Google Search Language Settings and their Impact on Search Results

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ABSTRACT

In this paper, language settings for Google Search have been looked into and their influence on the search results and users' preferences have been studied. More specifically, an assumption was made that a lot of people query in English, but that they have their language settings set on their mother language. We have examined to what extent users prefer either the mother language results or the English results. In order to validate this hypothesis, a short survey and user research with eighteen participants were conducted. The participants had to accomplish six tasks, which consisted of typing a query into two browser windows, each having a different language setting, and the users noted which results they found better. These six tasks covered the three basic Web queries intents, which are informational, transactional and navigational. The findings showed that different language settings for transactional and navigational tasks had no significant impact on users' preferences. Quantitative data indicated a preference for English settings in relation to informational query intent. However, when examining the results qualitatively, it was found that there was just one query with a strong preference for English. Therefore, to confirm that for informational query intent English language settings are more valuable than the user's mother language, more research would need to be conducted.

KEYWORDS

Google, Search Engine, Language Settings, Personalization

ACM Reference Format:
Jan Ondruch, Sam Aarnoutse, and Vincie Vossenaar. 2019. Google Search Language Settings and their Impact on Search Results. In *Proceedings of ACM Conference (Information Retrieval class).* , 4 pages.

1 INTRODUCTION

Google Search has been the most used search engine in the last decade both for desktop as well as for mobile devices, where its market share has been even more significant [2]. As the world has become more tech-savvy and educated, people tend to be able to speak more foreign languages and use them for information search. It is one of the reasons why Google offers users to use the services in different languages. Currently, more than 56% of websites on the Internet have English content [6]. Also, English is by far the most commonly studied foreign language in the world [4].

The assumption here is that many people have their language preferences set in their mother language, however, they often search for information in English. For this research, it is also presumed that people don't take this into consideration and don't count in the fact that various language settings will result in different results and thus, will influence their decisions. This poses some questions: should people frequently querying in English switch their language settings to English, or leave them as their mother language? Is there a perceivable difference in the results for users? And if so, how big is it and which results do they prefer?

The central research question that is answered in this article is: to what extent do Google Search users prefer either the mother language results or the English results? This question is answered to gain insight in the preference of the different results' presentations. With this the existence of a discrepancy between one's language settings and search results' preference is explored.

The next section elaborates more on the issue of languages in search and the related work on this matter of subject is exposed. Chapter 3 describes the methods in which also a description of the setup of the experiment is included. Chapter 4 delves more into the findings of the experiment based on the results, the conclusion and discussion sections.

2 RELATED WORK

Many research studies have been conducted on the topics of Cross-Language Information Retrieval (CLIR) and Multilingual information retrieval (MLIR), which are aimed at improving the user's information search experience by enabling them to utilize multiple languages. Google offered users to turn on a CLIR feature, however dropped it in 2013 due to the lack of its usage [5]. Study shows that users don't use Web Search Engines as multilingual tools, but the search language depends on the type of information they are searching for [7]. So, users of search engines use a particular language for a particular type of search. The task of the user is not the only reason for choosing a certain language. Also the difference in one's language skills do play a part in this case. Users have different language skills which are not trivial to evaluate. Hence the multilingual search can impact their experience as well as the effectiveness of a search [3].

In summary, usage and occurrence of various languages in information retrieval poses a difficult task and it's not yet clear what the most effective way of solving this problem is. One way Google has been trying to tackle this issue is by delivering better search

Information Retrieval class, December 2019, Radboud University, Nijmegen, Netherlands

results by enabling users to choose their language settings. However, once set, people don't tend to change these settings which can be a mistake. No studies regarding this very issue of choosing the right language setting for the user specific task has been done yet. Therefore an experiment is set up to answer the questions posed in chapter one.

3 METHODS

3.1 Experimental Setup

The experiment was conducted using a computer screen with two incognito Google Search browser windows positioned next to each other, one having language settings in English and the other one in the user's mother language. The data was collected according to a survey which was answered by eighteen people with different mother languages. All participants were proficient at both reading and speaking in English.

The study was carried out as follows. First, each participant was asked the following two questions: "What language settings for Google do you use on your phone/laptop?" and "How often do you search in English on Google?". Afterwards, they had to perform six search-oriented tasks. The following queries were used: "Find out, what are anonymous functions in JavaScript" (Query 1), "Try to buy a new iPhone XS" (Query 2), "Find a contact web page of Hohenzollern castle in Germany" (Query 3), "Search for today's news from London" (Query 4), "You are going on a holiday to Tenerife. You want to rent a 7 seater car" (Query 5) and "Go to a website for the Faculty of Science of Masaryk University" (Query 6). For each task, they had to type a query in one window, which was then duplicated to the other one. This means that on the left side the results with the English setup were shown and on the right side the results with the mother language setup. Then, the users had to compare the results in the left and the right window, state on a seven-point Likert scale their preference and justify their choice by explaining their reasons for their decision. The tasks covered various topics, as well as the three main search intents a user can have: navigational, informational and transactional [1]. Queries 1 and 4 are informational, queries 2 and 5 are transactional, and queries 3 and 6 are navigational.

