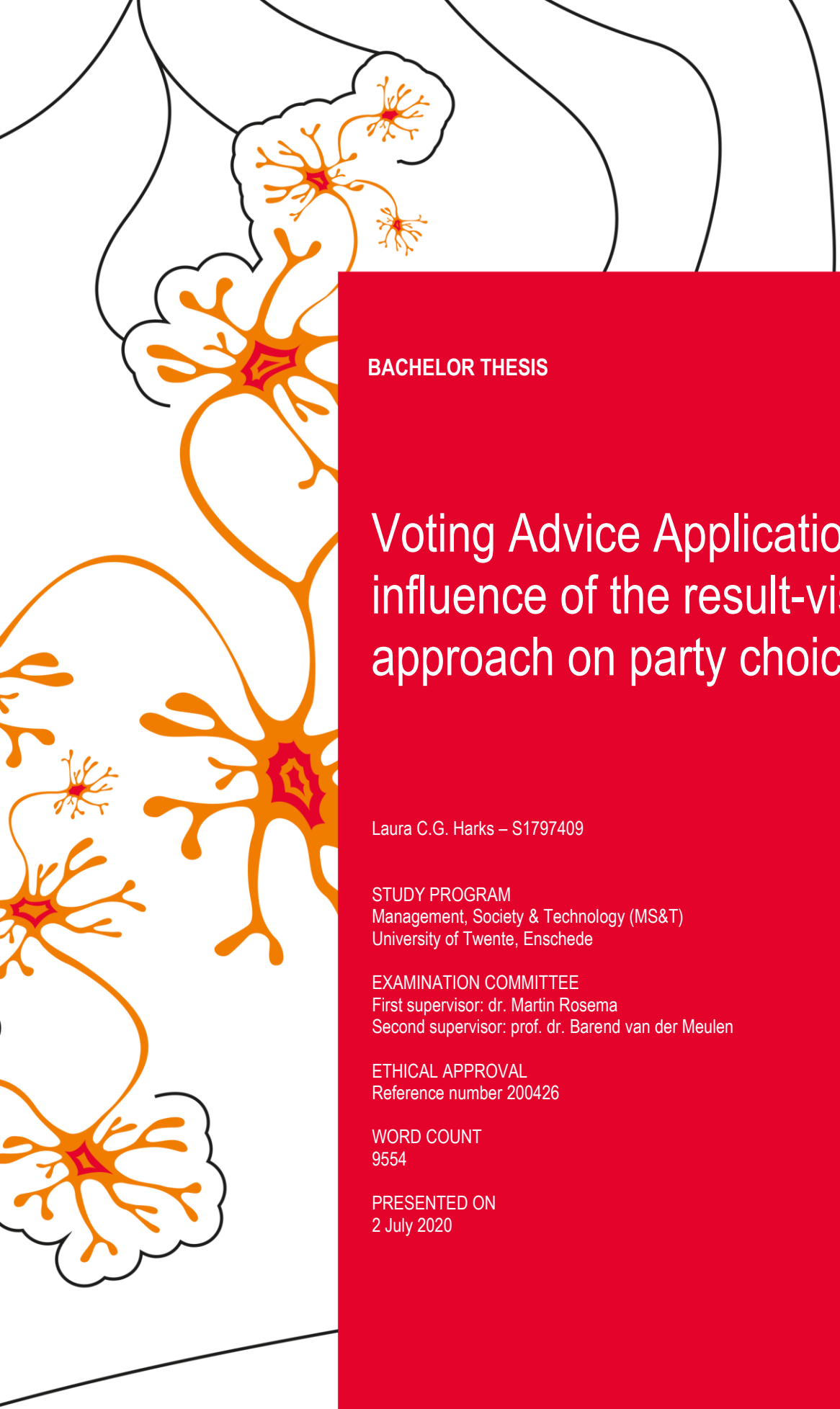

BACHELOR THESIS

Voting Advice Applications: the influence of the result-visualization approach on party choice

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ETHICAL APPROVAL
Reference number 200426

WORD COUNT
9554

PRESENTED ON
2 July 2020

UNIVERSITY OF TWENTE.

Abstract

In recent years, voting advice applications (VAAs) have increased in popularity. This study examines the influences of different result-visualization approaches of VAAs on party choice for three approaches: bar-chart, two-dimensional political space, and spider diagram. The influences are examined in terms of demographic and cognitive characteristics of users, by conducting a survey experiment. Within this survey experiment, respondents were asked about their party choice after seeing several result-screens. I hypothesized that the bar-chart approach would exert the smallest influence on party choice. Results of the survey experiment, with a slightly high educated, young, female sample, showed that in fact, deviation from initial party choice was highest for the two-dimensional political space approach. Furthermore, I found that those who are younger are, as hypothesized, more likely to be influenced. Moreover, analysis showed that the highest educated respondents are more likely to be influenced. Unlike the hypothesis, I found that males were influenced less. Considering the cognitive characteristics of respondents, it was found that those with low internal political efficacy and initial left-wing voters, unlike the hypotheses, are less likely to be influenced. Regarding vote certainty, it was, as hypothesized, found that those with low vote certainty are more likely to be influenced. Through gaining understanding in which aspects affect which users, VAAs can ultimately be optimized in their design.

Table of contents

1. Introduction

In modern democracies, one of the main characteristics is that the citizenry has the right to vote. Historically, these votes are based on ideological beliefs of individuals or their corresponding class. Nowadays, on the other hand, voters increasingly rely on issue voting rather than on this ideological voting. Issue voting means that voters determine their vote based on the distance of their own political position to that of political parties (Garzia, 2010). Within societies in which this issue voting is dominant, voters inform themselves of partisan positions, whilst developing their own personal issue positions (Kamoen et al., 2015). This requires voters to have a clear preference regarding policies, and that different political parties offer competing stances regarding the same policy (Garzia, 2010). In the current political context, it has shown to be hard for voters to be prevalent about the positions of political parties running for elections regarding all different issues, due to its' complexity and an increasing number of parties running for these elections (Kamoen et al., 2015). As a result of this shift to issue voting within this political context, citizens lack political knowledge, which contributes to a situation in which "making a vote choice has become difficult for a substantial part of the electorate" (Kamoen et al., 2015, p. 596). Another reason why political knowledge is important is because it serves as "an important resource for participation in the political space" (Schultze, 2014, p. 46). In the last couple of decades, elections started to transform into 'two-screen media events', in which the internet serves as an important provider of political information, aiming to assist voters in making distinctions between partisan stances regarding issues (Krouwel et al., 2012). Prior research has shown that the internet has the ability to revitalize this political participation, and in this context VAAs have been established as specific applications aimed at political education (Schultze, 2014). Through the usage of voting advice applications (VAAs), voters gain political knowledge in a way that they see the parties' positions in a comparative perspective, while also being made aware of topics relevant for the current election (Schultze, 2014).

These VAAs are online tools, which generate personalized voting advice, in order to assist and inform users by matching their issue positions to the programmatic stances of political parties running for election regarding these issues (Garzia, 2010; Garzia & Marschall, 2019; Schultze, 2014; Van de Pol et al., 2014). They are designed in a way that voters give their opinion regarding a list of policy issues, and after comparison between these answers and those of the user, the user receives an advice, indicating which party has the most overlap with the users' positions (Schultze, 2014). In the last years, VAAs have become increasingly popular and attracting high numbers of users during election campaigns in many European countries (Walgrave et al., 2008). Additionally, VAAs have shown to influence users of the tools in different ways: (1) to increase election turnout, (2) they influence (perceived) political knowledge and (3) they influence the actual voting choices (Alvarez et al., 2014, Kamoen et al., 2015; Klein Kranenburg, 2015; Van de Pol et al., 2014;). Due to these influences, significant effort was put into identifying the design of VAAs and the quality of this design, including for example how parties should be positioned in the tools (Bruinsma, 2018). However, the influences of the visualization of this advice have until now rarely been studied.

There are three main approaches distinguished in terms of the result-visualization approach of VAAs. These are a bar-chart, a two-dimensional political space, and a spider diagram. All three approaches give a personal estimation of the 'first match' of which political party is most compliant to the individual's policy preferences regarding the issues in the VAA, yet they visualize these results differently. The bar-chart approach of result-visualization includes a rank-ordered list, pictured in the form of a bar-chart (Bruinsma, 2018). The two-dimensional political space approach of result-visualization of VAAs positions users and parties in a spatial framework, which shows an implicit voting advice towards the party closest in space as the best match (Louwerse & Rosema, 2014). The spider diagram approach presents the results of the VAA in the form of a diagram that resembles a spider web, which combines eight different policy dimensions (Louwerse & Rosema, 2014). Just like the other parts of VAA design, the result-screen might influence the VAA users. This study aims to investigate whether there are differences between the influence the approaches exert on the most tangible output of the users: party choice.

Study of visualizations is important for several reasons. Firstly, one could regard the visualization as the primary output of the VAAs, namely the perceived advice (Bruinsma, 2018). Moreover, research regarding result-visualization has shown that the first match of users, the intended visualization of the designer is often not interpreted as being this first match of users (Bruinsma, 2018). The effect of the 'curse of knowledge', being that politically well-informed VAA designers assume that the politically poorly informed perceive the intended advice correctly (Xiong et al., 2019) thus needs to be considered. Furthermore, there is a growing need to research visualizations and how citizens interpret visual interpretation due to the fact that the current society knows a growing number of (digital) visualizations, which have shown to be more persuasive and effective than words alone (van Weelden & van Charldorp, 2019). Hence, it is relevant to examine visualization effects in the field of VAA research. The relevance of VAA research as such can be found when considering the role of VAAs in democracies. Optimization of VAAs is relevant due to the cognitive influence they have, regarding the abovementioned election turnout, a higher amount of (perceived) political knowledge and vote choice. These cognitive influences are important factors for participation in the political space. Due to the relevance of VAA optimization and the importance of visualizations, this research aims to examine the possible influence of the result-visualization approach on party choice of VAA users.

This brings us to the research question, which is posed as follows: '*To what extent does the result-visualization approach of VAAs influence party choice?'*. This explanatory question, which implies a comparative analysis, aims to investigate difference in the influence on different approaches of result-visualization, which can be used for VAA optimization in the future. These influences are measured for the approaches as such, as well as categorized based on demographic (age, gender, educational background) and cognitive (initial party choice, vote certainty, internal political efficacy) characteristics of the respondents. To answer the research question, several sub-questions need to be answered in advance. These are (1) 'What is the influence of bar-chart result-visualization on party choice?', (2) 'What is the influence of two-dimensional result-visualization on party choice?' and (3) 'What is the influence of spider diagram result-visualization on party choice?'.

2. Theory

Whereas prior VAA research mainly investigated VAA effects on political knowledge and vote choice of its users, and thus seeing whether these VAAs live up to their expectations, more attention is now being paid to the quality of the results these tools generate (Schultze, 2014), which is in line with the growing popularity of VAAs. This popularity is partially explained by the claim that VAAs make that in a structured manner they provide users with trustworthy information (Krouwel et al., 2012). The quality of VAAs has been researched with respect to different aspects of content and design, such as selection of statements, phrasing of these statements, party positioning methods and the calculation of the results (Bruinsma, 2018).

The users of these VAAs, however, primarily turn to VAAs to receive their voting advice. Research has been done regarding the extent to which advice perception overlaps with the intended advice, but not so much regarding whether the way the result is visualized influences the party choice of VAA users. To be able to examine influences that this result-visualization approach might have, it is important to distinguish the different approaches, but also to conceptualize influence as such. Influence of the result-visualization approach on party choice is considered to be the extent to which users vote differently than intended before the use of the VAA. The three main approaches that will be examined regarding their influence on party choice within this paper are a bar-chart, a two-dimensional political space, and a spider diagram. All three approaches give a personal estimation of the 'first match' in terms of which political party is most compliant to the individual's policy preferences regarding the issues in the VAA, yet they visualize these results differently.

