The manipulating effect of the Google search engine on users' ethical decision making

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ABSTRACT,

Search engines have made it possible for its users to find the most relevant answers to the questions that they are looking for. However, search engines like Google, personalise their search results, which means that users are only exposed to information that Google thinks is most relevant and cannot access all the information that is available online. This can lead to the case that a user is not exposed to contradicting views when it comes to ethical issues. To measure if there is indeed a bias on the Google search engine for ethical issues a survey was conducted that compared more than 100 search results of students of different nationalities for search queries related to ethical issues. This study measured how often search results were one-sided towards an issue being either ethical or unethical. The results show that on average the search results are significantly biased towards an action being unethical when considering the first four search results. This is the case for not only Google but also for DuckDuckGo, which is a search engine that does not collect personal user information Especially if an issue is not considered as being of high importance to individuals, personalised search engines could therefore influence user's ethical decision making in the long term by only showing them one-sided search results.

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Keywords

Google search engine, personalised search results. one sided ethical views, filter bubble, selected exposure, personalisation of search engines

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1. INTRODUCTION

Search engines have become an important part of our daily lives. These search engines, like Bing or Google, have made it possible for its users to find the most relevant search results in an enormous mass of data that is available on the internet. The most used and best-known search engine in the world is Google. People rely on Google for not only research purposes but also to make purchase decisions or to get updates on what is happening in and around the world.

What many users do not know about, however, is the fact that their search results are being personalised. By collecting data and creating a digital identity of its users, Google is able to adjust its search results and only provides the user with information in the end that Google thinks is most relevant.

This personalisation leads to the "filter bubble" effect, stating that not all information is available to the individual user and he is only exposed to information that has been filtered to fit his needs (Pariser, 2011). The result page will therefore only show page results that the search engine thinks the user wants to see. This means that some potentially important or relevant information can stay hidden to a user. It has been proven that content diversity that the user is exposed to decreases due to this algorithmic filtering (Helberger, Karppinen, & D'Acunto, 2018). But this filter bubble effect also has its benefits, as people would not like to have access to all available information. This is the case, because different people can have different needs when entering specific keywords into a search engine. An example for such a need-based research is the use of the word "code". While a lawyer would refer to a set of rules or, hence, the law, an IT specialist will be more interested in "codes" referring to metadata. And then again, a scientist can be more interested in results referring to a "code" as an encrypted language. If different users would therefore type in the same keywords into the search engine, they can expect to receive different results and rankings.

The ranking of the search results is especially important because it has been proven that users tend to pay more attention to the results that rank higher on the page and behave differently according to the position in the ranking (Pan et al., 2007; Bar-Ilan, Keenoy & Levene, 2009). But also, the relevance of results and the overall quality of the result set can have an influence on clicking decisions (Joachims et al., 2017). However, personalised information search can also introduce new biases as one user is not able to get access to all information that is available on the internet but is only exposed to a limited amount of data (Bozdag, 2013). This eventually causes a user to be less likely to discover new topics on the search engines and to see different views on a topic that contradicts his user profile (Burger et. al, 2016). Google is keeping the information private of how exactly their algorithm works and how user data is collected. This means that user's do not have the opportunity to find explanations on why exactly they got the search results that Google provided them with.

Multiple research has been done on the filter bubble effect and how search engine users are only exposed to limited information, but the extent and impact of this filter bubble still needs to be defined. As Google has become a necessary means to the end of managing everyday tasks, it is important to know what consequences can arise by relying on Google for information search. Research has shown, that this search engine manipulation effect can even have an impact on the outcome of elections by providing search results that are in favour of one candidate (Epstein & Robertson, 2015). Nevertheless, in Epstein and Robertson's later research it has been shown that if people are made aware of such a search ranking bias then this can lead to supposing of the search engine manipulation effect and can even shift users' behaviours towards lower search results (Epstein & Robertson, 2017). Bozdag and Van den Hoven have stated that personalisation can even lead to the case that a user does not see any contradicting views when it comes to political or ethical issues (Bozdag & Van den Hoven, 2015). If that is the case and a user is only shown one-sided information then the Google search results could have an impact on users' decision making for not only political but possibly even ethical opinions. The purpose of this research study is to gain further insights into this possible outcome of the filter bubble effect and to see if there is indeed a bias towards one-sided search results when it comes to ethical issues.

This leads to the following research question: To what extent does the Google search engine influence users' decision making by providing one-sided results on ethical issues?

2. BACKGROUND AND THEORETICAL FRAMEWORK

This section defines several terms that will further be used throughout this paper as well as review previous frameworks and theories that have been discussed in other papers. After the introduction of the theory, the hypotheses for this research paper will be stated and further explained.

2.1. Background

2.1.1. Search query

A search query is a set of keywords that individuals type into a search engine in hope of finding specific information to the answers that they are looking for. Upon the entry of the search query, the search engine will match the search results with the search query, based on an algorithm that is not accessible to the public. The search results will then be displayed on the search engine results page that is available to the individual user. The user can then choose one of the results in hope of finding the best possible information. A search query can consist of only one or two keywords or include a whole question. The more information is provided in the search query, the more specific the search result page is expected to be. How the search query looks like can depend on users' preferences or the amount of information that is already available to the individual. As of 2009, Google has started personalising all search results, also for users without a Google account (Horling & Kulick, 2009).

2.1.2. Personalised search results

Personalised search results are customised search results based on the digital profile of an individual user. A search result is personalised if the search engine adjusts its results to fit the needs of the user. When using a search engine that is personalised such as Google or Bing, search results will differ depending on which person is making a request on the search engine. This user data is based on one's "user profile." This profile is representing the interests of the individual and can be created by search engine searches that have been previously entered into the search engine (Harvey et al., 2013). Hannak et al. have concluded in their research that the personalisation on the Google search engine is triggered by two factors: If someone is logged into a Google account as well as from which geographic area a search request is made (Hannak et al., 2013). Google's updated privacy policy of 2012 stated that information is being shared on all sorts of Google tailors, which include Gmail, Youtube, Google Maps and so on (Witten, 2012). Youtube searches or previously watched videos can also have an impact on the results when typing search queries into the Google search engine. And also browsing histories can interfere with user attributes and therefore influence

future search results (Goel, Hofman & Sirer, 2012). Previous searches on a search engine can therefore have an impact on which results Google will provide to its users in the future. However, not every search query will be personalised to the same extent, according to Zhicheng et al. personalisation has different effects on different search queries (2007). Their research has shown that personalised search can lead to significant improvements of search results for some search queries but at other times, for other search queries, personalisation has little effect on the search results.

2.1.3. Manipulation effect

A manipulation effect occurs if Google can influence users' attitudes, beliefs or decisions based on the order of the search engine results. In this paper it will be stated that a manipulation effect is present if the search results are biased towards one view. Therefore, it will not be taken into account if this view is in alignment with a user's personal data. This is the case, because by providing one-sided search results Google could either be reinforcing the existing attitude or providing the user only with information that contradicts this view in order to change one's opinion or belief.

