

The Role of Public Relations and Mass Media in Influencing Public Attitudes to Genetically Modified (GM) and Organic Foods

Nuha Obaid ALMohammadi

The Cardiff School of Journalism, Media & Cultural Studies, Cardiff University
Nohaksa2008@gmail.com

Abstract

Purpose: To investigate the role of public relations and mass media as an influence on public attitudes about GM and organic foods.

Design/Methodology: The study involved a comprehensive analysis of four prominent UK newspaper articles, which discussed the topic of GM and organic foods. Key Informant Interviews (KIIs) were carried out with specialists in different areas of interest regarding the topic of GM and organic foods. Public attitudes and knowledge of GM and organic foods were explored by conducting Focus Group Discussions (FGDs) and reviewing relevant literature from two existing studies in 2009 and 2010.

Originality/Value: This study will establish a balanced inquiry into the role of public relations and mass media when it comes to explaining GM and organic foods to the public. Hence, the study offers empirical evidence derived from credible studies as well as a rigorous analysis alongside the significant insight and knowledge of key figures in the fields of science, public relations, media, and journalism, and that of common UK folk.

Findings: This study found that while public knowledge of GM and organic foods varied, there was no doubt about the influence of public relations on the journalism industry. Interestingly, newspapers' influence on public attitudes toward GM and organic foods was not strong.

Limitations: The main limitations within this study were sample size related to FGDs. Ideally, a much larger number of participants would be helpful in supporting the hypothesis of this study.

Introduction

Food consumption has seen a rapid increase in recent years, ascribed to the precipitous growth in world population. Because of this, food production has also intensified, paving the way for contemporary food manufacturing practices assisted by advanced technology.

The most state-of-the-art of these manufacturing practices includes cultivating genetically modified (GM) crops as well as developing organically grown food. Both modern genetic technology and organic agriculture have been widely debated, with the latter often perceived to be better than the former.

Burton et al (2001) believe that the public deems genetically modified crops and food to be harmful or unhealthy, attributing their opinions to the seemingly unnatural process by which GM foods are produced. Lockie (2006) believes this perception is largely due to the way the media represents GM and organic foods, with the former often being portrayed as artificial, while the

latter is rendered natural. Both are discussed and presented to a nominal extent in mainstream media.

Villella-Vila and Costa-Font (2008, p. 2095) point out that there are many suppositions regarding the media's direct influence on attitudes and risk perceptions. While some approaches indicate that the media has played a part in the perception of risks, particularly for GM foods, others believe this happened because many articles referring to GM and organic foods in the media amplify the effect of any negative points they may make (ibid). Simply put, public perception of food production strategies is influenced, not just by its presence on various mass media platforms, but also by exposure to the sheer volume of these news articles. In contrast, other academics believe that the effects of media on public opinion are neutral, and that the role of media is not to persuade but merely to communicate or convey information.

The mass media has long been an established platform the public usually relies on to gather information on current events and vital aspects of their daily lives such as culture, politics, education, and health. The media has a wide reach, which suggests that it can educate and influence various audiences instantaneously. Herman and Chomsky (1988) note that:

The mass media serve as a system for communicating messages and symbols to the general populace. It is their function to amuse, entertain, and inform, and to inculcate individuals with the values, beliefs, and codes of behavior that will integrate them into the institutional structures of the larger society. In a world of concentrated wealth and major conflicts of class interest, to fulfil this role requires systematic propaganda.

The media utilises prominent and powerful channels such as radio, television, newspapers and magazines, and social media such as Facebook, Twitter, and Instagram to attain these ends. As such, a great deal of responsibility and accountability is demanded from media owners, authors, public relations (PR) practitioners, journalists, and influencers, especially in terms of maintaining an objective standpoint in creating and publishing content, as the media remains not only a pivotal source of data but also a vital stimulus that can sculpt and mould the minds of its readers and viewers.

Conversely, due to an apparent lack of monitoring, guiding mechanisms, and set standards, the media continues to exhibit piecemeal reporting, particularly in science and other related fields. PR professionals working with the media should ensure that they only write or discuss matters that they are conversant about and for which they can provide evidence in any media setting. This would necessarily involve an increase in the number of journalists and PR practitioners with scientific backgrounds who can confidently assess the evidence and publish information with scientific backing to properly inform the public. This is necessary in areas

related to concerns of the public about health and GM and organic foods.

1- Statement of the Problem and Objectives

Hence, the researcher asks, “How does exposure to, or use of, public relations information in four prominent UK broadsheets influence the public’s perceptions of: a) GM foods, and b) organic foods?”

To answer this, the following objectives have been set in place as guide during the conduct of this study:

- To explore how the public perceives genetically modified organisms (GMOs/GMs) and organic foods and crops;
- To explore the role of public relations and mass media, specifically newspapers/broadsheets, in influencing the UK public’s attitudes and perceptions of GMOs/GM/organic crops;
- To identify the primary mass media channels utilized by the public when accessing information regarding GM and organic foods; and
- To determine how GM and organic foods are portrayed in published news articles;

Through a rigorous content analysis of GM and organic food-related newspaper articles in the first six months of the periods between 2003-2004 and 2015-2016, the researcher expects to determine the precise way in which the mainstream media portrays the subject matter. To uphold and ensure an objective disposition on this inquiry, the researcher will also employ and study relevant theses and literature that can support the discussion. This study made use of secondary data from two existing studies in the literature review, which will be examined extensively to support the research findings. The results of these studies will provide knowledge and insight into public attitudes towards GM and organic foods. One of the studies was commissioned by the Food Standard Agency (FSA) (2009) and addressed public attitudes to GM foods. The other study conducted a survey of the general public (2010) to investigate consumer attitudes towards organic foods. This study made use of primary data by conducting focus group discussions (FGDs) with different age groups to produce more data regarding the influence of newspapers on public perception of GM and organic foods. Furthermore, key informant interviews (KIIs) will be conducted with experts from the fields of public relations, communications, health, and science to reinforce and validate the key findings of the comprehensive content analysis and literature review.

2- Defining the research terms (GM and Organic Foods)

There is an enormous amount of information regarding the history and evolution of genetically

modified organisms (GMOs) and GM foods. Many organizations such as the World Health Organization (WHO), Greenpeace, and Friends of the Earth Europe chart the origins of this topic and provide clear definitions of GMO/GM foods. First, the World Health Organization ([no date]) describes GM foods as:

Foods derived from organisms whose genetic material (DNA) has been modified in a way that does not occur naturally, e.g. through the introduction of a gene from a different organism.

While at the time of writing, GM foods available were mostly from plants, the World Health Organization ([no date]) also mentions that it is possible to also have foods derived from genetically modified microorganisms and animals introduced to the market. Also, according to WHO, “Most existing GM crops have been developed to improve yield, through the introduction of resistance to plant diseases or increased tolerance of herbicides (ibid).”

Greenpeace (2016) describes genetic engineering (GE) as that which “enables scientists to create plants, animals and micro-organisms by manipulating genes in a way that does not occur naturally”. Friends of the Earth Europe ([no date]) goes further in discussing the risks of GM crops on humans and the environment and how corporate organizations place pressure on the traditional food industry to accept the introduction of GM products.

Many publications studied in this research also provide clear definitions of terms related to GMO/GM foods and help create a clearer picture of this topic. For example, The Oxford Dictionary of Science (2009, p. 32) describes biotechnology as:

The development of techniques for the application of biological processes to the production of materials of use in medicine and industry. For example, the production of antibiotics, cheese, and wine rely on the activity of various fungi and bacteria. Genetic engineering can modify bacterial cells to synthesize completely new substances, e.g. hormones, vaccines, monoclonal antibodies, etc.

For researchers Blair and Regenstein (2015), genetic engineering (GE) is defined as:

The manipulation of an organism’s genes by interdicting, eliminating or rearranging specific genes using the methods of modern molecular biology, particularly those techniques referred to as recombinant deoxyribonucleic acid (rDNA) techniques. This method uses laboratory techniques to introduce specific changes into the genetic code located within the cells so that the succeeding generations possess desired features.

The Soil Association ([no date]) describes organic products as those with fewer pesticides, no artificial colours and preservatives, the highest standards of animal welfare, and no routine use of antibiotics.

The Food and Agriculture Organization of the United Nations (2017) refers to an organic agriculture system as that which enhances the agro-ecosystem such as biodiversity, biological cycles and soil biological activity. It encourages the use of management practices while taking

into consideration the requirement of regional conditions and taking locally adapted systems, which are opposed to the use of synthetic materials (ibid). For Cahill et al (2010, p. 710) organic foods are “those grown, raised, processed without the use of synthetic pesticides and fertilizers and without the use of growth hormones and genetic engineering.”

Different opinions and values about GM and organic foods and the influence of the media and public relations on the topic will be discussed in detail in the succeeding sections of the literature review.

3- Theoretical Framework and Literature Review

3-1 Brief Background on GM and Organic Foods

There is a great deal of empirical writing in the literature, both online and offline, regarding genetically modified organisms (GMOs). Such literature often highlights the fact that the idea of using GMOs to improve farming yields has gained momentum in recent years. Aside from this, considerable information on the internet suggests that more people want to learn about the topic. This interest is revealed by data showing an increasing number of searches for ‘GMO’ on Google starting in late 2012 (GMO Search Term 2015).

A. Early Biotechnology

For Wilson et al (1999, p. 59), the idea of GMOs is not particularly new, and humans have been finding ways to modify and improve livestock and vegetation for hundreds of years. Archaeologists discovered that 10,000 years ago, our ancestors’ habits gradually shifted from hunting and gathering to farming using domesticated crops and plants and raising livestock (ibid). According to Rangel ([no date]), it is likely that in the past, our ancestors already had the ability to influence DNA, even though they did not understand genetics. They could change the DNA of succeeding generations of organisms by using artificial selection or selective breeding which is where they would choose plants with the most desirable characteristics and cross breed them so that the resulting body continued to propagate the desired features (ibid). Humans seem to have used an earlier version of genetic modification on crops and livestock, which is aimed at achieving an improved state of animal and plant characteristics or to find ways to resist disease, especially in times of severe weather conditions such as drought and low temperature (Rowland 2002, p. 25).

B. Benefits and Challenges of GM Food

Many scholars have discussed the advantages and disadvantages of GMOs and GM crops (Arntzen et al 2003; Azadi and Ho 2009; Ronald 2011; Shiva 2014; Ho 1999; Hug 2008; and Uzogara 2000). According to Arntzen et al (2003, p. 839), farmers who lose their crops as a result

of brutal weather conditions can realize more benefits by using the technology of genetic engineering. Conventional breeding and organic farming should coexist with GM farming to help change African and Asian agriculture (ibid). GM crops could be important in the quality of food production for lands because they help prevent pathogens and pests and protect crops from challenging weather conditions (ibid p. 839-840).

Similarly, Ronald (2011, p. 11), in his introduction of genetically modified (GM) crops, argues that genetic modification is the ideal tool for global food security and can address many challenges the world faces such as those of increasing population, climate change, and shrinking environmental resources. Ronald also believes that the amount of arable land is limited and is constantly being reduced because of urbanization, salinization, desertification and environmental degradation. As a result, it is not sensible to develop more land for cultivation to meet global demand. Moreover, the severely strained water systems in different parts of the world also prove to be a challenge in creating and maintaining agricultural development.

However, there are also those who pose valid concerns regarding the use of genetic modification and engineering. Azadi and Ho (2009, p. 162), for example, believe that the main concerns with genetic engineering in foods are not only those of safety, allergenicity, toxicity, carcinogenicity, and quality of foods, but also that of the environment. They note that cultivation of GM crops could result in changing the ecological systems of plants and, as a result, the rise of secondary pests.

Furthermore, Shiva (2014, p. 268) and Ho (1999, p. 136) claim that the introduction of genetic engineering (GE) is nothing but a false solution for feeding the world that results in destroying biodiversity with its sources of nutrition. For them, industrial agriculture systems globally are driven by maximizing profits without considering the nutrition of the foods.

In their study, Azadi and Ho (2009, p. 162) state that while consumers, especially those in the developing countries, should have the right to access information about the benefits and risks of GM technology, this is often not the case, and thus, another cause of concern. The researchers also note that in a survey to test Chinese consumers' knowledge of GM foods, only 18% of respondents could answer questions about the difference between GM foods and non-GM foods. Further, the study found that up to 68% of respondents were unable to name any GM crops. Most of the Chinese consumers surveyed did not deem GM crops as a threat to other crops.

In terms of health issues related to GM, Hug (2008, p. 90) contends that use of GMOs could result in potential health risks such as cancer. Hardell and Eriksson (1999, p. 1356) attribute this to GM crops supposedly having higher pesticide residues compared to non-GM crops. One of the main

ingredients of some pesticides is glyphosate, which has been associated with increasing instances of Non-Hodgkin's Lymphoma (ibid). Furthermore, according to the National Research Council (1996, cited in Shrader-Frechette 2005, p. 139), the use of legal pesticide residues on US foods could cause an increase of one-million early, fatal cancers in the next 75 years. Researchers also believe that food supplements such as L-tryptophan, which is produced by genetically engineered bacterium, was responsible for 37 deaths and disabilities among American citizens (Fagan 1997). Uzogara (2000, p. 182) introduced the main GM crop criticism, that the use of GM techniques for human food production could have several adverse consequences. These criticisms involve, safety, ethical, religious, and environmental concerns and he thinks they are more important than improving food quality, increasing food production, and improving agriculture (ibid).

C. Benefits and Challenges of Organic Food

There has been widespread demand for organic production in recent years (Anderson 2016), which may be attributed to the controversial issue of genetic modification in food in the past decade. Nevertheless, there is still speculation about the real benefits of organic products in comparison to non-organic products. Hickman (2002) claims that many dedicated organic food eaters believe that organic farming will be kinder to the earth and offer kinder living conditions for animals. According to the British Journal of Nutrition (1014, p. 794), organic crops contain lower levels of pesticide residues and toxic metals such as cadmium compared to non-organic crops. The European Food Information Council (2013) confirms that the restriction on the use of synthetic pesticides and fertilizers in the production of organic food is one reason why consumers think organic foods are better.

A Newcastle University study of organic fruit and vegetables conducted by Professor Carlo Leifert (2014) reports that organic food has as much as 60% more antioxidants than is found in conventional crops.

Organic dairy has also been found to contain higher levels of omega-3 fats (up to 50 per cent higher according to a 2016 European study) and is much lower in saturated fat. This is unsurprising given that organically reared; free-range animals roam more and are, therefore, less fat (*The Telegraph* 2016).

However, Avery (1999, p. 3) believes that organic farming is unsafe for health as well as for the wildlife of the world and that organic farming could result in soil erosion because it needs more land to produce a given amount of food. Aside from this, having a strictly organic-food diet can be quite harmful. While daily consumption of fruit and vegetables can help one avoid cancer, the financial costs of a strictly organic diet may impede one's dietary choices. There is also a risk that wild species may become extinct because of biological controls in organic farming (ibid).

In a study sponsored by the Department for Environment, Food and Rural Affairs (DEFRA),

Johnston (2008) notes that organic milk production, compared to traditional milk production, is harmful to the environment. This process of milk production creates more green house gas emissions (GHGS) as it needs 80% more land to produce a litre of organic milk, which is likely to lead to a 20% potential increase in global warming and cause a 70% increase in acid rain (ibid). Smith-Spangler et al (2012, p. 348) report in the *Annals of Internal Medicine* that 223 studies strongly criticized the possible benefits of organic foods on health. These arguments claim that “The published literature lacks strong evidence that organic foods are significantly more nutritious than conventional foods.”

3-2 Current Policy on GM and Organic Foods

Globally, there has been a steady increase in the production and use of GM crops, particularly after the first production of plantings in North America at the end of the 1990s (UK Government 2015). In 2014, 18 million farmers from 28 countries used 181-million hectares to grow GM crops; this comprises 13% of the world’s arable land (ibid). Since eating a healthy diet is an important subject for many citizens, the United Kingdom, along with various other European governments, set strict policies and guidelines to regulate the use and development of GMOs.

The UK government supports the use of GM crops only if they are safe for human consumption and the environment. Moreover, the decision-making process must be evaluated on a case-by-case basis, to consider the scientific evidence to back up these decisions (UK Government 2015). In particular, DEFRA, an independent committee in the UK, is working to ensure the safety of products and helping to define the issues surrounding the use of GMO technology (ibid).

In the UK, there is a ban on commercially growing GM crops, and most GM crops enter the country as animal feed (Gene Watch [no date]). However, the UK’s government has recently allowed trials of GM crops such as GM potatoes, wheat and *Camila Sativa*. In other EU countries, GM crops can enter as food, animal feed, and biofuels. GM food and feed also must be labelled and checked by EU regulators (ibid). However, there is no need to label dairy products and meat, which are from animals fed on GM feed (ibid). According to the US Library of Congress (2015), the UK and EU governments have taken a restrictive approach regarding the use of GMOs at the environmental level. Said approach requires a formal authorization, whether at the UK or EU level, if anyone wants to release GMOs into the environment. In England and Wales, the Secretary of State is responsible for regulating the process and ensuring the sustainability of the environment.

From another perspective, the European Council of Agricultural Ministers imposed a new Council Regulation in 2007 regarding organic production (European Commissions 2007). The new

regulation encourages the development of organic farming with the overall aim of respecting natural systems and limiting the resources of GMOs to ensure sustainability and therefore giving attention to more biodiversity. Products can only be labelled as organic if at least 95% of their farming ingredients are organic.

3-3 Public Perception of GM Foods

There is a considerable amount of written literature regarding public attitudes towards GM and organic foods. Many researchers have been interested in whether the public has access to sufficient information regarding GM and organic foods to make an informed decision about their food choices.

Since 2003, GM foods have caused intense discussion and debate among different interest groups, which also sparked the informal but intensely different passions concerning GM and organic foods. As stated in a 2004 study:

The concerns of European consumers about the potential health and environmental threats of GM crops [had] resulted in an unprecedented effort to investigate those anxieties and communicate with the wider public, particularly in the UK, where the use of public consultation has been extensively developed (Burke 2004).