2.1 Visualizations

Bar-chart approach

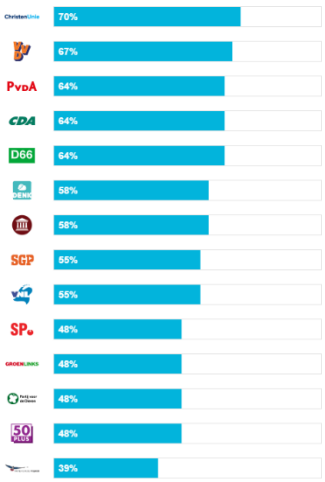

Figure 1: example of a bar-chart approach of result-visualization (StemWijzer)

As explained before, the bar-chart approach of result-visualization includes a rank-ordered list, pictured in the form of a bar-chart. This bar-chart shows the percentage to which an individual is in accordance with every political party and delivers an explicit advice. A reason for VAAs to implement the bar-chart approach is that the user can easily interpret the values and compare heights or lengths of different parties (Bruinsma, 2018). An example of a VAA utilizing this approach is the Dutch StemWijzer, which uses a bar-chart with a separate column for every party. StemWijzer does not present the advice by using a spatial model, but rather uses an 'agreement method', in which the users can choose between agree, disagree, neutral or no opinion (de Graaf, 2010). StemWijzer awards a point to a party for each match, which is doubled for issues the user has given extra weight to (Louwerse & Rosema, 2014). Issues that have been awarded 'no opinion' are not considered when establishing the advice (de Graaf, 2010). The best match of the user is the one which has been awarded most points (Louwerse & Rosema, 2014). The bar-chart approach gives a clear, rank-ordered list of the amount of position overlap and hence creates a rather explicit advice. This clear, rank-ordered first match allows for easy understanding of the intended advice and thus the smallest 'curse of knowledge'. Hence, I expect that deviation of the initial party choice is smallest for the bar-chart approach of result-visualization in comparison to the other approaches (H1).

Two-dimensional political space approach

Figure 2: example of a two-dimensional political space approach of result-visualization (Kieskompas)

As mentioned in the introductory chapter, the two-dimensional political space approach positions users and parties in a spatial framework, which shows an implicit voting advice towards the party closest in space as the best match (Louwerse & Rosema, 2014). Unlike the bar-chart approach, the advice is implicit rather than explicit and the dimensions show agreement with a certain dimension rather than with a certain party (Bruinsma, 2018). Many VAAs adopt this approach of using the issues to create a spatial model including both the users and the parties. One of these VAAs is the Dutch Kieskompas. The idea behind this form of visualization is that it gives insight in the stances of political parties to the voters, as well as the differences between these parties (Louwerse & Rosema, 2014). In a prior case study regarding a VAA utilizing a two-dimensional political space, eight percent of the users which did not have an aligning first preference with their result switched their party choice towards the implicit VAA advice (Alvarez et al., 2014). In the same regard, I expect the two-dimensional political space approach of result-visualization to exert an influence on party choice. Due to the implicit advice, and hence the more need for interpretation by the user, I expect this influence to be higher than that of the bar-chart approach of result-visualization (H2).

Spider diagram approach

As mentioned before, the spider diagram result-visualization approach presents the results of the VAA in the form of a diagram that resembles a spider web, which combines eight different policy dimensions (Louwerse & Rosema, 2014). Smartvote, a popular Swiss VAA that is used by about forty percent of the Swiss electorate, visualizes the results of users in three different ways. As an addition to the two abovementioned approaches, it utilizes the 'smart spider' (Louwerse & Rosema, 2014). The spider diagram comprises of eight axes with values between zero and hundred and places each political party and each user on all dimensions (Bruinsma, 2018). This results in an area within the diagram, which can be compared to the areas of the political parties. Users are shown their amount of overlap, thus their degree of match between themselves and political parties. Finding out which party has the most overlap with a user has to be done by comparison of all graphs (Louwerse & Rosema, 2014). This asks for an even higher degree of interpretation, which I expect to be increasing the influence on party choice. In prior research to the influence of VAAs on party choice, Ladner et al. (2012) found that a significant part of the users of Smartvote were influenced by their voting recommendations and that this influence was stronger than findings before that for other countries (Ladner et al., 2012). Comparably, I hypothesize that the influence of the spider diagram approach of result-visualization is bigger than that of the other two approaches (H3).

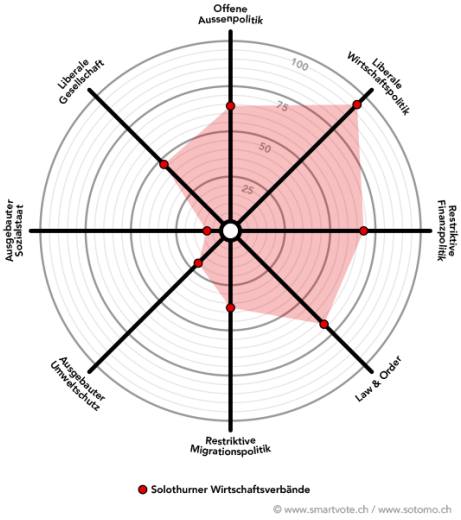

Figure 3: example of a spider diagram approach of result-visualization (Smartvote)

2.2 Respondents' characteristics

This research is ultimately aimed to support VAA optimization. To analyze the influences VAAs have on their users, it is important to know who these users are and which of these users are most likely to be influenced. Prior research has shown that users with particular demographic or cognitive characteristics are more likely to be influenced (Kamoen et al., 2014; Vassil, 2012). Vassil (2012) showed that VAA influences differ based on age and educational level, in a way that they are more likely to influence younger and less educated users (Vassil, 2012). Contrarily, Kamoen et al. (2014) focused on cognitive characteristics and the likeliness of those holding those traits of being influenced rather than the demographic characteristics. Within this research both the demographic and the cognitive characteristics are included separately.

Demographic characteristics

Users with certain demographic characteristics are more likely to be influenced by VAAs in general. These characteristics are that they are younger individuals, often male and highly educated (Vassil, 2012). These users are in general already familiar with new technologies, which raises expectations that especially these users will be affected most by VAAs (Alvarez et al., 2009). Hence, the demographic characteristics age (measured in age groups), gender and educational background are included in this research. Especially age is considered an important trait in terms of being influenced, since it has been shown in prior research that older people are more convinced about their political identification and hence less likely to switch in their party choice (Andreadis & Wall, 2014). Hence, younger voters are expected to switch their votes more often (Andreadis & Wall, 2014), and in line with earlier findings, to be influenced more by VAAs. Therefore, I hypothesize that the influence of result-visualization approaches is higher for younger users (H4). Moreover, I hypothesize that, in line with the higher influence VAAs as such have on younger, highly educated males, the influence of result-visualization approaches is higher for these younger, highly educated (H5) males (H6) as well.

Cognitive characteristics

Next to these demographic characteristics, prior research has shown that the influence of VAAs is dependent on certain cognitive characteristics as well. The users that are more likely to be influenced have shown to have a higher sense of internal political efficacy and a positive attitude with regard to politics in general (Vassil, 2012). On top of that, Kamoen et al. (2015) found that the influence of VAAs on political knowledge and vote choice was dependent on cognitive characteristics in terms of 'need for cognition', initial vote choice certainty and the reason for turning to a VAA. In this light, initial party choice, which relates to the political opinion, vote certainty and perceived political efficacy, by which is meant the sense of "one's competence to understand and participate effectively in politics" (Kamoen et al., 2015, p. 598), are included in this research. I hypothesize that, with regard to the cognitive characteristics, users with a lower vote certainty (H7) and low internal political efficacy (H8) are to a greater extent influenced by the result-visualization approach of VAAs, since vote uncertainty is related to a lack of political understanding (Kamoen et al., 2015). Moreover, these users generally do not have a strong political attitude and hence, are more likely to adjust the party choice after receiving new information in the form of an advice (Kamoen et al., 2015). Furthermore, strong party identification, thus high vote certainty, is negatively related to party choice switching (Andreadis & Wall, 2014).

Thirdly, in terms of initial party choice, right wing voters and conservatives have shown in the past that they are less likely to switch their party choice than progressive and left-wing voters (Andreadis & Wall, 2014). In the same regard, I hypothesize that users affiliated with the political parties on the left-wing progressive corner of the political space are more likely to switch their party choice than the users affiliated with the political parties on the right-wing conservative corner of the political space (H9). Furthermore, it is important to include the 'curse of knowledge', since it allows to investigate the influence on party choice based on the perceived advice. If users that perceive the advice differently than the intended advice, chances are higher that these users are less influenced by their intended advice, but rather by the perceived advice. If the perceived advice would not be considered, effects of result-visualization approaches might be misinterpreted. Due to its clarity and straight-forwardness, I expect the bar-chart visualization approach to have the fewest differences between the intended and the perceived advice (H10).

3. Data and methods

As described before, this study will focus on three approaches of result-visualization. For all three approaches, an example has been given. These examples are used as cases within the study, since they provide the opportunity to look at the influence result-visualization has. These three VAAs that are used as the cases of this study are selected based on their approach of result-visualization. The influence of the result-visualization approach on party choice is measured through a new dataset gathered through a survey experiment. The decision for a new dataset was made because the three VAAs are not all three operating for an overlapping election, causing a difficulty in utilizing existing data, since the data sets would omit certain variables such as the time and country of election, the political sentiment, influential events and news media around the time of the election. Moreover, it would be nearly impossible to examine the final party choice of users, due to, amongst others, the right to privacy in polling booths. Therefore, I created a new data set in the form of a survey. This survey experiment is designed in a way that the influence of the result-visualization approach is measured regardless of the design of the rest of the application. Hence, the original statements of the applications are removed. The respondents merely receive an 'advice', based on their initial party choice.

The survey consisted of questions regarding the cognitive background of respondents, as well as questions regarding the result-screens for each approach of result-visualization, the perceived advice and party choice, followed by questions about the demographic background of respondents. Cognitive background is measured by questions regarding internal political efficacy, vote certainty and initial party choice, which includes a short overview with general information about all political parties included in this survey experiment based on the 2017 Dutch parliamentary elections. Thereafter, the respondents see their advice, based on their initial party choice. For an initial party choice of the seven biggest parties or Forum voor Democratie, respondents receive result-screens for their initial party choice with an overlap of around eighty percent. When respondents indicated one of the other parties

as initial party choice, receive a result-screen not compliant with their initial party choice. The result-screens for each approach of result-visualization are shown in a randomized order, so that the order does not exert influence on party choice. Afterwards, a question regarding advice perception is included, followed by the questions regarding the demographic background of the respondents. These demographic questions are placed at the end of the survey, since prior research has shown that the response rate for survey questions increases when they are placed there (Savino, 2009). More information about the lay-out of the survey experiment and the stimuli materials that were utilized as the examples of the different approaches of result-visualization can be found in appendices A and B.

The political parties that were used in the data collection were the Dutch political parties succeeding to be seated in the 'Tweede Kamer' after the 2017 parliamentary elections, with created stimuli for the seven largest parties (VVD, PVV, CDA, D66, GroenLinks, SP, PvdA) and Forum voor Democratie, due to their growth ever since this elections and their achieved results after the following European Parliament elections and regional elections. After data collection, the initial party choice and the party choice after the different result-screens are analyzed. The deviation of the initial party choice is considered as the influence exerted by the result-screen. These deviations are compared across the different approaches, to exert the influence of voting advices as such and to see for which approach the influence is highest for each characteristic of respondents. The influences are analyzed in terms of specific influences for certain demographic and cognitive characteristics, to see whether these influences differ among these characteristics, and if so, to what extent.