2.2. Ethical Decision Making

Ethics relates to the belief if an action is morally right or wrong. The dilemma that arises is that differed individuals will have different opinions about if an action is morally right or not. Ethical issues can arise in several sectors, such as when making decisions related to the health sector (Wood, 2001) or making business decisions (O'Fallon & Butterfield, 2005). An ethical dilemma first emerges from the environment and is later recognised as a moral issue (Jones, 1991). An ethical dilemma can be resolved by applying different ethical principles and approaches (Wood, 2001). There are several approaches that state when an action can be defined as ethical. Some of these approaches will look at the final outcome when determining if an action is ethical, other approaches will look at the action itself instead of the outcome (Brownedu, 2018). One of these is Utilitarianism. Utilitarian ethics believes in the greatest good for the greatest number (Goodin, 1995). An action is therefore ethical if it leads to the best possible outcome for most people. This approach, however, suggest that the "ends justify the means", which would imply that it would be ethical to do harm in order to create the best outcome for the highest number of people. Deontological ethics considers an action as being ethical if it is driven by duties or rules (Chakrabarty & Bass, 2015). Depending on if an individual follows any of these or another ethical approach, people will have different opinions about which actions can be considered ethical or unethical.

Several factors can influence one's ethical decision making. Hunt and Vitell have created a framework that states environmental factors that affect ethical judgements and perceptions (Hunt & Vitell, 1986). These factors that can have an influence on ethical decision making are cultural environment, professional environment, organisational environment as well as industrial environment (Hunt & Vitell, 1986). Bartels has noted the importance of culture when it comes to ethical decision making in businesses (Bartels, 1967). Therefore, factors such as values, laws, religion, loyalty or national identity can have an impact on the ethical decision making of an individual. Hofstede came up with a framework that states that societies differ in four main dimensions: power distance, masculinity, uncertainty avoidance and individualism/collectivism (Hofstede, 2003). All of these four dimensions can have an impact on an individual's perception of ethical norms and behaviours (Vitell, Nwachukwu & Barnes, 1993). In their research, Vitell et al. state to what extent each of Hofstede's dimensions influences ethical decision making for individuals (1993). Depending on the importance of an ethical issue to a person, people can be more or less influenced by external factors. If one views an issue as being of high importance then a person is more likely to rely on personal values when making the decision if an action is ethical or unethical. However, if an issue is not viewed as an issue of high importance then people can be influenced by external factors when making their ethical decisions (Kreie & Conan, 2000). These external factors can include peer influences, ethic codes or search engine results. When it comes to ethical decision making, literature states that there were in most cases no noticeable differences in decision making between female and male individuals. However, if differences were found than females are found to make more ethical decisions that males (O'Fallon & Butterfield, 2005). Or in other words, women were more likely to disagree with unethical actions (Singhapakdi, Vitell & Franke, 1999).

2.3. Hypotheses

Three hypotheses can be made to determine if there is indeed a bias towards one-sided results when it comes to ethical issues on the Google search engine. Therefore, not only Google results will be looked at, but also the results of a search engine that does not personalise its search results.

H1: A personalised search engine provides results about ethical issues that are biased towards one view

If there would be no bias it would be expected that the results about ethical issues would be equally in favour as well as against a topic being ethical.

H2: The results in the search engine for ethical views are caused by personalised search results.

The second hypothesis hopes to find out if the bias towards one side is due to the personalisation of results or not. To acquire this information, the Google results will also be compared with the results of DuckDuckGo. This is a search engine that promises to respect peoples' privacy and therefore does not collect personal information about its users (Singh & Sharan, 2013). The only information that DuckDuckGo will therefore know is one's location. If in the end there will be a bias towards one ethical view on both Google and DuckDuckGo, then it can be said that this outcome does not necessarily have to be caused by personalisation alone.

Furthermore, by comparing DuckDuckGo results as well, it can be determined if this search engine really is unbiased as it promises its users. Since results should only be based on one's location, the results are not expected to differ if a request is made from the same location.

H3: One-sided Google search results that address ethical issues are caused by one's personal profile.

The research study will look at two search queries in total. The first search query, concerns the issue if it is ethical to eat meat. The search query therefore will be "eat meat". This has been a controversial topic for a while and can cause people to have different ethical opinions. It is also an important topic as an enormous amount of vegan and vegetarian products have entered the food market. Eating meat does not only concern animal rights and the question if people are allowed to kill animals to eat them, but the meat production does also contribute massively to global warming. Deciding not to eat meat can be caused by several reasons. If it is not caused by religious reasons, then personal health, avoiding animal cruelty, disgust or family influences can have an impact on one's decision making when it comes to eating meat or not (Fox & Ward, 2008). Several reasons for deciding not to eat meat do therefore not necessarily mean that an

individual believes that it is unethical behaviour. Someone could still eat meat but at the same time believe that it is an unethical practise and the other way around. However, moral vegetarianism has become increasingly common. According to Fessler et. al., moral vegetarians view meat avoidance as a moral imperative caused by ethical norms and values (2003).

The second search query is about if it is ethical to outsource jobs. The search query is therefore "is it ethical to outsource jobs." According to McGee, outsourcing can be defined as "the hiring of non-employees or foreign employees to do jobs that domestic employees would otherwise do" (McGee, 2005). This process can include offshoring which is the outsourcing of jobs to countries overseas. Outsourcing is part of the business ethics category. Reasons that companies have for outsourcing activities include wanting to minimise costs, not having employees with the necessary skills on hand as well as work abroad could be done faster or more efficiently. Looking at this issue from the view of Utilitarian ethics, outsourcing can be seen as an ethical action, because the outcome satisfies more people than it hurts.

While the first search query addresses the behaviour of individuals and their decision-making, the second search query is about the ethical decision making of an organisation in the business environment. Based on the two chosen search queries that are about eating meat and the outsourcing of jobs, this leads to these two hypotheses:

H3a: People who eat meat are more likely to see results that state that eating meat is an ethical action

H3b: People who see outsourcing as an ethical practise are more likely to see results that state that outsourcing is ethical

This third hypothesis aims to see if one-sided or equally contradicting search results are caused by one's profile. To get this information the participants also need to answer one personal question that is related to each search query. It will then be determined if there seems to be a correlation between personal preferences and the outcome of search results. But even if the results show that there could be indeed a correlation between an individual's personal profile and the Google results, this does not necessarily mean that Google is aware of this personal information. Figure 1 below gives an overview of the mentioned hypotheses.



Figure 1. Overview of Hypotheses

3. METHODOLOGY

This section describes the methodology that is used to see if people's search results are biased towards one outcome when it comes to issues that can cause ethical controversies. The section introduces the type of research method that is being

implemented and what type of participants are needed. It is also explained how data has been collected and analysed.

