All of them had at least a bachelor's degree in psychology or economics and were paid US$ 1500 each for the whole sales period. In addition to setting up and removing the market stands, they had to ensure that the salespersons strictly followed a written protocol on how to enter the data and how to address consumers. The selling groups were all informed about their task, the purpose of the project and the nature of the products at a kick-off meeting prior to the experiment.

The selling groups were told to praise each product in the same way but to be prepared to respond to inquiries about the origin and characteristics of the GM corn variety by offering an information sheet about Bt-11 corn.

The collected data were rapidly digitized by means of electronic cash registers that were used to enter details of each purchase including additional information such as the emotional response of the consumer. The data from all sites were stored on a central server. All this contributed to a solid infrastructure of support.

3. Results and Discussion

The results of the data analysis are divided into two parts. The first part consists of the analysis of the cash register data entered by the selling groups in the five locations. The second part looks at the data obtained through the ex-post questionnaires that the customers completed and returned after the purchase of corn bread. A more detailed analysis on consumer choice based on a discrete choice model was published in the Journal Food Policy [75].

3.1. Evaluation of the Cash Register Data

During the eight interventions we sold 4950 loaves of bread to 3275 customers. Twenty percent of the bread sold in total was made with GM corn, whereas the shares of conventional and organic corn bread were 31% and 49%, respectively.

However, many consumers bought more than one loaf of bread and if we just look at the dummy variable 'buys GM corn bread' (1), 'does not buy GM corn bread' (0), 23.2% of our custumers bought at least one loaf of GM corn bread (see Total in Table 1). The sales varied across the different locations. Whereas Zurich Bahnhofstrasse (Zurich BS) had the largest share of people who bought at least one loaf of GM corn bread (26.1%), Zurich Gemüsebrücke had by far the lowest (16.3%). Location therefore turns out to be a significant factor in determining the share of people who buy a GM corn bread. It shows that the customer base in a small farmer's market in downtown Zurich (Gemüsebrücke) is very different from the one at the cosmopolitan shopping street (Bahnhofstrasse).

Table 1. Choice by location.

Consumer Choice	**Location**					Total n = 3,274
	Zurich BSn = 987	Zurich GS n = 632	Bern n = 543	Lausanne n = 658	Biel n = 454	
does not buy GM corn bread	74%	84%	74%	75%	79%	77%
buys GM corn bread	26%	16%	26%	25%	21%	23%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Whereas the variation of GM corn bread sales between two locations within the same city (Zurich BS/Zurich GB) is highly significant, there is no significant difference in GM corn bread sales between the locations in the French (Lausanne) and German (Bern, Zurich BS, Zurich GB) parts of Switzerland in terms of purchasing behavior.

76.8% of the customers turned out to be women. They bought slightly less GM corn bread (22.2%) than the male customers (25.6%).

Consumers were found to be price sensitive (see Table 2). The share of those who bought at least one loaf of GM corn bread increased from 20.2% (expensive scenario) to 26.6% (cheap scenario). It is nevertheless surprising that 20.2% were still willing to buy a loaf of GM corn bread even when the price was equal to that of organic corn bread. Even though curiosity may have been the major reason for buying an expensive GM corn bread, the willingness to buy it for the price of the organic alternative may also indicate that many consumers buy it because they are convinced that the use of

genetic engineering in agriculture can address future sustainability problems related to food security and climate change. They may express their personal values as much as consumers of organic food do.

Table 2. Quantity of bread sold with different price scenarios for GM corn bread.

