

Analysis of visual communication concerning genetically modified organisms in Austria.

**A content analysis of images found on Austrian
websites.**

Master's thesis

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Vienna, October 5th, 2015



Affirmation

This is to declare my Master's thesis was independently authored by myself, using solely the referred sources and support. I additionally assert that this Master's thesis has not been part of another examination process.

Vienna, October 5th, 2015

Place, Date

Signature of the author

Acknowledgment

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Abstract

This study aims to describe the emotional appeal of images used on Austrian websites in relation to genetically modified organism (GMO). The intention is to describe the visual communication in public webbased media about GMOs. It is based on the theory that pictures are better memorized and have a stronger and subliminal influence on our opinions. Generally, Austrians have a negative opinion when it comes to the topic of GMO and GM products are currently hardly available on the Austrian market. Consequently, the underlying hypothesis of this thesis is that there are more negative and scary pictures on the Austrian websites than positive ones.

This study cannot say whether the public opinion is against GMO, because of the negative pictures or whether the negative picture are on the web, because the public opinion was already negative before the pictures appeared. A conclusion could be that a “negative” picture of GMO incorporates and gives us the impression that GMO is bad. In the course of this thesis, pictures used on websites with articles related to GMO are analyzed to better understand how pictures are used to frame the message of the corresponding article. Pictures, found through Google picture search with the German key words “gentechnisch veränderte Organismen” and the limitation to search only Austrian websites, serve as the database. A set of variables and an index are used to describe the pictures and later on to compare and look for coherence.

Only 9,3% of 549 images found on Austrian websites received an index >0 and are thus considered as “scary”. On the other hand, about 40% of the websites offered negative text about GMO. An even higher percentage of articles didn’t have GMO as their main topic, but only mentioned the term once. Consequently, Austrian websites provide only few neutral and hardly any positive text about this topic.

The high number of negative text observed on Austrian websites dealing with GMO might represent the Austrian public opinion. However, the results of the picture content analysis are not in accordance with the previous assumption that images reflect the public opinion as well. “Scary” images cannot be taken as an explanation for the prevalent negative public opinion about GMO in Austria.

Keywords: genetically modified organisms, public opinion, visual communication, consumer attitudes

Kurzfassung

Ziel dieser Studie ist es den emotionalen Eindruck von Bildern, die auf österreichischen Webseiten in Verbindung mit gentechnisch veränderten Organismen (GVO) vorkommen, zu beschreiben. Dadurch soll die visuelle Kommunikation in öffentlichen, web-basierten Medien über GVO bestimmt werden. Die Arbeit basiert auf der Theorie, dass Menschen sich an Bilder besser erinnern und, dass diese einen stärkeren und unterbewussten Einfluss auf unsere Meinung haben. Generell haben Österreicher eine negative Meinung über GVO, und gentechnisch veränderte Produkte sind derzeit am österreichischen Markt kaum verfügbar. Daraus folgt die Arbeitshypothese, dass es mehr negative und angsteinflößende Bilder auf österreichischen Webseiten gibt als positive.

Diese Studie kann allerdings nicht erläutern, ob die öffentliche Meinung gegen GVO besteht, weil es negative Bilder zu diesem Thema gibt oder ob die negativen Bilder im Web sind, weil die öffentliche Meinung bereits negativ war, bevor es entsprechende Bilder gab. Eine Schlussfolgerung könnte sein, dass ein „negatives“ Bild von GVO uns den Eindruck vermittelt und mitbegründet, dass GVO schlecht sind. In Zusammenhang mit dieser Arbeit werden Bilder analysiert, die in Artikeln über GVO auf Webseiten aufscheinen, um besser verstehen zu können, wie Bilder verwendet werden um die Botschaft eines entsprechenden Artikels zu unterstreichen. Als Datengrundlage wurden jene Bilder verwendet, die in der Google Bildersuche mit dem deutschen Begriff „gentechnisch veränderte Organismen“ gefunden wurden. Die Suche wurde auf österreichische Webseiten eingeschränkt. Ein Set an Variablen und ein Index wurden angewendet, um die Bilder zu beschreiben und in Bezug zu dem Text der Webseiten zu setzen.

Nur 9,3% aller Bilder, die auf österreichischen Webseiten über GVO gefunden wurden, bekamen einen Index >0 und wurden damit als „angsteinflößend“ eingestuft. Allerdings erscheinen auf 40% der Webseiten negative Texte über GVO. Einen noch höheren Prozentsatz von Webseiten behandelt das Thema GVO überhaupt nicht, sondern erwähnen lediglich den Begriff. Infolgedessen bleiben nur wenige österreichische Webseiten übrig, die neutrale oder sogar positive Texte über dieses Thema beinhalten.

Die große Anzahl an negativem Text über GVO auf österreichischen Webseiten zeigt die öffentliche Meinung in Österreich an. Die Ergebnisse der Inhaltsanalyse der Bilder

stimmen allerdings nicht überein mit der vorherigen Annahme, dass Bilder die öffentliche Meinung widerspiegeln. „Angsteinflößende“ Bilder über GVO auf österreichischen Webseiten können nicht als Erklärung für die überwiegend negative öffentliche Meinung über GVO in Österreich herangezogen werden.

Stichwörter: gentechnisch veränderte Organismen, öffentliche Meinung, visuelle Kommunikation, Konsumenteneinstellung

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List of abbreviations

DNA	Deoxyribonucleic acid
EU	European Union
FDA	Food and Drug Administration
GMO	genetically modified organism
GM	genetically modified
NGO	non-governmental organization
PR	public relations
SI Index	Scary Impact Index
TTIP	Transatlantic Trade and Investment Partnership
USA	United States of America

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1 Introduction

Genetically modified organisms (GMOs) are not as “new” as most people might think. In 1994 - 21 years ago - the first genetically modified crop was introduced in the US market (GMO Compass, 2006, s.p.). The actual discussion within the European Union (EU) began about the same time, although it is still not clear which position is going to be taken – allowance, restriction or complete prohibition.

While writing this thesis, the EU commission came to the conclusion that member states can decide by themselves about restriction or prohibition to use GMOs (European Commission, 2015a, s.p.), which got authorized by the EU and are consequential generally approved for cultivation and sale (European Commission, 2015b, s.p.).

Many Europeans, particularly in Austria seem to have a general aversion to GMOs. But what does the term “GMO” actually mean?

The Official Journal of the European Communities (Part A, Article 2) defines it as:

- (1) “ ‘Organism’ means any biological entity capable of replication or of transferring genetic material;
- (2) ‘Genetically modified organism (GMO)’ means an organism, with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination” (The European Parliament and the Council of the European Union, 2001, 4).

The following definitions about GMO are available in the Austrian national law (Gentechnikgesetz):

§4/1 “Organismen: ein- oder mehrzellige Lebewesen oder nichtzelluläre vermehrungsfähige biologische Einheiten einschließlich Viren, Viroide und unter natürlichen Umständen infektiöse und vermehrungsfähige Plasmide“

„Organisms: single- or multi-celled animate being or non-cellular augmentable biological unit including viruses, viroids and under natural circumstances infectious and augmentable plasmids” (Bundeskanzleramt and Rechtsinformationssystem, 2015, s.p.) (own translation).

§4/3 „Gentechnisch veränderte Organismen (GVO): Organismen, deren genetisches Material so verändert worden ist, wie dies unter natürlichen Bedingungen durch Kreuzen oder natürliche Rekombination oder andere herkömmliche Züchtungstechniken nicht vorkommt“.

„Genetically modified organisms (GMOs): Organisms, whose genetic material got changed in a way that would not occur under natural circumstances through crossbreeding or natural recombination or other traditional/conventional breeding techniques” (Bundeskanzleramt and Rechtsinformationssystem, 2015, s.p.) (own translation).

Techniques accompanying this technology are:

- DNA recombination techniques (§4/3a)
- direct injection of genetic information provided outside the organism (§4/3b)
- cell fusion and hybridization techniques (§4/3c) (Bundeskanzleramt and Rechtsinformationssystem, 2015, s.p.) (own translation).

The method of genetic modification is used to give “e.g. a plant's resistance to a disease, insect or drought, a plant's tolerance to a herbicide, improving a food's quality or nutritional value, or increased yield” (European Commission, 2015a, s.p.).

Initially, these issues don't seem so bad at the first sight, which again raises the question: Why are people so adverse to this new method?

The European Commission website states the following arguments for having a legislation about GMO:

- “Protect human and animal health and the environment by introducing a safety assessment of the highest possible standards at EU level before any GMO is placed on the market.
- Put in place harmonised procedures for risk assessment and authorisation of GMOs that are efficient, time-limited and transparent.
- Ensure clear labeling of GMOs placed on the market in order to enable consumers as well as professionals (e.g. farmers, and food feed chain operators) to make an informed choice.
- Ensure the traceability of GMOs placed on the market” (European Commission, 2015c, s.p.).

Within literature, one can find different theories, which try to explain why the aversion to GM food in some countries is higher than in others. Many maintain that media and the method of how information is presented have a big influence on how people think about e.g. GMO (McCluskey and Swinnen, 2004, 1236).

Inglis (1938, 526) introduced the “Reflection Theory” (when the public is reflected by literature) and the “Social Control Theory” (when literature is forming the public).

This thesis does not aim to decide whether the “Reflection Theory” or the “Social Control Theory” applies in the context of GMO. It only aims to describe whether findings from the literature are in accordance with findings from the content analysis of pictures related to GMO found on Austrian websites.

In the course of this thesis, pictures used on websites with articles related to GMO will be analyzed to explore other explanations on the differing opinions in the context of GMO. The images of Google search of GMO on Austrian websites are taken as the database. The findings shall be compared with the study of Ventura and Frisio (2015), which serves as a draft for this thesis, and with other studies about consumer attitudes and public opinions about GMO within Austrians (e.g. Eurobarometer surveys).

A picture or image is a source of information and furthermore has a communication function (Müller, 2003, 80).

What is happening in biotechnology research and what GMO actually “looks” like is not easy to explain. It is something unimaginable as it hasn’t been “seen” before, unlike a tree or a dog. The same unimaginable attitude might be applied for the image of an atom, DNA (examples mentioned in Trumbo (1999, 413f)), the universe or processes like photosynthesis. These abstract scientific terms have been depicted by scientists. Now, people are able to imagine them. As GMO includes many possibilities to be depicted – starting with the creation process until the final living being – there are a wide range of images available.

Research findings show that humans learn through pictures:

“... Visuals persuade. It’s a subtle process of which we are generally unaware.

Our brain processes language visually. When we see something, we create a visual representation of it and store it in our mind. When we call it up, we see it as a visual representation. You never see a word in your mind; you see a picture. ... In fact,

educational researchers at the Department of Labor tell us that over 83% of our learning happens visually” (Diamond, 2013, 7).

The conclusion is that a “negative” picture of GMO gives us the impression and incorporates that GMO is bad.

1.1 Goal setting

The aim of this thesis is to convey the emotional appeal of pictures used on Austrian websites in relation to GMO. It is based on the hypothesis that pictures are better memorized and have a stronger and subliminal influence on people’s opinions.

The more specific hypothesis is that there are more negative and scary pictures on Austrian websites about GMO than positive ones. In fact, the aim is to investigate if pictures are used to manipulate in a subliminal way, if articles with a negative message about GMOs also use negative “scary” images on Austrian websites.

However, it is impossible to determine that public opinion is against GMO because of the negative pictures, or if the negative pictures are posted on the web because public opinion was already negative before the pictures appeared. It is possible there is a circular relationship, wherein the pictures give reinforcement to an already negative attitude.

The purpose of describing the emotional appeal of pictures about GMO in Austria is to describe the “visual communication in public web-based media about GMO”.

Non-goals

This thesis is no meta study about former opinion surveys in Europe and the USA. Surveys from different institutions are *per se* not comparable, due to different study environments. Therefore, emphasis was placed on one survey provider in Europe and one in USA. The results of these surveys are compared. When results from other providers were available, they were included in the text.

This thesis doesn’t intend to offer complete insight into the topic of communication and its complex structure. The focus is on mass communication and online communication.

The same focused approach is applied within the topic of visual communication. For this thesis the development of how images are used in the media is not important. However, the contribution images in the media have on influence personal attitudes.

Furthermore, the process of how communication works, and how the information process takes place is not relevant.

This thesis will not identify, in general, who is using which media and how. Rather, it focuses on the overall use of images and photographs on Austrian websites dealing with GMO.

1.2 Research questions

This Master's thesis takes the following questions into account:

- What is the public opinion and consumer attitude towards GMO in Austria, Europe and the USA? (Theoretical part)
- How does visual communication influence the formation of
 - memory,
 - emotion,
 - public opinion? (Theoretical part)
- What is the emotional appeal (scariness) of images used on Austrian websites talking about GMO? (Empirical part)

A THEORETICAL PART

2 Public opinion and consumer attitude towards GMO

This chapter deals with the public opinions about GMO and their development in the last years focusing on the Europe, Austria, and the USA. Therefore, the Eurobarometer surveys¹ and surveys by the Pew Initiative for Food and Biotechnology² are specifically analyzed. Furthermore, other studies are considered for approval of these surveys as well as identifying possible causes of consumer attitudes towards GMO.

2.1 Eurobarometer surveys – Europe and Austria

In this part, the Eurobarometer reports are analyzed where the topic of GMO was observed. Therefore, the following Eurobarometer surveys are examined:

- Special Eurobarometer - Biotechnology
- Special Eurobarometer – Europeans, Science and Technology
- Special Eurobarometer – Food-related risks
- Special Eurobarometer – Risk Issues
- Special Eurobarometer – The attitudes of European citizens towards environment.

These surveys span ten years of consumer attitude research about GMO from 2001 to 2011. The latest Eurobarometer surveys (2012-2014) not include the topic of GMO. The surveys are not conducted annually, but within some of them, a periodical timeline of publishing can be obtained. If the timeline for periodically period of publishing continues there is evidence that in 2015 a new Eurobarometer survey about GMO is likely to be published.

In most of the surveys, it was possible to distinguish country-specific attitudes. Whenever possible, attitudes and opinions of Austrians were also sighted.

¹ Eurobarometer surveys are published under the command of the European Commission and try to reflect the opinion of Europeans on specific topics.

² Surveys of the Pew Initiative are done by The Mellman Group, Inc. (sometimes in cooperation with Public Opinion Strategies, Inc.). The surveys include the opinion among 1000 US American citizens.

2.1.1 Attitude towards GMO

In the Eurobarometer survey about risk issues (2006) and again, in 2010, the topic of food-related risks and GMOs shows up. In it, questions arose about the level of concern among the population about “genetically modified products in food or drinks” (Figure 1).

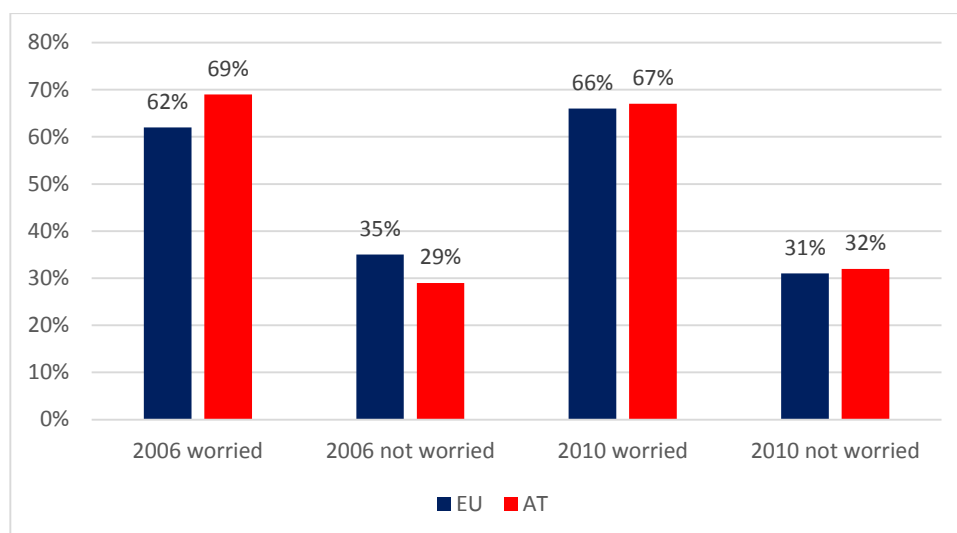


Figure 1: Percentage of people concerned/not concerned about “GM products in food or drinks” on EU average and in Austria (2006 EU-25, 2010 EU-27)

Source: modified after TNS Opinion & Social 2006, 74; TNS Opinion & Social 2010a, 20/78

In 2006, 62% of Europeans worried about “GMO in food and drinks” with a slight increase to 66% in 2010, while the number of people not worrying decreased from 35% to 31%.

The percentile of Austrians, who are worried about GMO, in 2006, was 7% higher and in 2010 only 1% higher than EU average (Table 1). In 2010, Austrians ranked the issue of GMO as the country’s most serious worry on the same level as their concern for pesticides. At the same time, no other European country considered GMO of that much importance (TNS Opinion & Social, 2010a, 30).

In 2006, the country specific results showed that citizens, most bothered about GMO, could be found in Greece, Italy and Cyprus. Those countries least concerned were Finland, Sweden and the Netherlands (Table 1). When comparing these prior results with the ones from 2010, an increase in the levels of concern in most countries can be obtained. The United Kingdom was the only country in which a significant decline in apprehension was found (TNS Opinion & Social, 2006, 24f; TNS Opinion & Social, 2010a, 28ff).

Table 1: Excerpt of the country specific results in 2006 and 2010: Worries about GMO in food or drinks

Country	2006	2010
Greece	81%	81%
Italy	77%	80%
Cyprus	76%	77%
...		
Austria	69%	67%
EU average	62% (EU 25)	66% (EU 27)
...		
United Kingdom	53%	48%
...		
Finland	46%	50%
Sweden	46%	48%
The Netherlands	42%	50%

Source: modified after TNS Opinion & Social 2006, 74; TNS Opinion & Social 2010a, 20/78

In 2010, an average of 84% of European had have heard of genetically modified foods within EU-27. Public awareness is different between countries. Respondents of Norway, Germany, Finland and the Netherlands displayed a higher awareness of GMOs. The same cannot be said of citizens of Turkey, **Austria**, Portugal and Malta (Table 2) (TNS Opinion & Social, 2010b, 14). In a further study, respondents, who have heard of GMO previously, were asked whether they had talked with anyone about it before. It is interesting to note that 82% of **Austrians** have talked about GMO before (top of EU range), whereas only 45% of respondents in Turkey had similar discussions (last of EU range) - although public awareness of GMO in both countries was the same (Table 2) (TNS Opinion & Social, 2010b, 16).

Table 2: Excerpt of country specific results in 2010: Awareness of GM food

Country	Heard about GMO	Talked about GMO
Norway	96%	72%
Germany	95%	78%
Finland	93%	69%
The Netherlands	93%	69%
...		
EU 27	84%	66%
...		
Turkey	68%	45%
Austria	68%	82%
Portugal	59%	65%
Malta	49%	48%

Source: modified after TNS Opinion & Social 2010b, 14ff

2.1.2 Danger of GMO

In 2006, GMO was spontaneously mentioned by 8% of European respondents, when they were asked about possible problems or risks related with food (Table 3). The most mentioned risk was food poisoning (16%). Nevertheless, GMO was ranked 5th place within all spontaneous answers (TNS Opinion & Social, 2006, 13). Onto the same question 24% of **Austrians** answered with GMO as possible risk related with food followed by 19% of Germans. No other country had such a high result of concern (TNS Opinion & Social, 2006, 69).

Table 3: Top 5 of the most mentioned problems and risks associated with food

	Possible problems and risks associated with food	% EU
1	Food poisoning	16
2	Chemicals/pesticides/toxic substances	14
3	Obesity, over-weight	13
4	Illness/health problems	9
5	GMOs	8

Source: modified after TNS Opinion & Social 2006, 13

Figure 2 shows how many percent of Europeans in 2001 and 2005 thought that “food made from genetically modified organisms is dangerous”. It also shows that more Austrian consumers considered it dangerous than on European average.

The numbers of Figure 2 come from the Eurobarometer survey in 2001, which was done within the EU-15 member states and Eurobarometer survey of 2005 within EU-25.

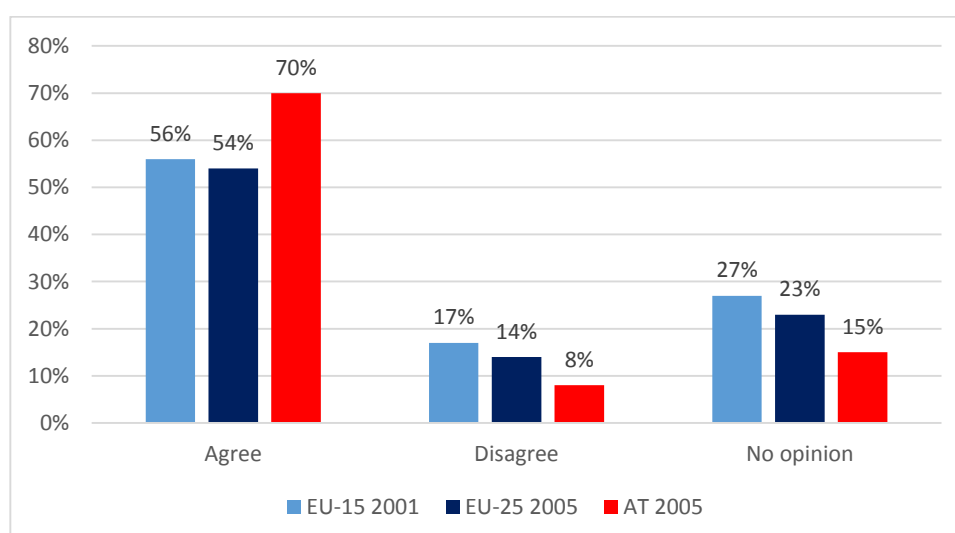


Figure 2: Percentage of agreement and disagreement of the public about whether “food made from GMO is dangerous”

Source: modified after TNS Opinion & Social, 2005a, 61, EORG, 2001, 26

Although more than half of all people agree that “GMO is dangerous” (56% in 2001 and 54% in 2005), it seems there is a lack of knowledge among Europeans whether GMO should be considered dangerous or not. Approximately one quarter “don’t know” how to answer. This can also be taken as a sign of uncertainty (EORG, 2001, 26; TNS Opinion & Social, 2005a, 61; TNS Opinion & Social, 2005b, 63). In 2005, the ranking of Cyprus, Greece, Croatia and **Austria** were well above average, more than 70% of inhabitants acknowledged that GMO is dangerous. People from the Netherlands and the United Kingdom (around 30% each) displayed the least concern about GMO (TNS Opinion & Social, 2005a, 63).

The Eurobarometer of 2008 had a whole chapter on the use of GMOs as well. European citizens were asked about whether they are personally in favor or opposed to the use of GMOs. In most of the countries (18 out of 25 member states) more than half of the people disagreed with the use of GMOs in their food. In **Austria** 17% were in favor and 62% were opposed – the rest had either never heard of GMOs or had no opinion (TNS Opinion & Social, 2008, 65).

2.1.3 Information about GMO

The concern about a topic and the level of information available are related to each other. This was the outcome of the Eurobarometer survey from 2008. The study describes GMO as an issue that is scientific by nature and therefore hard to understand. It shows that Europeans are not well informed about this topic. Nevertheless, these scientific topics are considered of less value and concern than broader global environmental dangers (TNS Opinion & Social, 2008, 63). The survey of 2005 already came to a similar conclusion. Summed up, there was a lack of information concerning GMO, at the same time, there were other areas people were more concerned about (TNS Opinion & Social, 2005b, 25).

There were two main issues in what consumers were lacking in information: One of these was the “Use of genetically modified organisms in farming”. Figure 3 shows the percentage of people lacking in information (European average and in Austria).

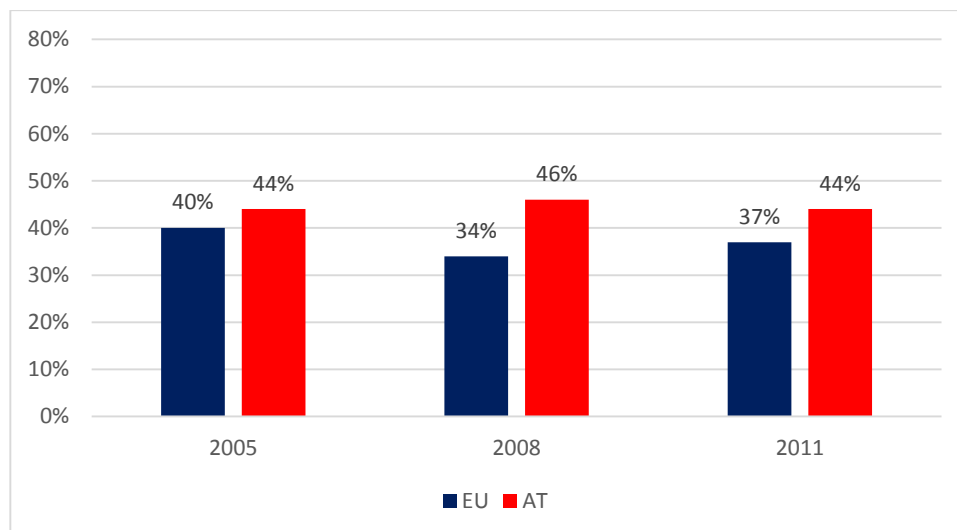


Figure 3: "The use of GMO in farming" in % mentioned with the top 5 issues of lacking information (2005 EU-25, 2008 & 2011 EU-27)

Source: modified after TNS Opinion & Social, 2005b, 85; TNS Opinion & Social, 2008, 62; TNS Opinion & Social, 2011, 143

In 2005, Europeans cited the "use of genetically modified organisms in farming" with 40%, making it the second biggest issue lacking in public information, after the "impact on health of chemicals used in everyday products" (TNS Opinion & Social, 2005a, 17).

Table 4: Top 5 of the issues people feel a lack of information about in 2005

Issues of lacking information		% EU
1	The impact on health of chemicals used in everyday products	41
2	The use of genetically modified organisms in farming	40
3	Loss in biodiversity (extinction of animal species, flora and fauna, etc.)	29
3	Agricultural pollution (use of pesticides, fertilizers, etc.)	29
3	Depletion of natural resources	29
4	Water pollution (seas, rivers, lakes, underground sources, etc.)	27
5	Climate change	26

Source: modified after TNS Opinion & Social, 2005b, 17

The sentiment of an absence of information was slightly higher in **Austria**, as well as in Denmark, Germany, Greece and Finland (with the highest percentage of lacking information) (Table 5) (TNS Opinion & Social, 2005b, 18). In 2008, the issue ranked second among Europeans – although the percentage declined 6% in 2008 and showed 3% growth in 2011.

In the study of 2008, the authors established a link between the concerns about GMOs and the inadequacy of information being given about GMOs. However, this link can only partly explain the high levels of rejections (TNS Opinion & Social, 2008, 66).

In most countries, this lack of information on GMO in farming decreased at least a few percentage points in 2008. Countries such as Denmark, Greece, Germany and Finland

still ranked among the highest. In **Austria**, the realization of the lack of information increased by two percentage points to 46%. In 2011, a general increase of all European countries as to this deprivation of information can be observed (Table 5) (TNS Opinion & Social, 2008, 61f; TNS Opinion & Social, 2011, 88f).

Table 5: Excerpt of country results in 2005, 2008 and 2011: lack of information

Country	2005	2008	2011
Austria	44%	46%	44%
Denmark	47%	38%	44%
Germany	49%	46%	52%
Greece	54%	47%	41%
Finland	66%	58%	59%

Source: modified after TNS Opinion & Social, 2005b, 18; TNS Opinion & Social, 2008, 62; TNS Opinion & Social, 2011, 89

2.1.4 Environment and GMOs

Figure 4 shows how differently the issue of GMO in farming is valued on European average and in Austria, when it comes to environmental concerns.

24% of Europeans claimed “the use of genetically modified organisms in farming” within their top 5 main environmental issues out of 15 possible answers in 2005. In comparison, 43% of **Austrians** and Greeks rated the concern of GMO in farming as their major concern (TNS Opinion & Social, 2005b, 11).

In the later surveys, the percentage decreased to 20% (in 2008) and 19% (in 2011) of respondents noted the topic of GMO use in farming within their top 5 concerns. In 2008, the **Austrian** level of concern remained as in 2005 with 43%. Three years later, the issue of GMO decreased a bit, but is still emphasized as a priority and in the top 5 list of 35% of Austrians (TNS Opinion & Social, 2008, 8ff; TNS Opinion & Social, 2011, 139).

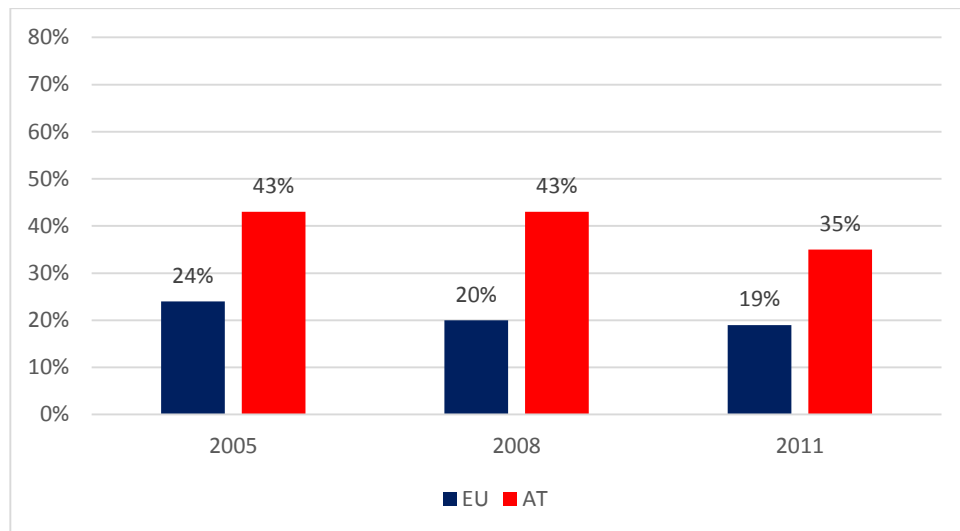


Figure 4: “The use of GMO in farming” in % mentioned within the top 5 of personal environmental issues (2005 EU-25, 2008 & 2011 EU-27)

Source: modified after TNS Opinion & Social, 2005b, 81; TNS Opinion & Social, 2008, 101; TNS Opinion & Social, 2011, 139

Although about a quarter of Europeans named GMO as a big concern, it is only located in the middle within 15 possible answers in 2005. There were seven issues which Europeans ranked far more often within the top 5 environmental issues (Table 6) (TNS Opinion & Social, 2005b, 8).