3.1. Research Method

To collect data on users' search result outcomes when typing specific previously determined search queries into the search engine, a survey has been conducted. This type of data collection is obtrusive and verbal. Individuals will be aware that data about them is being collected and questions will be communicated by the use of words. All questions of the survey are standardised, meaning that each individual participant of the sample will answer the same questions and further questions are not influenced by previously given answers. Only primary data is used since there has been no research done for the exact same keywords. A survey has been chosen because it was possible to distribute it to people from different places around the world. The unit of observation in this survey are students that use Google as their main search engine. But the unit of analysis are not the students in this case as the goal of the survey is not to get information about the participants but about search engines and their manipulation effect. As the results of two search engines will be analysed, both DuckDuckGo and Google are the units of analysis in this study. Manipulation will be measured in the context of search engines and to what extent they only show onesided search results. This measure is based on the research of Epstein and Robertson, who found out that elections can be manipulated by showing users one-sided search results about only one candidate (2015).

3.2. Participants

In total, 142 participants have responded to the survey (n=142). To qualify for the research study, the respondents needed to fulfil specific requirements to make their data relevant for the study. All participants needed to be at least 18 years of age to assure that they are legally allowed to accept the terms of this research study and that their data is being used for research purposes. Participants should use Google as their main search engine and should have also not removed their browser cookies too recently. A cookie can be defined as a piece of information that is stored on a person's computer hard drive by a web site that this individual visited (Greenberg & Long, 2003). Cookies are used "for tracking users' web surfing habits and building targeted advertising profiles" (Shankar & Karlof, 2006). If a person therefore removed their cookies too recently then the websites will have less information about a person's browsing behaviour. A study about the usage of the internet has shown that 77% of Americans use the internet on a daily basis (Pewresearchorg, 2018). As students are even more likely to use the internet daily for not only entertainment but also study and research purposes, the browsers will be able to collect enough data about a person in just a short period of time. Due to this reasoning, students will only be excluded from the research study if they have removed their browser cookies in the last two weeks. Furthermore, individuals need to conduct the survey on their own personal laptops or computers to be suitable for the study. Lastly, all participants should currently be studying. This requirement should rule out biases that could be caused by different educational levels. The participants are located in different countries around the world but they have to indicate their nationality and in which country they are currently located, because geographic areas can have an influence on Google search results.

3.3. Search Queries

Two search queries have been used that are addressing issues that can cause people to have different ethical opinions. The selected search queries are related to different categories to avoid the possibility of one search query influencing another one. This outcome can also be explained as the carry-over effect, which states that sequential user queries can refine search results (Zhicong et al., 2010; Smith et al., 2005). The chosen search queries do all include topics that have been searched for quite often to ensure that there will be views both in favour as well as against something being ethical. Both search queries will be phrased differently: one will be a whole question while the other one will only consist of two keywords. The reason for having the search queries differ in structure is that it can be determined if there is a bigger visible bias for one of the two search queries or if one-sidedness is the same for either phrasing of keywords.

3.4. Data Collection

To collect data, a survey has been designed in Google forms which then has been distributed to students of different nationalities. This has been done via several social media platforms such as Facebook or Instagram or by sending direct messages and emails to different people. Also, the link to the survey has been printed and handed out to students at the University of Twente. In total, 142 participants responded to the survey. The first part of the survey informed the participants of the purpose of this study and asked them to agree to the terms of this survey and accept that their data is being used for research purposes. It also states that due to the necessity of uploading files throughout the survey, Google makes it a requirement for email addresses to be collected. However, it was made clear that these email addresses would not be distributed or used for advertising purposes in any way. The second part of the survey determined if someone was suitable for this research study by asking questions that the participant needed to answer with yes in order to proceed with the survey. Thirdly, general questions about a person were asked that would function as control variables. These questions included asking about a person's gender, their educational level and where they are from. This information should make sure that if there is a high number of outliers then this information can be taken into account when analysing the data on SPSS. The next part of the surveys asked participants to type in several previously determined search queries into the Google search engine. After they have gotten the results they needed to screenshot the outcome and upload it in the survey. This needed to be done for both the Google search engine as well as for the DuckDuckGo search engine. Figure 2 below, gives an example of how such a screenshot looked like on the Google search engine for the first four search results.

Are Humans Supposed to Eat Meat? | PETA

https://www.peta.org/features/are-humans-supposed-to-eat-meat/
People who eat meat argue that it's "natural" for humans to consume animals. But is this true or just an excuse to ignore the horrific ways in which animals are

Ethics of eating meat - Wikipedia

https://en.wikipedia.org/wiki/Ethics_of_eating_meat ▼ The question of whether it is right to eat non-human animals (henceforth "animals") is among the most prominent flopics in food ethics. The most commonly given ...

Why I don't eat meat - Chengeer Lee - Medium

Nubres/Imedium.com/@chengeerlee/whyl-dont-eat-meat-1d95361e8601 ▼ Nov 26, 2017 - I was born and raised in Kazakhstan, where all Kazakh people are huge meat eaters, with horse meat being a traditional meat. Kazakh and ...

7 reasons why you should stop eating meat immediately | The ...

https://www.independent.co.uk/.../why-british-people-eat-less-meat-reasons-health-wei...

Aug 10, 2017 - Some 28 per cent of meat-eating Brits have reduced their meat consumption in the last six months, a new report by industry analysts Mintel

Figure 2. First four Google results for the "eat meat" search query (participant #1)

By submitting screenshots using the same search queries, differences between the results of the two search engines can be determined. From the first page of the search engine results, the first four results will be considered when analysing the presence of a bias towards one-sidedness of ethical issues. A bias will be present if more results are in favour of one view than the other. The higher the amount of search results in favour of one view, the higher the search engine bias will be.

Lastly, the survey asked questions related to the search queries. This step is important to see if one's personal information impacts the search results. One question has been asked for one search query. After submitting the results, the user has been thanked for his participating in the survey.

3.5. Data Analysis

A coding scheme has been developed to code the screenshots of both the Google as well as the DuckDuckGo results into numbers. The categories for this scheme are independent and mutually exclusive. Therefore, each result of the search engine can only be assigned to one category.

Each screenshot contains four search results, of which each search result has been assigned with a number. To get the total value for each screenshot, the four values given to each search result were added together to get one number four each screenshot.