Moreover, the perceived and intended advice are compared, for which analysis will show if the intended first match of the shown advice is compliant with how the participant perceives this advice. This advice perception is included in the survey experiment to visualize the possible 'curse of knowledge' as discussed in the introduction chapter. The addition of a question regarding the perceived intended first match shows possible differences between the intended against the perceived advice. Measuring this 'curse of knowledge' is important since it allows to investigate the influence on party choice based on the perceived advice.

Regarding the analysis of initial party choice, a two-dimensional political space is used. The political space that is used for the measurement of this hypothesis is the political space based on the two-dimensional model of André Krouwel with regard to the 2017 Dutch parliamentary elections, which includes the seven biggest political parties in terms of seats. This political space can be found in figure 4. Forum voor Democratie is the one political party subject to this paper which is not included in this political spectrum. This political party is estimated to exist in the right-wing conservative corner of the political space, based on their party positioning with regard to later VAAs.

Figure 4: The Dutch political spectrum as per March 2017

The survey experiment was open for responses from 2 April 2020 up until the 12 May 2020. The survey experiment was spread through various Social Media channels, being Facebook, Twitter, Linked-In, Instagram and WhatsApp. The spreading through Facebook was shared 24 times and my personal network on Facebook consists of 1664 people. The share via Linked-In received 1052 views and 16 reactions and the repost received another 196 views. On Twitter, the survey was posted and reposted to my Twitter network of 103 followers. Regarding Instagram, the survey experiment was promoted through the stories feature, which is visible for my 616 followers, and a link of the survey was put in my bio. Finally, considering WhatsApp, the survey was sent out in fifteen group chats with different target groups, ranging from younger highly educated friends from study and sports, as well as

older, lower educated family members and colleagues. These numbers were measured at the closing date of the survey experiment.

Effort was taken for the sample of respondents to be as heterogeneous as deemed possible. 192 respondents filled in the survey. Even though the taken measures, regarding excessive spreading of the survey, the sample has shown to be primarily female (63%) aged 18-24 (59%) and university educated (57%). This overrepresentation of females aged 18-24 and highly educated is probably partially due to my network since this is the category I would fall into as well. This sample bias might be visible in the analysis, but differences in influences between different demographic and cognitive variables remain measurable. Moreover, the party distribution of this sample is not fully representative of the Dutch electorate. Certain parties, especially the PVV, are underrepresented in the sample. Therefore, focus is put on the difference in influence of the VAA result-visualization approach between left-wing and right-wing voters. All responses to the survey experiment can be found in Appendix C, the data appendix.

4. Analyses

As stated in the Data chapter, the set of respondents is not representative of the population of Dutch voters nor VAA users. The distribution of this sample can be found in figures 5 and 6.

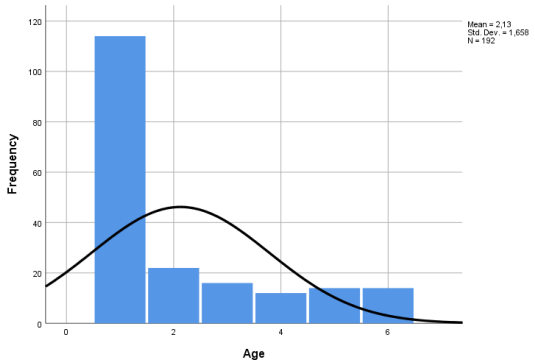

Figure 5: Distribution of age

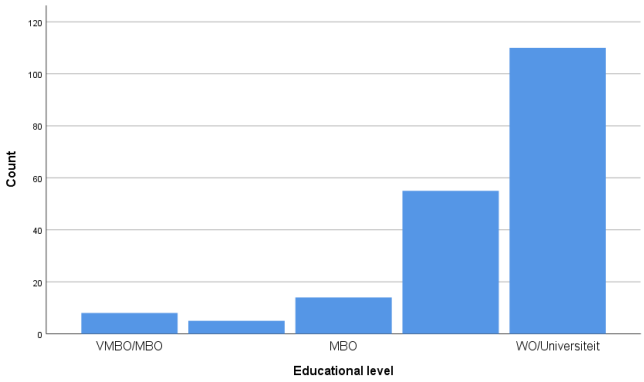

Figure 6: Distribution of educational level

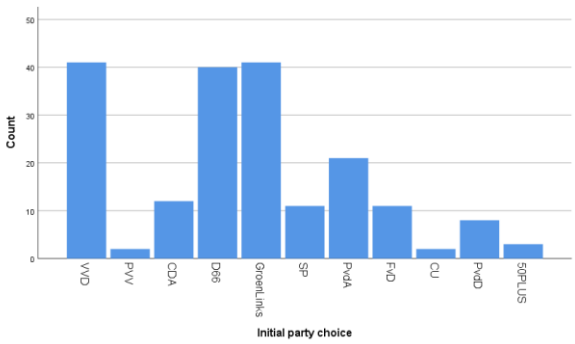

Figure 7: Distribution of initial party choice

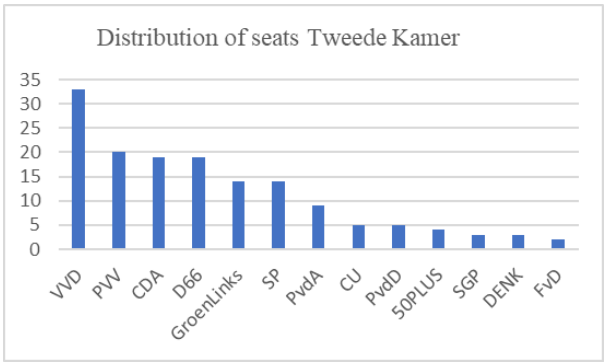

Figure 8: Distribution of seats Tweede Kamer

Moreover, as seen in figure 7 and 8, some political parties have a relatively low proportion of initial votes, when comparing the sample with the Dutch division of seats in the 'Tweede Kamer'. Therefore, it is more valuable to focus on the categories of different characteristics and how respondents with these characteristics are influenced by the result-visualization approaches in terms of party choice. However, it is still valuable to measure the difference between the approaches regarding switches of party choice. Though, due to this sample bias, the outcome of tests regarding H1, H2 and H3 may not be trustworthy when translating the outcomes of this analysis to results or recommendations.

Generally, for the bar-chart approach of result-visualization, 5% of the respondents changed their party choice after seeing their result screen. Regarding the two-dimensional political scale, 14% of the

respondents switched their party choice and regarding the spider diagram result-visualization approach 13% percent switched their party choice. This can be seen in table 1.

Table 1: Percentages of deviation from initial party choice after seeing different VAA result screens

	Deviation from initial party choice	Not switched
Bar-chart	10 (5%)	182
Two-dimensional	26 (14%)	166
Spider diagram	24 (13%)	168

N = 192

In this sense, one could say that the influence of the result-visualization approach on party choice is highest for the two-dimensional political space approach of result-visualization. A chi-square test can show whether this difference if significant, which shows the answer to hypotheses H1, H2 and H3. The p-value for this chi-square test is 0.02, which is a significant difference with a confidence level of 95%.

4.1 Demographic characteristics

Age

In terms of the demographic characteristics as established in the theory chapter, three hypotheses can be tested. The first of those has regard to the age (H4). Age as a variable has been divided in age classes, of which I hypothesized that the younger respondents are more likely to be influenced by the result-visualization approach than the older respondents. Before analyzing the differences of influences per age class, it is deemed valuable to look through the frequencies of switching of party choice per age class for each different approach separately. The percentages of respondents switching their party choice, divided per age class, can be found in table 2.

Table 2: Percentages of deviation from initial party choice - age

	Percentages of deviation from initial party choice			
	N	Bar-chart	Two-dimensional	Spider diagram
18-34	136	15	46	29
35-54	28	15	29	23
> 55	28	36	36	36

N = 192

Concerning the bar-chart approach, analysis shows that the switching of party choice is highest for the >55 age group, with 36% of party switches. Regarding the two-dimensional political scale approach, it is again visible that the age class >55 switches their party choice the most of all age classes (36%). However, the percentage of switches of party choice for the younger age group (18-34) is particularly high as well with 46%. Thirdly, taking the spider diagram approach into account, the >55 age class yet again shows a switch of party choice of 36%. Concerning the influence of the result-visualization approach on party choice regarding age, this is measured by taking the variance of switches of party choice. Variance is measured by taking the mean percentages of deviation from the initial party choice after seeing the different result screens. For each number, the mean is subtracted and the result is squared. The average of these squared differences is the variance. The different variances with regard to age can be found in table 3.

Table 3: Variance in deviations from initial party choice - age

	Squared differences				
	Mean	Bar-chart	Two-dimensional	Spider diagram	Variance
18-34	30	107	140	12	86
35-54	22	35	25	12	24
> 55	36	0	0	0	0

N = 192

The influence of the result-visualization approach regarding age class is considered to be the difference between the percentages per age class for the different approaches. Table 3 shows that for the oldest

age class (> 55) the variance is 0. Moreover, the table shows that variance of the youngest age class, is highest with 86. When looking to the middle age class, with a variance of 24, this influence is lower than for the younger users. This distribution has a p-value of <0.01. Hence, H4 concerning the hypothesis that young VAA users are more likely to be influenced by the result-visualization approach is not rejected.

Educational level

Considering educational level, I hypothesized that the higher educated are more likely to be influenced by the result-visualization approach of VAAs than the lower educated users (H5). The number of respondents of the two lowest educational levels, being VMBO/MAVO and Havo/VWO/Atheneum/Gymnasium, are combined for the sample of this educational level to be of a trustworthy N. The new label for this group is VMBO/HAVO/VWO. The different percentages of respondents switching their party choice, divided by educational level, can be found in table 4.

Table 4: Percentages deviations from initial party choice – educational level

		Percentages of deviation from initial party choice		
Educational level	N	Bar-chart	Two-dimensional	Spider diagram
VMBO/HAVO/VWO	13	15	23	15
MBO	14	14	14	14
HBO	55	9	16	13
WO/Universiteit	110	4	16	12

N = 192

As can be seen in table 4, concerning the bar-chart approach, the percentage of party switches is highest for the lowest educational level (15%) and lowest for the highest educational level (4%). When looking at the two-dimensional political space approach, the percentages of switches of party choice are still highest for the lower educational level respondents (23%). However, the percentage of respondents that switched their party choice of the higher educational levels (16% for both HBO and WO/Universiteit) is considerably higher than regarding the bar-chart approach (respectively 9% and 4%). Thirdly, considering the spider diagram approach of result-visualization, the same trend of the higher the educational level the lower the percentage of switches is visible as for the bar-chart approach of result-visualization. However, the percentage of switches of party choice for higher educational levels is higher than for the bar-chart approach of result visualization, but not as high as for the two-dimensional political space. To examine the possible influence of the result-visualization approach on party choice regarding educational level, table 5 plainly visualizes the variance in percentages of switches of party choice.

Table 5: Variance in percentages of deviations from initial party choice – educational level

		Squared differences			
Educational level	Mean	Bar-chart	Two-dimensional	Spider diagram	Variance
VMBO/HAVO/VWO	18	7	26	7	13
MBO	14	0	0	0	0
HBO	13	13	13	0	9
WO/Universiteit	11	49	33	1	28

N = 192

The influence of the result-visualization approach is measured by the variance of the percentages of switches of party choice. The table shows that for MBO, this variance is 0 and furthermore, that this is not in line with the influences as seen for the other educational levels. This leads to think that the group representing this educational level might not be trustworthy, which could very well be the case for an N of 14. Moreover, this table shows that the influence is highest for the highest educational level (WO/Universiteit) with 28. This influence is significantly higher than the influences of other educational levels (p = <0.01). This is in line with the hypothesis that the influence of the result-visualization approach on party choice is higher for highly educated respondents. The variance measurements of the different categories tell us that it is not a linear relationship between educational level and influence on party choice since the lowest educational level and the second to highest

educational level show similar influences. Since a linear assumption was not part of H5, the hypothesis does not need to be rejected.