Consumer Choice	GM Corn Bread Price Scenario			Total n = 3,274
	Cheap n = 1,030	Average n = 1,110	Expensive n = 1,134	
does not buy GM corn bread	73%	77%	80%	77%
buys GM corn bread	27%	23%	20%	23%
Total	**100%**	**100%**	**100%**	**100%**

With regard to the emotional response registered by the selling groups in the different locations, we observed a surprisingly low number of negative responses in all locations (see Table 3). The few negative responses were observed mainly at Zurich Gemüsebrücke. Otherwise a relatively high share of people even responded positively to the market stand and the presence of GM corn bread. The selling groups had the further possibility to press a button on the cash register to indicate 'no purchase' in the case that a customer felt put off by the mere presence of GM corn bread (perceived as a negative externality). This button was used fewer than ten times over the whole intervention period. The very few negative responses might have been related to the positive attributes of the market stand, such as transparency and freedom of choice offered by the selling groups. The locally recruited selling group may have further been seen as representing a minority position due to the sale of a politically controversial product. But they were still part of the same local in-group as their potential customers [68-70]. This confirms that the mere presence of GM food does not cause a negative externality for consumers in Switzerland as long as it is not automatically linked to a context framed as unnatural and unfair.

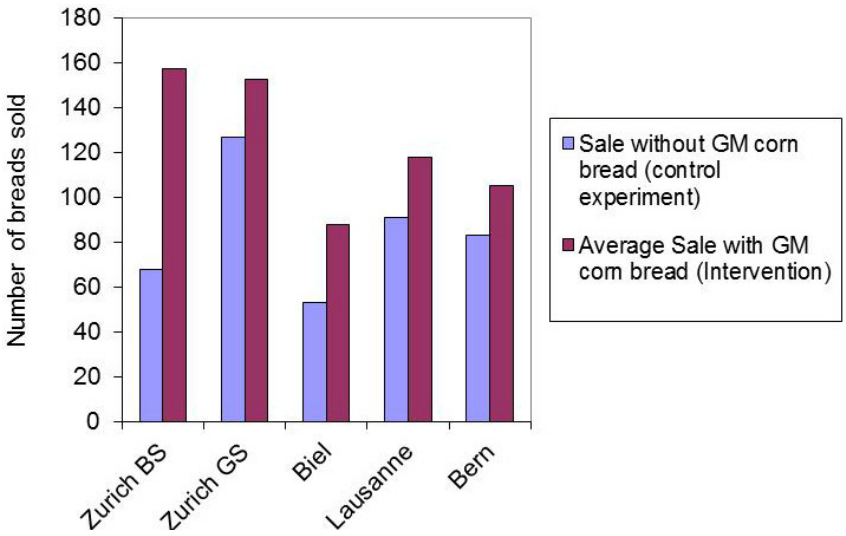
Table 3. Emotional responses to the market stand in the different locations.

Consumer Response	Location					Total n = 3,236
	Zurich BS n = 980	Zurich GS n = 631	Bern n = 521	Lausanne n = 657	Biel n = 447	
Positive	56%	5%	24%	94%	32%	45%
Negative	1%	5%	4%	1%	1%	2%
Neutral	44%	91%	73%	5%	67%	53%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

A further way to test whether the presence of GM products is perceived in a negative way is to compare the sales during the control experiment with the average sales during the intervention when GM corn bread was on offer. Figure 2 shows that sales increased substantially in each location once GM corn bread was on offer. The average bread sales per location during the control experiment were 84 loaves of bread, whereas the average was 125 loaves of breads during the interventions (a percentage increase of roughly 47%). Even when the conspicuous increase in the case of Zürich Bahnhofstrasse is not taken into account, the average increase is still above 30%. Since the control experiment was carried out only once at the beginning (21 April) whereas the interventions were

carried out eight times from May to July, the weather conditions might have mattered during the control experiment. Yet, even though it was fresh spring weather, the sky was relatively clear and, unlike on many occasions during the interventions, it did not rain. Judging from this significant increase in revenues once GM corn bread was added to the choice, we can argue that consumers in Switzerland appear to appreciate freedom of choice and transparency more than they resent the presence of GM food.

Figure 2. Total sales during the control experiment and the intervention.