If a search result was in favour of an action being ethical the value 1 was given to a search result. On the other hand, if a screenshot was in favour of an action being unethical, the value -1 had been assigned to that search result. If a result does not state an opinion about if an action is unethical or ethical it will be coded as a 0. This is also the case if the information given is equally ethical and unethical. A 0 will also be assigned if the search result is not directly related to the search query. In the end, the values of the search results that were in either first or second position were doubled, as people tend to pay more attention to the results that rank higher on the page. Therefore, the first two search results had a value of either -2, 0 or 2, while the third and fourth results could have a value of either -1, 0 or 1. More information on when which score is assigned can be found in appendix 1. When adding all values together, the final number for a screenshot could therefore be between -6 and 6. The value -6 means that all four search results were in favour of an action being unethical (-2-2-1-1=-6). The value 6 on the other hand would mean that all search results are in favour of an action being ethical (2+2+1+1=6). In summary, each screenshot has four search results, of which each search result will get an individual score of either -2,0 or 2 for the first two results or -1.0 or 1 for the third and fourth results. The final score of a screenshot in the end is the summation of the numbers from all four search results. The final score of a screenshot can therefore be between -6 and +6. For the assessment of the results and what they state about ethics it has been looked at the result title, link as well as the abstract. For example, if the first and third search result is in favour of an action being ethical, the second search result is in favour of an action being unethical, while the fourth result is neutral that would lead to a value 1 for the screenshot (2-2+1+0 = 1). To get the final value for a screenshot, the four values for each result will have to be added in the end which leads to a final value between -6 and 6. Figure 3 gives an overview of the coding for each of the search results.

Code	Content of search result	Presence of bias
2	The 1st search result shows mainly information about eating meat/ outsourcing being an ethical action	Biased towards ethical
2	The 2nd search result shows mainly information about eating meat/ outsourcing being an ethical action	Biased towards ethical
1	The 3rd search result shows mainly information about eating meat/ outsourcing being an ethical action	Biased towards ethical
1	The 3rd search result shows mainly information about eating meat/ outsourcing being an ethical action	Biased towards ethical
0	A result does not show results of either side, the result shows both information on an action being ethical as well as unethical. This is applicable for search results in 1st, 2nd, 3rd and 4th position	No bias
-2	The 1st search result shows mainly information about eating meat/ outsourcing being an unethical action	Biased towards unethical
-2	The 2nd search result shows mainly information about eating meat/ outsourcing being an unethical action	Biased towards unethical
-1	The 3rd search result shows mainly information about eating meat/ outsourcing being an unethical action	Biased towards unethical
-1	The 4th search result shows mainly information about eating meat/ outsourcing being an unethical action	Biased towards unethical

Figure 3. Coding scheme for each of the first four search results on a screenshot

3.6. Reliability

To calculate the reliability of the coding scheme two coders have been used that conducted the coding at different times and at different places to assure that the coders acted independently and did not influence each other's results. Additionally, it was done to assure inter-coder reliability. According to Lombard et al., inter-coder reliability is assessed by having two or more coders that sort units into different categories (2002). To calculate the reliability score, Krippendorf's alpha was used (Krippendorf, 2004). This measure is suitable for not only nominal but also ratio data, as it is the case with the currently used data. The data is classified as ratio, because it is a scale of -6 to 6 and 0 represents the case of no present search engine bias. The values can also be compared with each other, hence, -2 would represent twice as much bias as the value of -1. To be able to use Krippendorf's alpha, a macro file had to be installed on SPSS. Following that, the Krippendorf's alpha score was calculated for all four search queries, comparing the data of coder one and two. For the first search query on Google the K-alpha was 0.8246 and for the second search query on Google 0.6925. Furthermore, for the first search query in DuckDuckGo the K-alpha score was 0.6759 and 0.9074 for the second one. While 0.8 is usually seen as the norm for a good reliability test, 0.67 is the minimum score for the data to be counted as reliable (De-Swert, 2002). As all K-alpha scores are a minimum of at least 0.67, the coding scheme is of sufficient reliability. The considerable lower reliability for the first search query about eating meat on both search engines can be explained that the search results were not always directly related to the coding criteria and it was therefore not always clear which category to assign to a search result. Furthermore, the percentage of agreement between the two coders was 72,1%, which means that the coders categorised the units into the exact same category 72.1 per cent of the time.

4. **RESULTS**

In the following section, the results of the research study are presented and analysed.

4.1. Demographic Results

In total, 101 participants fulfilled all the requirements to be suitable for the research study. However, after coding the search queries further it showed that not every screenshot that these participants submitted was suitable for the research study. Since the survey asked participants to submit a picture of the first four search results, a screenshot was determined unsuitable if it only showed three or less search results. The age of all participants ranged from 18 to 29 years, with 52 people being male and 49 being female. All participants were students, however, not everyone is currently achieving the same educational level. 58,4 per cent of respondents, which is more than half of the participants, are currently doing a bachelor study. There are also a lot of master students who represent 28,7 per cent of the sample, which corresponds to 29 people. Furthermore, seven people are pursuing a higher vocational education (6,9 per cent) and six people are currently getting their higher general secondary education (HAVO/VWO). 26 participants are attending a study programme that is related to the field of business, 15 people are attending a medicine and health related study, 17 people follow social sciences and five people study programmes to the field related to natural and formal sciences. However, the majority of respondents (38 people) are currently following an engineering or computer science study programme. Survey respondents belonged to 20 different nationalities, with the majority of people being Dutch (62.4 per cent). The second and third largest representative of nationalities were Mexican and German. In total, 76.2 per cent of respondents were located in the Netherlands when filling out the online survey.

4.2. Participant's Google Behaviour Results

All of the 101 respondents whose data is being analysed use Google as their main search engine. This was made sure by excluding people to finish the survey if that was not the case. 91.09% of participants are actually aware of the fact that Google is personalising its search results and they might therefore see different results than another user. The majority of participants in this study, hence 65.35%, search mostly in English when making search requests. Other languages used are German, Dutch, Spanish and Swedish. 49 users stated that they do not use another search engine other than Google while 28 participants chose not to answer this question as it was optional. Of the 24 users that stated that they also use other search engines, some of these search engines included Bing, Ecosia and Scopus. Six people actually use DuckDuckGo as another search engine and these people also stated that they are aware of the personalisation effect which might have let to the conclusion of using DuckDuckGo at times when conducting search requests. Two participants did state that they use Safari and Firefox as other search engines, however, these are browsers and not search engines. Therefore, they did either not read the question correctly or the distinction between a search engine and an internet browser was not clear to them. This misconception, however, should not have an influence on the outcome of the results as the participants still submitted search requests made on the Google search engine.