A series of studies and evaluations were then launched to determine the scientific, social, and ethical implications of sowing and harvesting GM crops. These efforts were galvanised by a statement released earlier in the year from the British government stating, “There is no scientific case for a blanket approval of all uses of GM...equally there is no scientific case for a blanket ban on the use of GM.” However, the government also considered public apprehensions noting, “Most people believe that the use of genetic modification should be approached with caution. They want strong regulation and monitoring...” This implied that most British consumers felt dubious about the increase of genetically modified crops and food, which, at the time, witnessed a sudden rise in markets outside the UK such as the United States and China, leading to a shift in focus from the nature of the innovation to its safety and suitability for human consumption (ibid). The negative aspects of GM foods have gained attention, with 48% of the US population believing that genetic engineering causes serious health problems, even though there are many claims regarding the safety of GMOs (Gallup 2013). Amid increasing attention on GM foods, varying opinions on it are being voiced. Many people in the highest levels of the government supporting its production and use while others are strongly against the whole idea. Morris and Bate (1999, p. 58) point out that governments in countries such as Australia, Canada, China, and Japan have supported the research in this area and consequently encourage the commercial growing of GM foods. Curtis et al (2003) report that recent studies in China and Colombia found that Chinese consumers were more willing to pay for GM products over non-

GM alternatives. They were willing to pay a 16% premium for GM soybean oil and a 38% premium for GM rice. Meanwhile, Colombian consumers on average were readier to accept and try GM products, particularly those who did not have proper-quality foods at home .

Fernandez-Cornejo and Caswell (2006) note that since genetic engineering was introduced ten years ago, there has been a surge in GE markets, with many varieties of GE products such as cornmeal, oils, sugars and other food products being commercially available for American citizens. It is supposed that as much as 60% of food bought in US supermarkets is derived from transgenic crops (Bailey 2002, p. 105). Moreover, farmers have widely adopted the use of GE; many of them believe in its environmental benefits, as well as its contributions to better time management and improved quality of products (Fernandez-Cornejo and Caswell 2006). In the United States, the US Food and Drug Administration regards GE foods as “substantially equivalent” to non-GE foods, and therefore there is no need to label foods containing GE products. In contrast, the public in Britain and EU countries still have great concerns over GM foods and their possible detrimental consequences. *The Economist* (2010) notes that “In Europe, opposition to GM foods appears as strong as ever, despite increasingly strident scientific dissent.” This opposition is backed up by organizations such as Greenpeace and other environmentally concerned groups that denounce the technology and were delighted to see a decline in GM crop cultivation by a tenth in Europe in 2009 (ibid).

According to a survey by Rowell (2003, p. 1), 66% of British consumers regard themselves as “very” or “quite” worried about food safety. A study by the FSA (2009, p. 9) indicates that many UK consumers have no interest in the subject of GM foods, and only 5% of them have shown interest. The vast majority of UK consumers are not aware of the term “GM” and what it refers to; the public’s knowledge of GM foods is not clear, with many people perceiving GM foods negatively (ibid). It is evident that there is uncertainty and a lack of confidence among the British regarding GM foods, and much of the public is opposed to producing and making GM foods more widely accessible (Park et al 2010).

The discourse on GM crops intensified in Britain during 2002 to 2003, when a debate dubbed “GM Nation” was sponsored by the government to provide the public with necessary information about GM technology, with a focus on GM foods. Even though the debate was unsuccessful for many reasons, it generated widespread attention and participation from different interest groups (Horlick-Jones 2007, p. 1). In the report “Science and Society,” the House of Lords suggested that the perception of GM foods was “a media storm waiting to happen” (Durant and Lindsey 1999). In particular, concerns regarding Bovine Spongiform Encephalopathy (BSE) and the

apparent rush to introduce GM crops made the public anxious (ibid).

Allan (2002, p. 168-169) notes that many proponents of GM technologies believe that GM crops can be beneficial to the environment because of the way in which certain genetically modified crops can significantly reduce the need for and use of fertilizers and pesticides. Another supposed advantage of using specific GM foods is that staple foods such as rice could be produced in much greater quantities for many people around the world (ibid).

Despite these supposed advantages of GM use, its opponents are still wary of the technology, especially in terms of its effects on public health and safety, as well as those on the environment, as not enough compelling evidence has been found to reassure the public regarding these concerns. Opponents of GM also argue that a severe negative consequence of using the technology is that the ill effects genetic modification can cause to the environment might be impossible to reverse (ibid).

3-4 Public Perception of Organic Foods

As mentioned earlier, the world views healthy eating as more important than ever. This trend is particularly evident in affluent parts of the world where people can afford to choose healthier options. Many people spend a significant amount of money and time selecting the healthiest food for themselves and their children, and there are many articles on healthy eating online and in newspapers and magazines. A number of studies have shown a serious concern about the safety of food, which is deemed to have resulted in a growing demand for organic foods in recent years (Tsakiridou et al 2008; Rimal et al 2005; McEachern and McClean 2002).

A growing body of literature on consumers' motivation to purchase and consume organic foods report that in comparison to less-educated consumers with low income, educated consumers with high income are more likely to have positive attitudes toward organic foods and have bought organic products at some point in their lives (Roitner-Schobesberger et al 2008, p. 115). Moreover, studies report that females have more interest in purchasing organic foods than do their male counterparts (Lea and Worsley 2005, p. 208; Urena et al 2008, p.18; Magnusson, 2001, p. 211).

In the United States, the use of organic food has increased, and the market was estimated to be worth approximately \$45 billion in 2015 (TechSci Research 2015). Today, American citizens enjoy more options for organic products, with 20,000 natural food stores across the country (ibid). A study of Australian consumers by Lockie et al (2002, p. 23) showed that the amount of land allocated to certified organic production ranged from 7.6 million hectares in Australia, 1.3 million hectares in the United States, to 3 million hectares in Europe, which seems to be a result of the increasing demand for organic farming. Consequently, Magkos et al (2003, p. 211) believe

that the reason for this increase in demand for organic foods exists because of consumers' belief that organic foods are healthier and more environmentally friendly than traditional foods.

According to a report by the Soil Association (2016), there is a steady increase in sales of organic food in the United Kingdom. Specifically, in 2015, the organic market grew by 4.9%, whereas the non-organic market declined by 0.9%. A 2010 study by the Organic Centre Wales indicates that approximately three-quarters of UK consumers have bought organic foods. In addition, a majority of UK consumers believes in the benefits of organic produce for health and for the environment, and that organic foods are better in terms of the quality compared to traditional foods. A Mintel report [(no date)] (cited in Davies et al 1995, p. 18) stated that 13% of adults purchase organic foods frequently, and the most popular organic foods are fruit and vegetables. In addition, supermarkets such as Safeway, Sainsbury, Tesco and Asda, and shops are outlets for organic foods in the UK.

3-5 GM Foods, Organic Foods, and Mass Media

A great deal has been written regarding the pervasive nature of the media and promotional culture in society, particularly by writers such as Wernick (1991) and Davis (2013). Obviously, if the promotion has a value, then it must be able to persuade and, as Davis (2013, p. 3) argued, "The impact of promotional culture has been substantive." Hence, this dissertation focuses on how the media, along with public relations professionals, can influence the way the public perceives GM and organic foods.

A. Agenda-Setting in the Media

There is a growing body of empirical literature concerned with how the media influences the public regarding certain issues such as those of climate change and food consumption (Bellotti and Panzone 2016). Anderson (1997, cited in Thogersen, 2006, p. 148), believes it is likely that the news media can influence the public regarding environmental issues in industrial countries because the public has not had direct experience in such matters. This is particularly obvious when there is a decrease in the consumption of certain foods due to media reports of its contamination (McCluskey and Swinnen 2011). European consumers' opposition to the use and consumption of GM food, despite the wealth of scientific data describing numerous advantages of the technology, can also be attributed to negative media reports (ibid). For instance, press coverage of Bovine Spongiform Encephalopathy (BSE), commonly referred to as "Mad Cow Disease" in Japan, Europe, and Canada led to a decline in the demand for beef (King and Street 2005; Eldridge and Reilly 2003; Moeller 1999; Seale 2005). In addition, Verbeke et al (2000) note that television coverage of meat safety caused a decline in the demand for red meat after the BSE outbreak in Belgium. Younger people and households with small children were most

susceptible to the negative media coverage, whereas meat-eating consumers were the least likely to stop eating meat.

McCombs (2004, p.2) argues, “The news media sets the public agenda.” By emphasizing certain issues and ignoring others, it is likely that subjects emphasized in various media settings will also be the primary sources of information the public receives. Marks (2007, p. 184) also argues that the mass media has a major role to play, not only in deciding what issues are important, but also in framing the discussion around these issues. Entman (2007, p. 164) describes “the process of culling a few elements of perceived reality and assembling a narrative that highlights connections among them to promote a particular interpretation.” The process of framing includes devices such as metaphors, exemplars, catch phrases, depictions, and visual images and comprises three reasoning devices: the history of events, their consequences, and the appeal to principles (Hannigan 1995, p. 61).

The media plays an important role in educating the public, acting as a key gatekeeper of information, and helping form public opinion (Ceccoli and Hixon 2011). Hoban (1995, p. 192) and Hornig (1990, p. 768) state that the media has been very selective in deciding what types of stories and information should be available to the public. In general, mass media organizations prefer political stories to scientific ones. They prefer to put across simple rather than complicated messages, and the danger is that doing so is more likely to attract interest than safety.

The mass media plays a major role in setting the public agenda about biotechnology by collecting, interpreting, and transmitting information about the implications of risk. The media acts as a forum for particular groups to express their views and gives them the opportunity to influence public policies and perceptions (Hoban 1995, p. 192; Durant et al 1998, p.7). Gaskell et al (2000) note that the quality of media coverage could affect public perception of biotechnology. Their results indicate that the more media coverage there is on biotechnology products and its uses, the more public concern rises regarding these issues. Frewer et al (1998) conclude that television, radio, and newspapers, followed by discussion with other people, were the leading information platforms through which individuals make decisions about biotechnology.

Meanwhile, Lockie (2006, p. 313) describes ways that print media in Australia, US, and the UK frame issues such as sustainability, organic food, and agriculture. According to him, genetically modified food and food safety, are framed in a particular way, and often in relation to each other. Lockie also found that although there are different approaches to sustainability in scientific and agriculture discourses, the media discussion tends to reduce any complexity into a conflict between organic and conventional foods. There was regular reporting criticised organic food and

agriculture, but the binary approach to organic and GM produces an attitude where “safety”, “healthy nutrition”, and “product of nature” were seen as attributes of organic products. GM foods, on the other hand, were seen as the opposite, involving concepts such as “unnatural”, “unsafe”, and “dangerous” being used regularly (ibid).

Organic food as an alternative to GE was a common theme in the published materials of print media in the aforementioned countries, thus making organic food—with its high quality being regularly discussed and reported on—a more acceptable, desirable, and mainstream part of the market. Newspaper and magazine sections devoted to lifestyle increasingly gave way to articles on organic foods during the period it was being studied, with such articles veering more towards the opinion type. Oftentimes, and without any need for evidence, organics were accepted as superior to conventionally grown foods. Many of these journalists assumed that the taste of organic food was better or that it was safer, more natural, or better for the environment—without using any evidence to support their opinions (Lockie 2006, p. 319). A study examining six top US national newspapers, *New York Times*, *Boston Globe*, *Los Angeles Times*, *Chicago Tribune*, *The Atlantic Constitution*, and *The Washington Post* found that newspapers supporting social change favoured alternative/organic agriculture and described it as “a morally good occupation” (Reisner 2003). Alternative-organic farming is regarded as the best solution to environment and health-related pesticide problems. More than 36% of articles on organic food and agriculture in North American newspapers portrayed organic agriculture and food positively, while 41.4% of the articles were neutral about the two issues (Cahill et al 2010). This result indicates reporting positive accounts of organic production is likely to influence consumer decisions and result in increased popularity of the organic food market. Moreover, these positive reports are likely to be affected by consumer behaviour. The media increases its attention to organic topics when more people are willing to buy organic products.

On the other hand, Brainard (2012) notes that the press has shown a tendency to avoid emphasizing research indicating the benefits of organic foods. Brainard suggests that there were many stories about organics not being healthier than conventional foods, and the press has often homed in on this negative research. The media is often more attracted to unique or contradicting ideas, perceiving them to be more newsworthy and appealing more to human interest. Hence, because many people assume or believe that organic foods are more natural or healthy, it is only natural that headlines claim the opposite (ibid).

In his study, Brainard (2012) cites the UK Food Standards Agency’s (2009) finding of how “there are no important differences in the nutrition content, or any additional health benefits of organic food when compared with conventionally produced food.” The researcher also notes that

the UK study attracted enormous publicity, but journalists paid little attention to the results. However, an EU study published two months before the UK study came to the opposite conclusion. While the EU research found that some organic foods might be more beneficial than conventionally produced foods, the UK research argued that the advantages are not particularly significant. Amid the differences in results between the two studies, there is no doubt that the media preferred to highlight the less-impressive case for organics, partly owing to its bias in determining newsworthiness.

Many media articles highlight myths surrounding risks in the modern farming and food production methods. In discussing the role of the media, including platforms that claim to be science-based, it is apparent that the media thrives on uncertainty and has an important part in the public perception of risk. Begley (1991, cited in Craven and Johnson, 1999, p.154-155), notes that, “Risks surrounded by uncertainty and controversy are good contenders for coverage...Reporters crave uncertainty because it is usually equated with drama.” This is an uncomfortable, contradictory factor that both journalists and public relations practitioners must contend with if they wish to grab the public interest with their articles or PR material. Begley observes that scientific knowledge of risk and the ability to make a confident claim is itself often “uncertain and highly debateable”. Food risks, therefore, often make an eye-catching story.

In discussing the role of journalism in controversial science issues, Friedman et al (1999, p. 71) argue that, “...journalists, for collecting and presenting controversial information, may truncate readers’ abilities to glean a reasonable picture of what is going on”. This is often because they either present a broad range of opinions regarding the topic or have a lack of time and knowledge, thereby confining their roles to that of a “passive transmitter” of information without establishing its validity (ibid). This has led journalists to abandon their analytical skills and instead just present what is happening (ibid). This poses a legitimate concern, because when any controversial issue appears, journalists’ role is to report on them and comment in a balanced way to help readers understand what is happening. However, Friedman et al believe that if they do not have enough knowledge to do this, then journalists should be willing to quote sources on all sides so readers can follow up on the information themselves.

Kalaitzandonakes et al (2004, pp. 1238-1239) believe that media focus on risk can lead to what has been called “risk amplification.” This phenomenon happens when the experience of risk does not arise due to direct or actual physical harm recorded so far, but because the population—in reading a lot of material about the subject—will often be affected by the increased coverage and focus on risk (ibid). The media, therefore, acts as an amplification station for society and is

responsible for collecting information about risks, responding to information, and then informing the public about such risks (ibid). Mass communication academics have called this process mediated public attention “agenda setting” (ibid). In the concept as conveyed by Cohen (1963, p. 13), he states, “The press is significantly more than a purveyor of information and opinion. It may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about”.

Consequently, McCarthy et al (2008, p. 376) believe that by giving this role to the media as a mechanism to transmit scientific risk information, an essential element has been ignored; specifically, that media professionals and news journalists operate in unique conditions. Macnamara (2001) notes that PR professionals have an agenda, and journalists have problems such as deadlines and need for publicity grabbing headlines, which can cause them to convey biased information. As the public becomes increasingly anxious to know the truth about health matters, consumers need to be able to trust the information they are given. For Davies (2008), this puts increased pressure on PR practitioners and journalists to reveal sources and show themselves to be ethical in terms of the information they convey.

B. Public Relations, Journalism, and Science Communication

Public relations has contributed significantly to science communication, and many scientific organisations have utilised public relations in different ways (Rorchelt and Nielsen 2014, p. 58). One of the helpful aspects of public relations for organizations is when higher education institutions attract more students for their programmes or when research-performing organizations release results of their research to gain attention and attract more funding from the public.

Rorchelt and Nielsen (2014, p. 58) also note that in recent years, there has been an increased demand for public relations professionals in scientific organizations. The contribution of public relations in scientific communication is no longer limited to research efforts. In fact, public relations has helped researchers have a better understanding of different issues such as the relationship between the media and science, how the public perceives science, and the role of the internet in scientific knowledge.

This rise in the need for PR practitioners in the field is such that employment of PR specialists is projected to grow six percent from 2014 to 2024—about as fast as the average for all occupations (Davies 2008). This rise is thought to be due to the public’s desire for more information and expert scientific opinion concerning their food, as well as other controversial scientific issues.

Williams and Clifford (2010, as cited in Williams and Gajevic 2013, p. 508) found that there has been a decline in the number of science journalists and reporters in the UK and many of them are

worried about increasing job losses. They also report that many journalists are under pressure to write articles and therefore often use material from PR practitioners to meet deadlines (ibid). This finding is backed up by a number of studies that charted the relationships between journalism and public relations, its influence on media relations, as well as the significance of public relations in setting public agendas (Göpfert 2007; Weigold 2001, p. 171; Machill et al 2006).

Len-Rios et al (2009, p. 315) state that when it comes to health news reports, journalists often depend on information that comes from “information subsidies”. PR materials are one example of information subsidies. Gandy (1982, p. 61) defines an information subsidy as “...an attempt to produce influence over the actions of others by controlling their access to and use of information relevant to those actions”. Information subsidies are produced to control the flow of the information and make it available, involving less time and cost (ibid). Lewis et al (2008, p. 1) believe that these information subsidies are free through press releases, press conferences, video news releases, press briefings, lobbying and special reports for journalists, reporters, or editors who are under time constraints and pressure to meet deadlines.

For Curtin (1999, p. 53), PR practitioners are important in providing information subsidies to the media and help influence the media agenda, which makes them more likely to affect public opinion. Curtin (2003, p. 45) states that if PR practitioners can replace some media subsidies with their own materials, then they will have an influence on the media agenda and public agenda through the process known as agenda building. According to Carroll (2016, p. 27), “Agenda-building theory seeks to answer the question of who builds the media agenda, the public agenda, and the policy agenda”. Tanner (2004, p. 353) adds that the theory “...posits that the media, government and society reciprocally affect one another.”