Gender

Regarding gender, I hypothesized that male users would be more likely to be influenced by the result-visualization approach than female users (H6). The occurrence of switching of party choice and their percentages divided regarding gender can be found in table 6.

Table 6: Percentages of deviation from initial party choice - gender

	Percentages of deviation from initial party choice			
Gender	N	Bar-chart	Two-dimensional	Spider diagram
Male	72	7	15	10
Female	120	7	18	14

N = 192

Regarding the bar-chart approach of result-visualization the percentage of party choice switches indeed is slightly higher for males (6.94%) than for females (6.67%). However, this is not a significant difference, shown with a p-value of 0.94. Concerning the two-dimensional political space approach of result-visualization, the percentage of party choice switches is higher than about the bar-chart approach for both genders. Considering the spider diagram approach, the percentage of respondents switching their party choice is lower than regarding the two-dimensional political space and bigger than those percentages regarding the bar-chart approach. The results moreover show that with 14% of switches of party choice, females are influenced by the spider diagram approach of result-visualization to a bigger extent than male respondents (10%). To examine the influence of the result-visualization approach based on gender, the variance regarding the mean percentage of switches of the genders for the different approaches have been measured. These numbers can be found in table 7.

Table 7: Variance in percentages of deviation from initial party choice - gender

		Squared differences			
Gender	Mean	Bar-chart	Two-dimensional	Spider diagram	Variance
Male	11	14	21	1	12
Female	13	37	22	2	21

N = 192

The influence of the result-visualization approach regarding gender is measured by taking the variance in the percentages of switches of party choice for both genders. The table shows that for females this variance is higher (21) than for males (12). Therefore, it can be concluded that H6, hypothesizing that males are more likely to be influenced by the result-visualization approach of VAAs, needs to be rejected.

4.2 Cognitive characteristics

Vote certainty

In terms of the cognitive characteristics as established in the theory chapter, three hypotheses can be tested. The first of those has regard to vote certainty (H7). This hypothesis entails that respondents with lower vote certainty are more likely to be influenced by the result-visualization approach. Table 8 shows the percentage of switches of respondents, categorized by their vote certainty.

Table 8: Percentages of deviation from initial party choice – vote certainty

	Percentage of deviation from initial party choice			
Vote certainty	N	Bar-chart	Two-dimensional	Spider diagram
Low (1-3)	20	0	20	10
Medium (4-6)	61	7	23	15
High (7-10)	111	8	13	12

N = 192

Regarding the bar-chart approach, the higher the vote certainty, the higher the percentage of switches is, ranging from 0% to 8%. When considering the two-dimensional political scale approach of result-visualization, this trend is not that visible. The respondents with a low and medium vote certainty have a similar percentage of switches (respectively 20% and 23%), whereas the respondents with a high vote certainty have a lower percentage of switches with 13%. When looking at the spider diagram, the differences between the three different categories of vote certainty are less visible. To examine the influence of the result-visualization approach, the variance in the percentages of switches of party choice are measured for each level of vote certainty. These variances can be found in table 9.

Table 9: Variance in percentages of deviation from initial party choice – vote certainty

	Squared differences				
Vote certainty	Mean	Bar-chart	Two-dimensional	Spider diagram	Variance
Low (1-3)	10	100	100	0	67
Medium (4-6)	15	67	67	0	45
High (7-10)	11	7	3	1	4

N = 192

These numbers clearly show that the percentage points of party choice switches influenced by result-visualization is highest for the respondents with low certainty (67), followed by medium vote certainty (45) and high vote certainty (4). This is in line with H7 stating that people with low vote certainty are more likely to be influenced by the result-visualization approach of VAAs. Hence, this hypothesis does not need to be rejected.

Internal political efficacy

Regarding internal political efficacy, the hypothesis is that users with a low internal political efficacy are more likely to be influenced by the result-visualization approach. To measure internal political efficacy, three questions were asked. The creation of these questions can be found in Appendix A: survey creation. The mean score of these three questions was measured for each respondent, which is distributed as in figure 9.

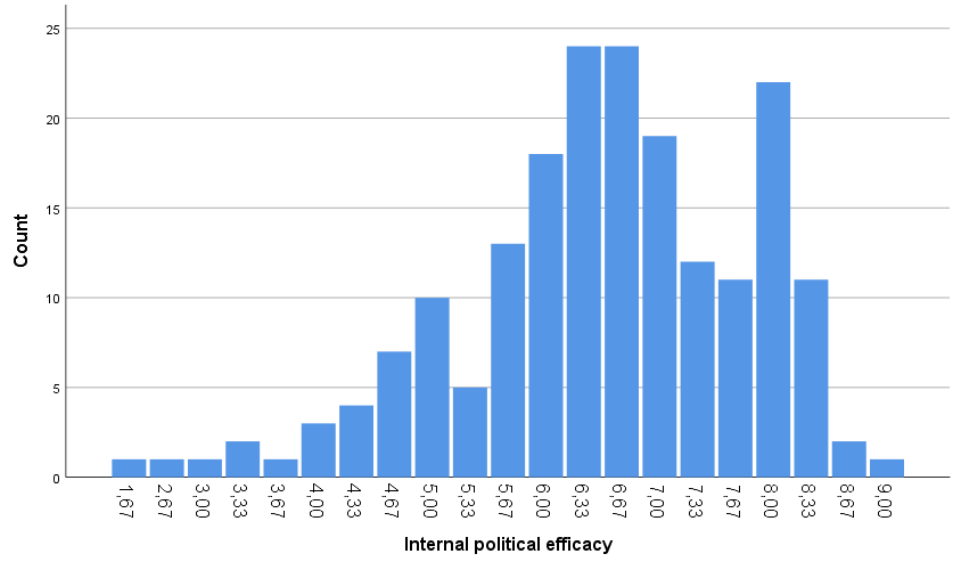

Figure 9: Mean scores of internal political efficacy

Deciding which respondents showed ‘low’, ‘medium’ or ‘high’ internal political efficacy, has been decided by estimating the scores of internal political efficacy that divides the sample in three more or less equal parts. Therefore, respondents with a mean score regarding the questions about internal political efficacy equal to or lower than 6 are considered to have low internal political efficacy. Those with a mean score higher than 7 are considered to have high internal political efficacy, which those in between as respondents with medium internal political efficacy. This led to the following percentages of deviations from the initial party choice categorized by internal political efficacy, shown in table 10.

Table 10: Percentages of deviation from initial party choice – internal political efficacy

	Percentages of deviation from initial party choice			
Internal political efficacy	N	Bar-chart	Two-dimensional	Spider diagram
Low	30	17	13	13
Medium	126	5	17	11
High	36	11	19	17

N = 192

When looking at the bar-chart approach of result visualization, the percentage of switches is highest for the respondents with high internal political efficacy (10%) and lowest for those with medium internal political efficacy (3%). When looking at the two-dimensional political scale, the percentage of switches of party choice is highest for the respondents with low internal political efficacy (18%) and lowest for people with low internal political efficacy (15%). This difference is however not significant with a p-value of 0,87. Thirdly, when concerning the spider diagram approach of result-visualization, it can be seen that the percentage of switches of party choice is highest for those with high internal political efficacy (17%) and lowest for those with medium internal political efficacy (10%). For each level of internal political efficacy, the variance is measured, which allow for examination of the influence of the result-visualization approach on party choice. These numbers can be found in table 11.

Table 11: Variance in percentages of deviation from initial party choice - internal political efficacy

	Squared differences				
Internal political efficacy	Mean	Bar-chart	Two-dimensional	Spider diagram	Variance
Low	14	5	1	1	2
Medium	11	37	34	0	24
High	16	21	14	1	12

N = 192

This table shows that, regarding the sample, variance in switching of party choice is highest for respondents with medium internal political efficacy (24%) and lowest for those with high internal political efficacy (10%). This is not in line with H8 and hence it needs to be rejected.

Initial party choice

Regarding initial party choice, I hypothesized that voters of political parties existing in the upper left corner of the two-dimensional political scale would be more likely to be influenced by the result-visualization approach. As can be seen in figure 4, the parties that are estimated in the upper left corner are, by order of magnitude, D66, GroenLinks, SP, PvdA, PvdD, 50PLUS and DENK. The other parties, VVD, PVV, CDA, CU, SGP and FvD are defined in the lower right corner. For this analysis CU, 50PLUS and PvdD responses are taken out of the sample due to their extreme measures and small N. The percentages of switches of party choice, categorized by initial party choice, can be found in table 12.

Table 12: Percentages of deviation from initial party choice - initial party choice

	Percentage of deviation from initial party choice			
Initial party choice	N	Bar-chart	Two-dimensional	Spider diagram
VVD	41	2	17	7
PVV	2	0	0	0
CDA	12	0	8	0
D66	40	0	3	10
GroenLinks	41	2	17	10
SP	11	9	18	18
PvdA	21	5	10	5
FvD	11	0	18	9

N = 192

This table shows that, regarding the bar-chart approach of result-visualization, the percentage of switches is highest for SP (9%) and lowest for FvD, D66, CDA and PVV with 0% of switches of party choice. When considering the two-dimensional political space, the percentage of switches is highest for FvD and SP (18%) and lowest for PVV with 0%. Thirdly, when looking at the spider diagram approach, the percentage of switches is highest for SP (18%) and lowest for CDA and PVV (0%). To interpret these numbers correctly for being able to measure the influence of the result-visualization approach on party choice, the variances in percentages of switches of party choice are taken. These numbers can be found in table 13.

Table 13: Variance in percentages of deviation from initial party choice – initial party choice

N = 192

	Squared differences				
Initial party choice	Mean	Bar-chart	Two-dimensional	Spider diagram	Variance
VVD	9	43	67	3	37
PVV	0	0	0	0	0
CDA	3	8	31	8	15
D66	4	17	3	34	18
GroenLinks	10	52	49	0	34
SP	15	37	9	9	18
PvdA	6	3	10	3	5
FvD	9	83	83	0	55

This table shows that the influence of the result-visualization approach is lowest for the PVV and highest for FvD. In order to measure whether the influence of the result-visualization approach is higher or lower for respondents with an initial party choice in the left-wing progressive corner of the two-dimensional political space are more likely to be influenced, the variances of each party are added to each other as either left-wing progressive corner or right-wing conservative corner. These do not need any division afterwards, since there are four parties included for each corner. The sums can be found in table 14.

Table 14: Sums of variances

	Sum of distance to mean
Left-wing progressive	75
Right-wing conservative	108

Table 14 shows that even though the influence of VAAs as such are higher when looking at switches of party choice for users with an a party choice concerning a party of the left-wing progressive corner of the two-dimensional political space, this is not because of the result-visualization approach. Respondents choosing those parties existing in the left-wing progressive corner are, based on this dataset, less likely to be influenced by the result-visualization screen than the voters of political parties existing in the right-wing conservative corner of the two-dimensional political space. Hence, H9 needs to be rejected. Moreover, it is deemed interesting to investigate to which party respondents switched when deviating from their initial party choice. Regarding the bar-chart approach, these numbers can be found in table 15.

