



BACHELOR THESIS

Helping disadvantaged citizens: is Education Level Playing a Role in the Relationship Between Voting Advice Applications and Voter Turnout?

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WORD COUNT
8266

PRESENTED ON
2 July 2020

Abstract

In the last two decades many studies have shown that Voting Advice Applications, VAAs, usage benefits voter turnout over the whole population. However, differences in socioeconomic factors have seldomly been taken into account. This study aims to shine a light on the effect of education inequality on the relationship between VAA usage and voter turnout. Expected is that low educated people could have more use of VAAs in terms of information gain, and therefore that the effect of VAAs on voter turnout gets stronger at low and medium education levels compared to high. Using Chi-Square tests this relationship is analyzed at three separate education levels to look at the significance, strength, and direction of the relationship. Using a sample of the Dutch Parliamentary Election Survey 2017 this research shows no initial differences between the relationships for the education groups. However, taking the fact that VAAs are not a widely known phenomenon amongst low education people, the study still sees some potential for the important role of providing information VAAs could have to make the voter population more representative.

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1. Introduction

The question who is allowed to vote in elections has been on the political table from the beginning of democracy and therefore, since the beginning of voting rights. Even in ancient Greece and for centuries after, only upper-class white males in society had the right to vote, after which more and more groups of people were slowly added to that list. In this day and age, in most western countries all citizens above the age of 18, residing in the country of citizenship are allowed to vote, with a distinction for mentally disabled persons (Blais, Massicotte, & Yoshinaka, 2001).

For some time, democracy has once again been the topic of public discussion. This time it is the question whether all people in society have the right competences to vote in elections. In this day and age, education seems to become the deciding factor. Does everyone have the knowledge to make a well thought out decision when it comes to politics? This fuels the discussion on education and how we aim to equip our citizens to be political participants. How do we expect our teachers to do so if this is a group that, in the last few years, has become very unsatisfied with how our society is treating them.

The problem of higher educated people being more likely to vote has been known for a long time, as well as the possible solution for giving more tools to the disadvantaged citizens (Lijphart, 1997). The problem in education having an influence in politics, might be that the inequalities between higher and lower educated groups, may only increase in time. Past research has shown that the difference in internet usage for these separate groups, only helps to keep the capital gap in place, not just that, the gaps seems to be getting bigger by how the internet is catering to higher educated people better. The higher educated seem to be able to strengthen their own position instead of bringing the knowledge closer together (van Deursen, van Dijk, & ten Klooster, 2015).

This solution is where Voting Advice Applications, VAAs, could come into play. Because if what mentioned above is true, this will only increase inequalities. Voting Advice Applications have been developed especially in Europe and have been used more and more since the 2000's (Garzia & Marschall, 2014). There has been a lot of research done into the development and effectiveness of these VAAs. However, less research has gone into whether these VAAs are helping those who are in need of additional information. Since VAAs have big goals of providing information on political topics and campaigns (Andreadis, 2013). They could potentially play a role in closing the information gap between low and high education people a bit more. The question at this stage is, do, or could VAAs help this problem? Unfortunately, some research has shown that the user group of VAAs is not (yet) a representative part of the population (Wall, Sudulich, Costello, & Leon, 2009). What the users do look like, seems to be mostly higher educated, which leaves out a large group of people that are not represented in most research (Garzia & Marschall, 2014). It seems to be hard to get everyone to use the VAA and while some research reports that most people use the application for fun (van de Pol, Holleman, Kamoen, Krouwel, & de Vreese, 2014; van de Pol, Kamoen, Krouwel, de Vreese, & Holleman, 2019) this is likely exactly the group of higher educated people using the tool. Nevertheless, research still shows an increase in voter turnout due to the use of VAAs.

This is interesting since the difference in education level could mean a different influence for the VAA on behavior. Education as an independent variable has been researched when it comes to politics itself. The overall tendency for this seems to be that especially higher education, for example college education, has a positive effect on political interest and

participation (Burden, 2009). However, education is not yet widely researched as a dependent variable when it specifically comes to the usage and influence of voting advice application. As a matter of fact, not often are any socioeconomic variables considered when doing researching this topic. Some research that does take socioeconomic factors into account, the variables, this research concludes that these do play a role. For example in the research by Gemenis and Rosema (2014) the results showed that lower educated people were more influenced by the VAA. This relationship is interesting to explore further.