3.1.1. Zurich Gemüsebrücke and Zurich Bahnhofstrasse: Two different worlds?

Comparing the behavior of consumers in the different locations, the large differences between Zurich Bahnhofstrasse (BS) and Zurich Gemüsebrücke (GB) turn out to be most conspicuous. Consumers at Zurich GB were most reluctant to buy a loaf of GM corn bread (only 16.3% bought a loaf of GM corn bread compared to 26.1% at Zürich BS) and were much more likely to respond negatively to the choice on offer during the interventions (half of the total negative responses were registered at Zurich GB, whereas Zurich BS had the lowest share). At the same time, the increase in sales after the control experiment was the lowest (20%) in Zurich GB and highest in Zürich BS (130%).

This indicates that, either consumers at the Zurich GB represent a completely different type of consumer, or that the environment of a local farmers' market may induce people to be more reluctant to buy a product that is not associated with local food production.

Adding further to the puzzle, consumers at Zurich GB bought the highest share of organic corn bread during the intervention with GM corn bread (65.3% compared to the average of 53.7%), while its share of organic corn bread sales was lowest during the control experiment (50.5% compared to an average of 56.6%). The reverse was observed for Zurich BS.

Obviously customers at Zurich GB are not necessarily determined buyers of organic corn bread but probably felt moral pressure to buy organic corn bread in the presence of GM corn bread, since genetic engineering in agriculture is generally perceived to be risky and morally unacceptable [6]. These phenomena of moral anxiety [76] may be an indication that consumers at this market stand made a political statement by buying organic. In order to find out more about the strength of the political attitude of consumers, we need to look at the results obtained from analyzing the questionnaire data.

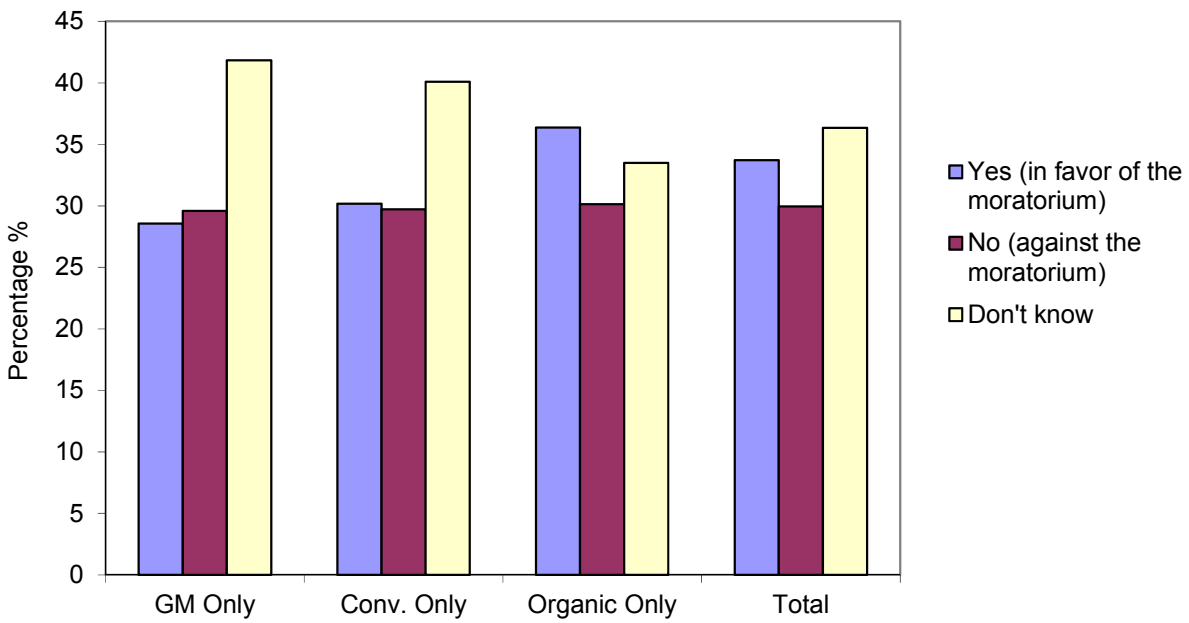
3.2. Evaluation of the Questionnaire Data

987 customers who bought at least one loaf of bread at our market stand completed and returned the one-page questionnaire they found in the envelope handed over to them during the sales transaction. This corresponds to a return rate of 30.14% which is quite high considering that we could not follow up the questionnaires. The high participation rate in the survey is a further indication that customers did not perceive the field study in a negative way.