3.2 Analysis

As described in the previous section, the collected data consists of qualitative and quantitative parts. The analysis of the qualitative data was done by using Atlas.ti. For the analysis, first, in-vivo coding was done. Second, ten open codes were created. Finally, axial coding was performed. A summary of the number of codes and the labels of the open and axial codes are included in Appendix A.

For the quantitative research, JASP was used. Some descriptive statistics and One Sample T-Tests were executed. For One Sample T-Test, the student t-test was used. If the mean is around four, then this means that the overall answer is neutral. For the student t-test, it was tested whether the mean of the particular query is normally distributed. This was done to test whether the mean differs from four. The same process was applied for both the individual queries and the three categories (navigational, transactional and informational).

4 FINDINGS

4.1 Results

This section starts with the results of the quantitative results. According to the first question of the survey, the following results occur. In this research one Danish, ten Dutch, one Greek, one Bosnian, three German and two Spanish people were included. The language setting that the participants normally use on Google are for one participant Danish, ten participants use Dutch, three participants English, two participant employ German and two participants Spanish. Two of them search in English whenever searching on Google. Four indicate so search in English frequently, one occasionally, two rarely, four sometimes, and five usually.

A summary of the indicated preferences in terms of a descriptive statistics table is shown in Table 1. Scoring a 1 means that the user indicated a very high preference for the English result presentation. Seven means that the user liked the presentation in their mother language way more than the English setup. At first sight, an outstanding difference in the mean of query four is discovered. Except for query 4, the means of the queries are around 4.000. This means that it doesn't matter for the participants which language setting is used based on the search results. Query 4 has a mean of 2.000, this indicated that participants preferred the English language setting.

	Query 1	Query 2	Query 3	Query 4	Query 5	Query 6
Valid	18	18	18	18	18	18
Missing	0	0	0	0	0	0
Mean	3.778	4.000	4.111	2.000	4.500	3.778
Std. Deviation	1.060	1.940	1.641	1.283	1.425	1.060
Minimum	2.000	2.000	2.000	1.000	1.000	2.000
Maximum	6.000	7.000	7.000	5.000	7.000	7.000

Table 1: Descriptive statistics of individual queries

According to Table 2, the p-value of query 4 was below 0.05 which means that this query is not normally distributed. Also for the informational queries, Table 3 had a p-value below 0.05, meaning it was also not normally distributed. Normally distributed in this context means that there was no preference for a specific language setting for these queries.

	t	df	p
Transactional	0.754	17	0.461
Navigational	-0.215	17	0.832
Informational	-5.144	17	< .001

Note. Student's t-test.
Note. For all tests, the alternative hypothesis specifies that the population mean is different from 4.

Table 2: One Sample T-Test of individual queries

With every score indication comes an argumentation of the particular score. Each of the respondents explained why they choose that specific score. By using digital software (Atlas.ti) patterns in the argumentation of the respondents are found. The following results are exposed by analyzing the qualitative data.

First of all, one might expect differences in advertisements. Differences in the content of the advertisements do exist. However,

	t	df	p
Query 1	-0.889	17	0.386
Query 2	0.000	17	1.000
Query 3	0.287	17	0.777
Query 4	-6.612	17	< .001
Query 5	1.489	17	< 0.155
Query 6	-0.889	17	< 0.386

Note. Student's t-test.
Note. For all tests, the alternative hypothesis specifies that the population mean is different from 4.

Table 3: One Sample T-Test of transactional, navigational and informational queries

only three people indicated a preference in the presentation of the ads for either English or home country settings. Two prefer the home country setup and one respondent prefers the English setup. The differences in the presentation of advertisements are not important for the perceived preference of the users.

Though, the respondents do care about the way the entities are presented. This reason does not include quality aspects of the URLs, but addresses the relevance of the placing/order of the entities and documents. Thirteen times did a respondent indicate that he/she liked the English setup more, because of the way the entities are presented. Only four times a respondent mentioned the mother language setup being the reason why he/she liked that setup. More specifically, the respondents liked the place of the relevant documents and entities way more at the side of the screen with the English setup. Fifteen times they indicated that the English setup has better placing of the relevant entities and URLs. Only two times did a user indicate that the placing of the mother language's setup is more convenient.