This relationship will be the topic of our research question. Exploring whether lower educated people can benefit more from VAA usage than higher education people. In other words: does education level act as a moderating variable in the relationship between VAA usage and voter turnout? Therefore, the research question is formulated as follows: *How does education level influence the relationship between VAA usage and voter turnout?*

2. Theory

For the research question to be answered, a theoretical background is needed. In this part, this paper will get into the research that has already been done. To be able to do this in a structured way, the different elements addressed by the research question will be separated and the different theories on them will be explained.

2.1 Intention to Vote and VAAs

Whether VAAs had an influence on the intention to vote was one of the first things researchers were interested in when VAAs became a phenomenon in the last two decades. This is one of the most obvious things to research in this field, since providing information and helping voters are why VAAs were developed in the first place. VAAs have the main goal of giving the user more information and helping them to decide what party to vote for. Most VAAs have proven to be fairly good at this goal, while still being an academically crafted tool that holds up to standard (Andreadis, 2013). Since VAAs help people to decide what party to vote for, the connection between the tool intention to vote is easily made. In this research, the overall consensus is clearly that VAAs have an influence on the intention to vote (Garzia, De Angelis, & Pianzola, 2014; Gemenis & Rosema, 2014; Ladner & Pianzola, 2010).

VAAs not only influence whether the user has the intention to vote, but also on what that vote will be. Voting Advice Applications are aimed at giving the user insight as to which political party fits their political preferences. This is a goal that VAAs seem to fulfill in multiple countries such as Belgium, Switzerland and Germany (Ladner, Fivaz, & Pianzola, 2012; Marschall & Schultze, 2012; Walgrave, van Aelst, & Nuytemans, 2008). Because of this relationship it is likely that VAAs give insightful information that users have not yet gained. Otherwise, users would not change their vote intention. An interesting revelation is that some users report the VAA having an impact on their intention, but a lesser percentage reported sticking with that change in the voting booth. Although this is relevant information to construct a background against which this research takes place, this next part of the paper will dive deeper into the relationship between education and political participation.

2.2 VAA Users

There has been some extensive research done on the topic of who uses VAAs. Since the usage of such applications is not mandatory in any country, citizens are free to choose whether or not they use an advice tool to help them make decisions. As this is what VAAs are

designed to do, they help the voters in making a decision on who to vote for in elections (Cedroni & Garzia, 2010). This is mostly done in the form of a questionnaire, after which the voter gets a result as to which party has the most similar opinions on the given statements. (Garzia, 2010).

Since this research addresses the variable education level, the research that will be discussed will mostly address VAA users through the differences in education levels. As mentioned briefly in the introduction, the user group seems to be mostly higher educated people. As thoroughly described by Garzia and Marschall (2014), research was done in multiple countries in Europe to see what the user group of VAAs looked like. Looking at cases in Italy, Lithuania, Luxemburg, Estonia and Germany, in all cases the majority of the users was higher educated, or as they put it: well-educated people. This is an assumption that has been tested many times before, but is still relevant to show in this research. This will be further addressed in the analysis.

Most highly educated VAA users, use the VAA because of entertainment purposes (van de Pol et al., 2014). The users that have the motivation for entertainment purposes, are about two third from the total amount of VAA users. A second motivation, for about one third of the users, seems to be the actual wanting to get some input, these ‘seekers’ do not know what to vote for yet and rely on the VAA to give advice, while the last group of 10%, the ‘doubters’, have little trust in the system and are doubting whether or not to cast a vote (van de Pol et al., 2014). Because of the theory that higher educated people seem to use the application for other reasons than to help them choosing a party to vote for, I expect the effect of VAAs on voter turnout will be less strong for higher educated people. An additional theory suggests that politically active people will be less influenced by VAAs since they are the people that have already made up their minds (Norris, 2001), in this case, those people seem to be the higher educated people. These are relevant theories since we are looking at the differences in VAA effects for the different education levels. When previous research showed that education has an effect on political participation or voter turnout (Mayer, 2011; Sunshine Hillygus, 2005) it is unclear whether there is a certain group, or level, that causes this relationship. To give the clearest insight in the relationship, this paper will separate the hypotheses by naming the specific education levels, and what the expected relationship is. Keeping this in mind, the first hypothesis is formulated as follows:

H1: The effect of VAAs on voter turnout is less strong on higher educated people than on medium educated people.