Table 15: Parties to which respondents switched – bar-chart

	Party to which respondents switched					
Initial party choice	CDA	D66	SP	FvD	PvdD	No change of party choice
VVD	0	1	0	0	0	40
GroenLinks	0	0	0	0	1	40
SP	0	1	0	0	0	10
PvdA	0	1	0	0	0	20
CU	2	0	0	0	0	0
PvdD	1	0	2	1	0	4

Respondents of parties of whom none deviated from their initial party choice are excluded from this table. Except for PvdD respondents, all deviators chose a party in the same corner as their initial party choice. With regard to PvdD respondents, one respondent chose for CDA and one for FvD, This shows that for the bar-chart approach, out of the ten respondents who deviated from their initial party choice, two of those opted for a party on the opposite corner of the two-dimensional political space. These are considered remarkable deviations. Table 16 shows to which party respondents switched when deviating from their initial party choice regarding the two-dimensional political space.

Table 16: Parties to which respondents switched – two-dimensional

	Party to which respondents switched									
Initial party choice	VVD	D66	GroenLinks	SP	PvdA	FvD	CU	SGP	DENK	No change of party choice
VVD	0	6	1	0	0	0	0	0	0	34
CDA	0	0	0	0	0	0	1	0	0	11
D66	0	0	0	0	0	0	0	1	0	39
GroenLinks	0	3	0	1	2	0	0	0	0	35
SP	0	2	0	0	0	0	0	0	0	9
PvdA	0	1	0	0	0	0	0	0	1	19
FvD	2	0	0	0	0	0	0	0	0	9
CU	0	1	0	0	0	0	0	0	0	1
PvdD	1	0	0	2	0	1	0	0	0	4

The respondents with an initial VVD party choice that deviated from this choice tend to opt for a more progressive party choice (D66, GroenLinks). Another interesting switch of party choice is that of an initially D66 voter opting for SGP after seeing the result-screen for the two-dimensional political space approach, which contrarily is a conservative party. A third interesting switch of party choice is that of an initial CU voter opting for D66 after seeing this result-screen, which is more progressive. The most remarkable deviation of initial party choice however is that of initial PvdD voters opting for VVD and FvD, which are quite on the opposite side of the two-dimensional political space. All in all, eleven out of the twenty-six respondents that deviated from their initial party choice did so in a remarkable matter. Table 17 shows to which party respondents switched when deviating from their initial party choice regarding the spider diagram.

Table 17: Parties to which respondents switched – spider diagram

	Parties to which respondents switched								
Initial party choice	VVD	CDA	D66	GroenLinks	SP	PvdA	FvD	DENK	No change of party choice
VVD	0	0	3	0	0	0	0	0	38
D66	0	0	0	1	0	2	0	1	36
GroenLinks	0	2	2	0	0	0	0	0	37
SP	0	1	1	0	0	0	0	0	9
PvdA	0	0	0	1	0	0	0	0	20
FvD	0	1	0	0	0	0	0	0	10
CU	0	2	0	0	0	0	0	0	0
PvdD	1	0	0	1	2	1	1	0	2

The respondents with an initial VVD party choice that have deviated from this choice based on the spider diagram approach of result-visualization opted for D66, which is a more progressive party. A second remarkable switch of party choice is that of initial GroenLinks and SP voters opting for CDA. The most remarkable is however, as seen at the two-dimensional political space approach as well, is initial PvdD voters opting for VVD and FvD, which are quite on the opposite side of the two-dimensional political space. All in all, eight out of the twenty-three respondents that deviated from their initial party choice did so in a remarkable way. This shows that, even though the two-dimensional space

approach of result-visualization shows party-positioning alongside the personal overlap between the parties and the user, the percentage of remarkable deviations from the initial party choice is highest for this approach.

Perception

The final hypothesis that needs to be tested is H10, stating that for the bar-chart approach of result-visualization, the difference between the intended and perceived advice are smallest. This hypothesis as such does not measure any influence of the result-visualization approach, but merely checks the perceived advice in comparison to the intended advice as shown by the result-screens. The perception is measured by seeing how often the intended advice and the perceived advice overlap. These measurements can be found in table 18.

Table 18: Degree of correctly understood intended advice

Degree of correctly understood intended advice		N = 192
		Percentage
Bar-chart	170	89
Two-dimensional	145	76
Spider diagram	159	83

This table shows that the degree of contradiction between the intended and the perceived advice is indeed smallest for the bar-chart approach of result-visualization. This contradiction in perception is highest for the two-dimensional approach of result-visualization. Seeing that the bar-chart approach of result-visualization indeed has the highest degree of correctly understanding the intended advice, it shows that H10 does not need to be rejected. Whether this is due to the approach as such or the advices given by these approaches is not measurable.

5. Discussion and conclusion

When returning to the central question of this thesis, which asks the extent to which the result-visualization approach of VAAs influences party choice, several conclusions can be drawn. The aim of this study was to investigate the difference in the influence on different approaches of result-visualization. The sub-questions, being (1) 'What is the influence of bar-chart result-visualization on party choice?', (2) 'What is the influence of two-dimensional result-visualization on party choice?' and (3) 'What is the influence of spider diagram result-visualization on party choice?' are systematically assessed and answered per characteristic in the analysis chapter. These questions are answered per characteristic and as a whole per result-visualization approach. By measuring the variance of the influences of the different approaches of result-visualization on party choice, it was tested whether the hypotheses needed to be rejected. It was found that deviation from the initial party choice was highest for the two-dimensional political space approach with 14% and lowest for the bar-chart approach with 5%. Through further analysis of this survey experiment, it was found that, in line with the hypotheses, young VAA users are more likely to be influenced by the result-visualization approach. Moreover, users with low vote certainty showed to be less likely to be influenced by the result-visualization approach. Regarding educational level, it was found that those with the highest educational level are most likely to be influenced by the result-visualization approach. However, this correlation between educational level and the influence of the result-visualization approach has shown not to be linear. The reason that this influence is not normally distributed could be accounted to a relatively small sample of the lower educational levels which therefore might not be representative.

When considering gender, the hypothesis that males would be more likely to be influenced by the result-visualization approach had to be rejected. This shows that even though males have shown to be influenced more by VAAs in total, this does not apply to the result-visualization approach. Hence, it is accounted to other aspects of VAAs in the design or possibly gender-related neurological preferences. The next characteristic that was measured in terms of the influence of the result-visualization approach on party choice is internal political efficacy. This study has shown that, even though VAA users with higher internal political efficacy are more influenced by VAAs as such, this cannot be accounted for by

the result-visualization approach. The respondents with low internal political efficacy have shown to be influenced the least by the result-visualization approach. Finally, when considering the initial party choice of VAA users, the respondents whose initial party choice was for a political party existing in the right-wing conservative corner of the two-dimensional political space, have shown to be influenced more by the result-visualization approach than those whose initial party choice was for a political party existing in the left-wing progressive corner of the two-dimensional political space. Left-wing progressive users are generally more likely to be influenced by VAAs as such, but this study showed that the influence of the result-visualization approach operates contrarily and influences the right-wing conservative voters more.

These findings have some theoretical and practical implications in terms of optimization of VAAs, which ultimately is the aim behind this research. This study showed that some of the characteristics of VAA users, that are known to affect the influence VAAs exert on party choice for these users, are not due to the result-visualization approach. Theoretically, it is therefore necessary to examine all different aspects of VAA design separately, to be able to measure which aspects have lead to a higher influence on party choice for younger, highly educated and male users of the VAA in general. By investigating for each aspect of VAA design what their influences on party choice are and for whom, VAAs can be optimized in a way that the design is as objective as possible and exerts the least influence as possible. This would be of importance since it would allow for the voting advice to be the main output of the content of the VAA, rather than all the additional effects that have shown to exist. Practically, this knowledge implicates an ethical obligation to optimize VAAs in one of two approaches: (1) adjusting the existing VAAs to a way in which the users are influenced the least as possible by the VAA design and (2) creating targeted VAAs specially made for the users with characteristics that ask for one of either approaches, which can focus on certain target groups that for one of the approaches are less likely to be influenced by the result-screen. These implications are in principle a good addition to VAA research, but this research also generates a question of weight of importance. Do we, in future research and in practical application of these findings, want to consider the influence of the result-visualization approach in creating new VAAs or revising existing ones, or do we want to focus on the influences of VAA design in general? Personally, I would favor considering all aspects separately, so that targeted VAAs can use the parts of the design that are least likely to influence their targeted users solely based on their visualization and that the voting advice is the main output of VAAs yet again.

Furthermore, I would like to shine a light on the strengths and weaknesses of this research design. Through the usage of a new dataset, it was possible to measure all the different characteristics of the respondents, whilst focusing on the three different approaches of result-visualization. Another way to conduct this research would be by comparing three different studies of the different approaches, but in that way, external factors could never be accounted for. Hence, I believe that a strength of this research design lies in the possibilities this new dataset created in terms of measuring and approaching the three different approaches in the same manner and from the same angle. Another strength of this research design is that by exclusion of the rest of the design of the VAAs, all measured influences and effects can directly be accounted to the result-visualization, which diminishes the room for error or external effects. In terms of weaknesses, it would have been better if the sample size would be bigger. A sample of approximately 200 respondents was initially deemed as enough, yet I found that, partially due to the homogeneity of my sample, some characteristics (such as low educational level, elder users, voters for certain parties) did not reach a trustworthy N. Another weakness can be considered in possible bias that occurred when creating the stimuli materials. Since this research does not focus on party positioning, I do not deem it problematic, but the positions of the parties regarding the spider diagram might not be fully accurate. Moreover, the users received a voting advice overlapping about 80% with their own party choice and in line with their initial party choice. For the sake of this research, it is helpful to give users a for them realistic result-screen, but in practice users often receive an advice not in line with their initial party choice or overlapping to a smaller extent.

These strengths and weaknesses lead me to future recommendations I would like to make based on this research. Firstly, I would recommend repeating this study with a bigger sample, which is heterogeneous. Furthermore, for such a research, it would be helpful to first gain accurate understandings of the result-screens in terms of party positioning. However, I do believe that the results gained from this research,

some practical recommendations are in place as well. I would recommend, as mentioned before, to investigate the other aspects of VAA design as a separate entity as well, and therefore gaining understanding in which aspects affect which users. This allows for a situation in which VAAs can be optimized, which ultimately remains the aim of this research.

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Appendix A: Survey creation

As explained in the Data chapter, a hypothetical election was created including the seven biggest parties after the Dutch 2017 parliamentary elections, as well as Forum voor Democratie due to their growth since these elections and their wins in the European Parliament elections as well as the regional elections. This Appendix aims to explain how the survey was created for the sake of replication studies.

Due to the focus on Dutch political parties and a hypothetical Dutch election, the survey was created in Dutch, to obtain more respondents. As described in the theory chapter, several characteristics of respondents are considered regarding the extent to which they are influenced by the result-visualization approach. At the beginning of the survey, questions are asked regarding their cognitive background. This includes political internal efficacy, vote certainty and initial party choice. Political internal efficacy is defined as "citizens' faith and trust in government and their beliefs about one's own competence to understand, and to participate effectively in, politics" (Kamoen et al., 2015, p. 598). Hence, three questions were created regarding internal political efficacy. These questions are posed as follows: '*Hoe groot is jouw vertrouwen in het Nederlands democratisch systeem?', 'In hoeverre heb je het gevoel dat je de Nederlandse politieke processen begrijpt?'* and *'In hoeverre heb je het gevoel dat je de Nederlandse politieke processen kunt beïnvloeden?'.* They translate to; 'How great is your trust in the Dutch democratic system?', 'To what extent do you feel like you understand Dutch political processes?' and 'To what extent do you feel like you are able to influence Dutch political processes?'. Regarding vote certainty, respondents were asked '*Hoe zeker ben je van jouw partijkeuze op dit moment?'* which translates to 'How confident are you regarding your party choice at this moment?'. These four questions regarding the cognitive background were asked on a scale ranging from one to ten, with one being the negative response and ten the positive response in terms of trust, understanding, influencing and vote certainty.