The central question in the questionnaire was how the respondent had voted in the national referendum on a five-year ban on the cultivation of GM crops in Switzerland. This referendum was approved in 2005. In view of the fact that the voting decision back then is unrelated to the actual purchase at the market stand, we assume that the vote in favor of or against the ban also reflects the prior revealed political preference with respect to the use of GMOs in agriculture. Even though a preference for banning the cultivation of GM crops in the field does not necessarily imply that people would also reject GM food on the market, we assume, in accordance with the concept of conceptual consumption [27] that a strong negative view towards GMOs and what it represents for the consumer (industrial agriculture, undue interference with nature, potential contamination of organic agriculture) would be reflected in the preference for organic corn bread and the avoidance of GM corn bread.

The results obtained from the questionnaire data cannot confirm this assumption. Figure 3 shows the extent to which the voting decision of the consumer was in accordance with the choice of bread. It turns out that more than one third of the respondents either could not remember what they voted or did not go to the polls in 2005. Of those who remembered about their vote, more people who bought a single loaf of GM corn bread voted in favor of the ban (26.7%) than against it (25.6%) and roughly 30% of those who *bought* a single organic loaf had voted against a moratorium compared to 35% that voted in favor of it. No meaningful statistical relationship could be found between political preference and consumer preference.

Figure 3. Comparing political preference with consumer choice.



4. Conclusions

In our natural experiment, we tested and revealed consumer preferences for genetically modified (GM) corn bread in a country with a highly negative public attitude towards genetic engineering in food and agriculture. Despite the national ban on the cultivation of GM crops, a few GM products such as Bt corn are officially approved for human consumption in Switzerland but not sold by any retailer for fear of being exposed to negative publicity. In fact, three months before the present field experiment started, there was a headline in the free commuter daily '20 Minutes' which read 'Researcher is breaking the Gentech-Taboo'—revealing that the legal sale of GM food would already amount to breaking a taboo.

In spite of the great uncertainty about the feasibility of such a potentially controversial project, Switzerland offered a unique opportunity to confront Swiss consumers for the first time with a conscious choice that included real GM food; and subsequently to compare their choice at the market stand with their political preference as revealed in a national referendum on a five year ban on GM crops approved in 2005. This allowed us to test the frequently heard claims that the mere presence of GM food would put off consumers [28,31], arguing that this would express their social values about the production of food in their purchasing decisions [24].

The results of our field study show that the Swiss are neither scared nor upset by the presence of GM food as long as they have freedom of choice and are properly informed. Roughly one fifth of the total number of loaves of bread sold in the natural experiment was GM corn bread, compared to 31% conventional and almost 49% organic loaves. Moreover, a comparison with the initial control experiment, when only organic and conventional corn bread was on sale, shows that the total sales increased on average by more than 30% once GM corn bread was added to the choice. The field study further showed that there is no consistency between people's vote on a temporary ban of GMOs in Swiss agriculture in 2005 and their purchasing decision at our market stands in 2008. It indicates that political attitudes toward genetic engineering in food and agriculture are relatively weak. The weak attitudes might be related to the lack of any real experience with the technology in Switzerland. Socially conditioned feelings rather than critical deliberation might therefore be the dominant response to GM food. Conditioned feelings, however, do not remain stable once they are exposed to the real object at stake. This may explain why there was surprisingly little complaint or argument about the offer of GM food at the market stand. Consumers might have a skeptical view of GM food, or even feel strongly negative about it. But faced with the real product at the market stand they are also confronted with positive external cues such as fresh bread of equal quality, transparency about the ingredients, freedom of choice and a local sales group that is not associated with foreign companies trying to sell GM food. In such a situation, fear of GM food may no longer be the salient factor and buying a loaf of GM bread might become a temptation. In other words, the high-level mental construal about GM food expressed in opinion surveys and the polls might differ substantially from the pragmatic low-level construal revealed at the market stand.

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