The next reasoning concerns the quality aspects of the entities and the URLs. Two times it is mentioned that the English screen shows more recent documents. This indication is further elaborated on in the discussion. Furthermore, people indicated six times that the consistency of the language that is used is much better on the side of the English setup. None of the respondents indicated that the language consistency of the home country setup was better. Besides, the respondents care about the price when typing in a transactional query, because they indicated price differences between the two setups. However, the users indicated cheaper prices on both the Dutch and the English side. No consistency or proof can be explained from these remarks. It can be stated that a user cares about the prices of the transactional task results since they do speak about these differences.

4.2 Conclusion

Based on the quantitative results, for informational queries could be said that people preferred the English language to search on Google. Query 4 indicated that there was a quite high preference for the English language setting above their mother language setting. This query was about London's news and can be explained based on the qualitative comments that the respondents mentioned. The difference that is mentioned by the respondents between searching on Google with the mother language setup and the English language setting is that the English language setting showed direct links to the news articles of the London's news. The mother language settings showed websites where news is published and no direct links to the actual articles. The respondents do prefer the results of the English setup way more than the setup of their mother language. Therefore, people prefer an English setup over their mother language setup, which is not English, when doing an informational task and especially an informational task from which the origin of the content is related to the language of the language settings.

For the other queries, there was not a significant quantitative difference between the two different setups. So, except for query 4, it is concluded that language settings do not matter in terms of personal preference differences between English and mother language settings. This is also the case for the clusters of queries, both navigational and transactional.

Only for the informational category, including query 4, a stronger preference for one of the setups is found when looking from the perspective of the three aforementioned categories of search tasks and their six including queries. However, based on the qualitative data a few general remarks can be made that did not directly lead to a higher preference score for one or the other which are actually interesting. In the results section, it is already briefly exposed that the overall presentation of the different entities is more preferable at the English setup results. Furthermore, searching in English with the mother language setting will sometimes result in an inconsistent usage of the chosen language in which the results are presented. Also, the date of the results that are shown is in general more recent than the results which are shown in the mother language setup.

Another important remark is that people do care about the order and presentation of the entities. Most of the times the English language setting is strongly preferred.

4.3 Discussion

Some queries gave advertisements as a search result on Google. Differences in advertisements do exist but do not directly cause a preference for one of the language setup results. However, for this study, people only look at the first pages and did not actually click on the links. It makes sense to have a preference based on the advertisements when you are actually buying something, for example. Further investigation should be performed in this field of research. Especially the relation between the presentation of the advertisements and a particular language setup in a transactional task context would be recommended as a subject for future research. The same counts for the difference in the prices that showed up when doing transactional tasks.

Complementary, future research could also be done with a quantitative approach. An addition would be that a specific mother language could be compared with the English language setting. Another option could be that based on the frequency people search in English, advice could be given about which language setting they should use to get the best results. In this research, this was not possible because of the low number of participants with the same mother language. More origin-specific conclusions can be made when introducing more participants to a study focusing on the differences between English and one specific origin other than English.

In this research, there are some limitations. Four of the respondents reacted enthusiastically about the fact that the results are shown in their mother language. The reason for this might be a different level of understanding of the results between their mother language and English reading. Another limitation is that the three used categories included only two queries. This may result in a non-representative outcome for these categories. In this research, query 1 and 4 belong to the informational category. The preference which query 1 indicated was neutral, but the preference of query 4 indicated a strong preference of the English language setting. By combining these two queries into the informational category, it implied that all queries in this category indicated a preference of the English language setting. However, query 1 had no preference for the English language setting. So, it could be concluded that the outcome of the informational category is not representative of all informational queries. Further research needs to be done in which more queries are added to the categories, to give a representative and generalized outcome. The participant had to note the findings of their searches which are used in the qualitative research. However, it could be that people have not written all their findings down because they thought it was not useful or did not want to write much for example. Due to this, it could be that some important reasons for choosing a language setting preference are not included in the analysis. In future research, this can be obviated by interviewing the participants by the researcher and recording their answers.

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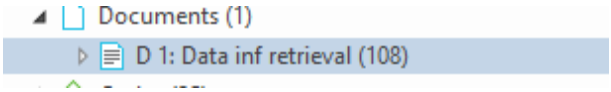
A ATLAS.TI CODES

- **Step 1: in-vivo coding**
  Result: 108 in-vivo codes



- **Step 2: open coding**
  Result: 10 open codes

Relevance english prefered	4	Sam
Relevance dutch prefered	4	Sam
Result allocation	4	Sam
English entity preference	3	Sam
Ads	2	Sam
Prices	2	Sam
Home entity preference	2	Sam
Language	2	Sam
URL quality	1	Sam
Same results	1	Sam

- **Step 3: axial coding**
  Result: three axial codes (representing the open codes)
  - Relevance (2)
    - Relevance english prefered
    - Relevance dutch prefered
  - Presentation (3)
    - Result allocation
    - English entity preference
    - English entity preference
    - Home country entity preference
  - Overall result quality (4)
    - URL quality
    - Language
    - Prices
    - Ads