4.3. Hypotheses Results

4.3.1. Hypothesis 1: Bias of search results

To figure out the distribution of the coded data for the two Google search queries a Shapiro-Wilk test has been conducted in SPSS to check for normality. For both search queries the p-value was 0.000, which is lower than the α -level of 0.05. If

normality would only be based on the outcome of the Shapiro-Wilk test, it could be said that both variables are not normally distributed. However, looking at the distribution and the box plots of the Google screenshots, it can be seen that the values are indeed bell-shaped or follow a normal distribution to some extent. The histograms and boxplots can be found in appendix 2. For both Google search queries the Kurtosis is in an acceptable range of -2 to 2, with values of 1.708 and 1.766. Therefore, the bell curve is leptokurtic as the kurtosis has a value higher than 0. This distribution can be explained with the fact that each screenshot result can only take up a value between -6 and 6 and does not continue indefinitely in either direction. Also, because the sample size is large enough, the normal distribution can be explained with the central limit theorem. This theory states that the sampling distribution of the sample means approaches a normal distribution as the sample size gets larger (Statisticshowto, 2018). This is especially true if the sample size is larger than 30, which is the case in this research study with a sample size of 101 (101>30). A t-test can still be used to interpret the data, since this test requires normally distributed data. A one sample t-test was used because there is only one variable and it will be looked if and to what extent the Google search results differ from the value 0. This value was chosen, because 0 represents the case that there is no bias in the search results. The eating meat search query has a pvalue of 0.000, which is smaller than the α -level of 0.05. All ttest results can be found in appendix 3. With a mean value of -1.42 it can be said that there is a significant bias towards eating meat being an unethical practise. Also, a sign test has been conducted which is a non-parametric test that does not assume normal distribution (appendix 4). This test measures the amount of positive and negative differences from a specific value, which in this case was 0. The results states that out of n=83, which is the number of screenshots that contained at least four search results, the number of coded values that were smaller than 0 is 56. While on the other hand, the number of values that were bigger than 0 equals 15, the other 12 results are equal to 0. With an α -level of 0.000, there is also a significant bias of results towards unethical views, because the p-value is smaller than 0.05 (p-value < 0.05) The bias is directed towards unethical results of eating meat because the amount of coded numbers that are lower than 0 is higher than the amount of values that are bigger than 0. Values that are smaller than 0 have been classified as unethical results based on the previously developed coding scheme. Furthermore, the distribution has a skewness of 0.831. A positive skewness value means that the data is skewed to the left side, indicating that there is a higher amount of negative than positive coded values. This is further evidence that the majority of search results presented a bias that more search results are biased towards eating meat being an unethical action. The null hypothesis can be rejected and there is enough evidence that supports the alternative hypothesis that states that Google is significantly biased towards one ethical view.

But not only the eating meat search query but also the search query that is concerned with the question if outsourcing is an ethical practise shows a significant bias. In this case all 101 screenshots could be taken into account and were also coded into values between -6 and 6. The mean value is -0.92. Therefore, the average result scored a value of around -1 which represents a slight bias towards the view that outsourcing is an unethical practise. This outcome is significant as the p-value that was calculated with a one-sided t-test is 0.000 (p-value < α -level). The null hypothesis can therefore be rejected again. This hypothesis states that there is no considerable bias towards a specific ethical view on Google and results will equally favour

both sides. Furthermore, the results of the sign-test support the rejection of the null hypothesis. Again, the results were compared to 0 and if the difference between the outcome of the search results and the value 0 was significant. 81 results were smaller than 0, while 11 results were positive, hence, bigger than 0. Furthermore, 9 results scored a value of 0, which represent the case of no bias towards one ethical view. With a p-value of 0.000, the outcome is smaller than 0.05 (p-value < 0.05), which leads to the case that there is enough evidence that the null-hypothesis can be rejected. The skewness of the distribution is 0.749, which means that the distribution is skewed to the left-hand side.

To summarise, both search queries show that the Google search results are biased towards an action being unethical. The null hypothesis that there is no considerable search engine bias towards one view can therefore be rejected in both cases. There is enough evidence that supports the view that the bias of Google towards one ethical view is indeed significant.

4.3.2. Hypothesis 2: Comparison with DDG

The previous hypothesis results demonstrate a bias towards search results that are in favour of an action being unethical. Now it will be figured out if this bias is due to the personalisation effect of Google or if other search engines that do not use personalisation are biased as well. To get this information a one-sample t-test has been used again, which, however, requires the data to be normally distributed. Even though the Shapiro-Wilk test delivered results of 0.000 for both DuckDuckGo search queries, it can still be assumed that the data is normally distributed by looking at the histograms and box plots. The eating meat search query in DuckDuckGo has a kurtosis of -1.326 which is still within the limits of -2 and 2. Also the outsourcing DuckDuckGo search query still fits within the limit with a kurtosis of -0.633.

First of all, it will be measured if DuckDuckGo is generally biased towards one ethical view. The first search query that will be analysed is the one that addresses the ethical issue of meat consumption. The coded value in this case ranged from -4 to 6, with a mean value of 0.86. The average score of the screenshot was therefore slightly biased towards the view that eating meat is an ethical practise. The reason why the values did not range from -6 to 6 was that when coding the results there were no results that showed a really strong bias of an action being unethical, which would have been indicated with a value of -5 or -6. The outcome of the conducted one-sample t-test shows that this outcome is significant as the p-value is 0.011. Since this pvalue is smaller than the α -level of 0.05, the null-hypothesis can be rejected and the alternative hypothesis can be supported which states that there is a bias of search results towards one ethical view. The skewness of the distribution is -0.168 which also indicates that the data is skewed to positive values.

Now it will be looked at the second search query on DuckDuckGo which is about the issue of outsourcing being an ethical practise or not. The skewness of 0.42 indicates that the data is skewed to the left. Also, the mean value of -1.04 indicates that the average value of the coded data is biased towards unethical search results. This outcome is significant due to a p-value of 0.000 that was obtained by conducting a one-sample t-test once again. This value is lower than the α -level of 0.05.

To conclude the first part of this hypothesis, both search queries on DuckDuckGo seem to be biased towards one ethical view, even though one was biased towards unethical results and the other one towards ethical results. As the Google search results were also biased, both results of Google and DuckDuckGo will now be compared with each other so see if there is a significant difference in the extent of the bias of the two search engines. The statistical test that was used to measure this difference is the independent t-test. This is the case because two independent samples will be compared with each other, which in this case are the search results of Google and the search results of DuckDuckGo. Each search query has only been measured once and the collected data can be measured on a continuous scale of -6 to 6. If there would be no bias of personalised search results due to the collected user information, both search engines would be expected to have the same mean values ($\mu 1 = \mu 2$). The first search query that will be compared is the eating meat search query. Before interpreting the results of the independent t-test, a Levene's test has been conducted to see if the variance of the two samples is equal or not. With a p-value of 0.000 this is not the case, because this value is smaller than the α -level of 0.05 (appendix 5). When interpreting the results of the t-test the row of no assumed equal variances therefore needs to be considered. The final outcome of the independent t-test for this search query is a p-value of 0.000. As this value is smaller than the α -level again, the null hypothesis can be rejected once more. There is enough evidence to support the alternative hypothesis that was made and the difference between the Google and DuckDuckGo results is significant. Based on only this outcome, there is a difference between a personalised and a non-personalised search engine. The search results of the Google search engine are therefore due to the personalisation effect.

Now the same independent t-test has been conducted for the second search query about the ethics of outsourcing jobs. A Levene's test with a p-value of 0.026 rejects the null hypothesis of variances being equal. The p-value of the independent t-test for unequal variances is 0.332. As this value is higher than the α -level of 0.05, the alternative hypothesis can be rejected and there is enough evidence to support the null hypothesis. For the question of outsourcing being an ethical practise, there is no statistically significant difference between the results of Google and DuckDuckGo. This test suggests that even though both search engines are biased towards one ethical view in this matter, the bias is not due to the fact that Google collects personal information about its users, because also DuckDuckGo is biased towards the same view and they only take people's location into account when providing its users with search results.