“Journalists are complicit in the in-take of PR material. They seek the material, use it to fill expanding editorial space and benefit from any audience or reader increases” (Moloney 2000, p. 123). Moloney explains that this contradictory mixture of hospitality and complicity between journalists and PR professionals happens because journalists are “weak as a professional group” due to the influence of the marketization of their respective institutions. There is also an over-supply of journalists for too few jobs, and because only a few are employed, those working are under great pressure and need PR materials to support their articles. In addition, journalists’ attitudes can be influenced by news managers who have more power in deciding what materials will be taken to fill space (ibid). However, news managers are now more likely to accept PR material. Journalists have increased their reliance on secondary sources (including PR), especially when these sources produce copy in a prepared journalistic form. Journalists thus rely more on

officials and company spokespeople as primary definers of events. This reliance gives sources the ability to cooperate or obstruct depending upon the favourability of journalists' copy (ibid). Davies (2008, p. 203) paints a disturbing picture of journalists; with very little time to sort or verify vast amounts of information which they receive, they often greatly rely on copy from PR professionals who may have clear vested interests in putting across the information they offer. Davies also reveals how the PR industry uses sophisticated methods to discover their target publics and work out how to construct information in a way that appeals to the audience's emotions and beliefs, whether or not they are based on a misapprehension or falsehood. Furthermore, Davies (2008, p. 184-185) gives a number of illustrations of the way news is managed as a PR exercise in the UK and USA, as well as in other countries. The governments of countries also use PR professionals to help manage their reputations. Davies further explains how private corporations use PR for crisis management as well as to enhance their reputations and to sell products. More recently, however, PR professionals have found themselves on the receiving end of counter arguments from pressure groups such as those concerned with environmental issues, and groups concerned about the pharmaceutical industry and public health. The PR industry is also known for peddling lies and putting across falsehoods by simply using the term "off the record" in their briefings.

Reviewing the literature has involved looking at definitions of GM foods and organic foods, outlining the evolution of the public's attitudes to the products, current policies, as well as the various claims made for them. The literature suggests that there are some benefits in the use of GMOs for sustainable development. However, much of the media coverage of GMOs in the UK and Europe tends to emphasize the potential risks of GMOs rather than the potential benefits. In recent years, there has been significant interest in the development of organic food and organic agriculture as a counterbalance to emerging products from the GM market. This has come hand in hand with public concern caused by a major public health problem known as BSE in cattle, which can be transmitted to humans via eating beef. The subject of GM foods, therefore, has come to be presented as organic/natural versus unnatural.

Studies by researchers such as Lockie (2006) and Reisner (2003) have addressed how the media, especially newspapers in different countries, portrayed issues related to food scares, environment, genetic engineering, and health. Therefore, these studies are relevant to the initial research objective of this dissertation, which is to investigate the how mainstream newspapers may influence public attitudes to GM and organic foods. Other studies, such as those of Göpfert (2007), Weigold (2001) and Machill et al (2006), have considered the relationships between

journalism and public relations and how this influences the public agenda.

However, this research will implement the two elements found in the aforementioned studies and will focus on the role of public relations and mass media platforms, especially mainstream newspapers and the way they might influence public attitudes to GM and organic foods. The research attempts to understand public perceptions and knowledge about GM and organic foods. It also seeks to find out from where the public receives information about the topic in question and the extent to which journalists are affected by copy from public relations practitioners. Therefore, the title of this research is “The Role of Public Relations and Mass Media in Influencing Public Attitudes to Genetically Modified (GM) and Organic Foods.”

4- Methodology:

This section will start by describing the theoretical approach to conducting any research. It will then describe three methods utilized to accomplish this research endeavor. Finally, this part will highlight ethical issues and implications, which will be considered in conducting this research, which can be important to future similar and relevant research endeavors.

4-1 Research Philosophies

Researchers can employ different philosophical perspectives and paradigms depending on their areas of study and the theoretical background of their subject area. It is important to consider these paradigms when conducting and evaluating research. To start, it is appropriate to describe paradigms. According to Babbie (2016, p.32), paradigms are “The fundamental models or frames of reference we use to organise our observations and reasoning”.

Similarly, Denzin and Lincoln (2013, p. 26) define a paradigm as “the net that contains the researcher’s epistemological, ontological and methodological premises.” Epistemology refers to the kind of “relationship between the inquirer and the known.” On the other hand, ontology is the way we see reality and what kind of entities exist. Methodology refers to the tools we use to enable us to have knowledge about the world and its processes (ibid).

A number of theoretical perspectives in communication research help us understand different modes of thinking within social sciences in the 20th century (Gunter 2000, p. 3). These theoretical perspectives include positivism, interpretivism/constructivism, transformative, and pragmatism (Hennink et al 2011, p. 14). Positivism is based on the principles of scientific research and quantitative studies and stresses the importance of objective measurement when reality can only be measured by facts and researchers have no impact on the process of data collection. The interpretivist approach arose because of the apparent frailties of positivism. This perspective renders more weight to human feelings or beliefs, and qualitative researchers seek an initial

understanding of people's behaviours and actions (ibid).

Primarily rooted in determining the role and influence of the media in shaping the public's views, this study will seek to determine how a prestigious media platform such as newspapers has affected the perception of audiences on pertinent issues—specifically regarding foods that are genetically modified or grown organically. Through the context of public relations, the researcher aims to find out how newspapers in this country portray GM and organic foods and if these representations have affected the behaviour of audiences and consumers. To further analyse the depth and intricacy of this challenge, the researcher will utilise the positivist and interpretive approaches.

The positivist approach essentially ensures that the data gathered is grounded in observation, empiricism, and pragmatism. This is deemed necessary in the data collection of newspaper articles on GM and organic foods, as the content of news stories necessitates analysis and evaluation using a uniform set of standards and parameters. The researcher will devise a coding sheet to document, consolidate, and analyse the technical aspects and underlying themes of relevant articles such as the physical placement of the news story, its primary subject, and the kind of imagery used in the story.

Alongside this, *Public Attitudes to GM Food*, a qualitative study by the Food Standards Agency will be used as secondary data for this research. The study explored how and why consumer perceptions and attitudes toward GM foods are formed (FSA 2009). Additionally, a quantitative survey by Organic Centre Wales titled *Consumer Attitudes towards Organic Food* will be utilised to acquire information about the relationship between the public and organic foods.

Since the study is mainly designed to examine the role of newspapers in shaping public opinion regarding GM and organic foods, it will also be important to gather data regarding the beliefs, opinions, and experiences of consumers and audiences. The interpretive paradigm responds to the lack of depth that the positivist approach sometimes demonstrates. The researcher will consider personal accounts from audiences and consumers an integral element to this study. Fundamentally, five interviewees will be selected from different fields, with each expected to provide specialist or scholarly input into the study.

Table 1. Matrix of Interviewees and their Fields of Expertise

INTERVIEWEE	SPECIALIZATION	COMMENTS
Mr. X	Retired manager of major GM Company, Monsanto, an American multi-national agrochemical, agricultural, and biotechnology corporation.	Will be interviewed via Cardiff University email. Will offer his professional input regarding GM foods.
Ms. Y	A marketing communication manager who works at the BBC in Cardiff.	Will be interviewed via Cardiff University email. Will offer her views regarding the role of the media in shaping public opinion and attitudes.
Dr. Andy Williams	A lecturer at Cardiff School of Journalism, Media and Cultural Studies.	Will be interviewed face-to-face. Will interview regarding the media's role in influencing public opinion.
Mr. Andy Green	A public relations expert and lecturer at Cardiff University.	Will be interviewed face-to-face. Will interview regarding the role of PR professionals and public opinion.
Ms. Liz O'Neil	From Friends of the Earth Organisation at Cardiff.	Will be interviewed via Cardiff University email. Will interview regarding the advantages and disadvantages of GM and organic foods.

Aside from these, focus group discussions (FGDs) with certain publics will be conducted to obtain a better understanding of the impact of public relations, news, and the media in shaping public perceptions on controversial topics.

Essentially, this research will encompass positivist (quantitative) and interpretive (qualitative) approaches. For the quantitative aspect, the researcher will conduct a comprehensive content analysis of four prominent UK broadsheets with articles focusing on GM and organic foods published in the first six months of 2003, 2004, 2015, and 2016. On the other hand, key informant interviews (KIIs), FGDs, and the key findings from the 2009 study of the Food Standards Agency will form the qualitative part of the study. For this study, the researcher believes that both paradigms will not only pave the way to a better understanding of how attitudes toward GM and organic foods are formed, but will also provide a more balanced juxtaposition of study variables.

4-2 Theory of Research Design

In this study, the researcher will strive to ascertain how public relations practitioners and the media, particularly newspapers, influence readers' perceptions and attitudes regarding GM and organic foods. The researcher considers that the most appropriate design for this study would be the descriptive and explanatory type of research, as the latter seeks to:

Connect ideas to understand a cause and effect [situation], meaning [the researcher] wants to explain what is going on. [The] explanatory [type] of research looks at how things come together and interact. This research does not occur until there is enough understanding to begin to predict what will come next with some accuracy (Study.com [no date]).

Descriptive research seeks to explore and explain the phenomenon at hand while providing supplementary information and knowledge about the topic.

This is where research [tries] to describe what is happening in detail, filling in the missing parts and expanding our understanding. This is also where as much information is collected as possible instead of making guesses or elaborate models to predict the future – the 'what' and 'how,' rather than the 'why' (ibid).

In essence, the study will seek to provide a deeper perspective on the arguments presented in newspaper articles on GM and organic foods, adding insight as to how readers' attitudes and perceptions are formed. However, it also will attempt to show why people view GM and organic foods the way they do; the qualitative aspect of the study will offer validation and substantiation on how the agenda presented by newspaper articles can affect consumers' mindsets and decision-making processes.

4-3 Methods

This section outlines the research methods employed during the study, specifically, content analysis, KIIs, and FGDs, as well as the units of analysis, sampling scheme, variables, and measures used for each method.

4-3.1 Content Analysis

The method of content analysis is a helpful tool for quantitative research, as it seeks to dissect and scrutinize each element of the study and assess results using a standard set of rubrics and parameters. Content analysis is a method that can certainly be helpful in supporting qualitative research and can make a useful contribution to any investigation because it involves a systematic analysis of data to put it into meaningful categories, which can be used for statistical analysis (Lavrakas 2008, p. 140).

This study theorizes that the public utilizes newspapers as its primary source of information for gaining insights and perspectives regarding GM and organic foods. Therefore, through the method of content analysis, aims to answer the following research questions:

- How are GM and organic foods portrayed in the newspaper articles of the *Guardian*, *The Daily Telegraph*, *The Times*, and *The Daily Mail* from 2003-2004 and 2015-2016
- What are the most commonly used themes and elements in the newspaper articles pertaining to GM and organic foods by the *Guardian*, *The Daily Telegraph*, *The Times*, and *The Daily Mail* from 2003-2004 and 2015-2016?

4-3.1.1 *Units of Analysis*

The primary units for the content analysis of this research are newspaper articles focusing on GM and organic foods, published within the first six months of 2003, 2004, 2015, and 2016 in the following prominent newspapers in Great Britain: *The Guardian*, *The Daily Telegraph*, *The Times*, and *The Daily Mail*. The articles will be mainly sourced from Nexis, an online news database that has a comprehensive 20-year archive. However, one drawback of using Nexis is that it is a text-based resource, which will not enable the researcher to analyse pictures that accompany the newspaper articles.

Newspaper articles will be selected as the main unit of analysis because this medium remains a widely acknowledged form of news and information gathering. Stanton Communications (2013) suggests that newspapers "...provide an essential window to the world" for those who do not have access to modern technological devices and the internet, and it seems that newspapers are still significant to a clear majority of audiences.

4-3.1.2 *Sampling Scheme*

The researcher deems that the use of pertinent keywords to search and identify which articles will be analysed is essential for the process of content analysis. However, the researcher acknowledges that while the terms will help optimise the identification of related news articles, not all articles with these keywords will necessarily be included in the study. The keywords that will be used to identify articles for this research are as follows:

- Genetically Modified Organisms (GMOs)
- Genetically Modified Food/GM Food
- Organic Food/Organic Crops
- GMO/Organic Food/s/Harmful/Healthy
- Recombinant DNA Technology
- Modern Biotechnology
- Genetic Engineering

4-3.1.3 *Variables and Measures*

To effectively draw out and gather relevant findings in this content analysis, the following

variables will be taken into consideration (Table 2):

Table 2. Matrix of Content Analysis Research Questions vis-à-vis Variables

RESEARCH QUESTIONS	VARIABLES
<p>How are GM and organic foods portrayed in the newspaper articles of the <i>Guardian</i>, <i>The Daily Telegraph</i>, <i>The Times</i>, and <i>The Daily Mail</i> from 2003-2004 and 2015-2016?</p>	<p>Publication: the name of the newspaper analysed</p> <p>Date Published: the date when the newspaper article was published</p> <p>Word Length: the number of words</p> <p>Type of the Article: the location of the newspaper article on the broadsheet/news site</p> <p>Source/s of the Article: the persons who corroborated or validated the newspaper article being analysed; the resource persons who were interviewed for the article</p> <p>Emotive Languages: words or phrases in the article that might arouse positive or negative feelings</p> <p>Subject Portrayal: whether the topic in question had a positive, negative, or neutral portrayal in the article</p>
<p>What are the most commonly used themes and elements in newspaper articles pertaining to GM and organic foods by The <i>Guardian</i>, <i>The Daily Telegraph</i>, <i>The Times</i>, and <i>The Daily Mail</i> from 2003-2004 and 2015-2016?</p>	<p>Main Theme – the most significant theme of the newspaper article being analysed</p> <p>Secondary Theme – the less significant yet still vital theme of the newspaper article being analysed</p>

4-3.1.4 Scope and Limitations

As mentioned, not all articles containing said keywords will be used in the study. Only those that mainly focus on GM or organic foods will be analysed. Moreover, due to time constraints, the study will be limited to articles published only in the first half of 2003, 2004, 2015, and 2016; this will reduce the number of articles included. While a more rigorous content analysis would have included all articles published from 2003 to 2016, the researcher decided that the most realistic and efficient way to do the content analysis will be to focus on the relevant years, in this case, 2003 and 2004, and 2015 and 2016.

That said, the author of this study recognises that although the nature of content analysis is already comprehensive and rigorous, triangulating the data using different research strategies can reinforce the data collected and could enrich the discussion in this study, hence the use of other research methods such as KIIs and FGDs.

4-3.2 Key Informant Interviews (KIIs)

Interview as a method is commonplace in qualitative research, as it facilitates an in-depth understanding of the interviewee's opinions and reflects his or her concerns regarding the subject (Bryman 2012, p. 470). Thus, interviews will provide deeper, more profound insight into the topic since they will be based on personal experience and acumen, fortifying and validating the empirical aspects of the study.

Interview methods cover many techniques, ranging from unstructured and semi-structured, to formal interactions with interviewees. They can be face-to-face, by email, by phone, and more. Semi-structured or in-depth interviewing is an important type of data collection in social sciences (Daymon and Holloway 2011, p. 223) because it allows the researcher to probe into the answers of the interviewees as required.

4-3.2.1 Units of Analysis

For this study, the semi-structured key informant interviews format will be used with experts who have significant professional experience in public relations (PR), specifically in how the media portrays certain agendas to the public. Since the study will put particular focus on the media's role in shaping public opinion regarding GM and organic foods, PR experts with extensive practise and involvement in public relations will be interviewed along with health and nutrition specialists. They will be able to lend an objective view, particularly as to whether GM and organic foods are well presented or misrepresented in the media. The interviews will be conducted to further establish and provide wisdom to the key findings of the content analysis and FGDs, and this should result in a more balanced inquiry on the subject.

4-3.2.2 Concepts and Indicators

To carry out the KIIs, the researcher will use an Interview Guide (See Appendix 7.2), which will encompass a set of guide questions, which can be given to the interviewees. Since the researcher will utilise the semi-structured format in conducting the interview, interviewees will be given the liberty of answering the guide questions in their preferred manner. Correspondingly, the researcher will pose various follow-up questions that will veer from the interview guide but will still be relevant to the study. This informal style of questioning will establish a sense of comfort in the interviews. Albeit this is the framework for conducting the interviews, the researcher will be careful to follow the interview guide and ask all the fundamental guide questions.

The following broad topics will be discussed:

- Personal knowledge of GM/organic foods
- Personal perceptions of GM/organic foods
- Mass media and the public's opinions of GM/organic foods
- Science and public's opinions of GM/organic foods
- The role of PR professionals/journalists in scientific issues

4-3.2.3 Sampling Scheme

There are two types of sampling; one is probability, and the second is non-probability. Probability sampling involves random techniques in selecting the respondents, whilst nonprobability sampling does not ensure randomness in its procedures (Hansen and Machin 2013, p. 215). For this study, the interviewees will be selected using a non-probability sampling method, where technical expertise and knowledge of the subject will be the primary basis for selection.

4-3.2.4 Scope and Limitations

It is important to acknowledge the sensitivity of conducting personal interviews. Interviewers may influence data collection depending on the way they ask questions, and it is possible for interviewers to present their own biases in the way they input responses (Snap Surveys 2014). However, the researcher will try to minimize bias in both questioning and analysing the data collected from the interviews.

Furthermore, due to time constraints, three out of five interviews will be conducted through Cardiff University email. This method is a partial drawback, as additional rich data such as body language, facial expressions, or tone of voice cannot be considered when analysing the findings.

4-3.3 Focus Group Discussions (FGDs)

Focus groups can be explained as a qualitative method in which one or two researchers and several participants meet as a group to discuss a defined topic (Bryman 2012, p. 502). For this study, the use FGDs will be an appropriate method to discover public opinion on GM and organic foods. One of the primary variables can only be assessed and evaluated by engaging the media-consuming publics or audiences. This study aims to elicit opinions and insights to determine the

public's opinion of GM and organic foods and if they are influenced by traditional newspaper outlets.

4-3.3.1 Units of Analysis and Sampling Scheme

Essentially, information derived from the discussions will serve as an important supplement to the quantitative data gathered in this study. It is significant that the sample will be comprised of audiences from different age groups, with participants of various genders, knowledge and educational backgrounds, to determine if their attitudes towards GM and organic foods differ based on their demographics.