Table 6: List of environmental issues of concern in 2005 (most frequently named within the top 5 of respondents)

	Environmental issues of worry	% EU
1	Water pollution (seas, rivers, lakes, underground sources, etc.)	47
2	Man made disasters (major oil spills, industrial accidents, etc.)	46
3	Climate change	45
3	Air pollution	45
4	The impact on our health of chemicals used in everyday products	35
5	Natural disasters (earthquakes, floods, etc.)	31
6	Growing waste	30
7	Agricultural pollution (use of pesticides, fertilizers, etc.)	26
7	Depletion of natural resources	26
8	The use of genetically modified organisms in farming	24

Source: modified after TNS Opinion & Social, 2005b, 8

2.1.5 Future consequences of GMOs

The Eurobarometer survey on biotechnology in 2005 (EU-25) and 2010 (EU-27) measured the optimism and pessimism for new technologies in Europe. Figure 5 shows how people see the effect of biotechnology and genetic engineering in the future.

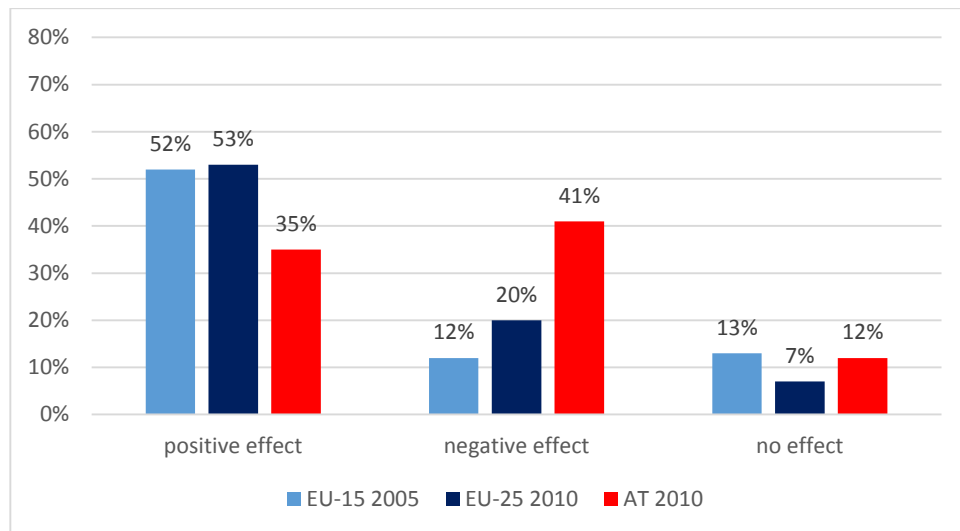


Figure 5: Percentage of people's belief in effects of biotechnology and genetic engineering in the next 20 years

Source: modified after Gaskell et al., 2006, 10; TNS Opinion & Social, 2010b, 251

In 2005, 52% of interviewed people thought that GMOs and biotechnology will improve our way of living in 20 years (Gaskell et al., 2006, 10). This number increased slightly 5 years later, to 53% of Europeans in 2010. This percentage seems very small compared to the positive attitude towards “solar and wind energy” and “computers and information technology” (both over 80%) (TNS Opinion & Social, 2010b, 9).

Although on average more than half of Europeans saw a positive effect in the new technology, the country specific attitudes vary greatly, and many differences can be discovered (about +/- 20%). Citizens from Iceland (79%), Estonia (77%), Norway (73%), and Finland (69%) responded positively. **Austrians** expressed the lowest conclusion in positive effects (35%) while at the same time, the highest concern in negative effects (41%) (TNS Opinion & Social, 2010b, 11).

2.2 Austria and the precautionary principle

In the next chapter this thesis focuses on Austria. A short summary of the Eurobarometer findings serves as an introduction:

1. The level of worries remain stable in Europe – with Austria approximating to the European average (TNS Opinion & Social 2006, 74; TNS Opinion & Social 2010b, 20/78),
2. More than half of Europeans acknowledge that GM food is dangerous while in Austria, nearly three quarters have concluded that (TNS Opinion & Social, 2005a, 61, EORG, 2001, 26),
3. The sentiment of absence in information is widespread in Europe. Austrians consider themselves more poorly informed than the average European (TNS Opinion & Social, 2005b, 85; TNS Opinion & Social, 2008, 62; TNS Opinion & Social, 2011, 143),
4. Austrians associate GMO with higher environmental risks than other Europeans (TNS Opinion & Social, 2005b, 81; TNS Opinion & Social, 2008, 101; TNS Opinion & Social, 2011, 139),
5. Half of the Europeans have a positive attitude towards the consequences of GMO, while Austrians are not convinced. The majority sees the future negative (Gaskell et al., 2006, 10; TNS Opinion & Social, 2010b, 251).

There is very little literature explaining why Austria is taking such an opposing role when it comes to GMO. There were two papers published by Mikl and Torgersen (1996) as well as Torgersen and Bogner (2005), which attempt to explain how the Austrian opposition occurred.

Multinational seed companies are not rooted in Austria, and therefore the industry sector was not paying close attention to biotechnology. They saw no benefit in introducing it to Austria. That may be one reason why biotechnology had a rough start in Austria (Torgersen and Bogner, 2005, 278).

The issue of GMOs in Austria first became a topic of discussion around 1996 (Mikl and Torgersen, 1996, 195). At that time, a general aversion in the public existed, which was not solely due to scientific arguments about perceived risks of GMO. Therefore, a lack of knowledge about risks was named among the reasons. Another possibility is

that a declining public trust in expert opinion existed in the 1980s (Mikl and Torgersen, 1996, 195). Additionally, Austria was assuming a leading role in organic farming, which may be another reason for GMO aversion (Mikl and Torgersen, 1996, 199).

Within the political system of Austria, there were very opposing opinions. NGOs worried about the broader context of the aims of genetic engineering (Mikl and Torgersen, 1996, 197). Politicians worried about the uncertainty in benefits and made clear that they didn't tend toward "a coherent approach for a more reflexive way to deal with a controversial technology" (Torgersen and Bogner, 2005, 277). Farmer representatives failed to take a stance and remained with the common and popular non-GM position (Torgersen and Bogner, 2005, 278). Social partners were more concerned about economy and economic growth than environmental issues. As Austria's law building parties wanted to take into account all differing opinions and the suggestions of political parties, as well as industry and NGOs into account, the result was a so called 'Yes, but' strategy. They said "Yes" to GMOs in general, but included a bulk of strong provisos, case-by-case assessments of socio economic effects, and protection of farming and forestry. Summed up, many issues were lumped together for consideration unrelated to the direct ecological impact of the use of GMOs (Mikl and Torgersen, 1996, 196). Another problem was that the EC Directive regulation only considered primary ecological risks and not secondary, risks of the effects of herbicide use, because "averse ecological effects ... might be caused by all sorts of organisms, not just GMOs" (Mikl and Torgersen, 1996, 197).

Agricultural practices

It was indicated that commercial agriculture adopted more economical practices which lead to ecological effects. Very little attention about this issue was cited in links with GMO risk assessment. This lead to further changes in agricultural practices and therefore, more impact on the environment. The Federal Environmental Agency suggested that influences from a new trait in agricultural practice should be considered as risk issue (Mikl and Torgersen, 1996, 198; Torgersen and Bogner, 2005, 278). The argument was made that everything might be a harm to the ecosystems, but it is simply technical progress and ecosystems are complex. "...Few of the regulators agree that risk assessment is an appropriate means of preventing secondary effects" (Mikl and Torgersen, 1996, 197). Austrian policy makers criticized "the lack of co-ordination

and the absence of an overall policy concept” (Torgersen and Bogner, 2005, 279). They felt that politicians don’t really want to touch the topic of GMO regulations and furthermore, that forces such as public opinion and non-governmental organizations (NGOs) play a major role and control policy (Torgersen and Bogner, 2005, 279).

Austrian biotechnology law

Five principles were taken into account on building the gene technology law of 1994:

- The precautionary principle;
- The principle of providing for the future;
- The step-by-step principle;
- The democratic principle;
- The ethical principle (Mikl and Torgersen, 1996, 196).

The Austrian biotechnology law is a “compromise” between scientists, who share the opinion that “most applications of genetic engineering pose no risk and therefore need no regulation” (Mikl and Torgersen, 1996, 197). One group of scientists stated that “regulation, including provision for public participation and monitoring, is justified for GMO releases” (Mikl and Torgersen, 1996, 197) and further scientists, who say that “...the main reason for regulation GMOs is to reassure the skeptical public, since the ecological effects are no different from those resulting from conventionally bred organisms” (Mikl and Torgersen, 1996, 197).

The precautionary principle

The precautionary principle’s aim is to ensure “rapid response in the face of a possible danger to human, animal or plant health, or to protect the environment” (EUR Lex, 2000, s.p.). It is used as a preventative form of regulation. In the European practice, it is also embedded in consumer policy and legislation (EUR Lex, 2000, s.p.). In the case of Austrian regulations, the precautionary principle takes not only scientific findings into account, but also possible overall impacts, such as impacts on the environment, landscape, health, and society. Every GMO variety must be in accordance with the law, thereby undergoing a federal oversight (Mikl and Torgersen, 1996, 197).

There are three different ways of interpreting the precautionary principle, which apparently considers uncertainty, benefits and ethics:

- Scientific understanding: Uncertainty/precaution always needs scientific case-to-case analysis. As a sign of benefit, an increase in knowledge is considered sufficient enough and taken for granted in exploiting scientific research results. Ethical concerns are scientifically irrelevant (Torgersen and Bogner, 2005, 280).
- Political-economic understanding: The precautionary principle serves as “guidance in cases of decisions under uncertainty” (Torgersen and Bogner, 2005, 280). Within the topic of science, a residual risk is almost always present, but “man-made risks can and should be minimised” (Torgersen and Bogner, 2005, 280) although benefits are weighed as important as risks. The issue of uncertainty about benefits includes preservation of small-scale and organic farming, although only health and environmental risks are seen as relevant and accepted in other countries. “Science delivers arguments that can be applied in a political struggle but loses its authority if politics interfere with scientific endeavours at finding the truth” (Torgersen and Bogner, 2005, 280).
- Normative system-critical understanding: Characteristic of this point of view is the consideration of non-quantifiable risks and long-term consequences. Two positions of decision making would be environmental ethics or modernization. An issue is also slowing down the decision-making process. Benefits are seen in sustainability, but “science is supposed to serve political aims and is emphasised if politically necessary” (Torgersen and Bogner, 2005, 280).

The precautionary principle was seen as “blurring the boundaries between science and politics” (Torgersen and Bogner, 2005, 277). An interpretation is also possible as a sign of increasing skepticism in the public towards science and perhaps the desire of citizens outside this sector to have a voice. It is possible boundary blurring is a step into a modernization process (Torgersen and Bogner, 2005, 278).

NGOs were enjoying a major influence in Austria. As the government met most of their demands, except an entire ban of GMOs, they had little to criticize. It seemed, as a matter of fact, that Austria would remain GM free – even for industry and science members (Torgersen and Bogner, 2005, 278).

Unfortunate circumstances of GM seed producing companies (illegal release of seeds) in the 1990ies lead to the proposal of a two-year moratorium of all GMO releases, giving assurance that the public would be united in its opinion of GMO. This moratorium was turned down, because it was too expansive and may have included commercial products with EU-wide market approval. This discussion coincided with BSE scandals, which may have influenced the debate about agricultural biotechnology in Austria (Mikl and Torgersen, 1996, 199).

The *de facto* moratorium of 2003 got prolonged by Austria and was seen as a huge success as it kept Austria GM-free for at least a couple more years. At the same time, other European countries were allowed to grow GM-feed now. Austria considered this a major threat to organic feed production, due to the problem of contamination across the Austrian border (Torgersen and Bogner, 2005, 282). A universal ban of GMO, establishing Austria as a GM-free area was not possible in the eye of the European Commission. Nevertheless, it was possible to outsource GM production from specific areas in Carinthia due to nature preservation issues and contamination (Torgersen and Bogner, 2005, 283).

2.3 United States of America (USA)

In this chapter, an analysis of early surveys conducted in the USA regarding their attitude towards GMO is examined. A comparison study similar to, but different than, the Eurobarometer survey was necessary to complement, support and possibly, contradict that of the Eurobarometer. Therefore, the surveys of the “Pew Initiative on Food and Biotechnology”, conducted between 2001 and 2006, are given particular attention (except 2002). After 2006, the Pew Initiative published no similar surveys. Additionally, no other organization nor institute published comparable periodical surveys that could be used for observation. For this reason, other surveys conducted between 2006 and 2014 were taken into account. It has to be mentioned, however, that all of the other surveys may use different counting measures and evaluation procedures.

The results of the surveys are sufficient enough to establish a trend in the average US American citizen’s attitude towards GMO. For more recent results, surveys of a number of different institutions are further analyzed to determine if the observed trend still remains.

2.3.1 Attitude towards GM food

Although the opposition against GM food is high, it was ranked 5th in a list of major concerns in food safety in 2001. The concerns of food freshness, food poisoning, Salmonella, and chemicals and fertilizers were of higher interest than that of GM food (The Mellman Group Inc. and Public Opinion Stragies, 2001, 3). Figure 6 underscores the sentiment of US consumers with the introduction of GM food into their food supply.

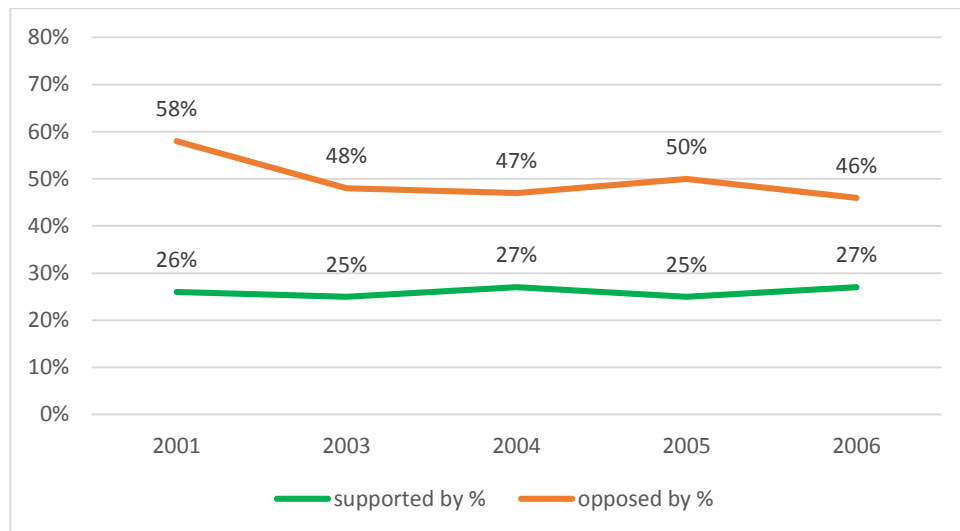


Figure 6: Percentage of consumer support or opposition towards the introduction of GM food into the US food supply

Source: The Mellman Group Inc., 2006, 3

In 2001, 26% of consumers supported the introduction of GM food into the US food supply while more than double that amount opposed it (58%). Support for “introducing genetically modified foods into the US food supply” didn’t really show any big changes within the years as it was also +/- 1 percentage point from the very first measured 26%. However, the opposition changed within the years from 48% (in 2003 to 47% in 2004), in 2005 the opposition grew to 50% then died back down to 46% in 2006 (The Mellman Group Inc. and Public Opinion Stragies, 2001, 2; The Mellman Group Inc. and Public Opinion Stragies Inc., 2003, 2; The Mellman Group Inc., 2006, 3).

Attitude towards GMO research

In 2001, 65% of US Americans supported research in GM food and 26% opposed it (The Mellman Group Inc. and Public Opinion Stragies, 2001, 3). There was no change in the number of US consumers comfortable with the genetic modification of plants within the years (on average, rated nearly 6 out of 10 points) (The Mellman Group Inc., 2004, 4). The opposition against GMO research was a bit higher when it came to GM animals – 56% were against it. The attitude changed again, if the purpose of GMO research with animals is seen as the possibility of protection against animal diseases (e.g.: resistance against avian flu and mad cow disease are regarded as sufficient reasons by 40% each) (The Mellman Group Inc. and Public Opinion Strategies Inc., 2005, 3f).

In 2004, scientists attempt to dispute reasons for the support of GM technology. They observed that good cause for supporting GM technology were outcomes which have a positive influence on personal life and family. In particular, 54% of US Americans thought that biotechnology is good for producing cheaper pharmaceutical drugs. Furthermore, 52% saw biotechnology as a good option, if it would help to produce cheaper food for the purpose of reducing world hunger (The Mellman Group Inc., 2004, 5). In 2006, primary factors for supporting or opposing GMO were seen in the impact it might have on oneself and one's family (59%) and the trust placed in people providing the information (50%) (The Mellman Group Inc., 2006, 8).

2.3.2 Awareness about GMO

Awareness levels about GMO vary a lot. Figure 7 shows a comparison of people who would eat GM food and the awareness of those already eating it.

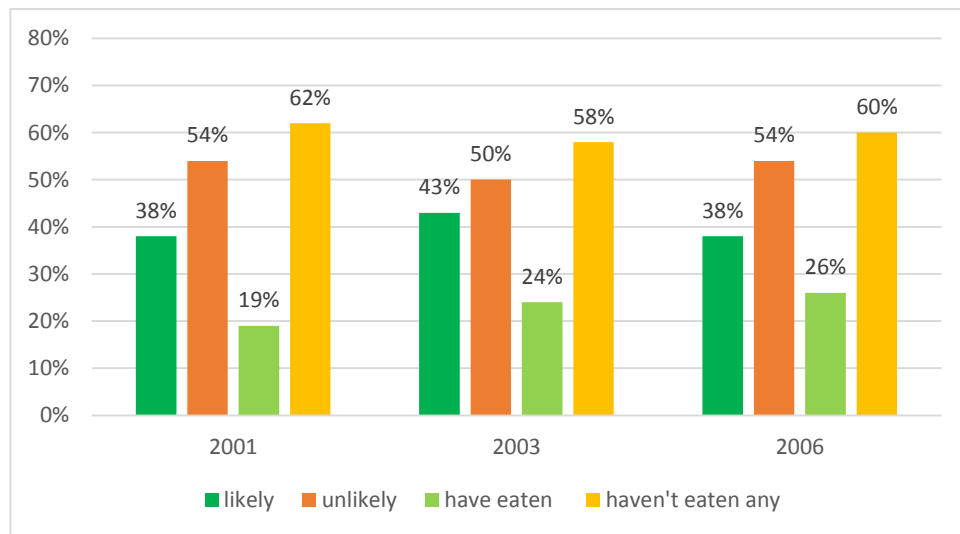


Figure 7: Percentage of people's likelihood and awareness of eating GM food

Source: modified after The Mellman Group Inc. and Public Opinion Stragies, 2001, 2; The Mellman Group Inc., 2006, 2ff; The Mellman Group Inc. and Public Opinion Stragies Inc., 2003, 2

The likelihood of US Americans eating GM food in 2006 remained at the same level as it had been five years earlier. When it comes to the awareness of eating GM foods, in 2001, 62% believed that they hadn't eaten it yet, while 19% believed they did – additional 19% didn't know it. These numbers haven't changed much over time: in 2006, compared to five years earlier, 2% fewer people feel certain they hadn't eaten any GM product as yet. On the other hand, 7% more thought that they had.

Educational background and level of knowledge

In general, the survey found that the more highly educated the consumer, the more likely they were to believe they have eaten GM food products. It was also learned in 2005 and 2006 that the level of knowledge about GMO also indicates whether people believed they were eating GM products already. 57% of the people who were aware of GMO thought that they had eaten it, while 15% of the people who knew nothing at all about it announced that they had eaten it before (The Mellman Group Inc. and Public Opinion Strategies Inc., 2005, 2; The Mellman Group Inc., 2006, 2ff).

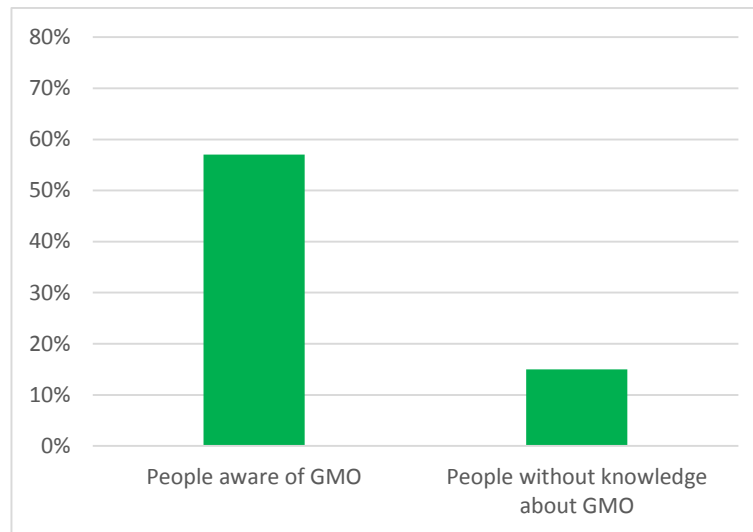


Figure 8: Percentage of people, who think that they ate GM food

Source: modified after The Mellman Group Inc. and Public Opinion Strategies Inc., 2005, 2

In 2013, fewer than half of US Americans knew that GM food was already being sold in supermarkets with only a quarter believing that they ever ate GM food (Hallman et al., 2013, 4). Although most US Americans still had a negative attitude towards GM foods in 2013, 45% felt sure that it was safe to eat. Nevertheless, more than half of the people determined they would pay more for non-GM food (Hallman et al., 2013, 5).

The Consumer Reports of 2008 published that 29% of US Americans would buy “meat or milk products from genetically engineered animals” (Consumer Reports National Research Center, 2008, 4). In 2014, a phone survey of Consumer Reports National Research Center found that 72% of consumers agreed that it is essential to avoid GM ingredients when purchasing food, while 26% feel it is not important to them (Consumer Reports National Research Center, 2014, 3).

2.3.3 Safety of eating GM food

Figure 9 compares the personal views about safety of GM food before and after receiving the information that more than half of the products in the supermarkets already contain GMO in some form.

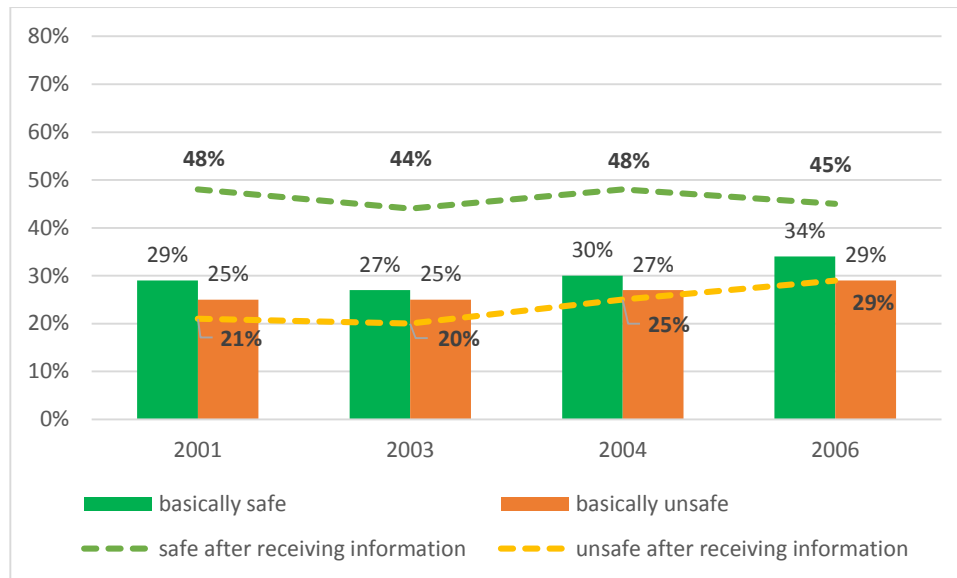


Figure 9: Percentage of consumer's judgment about safety before and after receiving information about GMO

Source: modified after The Mellman Group Inc. and Public Opinion Stragies, 2001, 2; The Mellman Group Inc. and Public Opinion Stragies Inc., 2003, 2; The Mellman Group Inc., 2004, 2; The Mellman Group Inc., 2006, 4f

In 2001, a quarter of US citizens thought that GM food is “basically unsafe”, and 29% believed it to be safe – 46% were either unsure or didn’t know about the safety of GM products. After consumers received information that half of the product in the supermarkets already contain GMO, the number of people believing GMO to be safe soared 9% higher, while those believing it to be unsafe diminished by 4%.

In 2003, 27% said that it was safe and 25% claimed that it wasn’t. In 2004 and 2006, public opinion in safe, as well as in unsafe, increased. In 2004, people who considered GM food as safe reached 30 %, then 34% in 2006. In 2004, 27% 2004 of US American citizens and 29% in2006, were convinced that it was “basically unsafe”. After announcing the information that more than half of the products already being sold in supermarkets consist of GM ingredients, the amount of people considering it safe always increased (The Mellman Group Inc. and Public Opinion Stragies, 2001, 2; The Mellman Group Inc. and Public Opinion Stragies Inc., 2003, 2; The Mellman Group Inc., 2004, 2; The Mellman Group Inc., 2006, 4f).

In 2008, levels of concern regarding “Eating meat or milk products from cloned or genetically engineered animals” were ranked in the middle with 58% being concerned. It is rated lower than harmful bacteria, safety of imports, synthetic growth hormones and carbon monoxide in meat. The concern about genetic engineering of food crops or animals to produce medicine is at a lower level with 43% (Table 7) (Consumer Reports National Research Center, 2008, 8).

Table 7: Excerpt of consumer concerns in 2008

	Concern	% of people concerned
1	Harmful bacteria	83%
2	Safety of imported foods	81%
3	Dairy cows given synthetic growth hormones	70%
4	Safety of meat treated with carbon monoxide to preserve red color	67%
5	Eating meat or milk products from cloned or genetically engineered animals	58%
6	Ocean pollution caused by fish farms advertised as organic	57%
7	Degradation of plastics used to make or line food and beverage containers	54%
8	Genetic engineering of food crops or animals to produce drugs, such as insulin	43%
9	Health problems associate with eating fish caught in the wild	41%

Source: modified after Consumer Reports National Research Center, 2008, 8

In 2015, another survey was published by the Pew Initiative, in which they tested public opinion about GMO again. In this report, the authors had two target groups: the first one were “normal” people (in the following referred to as, “public”) while the second group contained only scientists from the American Association for the Advancement of Science (AAAS) (in the following referred to as, “scientists”) (Funk and Rainie, 2015, 2). A finding was the large gap between the public and the scientists’ beliefs of GM food safety (Figure 10).

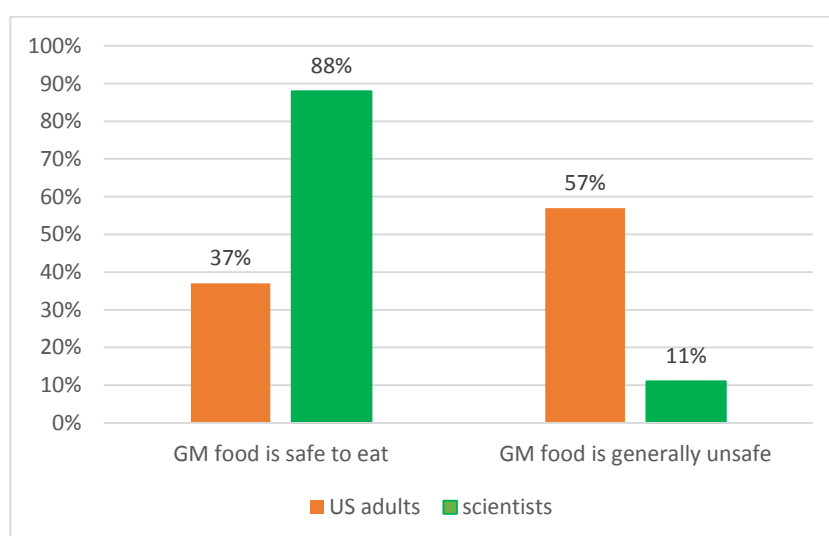


Figure 10: Comparison of beliefs in the safety of GM products among US adults and scientists

Source: modified after Funk and Rainie, 2015, 39

The percentage of the US public, who think that GM food is safe, would coincide with previous surveys. On the other hand, within scientists more than double the percentage amount of the public consider GM food to be safe. Consequently, the gap between the public and scientists who believe GMO is unsafe to eat, is remarkable as well (Funk and Rainie, 2015, 39).

2.3.4 Knowledge about GMO

The level of knowledge changed within the years as can be seen in Figure 11.

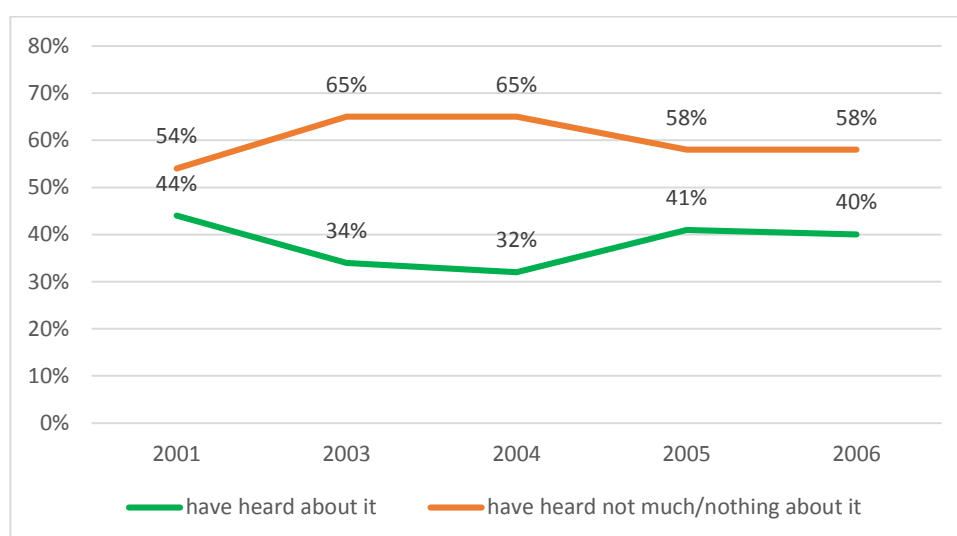


Figure 11: Level of knowledge about GMO in the USA in % on a timeline

Source: The Mellman Group Inc., 2006, 2

In 2001, the highest percentage level of knowledge about GMO and biotechnology was measured within all surveys: 44% of people “have heard about it” (The Mellman Group Inc. and Public Opinion Strategies, 2001, 1). This was likely due to the former attention media put on the topic because of the StarLink corn recall³. Knowledge of GMO decreased with declining attention the media put on the topic: 34% (2003) and 32% (2004) had heard about GM foods. In 2005, public awareness of genetically modified food grew, 9% compared to former years. Nevertheless, 58% of the public still considered themselves as not knowing about anything about GMOs. In 2006, the knowledge level remained on a consistent level (The Mellman Group Inc., 2004, 1; The Mellman Group Inc. and Public Opinion Strategies Inc., 2005, 2; The Mellman

³ The StarLink corn recall happened in 2000 in the US after genes of this GM corn variety were found in various corn products for human consumption, although it was only approved for animal feed, because there was an assumption of causing allergies in humans (Federation of American Scientists, s.a., s.p.).

Group Inc., 2006, 2). The survey in 2013 conducted by the GfK Custom Research⁴ came to a similar result: 54% knew little or nothing about GM foods (Hallman et al., 2013, 3).