2.3 Education and Political Participation

The relationship between education and politics have been part of research since the second portion of last century. Especially the difference in education seems to have been a hot topic for some time now. Because of the attention to the two variables, the influence education has on politics seems almost undeniable. Most research findings are that higher educated citizens are more likely to participate in elections and are more interested in political affairs. (Shields & Goidel, 1997; Sunshine Hillygus, 2005). Not only has the relationship been established for a long time, education has turned out to be the strongest socioeconomic variable to influence intention to vote (Wolfinger & Rosenstone, 1980). A paper by Fivaz and Nadig (2010) illustrates the use of VAAs in education. In Switzerland after VAAs were introduced early 2000s. Education picked up the application and used it to explain political topics to their

students. Additionally, this study found that VAAs contribute to the political interest of users, thus, likely the voter turnout would also rise.

In the last few years however, researchers have tried to take a different look at education and political participation. Yes, previous research has shown that higher educated people participate more often but is this also truly to be attributed to (college) education or is there a certain part of education that influences political interest? So rather than education, just certain aspects in education would be enough to influence political participation. Although some research concludes that there may be a nuance in the effect of education (Kam & Palmer, 2008), the distinction made by Kam and Palmer (2008) was once again been proven whilst taking the earlier critiques into account (Mayer, 2011).

To take a look at what it is in education that could contribute to political participation, research by Sunshine Hillygus (2005) has taken the different subjects of the SATs apart to see if different subjects contribute more or less to this correlation. The findings are that a subject such as mathematics, does not seem to influence political participation. So, scoring well in mathematics, does not correspond with political participation. Verbal aptitude however, showed a very high correlation. So, education based around verbal aptitude seems to have a positive effect on political participation. This theory could be one of the reasons why there could also be a specific difference in the effect that VAAs have between education levels, considering the theories on education levels and politics. If verbal aptitude helps people become more politically active, it could be stated that lower educated people get less verbal aptitude education, because they are less educated on all grounds. This is a theory that will also become visible in this paper.

2.4 Education Inequality and Information Gain

Former research has established that the political behaviour of people differs across different socioeconomic groups (Fivaz & Nadig, 2010). And other past research has shown that the gathering of information, does seem to level out the gap in political participation between lower and higher educated groups to some extent (Eveland & Scheufele, 2000). This happens because of the expectation that with more knowledge, especially verbal aptitude as described before, people tend to be extra politically active. Mahéo (2017) found these claims to be true. This research entailed testing the claim that lower educated people gained more in terms of political participation and interest from getting more information. In this case, using a VAA was also included. The results were indeed that the VAAs helped them in being more motivated to vote, while it did not make either group more interested in the campaign or political participation. The absence of the statistical significance, however, could be contributed to the small sample group that was used in this study. Therefore, it is still interesting to look at a bigger group of people, to see what the outcomes would be for a bigger sample.

A VAA is a tool for all interested voters to gain more information on the topic. This is a characteristic that was established in an earlier part of this paper. Concluding that there is a likely possibility that lower educated people gain more from tools that distribute information, such as VAAs, it is in the interest of closing the information gap between education levels to take a better look at whether VAAs (can) help. A paper by Fivaz and Nadig (2010) illustrates the use of VAAs in education. In Switzerland after VAAs were introduced early 2000s. Education picked up the application and used it to explain political topics to their students. Additionally, this study found that VAAs contribute to the political interest of users, thus, likely the voter turnout would also rise. This indicates that VAAs give that extra bit of information

that could be useful for low educated citizens, even if this is through education, by increasing the level of political topics addressed in class. Considering this possibility and the rise of political participation when using a VAA, the following hypothesis is constructed.

H2: The effect of VAAs on voter turnout is stronger for lower educated people than medium educated people

3. Data and Method

3.1 Data

For this research, it is interesting to have a data set that includes all relevant variables and has a big enough sample size to be able to include the two different categories of education level: lower- and higher education. The data that seems to be the best fit is the National Dutch Election survey 2017: DPES (2017). This is a survey that is conducted after the national parliamentary elections took place in 2017. The data was gathered via face to face interviews as well as web-based surveys. This survey is very suitable for this research because the questions cover the variables that are needed to test the hypotheses. The questions include whether the respondent knows of- and used a 'vote matcher', which is a synonym for VAAs. The survey also contains a broad spectrum of socioeconomic variables, including education, as characteristics for respondents. These characteristics include the three variables VAA usage, education level and voter turnout.