The focus group method will target people from three age categories: Group A (18-40) year olds, Group B (41-63) year olds, and Group C (64 years old and above). The first group will be composed of post-graduate students between the ages of 18 and 40. The second and the third groups will be those between ages 41- 63 years old and 64 years old and above, respectively, who will be either employed or retired participants. The Pew Research Centre (2010) stated that the younger generation is thought to be more willing to accept new things compared to the older generation. Therefore, the aim is to determine if the younger adults will be more willing to accept the technology of GM foods in comparison to the two other generations and to investigate their opinions about organic foods.

The number in each group will be between five to six people. This sample size will enable the facilitator to keep track of the conversations and ask questions during the sessions (Wimmer and Dominick 2006, p. 133). The three focus group discussions will use a series of open-ended questions (for the FGDs Guide see Appendix 7.3).

4-3.3.2 Concepts and Indicators

The following questions will be asked in the discussions:

- Have you heard about genetically modified foods (GM)?
- What are your perceptions about GM foods/organisms?
- Do you think organic food differs from GM food? If so, how?
- What are your main sources of information regarding GM and organic foods?
- Do you think newspapers help your understanding of GM and organic foods?

To stimulate the discussion, participants will be given newspaper articles and photos of GM and organic foods depicted in newspapers to measure their perceptions after reading or seeing the article/photos.

4-3.3.3 Scope and Limitations

Despite the advantages of using the focus group method for gaining insights, feelings and attitudes of a group, the researcher will only be able to conduct three focus group discussions. This means the research cannot be conclusive that findings generated from the focus groups attendees can be

taken as representative of the views of the public because the sample of three focus groups, whilst useful, nevertheless remains fairly small.

Furthermore, the moderator (the researcher) and participants know each other well, so this might have an influence on their willingness to participate or on their choice to freely express their opinions or remain neutral in the discussions.

4-4 Ethical Considerations

The researcher will use a consent form, which each participant must sign prior to the KIIs and FGDs. This way, each participant will receive all the important details before he or she engages in the discussion and will be able to choose to participate based on an informed decision.

The researcher will ask participants for permission to record and document the KIIs and FGDs as well as publish and share findings of the study, keeping the identities of the participants confidential. Finally, the participants will also be informed that their participation is voluntary and that they have the option to withdraw from the study at any time without giving any reason.

5- Results and Discussion:

This part describes and discusses the findings of 1) a comprehensive content analysis of articles from four prominent UK broadsheets, 2) Key Informant Interviews (KIIs) with five specialists, and 3) Focus Group Discussions (FGDs) with various groups regarding the topic of GM and organic foods.

5-1 Content Analysis Results

This section presents the results of the content analysis of the articles published in the four most prominent broadsheets in the United Kingdom. As a reference, all statistical tests done for the content analysis which have not been included in the main write-up can be found in Appendix 7.7.

A. Newspaper and Article Details

A total of 46 UK newspaper articles from January to June of the years 2003, 2004, 2015, and 2016 were analysed. Of the 46, 15 articles were published in *The Times London*; 13 were from the *Guardian*; 12 were from *The Daily Mail* and 6 were from *The Daily Telegraph* (Table 3).

Table 3. Frequency Distribution per Newspaper

Newspaper	Frequency Count	Valid Percent
The Daily Mail	12	26.1%
The Daily Telegraph	6	13.0%
The Guardian	13	28.3%
The Times	15	32.6%

About a third (30.4%) of the articles had between 151 and 300 words. Of the 32 remaining articles, 11 had more than 701 words; 18 had between 201 and 700 words, and only three had less than 150 words (Table 4).

Table 4. Word Count per Newspaper Article

Word Count	Frequency Count	Valid Percent
Below 150 words	3	6.5%
151 to 300 words	14	30.4%
201 to 500 words	9	19.6%
501 to 700 words	9	19.6%
More than 701 words	11	23.9%

Almost three-quarters of the articles analysed (33 of 46) focused on genetically modified foods, while a little more than a fourth talked about organic foods. Only one article out of the 46 focused on both GM and organic foods (Table 5).

Table 5. Frequency Distribution per Topic

Focus	Frequency Count	Valid Percent
GM foods	33	71.7%
Organic foods	12	26.1%
Both	1	2.2%

Publication * Topic

Cross-tabulation analysis done between publication and topic showed that of the four publications, only the *Guardian* published an article that focused on both GM and organic foods. It also showed that *The Times* had the most articles published for both GM and organic foods at 11 and 4 articles, respectively (Table 6).

Table 6. Cross Tabulation Results of Publication x Topic

Publication	Topic			Total
	GM Foods	Organic Foods	Both	
The Daily Mail	10	2	0	12
The Daily Telegraph	3	3	0	6
The Guardian	9	3	1	13
The Times	11	4	0	15
TOTAL	33	12	1	46

Date of Publication

In terms of when the articles were published, most of the articles were published mid-year, with a total of 28 out of the 46 articles (61%) coming out in May and June (Table 7 and Figure 2).

Table 6. Frequency Distribution of Articles Published per Month

Month Published	Frequency Count	Valid Percent
January	3	6.5%
February	7	15.2%
March	4	8.7%
April	4	8.7%
May	9	19.6%
June	19	41.3%

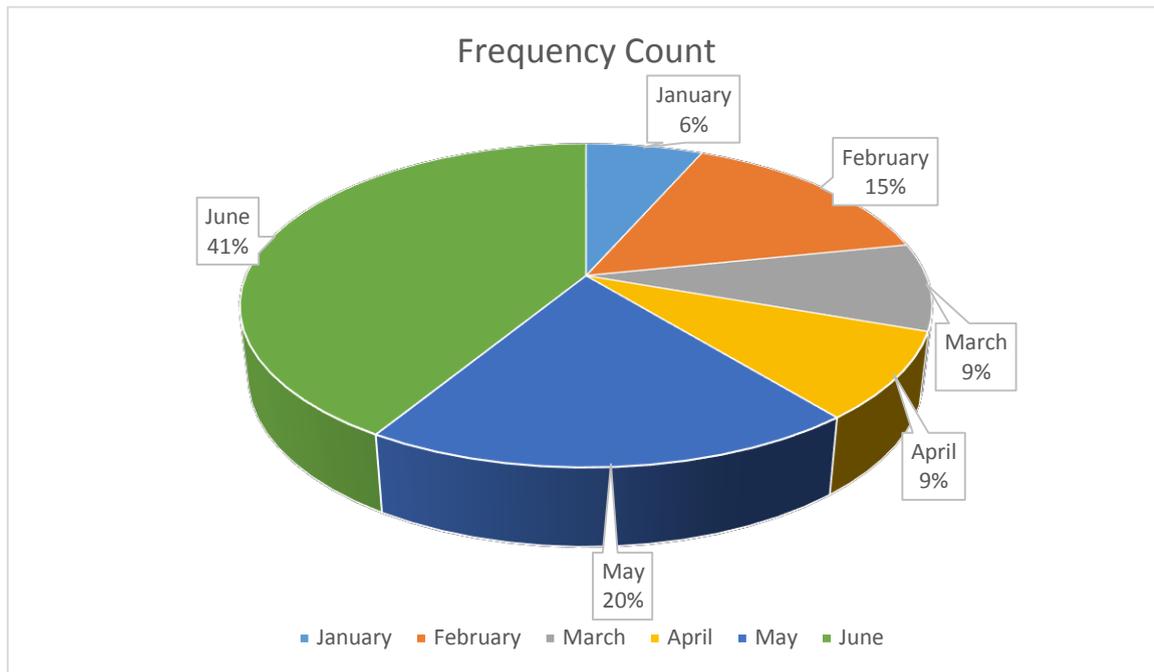


Figure 1. Frequency Distribution of Articles Published per Month

The same goes for the day articles about GMs and organic foods are published. Almost half of the newspaper articles (20 of 46 or 43.4%) analysed in this study were published during the latter part of the month, from days 21 to 31. Of the 26 remaining, 10 were published during days 1-10, and 16 were published from days 11-20 (Table 8).

Table 8. Frequency Distribution of Articles per Publication Day

Day Published	Frequency Count	Valid Percent
Days 1-10	10	21.7%
Days 11-20	16	34.7%
Days 21-31	20	43.4%

The majority of the articles (57%) were published in 2003, which is when the issue and debate on GM food consumption and production started. More than a third (37%) were published in 2015; 6.5% were published in 2016, and none were published in 2004 (Table 9 and Figure 3).

Table 9. Frequency Distribution of Articles per Publication Year

Year Published	Frequency Count	Valid Percent
2003	26	56.5%
2004	0	0%
2015	17	37.0%
2016	3	6.5%

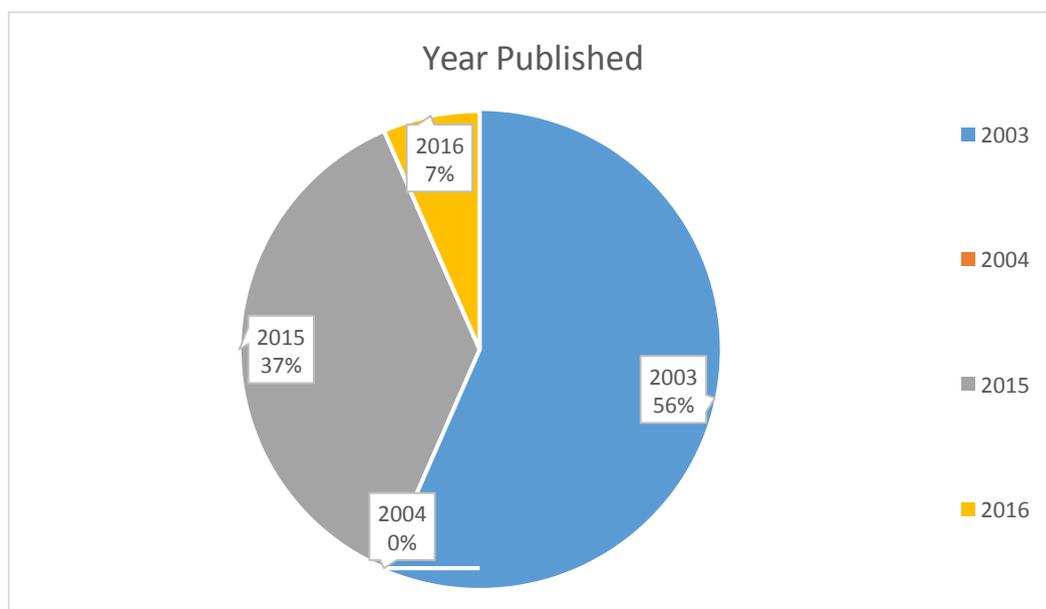


Figure 2. Frequency Distribution of Articles per Publication Year

Doing a quick cross tabulation, we can see that *The Times* published the most articles (10) in 2003, during the onset of the debate on genetically modified foods and crops. This is closely followed by the *Guardian*, *The Daily Mail*, and *The Daily Telegraph*, with a total of seven, five, and four articles, respectively. Conversely, no articles were published on either GM or organic foods during the first half of 2014.

In 2015, the *Guardian* published the most articles within the first six months, with a total of six articles. *The Daily Mail* and *The Times* had five articles each in 2015, while *The Daily Telegraph* published one article on the topic that same year. The following year, only *The Daily Mail* and *The Daily Telegraph* published articles on GM and organic foods, with two articles and one article published, respectively (Table 10).

Table 10. Cross Tabulation Results of Publication x Year

Publication	Year				Total
	2003	2004	2015	2016	
The Daily Mail	5	0	5	2	12
The Daily Telegraph	4	0	1	1	6
The Guardian	7	0	6	0	13
The Times	10	0	5	0	15
TOTAL	26	0	17	3	46

B. Theme

In terms of theme, *GM-Related Government and Trade Policy* was the most common, being published as the main theme in 15 articles (32.6%) and as a secondary theme in eight articles (17%).

Next, *Safety and Health Issues Related to Consumption of GM Foods* was the second most talked-about theme, with six articles having it as the main theme (13%) and nine articles focusing on it as a secondary theme (20%).

The third most common theme was *Public Opinion on GM*, which was the main theme of five articles (11%) and the secondary theme of two articles (4%). This was closely followed by *Public Opinion on Organic Foods*, which was the main theme of five articles (11%) (Table 11).

Table 11. Frequency Distribution of Primary and Secondary Themes per Topic

Theme		Primary Theme		Secondary Theme	
		Frequency Count	Valid Percent	Frequency Count	Valid Percent
GM Foods	Safety/health issues related to consumption of GM foods and crops	6	13%	9	20%
	Production and development of GM foods and crops	1	2%	0	0%
	Issues on indirect consumption/use of GM foods and crops	2	4%	0	0%
	Advantages and disadvantages of GM	3	7%	3	7%
	GM-related government and trade policy	15	33%	8	17%
	Public opinion on GM	5	11%	2	4%
	Proper labelling of GM products	2	4%		0%
Organic Foods	Safety/health issues related to consumption of organic foods and crops	1	2%	2	4%
	Production and development of organic foods and crops	3	7%	3	7%
	Issues on indirect consumption/use of organic foods and crops	0	0%	0	0%
	Advantages and disadvantages of organic	2	4%	6	13%
	Organic-related government and trade policy	0	0%	0	0%
	Public opinion on organic food	5	11%	0	0%
	Proper labelling of organic products	0	0%	0	0%
	Comparison between GM and organic food	1	2%	0	0%
	Not applicable	0	0%	13	28%
	TOTAL	46	100%	46	100%

Publication * Main Theme

By cross tabulating publication and main themes, we notice that *The Times* had the most number of articles on *GM-Related Government and Trade Policy*. Of the 11 articles that *The Times* published during the first six months of 2003-2004 and 2015-2016, six focused on said theme. *The Daily Mail* and the *Guardian* closely followed in terms of number of articles focusing on said theme with four articles each, while *The Daily Telegraph* had one on said topic (see Figure 4).

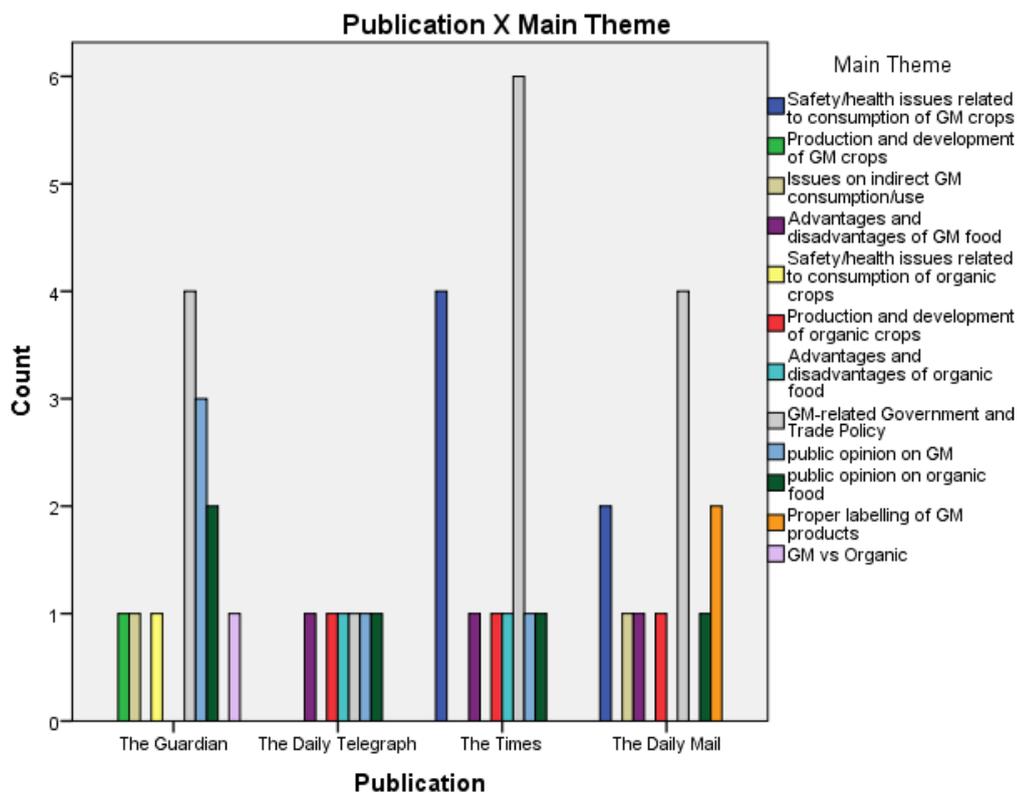


Figure 3. Cross-Tabulation Results of Publication and Primary Theme

Publication * Secondary Theme

Looking at a cross tabulation between publication and secondary themes, we will see that the most-common secondary themes are *Safety/Health Issues Related to Consumption of GM Foods* and *GM-Related Government and Trade Policy*, both of which are touched on the most by *The Daily Mail*, with four articles on each of the two topics. Alternatively, the *Guardian* published two articles on *Safety/Health Issues Related to Consumption of GM Foods* and three articles on *GM-Related Government and Trade Policy*, while *The Times* had three articles on the former and one article on the latter (Figure 5).