2.3.5 Knowledge about GMO regulations

As summarized above, the overall awareness about GMO wasn't very high in the USA. The level of knowledge was even worse when it came to regulatory issues (Figure 12).

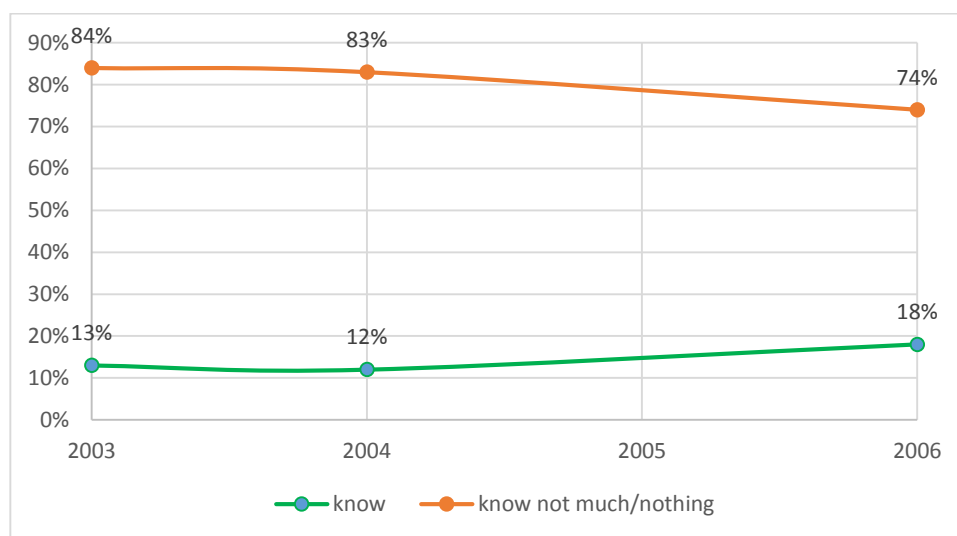


Figure 12: Percentage of people who have (no) knowledge about GM regulations

Source: modified after The Mellman Group Inc., 2004, 2; The Mellman Group Inc., 2006, 3

In 2004, 12% of the interviewed US Americans had knowledge about GM regulations – 83% claimed themselves as knowing little or nothing. These numbers remained stable compared to the prior year where 13% had heard of it, while 84% didn't. In 2006, a slight increase could be observed (The Mellman Group Inc. and Public Opinion Strategies Inc., 2003, 3; The Mellman Group Inc., 2004, 2; The Mellman Group Inc., 2006, 3). However, even in 2013, US Americans remained blind eyed when it came to regulations. Only a quarter of US Americans were aware that no regulations were currently in place into labeling GM products (Hallman et al., 2013, 4).

In 2004, among those who had heard about the regulations, 5% more people believed that the regulations were not sufficient, compared to 35% in 2003. Additionally, 6% less interviewed people found them about right compared to 25% in 2003. Just 8% (10%

⁴ The GfK Custom Research evaluated data of an online US national survey including 1.148 participants by using their national internet-based survey response panel (KnowledgePanel®). GfK is a market analyzing company which offers its data to companies (GfK, 2015, s.p.).

in 2003) said that there are too much. In 2006, only the percentage of people who thought there was too much regulation, increased to 16%, while there were very few changes in the other areas (The Mellman Group Inc. and Public Opinion Stragies Inc., 2003, 3; The Mellman Group Inc., 2004, 2; The Mellman Group Inc., 2006, 6).

2.4 Perceptions about information and regulations

There is general agreement about the issue of labeling of GM ingredients within US citizens. In 2004, 92% supported a label identifying GM foods and 91% a label of GM ingredients in processed foods (The Mellman Group Inc., 2004, 3). Already in 2001, 75% of consumers declared the importance of notification when a product contains GM ingredients. While only 21% thought this was not important (The Mellman Group Inc. and Public Opinion Strategies, 2001, 3).

In 2008 and 2010, the call for labels still remained unchanged at a very high level with 95% in agreement (Consumer Reports National Research Center, 2008, 13). 92% of US Americans think that labeling should be mandatory and government safety standards should be met as well (Consumer Reports National Research Center, 2014, 2). In 2013, another study also showed that nearly 90% of the interviewed people agreed that labeling of GM ingredients was seen as important – while one third expressed that it was extremely important to them (Hallman et al., 2013, 16).

In Europe, choice and information were also in high demand, at 94,6% and 85,9%, respectively within all member states of the EU-15 in 2001. Additionally, 85,8% agreed that GM food should only be introduced if it is scientifically proven to be safe and 70,9% announce that they “do not want this kind of food” (EORG, 2001, 40).

In 2004, 19% of US Americans wanted to achieve a prohibition of selling any genetically modified food in the US. 55% didn't agree with this position. 85% wanted to remove only unsafe GM foods, while the same percentage supported the idea of assurance that the products are safe before introducing them into the market. 81% of consumers saw the Food and Drug Administration (FDA) as the responsible institution for approval (The Mellman Group Inc., 2004, 3). In 2005, 61% felt that the government should approve GM food as safe before it should enter the market. This determination process was also supported if it causes delays in entering the market (63%). 6% didn't think that any determination process is necessary (The Mellman Group Inc. and Public Opinion Strategies Inc., 2005, 4).

The possibility that GM products were being imported into the USA without regulation was inconceivable to US Americans in 2005 - 80% had not heard of such a case.

Although, 80% of US Americans had barely heard of imported GM products, 65% were against it. 60% wanted importers to be required to identify products containing GMO. Additionally, 54% desired that imported products also have to be proven safe by US regulators (The Mellman Group Inc. and Public Opinion Strategies Inc., 2005, 4f).

Toke (2004) compared the differences of GM politics in the US, UK and India. The differing attitudes towards GMOs may be due to several reasons. The issues of discussion and who serves as a provider of information about GMO is essential. Issues of discussion can range from

- environmental nature – herbicide and pesticide reduction, higher efficiency in yields,
- ethical nature – animal genes in a vegetarian based lifestyle, or
- material agricultural circumstances as use of the countryside and availability of land, but also
- in the way a population sees food production and consumption - efficiency and technological know-how (Toke, 2004, 181ff).

Providers of information may include: biotechnology companies, wildlife conservation scientists or pro-biotechnology scientists (Toke, 2004, 181). A look behind the scene makes visible that some kind of lobbies are playing a big role in politics. For example, in the UK the statutory body is responsible that GM field trials currently exist, in India, a strong anti-GM crop lobby is considering that the Department of Biotechnology or biotechnology companies might take a leading position in studies about GMO in the US (Toke, 2004, 183).

2.5 Further studies about GMO acceptance

A meta-study conducted in 2003 to discover the prices consumers were willing to pay for non-GM products. The results revealed that Europeans were prepared to pay 92% more for the same product than US Americans would (Dannenberg, 2009, 2186f). Another interesting outcome of a survey done by Rousu et al. (2004) was that US consumers are willing to pay higher prices for a GMO free guarantee, yet they don't differentiate between levels of "contamination" with GMO ingredients regardless of whether a product contains 1% or 5% of GM material. This finding is an important distinction in case the US is ever going to implement a labeling system because a higher tolerance level is cheaper to meet (Rousu et al., 2004, 20ff).

Another study observed the amount one was willing to pay for consuming a GM cookie in locations in the US and in parts of Europe (Great Britain and France). In almost all cases, except France, the valuation decreased after providing consumers with information about the benefits of GM food production (for the environment, health and the third world). It was found that consumer attitudes and values can be changed with suitable information (Lusk et al., 2004, 200). Depending upon what kind of information is given, where it was given and to whom. For example, information about environmental issues produced stronger effects in the United States locations than in Europe. In Great Britain, information about health had a higher impact than in the US. Nevertheless, the consumers' prior attitude towards GM food influenced the later reaction to information provided. A slightly positive attitude induced a stronger influence was observed in those given some information about biotechnology, while others gave it little to no significance (Lusk et al., 2004, 201).

Frewer (2003) investigated that in case of GM food, a combination of issues contributes to consumer attitudes. These issues depend on an "assessment of risk and benefit", "ethical and moral considerations", "uncertainties and concerns about the potential for unintended effects", "trust in the regulatory system" as well as "trust in information sources" (Frewer, 2003, 330). Frewer et al. (2013) theorized that risk and benefit perceptions increased over the years. European consumers have, compared to Northern American and Asian consumers, a more universally negative attitude. Surprisingly in North America, ethical and moral concerns were higher than compared to Europe (Frewer et al., 2013, 151).

An initial possibility in identifying the different attitudes towards GMO, may be found within cultural attitudes (Hebden et al., 2005, 243). Previously, it has been found “...that world views have an important influence on the perception of gene technology” (Siegrist, 1999, 2103).

It was also already mentioned in Siegrist (1999) that trust plays an essential role on the acceptance of this new technology. Consumers in Europe place more trust in environmental groups, which are highly likely to put GMO in a negative light. Conversely, US Americans trust scientific and academic sources the most. Furthermore, trust also indicates some kind of risk taking. Most US American consumers would prefer to have labeling. However, if institutions like the FDA think that labeling isn’t required and they trust their opinion (Hebden et al., 2005, 244).

Secondly, differing attitudes towards GMO could be rooted in the different agricultural scale and structure, therefore, in the way it is seen by the population. In Europe, farms are located closer to urban centers and are part of the nature. In the USA, farms are further away from the people and not regarded as part of the nature. Therefore, Europeans may be more aware of what is happening on farms because they are confronted with it in their daily life (Hebden et al., 2005, 244).

The simplest explanation is that US Americans have not been exposed to much information through the media, while in Europe, the topic has been an extensive topic of discussion, which increased public awareness (Hebden et al., 2005, 245).

In a paper published by the Friend of the Earth Foundation⁵ the differences between the US and Europe are also noted for their differences in their approach to regulations (Schimpf, 2014, 1). US regulations are set up due to scientific assessment, while in Europe, this is only a small part of it. Regulations in Europe also attempt to include the wider context into account such as impacts on the environment, society, and ethics (Schimpf, 2014, 1).

⁵ The Friend of the Earth Foundation is an environmental network which takes action worldwide <http://www.foe.org/> (30.09.2015).

3 Communication

This chapter offers a closer look into marketing communication and pictures as a source of manipulation to explain the second research question that deals with their contribution of forming emotion⁶, memory⁷ and public opinion⁸.

The effects of media can be classified into cognitive, emotional and conative effects. Usually a combination of these effects lead to personal attitude (Schramm and Knoll, 2014, 168).

An examination of the interpersonal factors of determination (involvement, emotions, motive, attitude, values and personality), as these factors are considered to have had a large influence on our consumption habits (Trommsdorff and Teichert, 2011, 31). Furthermore, consumers make a purchase decision in combination with interpersonal factors (Meffert et al., 2008, 106f).

Finding a definition for communication or at least a proper classification/borderline about what communication is, turned out not to be as simple as it may seem. The following definitions can help.

- Communication is a process which needs a sender and a receiver. The aim of the communication process is to transmit a message (Blanz, 2014, 15f).
- Communication is target-oriented, and the transmitted message is sent with purpose and aims to be understood in the same way as it was sent by others (Argyle, 2013, 14).
- Additionally, it is defined as the “transmission of coded information to achieve a reaction in the receiver” (Meffert et al., 2008, 632). In the context of marketing this definition was expanded upon by Bruhn (2015) “communication means the transmission of information and content for the purpose of steering opinions, attitudes, expectations and behaviors of certain recipients due to specific goal setting“ (Bruhn, 2015, 3).

⁶ A condition of inner excitement is described as emotions. These can arise from any kind of stimulus (Trommsdorff & Teichert, 2011, 32, 59ff). Our actions are influenced by emotions in multiple ways even without us recognizing it (Trommsdorff & Teichert, 2011, 59ff).

⁷ Memory is defined as “(a)n aspect of cognition involving the functions of encoding, storing, and retrieving information” (Chandler and Munday, 2011, 272).

⁸ Public opinion is a result of two coinciding experiences: personal ones and opinions transmitted by the media. It cannot be divided from where the public opinion arises (Mahlau, 1999, 10).

The communication message includes the coding of an idea through modalities such as text, images or sound. The communication medium serves as a transmission device (Bruhn, 2015, 7).

A medium is “the means or agency through which communication takes place; often synonymous with channel” (Chandler and Munday, 2011, 270). A communication medium is “a major category of communication means, such as the print media, radio, television, cinema, posters, direct mail or the internet” (Busch et al., 2007, 255). The communication means are for example advertisement, insertion and poster (Bruhn, 2015, 8).

Communication instruments are “the sum of similar communication actions, e.g. advertisement, direct marketing, public relations“ (Bruhn, 2015, 6).

The term communication includes many different forms of adjustment. Blanz et al. (2014) made a division into:

- verbal communication,
- Nonverbal communication,
- Interpersonal communication,
- Group communication or
- Medial communication and mass communications.

In this thesis a special focus is placed on medial and mass communication, followed by the topic of online communication with the internet as its medium, and finally, visual communication (Figure 13).

Consequently, public relations can be seen as the basis on which this thesis is built—although it is typically dispensed to companies for the purpose of binding consumers. Therefore, it is mentioned very shortly in chapter 3.1.1.

Influence occurs through different portals (text, advertisements, images, videos) and channels (newspaper, radio, television, internet, social media). In this thesis, an investigation into the medium of media and its influencing characters will be discussed with specific emphasis on the contribution of images on the internet (online communication) is important. The following pages will address these issues.

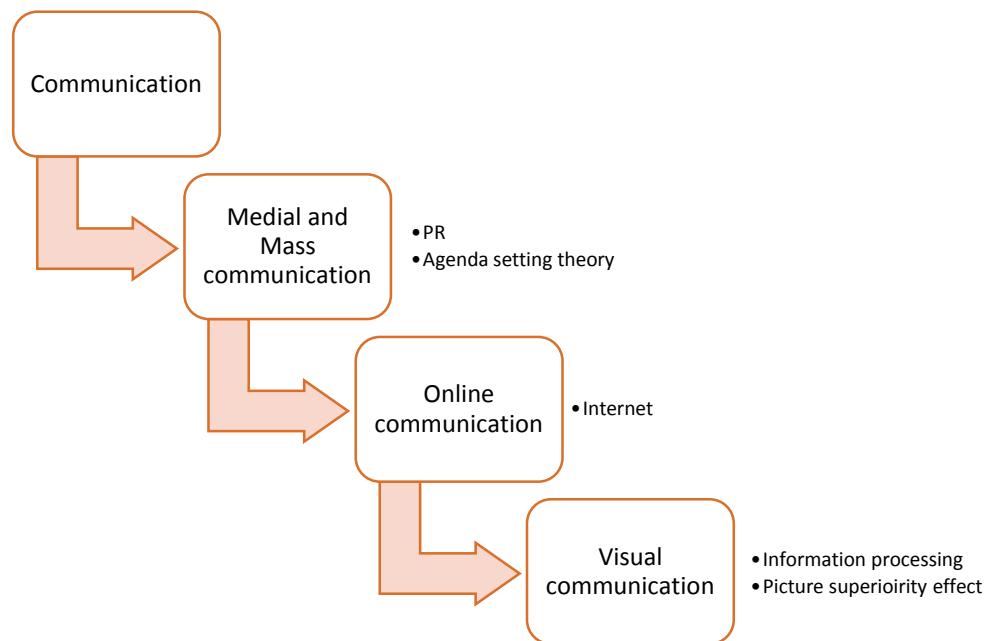


Figure 13: Structure of the chapter communication

Source: own elaboration

Literature already lists many ways communication can be characterized. Bruhn (2015, 368) presents a table where different approaches are summarized. For this thesis, the approach of Steffenhagen (2008) (Table 8) may be more suitable for further investigation, as it is the only approach among 13 others which considers physical communication and the opposing communication through words, writing, pictures, and/or sound as a form of communication.

Table 8: Classification possibilities of different forms of communication

	a)	b)
1	personal communication face-to-face communication from person to person, always live and two-sided	impersonal communication separation through place and/or time
2	two-sided communication reaction between the involved persons (transmitter and recipient) is immediately possible	one-sided/mono communication recipient cannot talk to the transmitter
3	physical communication non-verbal, simple presence of something e.g. exhibitions	communication through word, writing, picture and sound e.g. printings, radio, TV, internet
4	direct communication a specific person/organization is addressed	indirect communication the broad, anonymous public is addressed

Source: modified after Steffenhagen, 2008, 129

Online communication, which is this thesis' topic of interest, can be described as impersonal (1b), one-sided/mono, but also as two-sided (E-mail, Facebook) (2a, b) and indirect (4b) form of communication (Steffenhagen, 2008, 129ff). Additionally, online

communication can take place through words, writing, pictures, and sounds (3b) – all at the same time. The major part of communication takes place through word, writing, picture, and sound (Steffenhagen, 2008, 129f).

Within the German-speaking arena of research, very little attention has been given to visual communication. For a long time, it was viewed as equal to verbal communication processes. Compared to research in the USA, media impact research developed very slowly in order to investigate the visual media of film and television, and later, election campaigns (Müller, 2003, 183f).

Currently, visual communication is about to make its way to a distinct research field within the huge topic of communication.

3.1 Medial and Mass communication

“The media serve as the intermediaries that collect information and make it available to citizens and consumers” (Djankov et al., 2001, 1).

A division of the term, “media” broken down into three sections, can be made:

1. Media, which don't need any technical devices – language, facial expression gesture
2. Media, which use technical devices only for the purpose of production
3. Media, which use technical devices for its production and for transmission (Blanz, 2014, 34).

Medial communication is a term that describes communication besides “natural” communication (language, facial expression, and gesture) where technical devices are used. A special form of medial communication is mass communication (Unz and Blanz, 2014, 107). Mass communication is public, indirect, one-sided/mono, appeals to a diverse public and utilizes technical devices to transmit messages (Maletzke, 1963, 32). These messages can be audio (radio), audiovisual (TV), print (books) or multimedial interactive (internet) (Unz and Blanz, 2014, 107).

Monomedia are defined as using only one medium e.g. books or pictures. Videos combine pictures and sound and are therefore, seen as dual media. Multimedia combine all possible forms of media (e.g. internet) (Blanz, 2014, 35). This happens in the form of newspapers, radio, television, and the internet.

“An important factor in influencing public opinion is information provided by mass media. ... Mass media has [sic] become the key information broker in our society, and it is where most people obtain their information” (Swinnen and McCluskey, 2006, 611).

Scientists looked at ownership patterns of news suppliers in 97 countries and found that families or governments are most commonly the owners of media firms. Less free press and fewer political rights for citizens as well as inferior health and education regulations were observed in countries, where governments own the media (Djankov et al., 2001, 29). If the media were owned by a private company, it was seen as beneficial for social needs, political, and economic goals (Djankov et al., 2001, 30).

As just mentioned, the media serve as an information provider. Information is a large contributor in forming public attitude (Gierl, 2002, 189).

Swinnen and McCluskey (2006) gave an introduction into three papers which covered the topic of trade and globalization in the media. Within all three studies, an opinion-forming attitude from the media was observed (Swinnen and McCluskey, 2006, 612ff). McCluskey and Swinnen (2011) again stated that "...the media itself sets the stage for the public's response by choosing which information to present and ... how to present it" (McCluskey and Swinnen, 2011, 624).

Attitudes⁹ are developed through learning processes which result from previous experiences (Meffert et al., 2008, 122).

So what appeared in the first place? The attitude, which resulted from a learning process or the attitude, which resulted from information provided by the media? These are very essential questions, because attitude is a contributing factor on how something is evaluated. It is also very difficult to change.

When an attitude can be changed, there has to be either a positive attitude in a new item/topic or an assessment has to be completely missing (Gierl, 2002, 308). If it is negative from the very beginning, an attitude is very hard to change. Due to an overabundance of information, it may be difficult to process all information completely and therefore, it occurs more frequently that attitudes are built on incomplete information (Gierl, 2002, 189).

However, this is clearly not on topic for this thesis. Solely, how information provided by the media can contribute to forming attitudes is analyzed.

3.1.1 Public relations

The term public relations (PR) describes the sum of all activities in public media. Its task is to promote products and companies not only through advertisement, but also

⁹ Attitude is described as how you stand behind something based on knowledge and motives. It is shown in the way of acting due to something. A construct of multidimensional attitudes is also known as image. If an image want to be changed one has to deal with the separate components (Trommsdorff & Teichert, 2011, 33).

through other activities such as media activities or special events. PR serves to create an image which cannot be destroyed easily through e.g. any kind of crises and scandals. Two different kinds of PR can be named: marketing oriented PR and strategic PR. The prior one focuses on selling products. The task of strategic PR is to influence specific target groups, induce acceptance, and foster balance between companies and the public (Wagner, 2000, 267).

The Corporate Identity of a company is an important tool of communication which can be formed with tools of PR (Wagner, 2000, 267). The indications of strategic PR should not be examined obviously, because consumers should not know that they are influenced. Its task is to create a coherence of the marketing object with the communicated message.

Companies are trying to influence their consumers on the purchase decision through stances which are included into a purchase. A feeling which might not be explained rationally by any consumer because PR created it in the background of our minds. As a consequence, it is possible to announce that human beings are influenceable. In this thesis, images are used as the source of influence including photographs, illustrations, and signs. Images as a communication tool are discussed in chapter 3.3.1.

3.1.2 Agenda setting theory

The Agenda setting theory describes the circumstance that there is a selection of topics through (mass) media and furthermore the influence of this selection on recipients (Bonfadelli and Friemel, 2015, 181).

Maxwell McCombs and Donald Shaw were the first ones to verbalize the so called Agenda Setting Theory in 1972. Their study couldn't prove the agenda setting influence of mass media, but they also couldn't find another plausible reason to explain their research findings. The public receives most information through mass media. This is considered as enough evidence to acknowledge mass media to have an agenda setting function (McCombs and Shaw, 1972, 185).

The idea was said to be grounded 50 years before McCombs and Shaw, when Lippmann described a similar matter in his book "Public Opinion" which was published in 1922. He describes that (mass) media decide out of all "events" what

information is presented in the news. Media can be seen as a filter which selects information worthwhile to report about (Bonfadelli, 2004, 237).

Swinnen et al. (2005) extends the tasks of the media towards the presentation of information (format: photographs, text) and which aspects of information appear (positive, negative, environmental, political) (Swinnen et al., 2005, 177).

3.1.3 Origin of pictures in the media

Where do pictures in the media actually come from? Do journalists, professional photographers or normal citizens contribute to the images we see?

Generally three possibilities of obtaining pictures for e.g. websites can be named:

- taking them by yourself,
- buying licensed pictures or
- hiring a professional photographer (Beaird, 2011, 165).

Those three possibilities depend on personal skills, money and demand (Beaird, 2011, 165).

If time and talent are lacking, licensed pictures are a good option to discover suitable pictures of common objects. They are saved in databases and can be used for free or for a license fee – which may be up to several hundred Euro (Beaird, 2011, 166ff).

Licensed pictures can also be divided into free, free of charge, and limited rights of use (also known as “rights-managed”). Free pictures can be found in the database “freeimages” (former Stock.XCHNG)¹⁰ where every picture is audited before it is published in the database (Beaird, 2011, 168f). For pictures which are free of charge, a membership fee has to be paid and the use of pictures is free of charge. An example for this would be “iStockphoto”¹¹ and “dreamstime”¹². Besides the paying-per-picture attitude, some database websites also offer a monthly account which may be beneficial if many pictures are needed (Beaird, 2011, 170f). Pictures which are “rights-managed” are usually more expensive because the price depends on “the size of the company, the

¹⁰ <http://www.freeimages.com/> (30.09.2015)

¹¹ <http://www.istockphoto.com/> (30.09.2015)

¹² <http://www.dreamstime.com/> (30.09.2015)

number of viewers and the timeframe, in which the picture is used” (Beaird, 2011, 172). Examples are “corbis”¹³ and “getty images”¹⁴ (Beaird, 2011, 172).

Pictures from the Iraq war serve as an interesting example of how the media works. Lester (2005) announced that most photographs taken from journalists in the Iraq war depict the military – soldiers and trucks – and not actual civilians. As a reason therefore, it got pointed out that it was too dangerous to get away from the military escorts. Most pictures about actual Iraq civilians which appeared in the newspaper derived from free-lancers (Lester, 2005, 141f). Journalistic activities were limited and journalists had the possibility to depict only a little aspect of the war.

Another big aspect of producing images is money, as Benjamin Franklin once stated: “...time is money”. In the interconnected world we live in, it doesn’t really make sense that every news organization is sending a journalist to an event to deliver proper material like photographs and videos. There are common sources - so called pool feeds - which can be used by journalists to get the material they need. These pools cover up major events and prevent that more journalists than guests are present on an event (Bock, 2009, 257f).

Consequently, images are usually searched for in libraries and archives. Authors and publishers have to pay use fees if they release them in their work (Rowe, 2011, 708). In order to publish an image copyright and intellectual property laws, ownership status and permissions have to be taken into consideration as well (Rowe, 2011, 709).

Nowadays, most of the pictures in the media have their origin in so called multimedia databases such as “dpa Picture Alliance” or “picturemaxx”. Picture databases offer a wide range of images, they are made professionally and offer information about the content, the source, and copyright (Liebich, 2014a, s.p.; Liebich, 2014b, s.p.).

The “dpa Picture Alliance” contains more than 30 million pictures, graphics, and videos from more than 200 news agencies worldwide. Everybody can upload their images to the database (Liebich, 2014a, s.p.).

With “picturemaxx” (actually an online meta searching machine), journalists can search in about 350 libraries of picture agencies and have access to more than 1 billion media data. It is very common within German media, but is also more frequently used by journalists from the UK and USA (Liebich, 2014b, s.p.)

¹³ <http://www.corbisimages.com/> (30.09.2015)

¹⁴ <http://www.gettyimages.at/> (30.09.2015)

The media try to depict everything. If no picture is available associated with the article, journalists seek for pictures in archives of such pool feeds. Therefore, it also has to be taken into account that the same picture might be used for oppositional purposes (Bock et al., 2011, 279). The problematic issue is seen in the disconnection between images and its original context when photographs are used for different topics (Zelizer, 2006, 16). "Pictures are polysemic and therefore can have several meanings depending on the context in which they are presented" (Bock et al., 2011, 268).

But nevertheless, somebody has to take those photographs or produce the videos and consequently, influences what is going to be on the news already at a very early stage (Bock, 2009, 257f). It was observed that it is hardly mentioned by news organizations where and when a photograph from such a pool feed was taken. The internet - including its blogs and pod casts - is seen as a chance for alternative reporting and a greater transparency of news delivery (Bock, 2009, 274).

Time of publishing

The time of news to be published is seen as crucial (McCluskey and Swinnen, 2011, 627).

The first medium which releases a story, receives most attention and other information providers are building on that story. As a consequence of fast publication, it became quite common to release a story built on imperfect information (Swinnen et al., 2005, 180). It was obtained that "... the popular press is both earlier and more intense in its initial coverage of the crisis, but loses interest more quickly" (Swinnen et al., 2005, 187).

Timing is also important in the case of publishing pictures – especially in social media. As an example serves the picture of fanhansa with the Football World Championship trophy on the back (Figure 14). It was released when everybody in Germany was waiting for their soccer players to return and became a huge success within social media (Petersen, 2015a, s.p.).



Figure 14: Fanhansa with Football World Championship trophy

Source: n.n., 2014, s.p.

Although, errors may occur more often because of fast publications, it was stated “... that early claims, even when false, are reported much more extensively than eventual corrections” (Swinnen et al., 2005, 187). But of course, if a medium gets proven to present false information, it is not very beneficial (Gentzkow and Shapiro, 2005, 3).

3.2 Online communication and the internet

With the emergence of the internet, communication and spreading of information are able to happen faster and to affect a wider range of people, but it also becomes less controllable. Within the topic of marketing, it can either be beneficial for companies trying to spread their advertisement, or very bad for companies if negative news are circulating (Frosch-Wilke, 2002, 8).

The internet offers new possibilities of communication. Especially, the opportunity to use different forms of media at the same time like text, sound, and film is unique. This is summed up in the term hypermedia (Meffert et al., 2008, 664).

The internet is used for a lot of different activities like finding information, social media activities, and downloading music (Figure 15) (statista, 2015, s.p.).

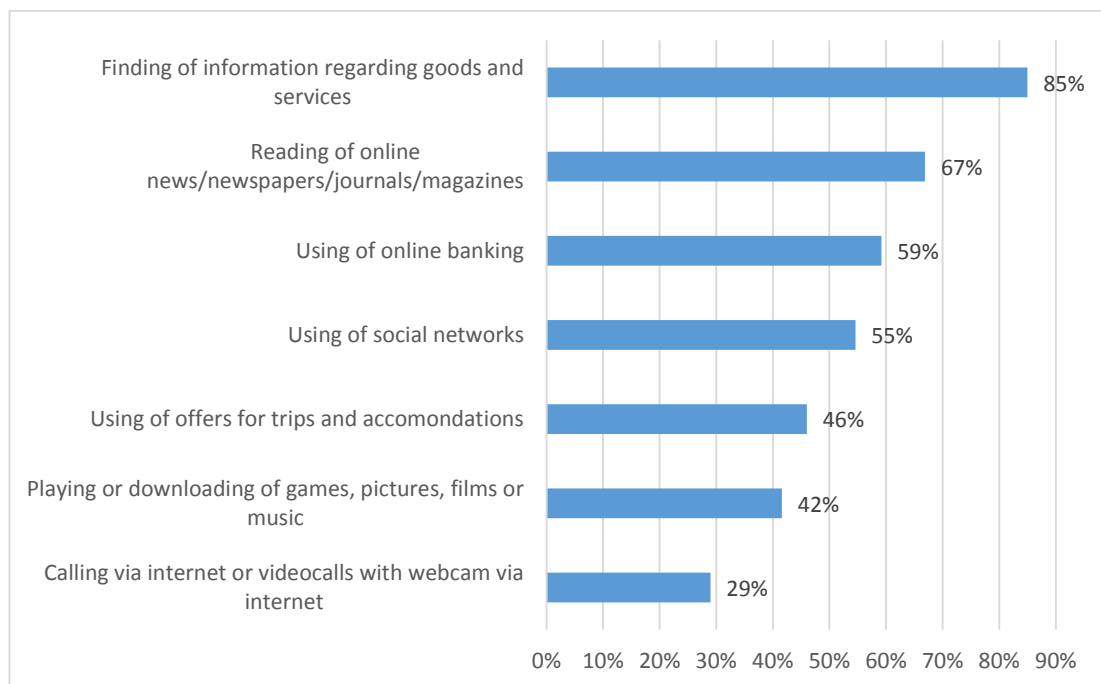


Figure 15: Activities of Austrians in the internet in percent

Source: modified after statista, 2015, s.p.

Online communication is built on its pull character, which means that the user has to search for information by himself, because information isn't just "presented" as was the case in other forms of media (Bentele, 2003, 515).