To measure the influence regarding initial party choice, it is asked for which party the respondent would vote for right now. Based on the answer regarding this question, the respondents see three result screens, one for each of the result-visualization approaches. The respondents see results with an estimated eighty percent overlap of their party choice, to gather a clear first match. These stimulus materials have been created for the eight parties mentioned earlier. If respondents opted for one of the five other parties, CU, PvdD, SGP, 50PLUS and DENK, they see an eighty percent overlap with one of the other parties, based on the most overlap when taking into account the created stimuli. The order of the three result screens is randomized, so that the order does not exert any influence.

The stimuli materials of the bar-chart approach and the two-dimensional political space approach themselves were created based on party statements and manifestos and aimed for an eighty percent overlap between the user and the respondent. The stimuli materials of Smartvote needed an estimation for the parties themselves as well, which were established based on the party statements and manifestos. For the user profiles of the spider diagram approach, the focus was put on having the intended first match as first match, rather than a specific percentage of overlap. All stimuli materials can be found below.

Bar-chart approach stimuli

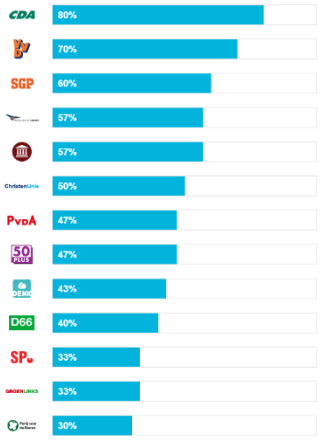

Figure A1.1: Stimulus StemWijzer – CDA

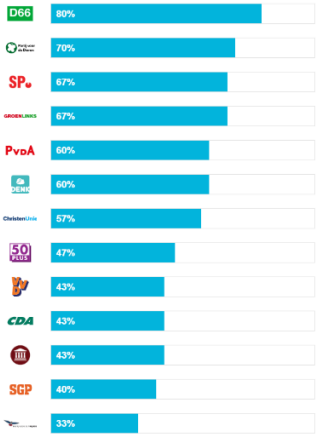

Figure A1.2: Stimulus StemWijzer – D66

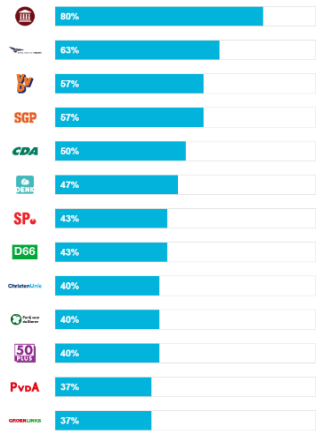

Figure A1.3: Stimulus StemWijzer – FvD