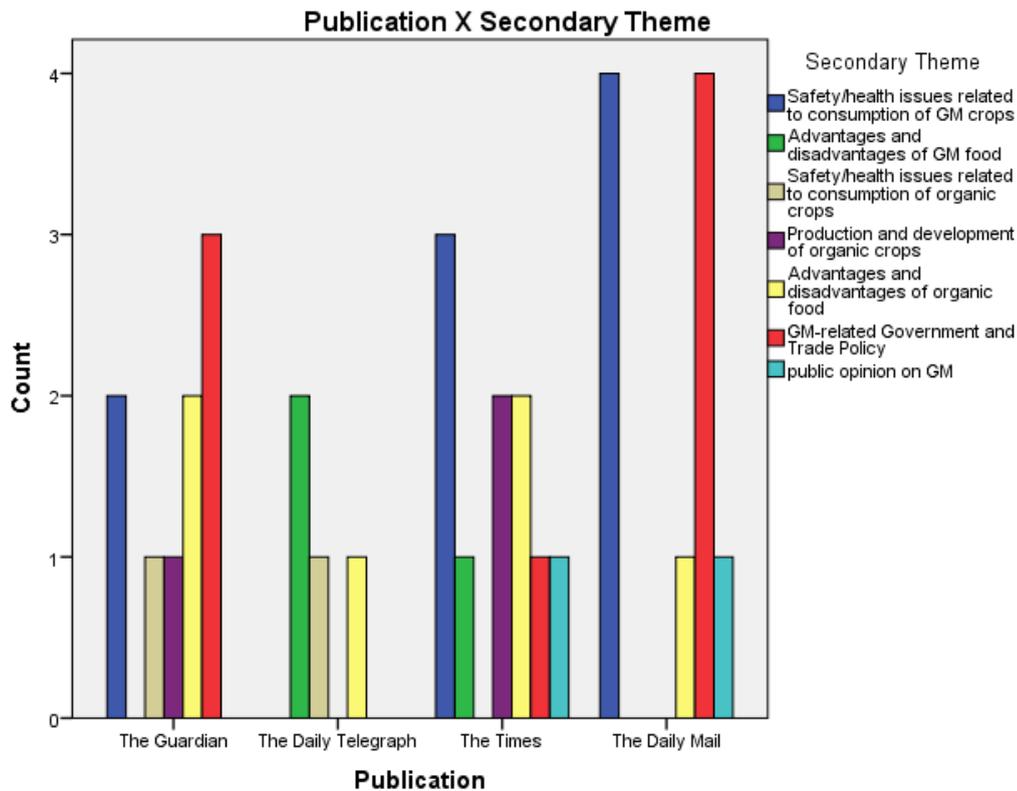


Figure 4. Cross-Tabulation Results of Publication and Secondary Theme

C. Sources

In the 46 articles analysed, the top source or reference cited are government agencies, which were used as a source 20 times. This is not surprising, given the fact that the recurring theme across the 46 articles is *GM-Related Government and Trade Policy*.

The second-most common source in the news articles are *Anti-GM, Non-Profit Organizations*, which appeared 15 times.

It is also worth noting that there were no statements from representatives of health institutions or Pro-GM, non-profit organizations in any of the 46 articles (Table 12).

Table 12. Frequency Distribution and Ranking per Source Cited

Rank	Source	Frequency Count
1	Government agency	20
2	Non-profit organization (Anti-GM)	15
3.5	Non-profit organization (Pro-organic)	8
3.5	Scientist/expert	8
5.5	Farmers/growers	6
5.5	Ordinary citizen	6
7.3	Polling/market research agency	3
7.3	Public Figure	3
7.3	Politician	3
10.5	Non-government organization	2
10.5	Food Establishment	2
12.5	Non-profit organization (Anti-organic)	1
12.5	Consumer groups	1
14.5	Health institution	0
14.5	Non-profit organization (Pro-GM)	0

D. Emotive Language

Almost half of the articles either exhibited no emotive language (21.7%) or portrayed the subjects as dangerous (21.7%). On the other hand, eight articles (17.4%) depicted the subjects as beneficial (Table 13).

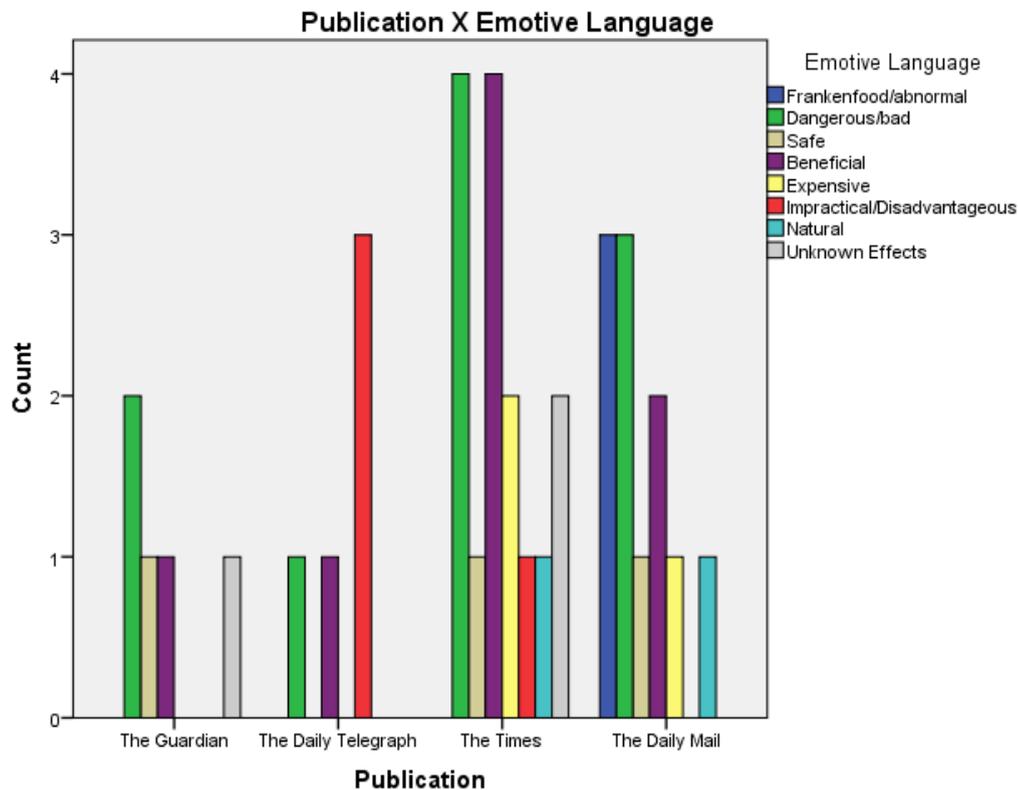
Table 13. Frequency Distribution per Emotive Language

Emotive Language	Frequency Count	Valid Percent
Frankenfood/abnormal	3	6.5%
Dangerous	10	21.7%
Safe	3	6.5%
Beneficial	8	17.4%
Expensive	3	6.5%
Impractical/disadvantageous	4	8.7%
Natural	2	4.3%
Unknown Effects	3	6.5%
None	10	21.7%

Publication * Emotive Language

The most common emotive language is that of GM being *dangerous*, and among the four publications, *The Times* displayed that emotive language the most, with four articles using that

tone. *The Daily Mail*, the *Guardian*, and *The Daily Telegraph* had three, two, and one article/s using such emotive language, respectively.



Surprisingly, *The Times* also had the most articles that used an emotive language that portrays both GM and organic foods as *beneficial*, with also four articles using that tone, effectively balancing their reportage of the issue (Figure 6).

Figure 5. Cross-Tabulation Results of Publication and Emotive Language

Publication * Emotive Language * Year of Publication

Cross tabulating publication with emotive language and year of publication tells us that while *The Times* had the same number of articles utilising the emotive language *dangerous* and *beneficial*, these articles were published in different years. It shows that the initial portrayal of the issue of GM as a dangerous and bad thing in 2003 (Figure 7) eventually transformed into a positive depiction of the issue (Figure 8). The same trend can also be observed with the other publications.

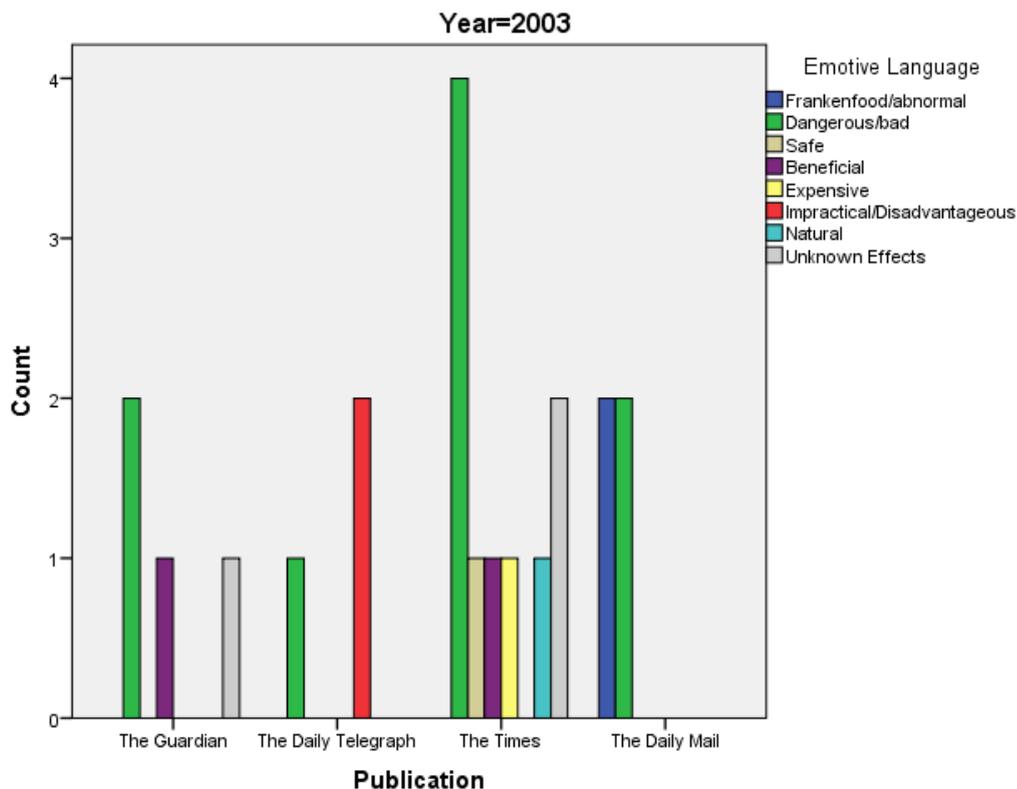


Figure 6. Cross-Tabulation Results of Publication, Emotive Language, and Year – 2003

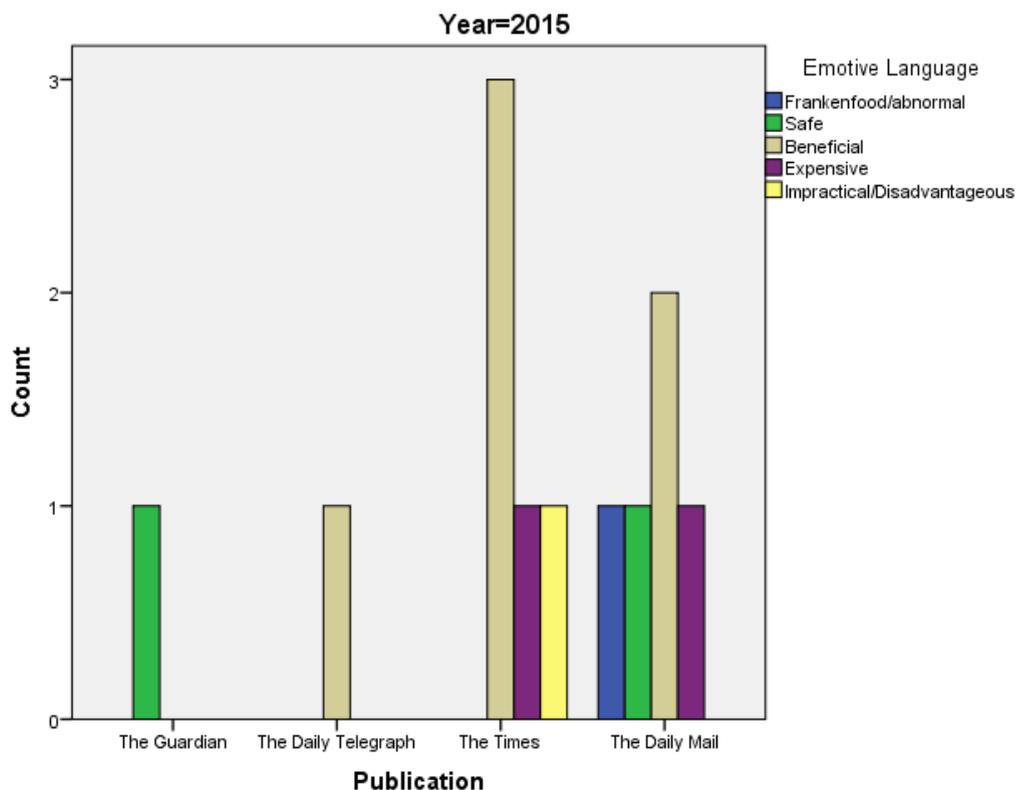
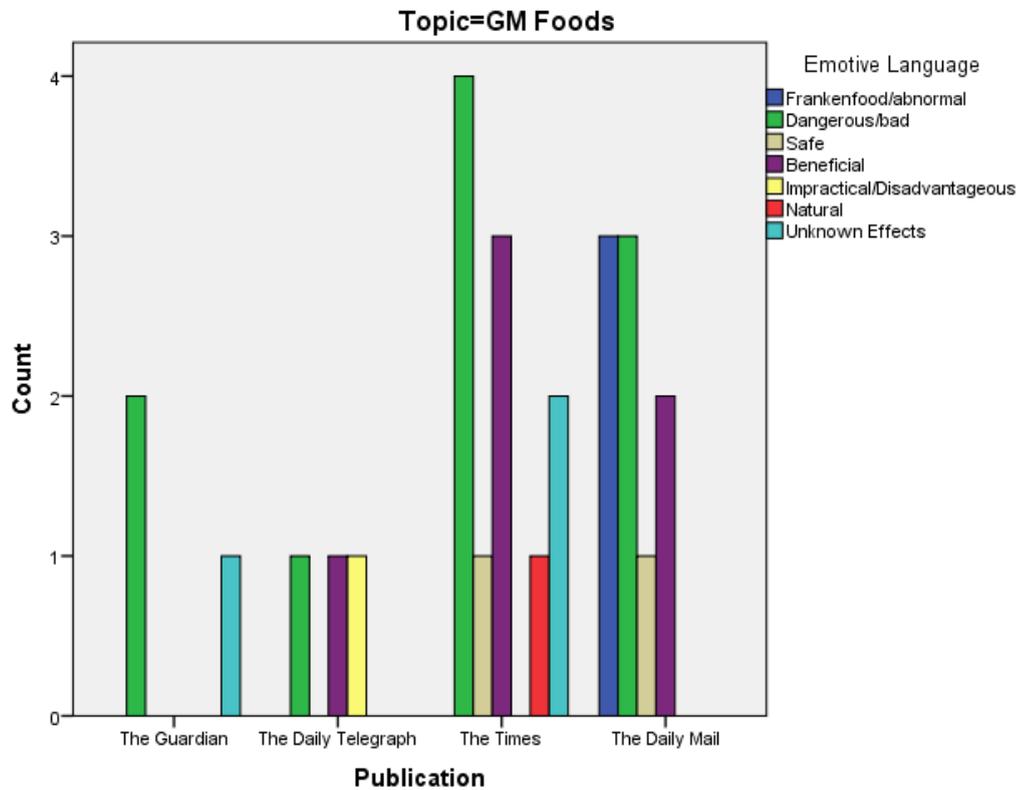


Figure 7. Cross-Tabulation Results of Publication, Emotive Language, and Year – 2015

Publication * Emotive Language * Topic



Looking at a cross tabulation of publication, emotive language, and topic, we notice that the most common emotive language for articles focusing on GM foods is *dangerous* and *beneficial*, most of which are published by *The Times*, as also evidenced in the prior crosstab data. Apart from the two emotive languages, another common emotive language that emerged for GM foods is *Frankenfood*, which was most used by *The Daily Mail* (Figure 9).

Figure 8. Cross-Tabulation Results of Publication, Emotive Language, and Topic – GM Foods

Of the articles that focused on organic foods, the most commonly utilized emotive language is *Impractical* (for *The Daily Telegraph*), and *Expensive* (for *The Times*) (Figure 10).

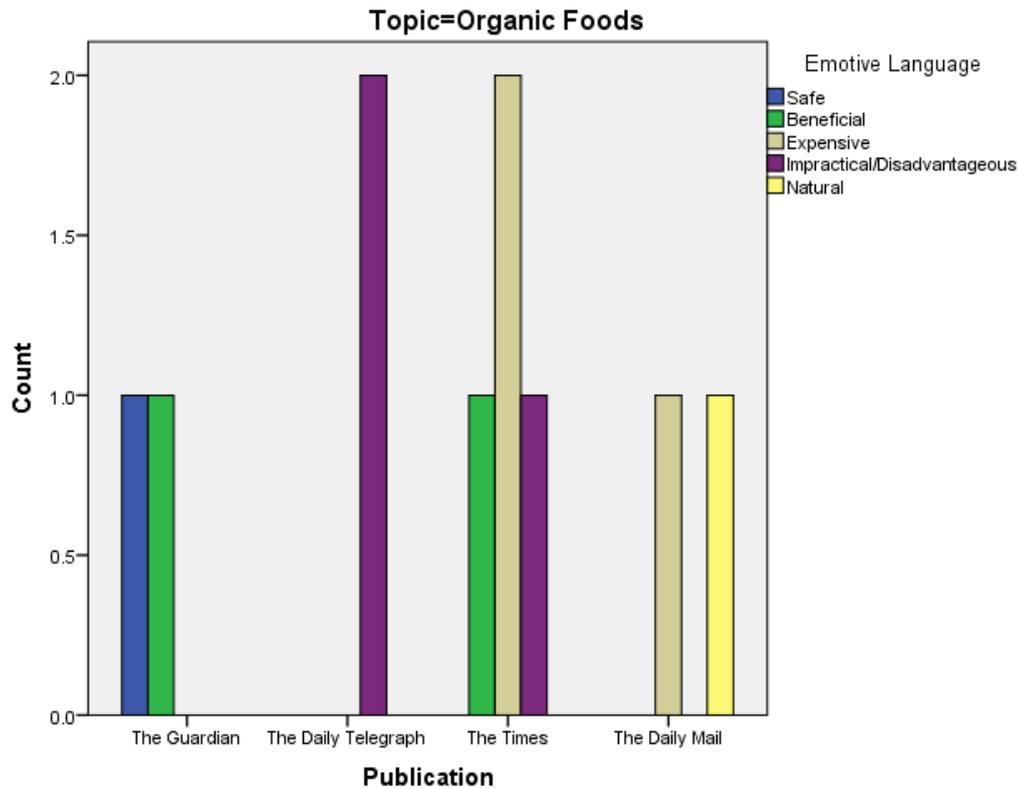


Figure 9. Cross-Tabulation Results of Publication, Emotive Language, and Topic – Organic Foods

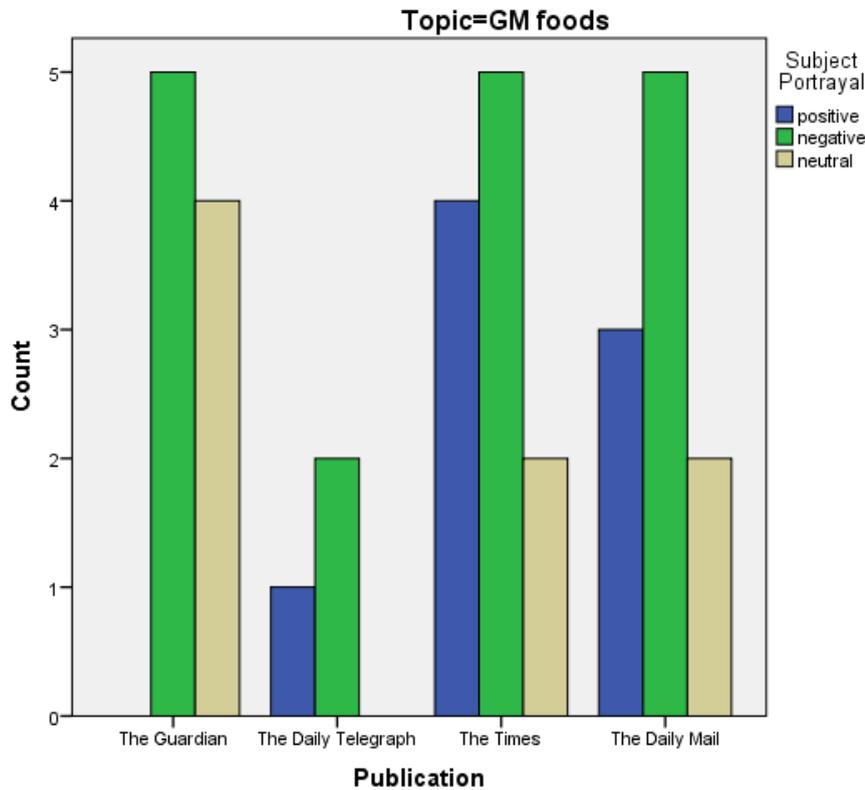
E. Subject Portrayal

In terms of subject portrayal, nearly half (45.7%) of the articles portrayed the subjects – GM and organic foods – in a negative light; almost a third were neutral (28.3%), and a little more than a quarter showed both subjects positively (26.1%) (see Table 14). This reinforces the results of the cross tabulation in the previous section, which shows that the emotive language often used to portray the articles are *Dangerous* and *Frankenfood*, both of which are considered to be negative traits.