In Menrad et al. (1998) communication measures were characterized as "external inquiries, information material, TV interviews and radio programmes, organization of seminars or other specific events and additional measures" (Menrad et al., 1998, 49). Within the last 17 years, since Menrad et al. (1998) characterized communication

measures, claims appeared that the media market itself had undergone a change due to 24-hour news and enlarged because of the internet, which offers new sources of information such as blogs, social media, and online distribution of videos (McCluskey and Swinnen, 2011, 624). The internet offers a medium of direct communication behind the medium of mass media (McCluskey and Swinnen, 2011, 628).

There was a difference obtained when it comes to the appearance and presence of topics in the internet. The lifetime of a topic was observed as longer if it was discussed in a blog compared to an article published in the news. The reason was seen in the fact that the blog community keeps talking about a topic and includes more and more people, whereas in the news, topics get replaced by other new issues (Leskovec et al., 2009, 503f). Although a topic may be presented longer, it was also mentioned that, especially in online public relations, a special focus should be put on transparency and trustworthiness of a website (Burkart, 2004, 178ff). These thoughts imply that the internet might be used to communicate false information on which no one should rely on.

Besides the kind of information presented with pictures on websites, in the internet it is also important that a link goes exactly where people should look at. This is called a landing page. Nobody wants to search for something again, if they already pressed to a link which should get them where they wanted to go. It was observed by marketers that it is not very efficient to set a link to the homepage if the kind of information, which was requested, isn't visible there (Diamond, 2013, 202). On average, websites are left again after 10 – 20 seconds and users only read a quarter of the information provided. Visitors behave very skeptical as they have experienced bad designed websites and assume that most of them are useless. Consequently, they want to avoid wasting time on a useless website (Nielsen, 2011, s.p.).

3.3 Information processing

People tend to select and interpret information according to their previous mind setting. “Initial attitude to genetic engineering appears to be the most important determinant of attitudes after information provision” (Frewer et al., 1998, 24). Another finding suggests that trust, prior beliefs, and the kind of received information have a big contribution onto public opinion about GMO. People, who already formed a positive or negative opinion, are very likely to stay with it no matter if they receive positive or negative information. Contrary, ambivalent people are more likely to put trust in negative information about GMO (Poortinga and Pidgeon, 2004, 1484f). Frewer et al. (1998) concluded something very similar a few years earlier. Initial attitudes were observed as the contributors of information perception. People with a more negative perception of GM food valued given information as more biased and less trustworthy than people having a positive view (Frewer et al., 1998, 25f). Additionally, “...respondents with negative views find the information more informative if information about uncertainty is included ...” (Frewer et al., 1998, 26). Additionally, labeling of GM products would increase trust within positive, negative, and ambivalent people (Poortinga and Pidgeon, 2004, 1485).

Although, a study showed that source credibility matters in forming an attitude (Kumkale et al., 2010, 1349) additionally, a more recent study observed that internet users paid only little attention into the reliability of a source while seeking for health information (McCluskey and Swinnen, 2011, 626).

A Eurobarometer survey discovered a correlation between exposure of a topic in the media and the appearance of worries within the population (TNS Opinion & Social, 2006, 53). Four different kind of reactions were monitored, after something about food safety appeared in the media. Europeans, who

- permanently changed their eating habits (16%)
- avoided the food mentioned in the story only for a while (37%)
- were passively worried but did nothing about it in the end (23%) and
- completely ignored what they heard (19%) (TNS Opinion & Social, 2006, 54).

Most of the EU-25 countries are within a range of 10-20% of changing their eating behavior completely. Cyprus and Poland are with 31% each above the average influence of the media, and on the other hand, Austria seemed to be hardly influenced

by media on the topic of food safety. Only 5% announce that they changed their eating behavior completely after hearing something on the news. However, at this point it need to be mentioned that in Austria, there were by far the most other spontaneous answers given (20%). If the uncategorized answers are excluded the percentage of people who would change their eating behavior increases according the new number of total answers. Unfortunately, the study didn't explain why there was such a huge amount of spontaneous answers uncategorized and what they were dealing with (TNS Opinion & Social, 2006, 55).

The most trusted sources were considered to be consumer groups, personal doctors, and scientists (each selected by almost one third of Europeans). Although, the media seem to have a respectable influence on consumption behavior, the media don't appear to be very trustworthy as only 17% of the people picked this answer (when the possibility existed to choose a maximum of two answers) (TNS Opinion & Social, 2006, 57).

Imperfect information

Imperfect information is defined as "information that only reduces uncertainty but ... does not eliminate it" (n.n., s.a., s.p.). Several studies observed already that people are generally fine with staying imperfectly informed (e.g. Swinnen et al., 2005; McCluskey and Swinnen, 2011).

The issue about the possibility for someone to distinguish whether imperfect or perfect information is provided would go beyond the topic of this thesis and therefore, is not further discussed.

Staying imperfectly informed was obtained to be okay for someone, because

1. opportunity cost of information processing are seen as too high (Swinnen et al., 2005, 187; McCluskey and Swinnen, 2011, 625).

Six years later, two other possible reasons were offered about why people don't use the provided information but rather prefer to stay uninformed:

2. the fact that information needs to be bought and might only provide little benefit, as well as
3. ideological distrust of information providers (McCluskey and Swinnen, 2011, 625).

McCluskey and Swinnen (2004) introduced “The Rationally Ignorant Consumer Hypothesis”. It tries to explain why consumers are comfortable with not being informed and highlights:

- the actual costs (price of purchasing stories as well as opportunity costs of processing information) compared to marginal benefit of information, and
- the attributes of the story presenting the information – negative impact of consumer welfare –

as reasons (McCluskey and Swinnen, 2004, 1233).

From these findings is derived that consumers are very likely to only consume the information which is provided by the media and in the way it is provided by the media.

3.3.1 Images and visual communication

“Images are pictures in peoples’ mind, which are composed of personal and transmitted experiences, to visualize the world” (Mahlau, 1999, 8).

The approximated maximum of information reception is declared to several million bit/s (bit per second) for our eyes and only about one hundred thousand bit/s for our ears (Blanz, 2014, 29).

It takes 1,5 to 2,5 seconds

- to process a picture to be able to recognize it again or
- to read about ten words.

So within the same time span a picture probably offers more information than words because it is more difficult to describe a picture in words (Kroeber-Riel and Esch, 2004, 19). Images make the communication process easier – especially in the reception, handling, and memory of information. If images are adopted by a social group, it is also known as public opinion (Mahlau, 1999, 9).

- “Photographs have the power to persuade public opinion” (Tolbert and Rutherford, 2009, 6).
- “Images create statements” (Tolbert and Rutherford, 2009, 6).

Nowadays, there are more pictures needed and used in media than ever before because of the range of different online communication channels. Every article or text needs at

least one image, because of the competition on winning a reader's attention (Liebich, 2014c, s.p.). It was obtained on the website presseportal.de (30.09.2015) that articles with pictures are viewed almost twice as often as articles without. Articles with audio material or videos have even more readers (Petersen, 2015b, s.p.).

Images are used to catch attention for an article, but more importantly they also affect the way a corresponding text is evaluated by the reader. If a boring picture of a press conference is presented in the media, people infer that the conversation must have been boring as well (Petersen, 2015c, s.p.). Contrary, the G8 meeting of 2007 in Heiligendamm, Germany, shows a family-like atmosphere (Figure 16).



Figure 16: The G8 Heads of State and Government seated in a wicker beach chair (07.06.2007)

Source: (REGIERUNGonline/Kühler, 2007, s.p.)

If images are used to influence the recipient, it is called visual framing and therefore, the selection of images is of great importance in news production (Brantner et al., 2011, 533f; Lester, 2005, 139). Nevertheless, Lester (2005) also announced that words are equally important, e.g. for explanation purposes. On the other hand, there is also confidence that the way how something is presented is essential for a learning process and mustn't be underestimated (Trumbo, 1999, 415f). The learning process in pictures dominates over text because text needs to be cognitively processed while the emotional reaction to images takes place automatically (Trumbo, 1999, 416). Additionally, findings indicate that the journalistic quality itself is not influenced by the appearance of pictures (Brantner et al., 2011, 533).

3.3.2 Picture superiority effect

In addition to the agenda setting theory, the picture superiority effect also has to be considered as a very important factor within this thesis. It describes the fact that pictures are better memorized than words. Hockley (2008) stated that this has been proven by an uncountable number of studies which dealt with this topic in one way or another (Hockley, 2008, 1351). The reason that pictures are better memorized and a better source of activation was observed to be in their entertaining premise (Trommsdorff and Teichert, 2011, 68; Kroeber-Riel and Esch, 2004, 20).

This effect – not the term picture superiority effect - was described in Paivio (1971, 377) one of the first times.

The picture superiority effect builds on the dual-coding theory¹⁵ of Paivio (Whitehouse et al., 2006, 767; Hockley, 2008, 1356). Our brain stores visuals and text differently, which is also known as dual coding. Therefore, chances are higher to remember something if it is seen and read as both coding systems are able to connect with each other (Malamed, 2009, 36).

A study within the picture superiority effect observed that pictures are not only better memorized, but also provide advantages in associative recognition (Hockley, 2008, 1355). Furthermore, it was discovered that the reason may be found in the encoding process of pictures (Hockley, 2008, 1356f), because it observed to be faster with pictures than with words (Kroeber-Riel and Esch, 2004, 152). Nevertheless, findings of the literature didn't completely agree on the main contributing factors of the picture superiority effect (Stenberg, 2006, 24ff).

Furthermore, information provided in different forms at the same time is also better remembered and longer vivid. This vividness has been identified as a very important issue especially in webbased media (Schlosser, 2003, 196).

¹⁵ The dual coding theory refers to the finding, that the presentation of verbal and pictorial information together improves the learning processes compared to only one of them (Paivio, 1971, 255; Paivio, 1991, 259).

3.3.3 Pictures and their information content

Pictures can either contain a high amount of information or no information such as e.g. for the purpose of amusing the “reader”. Whatever picture it is, it is stated that “...the presence or absence of visual images has the power to make or break the worthiness of any news story“(Wright, 2011, 317). A big advantage of pictures is seen in the fact that it needs less effort to process them. This is especially comforting for people with passive and low involvement (Kroeber-Riel and Esch, 2004, 20).

Pictures are also open in their meaning (Alexander, 2013, 73; Schweppenhäuser and Friedrich, 2010, 25). They cannot make a metastatement¹⁶ as they don't have metasigns¹⁷. A picture can be described in words, but words may not be described in a picture. Therefore, it is unlikely that the same message is going to be transmitted. Pictures are good to illustrate text. Pictures only present, whether it is the truth or a lie - in other words, it isn't visible whether it was taken for the purpose of manipulation. Photographs are considered as better illustrators of the truth (Nöth, 2011, 309f). In some cases it is possible to give a word a fitting picture, but often it is not possible to name a picture with one explicit term. Words and pictures only complement or supplement each other (Alexander, 2013, 73). Generally, language arguments rationally, while a picture impresses emotionally - although it is also possible to account both issues (rationality and emotions) with language and pictures at the same time, which is examined in advertisements (Kroeber-Riel and Esch, 2004, 151). As visuals became more important and popular in the media, consumers became passive and are not used to read actively. Consequently, it barely happens that someone is actively searching for information when it is much more comfortable to look for impressing information (preferably in the form of pictures) (Kroeber-Riel and Esch, 2004, 21).

It was observed that looking at pleasant and unpleasant pictures (both affective pictures) releases an emotional reaction which doesn't exist while looking at neutral pictures. Therefore, emotional appeals in pictures are seen as promoters of changes in a person's attitude. Pictures can evoke a whole range of feelings depending on the aim

¹⁶ Metastatement: A statement that describes a statement (n.n., 2015, s.p.).

¹⁷ Metasign: A sign that describes a sign (n.n., 2015, s.p.).

of a specific campaign. Messages based on fear can show harmful consequences of a specific behavior and change attitudes (Malamed, 2009, 203f). As examples, public health campaigns can be named which picture consequences of sugar abuse or smoking (Malamed, 2009, 203f). Of course this system also works the other way around and positive pictures lead to a positive feeling for the product.

Pictures and text

Pictures can be used for many different purposes and the interpretation underlies the circumstance in which they appear and are used (Nöth, 2011, 309).

Barthes (1977) “showed that text-image relations are culturally and historically specific. This is an important point, because ... the roles given to different communicative modes and the values attached to them vary and are motivated by the interests and preoccupations of specific socio-cultural contexts and historical periods” (van Leeuwen, 2011, 551).

Pictures and text can relate to each other as redundant (same information is given in text and picture), discrepant (no relationship between the information in the text and the information in the picture) or complementary (information of text and pictures complement one another) (Alexander, 2013, 74).

Text and pictures have a correlating relationship as well. As a matter of fact, the correlating item can produce a memorable picture which gets saved in our mind. Even if the picture isn't present all the time, it is about to show up in our mind whenever we hear or read the correlating text, which we have in our mind to fit the picture. Pictures stay in our mind because they were extraordinary shocking or beautiful. As examples “Mona Lisa” and “Marilyn Monroe – skirt scene” (Figure 17) can be named, because a majority of people knows these pictures and they will show up in their minds immediately (Schweppenhäuser and Friedrich, 2010, 20).

Resulting from the findings in literature one might suspect that negative pictures of GMO are staying in our mind and are leading our feelings.



Figure 17: Marilyn Monroe during the movie of „The Seven Year Itch“

Source: Shaw, 1954, s.p.

Appearance of images

The term “images” not only includes paintings, pictures, and photographs but also infographics and diagrams.

Infographics are informational graphics which combine images with text (Figure 18).

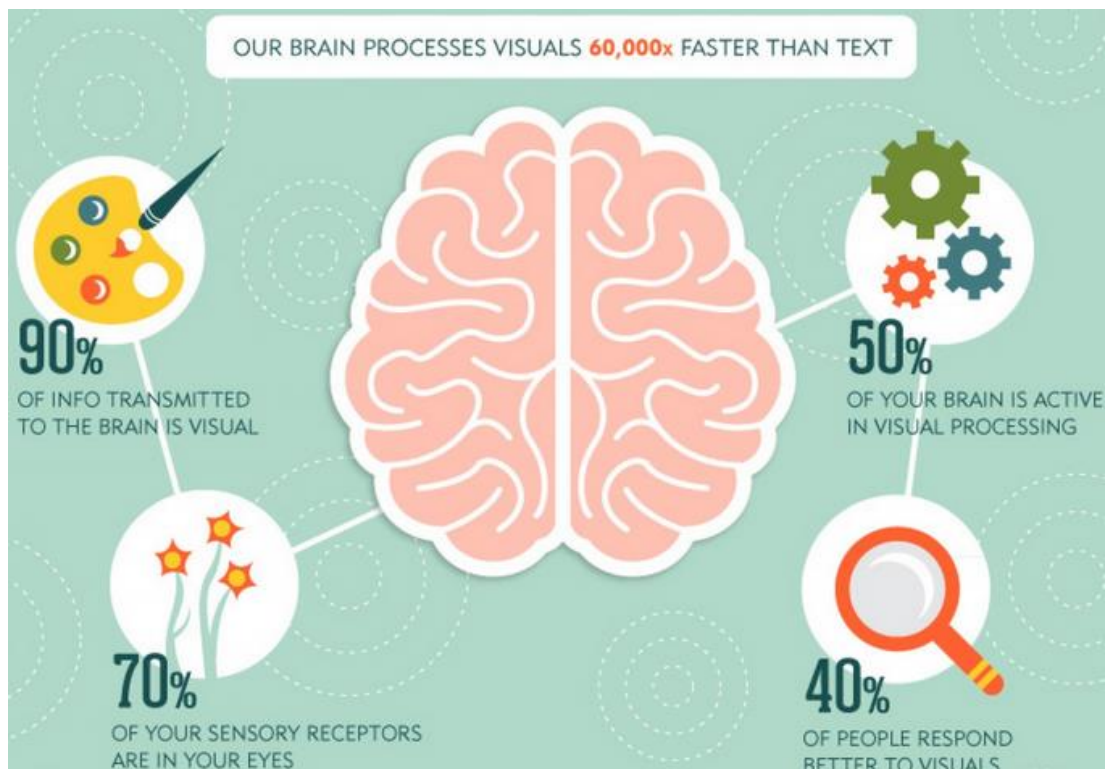


Figure 18: Infographic

Source: More, 2014, s.p.

Infographics are rated as more engaging than solely pictures or text (Lazard and Atkinson, 2015, 26). An earlier study compared predictions of layout designers with actual eye-movement of participants and it was observed that infographics received attention later than was predicted by designers. Photographs in comparison were observed within the same amount predicted by designers (Wartenberg and Holmqvist, 2005, 8). It could be interpreted that infographics were given more value than they actually have.

Nevertheless, good infographics are entertaining and easy to understand. They tell a story and help to retain information efficiently (Diamond, 2013, 150).

Diagrams focus on making data easier to understand. They try to organize information (Diamond, 2013, 106).

3.4 The relationship between media and science

The role of media and science has undergone a change within the last centuries. Prior, the media were a medium to communicate scientific achievements to the public. Science had an unquestionable role of presenting the truth. The media had no influence in the creation process of the “truth”. Then, the role of science was weakened while the media gained in importance. Media prominence and scientific reputation had to start dealing with each other (Weingart, 1998, 869ff).

McCluskey and Swinnen (2011) concluded that the media as well as all other information providers (e.g. scientists, companies or politicians) are commonly in charge of forming public opinion and that both should work together to provide proper information to the public (McCluskey and Swinnen, 2011, 628).

The question on how to communicate about GMO is not a new topic for accountable companies. Differences in the number of people involved and the communication methods used differ within the companies (Menrad et al., 1998, 48).

A linkage between media and consumer attitude towards GMO was observed while comparing attitude of low developed countries and high developed countries. Three factors were named:

- access to media is more difficult (increased costs¹⁸ of media consumption),
- availability of leisure time is rare (also increased costs of media consumption) and
- governmental control of the media, which may control the perspective media, is attributing a topic (Curtis et al., 2008).

Another interesting bridge was built within biotechnology and food crisis’ because it was observed that the first news about GMO in Europe appeared shortly after the BSE food crisis¹⁹. Media set a linkage/agenda between biotechnology and the previous food crisis. This might have led to a change from prior positive news to more negative ones

¹⁸ In this context costs don’t have a monetary value, but expresses personal effort.

¹⁹ BSE is a disease in the brain of cattle, which lead to the death of thousands of animals. The first signs of BSE in Europe were officially obtained around the 1990ies. Humans, who were eating beef from BSE cattle, could get sick and die. This resulted in a big threat within the public and their beef consumption. Although the BSE food crises was very present in the media, until 2014 “only” 229 humans died (Hecking and Elmer, 2014, s.p.).

and increased the universal negative public opinion in Europe. In the USA, more positive information was provided and attention was put onto potential benefits of GM production within the same period of time (Marks and Kalaitzandonakes, 2002, 202ff). The paper concluded that the media have played an agenda setting role during the introduction phase of biotechnology and raised awareness in Europe and the US (Marks and Kalaitzandonakes, 2002, 206).

Therefore, the agenda setting theory (as presented in chapter 3.1.2) also has to be considered when talking about the role of media.

Images and food safety

“Risk communication becomes a tool for communication values and identities as much as being about the awareness, attitudes and behaviors related to the risk itself” (Palenchar and Heath, 2007, 127). Risk communication can be used for good (e.g. increasing awareness) and for bad (e.g. promoting something to be good which isn’t) (Palenchar and Heath, 2007, 127). The position of consumers towards risks is also important in the case of GMO – as it is seen as potential health risk (see Eurobarometer surveys in chapter 2.1). Consumers want to avoid dissonances and therefore, they tend to stick to previous purchasing decisions where dissonance didn’t occur (Meffert et al., 2008, 126f).

The presentation of food safety scandals also depends on existing pictorial material as they may overdraw (Linzmaier, 2007, 17; Kepplinger, 2001, 37) and therefore, also what kind of message is transmitted. It makes a difference if newspapers are able to show a picture of burning dead animals (as was the case within the BSE crises) or “invisible” arrears of pesticides in food.

Although the topic of GMO cannot really be handled as a food safety scandal (because there wasn’t an actual scandal until now and therefore, it can only be seen as a drawback), it might be possible to compare the media coverage of GMO with a food safety scandals (Linzmaier, 2007, 15f).

The media are responsible for most of the information people get in case of food safety scandals. As primary sources serve newspapers and television, but also radio and the internet were named. In this case, the internet is again used as a “pull-medium” and offers the chance to actively search for information, which by the way was not so

commonly used in the case of food scandals (Linzmaier, 2007, 102). As only few people are searching for any scandals on the internet, the media are taking a key role in presenting a topic or issue and increases the awareness (Linzmaier, 2007, 103).

It is important within scandal induction to put the presentation as much away from reality as possible without being implausible (Kepplinger, 2001, 42). In Linzmeier (2007) consumers were asked what main issues are considered as important if someone wants to write a scaring article. Issues like location of the article on the front page, eye-catching layout, and scary pictures were named to be important for increasing uncertainty for the reader as well as catchy headlines and negative, exaggerated, figurative language – in short a dramatizing and emotionalizing presentation.

B EMPIRICAL PART

4 Methods

This thesis adheres to a study from the University of Milan about GMO pictures on Italian websites (Ventura and Frisio, 2015) and is using a content analysis to evaluate the images and corresponding data.

Content analysis combines qualitative and quantitative research methods. First, objects (texts, songs, pictures ...) are valued qualitative while trying to reduce complexity and focus on central structures. Then, these results are summarized and evaluated (quantitative method) (Rössler, 2005, 16).

Content analysis is utilized to make “generalizations about the relative frequencies of visual representations of particular classes of people, actions, roles, situations or events” (Bell, 2001, 10) and therefore, involves “implicit or explicit classification and quantification of media-circulated content” (Bell, 2001, 10).

Before a content analysis is conducted, variables have to be built to describe the field of research - in other words to do a classification (Bell, 2001, 15).

Two steps are announced for executing a correct content analysis:

1. Defining variables of representation and/or salience
2. Distinguishing values on each variable to build categories which can be used for the evaluation (Bell, 2001, 15) (Table 9).

Table 9: Variables and values as examples

<i>Variables</i>	<i>Values</i>
<i>Gender</i>	Male
	Female
<i>Profession</i>	Nurse
	Flight attendant
	Teacher
	Farmer

Source: modified after Bell, 2001, 15

Besides gender, other formal or objective variables of examination may be “picture size, picture position in the newspaper text, the amount of space allocated relative to the presented text, ...” (Bock et al., 2011, 267).

Limitations, extensions and validity

Qualitative interpretation of quantitative data is not usually done in science (Bell, 2001, 24) and therefore, it should be treated with caution. Correspondingly, variables and values cannot be accounted as objective, because they may be interpreted differently depending on the point of view (Bell, 2001, 24). Additionally, generalizations from results should not be made, because it may go beyond of what data is depicting (Bell, 2001, 25).

“Content analysis, by itself, does not demonstrate how viewers understand or value what they see or hear. Still, content analysis shows what is given priority or salience and what is not” (Bell, 2001, 26).

Implementation

As the Italian study (Ventura and Frisio, 2015) is taken as a draft, the same variables are applied and solely adjusted to the requisites found on Austrian websites. Ventura and Frisio (2015) introduced an index (entitled “Scary Impact Index”) for the description of the images which seem frightening, and a set of variables for a further description of the context in which the images appear. In this thesis, the same method is performed with the focus on Austrian websites.

The term “value” was named into “code” within this thesis, because in this context the term “code” seemed more appropriate to entitle the categories within the variables.

The codes of the images were transferred into a statistics program, compared and searched for coherence.

4.1 Data collection

The collection of images happened through Google picture search as it is the most frequently used searching machine in Austria (Maier, 2014, s.p.).

Until now, Google was not willing to present its algorithms behind the searching instrument to the public. Obviously, they are afraid that competitive companies will copy them, but not presenting the algorithm should also reduce the risk of manipulating it. Therefore, it is not comprehensible why pictures appear in that exact order (Neymanns, 2008, 134).

The search term had to be set in advance. This was not as easy in German language as it was in Italian, because many different words and terms are used within Austria which relate to the same thing. The English shortcut “GMO” can be used in German language describing “gentechnisch modifizierte Organismen” as well as the shortcut “GVO” which means “gentechnisch veränderte Organismen”. After a test in Google search, very similar – although not the same – results were observed by using the different terms. Additionally, it was monitored that the search with the shortcut term GMO or GVO was not very successful and didn’t show proper results. Finally, it was decided to use the term “gentechnisch veränderte Organismen” for data collection as this term is used in the Austrian gene technology law as well (Bundeskanzleramt and Rechtsinformationssystem, 2015, s.p.).

The Google picture search was further limited to websites from Austria only.

The data collection happened between July 7th and July 10th, 2015. 539 images were identified. The URLs were transferred into a Microsoft Excel file to retrace the order of appearance of the images. The websites were saved as a “pdf” data type for further evaluation. The order of image are not fixed in Google results. Therefore, it has to be considered that some of the images might have changed position within the timeframe of data collection. Nevertheless, all Google results were again observed on July 11th, 2015 to ascertain if some images showed up, which hadn’t been observed yet. Additional 12 images were found and included into the previous order. That gives a total of 551 images for further evaluation in MaxQDA²⁰.

²⁰ MaxQDA is a software for qualitative data analysis.

Within the evaluation process, it was observed twice that the identical image and corresponding website were saved. They were deleted again from the data set and ultimately, 549 images were coded and used for the statistical analysis.

4.2 Index for coding the images (dependent variable)

The classification of the images was set considering fearful attributes visible on the pictures. An index was built to account for the scary impact of these images (=Scary Impact Index or SI Index). The index was created by Ventura and Frisio (2015) and identifies twelve different attributes (Table 10).

Table 10: Scary Impact Index on the basis of the Italian study

Index attribute	Meaning	Yes	No
Imaginary vegetable	modification of vegetables	1	0
Imaginary animal	modification of animals	1	0
Modification of size	bigger vegetable/animal	1	0
Modification of color	blue oranges	1	0
Modification of shape	square cherry	1	0
Syringe	presence of syringe	1	0
War	reference to war e.g. weapons	1	0
Hazard/death	reference to risk e.g. skulls	1	0
DNA	presence of DNA double helix	1	0
Drug	presence of medicines, pills	1	0
Activism	images of activists, demonstrations, anti-GM signs	1	0
Monster	presence of monstrous creature	1	0

Source: modified after Ventura and Frisio, 2015, 3





The images found on Austrian websites are going to be described following these index attributes. One image can be described by more than one attribute. The number of accounting attributes are summed up to build the Scary Impact Index and rank the images according their “scariness” (Table 11).

The Italian study (Ventura and Frisio, 2015) was doubling the initial weight of the SI Index for references to “War” and “Hazard/Death”. The same doubling mechanism is performed with the Austrian images. This second index is referred to as Scary Impact Index 2 – SI Index 2. For example, if an image was valued in SI Index with former one index point in “War”, within the SI Index 2 it receives two index points.

Table 11 presents the double coding of SI Index 2 as well.

How this double coding effects the results is presented in chapter 5.

Table 11: Examples for evaluation of the images

 <p>Index attributes: No scary attributes</p> <p>SI Index: 0</p> <p>SI Index 2: 0</p> <p>Source: http://www.wienerzeitung.at/nachrichten/europa/europaeische_union/636650_Doch-kein-Genmais-in-Oesterreich.html (02.10.2015)</p>	 <p>Index attributes: Imaginary vegetable, Modification of colour, Modification of shape</p> <p>SI Index: 3</p> <p>SI Index 2: 3 (no double coding)</p> <p>Source: http://www.handelszeitung.at/eu-minister-erlauben-ausnahmen-bei-gentechnik-saatgut-131946.html (02.10.2015)</p>
 <p>Index attributes: Hazard/Death</p> <p>SI Index: 1</p> <p>SI Index 2: 2 (double coding of Hazard/Death)</p> <p>Source: http://aktuell.spoe.at/ttip-ausschuesse-im-eu-parlament-gegen-private-schiedsgerichte-429171/ (02.10.2015)</p>	 <p>Index attributes: Hazard/Death, Activism</p> <p>SI Index: 2</p> <p>SI Index 2: 3 (double coding of Hazard/Death)</p> <p>Source: http://www.greenpeace.org/austria/de/themen/landwirtschaft/Probleme-und-Losungen/probleme/Gentechnik-in-der-Landwirtschaft/ (02.10.2015)</p>

Source: own elaboration

Interpretation of data

If a lot of images are valued with at least one of those SI Index attributes, it indicates that a high number of negative images are present in Austrian websites. This finding would be in coherence with the hypothesis of this thesis that more negative images are found according to the universal negative opinion in Austria.

4.3 (Independent) Variables and their codes

The evaluation not solely considered the content of the picture, but also the context in which it was presented. Ventura and Frisio (2015) included three different variables in the analysis: order of appearance, type of image and global viewpoint of the website. One variable consists of a number of codes.

Within this thesis the following variables were introduced (Table 12 shows the codes):

1. Position: This variable measures on which position on Google search the pictures appear, which offers information about the level of public exposure to scary images. (In the Italian study (Ventura and Frisio, 2015) this variable is called “order of appearance”).
2. Global viewpoint: A second variable helps identifying the context in which the pictures are presented. The overall message could be: pro, neutral, against GMO. Within this variable, the code “none” was added and is used if the text doesn’t cover the topic of GMO.
3. Content of picture: This variable is built to entitle what is visible on the pictures. (In the Italian study this variable is called “type of image” (Ventura and Frisio, 2015, 3)).
4. Content of text: Four different codes are built to assign the text corresponding to the images.
5. Kind of website: Diverse kind of websites may present the topic of GMO different. Therefore, it is observed which kind of websites provides what kind of images.
6. Presence of direct link: It was also investigated, if the link of an image is leading directly to the corresponding article, because it was assumed that nobody is going to search for the correct article of an image. A person is very likely to read the first article appearing with a link.
7. Presence of picture legend: It was said in the literature (Pfau et al., 2006, 150), that a picture legend has a big contribution onto what people think about a picture. Therefore, the appearance of a picture legend is also observed. It is also integrated as a picture legend if solely the source of an image was announced, because it may be useful for further investigation about sources of pictures.
8. Comment: This variable gives additional information to the variable “content of text”.

The codes of each variable are further described in Table 12.

Table 12: Variables and their codes applied in the evaluation of Austrian GMO images and their websites

Variables	Codes and their description
Position	Order of appearance on Google search
Global viewpoint	positive: anything stated that GMOs may be beneficial
	neutral: objective information is provided
	negative: GMO is seen negative and the probation of GM plants is seen as a goal
	none: the term GMO is solely mentioned but not further discussed
Content of picture	Lab: equipment, scientists in the lab
	Cultivated land: land prepared by machinery, incl. landscape
	Graphs: diagrams, infographics
	Event flyers
	People: groups, profile pictures, speakers, politicians
	Logo: food certificates, companies, environmental protection signs
	GM-free campaign: activism, anti-GM signs
Content of text	Animal feed: feed for cats and dogs
	Information: actual information about GMO, results of studies and surveys
	Preservation of a GM-free Austria: claims that Austria should stay free from GMOs
	Polemic: only negative issues are presented without further investigation
Kind of website	TTIP: the text is not about GMO but about the Transatlantic Trade and Investment Partnership (TTIP)
	Blog: kind of diary in the web with the possibility for other people to comment (ITWissen, s.a.-a, s.p.)
	Forum: open public discussions in the internet, usually divided into topics (ITWissen, s.a.-b, s.p.)
	Website of news provider: incl. websites of newspapers, radio channels and TV channel
Presence of direct link	Website of a political party: incl. political persons
	Yes
Presence of picture legend	No
	Yes
Comment	No
	Yes
Comment	TTIP mentioned: the text is about GMO and the term TTIP is mentioned
	Monsanto²¹ negative: the text focuses on negative effects of the company Monsanto

Source: modified after Ventura and Frisio, 2015, 3f

Table 13, Table 14, Table 15, and Table 16 show examples of articles and their evaluation within the variables “global viewpoint” and “content of text”. Reasons for assigning the particular codes are also provided.