4.3.3. Hypothesis 3: Influence of personal profile

The third hypothesis states that personalised search results are caused by one's personal profile. Therefore, it will be looked at if there is a correlation between a personal profile of a person and the extent of a search result bias in Google. Because the two search queries are about the ethics of eating meat and the ethics of outsourcing jobs, there were two related questions in the survey that participants answered. The first question asked the participants if they eat meat, eat meat but are trying to reduce meat consumption, are vegetarian or if they are vegan. The second question related to an individuals' personal profile asked participants to state their opinion about outsourcing from very negative to very positive. The question included a small definition of what outsourcing is, so that it could be made sure that each participant knew what it is exactly before stating their opinion about it. These questions have led to two hypotheses that address the influence of one's personal profile: A person that eats meat is more likely to see results that refer to eating meat as an ethical practise. And also: A person that thinks outsourcing is an ethical practise will be more likely to see results in Google that refer to outsourcing as an ethical practise.

If one's personal profile does indeed influence user's search results when it comes to ethical issues then there should be a relationship between personal information and search results. When looking at the search query about if it is ethical to eat meat, people who eat meat would be expected to see views that are either reinforcing their existing believes or views that contradict these views. According to this idea, it has been looked at a scatterplot, which can be found in appendix 6, to see if there is a visible pattern that would support this statement. People who eat meat have been labelled with the value 1, people who eat meat but are trying to reduce meat consumption with the value 2, vegetarians as a 3 and vegans with a 4. The scatterplot shows that people who eat meat are shown results of eating meat being both biased towards ethical as well as results being biased towards the action being unethical. The same is true for the people who eat meat but are trying to reduce their meat consumption. There seems to be no pattern that people with the same eating habits are receiving the same search results. Furthermore, for vegetarians there is no visible clear pattern. The sample size of vegetarians was only six, but in total these six individuals received five different results. The sample size of vegans was even smaller, which means that no actual conclusions could be drawn out of this sample. Based on the interpretation of the scatterplot there is no visible pattern between people's search results and eating habits and therefore there is not enough evidence to reject the null hypothesis.

To see if one's personal profile influences search results a hypothesis was made that states that people who think more positively about outsourcing are more likely to see search results about outsourcing being an ethical practise. The two variables that will be looked at in this case are the outcomes of the Google results for outsourcing and a person's opinion about outsourcing, which people gave by rating their opinion about it on a scale of 1 to 5. One in this case represents the case that someone feels very negative about this business practise while five indicates that the respondent feels very positively about it. A score of 3 would mean that an individual either has no opinion about outsourcing or that he does not feel like it is either an ethical or unethical business decision. The correlation between the two variables was calculated with SPSS and according to a Pearson correlation score of 0.015 it is clear that there is barely any correlation between the two variables. A perfect correlation would have resulted in a score of 1 or -1. Also, the 1-tailed significance p-value of 0.443 is higher than the α -level of 0.05. There is no significant evidence leading to the case of rejecting the null-hypothesis. Additionally, the scatterplot supports this decision. People who felt really positively about the practise of outsourcing received results about outsourcing being ethical as well as unethical. This was the same case for people who felt positively, neutral or negatively about it. In general, the majority of people have gotten results that were slightly biased towards outsourcing being unethical even though personal opinions about outsourcing varied greatly.

Concluding, for both search queries there has not been enough evidence to reject the null hypothesis in this case. Based on the data that was collected and the statistical tests that have been conducted there is not enough evidence to support the claim that the personalisation effect was caused by a person's personal profile. However, it is unknown if Google was aware of this specific personal information and to what extent, when taking it into account when personalising search results to fit the need of the individual user.

5. DISCUSSION

Personalisation of search results leads to the filter bubble effect of search engine users only being exposed to limited information on the internet. While this effect can lead to more relevant information that is shown to the user, it can also lead to the rise of several risks. One of these risks is the case that a user gets exposed to results concerning ethical issues that are biased to one ethical view. The major finding of this research study is that Google's search results are biased towards actions being unethical. But not only on Google a bias was seen, also on DuckDuckGo, which is a search engine that is known for not collecting personal information about its users (Singh & Sharan, 2013). The bias that was measured on this non-personalised search engine, however, was not solely towards one specific ethical view. Furthermore, the Google biases are not necessarily proven to be caused by one's personal profile. But these findings do not implicate that Google does not use personal information but that the information that was necessary to personalise results in this case could have not been known by Google at the moment.

One of the reasons why there was not a significant difference between the results of Google and DuckDuckGo in regards to the question if it is ethical to outsource jobs, is that the search query for outsourcing was longer and also phrased as a question. Due to the fact that the search request was more precise and made it clearer what the search engine user was looking for, the results did not differ to a large extent. This resulted in the outcome of the DuckDuckGo results being mostly the same so the fact of where the search request was made from did not influence the search results to a large extent. Also, in Google, the results varied to a smaller extent for the outsourcing search query, compared to the meat search query which only consisted of two words. For a longer and more precise search query, the search results for both search engines did not differ as much when comparing it to the short search request. This explains why the difference of the DuckDuckGo and Google search results was not significant in this case and both search engines were biased to the same ethical view. However, it might only have been a coincidence or due to the fact that the personal profile of a user influences search results to a different extent and that not every search request is personalised the same way. Nevertheless, even though the results did not differ to a large extent, there was still a significant bias in each search engine. Another reason for the outcome of the same bias of the search engines and similar results is the fact that the practise of outsourcing is related to the field of business ethics. All of the participants in this study were students and the possibility that they had jobs that they wanted to outsource is quite low. Therefore, unless it was part of their study programme recently or they would have shown personal interest in this topic, they would have not made a lot of searches for outsourcing related issues. Due to this reasoning, Google would have not had enough information about a person to personalise their search results to a large extent for this exact search query. While Google is probably aware of the fact that the participants of the study are currently studying, DuckDuckGo is not. As far as the latter search engine is concerned someone might be already working and addressing business decisions in their daily lives. Anyway, both search engines are biased towards outsourcing being unethical, which means that being a student should not have an influence on the search results in this case.

While the search results for the outsourcing search query in Google and DuckDuckGo were similar in some ways, this was not the case for the eating meat search query. One reason for that could be that ethics was not particularly mentioned in the search query or that the search query was phrased differently and by using only two words. Even though ethics was not mentioned, most Google search results were concerned about the ethics of eating meat and showed results that were related to it in most cases. In DuckDuckGo on the other hand, a lot of the results did not mention ethics but instead showed restaurants that had the word "eat" and "meat" in it. Google might have known that a user was looking for ethics related articles instead of restaurants. Also compared to the outsourcing search query it seems more likely that Google has information about a person's eating habits as users might have conducted related searches about it. Such as if someone googled vegetarian restaurants or vegan recipes, which would explain why the search results of Google and DuckDuckGo significantly differed, even to the extent that one was biased towards eating meat being unethical while the other one was biased towards eating meat being ethical.