Table 14. Frequency Distribution per Subject Portrayal

Subject Portrayal	Frequency Count	Valid Percent
Positive	12	26.1%
Negative	21	45.7%
Neutral	13	28.3%

Publication * Subject Portrayal * Topic



Of the articles that focused on GM foods, the portrayal is mostly negative, with the *Guardian*, *The Times*, and *The Daily Mail* publishing five articles each that talk about GM negatively. Among the four publications, *The Daily Telegraph*, *The Daily Mail*, and *The Times* all had at least one positive article about GM foods, while the *Guardian* had none. On the other hand, the *Guardian*, *The Times*, and *The Daily Mail* had at least two published articles that were neutral about the topic, while *The Daily Telegraph* had none (Figure 11).

Figure 10. Cross-Tabulation Results for Publication, Subject Portrayal, and Topic – GM Foods
 Articles that focused on organic food depicted it mostly in a positive light, with *The Guardian* and *The Times* each writing two positive articles about it. All publications wrote one article that was neutral about the topic. Of the four publications, *The Daily Telegraph*, *The Times*, and *The Daily Mail* each had at least one negative article on organic foods. The *Guardian* had no article portraying organic foods negatively (Figure 12).

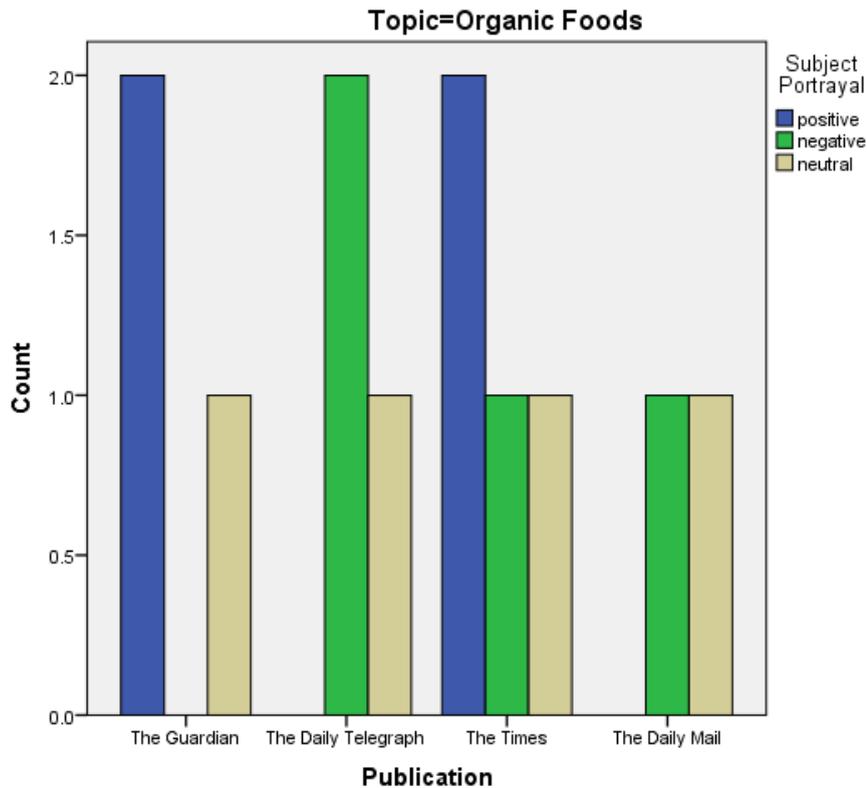


Figure 11. Cross-Tabulation Results for Publication, Subject Portrayal, and Topic – Organic Foods

Publication * Subject Portrayal * Year of Publication

Considering the year when the newspapers were published and how both subjects were portrayed reinforces the earlier results of a cross tabulation between emotive language, publication, and year. Most of the articles published in 2003 depicted both subjects negatively, while those published in 2015 were either neutral or positive. The graphs below use an aggregate of all 46 articles published on organic and GM foods and crosses it with the year published and how they were portrayed (Figures 13 and 14).

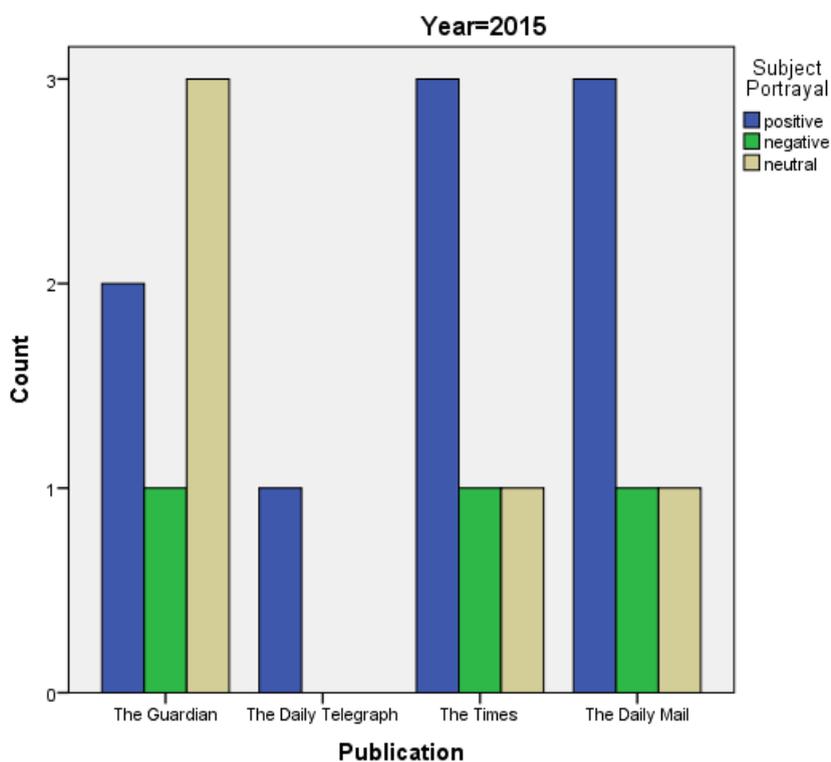
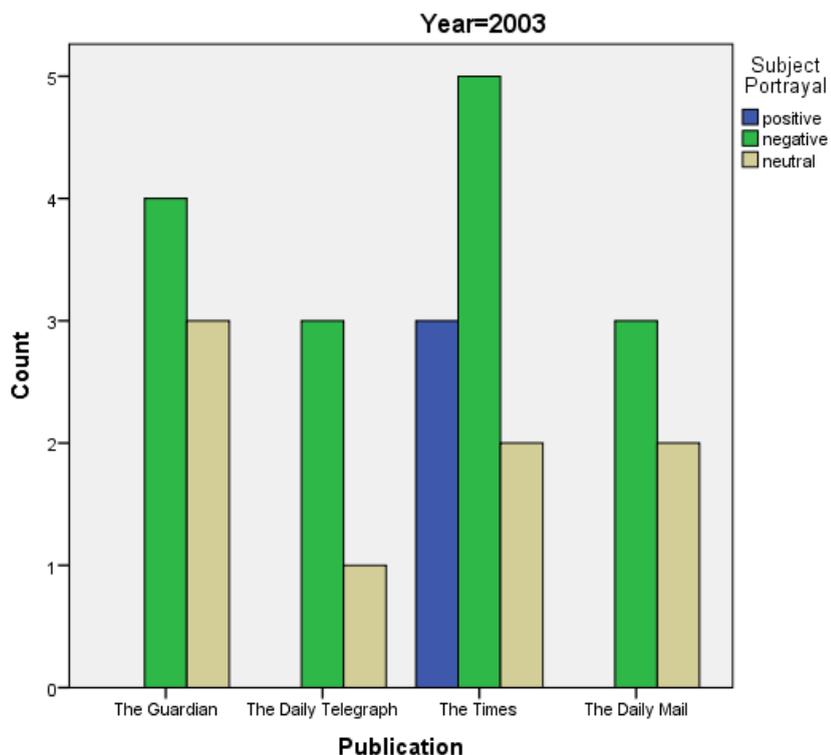


Figure 12. Cross-Tabulation Results for Publication, Subject Portrayal, and Year of Publication – 2003

Figure 13. Cross-Tabulation Results for Publication, Subject Portrayal, and Year of Publication – 2015

Topic * Subject Portrayal * Year of Publication

When looking at a cross between specific topics, year published, and subject portrayal, it is evident that a large number of the articles in 2003 portrayed GM foods negatively, right when the whole debate on GM began in the United Kingdom. Several articles were neutral, and very few talked about it in a positive light.

On the other hand, given that there are only a handful of articles about organic foods in 2003, the cross shows an equal number of articles portraying it both positively and negatively (1 each). Two articles talk about it in a neutral tone (Figure 15).

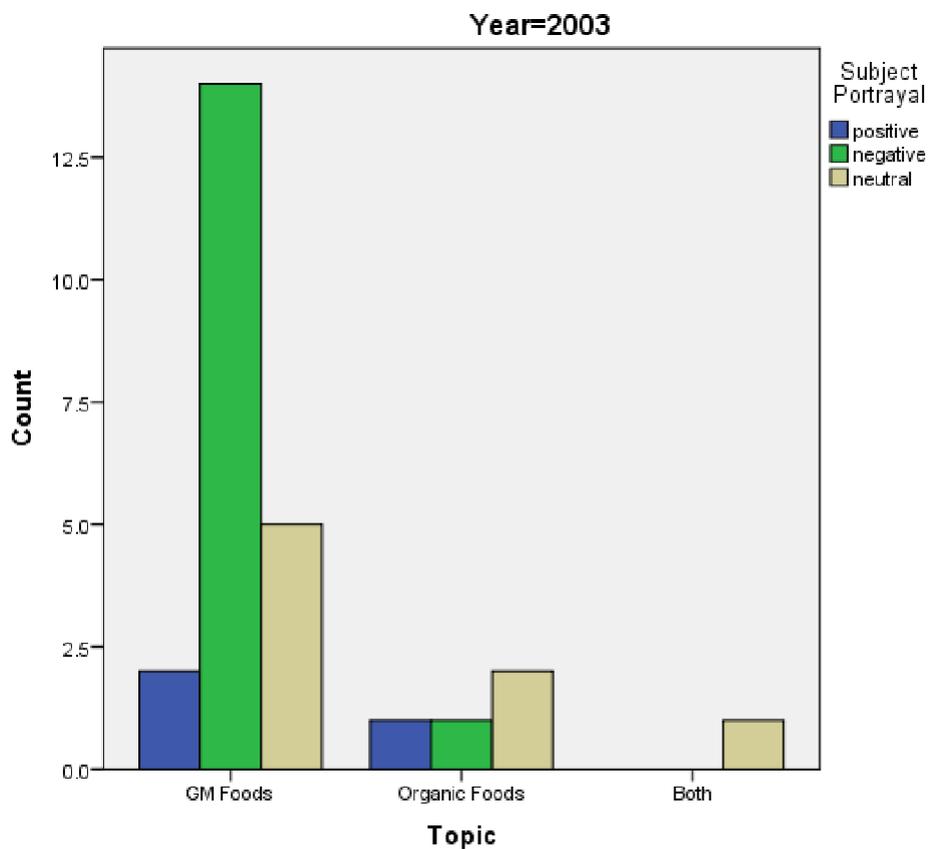


Figure 14. Cross-Tabulation Results for Topic, Subject Portrayal, and Year of Publication – 2003

In the graph below (Figure 16) that uses the same cross-tabulation results, we can see that in 2015, the tides turned and a majority of the articles portray both GM and organic foods in a positive (52%) or neutral (29%) light. Similar trends can be observed for both subjects where there are almost twice the number of positive articles for each negative article. There are also more neutral articles than negative ones for both topics.

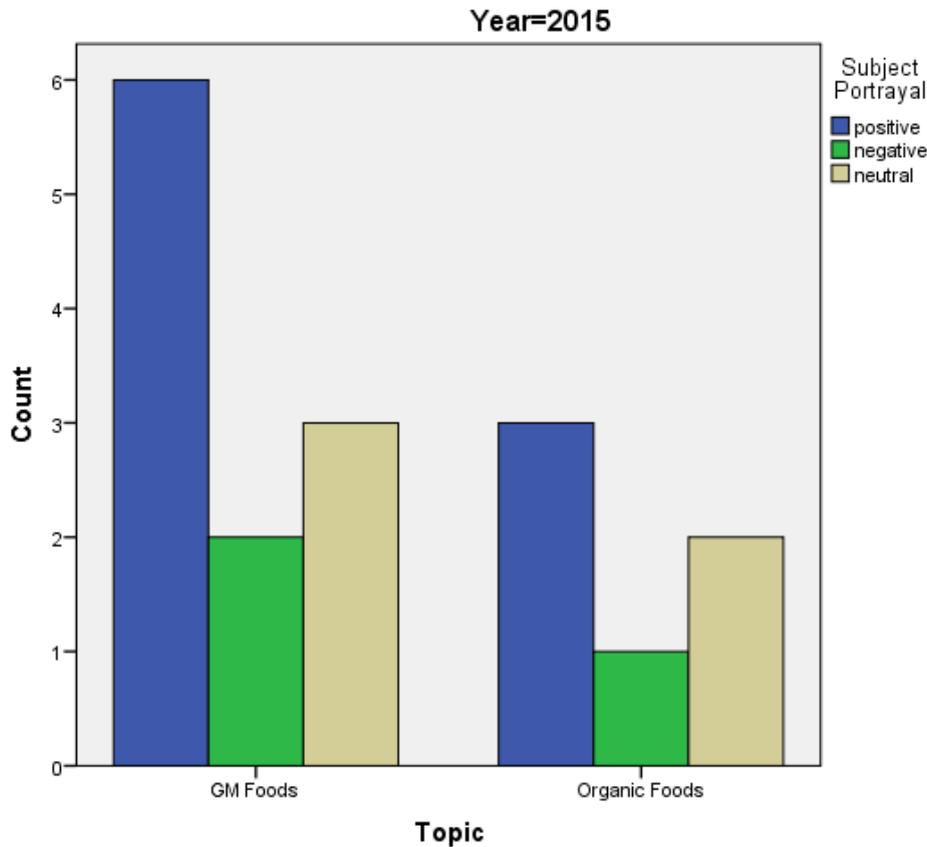


Figure 15. Cross-Tabulation Results for Topic, Subject Portrayal, and Year of Publication – 2015

F. Conclusion

The content analysis yielded a wealth of data, enabling the researcher to address the first objective of the content analysis, which is to determine how GM and organic foods were portrayed in articles published in major UK newspapers for the specified years.

Mainly, the findings from the content analysis showed that most of the newspapers in Britain in 2003 favoured organic foods or tended to depict them in a neutral light. It showed that some newspapers portrayed the issue of GM foods as *Dangerous* and *Frankenfood*. However, things changed a bit in 2015, when GM and organic foods were both portrayed in a more positive light.

Conversely, the content analysis results illustrated that for GM foods, *GM-related government and trade policy* as well as *safety/health issues related to the consumption of GM foods* were the most common themes. However, for organic foods, the most common theme was *public opinion on organic foods*.

5-2 Key Informant Interviews Findings

A- Findings

The general research question of the role of public relations and newspapers in influencing public attitudes toward GM and organic foods was investigated through the interviews. In addition, specific questions were asked of each interviewee depending on his or her area/s of specialism. Appendix 7.2 provides details on the interview guide questions.