²¹ Monsanto is one of the world’s largest seed and pesticide producing companies. Another focus of Monsanto is plant biotechnology (Monsanto Company, 2015, s.p.).

Table 13: Example 1 (Positive; Information)

URL	http://oe1.orf.at/programm/401797 (26.09.2015)
Article	<p>„Dimensionen - die Welt der Wissenschaft</p> <p>Punktlandung im Genom. Die neuen Methoden der Gentechnik.</p> <p>In der Gentechnik herrscht Aufbruchsstimmung: Neue Techniken haben sich innerhalb weniger Jahre in den molekularbiologischen Labors durchgesetzt, die mit nie dagewesener Präzision in das Erbgut eingreifen. Während bei den klassischen Genmanipulationen DNA-Sequenzen mehr oder weniger zufällig in das Genom eingefügt wurden, treffen die neuen Methoden mit sperrigen Namen wie "CRISPR/Cas9" punktgenau. Einzelne Buchstaben des genetischen Codes können damit verändert werden, ohne den Rest des Erbguts zu gefährden. Der Gentechnik könnte damit der Sprung in die Medizin gelingen: Vor allem genetische Erkrankungen des Blut- und Immunsystems, aber auch Lebererkrankungen oder HIV könnten damit behandelt werden. Auch für die Landwirtschaft ist die Methode interessant: Neue Pflanzensorten können damit in kürzester Zeit gezüchtet werden, ohne den Einsatz artfremder Gene. Doch die Methode wirft auch neue Fragen auf. Durch ihre chirurgische Präzision ist sie für den Einsatz in der menschlichen Keimbahn geeignet, Embryos genetisch zu manipulieren war noch nie so einfach. Auch landwirtschaftliche Produkte, die durch "CRISPR/Cas9" erzeugt werden, sind nicht unumstritten: Sind Pflanzen oder Tiere, in denen nur ein einzelner DNA-Baustein künstlich verändert wurde - ein Prozess, wie er auch in der Natur ständig geschieht - als gentechnisch veränderte Organismen zu klassifizieren? Braucht es gar eine gesellschaftliche Neubewertung der Gentechnik?" (Däuble, 2015, s.p.).</p>
Global viewpoint	Positive: GMO can help to cure diseases
Content of text	Information: Presentation of scientific achievement

Source: own elaboration

The article in Example 1 (Table 13) was coded as “positive”, because GMO was considered as a possible cure for diseases. This article builds on scientific results and therefore, received the code “information”.

Example 2 (Table 14) also presents an article about scientific results and therefore, was coded as “information”. Within this second example the scientific results indicate a bad effect of GMOs and consequently leads to the code “negative” for the variable “global viewpoint”.

Table 14: Example 2 (Negative; Information)

URL	http://diepresse.com/home/panorama/klimawandel/1292159/Mit-Genmais-gefuetterte-Ratten-sterben-frueher (26.09.2015)
Article	<p>„Mit "Genmais" gefütterte Ratten sterben früher</p> <p>Der Versuch französischer Forscher sorgt für eine Debatte um die Zulassung gentechnisch veränderter Pflanzen in der EU. Ratten, die nur gentechnisch verändertem Mais zu essen bekamen, erkrankten häufiger an Krebs</p> <p>Eine Untersuchung über die Folgen von gentechnisch verändertem Mais auf Ratten hat eine Diskussion über die Zulassung von Genpflanzen in der EU ausgelöst. Einer am Mittwoch veröffentlichten Studie französischer Forscher zufolge sterben mit Genmais gefütterte Ratten jünger und erkranken deutlich häufiger an Krebs als Tiere, die herkömmliche Nahrung erhalten. Die EU-Kommission kündigte an, Konsequenzen zu prüfen.</p> <p>Der Verfasser der in der Fachzeitschrift "Food and Chemical Toxicology" veröffentlichten Studie, Gilles-Eric Seralini von der Universität Caen, nannte seine Forschungsergebnisse "alarmierend". Die Arbeitsgruppe des Experten für gentechnisch veränderte Organismen (GVO) in Nahrungsmitteln beobachteten 200 Ratten über einen Zeitraum von zwei Jahren.</p> <p>Eine Gruppe von Nagern wurde mit unbehandeltem Genmais der Sorte NK603 gefüttert. Der Mais des US-Agrar-Riesen Monsanto ist in der EU nicht zum Anbau, jedoch zur Verwendung in Tierfutter und Lebensmitteln zugelassen. Eine zweite Tiergruppe erhielt NK603-Mais, der zuvor mit dem Pestizid Roundup behandelt wurde. Eine dritte Gruppe erhielt herkömmlichen Mais, der ebenfalls mit Roundup besprüht wurde.</p> <p>Das Ergebnis der Studie: Die mit Genmais gefütterten Ratten starben deutlich früher. 17 Monate nach Beginn der Untersuchung seien von den mit Genmais gefütterten Ratten fünfmal mehr Tiere tot gewesen als in der Vergleichsgruppe. Die meisten Weibchen erkrankten der Studie zufolge an Brustkrebs, die Männchen häufig an Haut- oder Nierentumoren. ...“ (n.n., 2012, s.p.).</p>
Global viewpoint	Negative: GMO leads to cancer in rats
Content of text	Information: Presentation of scientific study

Source: own elaboration

The text in example 3 (Table 15) presents a lot more negative than positive statements about GMOs. Therefore, it received the code “negative”. Due to the fact that statements are randomly named and the traceability of arguments is not given the text was coded as “polemic”. Furthermore, the text mentions that a prohibition of GMOs in Austria has to be enforced. This results in receiving the code “preservation of a GM-free Austria”.

Table 15: Example 3 (Negative; Preservation of a GM-free Austria, Polemic)

URL	http://www.euaustrittspartei.at/eu-nein-danke/gentechnik/ (26.09.2015)
Article	<p>„THEMA: Gentechnik</p> <p>... VORTEILE:</p> <ul style="list-style-type: none"> • Internationale Lebensmittel-Kontrolle der wenigen verbliebenen Gen-Saatgut-Erzeuger • mehr Profite für Biotech-, Pharma- und Chemiekonzerne • riesige Gewinne durch Monopolisierung • keine Haftung für Gen-Saatgut-Erzeuger • Für „Patente auf Leben“ werden großzügige Lizenzgebühren verlangt <p>NACHTEILE:</p> <ul style="list-style-type: none"> • Gentechnik ist ein irreversibler Prozess. Belastete und verseuchte Böden können schwer gerettet werden. GVO einmal in die Natur ausgebracht, ist nicht wieder rückholbar. • Weltmacht hält derjenige in der Hand, der weltweit die Nahrungsmittel kontrolliert. Durch Lizenzierung des GVO-Saatgutes entsteht eine Abhängigkeit von ausländischen Argar-[sic] und Chemiekonzernen. • GVO-Pflanzen, die selbst ein Pestizid erzeugen (z.B. BT-Mais) sind als ganze Pflanze giftig! • alle unabhängigen Studien über GVO weisen auf erhebliche Gesundheitsschäden (Organschäden und Mißbildungen[sic]) hin, (Prof. Arpad Pusztai, Prof. Susan Bardocz-Pusztai, Prof. Inacio Andrioli, Prof. Andrés Carrasco u.a.m.) • Bauern, die GVO anbauen, werden von Saatguterzeugern abhängig gemacht. • Gentechnikfrei wirtschaftende (Bio-)Bauern müssen um ihre Existenz durch Saatenverunreinigung bangen, wenn auch in größeren Entfernungen Gentechnik angebaut wird. • Gentechnik = Gifttechnik: Entweder erzeugt die Pflanze selbst ein Gift oder überlebt ein Gift, das alle anderen Pflanzen umbringt. • Höherer Spritzmitteleinsatz wegen "Superunkräutern" nötig (in Argentinien muss bis zu 15 mal [sic] gespritzt werden - Bericht Prof. Carrasco), weil diese sonst sogar das Totalpflanzengift Glyphosat auf Gentechnikfeldern überleben. Der Anbau von Gensaaten wird somit von Jahr zu Jahr teurer. <p>...</p> <p>Fazit: Wollen wir gesund bleiben, weiter natürliche Lebensmittel genießen, die Umwelt schützen, freie Bauern haben und demokratisch mitgestalten, so müssen wir die Gentechnik in Landwirtschaft und Lebensmitteln verbieten. Dies ist aber nur möglich, wenn wir aus der EU austreten und die Landwirtschaft wieder zur nationalen Angelegenheit machen. ...“ (EU-Austrittspartei, 2015, s.p.).</p>
Global viewpoint	Negative: Way more negative statements about GMO than positive
Content of text	<p>Preservation of a GMO-free Austria: The prohibition of GMO in Austrian Agriculture is the main topic of the text.</p> <p>Polemic: Randomly used arguments to set GMO in a bad light.</p>

Source: own elaboration

Within example 4 (Table 16) GMO is not the main topic of the text. Therefore it got the code “global viewpoint: none”. The main topic of the article is the Transatlantic Trade and Investment Partnership which results in the coded “TTIP”.





Table 16: Example 4 (None; TTIP)

URL	http://www.buergerunion.at/spezial-wirtschaft%20ttip%202015.htm (26.09.2015)
Article	<p>„WOLLEN WIR DAS? Informieren Sie sich!</p> <p>Derzeit verhandeln die EU und die USA den transatlantischen Handels- und Investitionsvertrag TTIP. CETA, ein ähnliches Abkommen mit Kanada, steht vor der Ratifizierung. Diese Abkommen drohen, Demokratie und Rechtsstaat, Umwelt- und VerbraucherInnenenschutz zugunsten von Wirtschaftsinteressen auszuhebeln. Profitieren werden dabei vor allem große Konzerne, zum Nachteil aller:[sic]</p> <p>Investoren-Schutz: Kanadische und US-amerikanische Firmen sollen das Recht erhalten, Staaten auf Schadensersatz zu verklagen, wenn ihnen Profite durch Entscheidungen des Staates entgehen. Dabei kann es sich auch um Gesetze handeln, die dem Gesundheits-, Verbraucher- oder Umweltschutz dienen.</p> <p>Es würde schwerer werden, unsere Standards für Lebensmittel, Arbeitnehmerrechte, Umwelt- und VerbraucherInnenenschutz aufrecht zu erhalten oder diese gar zu erhöhen.</p> <p>Liberalisierungen and [sic] Privatisierungen sollen zur Einbahnstraße werden. Die EU und ihre Mitgliedsstaaten werden unter Druck gesetzt, Risikotechnologien wie Fracking oder gentechnisch veränderte Organismen zu erlauben“ (Die Grünen Klosterneuburg, 2015, s.p.).</p>
Global viewpoint	None: The term GMO is only mentioned, but GMOs are not the main content of the article.
Content of text	TTIP: TTIP is the main topic of the article

Source: own elaboration

Table 17 shows examples of the evaluation of images (including their context) within all variables.

Table 17: Examples for the evaluation of images and the corresponding context

 <p>SI Index: 0 Position: 154 Global viewpoint: Negative Content of picture: Cultivated land Content of text: Information, Preservation of GM-free Austria Kind of website: Website of a news provider Presence of direct link: Yes Presence of picture legend: Yes</p>	 <p>SI Index: 3 Position: 166 Global viewpoint: Negative Content of picture: Missing (not classified) Content of text: Information Kind of website: Website of a news provider Presence of direct link: Yes Presence of picture legend: Yes</p>
 <p>SI Index: 1 Position: 005 Global viewpoint: None Content of picture: Cultivated land Content of text: TTIP Kind of website: Website of a political party Presence of direct link: Yes Presence of picture legend: Yes</p>	 <p>SI Index: 2 Position: 065 Global viewpoint: Negative Content of picture: GM-free campaign Content of text: Polemic Kind of website: Missing (not classified) Presence of direct link: Yes Presence of picture legend: Yes</p>

Source: own elaboration

Interpretation of data

Position: This variable indicates in which order an image appears. Obviously, images which are ranked in the front are seen more often. If “scary” images are ranked in the front, they are visible for more people and in this manner may contribute to a bad feeling and opinion about GMOs in Austria.

Global viewpoint: This data helps identifying if the image presents the same feeling as the corresponding text does. For example, if there is a “scary” picture, this variable reveals a correlation with a negative opinion in the text exists. Consequently, positive or negative text would not be in accordance with the message the “scary” image is transporting.

Content of picture: This information serves as a further description of the images to get an insight of what kind of images can be found. Furthermore, it is an important variable to compare the Austrian results with the Italian ones in Ventura and Frisio (2015).

Content of text: This category is introduced to identify how often GMO is mentioned with the topic of TTIP, as in 2015, it is an important topic in the news. The variable further contains three other codes, which can also help identifying the topics on the internet within the context GMO.

Kind of website: This variable helps to identify which “global viewpoint” and “content of text” different websites are providing. For example, if online newspapers represent the negative public attitude within their articles.

Presence of direct link: If a link doesn’t lead directly to the article of a picture, less people are going to search for the “right” article, but look at the article they are led to first. So the presented information may not correlate with the actual purpose of the image and the “right” article.

Presence of picture legend: This data gives notice of how often the text beneath an image is present. It may help further investigations about where pictures come from as the source is also assessed as a picture legend.

Comment: This information is important to identify corresponding topics which were mentioned together with GMO.

4.4 Evaluation methods

After the images and their corresponding context of appearance are evaluated according to the Scary Impact Index and other defined variables, statistical analysis is conducted.

The evaluated data is going to be nominal and/or ordinal. Ordinal data is not numeric, but due to its content it can be put in an order, e.g. low – middle – high. Instead, nominal data doesn't have any order (Brosius, 2014, 99). With nominal data only frequencies are statistically measurable (Meffert et al., 2008, 149).

Frequency analysis and ordinal logistic regression are used as methods.

4.4.1 Frequency analysis

A frequency analysis can be done with nominal and ordinal data. In this thesis, a frequency analysis of the images within the SI Index and SI Index 2, and furthermore, with all other variables is conducted.

4.4.2 Ordinal logistic regression

In the Italian study of Ventura and Frisio (2015), the main focus was put on the ordinal logistic regression. Through an ordinal logistic regression, the relationship between the Scary Impact Index (SI Index) (dependent variable) and a set of variables (independent variables) is estimated.

The ordinal regression analysis uses the following independent variables: “content of picture” and “global viewpoint”, as Ventura and Frisio (2015) did. Furthermore, the relationship of the SI Index with “content of text” and “kind of website” is evaluated as well.

The variable “position” is inserted in SPSS as a covariate.

5 Results

In this chapter, the results of the statistical analysis are presented.

During data collection, it already became obvious that only few images found within Austrian websites can be classified as scary. The results confirm this prior observation as the number of coded images within the SI Index is very small (Table 18). Only 51 examples (9,3%) are valued with an SI Index ≥ 1 . More than 90% of the images had no scary attributes (0 SI Index points) according to the SI Index. The maximum level of the SI Index was found at 3 SI Index points despite the fact that a maximum level of 5 SI Index points was observed within the Italian study (Ventura and Frisio, 2015). The majority of the images depicts common things like agricultural fieldwork, farm animals, vegetables or just people – politicians, speakers, and audiences, which were valued with 0 SI Index points.

Table 18: Appearance of images within the SI Index and SI Index 2

<i>SI Index points</i>	SI Index		SI Index 2	
	Frequency	Percentage	Frequency	Percentage
0	498	90,7	498	90,7
1	35	6,4	28	5,1
2	13	2,4	13	2,4
3	3	0,5	9	1,6
4	0	0	1	0,2
<i>Total</i>	549	100,0	549	100,0

Source: own elaboration

Further analysis considers only the sum of given SI Index points and doesn't differentiate between the kind of Scary Impact codes. The overview, of how often each Scary Impact code was attributed to the images, is only presented for the purpose of information (Table 19).

Table 19: Overview about how often each Scary Impact code was given

Scary Impact Codes	Number of given codes
Imaginary vegetable	3 times
Imaginary animal	4 times
Modification of Size	2 times
Modification of Color	4 times
Modification of Shape	4 times
Syringe	6 times
War	2 times
Hazard/Death	13 times
DNA	3 times
Drug	4 times
Activism	22 times
Monster	3 times

Source: own elaboration

The variables description gives an overview of the variables and how their codes appear within the examples (Table 20).

Table 20: Variables description

Variables & codes	Observed	Mean	Std. Deviation	Frequency	Number of appearance	Min	Max	Mode
Position	549	275	158,627	1,000	549	1	549	
SI Index	549	0,13	0,438	0,093	51	0	3	0
SI Index 2	549	0,15	0,547	0,093	51	0	4	0
Global viewpoint								
Positive	549	0,02	0,146	0,022	12	0	1	0
Neutral	549	0,19	0,394	0,191	105	0	1	0
Negative	549	0,38	0,486	0,379	208	0	1	0
None	549	0,41	0,492	0,408	224	0	1	0
Content of picture								
People	549	0,21	0,406	0,208	114	0	1	0
Logo	549	0,09	0,288	0,091	50	0	1	0
Graph	549	0,06	0,238	0,060	33	0	1	0
Cultivated land	549	0,06	0,238	0,060	33	0	1	0
GM-free campaign	549	0,04	0,188	0,036	20	0	1	0
Lab	549	0,03	0,183	0,035	19	0	1	0
Animal feed	549	0,02	0,134	0,018	10	0	1	0
Event flyers	549	0,01	0,095	0,009	5	0	1	0
Content of text								
Information	549	0,34	0,475	0,342	188	0	1	0
Preservation of a GM-free Austria	549	0,19	0,395	0,193	106	0	1	0
Polemic	549	0,09	0,291	0,093	51	0	1	0
TTIP	549	0,06	0,235	0,058	32	0	1	0
Kind of website								
News provider	549	0,21	0,406	0,208	114	0	1	0
Political party	549	0,09	0,293	0,095	52	0	1	0
Blog	549	0,09	0,283	0,087	48	0	1	0
Forum	549	0,01	0,095	0,009	5	0	1	0
Appearance of direct link	549	0,76	0,426	0,763	419	0	1	1
Appearance of picture legend	549	0,34	0,475	0,342	188	0	1	0

Source: own elaboration

Two additional columns were added to the usual results of a variables description (Table 20): “frequency” and “number of appearance”. This data might already help to get an overview of all variables and codes. The “number of appearance” shows how often each code was actually applied and the column “frequency” relates this number to the total number of examples.

5.1 Frequency analysis

Frequency analysis presents the number of categorized examples within a code of a variable. Codes were built out of topics which solely seemed important for this thesis. Therefore, a suitable code was not available for all of the images and their context and some of them couldn't be categorized. This results in a number of missing cells (Table 21). Within the variable "global viewpoint", 549 of the images got categorized, which means 0 are missing as the sample size is 549. Within the variable "content of picture" 284 of the images were categorized (valid) and 265 were not (missing).

Table 21: Overview of valid and missing codes within each variable

	a) Global viewpoint	b) Content of picture	c) Content of text	d) Comment to 'content of text'	e) Kind of website	f) Presence of picture legend	g) Presence of direct link
Valid	549	284	303	39	219	549	549
Missing	0	265	246	510	330	0	0
% valid	100	51,73	55,19	7,10	39,90	100	100
% missing	0	48,27	44,81	92,90	60,10	0	0

Source: own elaboration

Examples of websites and how they were coded are provided within the next pages to receive a better understanding of what valid and missing codes are. Screenshots of the whole websites are arranged in the annexes (chapter 10.2).

The first example was categorized within each variable, which means that every variable offered an eligible code to describe the image and the corresponding text (Table 22).

The second website was only categorized within "global viewpoint" and "kind of website" (Table 23).


The third example was not categorized within "comment to 'content of text' " and "kind of website" (Table 24).

Table 22: Categorization of example 1

Example 1	Categorization within all variables
	
URL	http://derstandard.at/1271374561711/Interview-Genmanipulierte-Pflanzen-werden-verschwinden (30.09.2015)
SI Index points	0: no scary image
Global viewpoint	Negative: Advantages of GMOs in Agriculture are seen as a lie.
Content of picture	People: The image depicts a woman.
Content of text	Polemic: Only negative points of view are named randomly.
Comment to 'content of text'	Monsanto negative: The company Monsanto is also mentioned as negative.
Kind of website	Website of a news provider: "der Standard" is a newspaper in Austria.

Source: own elaboration

Table 23: Categorization of example 2

Example 2	Categorization only within the variable "kind of website"
	
URL	http://www.forum-ernaehrung.at/artikel/detail/news/detail/News/biene-maja-in-gefahr/ (30.09.2015)
SI Index points	0: no scary images
Global viewpoint	Negative: GMOs are named as possible threat for bees.
Content of picture	Missing: No eligible code is available.
Content of text	Missing: No eligible code is available.
Comment to 'content of text'	Missing: No eligible code is available.
Kind of website	Forum

Source: own elaboration

Table 24: Categorization of example 3

Example 3	Categorization within all variables is missing
	
URL	http://www.greenpeace.org/austria/de/themen/landwirtschaft/Probleme-und-Losungen/probleme/Gentechnik-in-der-Landwirtschaft/ (30.09.2015)
SI Index points	2: Activism, Hazard/Death
Global viewpoint	Negative: GMOs are seen as a threat to nature and the environment.
Content of picture	GM-free campaign: The image depicts activists which were demonstrating against GMOs.
Content of text	Polemic: Arguments against GMOs are named without further investigation.
Comment to 'content of text'	Missing: No eligible code is available, because the term TTIP was not mentioned and Monsanto was not seen as negative
Kind of website	Missing: No eligible code is available, because websites of NGOs were not coded separately

Source: own elaboration

The examples shall serve for an increased understanding of the following results of the frequency analysis.

a) Global viewpoint

All examples were categorized within this code. There were a lot of examples observed in which the topic of GMO was not discussed at all (“global viewpoint: none” - 41%) as well as a very high number of examples with a negative point of view (“global viewpoint: negative” - 38%). Positive text was barely available (only 2%) and 19% of the websites had a neutral point of view towards GMO (Figure 19).

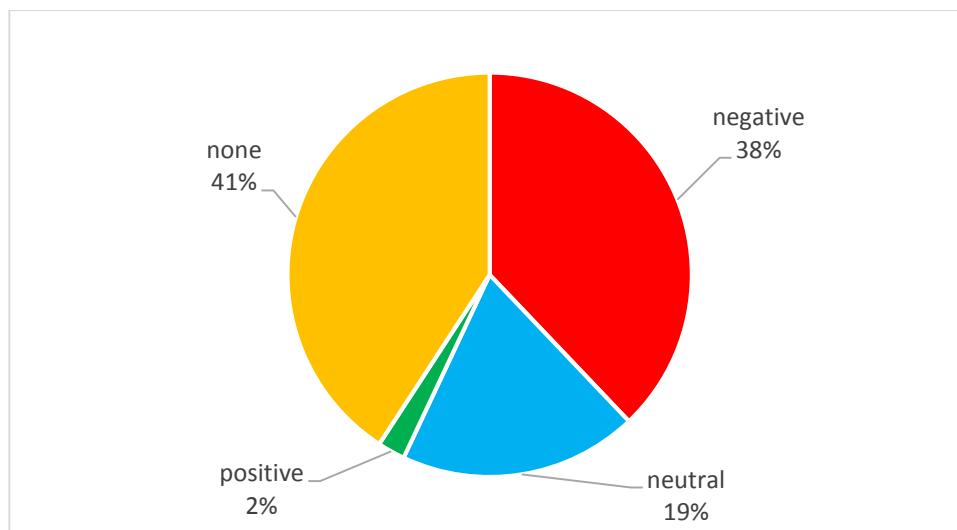


Figure 19: Share of valid text within the variable “Global viewpoint“ about GMO (n = 549)

Source: own elaboration

b) Content of picture

265 images were not categorized within the codes of this variable. The other 284 images were divided into 8 different codes (Figure 20).

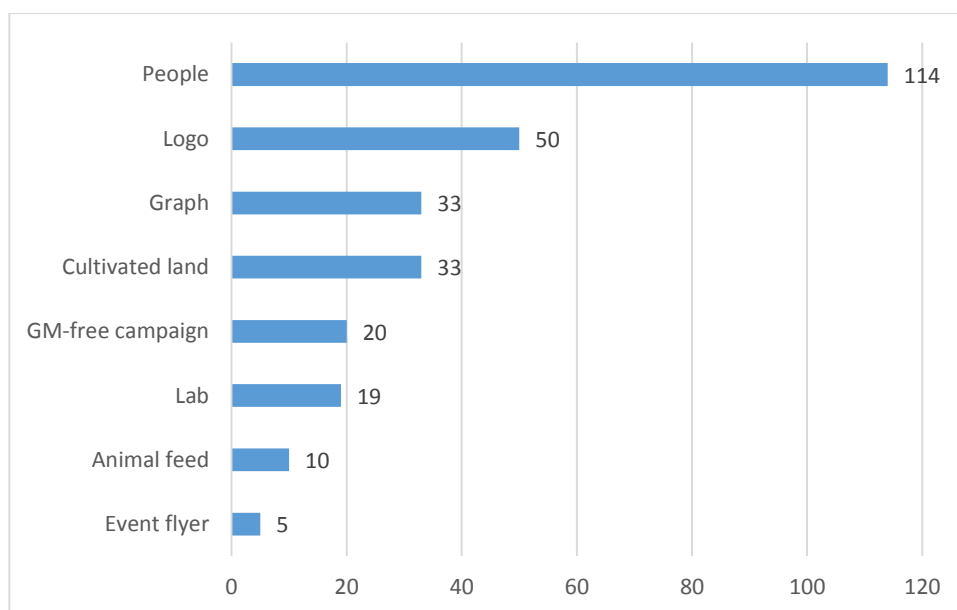


Figure 20: Number of categorized images within each code of the variable “Content of picture“

Source: own elaboration

Valid examples with “content of picture” were further analyzed according to the “global viewpoint” and SI Index they appeared with (Table 25). The numbers of the column “all” can be found in the previous Table 20 (column “number of appearance”). The other numbers were evaluated through SPSS.

Table 25: Amount of examples within the codes of the variable “content of picture” with different observations

	all i)	positive, neutral and negative ii)	only negative iii)	only SI >0 iv)
People	114	66	49	3
Logo	50	33	15	0
Graph	33	26	13	0
Cultivated land	33	28	20	2
GM-free campaign	20	20	18	17
Lab	19	9	0	2
Animal feed	10	0	0	0
Event flyer	5	1	0	1
Total	284	183	115	25

i) out of all examples, which were evaluated in this variable (51,7% were categorized; 48,3% were not categorized)

ii) only examples with a “global viewpoint: positive, neutral and negative” (without “none”)

iii) only examples with a “global viewpoint: negative”

iv) only examples with a SI Index >0

Source: own elaboration

About two third of images were observed next to text which was coded as “global viewpoint: positive, neutral or negative” (183 out of 284). Consequently, this means that about one third of the images appeared with a corresponding text which was coded as “global viewpoint: none”. On average 41% of examples were coded with “global viewpoint: none”, because the main topic of the article was not GMO. According Table 25, pictures, categorized within the variable “content of picture”, were more likely to address the topic of GMO in their corresponding articles, because fewer examples with a “global viewpoint: none” appeared within this variable than on average within all examples.

The percentage of categorized images with negative text is about the same percentage as within all images – 40% (115 out of 284) and 38% within all examples (Figure 19). Almost half of all images with a scary character were also categorized within the variable “content of picture”. Most of them were coded with “GM-free campaign”.

c) Content of text

The results of the frequency analysis attributed to 303 examples, because 246 examples were not categorized within this variable. The variable “content of text” only attributes to the corresponding text of an image and has nothing to do with what is depicted on the image. Some examples received two codes within this variable which is the reason why the sum of number of examples in each code is higher than 303 (Figure 21).

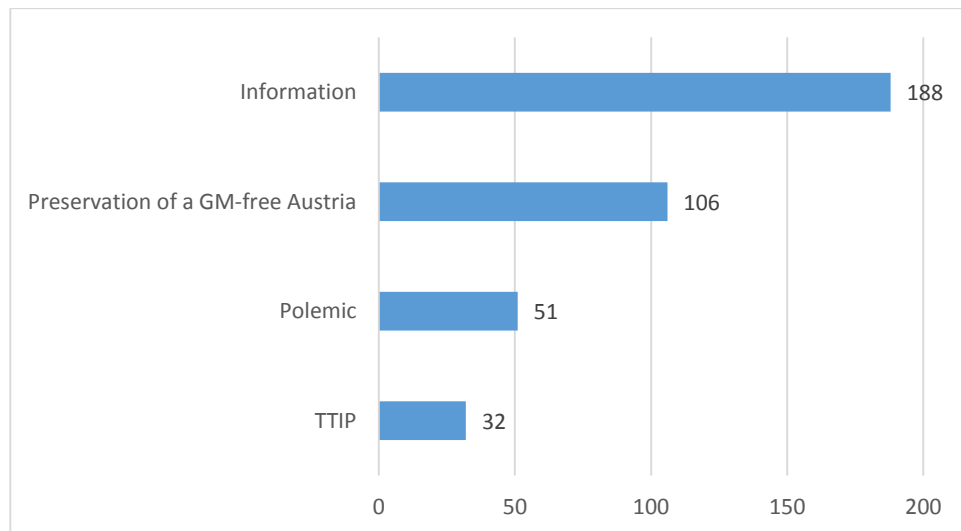


Figure 21: Share of coded categories of valid text

Source: own elaboration

The highest share of examples can be found within “information”. Furthermore, approximately one fifth of the text within all examples (106 out of 549) focus on the “preservation of a GM-free Austria”. Almost 10% of the text was “polemic”. 32 examples had TTIP as their main topic.

Furthermore, articles coded as “information” were analyze to evaluate their dominant “global viewpoint”.

Actual information is provided by 50% of valid articles (94 out of 188) in a neutral point of view, which is surprising in comparison with only 19% of neutral text on websites within all 549 examples. There is also 46% of negative information offered (86 out of 188), and only 4% of positive information (8 out of 188) (Figure 22).