For the last hypothesis, there seemed to be no visible pattern of one's personal profile influencing search results. However, due to the distribution of the sample size, not every personal profile was presented to the same extent. For the eating meat search query, the number of people who participated in the study and do not eat meat were really small that it was impossible to compare it to the number of people who eat meat. Also, only one question was asked about people's eating habits which does not give enough information about one's personal profile. Furthermore, it is not clear how much Google knows about people's preferences and opinions. If people have not made any previous searches about these issues then Google would not be able to know if someone does eat meat or not. The fact that there was not enough evidence to reject the null hypothesis can therefore not be generalised, as Google could have taken personal profile information into account when showing results on the search queries of outsourcing and eating meat, but only for participants that have provided the search engine with this information at some point.

However, another cause for the bias towards one ethical view if it is not caused by a personal profile, is the availability of data on the internet concerning these ethical topics. It can be the case that in general there is a lot more information on the internet that states that eating meat and outsourcing are unethical actions then the other way around. If the information market is dominated by one content in favour of one ethical view, then the search engine might not be able to order the information in a way that balances out the bias towards one view. This explains why participants of the research study have received biased results, even though these results were not in alignment with one's personal profile. Another explanation of the search result bias that is not based on a person's profile is personalisation. As it has been explained earlier on, personalised search results only expose the user to information that it thinks is most relevant (Pariser, 2011). Therefore, it could be the case that based on the algorithm, unethical articles will be more relevant to most participants. Not because people eat meat or not, but because people that believe something is unethical would be more likely to search for the ethics of an action on the Google search engine. Someone who wants to outsource jobs and thinks it is ethical will be less likely to search for reasons why it is ethical or not but rather start with the process of outsourcing right away. However, if someone has his doubts and makes a search request about the ethics of outsourcing, unethical views can be more relevant because the person made that search request in the first place.

Based on the findings of all the hypotheses, there is a clear and significant bias of Google towards ethical issues being unethical but is not necessarily due to personalisation or one's personal profile. But also, DuckDuckGo is not completely without a bias. While it only personalises results based on location, these results are still in favour of one ethical view, even though in this case it was ethical once and unethical in the other case.

6. LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

This research paper has brought several limitations with it. For the data collection and analysis only two search queries have been determined, as the timeframe for the research and the data collection was limited. Therefore, the data results could have been more accurate by conducting the study, using more than two search queries. Furthermore, both of these search queries were phrased in a different wording, which means that only one search request measured the bias of a search query phrased as a question and only one measured the bias of a search query phrased as two short keywords. The outcome of the bias of only one search query is therefore not generalisable to all search queries that are about ethical issues, as not enough data has been collected on it yet. This is also due to the fact that both search queries have addressed different areas in the field of ethics. Different ethical issues could be biased to different extents, which the research study has not considered due to the limited amount of search queries for the data collection. For the limitations of the data analysis, a lot of the data could not be analysed because some participants did not take screenshots of the organic results but instead of the ads or the Google maps section which then led to an insufficient amount of Google results. If this study or a similar one would be conducted in the future it should have not been assumed that every participant knows what the meaning of an organic result is and that should have further been explained in the description of the survey to avoid confusion. Furthermore, the influence of the carry-over effect has not been recognised in the study. The carry-over effect states that previous searches can influence subsequent searches, when the search is done within ten minutes (Hannak et. al., 2013). The respondents of the survey had to type several search queries into the search engine within a limited timeframe, therefore it could be possible that the results were biased due to the previously asked search queries. To rule out the bias, participants of the survey would have had to wait several minutes between searches for the next keywords. Another limitation of the study is the fact that only students and only a specific age range were analysed and the study therefore lacks generalisability of the results for the entire population. Also, according to Ruegger and King, older students are more ethical, which has not been taken into consideration when analysing the data (Ruegger & King, 1992). A final limitation is the fact that only one question was asked about an individual's personal profile concerning the search queries. Only one asked question does not assure that the information received is reliable and it is not possible to know if this exact question would have an influence on the search results to test it for a correlation. More data about a person's personal opinion should have therefore been collected and also the limited sample size of for example people who do not eat meat suggests that more data should have been collected.

For future researches, people with different backgrounds, work experiences and years of age should be analysed to see if there are significant differences. It could also be looked into if older students are indeed to act more ethical if that also has an influence on their search results. Hence, if older students receive search results that are more biased towards an action being ethical or unethical or if that is not the case. Also, importance of an issue has not been considered. Since it has been stated that people can be more influenced by external factors if they do not seem to categorise an issue as very important. In future research it could be looked into if Google also takes this into account and shows different results to people who classify an issue as being of high importance. Meaning that the manipulation effect in the search engine results would be lower or higher if an issue is seen as more important. In the future it could be looked into if Google also knows what is important to users and not just in what topics they are interested in. Furthermore, more research could be done on if personal information influences search results. As this study had its limitations when trying to answer the question of if a personal profile influences results, the study could be repeated but with a larger sample size for each representative of a group and more data that would be collected about an individual. One last implication for further research is related to the field of ethics. Thus, if search queries that come from different ethical classifications are biased towards the same extent. The aim of this study would be to see if for example animal ethics has a higher bias towards one ethical view than business ethics or health related ethics.

7. CONCLUSION

This paper tried to answer the question to what extent Google manipulates its users by showing one-sided search results when it comes to ethical issues. Overall it can be seen that in the Google search engine there is a bias towards one ethical view. This outcome can in a sense be manipulative as it can either reinforce an existing ethical opinion or try to change an already established opinion about an ethical issue, by providing a user with results that are not in alignment with his or her opinion. Especially if an issue is not of high importance to an individual he can be more likely to be influenced or convinced by external factors such as the Google search engine. As the majority of people who have access to the internet use Google as their main search engine and rely on it to help them with their day to day activities, this bias can influence people's decision making in the future. It has been shown that Google tends to show views in favour for one particular ethical view for both a search query phrased as a question and a search query only consisting of two search terms.

While comparing the Google and DuckDuckGo results for the eating meat search query, the results for the two search engines significantly differed. From the search query alone, it was not particularly clear that the search results should be related to ethics. However, while the un-personalised search engine showed a lot of results that were not necessarily related to the field of ethics, such as restaurant recommendations, Google came up with a lot of results about ethics even though it was not mentioned in the search request. What this finding implicates is that even when a user is looking for something that is not directly related to ethics but could indeed cause ethical controversies, Google might still show this user results that are biased towards one ethical view.