In general, the interviewees had little doubt that the media and mainstream newspapers influence public opinion. Dr. Williams, a lecturer at Cardiff University School of Journalism and Cultural Studies, stated:

The media does influence public opinion in different ways...their attitudes and behaviours as well. [It] tends to work its influence by repetition of particular frames, messages, narratives or ways of seeing something in particular...Therefore, the same idea...gets repeated, repeated and repeated...When people are exposed to repeated messages for a long period of time, they adopt these messages and integrate them into parts of their worldviews...However, certain dominate (sic) frames, messages on particular key issues that the media focus on, and then have their influence on both the way we view the world when we talk about it to others and the way we act in the world based on the information we received.

However, media organizations, in this case, newspapers, also follow public opinion to create a following among their audiences. Mr. Green, a PR professional and lecturer at Cardiff University, stated in his interview, “The media is...the follower of the public in terms of people maybe having a long-established interest or views, and the media then is surfing on the back of that as opposed to leading and directing.”

Another interesting finding from the interviews with Dr. Williams and Mr. Green was that there is no single determining factor for influencing public opinion on risk and scientific issues. On the contrary, a variety of factors can influence public opinion. According to Mr. Green, “There is no simple link between cause and effect, but rather a complex issue of different influences”. Similarly, Dr. Williams gave an example how the debate around the risk of getting lung cancer from smoking would generate a whole range of competing interest groups, all of whom seek to influence public opinion on the issue.

Regarding the questions about how the journalism industry handles sensitive issues such as those concerning health and science, Dr. Williams, Mr. X, and Ms. Y agree that the way in which journalists deal with scientific issues is dependent on the organisations they work for. Tabloid

newspapers may choose to sensationalise the issue, whilst other newspapers may try to explain them in a more fact-based format.

When asked about how GM and organic foods and products were portrayed by British mass media, especially newspapers, Mr. X answered that the British press is hugely inconsistent when dealing with GM foods. Some newspapers will print almost anything in order to attract attention and sell newspapers even if it meant sacrificing truth. An example he gave is that of a newspaper that had been running regular scare articles on GM foods, specifically *The Daily Mail* with its famous *article* titled “Frankenfood”. However, Mr. X seems confident that some newspapers, such as *The Times*, quote scientific sources and attempt to give the public an honest view of scientific developments in this field.

Mr. Green believes in the power of what he called “memes” when dealing with scientific issues. In his interview, he said that memes [are] information that [is] able to replicate itself, and unfortunately, GM foods have been labelled as “Frankenstein food”. Meanwhile, there is a complex situation behind labelling organic foods. In some cases, the idea that this labelling leads to problems to the environment is propagated. Others depict it as an environment-friendly alternative. In the end, Mr. Green comments that “All communication [is] emotionally driven rather than based in fact and rational decisions”.

Liz O’Neil, Director of GM Freeze (Friends of the Earth Organization Cardiff), criticised the British media’s way of dealing with issues related to GM and organic foods. Ms. O’Neil stated:

Most of the British press [are] not accurate or balanced on any subject at all! With food and farming, there is a constant focus on human health. Stories on GM and organic food focus very heavily on what advantages or disadvantages they may have for human health (are they “safe”?) when in fact the biggest differences are in the environmental, social and ethical spheres. These rarely get a look [at] with media coverage. I have...given interviews with the vast majority of my content focused on social and ethical concerns about GM. These interviews have been edited in a very unbalanced way so that only my very brief comments relating to potential safety risks have been included. This gives a very inaccurate and misleading picture of the nature of public objection to GM.

Aside from the unbalanced means of reporting and focusing only on certain sound bites, Ms. O’Neil was also able to see the difficulties of a binary approach—even if it meant that organics were given an accolade from the newspapers. She pointed out that the discussion could be much more far-reaching, as there were other forms of food production that were not necessarily related to GM or organically driven principles.

In terms of the influence of PR materials on the journalism industry, three out of five interviewees agree that the media relies on public relations information when it comes to scientific and food issues. According to Ms. Y:

PR professionals may provide information about a current topic on behalf of a client to the media. They could suggest case studies for this story to illustrate a point, but journalists will usually require several representatives to speak on one topic. PR professionals may also provide video footage to use in press or online stories.

Moreover, Dr. Williams believes:

...journalists get less time and resources to do their jobs, and this means they are much more reliant on public relations and on information given to them by news sources...Journalists' work about science is therefore confined to processing information and putting it on news outlets rather than checking and critiquing the information and getting other sources to comment.

B- Conclusion

There was a slight tendency for interviewees to favour the newspapers and articles sympathetic to the interests of the organisation they worked with, as should be expected. However, all of them were willing to accept evidence and reasoned arguments discussed in the newspapers. On the one hand, the interviewee who had been employed in the GM field was particularly irritated with the unfairness and lack of science involved in a number of press attacks on GM foods. On the other hand, the interviewee who worked for the organisation promoting organic foods and organic farming believed that to support organic food and farming means to embrace a set of values that are fundamental to the practice. She said particularly that food should be produced in a responsible, fair, and sustainable way and that organic farming was working towards these values. While these are admirable beliefs, they are perhaps less open to proof.

It is striking to recognise the degree to which all the interviewees from the different areas of specialization agreed that newspapers are often biased and much too influenced by biotech companies and PR information. However, they also agreed that some newspapers were much more reliable than were others. Interestingly, the majority of the interviewees realize the major problems caused by simplistic reporting, and there is agreement on the need for more honest scientific reporting from journalists who have been given the task to search for facts and evidence on concerns that may arise with regard to major scientific issues such as GM and organic agriculture and products. The interview answers also found journalists often depend on information that comes from "information subsidies" and PR materials.

5-3 Focus Group Discussion Findings

A- Findings

The three focus groups conducted for this study aimed to provide more in-depth insight into public attitudes to GM and organic foods, as well as discover whether newspapers play a role in influencing public opinion on said subjects. Three FGDs were conducted with three age groups to determine if attitudes towards GM and organic foods varied depending on their demographics. Interestingly, the participants' perceptions and attitudes to GM and organic foods were just as diverse, ranging from accepting the idea of GM foods to resisting GM foods and favouring organic foods.

Those who favour GM believe that the technology can help feed the growing population, eradicate famine, and save many lives in the world. According to Mr. Ian:

I personally am fairly open minded about it....We have to give scientists the right to do experiments to see if they can produce GM foods which are healthy, because the world needs more food to feed the increasing population. People would argue that purely traditional farming methods and organic farming never could feed or produce enough food for everybody.

Similarly, Mr. Raymond states:

To improve the yields and crops, farmers choose different varieties and methods and one of them is GM variety. The purpose of feeding the world is the main advantage of using GM foods, improving yield, and therefore save people from famine and starvation.

Conversely, some participants rejected the idea of GM foods and attributed their attitudes to the fact that there is a lack of evidence regarding the advantages and disadvantages of said technology. According to Ms. Valgria, "I would not buy GM foods...However, if there were scientific evidence to prove the benefits, I would go for GM foods". Meanwhile, Ms. Yiren is afraid of GM foods and tries to avoid them, but if she received basic information regarding benefits and drawbacks of GM foods in a simple way, then she would consider buying them.

The question regarding the differences between GM and organic foods generated a number of answers. According to Ms. Kahmile, there are some differences between the two. For her, GM foods look perfect, shiny, and attractive, whereas organic foods look more natural. Ms. Kahmile, as an example, said she would prefer certain potatoes at Tesco over the GM variant because she "knows where they come from".

However, Mr. Ian believes there is no difference between GM and organic foods. Mr. Ian said:

Overall, scientists cannot prove that organic is better. Generally, they say...there is very little difference [in practice]. Those opponents—commercially interested—would argue [that] there is a difference, and they will find some scientist to back up their argument. The consensus is that organic foods are not better than non-organic foods and GM foods. Organic and non-organic and GM foods are probably [just] three

different methods, really. Additionally, most participants consider price to be a main deciding factor when purchasing, and the chief difference between GM and organic foods. According to Ms. Heather, Ms. Jo, Mr. Stephen, Ms. Z-amin, Ms. Bakyt, and Ms. Yiren, organic foods are the most desirable food to eat, but they are expensive and not possible for everybody to consume daily.

The role of newspapers in influencing public perception and attitudes toward GM and organic foods was also covered in the discussions. Interestingly, only three out of the 15 participants declared they acquired their information about GM and organic foods from newspapers; other participants received their information from different communication channels such as the internet, TV, radio, social media, and other channels. Mr. Yuanjie adds:

I agree newspaper has its own purpose; you buy it to read about the news, not about foods. If you are waiting at doctor services and there are shelves of books and magazines, that is where you get informed about these kinds of subjects. Magazines probably, but not newspapers.

Despite conflicting opinions regarding the influence of newspapers on how the public perceives GM and organic foods, the majority of participants declared that newspapers have little or no influence on their attitudes to said subject. This came to light when participants were shown photos and information from newspaper articles to stimulate the discussion and assess their attitudes about GM and organic foods. Hence, the findings show that the majority of participants had a critical mind and were not influenced by the photos and information they saw and read. According to Mr. Simon, “The article gives a lot of more [sic] information about who is saying what. I do not think it particularly influences my opinion because what come [sic] out from the discussion is such a lot [sic] of very specialist details”. Meanwhile, Ms. Bakyt said, “The article is telling you that GM foods are bad for you, but there is no evidence to back up the argument. It is just telling opinions [sic] of some people”.

B- Conclusion

The aim of the FGDs was not to find consensus; it was to generate a discussion and learn the insights and viewpoints of the public towards GM and organic foods, as well as to determine whether public attitudes were influenced by newspaper articles. The sample utilised in the FGDs consisted of three different groups. The first group (A) was post-graduate students between the ages of 18 and 40. The second and the third groups (B and C) were aged 41- 63 and 64 and above, respectively, who were either employed or retired. Therefore, using maximum variation, the FGDs attempted to examine whether young adults may be more willing to accept the technology of GM foods in comparison to the two other groups. It also provided more insight into the attitudes of certain groups of people toward the topic.

Interestingly, the focus group findings revealed that in the group of the younger generation, all of whom were studying for a post-graduate qualification—two out of five—were wary about the issues of GM foods; they expressed a need for more evidence on the advantages and disadvantages of GM foods to really understand the issue. However, in the B and C groups, the majority of participants (9 out of 10) showed some positive attitudes to the subject of GM foods. This indicated that the younger generation was slightly more likely to be in doubt about the technology of GM foods and generally more inclined to favour organic foods in comparison to older generations. However, the majority of participants in the three FGDs regarded organic foods as the more desirable food between GM and organic, but they agree that organic foods are expensive and not affordable for everyone and GM foods were cheaper.

The research also revealed that only three out of all 15 participants in the FGDs relied on newspapers for their information about GM and organic foods. Amongst the 12 participants who reported not being particularly influenced by newspapers, there was agreement that they received their information from other communication channels such as the internet, TV, radio, social media, and other channels such as personal experience, health organizations, and others.

6- Focus for Further Research

While conducting this research and from various sources in the literature review there have been many references and examples of the United Kingdom, along with other European governments, setting policies and guidelines for the use of GMOs and organic foods. The FGD findings revealed that overall, participants did not feel fully informed about GM and organic foods and insisted they needed far more evidence on the advantages and disadvantages before forming an opinion. Hence, improved communication and information dissemination campaigns from the government could allow the public better understand the implications of both types of food production. On top of this, generating and publicizing more information from trusted and reliable sources could create a public that is more willing to accept and support GMOs and GM food. The production of GM and organic foods will always bring the necessity for further research, as it is constantly a matter of public interest. Therefore, new concerns will abound and create a need for the measured views of scientists, food industry experts, and governments supported by journalists and an ethical PR industry to give the public confidence that the sources of any information published and realize that changes are a safe and healthy way forward.

In the future, I would like to assess the influence of social media, Twitter in particular, and its ability to persuade the Saudi public regarding health matters in general and especially on the subject of GM and organic foods since Saudis are among the world's heaviest Twitter users (BBC

News 2014). This could add valuable information and extend understanding of the subject being researched. This study could make use of both positivist and interpretive approaches, in particular the use of survey questionnaires (quantitative) and FGDs or KIIs (qualitative) to thoroughly address the research questions.

– Bibliography

- Allan, S. (2002). *Media, risk and science*. Buckingham: Open University Press
- Anderson, A. (1997). *Media, culture and the environment*. London: UCL Press
- Anderson, E. (2016). Organic food sales surge to hit almost £2b. *The Telegraph* 23 February 2016, p.1
- Arntzen, C. et al. (2003). GM crops: science, politics and communication. *Nature Reviews Genetics* 4 (10), pp. 839-843. doi: 10.1038/nrg1185
- Avery, D. (1999). The fallacy of the organic utopia. In: Morris, J. and Bate, R. eds. *Fearing food: risk, health and environment*. Oxford: Butterworth-Heinemann, pp. 3-18
- Azadi, H. and Ho, P. (2009). Genetically modified and organic crops in developing countries: a review of options for food security. *Biotechnology Advances* 28 (1), pp. 160- 168. doi:10.1016/j.biotechadv.2009.11.003
- Babbie. (2016). *The practice of social research* [eBook version]. The USA: Cengage Learning. Available at: <https://www.dawsonera.com/readonline/9781473732315> [Accessed: 15 April 2017]
- Bailey, R. (2002). Dr. Strangelunch: Why we should learn to love genetically modified food. In: Pence, G. eds. *The ethics of food a reader for the twenty-first century*. The United States of America: Rowman& Littlefield Publishers, Inc., pp. 100-115
- Barthel, M. (2016). *Newspapers: Fact Sheet*. Washington, DC: Pew Research Center [Online]. Available at: <http://www.journalism.org/2016/06/15/newspapers-fact-sheet/> [Accessed: 25 May 2017]
- BBC News. (2014). *BBC Trending* [Online]. Available at: <http://www.bbc.co.uk/news/blogs-trending-25864558> [Accessed: 4 August 2017]
- Bellotti, E. and Panzone, L. (2016). Media effects on sustainable food consumption. How newspaper coverage relates to supermarket expenditures. *International Journal of Consumer Studies* 40 (2), pp. 186- 200. doi: 10.1111/ijcs.12242
- Bengtsson, M. (2016). *How to Plan and Perform a Quantitative Study using Content Analysis*. *NursingPlus Open* 2352-9008 (2), pp. 8-14. doi: 10.1016/j.npls.2016.01.001
- Bernard, H. (2013). *Social research methods: qualitative and quantitative approaches*. 2nd ed. Los Angeles, London: SAGE Publications
- Blair, R. and Regenstein, J. (2015). *Genetic modification and food quality: a down to earth analysis*. United Kingdom: John Wiley and Sons Inc. Available at: <http://onlinelibrary.wiley.com/book/10.1002/9781118823644> [Accessed: 13 June 2017]
- Brainard, C. (2012). *The good news about organics* [Online]. Available at: http://www.cjr.org/the_observatory/organic_food_versus_convention.php [accessed: 15 May 2017]
- British Journal of Nutrition. (2014). Higher antioxidant and lower cadmium concentrations and lower incidence of pesticides residues in organically grown crops: a systematic literature review and meta- analyses. *British Journal of Nutrition* 112 (5), pp. 794-811. Available at: <https://doi.org/10.1017/S0007114514001366> [Accessed: 20 January 2017]

- Bryman, A. (2012). *Social research methods*. 4th ed. United States: Oxford University Press Inc
- Burke, D. (2004). *GM Food and Crops: What Went Wrong in the UK?* Maryland: National Center for Biotechnology Information [Online]. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1299063/> [Accessed: 25 May 2017]
- Burton, M. et al. (2001). Consumer attitudes to genetically modified organisms in food in the UK. *European Review of Agricultural Economics* 18 (4), pp. 479-498
- Cahill, S. et al. (2010). Coverage of organic agriculture in North American Newspapers: media: linking food safety, the environment, human health and organic agriculture. *British Food Journal* 112 (7), pp. 710-722. doi 10.1108/00070701011058244
- Callup. (2013). *Nutrition and Food* [Online]. Available at: <http://www.gallup.com/poll/6424/nutrition-food.aspx> [Accessed: 18 March 2017]
- Carroll, C. (2016). *The SAGE encyclopedia of corporate reputation*. California, United Kingdom, New Delhi and Singapore: SAGE Publications, Inc. Available at : <https://books.google.co.uk/books?hl=en&lr=&id=g3-zDAAAQBAJ&oi=fnd&pg=PP1&dq=The+SAGE+Encyclopedia+of+Corporate+Reputation&ots=6D1hKDUdLX&sig=wkpS9VGF3A3piaafqmNMuBMMF72I#v=onepage&q=The%20SAGE%20Encyclopedia%20of%20Corporate%20Reputation&f=false> [Accessed: 23 June 2017]
- Ceccoli, S. and Hixou. W. (2011). Explaining attitudes towards genetically modified foods in the European Union. *International Political Science Review* 33(3), pp. 301-319 doi: 10.1177/0192512111418788
- Cohen, B. (1963). *The press and foreign policy*. New Jersey: Princeton University Press
- Craven, B. and Johnson, C. (1999). Politics, policy, poisoning and food scares. In: Morris, J. and Bate, R. eds. *Fearing food: risk, health and environment*. Oxford: Butterworth-Heinemann, pp. 141-169
- Curtin, P. (1999). Reevaluating public relations information subsidies: market-driven journalism and agenda-building theory and practice. *Journal of Public Relations Research* 11 (1), pp. 53-90. doi:10.1207/s1532752xjpr1101_03
- Curtis, K. et al. (2003). Consumer acceptance of genetically modified food products in the developing world [Online]. Available at: <http://www.agbioforum.org/v7n12/v7n12a13-mccluskey.htm> [Accessed: 30 June 2017]
- Davies, A. et al. (1995). Who buys organic food? : A profile of the purchasers of organic food in Northern Ireland. *British Food Journal* 97 (10), pp. 45-62. doi: 10.1108/00070709510104303
- Davies, F. (2008). Public relations and journalism: truth, trust, transparency and integrity [Online]. Available at: http://eprints.lincoln.ac.uk/16177/1/ddat01_staffhome_bjones_Downloads_3-15-2-PB.pdf [Accessed: 27 June 2017]
- Davis, A. (2013). *Promotional cultures: the rise and spread of advertising, public relations, marketing and branding*. UK: Polity Press
- Daymon, C. and Holloway, I. (2011). *Qualitative research methods in public relations and marketing communications*. 2nd ed. USA, Canada and New York: Routledge
- Denzin, N. and Lincoln, Y. (2013). *Strategies of qualitative inquiry*. 4th ed. Los Angeles and London. SAGE
- Durant, J. and Lindsey, N. (1999). *GM foods and the media* [Online]. Available at: <http://www.publications.parliament.uk/pa/ld199900/ldselect/ldscitech/38/3815.htm> [Accessed: 23 May 2017]
- Durant, J. et al. (1998). *Biotechnology in the public sphere*. London: Science Museum
- Eldridge, J. and Reilly, J. (2003). Risk and relativity: BSE and the British media. In: Pidgeon, N. et al. eds. *The social amplification of risk*. The United Kingdom: Cambridge University Press