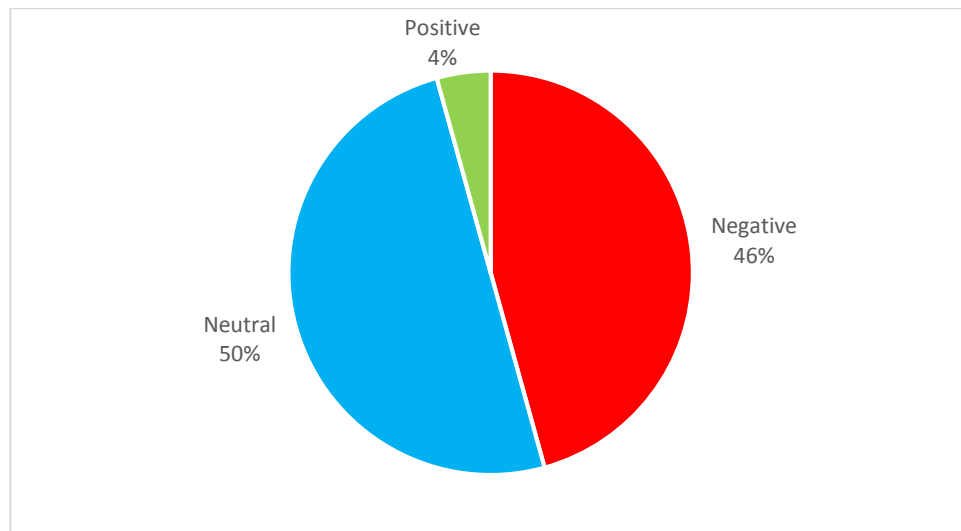


Figure 22: Percentage of negative, neutral and positive “information” provided by websites (n = 188)

Source: own elaboration

d) Comments

Additionally, the term TTIP got mentioned 19 times, although the text was dealing with the topic of GMO. A fact, which should be taken into account, is that altogether, about 10% of text (51 examples: 32 examples in the variable “content of text” and 19 examples in the variable “comment”) are dealing or at least mentioning the topic of TTIP. TTIP is displayed as a loophole for the entrance of GMOs in the European and Austrian market.

Another interesting finding within the content of a text was that not only GMOs are seen negatively, but also one of the GMO-producing companies: Monsanto. 20 images had a corresponding text, which had Monsanto and their “bad” goals as a main topic.

e) Kind of website

The code “websites of news providers” contains the most images (20,8%). Followed by 9,5% of images provided by websites of political parties and blogs with 8,7%. More than half of the websites were not further categorized (60,1%).

It was further analyzed what “kind of website” provides negative text and what the content of the negative text is, according to the available codes (Table 26).

The numbers of the column “all” can be found in Table 20, column “number of appearance”. The other numbers were evaluated through SPSS.

Table 26: Amount of examples within the codes of the variable “kind of website” with different observations

	all i)	only negative ii)	negative information iii)	neutral information vi)	negative polemic iv)	negative preservation v)
News provider	114	56	40	25	4	25
Political party	52	22	1	1	5	16
Blog	48	27	3	0	15	5
Forum	5	2	0	0	2	0
Total	219	107	44		26	46

i) out of all examples, which were evaluated in this variable (39,9%; 60,1% were not categorized)

ii) only examples with a “global viewpoint: negative”

iii) only examples with a “global viewpoint: negative” and “content of text: information”

iv) only examples with a “global viewpoint: negative” and “content of text: polemic”

v) only examples with a “global viewpoint: negative” and “content of text: preservation of a GM-free Austria”

vi) only examples with a “global viewpoint: neutral” and “content of text: information

Source: own elaboration

If a website received one of the four codes of the variable “kind of website”, about 50% of the text had a negative global viewpoint (107 out of 219) – which is higher than the universal 41% of negative global viewpoint of all examples.

About one third of the articles (40 examples out of 114) published by news providers offered negative information about GMO. There is also some neutral information, but barely any with a positive “global viewpoint” (only 4 examples in “news providers” and 0 in all other codes).

Negative polemic articles were most frequently observed in blogs. The preservation of a GM-free Austria seems to be a big topic within news providers, but also on websites of political parties.

f) Presence of direct link

In 76,3% of the examples, the link, attributed to the image, lead directly to the website and to the article with the image. Consequently, 23,7% (130 examples) of the links of images didn’t lead directly to the according website, but to some kind of overview or even the wrong article.

Table 27 shows all “kind of websites” and whether they appeared with a direct link or not. The numbers of the column “all” can be found in Table 20, column “number of appearance”. The other numbers were evaluated through SPSS.

Table 27: Amount of examples within the codes of the variable “kind of website” with direct links

	all	Direct link: yes	Direct link: no
Blog	48	29	19
Forum	5	2	3
News provider	114	90	24
Political party	52	27	25
Sum	219	148	71
Total	549	419	130

Source: own elaboration

g) Presence of picture legend

34% of all images appeared with a picture legend (text and/or source of the image), which are 188 images.

Almost 60% (111 out of 188) of those images could be categorized according to their “kind of website” (Table 28).

Table 28: Amount of examples within the codes of the variable “kind of website” with picture legend

	all	Picture legend: yes
Blog	48	11
Forum	5	1
News provider	114	75
Political party	52	24
Sum	219	111
Total	549	188

Source: own elaboration

5.2 Ordinal logistic regression

The only valid way to evaluate this qualitative data may be through frequency analysis. However, the main source of analysis in the Ventura and Frisio (2015) was an ordinal regression analysis. Although the number of images within the SI Index is very low, an ordinal regression analysis is examined to compare the Austrian results to the Italian ones.

Due to the fact that not a lot of “scary” images appeared within Austrian websites (Table 18), the ordinal regression analysis wasn’t conducted within all examples. Therefore, two ways of evaluation were exercised:

1) Case 1:

Examples with a SI Index ≥ 1 were taken for analysis and those with a SI Index = 0 were excluded from the analysis (Table 29). Within Case 1, 51 examples were used for ordinal regression analysis.

Table 29: Calculation of the number of examples in Case 1

<i>SI Index points</i>	<i>Number of examples</i>
<i>1 SI Index point</i>	35
<i>2 SI Index points</i>	13
<i>3 SI Index points</i>	3
<i>Total</i>	51

Source: own elaboration

2) Case 2:

Examples with a “global viewpoint: positive, neutral or negative” were taken for analysis (325 examples, Table 30). This included images with 0 SI Index points as well.

Table 30: Calculation of the number of examples in Case 2

<i>Global viewpoint</i>	<i>Number of examples</i>
<i>Positive</i>	12
<i>Neutral</i>	105
<i>Negative</i>	208
<i>Total</i>	325

Source: own elaboration

The ordinal regression is examined using the same variables as the Italian study (Ventura and Frisio, 2015) did (Table 31).

Table 31: Ordinal logistic regression results of the Italian study

	Scary Index			Scary Index2		
Observations	517			517		
Pseudo R ²	.1194			.1080		
	<i>Coef.</i>		<i>Std. Err.</i>	<i>Coef.</i>		<i>Std.Err.</i>
ID	-.0033	***	(.0006)	-.0029	***	(.0006)
<i>Attribute</i>						
Satire	.6586	*	(.3403)	.8329	**	(.3364)
GM-free Campaign	-.1785		(.2755)	-.00754		(.2774)
Lab	-1.4680	***	(.3856)	-1.2796	***	(.3858)
Cultivated Land	-1.9079	***	(.3107)	-1.7633	***	(.3304)
Graph	-3.1880	***	(.5316)	-3.0727	***	(.5475)
Conference/Event	.7112		(.3689)	.5572		(.3706)
<i>Viewpoint</i>						
No-GM	1.3211	***	(.4072)	1.3228	***	(.3991)
Neutral	.5136		(.4019)	.3675		(.3923)

Significance at *p<0.05, **p<0.01, ***p<0.001

Source: Ventura and Frisio, 2015, 5

As a dependent variable, the SI Index is taken first and in a second step the SI Index 2. The variable “position” is used as a covariate.

“Global viewpoint” codes were put into the following order:

1. Negative
2. Neutral
3. Positive
4. None

“Content of picture” codes were put into the following order (according to their number of appearance):

1. People
2. Logo
3. Graph
4. Cultivated land
5. GM-free campaign
6. Lab
7. Animal feed
8. Event flyer
9. Not classified

A low level of significance is statistically significant. It is set at $p < 0,05$.

The results of ordinal regression analysis for “Case 1” are visible in Table 32.

Table 32: Results of ordinal regression (Case 1)

	SI Index			SI Index 2		
Observation	51			51		
Pseudo R ²	0,280			0,223		
	Estimate	Std. Error	Sig.	Estimate	Std. Error	Sig.
Position	0,001	0,002	0,719	0,003	0,002	0,232
Negative	1,435	1,369	0,242	0,611	0,880	0,487
Neutral	4,747	7,780	0,005	3,019	1,333	0,023
Positive	3,367	2,042	0,153	0,936	2,008	0,641
People	-17,417	9287,891	0,998	0,160	1,398	0,909
Cultivated land	1,264	1,601	0,430	2,310	1,455	0,112
GM-free campaign	-0,440	0,763	0,564	-0,653	0,704	0,353
Lab	-0,996	1,731	0,565	-0,964	1,617	0,551
Event flyer	-17,081	0,000	.	-18,037	0,000	.

Source: Own elaboration

Solely the variable “global viewpoint: neutral” is statistically significant within the SI Index. Within SI Index 2, the same value is also accounted as significant. Due to the fact that the estimate coefficient is positive, neutral text is more likely to appear with images with a high SI Index. In other words, neutral articles came along with “scary” images. The result shows a disagreement between the message of a text about GMO and the visual communication about it.

The results are different within the analysis of Case 2 (Table 33).

Table 33: Results of ordinal regression (Case 2)

	SI Index			SI Index 2		
Observation	325			325		
Pseudo R ²	0,376			0,362		
	Estimate	Std. Error	Sig.	Estimate	Std. Error	Sig.
Position	-0,001	0,001	0,354	-0,001	0,001	0,407
Negative	-0,102	1,167	0,930	-0,080	1,172	0,945
Neutral	-0,851	1,183	0,472	-0,841	1,189	0,479
People	-16,768	1384,386	0,990	-16,788	1385,438	0,990
Logo	-16,565	1948,192	0,993	-16,579	1949,417	0,993
Graph	-16,874	2196,776	0,994	-16,867	2198,510	0,994
Cultivated land	-1,531	1,044	0,143	-1,523	1,041	0,144
GM-free campaign	2,385	0,509	0,000	2,364	0,505	0,000
Lab	1,199	0,889	0,178	1,129	0,902	0,211
Event flyer	-16,432	0,000	.	-16,411	0,000	.

Source: Own elaboration

The results of Case 2 show that no “global viewpoint” is significant (SI Index and SI Index 2), which means that no indication is found between the point of view of an article and the SI Index. Within “content of picture” only the code “GM-free campaign” is significant. Images with the content of a “GM-free campaign” had a positive correlation with the SI Index, indicating that “scary” images appeared with “GM-free campaign” images. One attribute in the SI Index was “Activism” (Table 10) and images of a “GM-free campaign” often depicted activists, demonstrations and anti-GM signs. Therefore, images of a “GM-free campaign” were likely to receive at least one SI Index point within the SI Index and contribute to a correlation between this code and a high SI Index.

Extended analysis of the images

Furthermore, analysis was extended and the variables “global viewpoint” and “content” were also included into the ordinal regression analysis and used as independent variables. Again, the results are shown for Case 1 (51 examples) (Table 34) and Case 2 (325 examples) (Table 35).

“Content of text” codes were put into the following order:

1. Information
2. Information, Preservation of a GM-free Austria
3. Preservation of a GM-free Austria
4. Polemic, Preservation of a GM-free Austria
5. Information, Polemic
6. Polemic
7. TTIP
8. Not classified

“Kind of website” codes were put into the following order:

1. Website of a news provider
2. Blog
3. Website of a political party
4. Forum
5. Not classified

Analysis of images in Case 1 (Table 34) shows no significant values within SI Index.

Table 34: Results of ordinal regression extended (Case 1)

	SI Index			SI Index 2		
Observation	51			51		
Pseudo R ²	1,000			0,569		
	Estimate	Std. Error	Sig.	Estimate	Std. Error	Sig.
Position	-0,003	0,004	0,510	-0,001	0,003	0,864
Negative	-18,137	6859,344	0,998	-19,510	1,387	0,000
Neutral	-15,459	6859,344	0,998	-16,313	2,129	0,000
Positive	5,054	2,818	0,073	1,187	2,214	0,592
People	-15,117	5536,965	0,998	0,835	1,643	0,611
Cultivated land	2,897	2,640	0,272	2,481	2,468	0,315
GM-free campaign	-1,039	1,139	0,362	-1,034	1,014	0,308
Lab	-0,940	1,879	0,617	-0,849	1,660	0,609
Event flyer	3,200	13719,669	1,000	-16,496	8355,381	0,998
Information	19,668	6859,344	0,998	19,498	1,370	0,000
Information, Preservation...	-0,462	8783,006	1,000	-0,682	4715,558	1,000
Preservation of a GM-free Austria	3,922	8332,263	1,000	3,577	4769,208	0,999
Polemic, Preservation...	3,267	8219,342	1,000	2,936	3878,904	0,999
Polemic	20,018	6859,344	0,998	20,802	0,000	.
TTIP	-2,611	10391,453	1,000	-0,080	4,000	0,984
Website of a news provider	2,440	1,708	0,153	3,855	1,561	0,014
Blog	-0,616	1,487	0,679	1,402	1,061	0,186
Website of a political party	-17,094	3723,927	0,996	-0,064	1,714	0,970
Forum	2,193	1,794	0,222	2,701	1,672	0,106

Source: Own elaboration

Within SI Index 2 the codes “negative” as well as “neutral” “global viewpoint” are significant. Unlike the results in the prior analysis (Table 32), the estimate coefficient is negative which means that the SI Index 2 is negatively affected. If an example has a “global viewpoint: negative or neutral”, SI Index 2 decreases.

The attributes “war” and “hazard/death” in SI Index were considered as the most fearful attributes of an images. The doubling of the initial weight of these two attributes within SI Index 2 led to these different results. This could indicate that negative and neutral articles contain less images with a content of war and hazard/death and therefore, are considered as less fearful.

As Case 1 only contains examples with an SI Index >0 - also classified as “scary” images – the non-scary images are not included into the calculation. Correspondingly,

images which appear with a negative or neutral text are just considered to be less “scary”.

Furthermore, the codes “information” (within the variable “content of text”) and “website of news provider” (within the variable “kind of website”) show significance. If a website provided “information”, the SI Index 2 increased, indicating that “information” (which should be provided neutrally) appears with “scary” images. If an example was coded with “website of a news provider” it positively affected the SI Index 2 as well. This result shows that news providers (the media) influence the appearance of a high SI Index 2 and accordingly “scary” images.

The extended results for Case 2 (Table 35) are similar to the prior analysis (Table 33).

Table 35: Results of ordinal regression extended (Case 2)

	SI Index			SI Index 2		
Observation	325			325		
Pseudo R ²	0,671			1,000		
	Estimate	Std. Error	Sig.	Estimate	Std. Error	Sig.
Position	-0,002	0,002	0,193	-0,002	0,002	0,293
Negative	0,052	1,230	0,966	0,065	1,232	0,958
Neutral	-0,516	1,219	0,672	-0,508	1,223	0,678
People	-16,220	1334,821	0,990	-16,235	1332,991	0,990
Logo	-16,122	1923,637	0,993	-16,136	1921,133	0,993
Graph	-16,875	2101,390	0,994	-16,868	2090,656	0,994
Cultivated land	-1,296	1,023	0,205	-1,265	1,009	0,210
GM-free campaign	2,205	0,546	0,000	2,231	0,545	0,000
Lab	1,215	0,901	0,178	1,154	0,912	0,206
Event flyer	-15,491	0,000	.	-15,407	0,000	.
Information	0,870	0,847	0,305	0,912	0,849	0,283
Information, Preservation...	0,061	1,043	0,953	0,082	1,047	0,937
Preservation of a GM-free Austria	0,179	1,363	0,896	0,049	1,380	0,971
Polemic, Preservation...	0,630	1,087	0,562	0,556	1,093	0,611
Information, Polemic	-16,422	6519,088	0,998	-16,387	6521,399	0,998
Polemic	1,284	0,915	0,160	1,448	0,911	0,112
TTIP	-14,433	3629,991	0,997	-14,397	3637,468	0,997
Website of a news provider	0,619	0,569	0,276	0,613	0,569	0,281
Blog	1,430	0,700	0,041	1,398	0,694	0,044
Website of a political party	1,070	0,995	0,282	1,221	0,986	0,216
Forum	2,724	1,465	0,063	2,656	1,472	0,071

Source: Own elaboration

The extended analysis for Case 2 shows levels of significance with “GM-free campaign” (within the variable “content of picture”). Images with the content of a “GM-free campaign” positively affected the SI Index. Consequently, “GM-free campaign” images appear with “scary” images. A lot of those images depicted demonstrations and activists and therefore, they also received the SI Index attribute “activism”. This probably leads to the correlation within the analysis. Furthermore, “blogs” reached the level of significance within the variable “kind of website” in SI Index and SI Index 2. If examples were coded as “blogs”, it positively affected the SI Index. Blogs aim to get attention and “scary” images are a good source for gaining attention.

6 Summary

About two third of Europeans worry about “GM products in food or drinks” (TNS Opinion & Social 2006, 74; TNS Opinion & Social 2010b, 20/78) and more than half of Europeans think that “food made from GMO is dangerous” (TNS Opinion & Social, 2005a, 61, EORG, 2001, 26). These levels remained more or less the same within the years. Interestingly, the lack of information about “The use of GMO in farming” has also stayed at the same very low level (TNS Opinion & Social, 2005b, 85; TNS Opinion & Social, 2008, 62; TNS Opinion & Social, 2011, 143). Although the amount of people in Europe, who see a positive future effect in GMOs has been rising in the last years, the number of people who foresees a negative effect has increased to a greater extent (Gaskell et al., 2006, 10; TNS Opinion & Social, 2010b, 251).

Within all issues, Austrians seem more concerned than the average European citizen. Especially “the use of GMO in farming” is a big environmental risk issue for Austrians (TNS Opinion & Social, 2005b, 81; TNS Opinion & Social, 2008, 101; TNS Opinion & Social, 2011, 139). GMOs are also assumed to be especially a threat to the Austrian organic agricultural production (Mikl and Torgersen, 1996, 199; Torgersen and Bogner, 2005, 282).

Attitudes towards GM food in the USA seem to vary a little within the years. It is supposed that the variation depends mainly on current crises and scandals within food industry (The Mellman Group Inc., 2006, 2). Generally about half of US citizens support an “introduction of GM food into the US food supply” (The Mellman Group Inc., 2006, 3). GM food is available in the US food chain and market for many years already, but the level of awareness and knowledge about GMO is surprisingly low. In 2006, only a quarter of people believe that they have eaten GM food, one third is considering GM food as basically safe and just a slightly lower percentage is considering it as basically unsafe (The Mellman Group Inc., 2006, 2ff). It was observed that peoples’ minds are not that fixed about GMO and that additional information might change their former point of views (The Mellman Group Inc., 2006, 4f).

Both Europeans and US Americans, have specific estimations when it comes to the topic of GMO, but the underlying drivers differ.

The term communication combines all kind of interaction between humans and can take place anywhere and anytime (Bruhn, 2015, 3ff). Therefore, it is almost impossible that communication doesn't have a contribution to forming peoples' attitudes. Through the appearance of the internet, the communication process itself can happen faster than ever (Frosch-Wilke, 2002, 8) and pictures can help the brain to even process the communication message faster than written text (Kroeber-Riel and Esch, 2004, 19; Malamed, 2009, 36).

The expected negative emotional appeal of images used on Austrian websites talking about GMO could not be observed: Less than 10% of "scary" images were found. This low percentage is even more surprising, considering that about 40% of articles offer a negative text about GMO. These results indicate that the prior mentioned negative attitude of GMO within Austrians cannot be explained by "scary" images found on Austrian websites.

7 Discussion

This chapter deals with the empirical part of this thesis. First, the methods are investigated and furthermore, the results interpreted and compared to the Italian study (Ventura and Frisio, 2015).

7.1 Discussion of methods

7.1.1 Data collection

The collection of images through Google advanced search is easy and very efficient. It just has to be taken into account that the appearance of images might switch their order. Unfortunately, Google search requests cannot be saved or “frozen”. So it is very likely that the position of appearance changes within a few days, weeks or months. Therefore, the websites got saved as pdf for further evaluation.

There existed a lot of websites, which were found because of the term “ohne gentechnisch veränderte Organismen” (“without genetically modified organisms”). This mainly contributes to product information issues. Such cases were put into the code “global viewpoint: none”, if nothing else about GMO was found on the website.

7.1.2 Scary Impact Index

The Scary Impact Index, provided by Ventura and Frisio (2015), works fine. There was no scary attribute obtained which didn’t fit into one of the 12 categories.

Only the attribute “drugs” could be misleading. This category contains images with drugs and pills, but within Austria that also included medical articles, which didn’t seem frightening. Those medical articles appeared in Google search, because it was announced in the text that they were free from GMOs.

The category “activism” got enlarged within this thesis to account not only for images of activists and demonstrations, but also for anti-GM signs. There could be another index category developed to account only for such anti-GM signs. Information about anti-GM signs and how to handle them within the SI Index was not available in the Ventura and Frisio (2015).

7.1.3 Variables and their codes

Position

There was the attempt to save the correct number of position on the Google search result page of the images. Unfortunately, this might not have worked out 100%, as their position adjusted with every new opening of the Google search. Therefore, attempts were made to reduce this to a minimum, and data collection was done within three days. Afterwards, the appearance of images was observed again for adjustment and recognition of still missing images.

Global viewpoint

The code “none” got added in the Austrian evaluation besides positive, neutral and negative. “None” was necessary, because it happened very often that the searching term appeared within the text, but the text itself actually wasn’t dealing with GMOs (e.g. product information).

Content of picture

In comparison with the Italian study (Ventura and Frisio, 2015), the variable “satire“, “benefit“ and “conference/event“ were removed as they didn’t seem appropriate for the Austrian evaluation.

The following codes were added instead: “event flyer”, “people”, “logo”, and “animal feed”. Maybe the Italian code “conference/events” includes the Austrian code “people”, because people may appear on “conference/event” images as participators. Within the Austrian evaluation, the code “people” implies any kind of speaker, handshaking between politics or simply a profile picture.

Content of text

The codes “information”, “TTIP”, “polemic” and “preservation of a GM-free Austria” didn’t exist in the Italian study (Ventura and Frisio, 2015), but were considered as interesting additional information.

Besides these codes, further categorization might be important for future studies: e.g. news reports of events/demonstrations, product information (GM-free claim).

Comment

This variable only specifies the variable “content of text” and could have been included there. It represents additional information about the content of the text. However, there is a slight difference between them and that is why they were separated. The difference between these two “TTIP”-codes is that within the variable “comment” the code “TTIP” only accounts for the appearance of this term and not that the whole text is about TTIP – as would be the case if the variable “content of text” was coded with “TTIP”.

The code “Monsanto negative” was also added to the comment column, because it was observed a couple of times.

Kind of website

The categorization of websites which provide images of GMO was not the main aim of this thesis, but was considered as interesting additional information.

With the observed codes “blog”, “forum”, “website of news provider” and “website of political party” an insight into this category was possible. However, more than half of the websites were not further categorized (60,1%), which means that the results within this variable accounts for less than half of the examples.

The list provides examples of other codes, which could have been introduced within the variable “kind of website”:

- NGO: greenpeace, global2000
- Food supplier: Billa, Schirnhofen, nu3, bio Austria
- Official agencies: Bundesministerien, Ages, Europäische Kommission (European Commission)
- Analytic laboratories
- Bundesländer websites: Land Oberösterreich.

The rough estimated percentage of appearance for each of those other variables is probably around 5%.

Presence of direct link

Different scenarios were obtained while evaluating the images and their websites.

The image was found on Google search and the corresponding link:

1. lead directly to the website where the image was presented.
2. went to an article overview website, which offered a wide range of articles. The corresponding article was searched for, and this article was then evaluated.
3. was directed to an overview website, where a list of topics or articles were provided (without any images). In this case the overview website was evaluated, because the task was to evaluate images and their page content and not if a topic on the website fits to GMOs.

Presence of picture legend

Picture legend usually might only account for a phrase, which describes the images. In this evaluation, an image was also evaluated as having a picture legend if only the provider of the image was stated underneath. This was done if further studies want to evaluate providers of images of GMO in Austria.

7.1.4 Statistical evaluation techniques

Frequency analysis

Only within the variables SI Index, “global viewpoint”, “presence of direct link”, and “presence of picture legend”, every image and its website was put into a code. The other four variables “content of picture”, “content of text”, “kind of website”, and “comment” have a big number of uncategorized cells. This is not really a problem, it just has to be considered.

Of course, there could have been as many other codes built within each variable to fit everything observed. However, it has to be considered that the current codes are very likely to be also the ones, which appear the most often and offer some interesting insights.

Ordinal logistic regression

First of all, it is not common to show standard deviation, if normal distribution is not given. Therefore, it has to be considered that regression analysis might not be the most suitable way to analyze the observed data, because the data is nominal and has no

normal distribution. If it wasn't for the purpose of comparison with the previous Italian study from Ventura and Frisio (2015), this method hadn't been undertaken.

The SI Index and the variable "position" are not only nominal, but ordinal data.

It might be possible to put the codes of the "global viewpoint" in a logical order: negative – neutral – positive (- none). However, within the codes of the variable "content of picture", "content of text" or "kind of website", it is hardly possible. Therefore, the number of appearance was used partly to rank them.

Unfortunately, it cannot be retraced how the ranking in Italian survey (Ventura and Frisio, 2015) was done within the variable "content of picture". Without a ranking, the codes are put in alphabetical order by SPSS. The results of the independent variables always refer to the last code of a variable in SPSS ordinal regression analysis. Therefore, it was necessary to build a ranking, so that SPSS outranges codes without further meaning such as "global viewpoint: none" and if a categorization didn't take place (value "not categorized" within the variables "content of picture", "content of text" and "kind of website").

It may not be very beneficial that not all examples could be put into one of the existing codes of the corresponding variable and therefore put into the code "not categorized" and named as "missing code" in SPSS.

There was the attempt to name codes according to their importance for interpretation and number of appearance.

Although it is very unlikely that images which are making statements to be free from GMO got excluded in the Italian study (Ventura and Frisio, 2015), the idea cannot be eliminated. It could not be obtained from the paper of Ventura and Frisio (2015) and description of their method. Maybe Google search was also used to exclude images, about e.g. product information, which only claim to be free from any GMO. Those kind of images were found quite often within the Austrian Google search request.

7.2 Discussion of the results

Only 9,3% of all 549 images found on Austrian websites were given an index ≥ 1 and are therefore considered as “scary”.

This is a pretty clear statement. The results for Austria are not in accordance with the prior hypothesis. There are way less “scary” images found in Austrian websites than on Italian ones (Ventura and Frisio, 2015, 4). Possible reasons for that are examined within the discussion of the results

The percentage of images found within the SI Index varies a lot between Italy and Austria (Table 36).

Table 36: Results within the SI Index in Italy and Austria (in %)

<i>Scary Impact Index points</i>	<i>% Italy</i>	<i>% Austria</i>
0	42,55	90,7
1	25,15	6,4
2	14,31	2,4
3	9,67	0,5
4	5,22	0
5	3,09	0
<i>Total</i>	100	100

Source: modified after Ventura and Frisio, 2015, 4 and own elaboration

7.2.1 Frequency analysis

The results of the frequency analysis are not to be compared with the Italian study as the paper of Ventura and Frisio (2015) offers no such information. The results are going to be compared within the Austrian results only with special ways of looking into the results.

As content analysis combines qualitative with quantitative research instruments, the numbers should not be taken as a matter of fact. Nevertheless, they are presented to get a feeling for the whole issue.

Surprisingly, out of all images, most images were found with text, which didn't actually deal with the topic of GMO and had the “global viewpoint: none” (41%). The images were found only on Google search due to the fact that the term “gentechnisch veränderte Organismen” (“genetically modified organisms”) was stated at some point on the website. This was often the case in combination with any kind of advertisement: whether it was a product (protein powder, feed for cats and dogs, medicine, ...), which

promoted that it was produced without GMOs, or holidays on a farm, which emphasize that their livestock was fed without GMOs, and also all kind of “official” logos, which claim that the product which is labeled with that logo is free from GMOs.

There were also considerations that claims of being free from GMO should be put into the negative section of the variable “global viewpoint”. If someone hasn’t heard about GMO before and therefore doesn’t know anything about it, it might lead to the thought that it is considered negative if something contains GMOs. On the other hand, if only the term GMO is mentioned within such advertisements, curious people maybe search by themselves about what GMO actually is. Therefore, it is not possible to say what message such images and text are more likely to transport.

Frequency analysis shows that about one third of the articles, which were found on “websites of news providers”, contain “information” with a “global viewpoint: negative”. These results are not surprising, as it is said that media and news providers reflect the opinion of the public, but it could also be interpreted the other way around as agenda setting of the media. It cannot be said that images contribute to the negative opinion of Austrians about GMO, it definitely can be said that most text and information provided is written from a negative angle.

Within “websites of political parties”, it seems more important to care about the “preservation of a GM-free Austria” than actually give “information” about GMOs and explain why a preservation is needed in their point of view. Again, the question could be asked: Are politics reflecting the public opinion or the other way around?

“Blogs” are mostly written by individuals and depict their point of view. Austrian bloggers are quite enthusiastic to tell the world that GMOs are bad. Although there hasn’t been a lot of websites categorized within the code “blog” or “forum”, they are the only sources within the internet where individual opinions can be stated and these categories were largely negative about GMO. So at least the results from Eurobarometer surveys are in accordance with the internet results, and again the drivers cannot be named.

When the topic of ‘agenda setting of the media’ is discussed the links of the images could also play a role. Although most of the links were correct and led to the corresponding article, almost a quarter of the picture links didn’t. Sometimes the fact that the wrong website has been reached will not even be recognized. And if the wrong

link was discovered by the reader, how many people would actually search for the right article in a second step?

It is not an aim of this thesis to further analyze why images are found and why sometimes the link of an image doesn't lead directly to the website with the image. But it is assumed that the link of an image can be set by the provider of the website. So, a wrong link might be a slight sign of attitudes to an agenda setting function of providers of a website. It seems that a lot of misleading links can be found especially within websites of political parties, but also news providers and blogs (Table 27). Altogether, the misleading links of "websites of political parties", "websites of news providers", "blogs", and "forum" contribute to more than half of all misleading links (71 out of 130).

Another issue, upon which is briefly touched, is regarding picture legends accompanying an image. It isn't obligatory to make a picture legend with an image, but as already stated in chapter 4.3 (p. 64), it is assumed that images are better remembered with a picture legend.

A disproportionately large number of images with picture legends can be found within "websites of news providers" and "websites of political parties". It isn't very surprising that those kind of websites provide such information.

In this connection, the topic of the origin of pictures appears as well. It is mandatory to name the origin of pictures in the media, if they weren't taken by the author himself. Within the examples, it was not observed how often this was really taken into account by the website providers, but as the number of a picture legend itself is higher within "websites of news providers" and "websites of political parties", it might be assumed that they are also much more likely to offer such information.