In previous research it was stated that Google's search results can influence the outcome of elections and this study shows that Google could also influence ethical decision making by providing a user with one-sided results towards one ethical opinion. Knowing this, the question arises about what else Google could have an influence on without the population knowing about it yet. As also the number of people who have access to the internet increases, the number of people who Google can influence in their decision-making increases with it. Therefore, it is important that internet users know of the existence of such a bias and the risk that it can bring with it. As Epstein and Robertson have stated in their most recent paper, that if people are aware of the search ranking bias, they are able to suppose the manipulation effect (2017).

Other than a bias awareness tool there should be other tools that help suppose the manipulation effect and assure that people can decide for themselves what they think is ethical or unethical. One example would be sentiment mining, which involves building a system to collect and categorise opinions about a product. In this case the product would be the search results. By implementing a tool that lets users rate their search results and how they reflect their own beliefs and values, it could be made sure that users would only be exposed to information that is in alignment with their views. While this tool would not suppress the filter bubble effect, it would at least make sure that users are not exposed to information that is contradicting to their original beliefs and would therefore not manipulate decision making. This would rule out the bias that users are manipulated into having an ethical view that is due to a search engine bias. For example, if someone is exposed to only ethical views, which will also be stated by the tool, the user can rate the results on a scale of 1 to 10 If they agree with what is stated. With a 10 representing the case that the search engine completely reflects internal values and a 1 meaning that the search results show the exact opposite of what someone believes in. In the latter case, the next time the search results will differ and rather show unethical views. There will also be an option to leave personal feedback so that it is clear why a specific score was given to a search result page.

This tool would in a sense be similar to the awareness tool, as it first makes the user aware of the bias, which gives them after the opportunity to rate the search results. Over time, as more data is collected about a person and their search result preferences, the more accurate results can be in the future when representing ethical views.

But to answer the research question, the Google search engine can influence user's ethical decision making by showing them one-sided search results to the extent that they can either reinforce or contradict with their existing beliefs and attitudes. However, this is only possible if an issue is seen as not as important by an individual and he is not aware of the manipulation effect of personalised search results.

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APPENDICES

Appendix 1: Explanation of when a search result can be sorted into the dif	ferent
categories	

A result states that eating meat is ethical	A result states that outsourcing is ethical
 The result states that it is an ethical action The results show restaurants that sell meat The result states the health benefits of eating meat 	 The result states that it is an ethical action The result states the benefits of outsourcing: cost-efficient, skilled labour, fill jobs overseas, etc. The result states that outsourcing is a smart business decision
A result states that eating meat is unethical	A result states that outsourcing is unethical
 The result states that it is an unethical action The result states the benefits of not eating meat The result shows a vegetarian/vegan restaurant 	 The result states that it is an unethical action The results states that it should be the main concern to protect local jobs The result states the disadvantages of outsourcing
A result is neutral for the action of eating meat	A result is neutral for the action of outsourcing
 The result states both reasons for why eating meat is ethical and unethical The result is not related, e.g. translation 	 The result states both reasons for why outsourcing is ethical and unethical The result shows a definition of what outsourcing is The result shows information that is not relevant

Appendix 2: Histograms and Box plots of normal distribution





Appendix 3: SPSS results for one sided t-tests

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
GoogleMeat	83	-1.42	2.187	.240

One-Sample Test

		Test Value $= 0$									
			Sig. (2-	Mean	95% Confidence the Diffe	e Interval of rence					
	t	df	tailed)	Difference	Lower	Upper					
GoogleMeat	-5.922	82	.000	-1.422	-1.90	94					

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
GoogleOutsourcing	101	92	1.046	.104

One-Sample Test

		Test Value $= 0$							
			Sig. (2-	Mean	95% Confidence Interval of the Difference				
	t	df	tailed)	Difference	Lower	Upper			
GoogleOutsourcing	-8.849	100	.000	921	-1.13	71			

One-Sample Statistics						
	N	Mean	Std. Deviation	Std. Error Mean		
DDGMeat	97	.86	3.234	.328		

One-Sample Test

			Te	st Value = 0		
	t	df	Sig. (2– tailed)	Mean Difference	95% Confidence the Diffe Lower	e Interval of rence Upper
DDGMeat	2.606	96	.011	.856	.20	1.51

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
DDGOutsourcing	98	-1.04	.657	.066

One-Sample Test

		Test Value = 0								
	t	45		Mean Difference	95% Confidence Interval of the Difference					
DDCOutcoursing	15 6 80	07	000	1.041	1 17	01				
DDGOutsourcing	-15.689	97	.000	-1.041	-1.17	9				

Appendix 4: SPSS results sign test for Google search queries

Frequencies

Frequencies

		Ν			Ν
Value0 - GoogleMeat	Negative Differences ^a	15	Value0 -	Negative Differences ^a	11
	Positive Differences ^b	56	GoogleOutsourcing	Positive Differences ^b	81
	Ties ^c	12		Ties ^c	9
	Total	83		Total	101
a. Value0 < Google!	Meat		a. Value0 < GoogleOu	utsourcing	
b. Value0 > GoogleMeat			b. Value0 > GoogleOutsourcing		
c. Value0 = GoogleMeat			c. Value0 = GoogleOu	utsourcing	

Test Statistics^a

	Value0 - GoogleMeat
Z	-4.747
Asymp. Sig. (2-tailed)	.000
a. Sign Test	

Test Statistics^a

	Value0 – GoogleOutso urcing		
Z	-7.194		
Asymp. Sig. (2-tailed)	.000		
- Circu Talat			

a. Sign Test

Appendix 5: SPSS results for independent t-tests

Group Statistics							
	Group	N	Mean	Std. Deviation	Std. Error Mean		
Meat	Google - eat meat	83	-1.42	2.187	.240		
	DuckDuckGO – eat meat	97	.86	3.234	.328		

Independent Samples Test Levene's Test for Equality of Variances t-test for Equality of Means 95% Confidence Interval of the Difference Std. Error Difference Sig. (2– tailed) Mean Difference Upper df Lower Sig. F t Meat Equal variances assumed -1.451 40.008 .000 -5.438 178 .000 -2.277 .419 -3.104 Equal variances not assumed -5.599 169.396 .000 -2.277 .407 -3.080 -1.474

Group Statistics							
	Group	N	Mean	Std. Deviation	Std. Error Mean		
Outsourcing	Google - outsourcing	101	92	1.046	.104		
	DuckDuckGO – outsourcing	98	-1.04	.657	.066		

Independent Samples Test

		Levene's Test for Equality of Variances t-test for Equality of Means					of Means			
						Sig. (2-	Mean	Std. Error	95% Confiden the Diff	ce Interval of erence
		F Sig. t df tailed)	Sig. t	F Sig. t	tailed)	Difference	Difference	Lower	Upper	
Outsourcing	Equal variances assumed	5.030	.026	.966	197	.335	.120	.124	125	.365
	Equal variances not assumed			.973	169.023	.332	.120	.123	124	.364

Appendix 6: Scatterplots Google and personal information