What is important to note is that in this data set, there is an overreporting of voter turnout. This is a problem that is well known in the electoral research (Selb & Munzert, 2013). There are three reasons as to why this occurs regularly in election research. One of the ways it can be explained is by the fact that people who do not participate in the survey will probably be less interested in responding to election surveys. A second reason is that during face-to-face interview, or even surveys, people may feel the need to answer questions socially desirably. Wanting to give the 'good' answer, thus maybe stating that they voted while they actually did not. The last reason for overreporting of voter turnout in these kinds of data sets is because talking about politics, having a discussion about the decision to vote could have a stimulating effect itself. This would make people vote sooner after participating in the study. For this dataset specifically the last reason would be less probable since all information gathering was done after the election took place.

For this survey, the Dutch Central Bureau for Statistics has selected a random sample for every form of gathering information, so the survey did have the chance of being representative. Although the sample will not be one hundred percent representative for voter turnout and education level, there are enough respondents for every group to still produce statistically significant data. This will be addressed in part 4. Analysis.

3.2 Method

In order for the hypotheses to be answered, some statistical tests will be in order. What this study aims to do is to show whether education has an influence on the significant relationship between VAA usage and voter turnout. To test this, the survey data for the Dutch parliamentary elections in 2017 is used. To be able to use this data for this specific research, the cases selected need to give relevant information for the analysis. Since this research is looking into the relationship between three different variables, cases are only useful when they have answered the questions corresponding to these variables validly. Therefore, the sample

was selected from the DPES (2017) as the cases that answered V368 (education level), V030 (knowledge of VAAs) and V160 (Voter turnout). From the sample, a smaller sample of 2844 remained, which is still big enough to conduct the analysis. Afterwards, some of the variables were recoded to make sure the analysis could be done correctly. Below will be discussed what and how the variables were recoded.

Firstly, since this paper addresses the moderating variable education level on the relationship between independent variable VAA usage and dependent variable voter turnout, the study will divide the sample group on the basis of the variable education level. This is done to look at the separate relationship between the independent and dependent variable lower educated people and higher educated people. To have a group to which the low and high educated people can be compared, there will also be a distinction made for people that have the education level 'medium'. In the data set, there are two questions asked with respect to education level of the respondent. One asks about the highest education level completed, and the other one asks about the highest education level attended. Since in the theory we have discussed that the education itself has an influence on the susceptibility to information gain, and not just the intelligence of an individual, this study will use the first question. The variable is answered in eight different categories as variable V368: 1= *elementary/primary*, 2= *secondary lower vocational*, 3= *secondary higher vocational*, 4= *Tertiary vocational*, 5= *Higher secondary*, 6= *Tertiary higher vocational*, 7= *University bachelor*, 8= *University master*. This variable was recoded into the three different educational level groups I want to distinguish in order to test the hypotheses. Because this survey was conducted in the Netherlands the distinction between lower and high and medium education will be made based on the Dutch education system. A definition on separating the different educational levels according to this system was made by the Centraal Bureau voor de Statistiek (CBS), which is the Dutch Central Bureau for Statistics (Centraal Bureau voor de Statistiek, 2019). This definition will be used as the questions were made on the basis of this system, using this definition also helps with seeing whether this sample is representative for the Dutch population, since it is easily compared to national statistics presented by the CBS.

The distinction between the educational levels translates into the recoded variable V368_edulevel: 1= *Low education*: primary and secondary vocational (e.g. the Dutch VMBO, praktijk onderwijs). 2= *Medium education* will mean the tertiary vocational and higher secondary education (e.g. MBO and HAVO/VWO). 3= *High education*, identified as tertiary higher vocational and university bachelor and master as highest completed education (HBO and university degrees). This means that the categories 1 through 3 will be identified as lower education, the categories 4 and 5 will be identified as medium education, and 6 through 8 will identify as higher education.

A second recoded variable is needed for VAA usage. VAA usage is addressed in two different questions: V030: Do you know vote matchers? And V031: Did you fill in a vote matcher? Both questions are answered by a simple 0= *no* 1= *yes*. In order to select a sample, that is valuable to the research conducted in this study, it is important that this variable is rightly recoded. This is the case because if a respondent answered 0= *no* to V030, the respondent would not have been asked question V031 and therefore received a 993= *INAP*' (inapplicable). Because we do want to include the people who did not know of VAAs but did not use one, cases were selected based on having filled out V030 correctly. After this, V031 was recoded into V031_inclu consisting of V031 values 993 = *INAP*' and 0 = *no* as the new V031_inclu: 1 = *no*'. The cases for V031 1= *yes*' were recoded into a new value V031: 2 =

'yes'. The values 1 and 2 were used because SPSS would not recognize 0 as a valid value when selecting the cases.