Through a swift look over the results of the usual Google search of GMO without restriction to a country and then a restriction to Italian websites only, it was noticed that many pictures from international domains (.com) were taken and put into Italian websites. Of course it is possible that this also happened the other way around and the actual origin of such "scary" and "catchy" images is Italy.

Which country actually has developed such images is not part of the study and therefore, no more attention is put on this topic. However, even if the origin of the pictures might not be in Italy, it seems that many Italians are concerned about GMO

and therefore take pictures from other websites and put them on Italian ones (most likely without knowing or caring about copyright issues).

This was not obtained on Austrian websites. It can only be hypothesized why such catchy images are hardly used within Austrian websites. It might be due to copyright issues and a lack of such images in picture databases, which are very much used by the media. This would also explain the high use of casual images of agricultural production (animals, vegetables, cultivated land) or politicians/speakers, where plenty of pictures might be available.

Two other arguments could also apply to Austria:

1. lack of creativity about the development of scary/catchy images – as the number of activist-images is quite high within the SI Index;
2. an underestimation of the function of visual communication as appearance of pictures and images.

7.2.2 Ordinal logistic regression

As already mentioned several times: only very few images of Austrian websites were coded within the SI Index. Therefore, results vary a lot from the Italian results (Ventura and Frisio, 2015, 5).

The fact that the code “global viewpoint: none” had to be introduced into the Austrian evaluation of websites, also led to the circumstance that results are not fully comparable with the Italian ones. Results change a lot depending on the number of examples included in the ordinal analysis.

Ordinal regression analysis of Case 1 and Case 2 also offer diverse results. This differing results originate from the number of examples used for calculation. Case 1 is used for comparison with the Italian study of Ventura and Frisio (2015) (Table 37).

Table 37: Comparison of the ordinal regression results of Austria with Italy

	SI Index Italy			SI Index Austria		
Observations	517			51		
Pseudo R ²	0,1194			0,280		
	+/-	Estimate	Significance	+/-	Estimate	Significance
Position	-	0,0033	***	+	0,001	(0,719)
Global viewpoint						
negative	+	1,3211	***	+	1,435	(0,242)
neutral	+	0,5136		+	4,747	**
Content of picture						
Satire	+	0,6586	*	.	.	.
Lab	-	1,4680	***	-	0,996	(0,565)
Cultivated land	-	1,9079	***	+	1,264	(0,430)
Graph	-	3,1880	***	.	.	.

+ ... positively affects the SI Index

- ... negatively affects the SI Index

Significance at *p<0,05; **p<0,01; *** p<0,001

Source: Ventura and Frisio, 2015, 5 and own elaboration

Ventura and Frisio (2015) found out that the first and most viewed Google results were the scariest ones. Due to the fact that there were only so few “scary” images within Austrian websites, the variable “position” was calculated as not important for the results and has no relationship to the SI Index in any ordinal regression analysis (Case 1 and Case 2; Case 1 extended and Case 2 extended).

Although Google search for Austrian websites only found 51 “scary” images, it could have been the case that they are placed within the first Google search results. Images are seen more often, when they appear within the first searching results. This is important to notice, because it could have been attributed to the Austrian negative opinion about GMO. However, images with a SI Index ≥ 1 show up randomly and it cannot be comprehended through the results of ordinal regression that “scary” images are located within the first Google results.

Within the Italian study a “global viewpoint: No-GM” (the term is comparable with “global viewpoint: negative” in the Austrian analysis) is in coherence with a high SI Index (Ventura and Frisio, 2015, 5). “Scary” images are likely to show up with negative text on Italian websites.

Austrian “scary” images showed significance within “global viewpoint: neutral” in SI Index 1 within Case 1. This means that “scary” images are likely to appear with “neutral” text. An explanation for that could be that attributes such as “imaginary animal/vegetable” and “modification of colour/size/shape” can be found within the SI

Index, but images of e.g. a “glowing fish - GloFish” are used for the purpose of simple explanations. On Italian websites “scary” images were also obtained with neutral text. This significance level of “global viewpoint: neutral” changed a little in the results of the SI Index 2 within Case 1. This could be due to the fact that neutral text has less attributes to “war” and “hazard/death” than the others. Therefore, the SI Index remained the same also with SI Index 2 and “global viewpoint: neutral” didn’t have such a big influence anymore.

In the Ventura and Frisio (2015) the codes “lab”, “cultivated land”, and “graph” contributed to a decreasing SI Index and the code “satire” to an increasing SI Index. Within the Austrian results of Case 1, no code within the variable “content of picture” show an influence on the SI Index. Results within Case 2 announce only an increasing SI Index within the code “GM-free campaign”. Images within the code “GM-free campaign” often showed actions of activism, which was also an attribute within the SI Index. This accounts for the correlation of an increasing SI Index with this code.

Extended analysis

The extended analysis offers results in addition to “content of text” and “kind of website”.

Within the variable “content of text” the code “information” only had an increasing effect on the SI Index 2 within Case 1. This indicates that information comes along with “scary” images, images which have some reference to “war” or “hazard/death” as information doesn’t show any significance in the results of SI Index 1.

Within the variable “kind of website”, the code “website of a news provider” increases the SI Index of images in Case 1 (SI Index 2). In Case 2 only the code “blog” had an increasing effect on the SI Index.

There were no significances obtained in the variable “content of picture” in the extended analysis within Case 1 and Case 2.

8 Conclusion and further research

Both Europeans and US Americans, are not sure what to think about GMOs. While environmental issues seem more important in Europe (TNS Opinion & Social, 2005b, 8), food safety concerns are the top one in the USA (Consumer Reports National Research Center, 2008, 8). Of course, the differing results could be due to the different institutions which made the surveys and due to different questions asked.

Unfortunately, it was obtained that within the last years a lot of surveys from different providers appeared for the first time so that comparisons should be made with caution. With a look at some papers about the topic of labeling (e.g. Hallman et al., 2013; Consumer Reports National Research Center, 2014), it might seem that the US public is more aware of GMO and therefore, they are about to care more and also develop a negative attitude as is observed in Europe. There is no proper survey available which acknowledges this negative attitude of US Americans by the time writing this thesis.

If there is something new and unknown, a natural reaction might cause fear and/or interest/curiosity.

Surveys indicate that fear and negative attitude come along with a low level of knowledge about GMOs (Mikel and Torgersen, 1996, 199; The Mellman Group Inc. and Public Opinion Strategies, 2001; The Mellman Group Inc. and Public Opinion Strategies, 2003; The Mellman Group Inc., 2004; The Mellman Group Inc., 2006).

There are at least two ways (a positive and a negative way) a person's mind develops and maybe the information provided and given to the person is the essential driver for or against e.g. GMO.

There might be some indication found within the results on how the media could possibly influence Austrian population and actually take an agenda setting role.

However, if the number of images with a SI Index >0 is considered, the results indicate no agenda setting function or influence of peoples' opinion through the appearance of images - at least the current images on websites.

Therefore, a thought was given to another way of looking at the whole topic:

It could be assumed that Austrians are "scared" and have a negative opinion of GMOs because of their cultural dominant codes. GMOs are something new and something

unknown – as already announced. Additionally, the so-called “uncertainty avoidance”²² is quite high within Austrians. There is a fitting expression for that: *Was der Bauer nicht kennt, frisst er nicht!*. (Translation: “If a peasant is unfamiliar with something, he is not going to eat it!”.)

Maybe the degree of a countries “uncertainty avoidance” can be compared with their willingness to accept GMOs. The following image shows a world map and the “uncertainty avoidance” of each country (Figure 23). The darker the color the higher the uncertainty avoidance in a country.

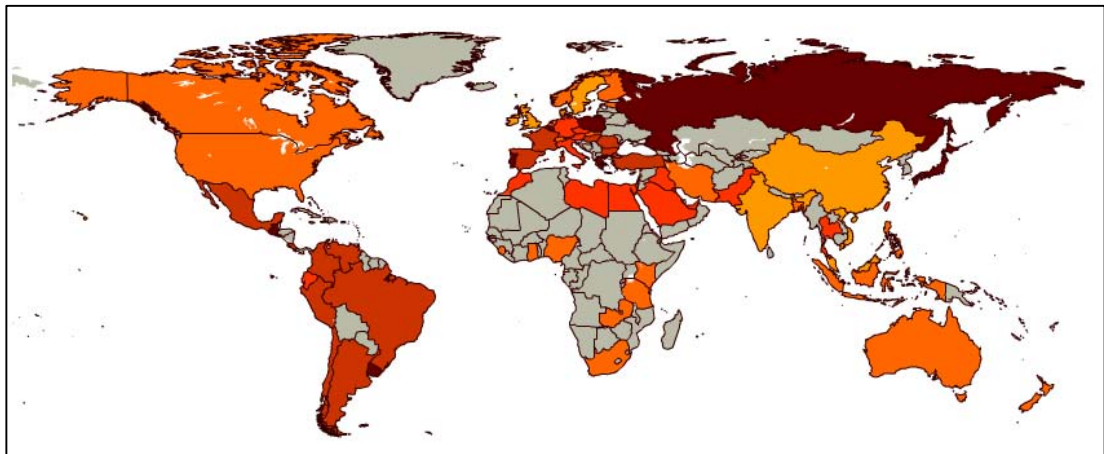


Figure 23: World map of uncertainty avoidance - Hofstede

Source: Kwintessential, 2015a, s.p.

There cannot be any direct benefit gained from GMOs for Austria, unlike in a lot of other GM-producing countries. The Austrian agriculture is still quite small structured and family run business compared to other countries. Economies of scale, meaning the bigger the farm the better suited to GMO, seem to be a main driver for the use of GMO plants in agriculture.

Generally, it has to be mentioned that every attempt to depict the human mind by actually asking humans, already influences the results. This might be due to unexplainable reasons such as an inner feeling about why we behave as we do, but also that people state answers which they think they are expected to give. The assumption of the quantum theory is that monitoring already influences reality (Double-slit

²² After the outcome of two studies by Geert Hofstede, he introduced five dimensions to explain cultural differences. One of them is “uncertainty avoidance”. “Uncertainty avoidance” describes whether members of a culture are more comfortable only within strict laws and regulations or also within ambiguity, risks and unknown situations (Kwintessential, 2015b, s.p.). The Minerva study included Geert Hofstede’s variables to its country profiles.

experiment²³). Of course this is a completely different field of science, but if tiny particles already are behaving different when observed, why shouldn't humans do so?

Further research

The same research methods can be used to compare the appearance of scary GMO images within websites of other countries and examine whether the universal opinion of a country is in accordance with the kind of images found.

This study could be repeated in Austria in e.g. 5 years to see if the results have changed to images reflecting the Austrian public opinion.

Generally, more research should be done considering background of this negative European or Austrian attitude (within the premise that opinion research gives valuable results). If the available literature is examined, no real results have been published about the source of negative opinions. Neither people in the USA nor in Europe seem to have sufficient knowledge about the topic of GMO. Nevertheless, they present such opposing positions in dealing with them. The answer could be rooted in peoples' mind but also within industrial sector and the industries' influence in politics.

The topic of communication was broadly discussed in the literature already. Maybe it is time to look for correlations within the frame of communication, because the internet offers a lot of new possibilities. The research field of images within communication is quite young, so in the near future, some interesting studies might be published. Within the time writing this thesis, a quite interesting change within the social media platform "facebook" was observed: a change from a picture based sharing attitude to a video sharing behavior. It was mentioned in the literature that videos are an even better motivator than images to get into a topic and read an article (Petersen, 2015b, s.p.). Videos are an easy way to get updated, informed, entertained or amused. So probably videos and their contribution should be considered as a new field of research.

Another topic of research might also be how scientific communication takes place. Knowledge about which channels are used most and which are consumed most could increase the spread of scientific research findings.

²³ In 1802, the experiment was undertaken by Thomas Young to demonstrate the interference of radiation (Greulich and Kilian, 2000, 459).

9 Bibliography

- ALEXANDER, K. (2013): Kompendium der visuellen Information und Kommunikation. Dordrecht: Springer Berlin Heidelberg.
- ARGYLE, M. (2013): Körpersprache & Kommunikation: nonverbaler Ausdruck und soziale Interaktion. 10., überarb. Neuaufl., Paderborn: Junfermann.
- BEAIRD, J. (2011): Gelungenes Webdesign: die Prinzipien der Webseitengestaltung: ein Leitfaden für Webprogrammierer. 2., überarb. erw. Aufl., Heidelberg: dpunkt-Verlag.
- BELL, P. (2001): Content analysis of visual images. In: LEEUWEN, T. V. (Ed.): Handbook of visual analysis. 1. publ. ed. Los Angeles, CA: Sage.
- BENTELE, G. (2003): Öffentliche Kommunikation. 1. Aufl., Wiesbaden: Westdt. Verlag.
- BLANZ, M. (2014): Definitiorische und deskriptive Aspekte von Kommunikation. In: BLANZ, M., FLORACK, A. and PIONTKOWSKI, U. (Eds.): Kommunikation eine interdisziplinäre Einführung. 1. Aufl. ed. Stuttgart: Kohlhammer.
- BOCK, A.; ISERMANN, H. and KNIEPER, T. (2011): Quantitative Content Analysis of the Visual. In: MARGOLIS, E. (Ed.): The SAGE handbook of visual research methods. Los Angeles, CA: Sage.
- BOCK, M. A. (2009): Who's Minding the Gate?: Pool Feeds, Video Subsidies, and Political Images. The International Journal of Press/Politics 14: 257-278.
- BONFADELLI, H. (2004): Medienwirkungsforschung I. Konstanz: UVK Verlagsgesellschaft mbH.
- BONFADELLI, H. and FRIEMEL, T. N. (2015): Medienwirkungsforschung. Konstanz, München: UVK Verlagsgesellschaft mbH, UVK Lucius.
- BRANTNER, C.; LOBINGER, K. and WETZSTEIN, I. (2011): Effects of visual framing on emotional responses and evaluations of news stories about the gaza conflict 2009. Journalism and Mass Communication Quarterly 88: 523-540.
- BROSIUS, F. (2014): SPSS 22 für Dummies. 1. Aufl., Weinheim: Wiley-VCH-Verl.
- BRUHN, M. (2015): Kommunikationspolitik: systematischer Einsatz der Kommunikation für Unternehmen. 8., überarb. Aufl., München: Vahlen.
- BUNDESKANZLERAMT and RECHTSINFORMATIONSSYSTEM (2015): Gesamte Rechtsvorschrift für Gentechnikgesetz - Bundesrecht konsolidiert, Fassung vom 13.08.2015.

- BURKART, R. (2004): Online-PR auf dem Prüfstand: Vorbereitende Überlegungen zur Evaluation von Websites. In: RAUPP, J. (Ed.) Quo vadis Public Relation. 1. Aufl., Wiesbaden: VS, Verlag für Sozialwissenschaft.
- BUSCH, R.; SEIDENSPINNER, M. and UNGER, F. (2007): Marketing communication policies. Berlin: Springer.
- CHANDLER, D. and MUNDAY, R. (2011): A dictionary of media and communication. 1. Aufl., Oxford: Oxford Univ. Press.
- CONSUMER REPORTS NATIONAL RESEARCH CENTER (2008): Food-Labeling Poll 2008. At: <http://www.greenerchoices.org/pdf/foodpoll2008.pdf> (13.05.2015).
- CONSUMER REPORTS NATIONAL RESEARCH CENTER (2014): Cosumer Support for Standaardization and Labeling of Genetically Engineered Food: 2014 Nationally-Representative Phone Survey. At: https://consumersunion.org/wp-content/uploads/2014/06/2014_GMO_survey_report.pdf (13.05.2015).
- CURTIS, K. R.; MCCLUSKEY, J. J. and SWINNEN, J. F. M. (2008): Differences In: global risk perceptions of biotechnology and the political economy of the media. International Journal of Global Environmental Issues 8: 77-89.
- DANNENBERG, A. (2009): The dispersion and development of consumer preferences for genetically modified food - A meta-analysis. Ecological Economics 68: 2182-2192.
- DIAMOND, S. (2013): The Visual Marketing Revolution. Indianapolis: Pearson Education, Inc.
- DIE GRÜNEN KLOSTERNEUBURG (2015): Wollen wir das? At: <http://www.buergerunion.at/spezial-wirtschaft%20ttip%202015.htm> (27.09.2015).
- DJANKOV, S.; MCLIESH, C.; NENOVA, T. and SHLEIFER, A. (2001): Who Owns the Media? National Bureau of Economic Research Working Paper Series No. 8288.
- DÄUBLE, W. (2015): Dimensionen - die Welt der Wissenschaft. At: <http://oe1.orf.at/programm/401797> (27.09.2015).
- EORG (2001): Eurobarometer 55.2: Europeans, science and technology.
- EU-AUSTRITTSPARTEI (2015): Thema: Gentechnik. At: <http://www.euaustrittspartei.at/eu-nein-danke/gentechnik/> (27.09.2015).

- EUR LEX (2000): The precautionary principle. At: <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=URISERV:l32042&qid=1432109923352&from=EN>.
- EUROPEAN COMMISSION (2015a): Genetically Modified Organisms. At: http://ec.europa.eu/food/plant/gmo/new/index_en.htm (22.08.2015).
- EUROPEAN COMMISSION (2015b): GMO Authorisation. At: http://ec.europa.eu/food/plant/gmo/new/authorisation/index_en.htm (22.08.2015).
- EUROPEAN COMMISSION (2015c): GMO Legislation. At: http://ec.europa.eu/food/plant/gmo/new/legislation/index_en.htm (23.08.2015).
- FEDERATION OF AMERICAN SCIENTISTS (s.a.): StarLink Corn. At: <http://fas.org/biosecurity/education/dualuse-agriculture/2.-agricultural-biotechnology/starlink-corn.html> (30.07.2015).
- FREWER, L. J. (2003): Societal issues and public attitudes towards genetically modified foods. *Trends in Food Science & Technology* 14: 319-332.
- FREWER, L. J.; HOWARD, C. and SHEPHERD, R. (1998): The influence of initial attitudes on responses to communication about genetic engineering in food production. *Agriculture and Human Values* 15: 15-30.
- FREWER, L. J.; VAN DER LANS, I. A.; FISCHER, A. R. H.; REINDERS, M. J.; MENOZZI, D.; ZHANG, X.; VAN DEN BERG, I. and ZIMMERMANN, K. L. (2013): Public perceptions of agri-food applications of genetic modification – A systematic review and meta-analysis. *Trends in Food Science & Technology* 30: 142-152.
- FROSCH-WILKE, D. (2002): Das Internet als Marketingmedium. In: FROSCH-WILKE, D. and RAITH, C. (Eds.): *Marketing-Kommunikation im Internet Theorie, Methoden und Praxisbeispiele vom One-to-One- bis zum Viral-Marketing*. 1. Aufl., Braunschweig: Vieweg.
- FUNK, C. and RAINIE, L. (2015): Public and Scientists' Views on Science and Society. At: <http://www.pewinternet.org/2015/01/29/public-and-scientists-views-on-science-and-society/> (13.05.2015).
- GASKELL, G.; STARES, S.; ALLANSDDOTTIR, A.; ALLUM, N.; CORCHERO, C.; FISCHLER, C.; HAMPEL, J.; JACKSON, J.; KRONBERGER, N.; MEJLGAARD, N.; REVUELTA, G.; SCHREINER, C.; TORGERSE, H. and WAGNER, W. (2006): Special Eurobarometer 244b: Europeans and Biotechnology in 2005: Patterns and Trends.
- GENTZKOW, M. and SHAPIRO, J. (2005): Media Bias and Reputation. National Bureau of Economic Research Working Paper Series No. 11664.

- GFK (2015): About us. At: <http://www.gfk.com/about-us/Pages/default.aspx> (09.07.2015).
- GIERL, H. (2002): Marketing. 2., überarb. Aufl., Stuttgart: Schäffer-Poeschel.
- GMO COMPASS (2006): Genetically Modified Tomatoes. At: http://www.gmo-compass.org/eng/grocery_shopping/fruit_vegetables/15.genetically_modified_tomatoes.html (23.08.2015).
- GREULICH, W. and KILIAN, U. (2000): Lexikon der Physik: Sc bis Zz. Heidelberg: Spektrum.
- HALLMAN, W. K.; CUI, C. L. and MORIN, X. K. (2013): Public Perceptions of Labeling Genetically Modified Foods: Working Paper 2013-01. At: http://humeco.rutgers.edu/documents_PDF/news/GMlabelingperceptions.pdf (13.05.2015).
- HEBDEN, W. C.; SHIN, H. K. and HALLMAN, W. K. (2005): Consumer Responses to GM Foods: Why are Americans so Different? Choices: The magazine of food, farm, and resource issues 20: 243-246.
- HECKING, C. and ELMER, C. (2014): Rinderwahn: Was wurde eigentlich aus BSE? At: <http://www.spiegel.de/wissenschaft/medizin/bse-agrar-lobby-will-massnahmen-gegen-rinderwahn-aufweichen-a-1003517.html> (30.07.2015).
- HOCKLEY, W. (2008): The picture superiority effect in associative recognition. Memory & Cognition 36: 1351-1359.
- INGLIS, R. A. (1938): An Objective Approach to the Relationship Between Fiction and Society. American Sociological Review 3: 526-533.
- ITWISSEN (s.a.-a): Blog (weblog). At: <http://www.itwissen.info/definition/lexikon/weblog-Blog-Weblog.html> (27.08.2015).
- ITWISSEN (s.a.-b): Diskussionsforum. At: <http://www.itwissen.info/definition/lexikon/Diskussionsforum-newsgroup.html> (27.08.2015).
- KEPPLINGER, H. M. (2001): Die Kunst der Skandalierung und die Illusion der Wahrheit. Die Kunst der Skandal.
- KROEBER-RIEL, W. and ESCH, F.-R. (2004): Strategie und Technik der Werbung: verhaltenswissenschaftliche Ansätze. 6., überarb. erw. Aufl., Stuttgart: Kohlhammer.
- KUMKALE, G. T.; ALBARRACÍN, D. and SEIGNOUREL, P. J. (2010): The Effects of Source Credibility in the Presence or Absence of Prior Attitudes: Implications for the Design of Persuasive Communication Campaigns. Journal of Applied Social Psychology 40: 1325-1356.

- KWINTESSENTIAL (2015a): A World Map of Hofstede's Uncertainty Avoidance Index Dimension. At: <http://www.kwintessential.co.uk/map/hofstede-uncertainty-avoidance.html> (27.09.2015).
- KWINTESSENTIAL (2015b): Uncertainty Avoidance. At: <http://www.kwintessential.co.uk/intercultural/uncertainty-avoidance.html> (27.09.2015).
- LAZARD, A. and ATKINSON, L. (2015): Putting Environmental Infographics Center Stage: The Role of Visuals at the Elaboration Likelihood Model's Critical Point of Persuasion. *Science Communication* 37: 6-33.
- LESKOVEC, J.; BACKSTROM, L. and KLEINBERG, J. (2009): Meme-tracking and the dynamics of the news cycle. Proceedings of the 15th ACM SIGKDD international conference on Knowledge discovery and data mining. Paris, France, ACM.
- LESTER, P. M. (2005): On Mentors, Ethics, War, and Hurricanes. *Visual Communication Quarterly* 12: 136-145.
- LIEBICH, S. (2014a): Wie PR-Bilder in Redaktionen gelangen (Teil 1): Multimediadatenbank der dpa Picture Alliance. At: <http://www.newsaktuell.de/blog/2014/05/05/wie-pr-bilder-in-redaktionen-gelangen-teil-1-multimediadatenbank-der-dpa-picture-alliance/>.
- LIEBICH, S. (2014b): Wie PR-Bilder in Redaktionen gelangen (Teil 2): Metabildsuchmaschine picturemaxx. At: <http://www.newsaktuell.de/blog/2014/05/06/wie-pr-bilder-in-redaktionen-gelangen-teil-2-metabildsuchmaschine-picturemaxx/> (17.07.2015).
- LIEBICH, S. (2014c): Was sich Journalisten in Sachen Bilder wünschen – Eindrücke von der CEPIC. At: <http://www.newsaktuell.de/blog/2014/06/05/was-sich-journalisten-in-sachen-bilder-wunschen-eindruecke-von-der-cepic/#more-12561> (17.07.2015).
- LINZMAIER, V. (2007): Lebensmittelskandale in den Medien: Risikoprofile und Verbraucherverunsicherung. München, Fischer.
- LUSK, J. L.; HOUSE, L. O.; VALLI, C.; JAEGER, S. R.; MOORE, M.; MORROW, J. L. and BRUCE TRAILL, W. (2004): Effect of information about benefits of biotechnology on consumer acceptance of genetically modified food: evidence from experimental auctions in the United States, England, and France. *European Review of Agricultural Economics* 31: 179-204.
- MAHLAU, G. (1999): Das Image der Landwirtschaft. 1. Aufl., Witterschlick, Bonn: Wehle.

- MAIER, L. (2014): Suchmaschinen Marktanteile Europa 2014 - lunapark. At: <http://www.luna-park.de/blog/9142-suchmaschinen-marktanteile-europa-2014/> (21.04.2015).
- MALAMED, C. (2009): Visual language for designers: principles for creating graphics that people understand. Beverly, Mass: Rockport Publishers.
- MALETZKE, G. (1963): Psychologie der Massenkommunikation - Theorie und Systematik. Hamburg: Bredow-Institut.
- MARKS, L. A. and KALAITZANDONAKES, N. (2002): Mass Media Communications About Agrobiotechnology. Journal of Agrobiotechnology Management & Economics: 199-208.
- MCCLUSKEY, J. and SWINNEN, J. (2011): The media and food-risk perceptions. EMBO reports 12: 624-629.
- MCCLUSKEY, J. J. and SWINNEN, J. F. M. (2004): Political economy of the media and consumer perceptions of biotechnology. American Journal of Agricultural Economics 86: 1230-1237.
- MCCOMBS, M. E. and SHAW, D. L. (1972): The agenda-setting function of mass media. Public Opinion Quarterly 36: 176-187.
- MEFFERT, H.; BURMANN, C. and KIRCHGEORG, M. (2008): Marketing. 10., vollständig überarb. erw. Aufl., Wiesbaden: Gabler.
- MENRAD, K.; KOSCHATZKY, K.; MASSFELLER, S. and STRAUSS, E. (1998): Communicating genetic engineering in the agro-food sector to the public. Luxembourg: Office for Official Publications of the European Communities.
- MIKL, M. and TORGENSEN, H. (1996): Austria's biotechnology regulation: From 'virtual releases' to public protest. Science and Public Policy 23: 195-200.
- MONSANTO COMPANY (2015): Monsanto at a Glance. At: <http://www.monsanto.com/whoweare/pages/default.aspx> (31.08.2015).
- MORE, T. (2014): The importance of visual content (and how to deliver it effectively). At: <http://thenextweb.com/dd/2014/05/21/importance-visual-content-deliver-effectively/> (30.07.2015).
- MÜLLER, M. G. (2003): Grundlagen der visuellen Kommunikation: Theorieansätze und Methoden. Konstanz: UVK-Verlagesellschaft.
- NEYMANN, H. (2008): Google. In: HACHMEISTER, L. (Ed.): Grundlagen der Medienpolitik: ein Handbuch. Bonn, Bundeszentrale für Politische Bildung.
- NIELSEN, J. (2011): How Long Do Users Stay on Web Pages? At: <http://www.nngroup.com/articles/how-long-do-users-stay-on-web-pages/> (19.07.2015).

- N.N. (2012): Mit "Genmais" gefütterte Ratten sterben früher. At: <http://diepresse.com/home/panorama/klimawandel/1292159/Mit-Genmais-gefuetterte-Ratten-sterben-frueher> (27.09.2015).
- N.N. (2014): Der Pokal ist endlich In: Deutschland. At: <http://www.bolle-und-ernst.de/2014/07/der-pokal-ist-endlich-in-deutschland-fotos/> (30.07.2015)
- N.N. (2015): meta- prefix. At: <https://en.wiktionary.org/wiki/meta-#English> (19.07.2015).
- N.N. (s.a.): Imperfect information. At: <http://www.businessdictionary.com/definition/imperfect-information.html> (30.07.2015).
- NÖTH, W. (2011): Visual Semiotics: Key Features and an Application to Picture Ads. In: MARGOLIS, E. (Ed.): The SAGE handbook of visual research methods. Los Angeles, CA: Sage.
- PAIVIO, A. (1971): Imagery and verbal processes. Imagery and verbal proces, New York, NY: Holt, Rinehart and Winston.
- PALENCHAR, M. J. and HEATH, R. L. (2007): Strategic risk communication: Adding value to society. Public Relations Review 33: 120-129.
- PETERSEN, J. (2015a): Bild-PR im Social Web: kreativ und emotional. At: <http://www.newsaktuell.de/blog/2015/04/23/bild-pr-social-web/#more-13480> (17.07.2015).
- PETERSEN, J. (2015b): Videos sind die besten Traffic-Booster. At: <http://www.newsaktuell.de/blog/2015/05/13/videos-sind-die-besten-traffic-booster/#more-13914> (17.07.2015).
- PETERSEN, J. (2015c): PR-Frühstück im Hamburger betahaus: "Wir sind alle Augentiere". At: <http://www.newsaktuell.de/blog/2015/02/19/pr-fruehstueck-im-hamburger-betahaus-wir-sind-alle-augentiere/#more-13393> (17.07.2015).
- PFAU, M.; HAIGH, M.; FIFRICK, A.; HOLL, D.; TEDESCO, A.; COPE, J.; NUNNALLY, D.; SCHIESS, A.; PRESTON, D.; ROSZKOWSKI, P. and MARTIN, M. (2006): The Effects of Print News Photographs of the Casualties of War. Journalism & Mass Communication Quarterly 83: 150-168.
- POORTINGA, W. and PIDGEON, N. F. (2004): Trust, the Asymmetry Principle, and the Role of Prior Beliefs. Risk Analysis 24: 1475-1486.
- REGIERUNGONLINE/KÜHLER (2007): G8 family photo in a wicker beach chair. At: <http://www.g-8.de/Webs/G8/DE/Medien/FotoDownload/2Gipfeltag/blaettern7d46.html?id=220204> (17.07.2015).