Entman, R. (2007). Framing bias: Media in the distribution of power. *Journal of Communication* 57(1), pp. 163-173. doi: 10.1111/j.1460-2466.2006.00336.x

European Commission. (2007). *EU law on organic production: an overview* [Online]. Available at: https://ec.europa.eu/agriculture/organic/eu-policy/eu-legislation/brief-overview_en [Accessed: 25 May 2017]

Fagan, J. (1997). *Thirty-seven deaths due to genetically engineered L-Tryptophan?* [Online]. Available at: <http://nwrage.org/content/thirty-seven-deaths-due-genetically-engineered-l-tryptophan> Accessed: 21 June 2017

Fernandez-Cornejo, J. and Caswell, M. (2006). The first decades of genetically engineered crops in the USA. *United States Department of Agriculture* [Online]. Available at: <http://ageconsearch.umn.edu/record/33897/files/ei060011.pdf> [Accessed: 1 June 2017]

Food and Agriculture organization of the United Nations. (2017). *What is organic agriculture?* [Online]. Available at: <http://www.fao.org/organicag/oa-faq/oa-faq1/en/> [Accessed: 26 June 2017]

Food Standards Agency. (2009). *Public Attitudes to GM Food. Wales: national centre for social research.* Available at: <https://www.food.gov.uk/science/research/ssres/foodsafetyss/gmfoodpublicattitudes> [Accessed: 25 April 2017]

Frewer, L. et al. (1998). Understanding attitudes to technology. *Journal of Risk Research* 1 (3), pp. 221- 235. doi: 10.1080/136698798377141

Friedman, S. et al. (1999). *Communicating uncertainty: media coverage of new and controversial science.* Mahwah: Lawrence Erlbaum Associates, Inc

Friends of the Earth Europe. [No date]. *GMOs our vision is of European food and farming free from GM crops and corporate control* [Online]. Available at: <http://www.foeeurope.org/gmos> [Accessed: 25 May 2017]

Gandy, O. (1982). *Beyond agenda setting: information subsidies and public policy.* United States of America: Alex Publishing Corporation

Gaskell, G. et al. (1999). Worlds apart? The perception of genetically modified foods in Europe and the US. *Department of Social Psychology* 285(5426), pp. 384-387

Gene Watch. [No date]. *GM crops and foods in Britain and Europe* [Online]. Available at: <http://www.genewatch.org/sub-568547> [Accessed: 28 May 2017]

GMO Search Term. (2015). *Google Trends* [Online]. Available at: <https://www.google.com/trends/explore?date=all&q=GMO> [Accessed: 23 June 2017] Göpfert, W. (2007). The strength PR and weakness of journalism. In: Bauer, M. and Bucchi, M. eds. *Journalism, Science and Society: science communication between news and public relations.* New York: Routledge. Pp. 215-226

Government UK. (2015). *2010 to 2015 government policy: food and farming industry* [Online]. Available at: <https://www.gov.uk/government/publications/2010-to-2015-government-policy-food-and-farming-industry/2010-to-2015-government-policy-food-and-farming-industry#appendix-7-genetic-modification> [Accessed: 30 May 2017]

Greenpeace. (2016). *What is wrong with genetic engineering (GE)?* [Online]. Available at: <http://www.greenpeace.org/international/en/campaigns/agriculture/problem/genetic-engineering/> [Accessed: 26 May 2017]

Gunter, B. (2000). *Media research methods: measuring audiences, reactions and impact.* London : Sage Publications

Hannigan, J. (1995). *Environnemental sociology : A social constructivist perspective.* London:Routledge

Hansen, A. and Machin, D. (2013). *Media and communication research methods.* Basingstoke,

Hampshire: Palgrave Macmillan

Hardell, L. and Eriksson, M. (1999). A Case–Control Study of Non-Hodgkin Lymphoma and Exposure to Pesticides. *Peer Reviewed Journal* 85 (6), pp. 1353-136. doi: 10.1002/(SICI)1097-0142(19990315)85:6<1353::AID-CNCR19>3.0.CO;2-1

Hennink, M. et al. (2011). *Qualitative research methods*. London, California, New Delhi and Singapore. SAGE Publications Inc

Herman, E. and Chomsky, N. (1988). *A Propaganda Model: Excerpted from Manufacturing Consent* [Online]. Available at <https://chomsky.info/consent01/> [Accessed: 25 April 2017]

Hickman, L. (2002). *How to buy: Organic food* [Online]. Available at: <https://www.theguardian.com/lifeandstyle/2002/may/21/foodanddrink.shopping> [Accessed: 20 June 2017]

Ho, Mae-Wan. (2000). *Genetic engineering: dream or nightmare? : turning the ride on the brave new world of bad science and big business*. 2nd ed. New York: Continuum

Hoban, T. (1995). The construction of food biotechnology as a social issue. In: Maurer, D. and Sobal, J. eds. *Eating agendas food and nutrition as social problems*. New York: Walter de Gruyter, Inc, pp. 189- 209

Horlick-Jones, T. et al. (2007). *The GM debate: risk, politics and public engagement*. Abingdon: Routledge

Hornig, S. (1990). Science stories: risk, power and perceived emphasis. *Susanna Journalism Quarterly* 67(4), pp. 767-776

Hug, K. (2008). Genetically modified organisms: do the benefits outweigh the risks? *Department of Medical Ethics* 44(2), pp. 87-99

Johnston, R. (2008). The great organic myths: why organic foods are an indulgence the world cannot afford. *Independent* 30 April 2008, p.1

Kalaitzandonakes, N. et al. (2004). Media coverage of biotech foods and influence on consumer choice. *American Journal of Agricultural Economics* 86 (5), pp. 1238-1246. doi: 10.1111/j.0002- 9092.2004.00671.x

King, M. and Street, C. (2005). Mad cows and mad scientists: what happened to public health in the battle for the hearts and minds of the Great British beef consumers? In: King, M. and Watson, K. eds. *Representing health: discourses of health and illness in the media*. New York: Palgrave Macmillan

Lavrakas, P. (2008). *Encyclopedia of survey research methods*. The United State of America: A Sage Reference Publication

Lea, E. and Worsley, A. (2005). Australian consumers' food-related environment beliefs and behaviours. *Peer Reviewed Journal* 50 (2), pp. 207-214. doi: 10.1016/j.appet.2005.07.012

Len-Rios, M. et al. (2009). Health news agenda building: journalists' perceptions of the role of public relations. *Journalism and Mass Communication Quarterly* 86 (2), pp.315-331. doi: 10.1177/107769900908600204

Lewis, J. et al. (2008). A compromised fourth estate? *Journalism Studies* 9 (1), pp. 1-20. doi : 10.1080/14616700701767974

Library of Congress. (2015). *Restrictions of genetically modified organisms: England and Wales* [Online]. Available at: https://www.loc.gov/law/help/restrictions-on-gmos/england-wales.php#_ftnref48 [Accessed: 28 May 2017]

Lockie, S. (2006). Capturing the sustainability agenda: Organic foods and media discourses on food scares, environment, genetic engineering, and health. *Agriculture and Human Values* 23 (3), pp. 313- 323. doi: 10.1007/s10460-006-9007-3

- Lockie, S. et al. (2002). Eating 'Green': motivations behind organic food consumption in Australia. *Journal of the European society for Rural Sociology* 42 (1), pp. 23-40. doi:doi/10.1111/1467-9523.00200
- Machill, M. et al. (2006). The influence of video news releases on the topics reported in science journalism. An explorative case study of the relationships between science public relations and science journalism. *Journalism Studies* 7 (6), pp. 869-888. doi:10.1080/14616700600980637
- Macnamara, J. (2001). *The impact of PR on the media* [Online]. Available at: <http://www.pria.com.au/sitebuilder/resources/knowledge/files/2140/primactmedia.pdf> [Accessed: 20 June 2017]
- Magkos, F. et al. (2003). Putting the safety of organic food into perspective. *Nutrition Research Reviews* 16 (2), pp. 211-221. doi:10.1079/NRR200361
- Magnusson, M. et al. (2001). Attitudes towards organic foods among Swedish consumers. *British Food Journal* 103 (3), pp. 209-226. doi: 10.118/00070700110386755
- Marks, L. et al. (2007). Mass media framing of biotechnology news. *Public Understanding of Science* 16 (2), pp.183-203. doi: 11.1177/0963662506065054
- McCarthy, M. et al. (2008). Media risk communication- what was said by whom and how was it interpreted. *Journal of Risk Research* 11(3), pp. 375-394. doi: 10.1080/13669870701566599
- McCluskey, J. and Swinnen, J. (2011). The media and food-risk perceptions. *Science & Society Series on Food and Science* 12 (7), pp. 624-629. doi: 10.1038/embor. 2011.118
- McCombs, M. (2004). *Setting the agenda: the mass media and public opinion*. The UK: Polity Press
McEachern, M.G. and McClean, P. (2002). Organic purchasing motivations and attitudes: are they ethical? *International Journal of Consumer Studies* 26 (2), pp. 85-92
- Mintel Group Ltd. (2011). *National newspapers- UK-March 2011 strengths and weaknesses in the market* [Online]. Available at: <http://academic.mintel.com/display/571972/?highlight> [Accessed: 30 May 2017]
- Moeller, S. (1999). *Compassion fatigue: how the media sell disease, famine war and death*. New York and London: Susan D. Moeller
- Moloney, K. (2000). *Rethinking Public Relations: The Spin and the Substance*. London and New York: Routledge. Available at: https://books.google.co.uk/books?id=jsXNIVlylPsC&pg=PT132&lpq=PT132&dq=the+expansion+of+the+mass+media+is+before+our+eyes,ears+and+fingers+everyday&source=bl&ots=s1wxE1wX65&sig=UkZ2IpOT_GUVBOho8gT0PzLABVU&hl=en&sa=X&ved=0ahUKEwj6tqSAsbvUAhXQYVAKHYrBAbwQ6AEIJzAA#v=onepage&q=the%20expansion%20of%20the%20mass%20media%20is%20before%20our%20eyes%20ears%20and%20fingers%20everyday&f=false [Accessed: 25 June 2017]
- Newcastle University. (2015). *Organic vs non-organic food* [Online]. Available at: <http://www.ncl.ac.uk/press/news/2015/10/organicvsnon-organicfood/> [Accessed: 26 May 2017]
- Oxford University Press. (2009). *A dictionary of physics*. Oxford Reference: Oxford University Press. Available at <http://www.oxfordreference.com/view/10.1093/acref/9780199233991.001.0001/acref-9780199233991> [Accessed: 30 May 2017]
- Park, A. et al. (2010). *British social attitudes*. London: Sage Publications Ltd
Rangel, G. [No date]. *From Corgis to corn: A brief look at the long history of GMO technology* [Online]. Available at: <http://sitn.hms.harvard.edu/flash/2015/from-corgis-to-corn-a-brief-look-at-the-long-history-of-gmo-technology/> [Assessed: 15 June 2017]
- Reisner, A. (2003). Newspaper construction of a moral farmer. *Rural Sociology* 68 (1), pp. 46-63. doi:10.1111/j.1549-0831.2003.tb00128.x

- Rimal, A. et al. (2005). Agro-biotechnology and organic food purchase in the United Kingdom. *British Food Journal* 107 (2), pp. 84-97. doi:10.1108/00070700510579162
- Roitner-Schobesberger, B. et al. (2008). Consumer perception of organic food in Bangkok, Thailand. *Food Policy* 33 (2), pp. 112-121. doi: 10.1016/j.foodpol.2007.09.004
- Ronald, P. (2011). Plant genetics, sustainable agriculture and global food security. *Peer Review Journal* 188 (1), pp. 11-20. doi:10.1534/genetics.111.128553
- Rorchelt, R. and Nielsen, H. (2014). Public relations in science: managing the trust portfolio. In Bucchi, M and Trench, B. eds. *Routledge handbook of public communication of science and technology*. 2nd edition. London; New York: Routledge, Taylor & Francis Group
- Rowell, A. (2003). *Do not worry: it is safe to eat*. The UK and USA: Earthscan Publications Ltd
- Rowland, I. (2002). Genetically modified foods, science, consumers and the media. *Proceedings of the Nutrition Society* 61 (1), pp. 25-29. doi: 10.1079/PNS2001135
- Seale, C. (2005). *Media and health*. London, California and New Delhi: SAGE Publications Ltd
- Shiva, V. (2014). Biofortification, Genetic engineering and corporate interests: false solutions to malnutrition. *Society for International Development* 57 (2), pp. 268-273. doi: 10.1057/dev.2014.71
- Shrader-Frenette, K. (2005). Property Rights and Genetic Engineering: Developing Nations at Risk. *Science and Engineering Ethics* 11 (1), pp. 173-149
- Smith-Spangler, C. et al. 2012. Are organic foods safer or healthier than conventional alternatives? *Annals of Internal Medicine* 157 (5), pp. 348-366. doi:10.7326/003-4819-157-5-201209040-00007
- Snap Surveys. (2014). Advantages and Disadvantages of Face-to-Face Data Collection [Online]. Available at: <https://www.snapsurveys.com/blog/advantages-disadvantages-facetoface-data-collection/> [Accessed: 19 July 2017]
- Soil Association. (2016). *Organic market report 2016* [Online]. Available at: <https://www.soilassociation.org/news/2016/organic-market-report-2016/> [Accessed: 1 June 2017]
- Soil Association. [No date]. *What is Organic?* [Online]. Available at: <https://www.soilassociation.org/organic-living/what-is-organic/> [Accessed: 24 May 2017]
- Spencer, B. (2014). Top civil servants rely on newspapers: study finds the papers are still among the most influential sources of information. *Mail Online*. 2 April 2014
- Stanton Team. (2013). *Why Newspapers Still Matter*. USA: Stanton Communications [Online]. Available at: <http://stantoncomm.com/four-on-Friday-why-newspapers-still-matter> [Accessed: 25 May 2017]
- Study.com. [No date]. *Purposes of Research: Exploratory, Descriptive, and Explanatory* [Online]. Available at: <http://study.com/academy/lesson/purposes-of-research-exploratory-descriptive-explanatory.html>. [Accessed on 25 April 2017]
- Tanner, A. (2004). Agenda building, source selection, and health news at local television stations: a nationwide survey of local television health reporters. *Science Communication* 25 (4), pp. 350-363. doi: 10.1177/1075547004265127
- Taskiridou, E. et al. (2008). Altitudes and behaviour towards organic products: an exploratory study. *International Journal of Retail and Distribution management* 36 (2), pp. 158-175. doi: 10.1108/09590550810853093
- TechSciResearch. (2015). *US organic foods market poised to surpass USD45 billion in 2015* [Online]. Available at: <https://www.techsciresearch.com/news/333-us-organic-foods-market-poised-to-surpass-usd45-billion-in-2015.html> [Accessed: 16 June 2017]

The Economist. (2010). *The developing world embraces a controversial technology* [Online]. Available at: <http://www.economist.com/node/15580864> [Accessed: 30 June 2017]

The European Food Information Council. (2013). *Organic food and farming: scientific facts and consumer perceptions* [Online]. Available at: http://www.eufic.org/article/en/expid/organic_food_and_farming_scientific_facts_and_consumer_perceptions/ [Accessed: 21 May 2017]

The Pew Research Centre (2010). *Millennials: Confident. Connected. Open to Change* [Online]. Available at: <http://www.pewsocialtrends.org/2010/02/24/millennials-confident-connected-open-to-change/> [Accessed: 13 April 2017]

The Telegraph. (2016). It is only natural: the benefits of eating organic food. *The Telegraph* 27 May 2016, p. 1

Timmins, C. (2010). *Consumer attitudes towards organic food: survey of the general public* [Online]. Available at: http://www.organiccentrewales.org.uk/uploads/ca_survey_br_phase_2_report.pdf [Accessed: 29 May 2017]

Urena, F. et al. (2008). Women, men and organic food: differences in their attitudes and willingness to pay. A Spanish case study. *International Journal of Consumer Studies* 32 (1), pp. 18-26. doi: 10.1111/j.1470-6431.2007.00637.x

Uzogara, S. (2000). The impact of genetic modification of human foods in the 21st century: a review. *Biotechnology Advances* 18 (3), pp. 179-206. doi:10.1016/S0734-9750(00)00033-1

Verbeke, W. et al. (2000). Probit analysis of fresh meat consumption in Belgium: exploring BSE and television communication impact. *Peer Reviewed Journal* 16 (2), pp. 215-234. doi: 10.1002/(SICI)1520-6297(200021)

Vilella-Vila, M. and Costa-Font, J. (2008). *Press media reporting effects on risk perceptions and attitudes towards genetically modified (GM) food*. The journal of Socio-Economics 37 (5), pp. 2095-2106. doi: 10.1016/j.socec.2008.04.006

Weigold, M. (2001). Communicating science: a review of the literature. *Science Communication* 32(2), pp. 164-93. doi: 10.1177/1075547001023002005

Williams, A. and Gajevic, S. (2013). Selling Science? *Journalism Studies* 14(4), pp. 507-522. doi: 10.1080/1461670x.2012.718576

Wilson, M. et al. (1999). Genetic modification in context and perspective. In: Morris, J. and Bate, R. eds. *Fearing food: risk, health and environment*. Oxford: Butterworth-Heinemann, pp.58-77

Wimmer, R. and Dominick, J. (2006). *Mass media research: an introduction*. 8th ed. The USA: Thomson Wadsworth

World Health Organization. [No date]. *Food genetically modified* [Online]. Available at: http://www.who.int/topics/food_genetically_modified/en/

[Accessed: 22 June 2017]