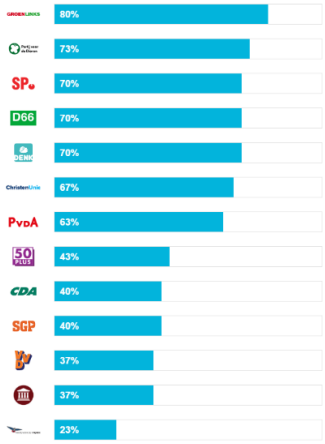

Figure A1.4: Stimulus StemWijzer - GroenLinks

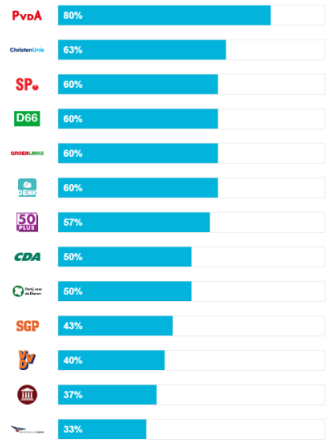

Figure A1.5: Stimulus StemWijzer – PvdA`

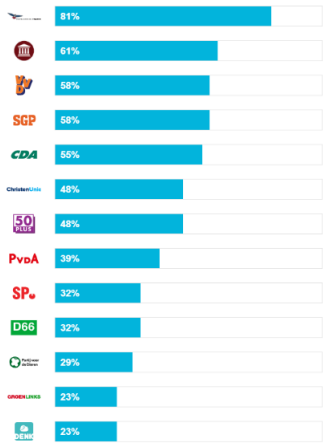

Figure A1.6: Stimulus StemWijzer - PVV

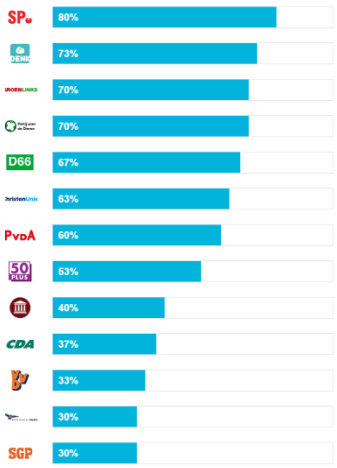

Figure A1.7: Stimulus StemWijzer – SP

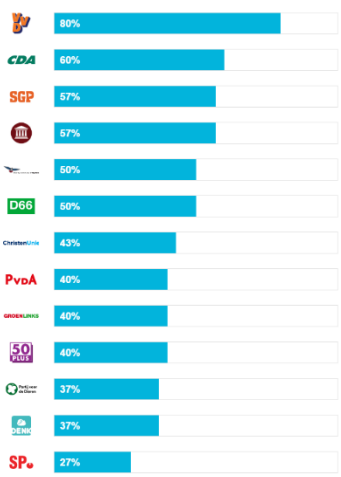

Figure A1.8: Stimulus StemWijzer - VVD

Two-dimensional political space stimuli

Figure A1.9: Stimulus Kieskompas – CDA

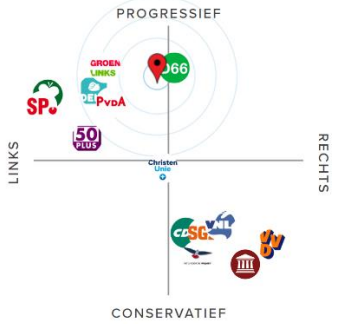

Figure A1.10: Stimulus Kieskompas – D66

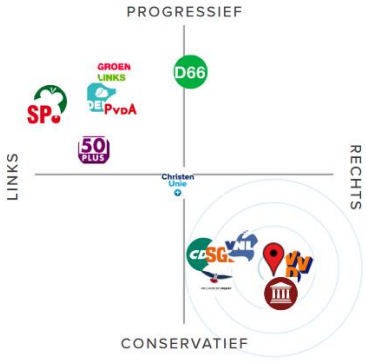

Figure A1.11: Stimulus Kieskompas – FvD

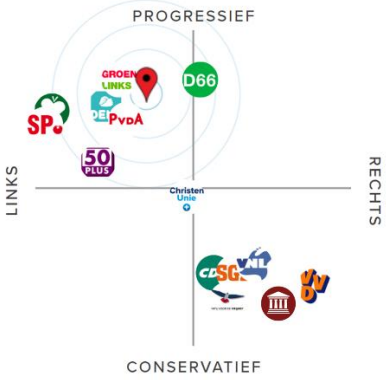

Figure A1.12: Stimulus Kieskompas - GroenLinks

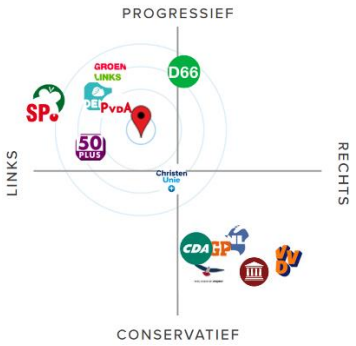

Figure A1.13: Stimulus Kieskompas – PvdA

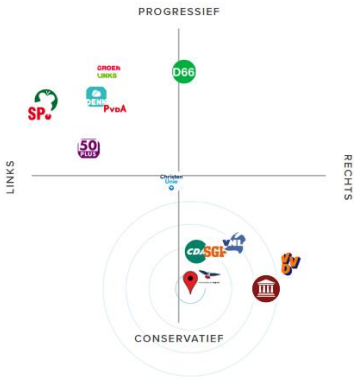

Figure A1.14: Stimulus Kieskompas - PVV

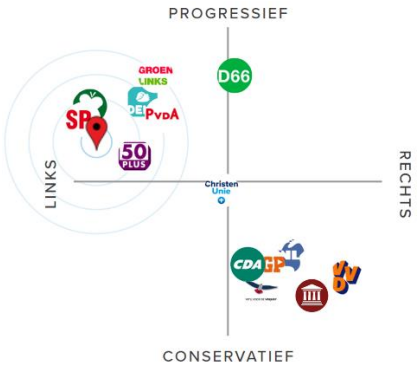

Figure A1.15: Stimulus Kieskompas – SP

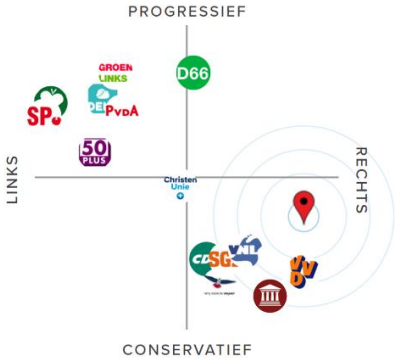

Figure A1.16: Stimulus Kieskompas - VVD

Spider diagram stimuli

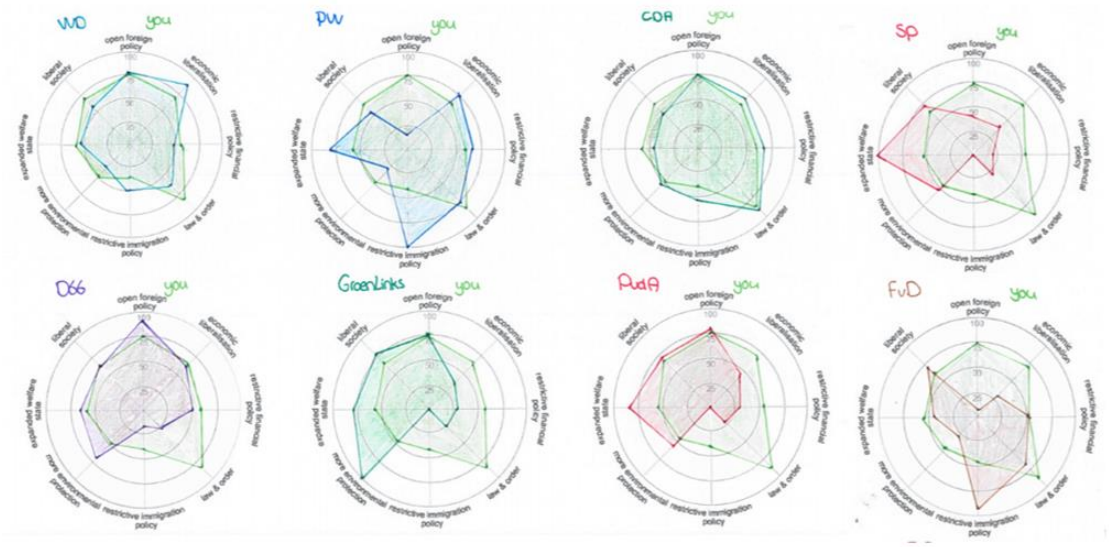

Figure A1.17: Stimulus Smartvote - CDA

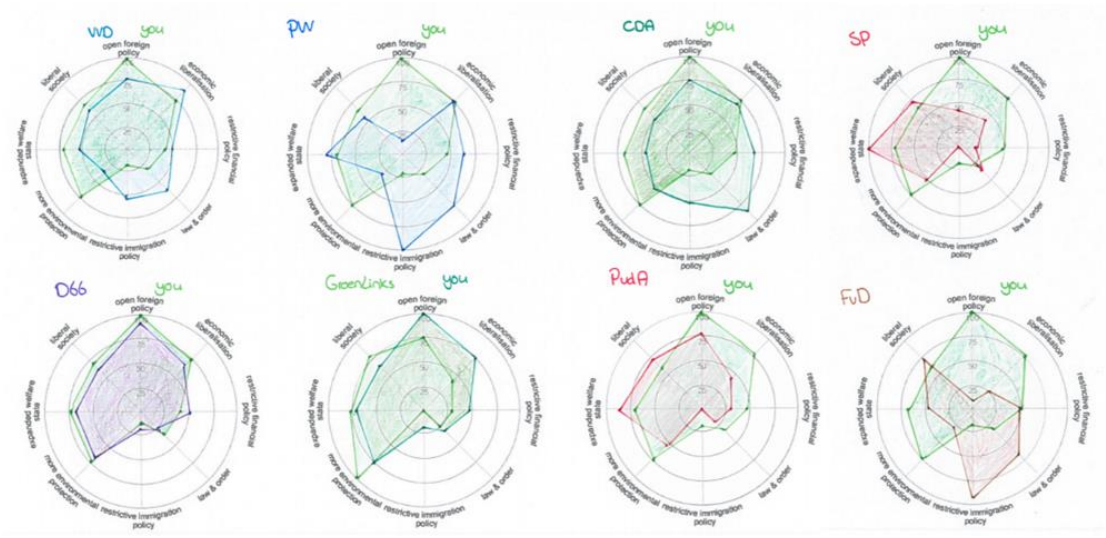

Figure A1.18: Stimulus Smartvote – D66

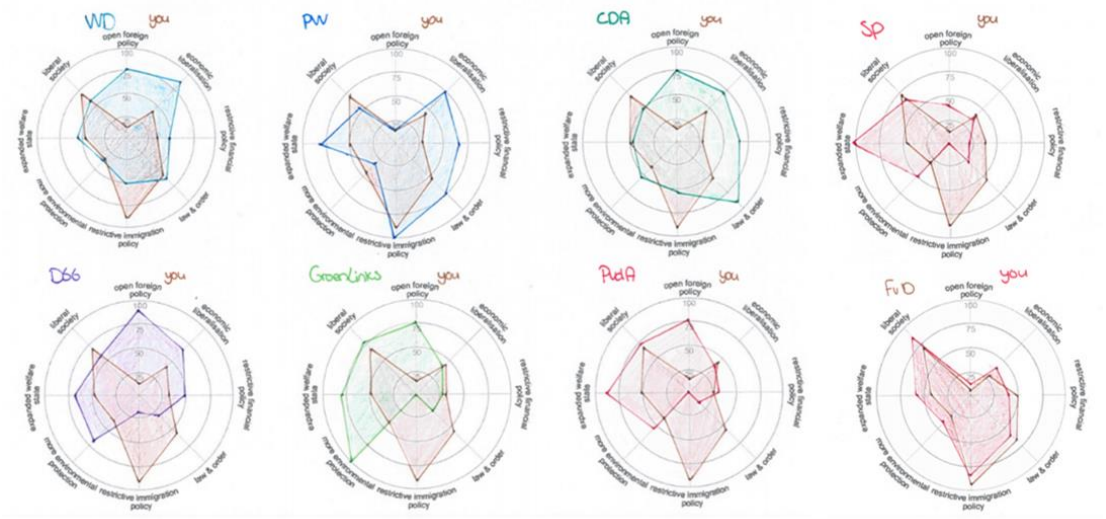

Figure A1.19: Stimulus Smartvote - FvD

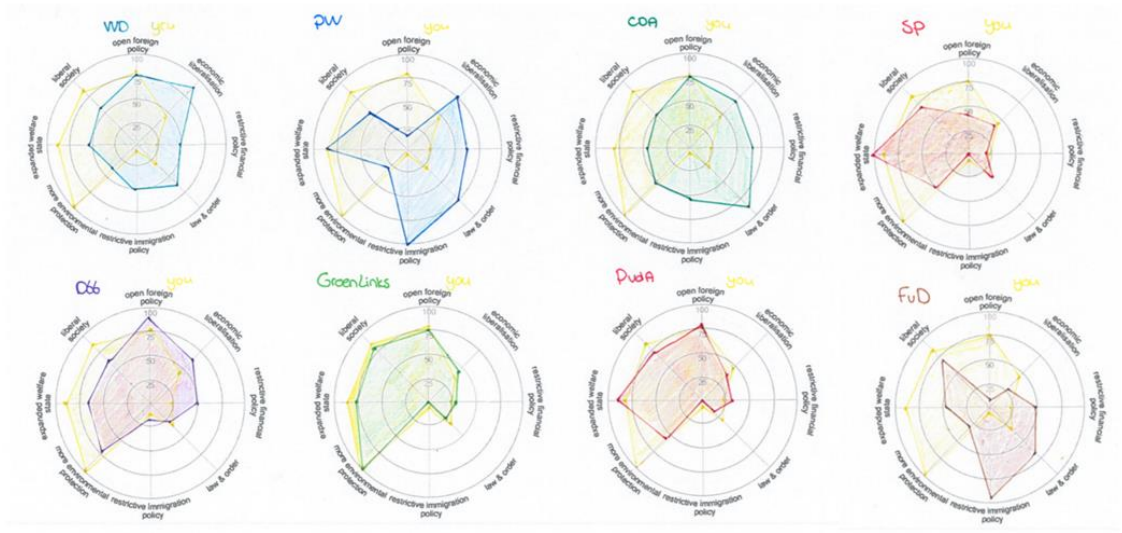

Figure A1.20: Stimulus Smartvote - GroenLinks

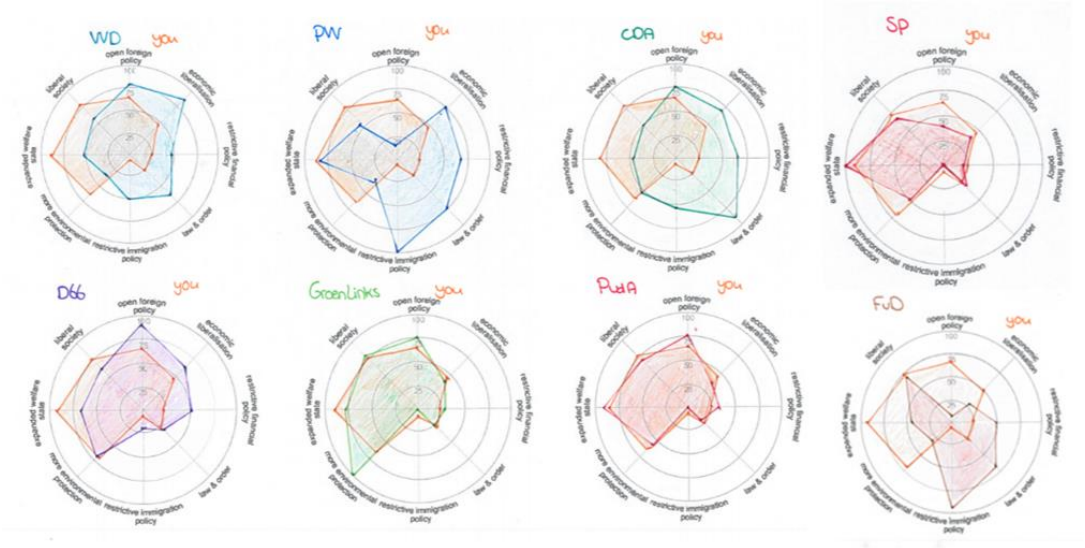

Figure A1.21: Stimulus Smartvote – SP

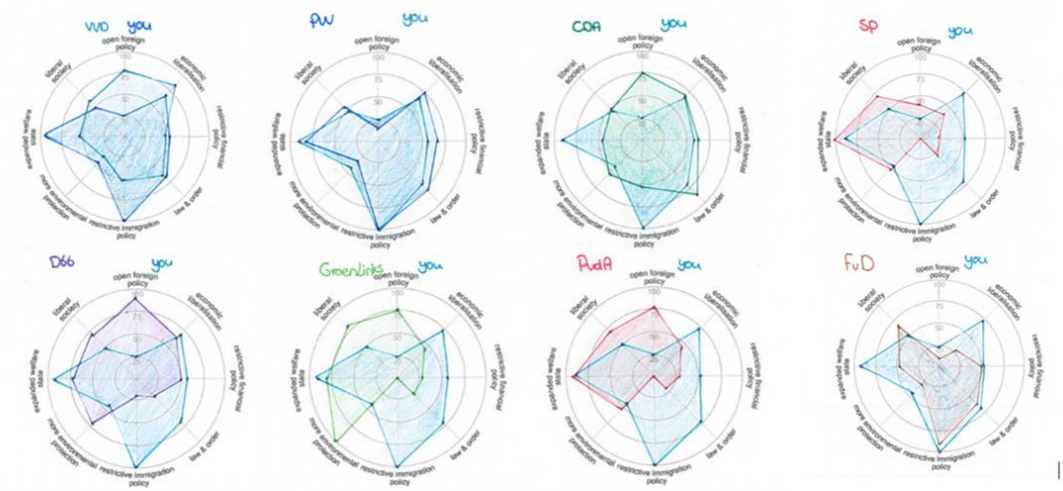

Figure A1.22: Stimulus Smartvote – PVV

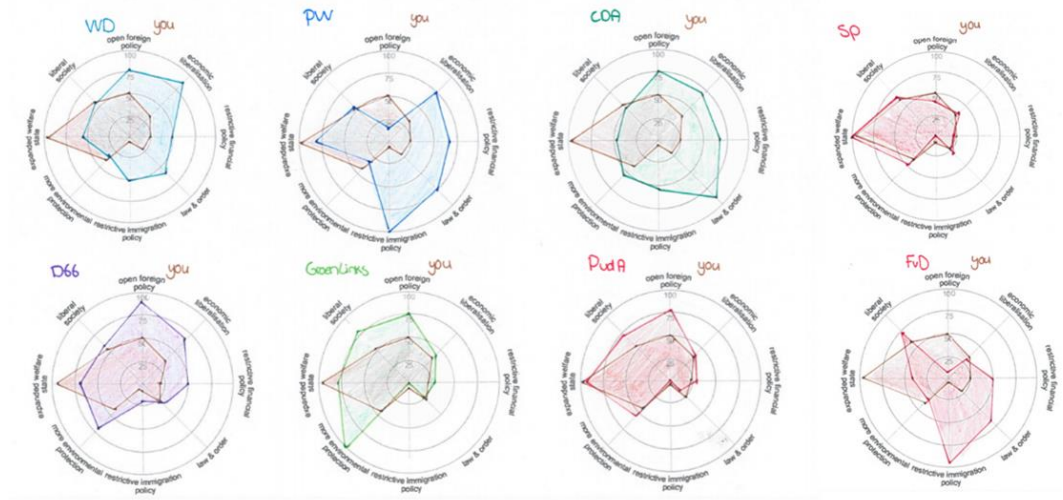

Figure A1.23: Stimulus Smartvote - SP

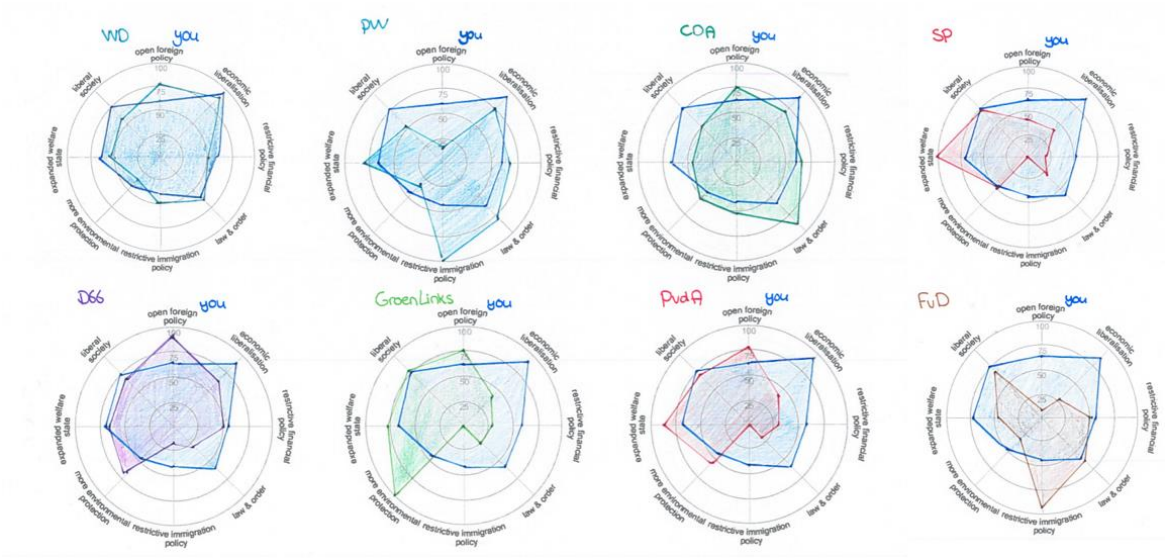