- ROUSU, M.; HUFFMAN, W. E.; SHOGREN, J. F. and TEGENE, A. (2004): Are United States Consumers Tolerant of Genetically Modified Foods? Review of Agricultural Economics 26: 19-31.
- ROWE, J. (2011): Legal Issues of Using Images in Research. In: MARGOLIS, E. (Ed.): The SAGE handbook of visual research methods. Los Angeles, CA: Sage.
- RÖSSLER, P. (2005): Inhaltsanalyse. Konstanz: UVK-Verlagsgesellschaft.
- SCHIMPF, M. (2014): GM food an the EU-US trade deal. At: http://www.foeeurope.org/sites/default/files/publications/gm_food_eu-us_trade_deal.pdf (01.05.2015).
- SCHLOSSER, A. E. (2003): Experiencing Products In: the Virtual World: The Role of Goal and Imagery in Influencing Attitudes versus Purchase Intentions. Journal of Consumer Research 30: 184-198.
- SCHRAMM, H. and KNOLL, J. (2014): Medienwirkungen. In: BLANZ, M. (Ed.): Kommunikation eine interdisziplinäre Einführung. 1. Aufl. ed. Stuttgart, Kohlhammer.
- SCHWEPPENHÄUSER, G. and FRIEDRICH, T. (2010): Bildsemiotik: Grundlagen und exemplarische Analysen visueller Kommunikation. Basel: Birkhäuser Verlag.
- SHAW, S. (1954): Marilyn Monroe, The Seven Year Itch. At: <http://www.shawfamilyarchives.com/work.php> (19.07.2015).
- SIEGRIST, M. (1999): A Causal Model Explaining the Perception and Acceptance of Gene Technology. Journal of Applied Social Psychology 29: 2093-2106.
- STATISTA (2015): Österreich - Internetnutzung nach Zweck und Geschlecht 2014 Statistik. At: <http://de.statista.com/statistik/daten/studie/298263/umfrage/internetnutzung-in-oesterreich-nach-zweck-und-geschlecht/> (19.07.2015)
- STEFFENHAGEN, H. (2008): Marketing: eine Einführung. 6., vollst. überarb. Aufl., Stuttgart: Kohlhammer.
- STENBERG, G. (2006): Conceptual and perceptual factors In: the picture superiority effect. European Journal of Cognitive Psychology: 1-35.
- SWINNEN, J. F. M.; MCCLUSKEY, J. and FRANCKEN, N. (2005): Food safety, the media, and the information market. Agricultural Economics 32: 175-188.
- SWINNEN, J. F. M. and MCCLUSKEY, J. J. (2006): Trade, globalisation and the media: Introduction. World Economy 29: 611-614.

- THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION (2001): Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC. Official Journal of the European Communities 106. At: http://eur-lex.europa.eu/resource.html?uri=cellar:303dd4fa-07a8-4d20-86a8-0baaf0518d22.0004.02/DOC_1&format=PDF.
- THE MELLMAN GROUP INC. (2004): The Pew Initiative on Food and Biotechnology: Overview of Findings: 2004 Focus Groups & Poll. At: http://www.pewtrusts.org/~media/legacy/uploadedfiles/wwwpewtrustsorg/news/press_releases/public_opinion_and_polls/PIFBPublicSentimentGMFoods2004pdf.pdf (14.05.2015).
- THE MELLMAN GROUP INC. (2006): The Pew Initiative on Food and Biotechnology: Review of public opinion research. At: http://www.gentechnikfreie-regionen.de/fileadmin/content/studien/umfragen/06_pew_biotech_report.pdf (12.05.2015).
- THE MELLMAN GROUP INC. and PUBLIC OPINION STRAGIES (2001): The Pew Initiative on Food and Biotechnology: Summary of findings "Public Sentiment About Genetically Modified Food". At: http://www.gentechnikfreie-regionen.de/fileadmin/content/studien/umfragen/01_pew_biotech_report.pdf (15.05.2015).
- THE MELLMAN GROUP INC. and PUBLIC OPINION STRAGIES INC. (2003): The Pew Initiative on Food and Biotechnology: Memorandum. At: http://www.gentechnikfreie-regionen.de/fileadmin/content/studien/umfragen/03_pew_biotech_report.pdf (15.05.2015).
- THE MELLMAN GROUP INC. and PUBLIC OPINION STRATEGIES INC. (2005): The Pew Initiative on Food and Biotechnology: Memorandum. At: http://www.pewtrusts.org/~media/legacy/uploadedfiles/wwwpewtrustsorg/news/press_releases/food_and_biotechnology/PIFBPublicSentimentGMFoods2005pdf.pdf (12.05.2015).
- TNS OPINION & SOCIAL (2005a): Special Eurobarometer 224: Europeans, Science and Technology.
- TNS OPINION & SOCIAL (2005b): Special Eurobarometer 217: The attitudes of European citizens towards environment.
- TNS OPINION & SOCIAL (2006): Special Eurobarometer 238: Risk Issues.
- TNS OPINION & SOCIAL (2008): Special Eurobarometer 295: Attitudes of European citizens towards the environment.






- TNS OPINION & SOCIAL (2010a): Special Eurobarometer 354: Food-related risks.
- TNS OPINION & SOCIAL (2010b): Special Eurobarometer 341: Biotechnology.
- TNS OPINION & SOCIAL (2011): Special Eurobarometer 365: Attitudes of European citizens towards the environment.
- TOKE, D. (2004): A Comparative Study of the Politics of GM Food and Crops. *Political Studies* 52: 179-186.
- TOLBERT, J. N. and RUTHERFORD, T. (2009): A semiotic analysis of biotechnology and food safety images in Time, Newsweek, and U.S. News & World Report. *Journal of Applied Communications* 93: 6-20.
- TORGERSEN, H. and BOGNER, A. (2005): Austria's agri-biotechnology regulation: political consensus despite divergent concepts of precaution. *Science and Public Policy* 32: 277-285.
- TROMMSDORFF, V. and TEICHERT, T. (2011): *Konsumentenverhalten*. 8., vollständig überarb. und erw. Aufl., Stuttgart: Kohlhammer.
- TRUMBO, J. (1999): Visual Literacy and Science Communication. *Science Communication* 20: 409-425.
- UNZ, D. and BLANZ, M. (2014): *Mediale Kommunikation und Massenkommunikation*. In: BLANZ, M. (Ed.): *Kommunikation eine interdisziplinäre Einführung*. 1. Aufl., Stuttgart: Kohlhammer.
- VAN LEEUWEN, T. (2011): Multimodality and Multimodal Research. In: MARGOLIS, E. (Ed.): *The SAGE handbook of visual research methods*. Los Angeles, CA: Sage.
- VENTURA, V. and FRISIO, D. G. (2015): How scary! An analysis of visual communication concerning genetically modified organisms in Italy. In: DEITERS, J., RICKERT, U. & SCHIEFER, G. (Eds.): *Proceedings of the 9th International European Forum on System Dynamics and Innovation in Food Networks*. Innsbruck-Igls, Austria.
- WAGNER, P. (2000): *Marketing In: der Agrar- und Ernährungswirtschaft*. Stuttgart: Ulmer.
- WARTENBERG, C. and HOLMQVIST, K. (2005): Daily newspaper layout - designers' predictions of readers' visual behaviour - a case study. *Lund University Cognitive Studies* 126. At: <http://www.lucs.lu.se/LUCS/126/> (07.07.2015).
- WEINGART, P. (1998): Science and the media. *Research Policy* 27: 869-879.

- WHITEHOUSE, A. J. O.; MAYBERY, M. T. and DURKIN, K. (2006): The development of the picture-superiority effect. *British Journal of Developmental Psychology* 24: 767-773.
- WRIGHT, T. (2011): Press Photography and Visual Rhetoric. In: MARGOLIS, E. (Ed.): *The SAGE handbook of visual research methods*. Los Angeles, CA: Sage.
- ZELIZER, B. (2006): Reflections Essay: What's Untransportable About the Transport of Photographic Images? *Popular Communication* 4: 3-20.

10 Annexes

10.1 Timetable

The workload is divided into five main sections:

	Concept writing		Master's thesis writing
	Literature research activities		Proof reading
	Data research activities		

A detailed structure of the timetable can be seen in Figure 24 and Figure 25.

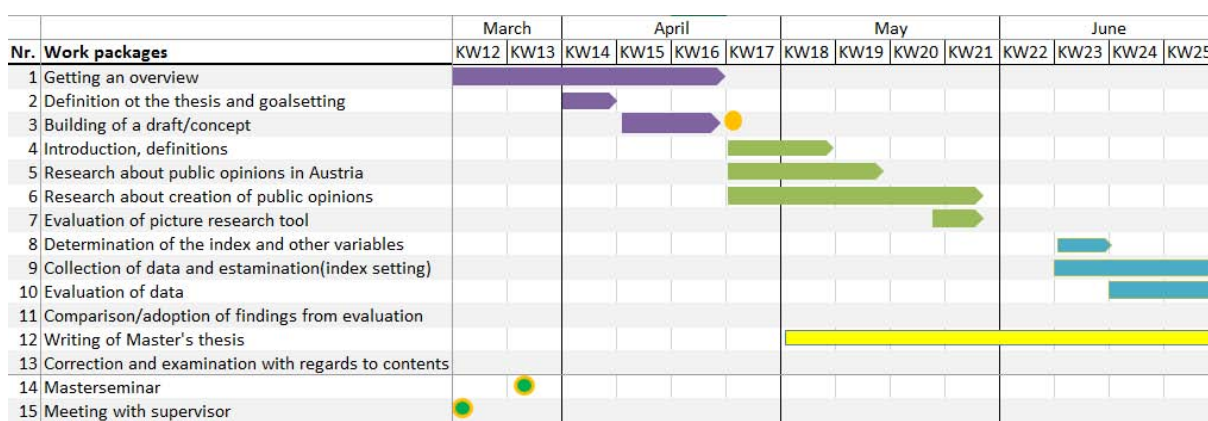


Figure 24: Timetable March until June 2015

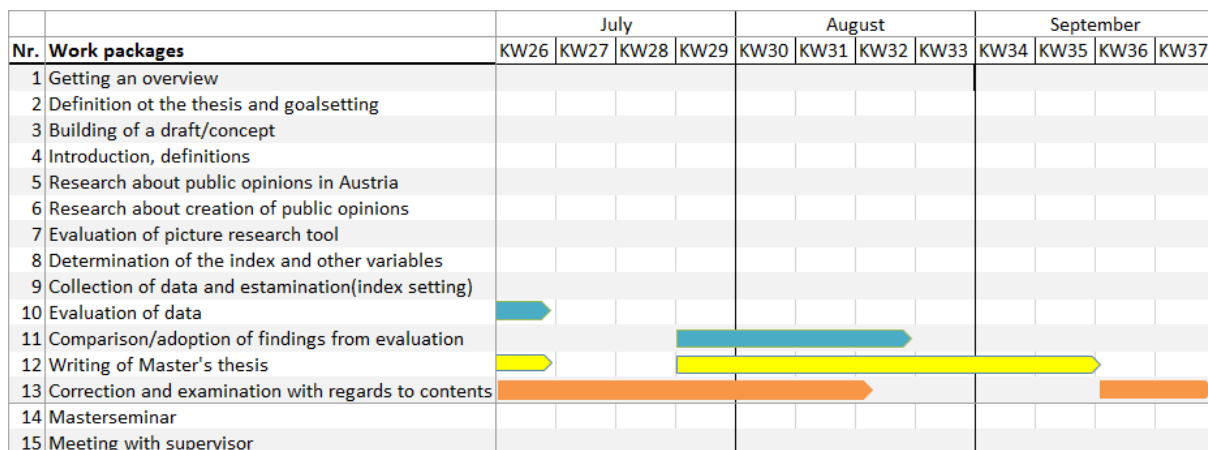


Figure 25: Timetable July until September 2015


10.2 Examples of websites: coding within the variables

Three different websites were taken as examples (Figure 26, Figure 27, Figure 28, and Figure 29). The coding is described in chapter 5 (Table 22, Table 23, and Table 24).

derStandard.at
Wissenschaft » Schwerpunktausgabe Gen
Wien 10°
International Inland Wirtschaft Web Sport Panorama Etat Kultur Wissenschaft Gesundheit Bildung Reisen Lifestyle Familie
Mensch Natur Raum Technik Welt Zeit Forschung Spezial Wissens-Blogs

"Genmanipulierte Pflanzen werden verschwinden"

17. April 2010, 12:53 7 POSTINGS



Keiner will Gentechnik, ist Marie-Monique Robin überzeugt.

Journalistin Marie-Monique Robin hält die Vorteile der Gentechnik in der Landwirtschaft für eine große - von der Agrarindustrie gestreute - Lüge

Standard: Liest man Ihr Buch oder sieht man Ihren Film, bekommt man den Eindruck, genmanipulierte Pflanzen wären das Werk des Teufels und die amerikanische Firma Monsanto, die sie herstellt, der Teufel selbst. Gibt es denn nichts Positives an der Biotechnologie?

Robin: Es gibt zwei Aspekte: einerseits die Biotechnologie, die im Labor passiert und dazu dient, neue Medikamente zu entwickeln. Daran ist nichts auszusetzen. Und andererseits die genmanipulierten Pflanzen im Feld. Die dienen nur dem Gewinn der Agrarindustrie - und nicht den Konsumenten, nicht den Bauern und nicht der Umwelt.

Standard: Ein oft vorgebrachtes Argument für genmanipulierte Pflanzen ist, dass die Erträge der Pflanzen höher sind und wir mehr Erträge brauchen, um die rasant wachsende Weltbevölkerung zu ernähren.

Robin: Das ist eine Lüge. Erstens produzieren wir mehr als genug Lebensmittel - das gibt sogar die FAO zu. Das Problem liegt vielmehr in der Verteilung der Nahrung und in den Marktsystemen. Man müsste zuerst darauf achten, dass die Bauern besser verdienen und keine Subventionen mehr brauchen. Lebensmittel sollten zu ihrem rechten Wert bezahlt werden. Zweitens hat eine Firma wie Monsanto mit der Ernährung der Weltbevölkerung aber auch rein gar nichts am Hut.

Standard: Was ist mit geringerem Input? Oft wird angeführt, dass genmanipulierte Pflanzen weniger Wasser, Platz, Pflanzen- und Insektenschutzmittel brauchen.

Robin: Auch das ist eine Lüge. Pflanzen und Insekten bauen Resistenzen auf. Dadurch braucht man immer mehr Input und Chemie, um aus den ausgelaugten Böden überhaupt etwas zu holen. In dem Fall besteht überhaupt kein Unterschied zur konventionellen Landwirtschaft. Das einzig Neue an der Dritten Grünen Revolution - wie man sie nennt - ist, dass es jetzt Patente gibt. Die Bauern dürfen ihre Samen nicht behalten, sondern müssen sie jedes Jahr neu kaufen - und zwar von Monsanto.

Standard: Nun sind gentechnisch veränderte Organismen längst unter uns. Unser Vieh wird mit ihnen gefüttert, und gerade erst hat die EU eine genmanipulierte Kartoffel zum Anbau freigegeben.

Robin: Letzteres erklärt sich dadurch, dass auch das Komitee, das die EU in Sachen Genmanipulation berät, zu 80 Prozent aus Leuten besteht, die alles andere als unabhängig sind. Und das mit dem Viehfutter stimmt zwar, wird sich aber nicht lange halten. Der französische Handelsriese Carrefour etwa kauft kein Fleisch von Tieren, die so ernährt wurden - weil sie wissen, dass der Konsument es früher oder später ablehnen wird.

Standard: Glauben Sie wirklich, dass der Widerstand in einer globalisierten Welt lange halten wird?

Robin: Ich war gerade in Minnesota und in Kanada. Ich kann Ihnen sagen, dass die Bauern dort alle aufhören wollen, gentechnische Pflanzen anzubauen.

Standard: Es stimmt also nicht, dass sich die sogenannte Grüne Gentechnik weiter ausbreitet?

Robin: Das behauptet die Industrie. Das Gegenteil stimmt. Genmanipulierte Pflanzen werden von selbst verschwinden, wenn alle Bauern erkannt haben, dass sie nichts bringen.

Standard: Das klingt optimistisch.

Robin: Mein Pessimismus bezieht sich auf die Böden. In Argentinien wurden Millionen Hektar mit genmanipuliertem Soja bepflanzt, das der Ernährung amerikanischer und europäischer Rinder dient. Es besteht die Gefahr, dass diese Böden endgültig unbrauchbar werden. Argentinien wird Milch und Fleisch importieren müssen. Dagegen hilft auch die Kampagne der Regierung nicht, die die Bevölkerung zu Sojamilch und Tofu überreden will.

(Georg Desrues, DER STANDARD/Printausgabe, 17.4.2010)

ZUR PERSON

Marie-Monique Robin (50), französische Aufdeckjournalistin und Regisseurin. Ihre Dokumentation Monsanto - Mit Gift und Genen, die sie für Arte drehte, wurde in zwanzig Ländern ausgestrahlt, das gleichnamige Buch in sechzehn Sprachen übersetzt. Immer wieder wird ihr vorgeworfen, dass weder im Film noch im Buch Verantwortliche der von ihr attackierten Firma zu Wort kommen. Was Robin damit erklärt, dass man ihr jede Auskunft vonseiten Monsanto verweigert hätte.

Das aktuelle Kinoprogramm finden Sie auf derStandard.at/Kino

Feedback

[derStandard.at/Wissenschaft auf Facebook](#)
[Newsletter abonnieren](#)

Figure 26: Screenshot of example 1



© Fotolia

24.06.2015

Biene Maja in Gefahr?

„Wenn die Biene einmal von der Erde verschwindet, hat der Mensch nur noch vier Jahre zu leben“ – so ein angebliches Zitat von Albert Einstein. Was ist dran an dieser Aussage? Wie bedeutend sind die Bienen für Umwelt und Mensch? Welche Produkte liefert das Bienenvolk?

Seit einigen Jahren sorgen die Bienen für Gesprächsstoff. Vor allem das Bienensterben ist in aller Munde. Im Zusammenhang mit dem Bienenrückgang wird auch die Gefahr für die Menschheit diskutiert. Warum? Bienen sind von immenser Bedeutung für unser Ökosystem und für unsere Ernährung, denn sie sorgen für die Bestäubung der meisten Wild- und Kulturpflanzen. Gemeinsam mit anderen Insekten wie Käfer, Fliegen und Schmetterlinge verantworten sie, dass sich rund 80 % der Blütenpflanzen vermehren. Neben Rindern und Schweinen zählt man die Bienen somit zu den wichtigsten Nutztieren. Schätzungen zufolge beträgt der jährliche, weltweite Wert der Bestäubung durch die Honigbienen für die menschliche Ernährung rund 153 Millionen Euro.

WISSENSWERT

Um die 30.000 Bienenarten sind weltweit bekannt. In Österreich glüht es neben den Honigbienen (*Apis mellifera*) rund 700 Wildbienenarten. Wildbienen werden im Gegensatz zu Honigbienen nicht nachgezüchtet. Wenn eine der 700 Arten verschwindet, kann man das nicht mehr rückgängig machen.

Was ist dran am Bienensterben?

Schwankungen in der Anzahl der Bienenvölker sowie Herausforderungen im Umgang mit dem Bienenrückgang gibt es seit eh und je. Die Ursache für den Bienenrückgang ist komplex und vielschichtig. Aufgrund von Monokulturen und immer weniger blühenden Wiesen verlieren die Bienen Nahrung und Lebensraum. Das wird als eine der Hauptursachen diskutiert. Zu den Feinden beziehungsweise möglichen Gefahren zählen aber auch Krankheiten und Parasiten wie die Varroa-Milbe, der Einsatz von Chemikalien und gentechnisch veränderte Organismen sowie die Klimaveränderung und der Rückgang der Bienenhaltung.

Laut Stephan Lorenz und Kerstin Stark, Autoren des Buches „Menschen und Bienen: Ein nachhaltiges Miteinander in Gefahr“, ist ein allgemeines Bienensterben jedoch nicht zu befürchten – zumindest nicht in absehbarer Zeit. Zudem kann man die Frage, ob ein Bienenrückgang für die menschliche Existenz bedrohlich ist, objektiv nicht feststellen. Dafür sind zu viele Einflussfaktoren miteinander verwoben. Fakt ist allerdings, dass Bienen wesentlich sind für unsere Nahrungssicherung und dass ein mögliches Bienensterben ökologische Gefahren mit sich bringt. Die Bienengefährdung sollte daher als reales Problem anerkannt und die genauen Ursachen sowie Zusammenhänge zwischen ökologischen, ökonomischen und sozialen Aspekten genauer beleuchtet werden (siehe Buchtipp unten).

Was kann jeder Einzelne tun?

Vielfalt ist das Zauberwort: Pflanzen sind die Nahrung für die Bienen. Sei es das Blumenkistl am Balkontisch oder die blühenden Gärten und Wiesen. Generell gilt: Je mehr Pflanzen auf einer Fläche blühen, umso mehr Bienenbesucher. Das gilt nicht nur für den ländlichen, sondern auch für den städtischen Raum. Die Städte bieten den Bienen einen bunten Speisezettel und die Diversität an Blüten ist in der Stadt sogar größer als am Land. Auch das Interesse an Imkern steigt im urbanen Raum und so bieten immer mehr Städte darunter New York, Paris, Berlin, aber auch Wien Bienen ein neues zu Hause, zum Beispiel auf dem Dach der Wiener Volks- und Staatsoper.

Produkte des Bienenvolkes

Das mit Abstand wichtigste Produkt der Honigbienen ist der Honig. Er ist weltweit in vielen Esskulturen beliebt und wurde bereits in der Steinzeit konsumiert. Bereits vor 12000 Jahren wurde wilder Honig gesammelt. Das ist einer Höhlenmalerei aus der Gegend rund um Valencia in Spanien zu entnehmen. Und erstmals gehalten wurden Bienen vor circa 7000 Jahren in der Türkei. Wie entsteht Honig? Im ersten Schritt nehmen die Bienen Blütennektar, Pflanzensäfte oder Honigtau, eine zuckerreiche Absonderung von Blattläusen, auf. In weiterer Folge versetzen sie dieses Gemisch mit enzymhaltigen Sekreten und sammeln es in Waben. In diesem Gebilde aus Bienenwachs reift dann der Honig, bis er von den Imkern geerntet wird. Für 1 g Honig sind übrigens rund 8000 bis 10.000 Blütenbesuche notwendig. Ungerechnet bedeutet das: Das Lebenswerk einer Biene ist ein Teelöffel Honig!

WISSENSWERT

Frisch von der Wabe ist Honig klar und flüssig; im Lagerungsprozess kristallisiert Glukose und der Honig wird fester. Trocken gelagert und vor Licht geschützt ist Honig über ein Jahr gut haltbar. Will man ihn wieder verflüssigen, erhitzt man ihn im Wasserbad. Die Temperatur sollte aber 50 °C nicht überschreiten, weil sonst wertvolle Inhaltsstoffe wie Enzyme zerstört werden.

VERWANDTE ARTIKEL

1. Essbare Insekten: Ist die Zeit reif?
2. Fisch in der Hauptrolle?
3. Lebensmittel richtig lagern
4. Restl-os einkaufen
5. Foodsharing – Essen verschenken statt entsorgen

VERANSTALTUNGSKALENDER

< Oktober 2015 >

Mo	Di	Mi	Do	Fr	Sa	So
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4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

ALLE TERMINE F.H.-TERMINE

NEWSLETTER

Vorname*

Nachname*

E-Mail*

ANMELDEN

GLOSSAR

G wie Glossar

Wir bieten von Adipositas bis zur Zentralmatura Aufklärung und Wissenswertes

MEHR

Photo: stockphoto.com



Figure 27: Screenshot of example 2 (1st part)

Honig besteht zu 70-80 % aus Zucker, vorwiegend Frucht- und Traubenzucker. Gut 20 % sind Wasser. Daneben enthält er geringe Mengen anderer Zuckerarten, Mineralstoffe, Spuren von Vitaminen, Eiweiße und Enzyme sowie zahlreiche Aromastoffe. Sein charakteristisches Aroma erhält er durch den Nektar und die Pollen von unterschiedlichen Blüten. Somit findet man neben Akazienhonig auch Orangen-, Lavendel- oder Löwenzahnhonig und viele andere mehr. Die Vielfalt spiegelt sich auch in den Farben, dem Aroma und der Konsistenz wider. Es gibt hellgelbe, sehr milde und dünnflüssige Honige über goldgelbe, aromatische und sehr dickflüssige bis hin zu grünschwarzen, sehr würzigen und zähflüssigen Sorten.

Kann Honig Wunden heilen?

Laut aktuellem Stand der Wissenschaft trifft das möglicherweise zu: Honig verstaft also nicht nur Tee und Brot, er hat auch Potenzial, leichte Verbrennungen schneller zu heilen. Die heilende Wirkung des „Medihoney“ ist dabei auf mögliche antibakterielle Inhaltsstoffe zurückzuführen. Die Heilkraft für den Einsatz bei anderen Wunden ist allerdings nicht bewiesen.

In der Apitherapie behandeln Mediziner Patienten mit Erschöpfung, Appetitmangel und Gewichtsverlust durchaus erfolgreich mit Honig, Pollen, Gelée Royale, Bienenzwachs und Propolis.

Produkte aus dem Bienenvolk

Produkt	Eigenschaften
Honig	siehe oben
Blütenpollen	Pollen sind für die Bienen wichtigste Eiweißquellen. Für den Menschen sind die Pollen ein funktionelles Nahrungsmittel, dem viele therapeutische Wirkungen nachgesagt werden.
Propolis	...auch Harz genannt. Ist eine klebrige Masse, die von Bienen auf Bäumen gesammelt wird. Es wird als Arzneimittel verwendet und besitzt antibakterielle sowie entzündungshemmende und antioxidative Eigenschaften.
Gelee royal	...ist der Futtersaft, mit dem Bienen ihre Königinnen aufziehen, und kann auch als Lebensmittel für Menschen verwendet werden.
Met	Honigwein
Bienenzwachs	...dient als Verfestigung für Schrifttafeln und für die Beleuchtung mit Kerzen. Wachs kommt auch in der Medizin zum Einsatz.

Buchtipps



Lorenz S. Stark K: Menschen und Bienen
Ein nachhaltiges Miteinander in Gefahr
oekom verlag München (2015)
246 Seiten, gebunden,
ISBN-15: 978-3-86581-713-6
Preis: € 30,80

Die Autoren Stephan Lorenz und Kerstin Stark beleuchten den Zusammenhang zwischen Biene und Mensch mit Beiträgen aus unterschiedlichen Disziplinen wie Ökologie, Soziologie und Politik. Dabei treffen Wissenschaft auf Praxis, Natur- auf Sozialwissenschaften, Agrar- auf Kulturwissenschaften und Industrie auf Naturschutz. Damit wird den Lesenden eine ganzheitliche Perspektive ermöglicht und die Mannigfaltigkeit der Thematik aufgezeigt. Es geht um die Verbindung von Bienen und Menschen, den gesellschaftlichen Nutzen der Bienen sowie die Praxis der Bienenhaltung seit Jahrtausenden.

Mehr zum Thema finden Sie diese Woche (20. – 26. Juni 2015) auch, im [ORF](#) und auf [Ö1](#) unter der Schwerpunktreihe: „Mutter Erde“ Summen Sammeln für die Bienen.

Literatur

Brockhaus: Ernährung – gesund essen, bewusst leben. Brockhaus Verlag, Göttersloh, 4. Auflage. [2011].

Lorenz S. Stark K: Menschen und Bienen Ein nachhaltiges Miteinander in Gefahr oekom verlag München [2015].

Medizin transparent: Honig zur Wundheilung? www.medizin-transparent.at/honig-zur-wundheilung [Zugriff 21.06.2015]

Petersen D: Natürliche Süße mit Charakter. UGB Forum 3(13): 1-3 [2013].

www.muttererde.at/ [Zugriff 20.06.2015].

www.ages.at/themen/umwelt/bienen/honig-und-bienenprodukte/ [Zugriff 20.06.2015].

WIR ÜBER UNS	KALENDER	MAGAZIN	SHOP	PRESSE	SERVICE
TEAM		ABO LOGIN		PRESSEMELDUNGEN	KONTAKT
KURATORIUM		ARCHIV		MEDIENECHO	NEWSLETTER
PARTNER					LINKS
					DOWNLOADS
					GLOSSAR
					SITEMAP

Figure 28: Screenshot of example 2 (2nd part)

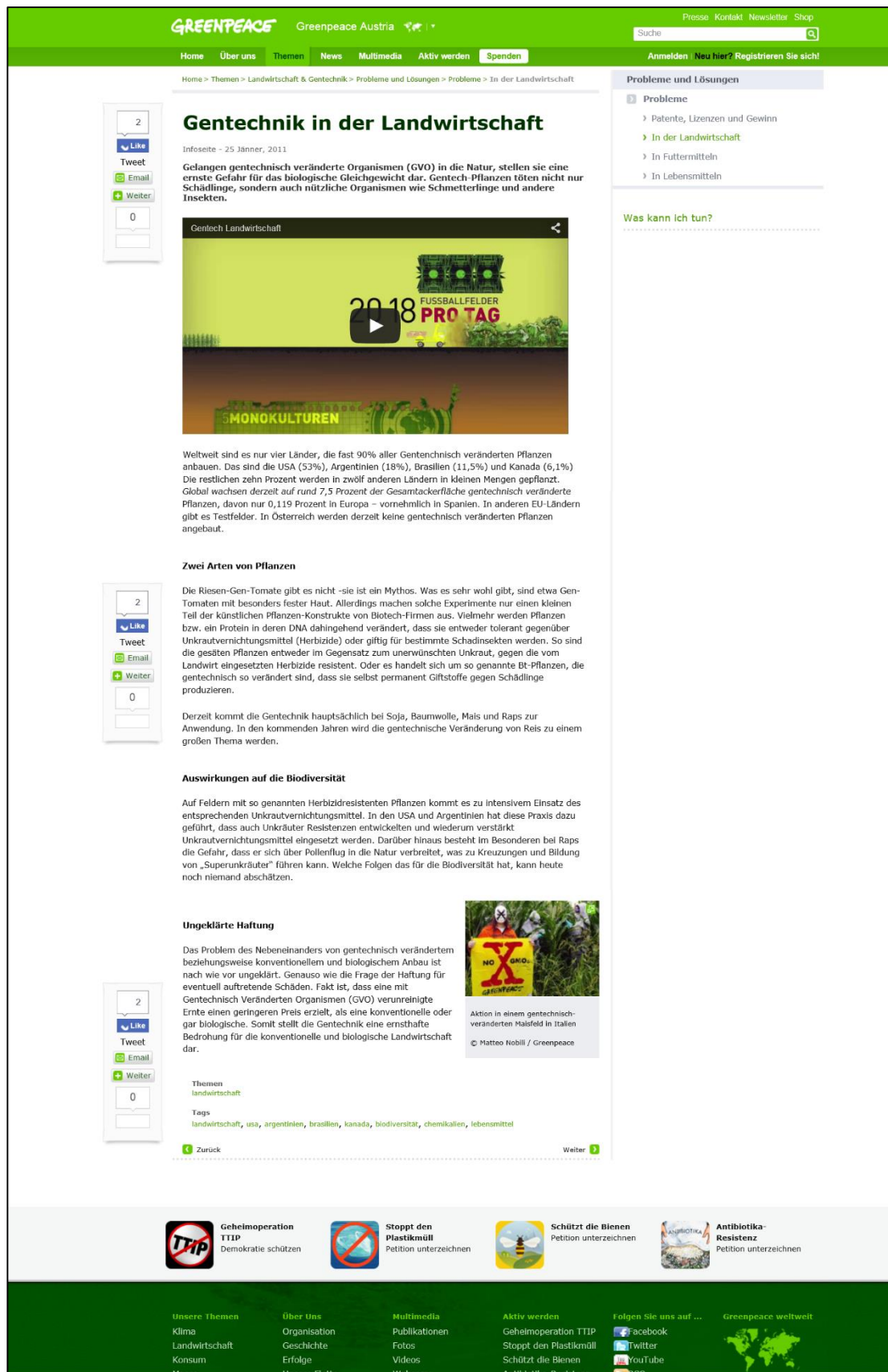


Figure 29: Screenshot of example 3