Figure A1.24: Stimulus Smartvote - VVD

After seeing these result screens, the respondents were asked to indicate their party choice per result screen. Moreover, the respondents were asked to indicate which political party was the intended first match, to see to what extent a 'curse of knowledge' was present. This question serves primarily as a check mechanism, showing possible differences between the intended against the perceived advice. Afterwards, the respondents were asked about their demographic background. The demographic questions were posed regarding (1) age, with the age classes defined as <18, 18-24, 25-34, 35-44, 45-54, 55-65 and 65>, (2) gender and (3) educational level, ranging from primary education up until university education.

Appendix B: Survey outline

In this Appendix, the outline of the survey can be found. The question regarding party choice ('Partijkeuze') is conditional. Dependent on the answer for this question, different result screens, which are represented by the stimulus materials as seen in appendix A, are shown.

Figure A2.1: First screen survey - introduction

Figure A2.2: Second screen survey – cognitive questions

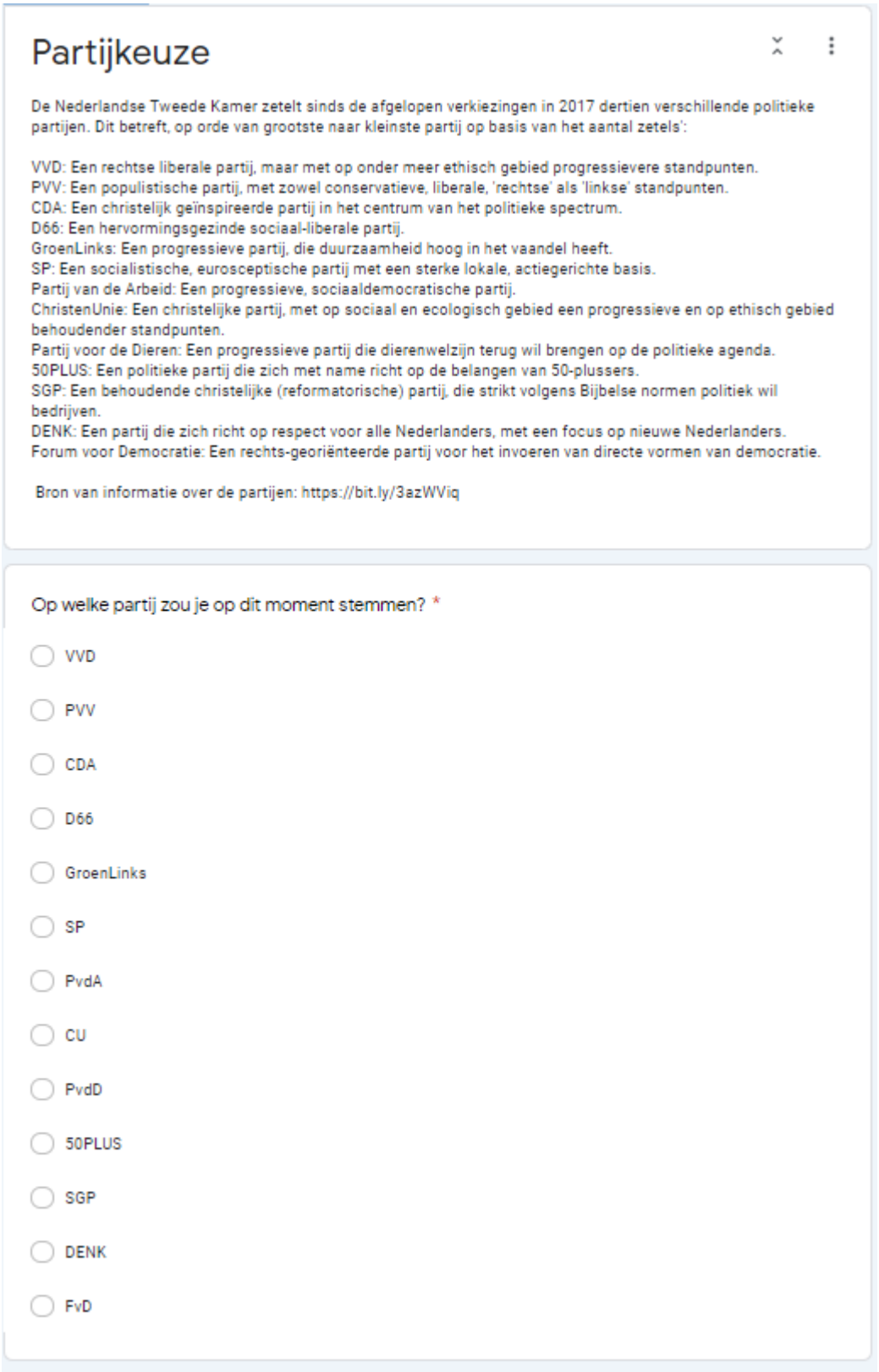

Figure A2.3: Third screen survey – party choice

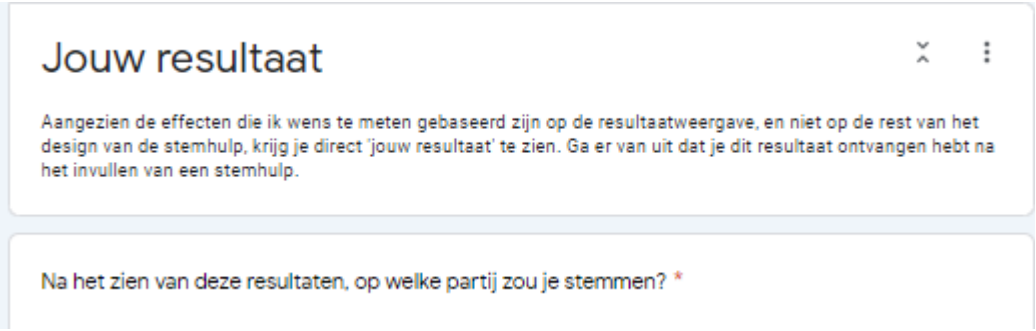

Figure A2.4: Fourth screen survey - results

This question is repeated three times for the three different approaches in a random order.

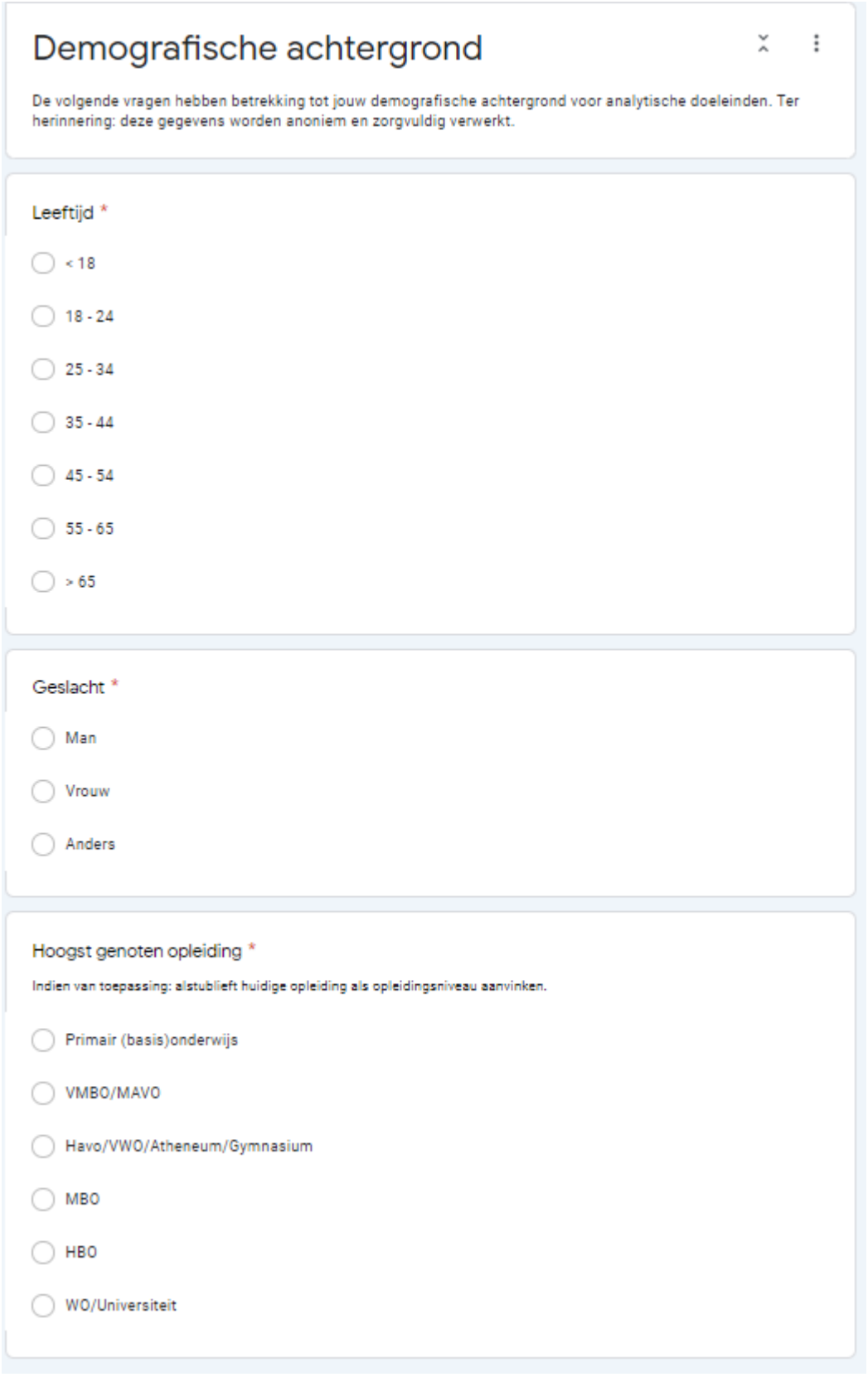

Figure A2.5: Fifth screen survey – demographic questions

Figure A2.6: Sixth screen survey - thanks

Appendix C: Data Appendix

The data appendix of the SPSS.sav format can be found in a separate document.