Thirdly, the independent variable VAA usage and dependent variable voter turnout are identified as nominal variables. Voter turnout is asked in the survey in V160: Did (not) vote in 2017 parliamentary elections. The question is answered by 1 = *yes* and 2 = *no*. Since there are no more than two answers, these are both dichotomous variables, and since no order can be established and thus, the variables are considered nominal. As mentioned before, after these variables were controlled for, a sample of 2844 remained.

Since this study aims to look at the relationship for the three education groups separately, I will use the Chi-Square test of independence on the independent variable VAA usage and dependent variable voter turnout three times. Once for low education, once for medium education and lastly for high education. This statistical test will calculate whether the relationship between the, in this case two, variables is significant. To look at the significance the α (alpha) will be set at 5%. Therefore, the relationship will be deemed significant if the p-value of the Chi-Square test is smaller than 0.05. After the results for every test have been reported, the relationship will be further investigated to see differences in the strength and direction of the relationship.

To compare the relationships further, I will not just look at the presence of a significant relationship, but also at the strength of the relationships. This way differences in the direction and strength of the relationship can be assessed and taken into account when searching for an influence of education level. As a way of measuring the association of the relationship, I will use the phi coefficient. This coefficient based on the Chi-Square statistic will work best with a 2 by 2 table, which is what this research will consist of since only the independent variable VAA usage and dependent variable voter turnout will be shown in the statistical test. The output of the two tests will be three separate 2 by 2 tables, one for every education level. The phi coefficient will consist of a value between 0 (no relationship) and 1 (very strong relationship) (Weisburd & Britt, 2014). In between, the relationship will be categorized and interpreted as follows: $\phi > |0.25|$ indicates a 'very strong' relationship, $\phi > |0.15|$ indicates 'strong', $\phi > |0.10|$ indicates a 'moderate', $\phi > |0.05|$ indicates a 'weak' relationship and $\phi = 0$ indicates no relationship or a very weak one. (Akoglu, 2018).

4. Analysis

4.1 Sample Representativeness

As made clear in the previous chapters, this study consists of an analysis conducted from a survey dataset. This dataset is a survey that aims to give more insight into the voting behavior and background of the Dutch citizens. As mentioned before the problem of over-reporting voter turnout has to be addressed first. To make sure that the sample of nonvoters is still big enough, I will first look at the frequencies for voter turnout for this sample, these are shown in Table 1.

Table 1 – Frequency table voter turnout

		Value
Voter turnout	1 Yes	93.0 (2644)
	2 No	7.0 (200)
	Total	100 (2844)

Note: Entries are percentages; frequencies in parentheses
 Source: Adapted from DPES (2017)

The numbers in Table 1 show a voter turnout of 92.8 percent for this sample. The actual voter turnout measuring at 81.9 percent (van Holsteyn, 2018), this sample indeed shows turnout bias. What can be note is that there are some big differences. Unfortunately, as described before this is a known problem in election studies. Since the percentage of nonvoters (7.0%) is low compared to the true number of 18.1%, there could be some differences compared to the true population. However, because there are still 200 cases available, the research may continue since it will still give relevant insight.

Next, I will take a look at the frequencies for the recoded education level variable to make sure the sample is big enough for every level, and to take a quick look at the representativeness of the sample. The ages at the time this survey was taken ranged between 18 and 94. The frequency table for education level can be found below in Table 2. To be able to assess whether this is representative for the Dutch population Table 2 will also show the education level distribution for Dutch population between ages 15 and 75 according to CBS in 2020. These numbers can be seen in the third column.

Table 2 - Distribution of education level sample vs. Dutch population

		Sample value ¹	Dutch population value ²
Education level	1 Low education	22.7	30.6
	2 Medium education	34.7	37.4
	3 High education	42.6	32.0
	Total	100.0 (2844)	100.0 (14204)

Note: Entries are percentages; frequencies in parentheses

¹Source: Adapted from DPES (2017)

²Source: adapted from CBS StatLine - Bevolking; onderwijsniveau; geslacht, leeftijd en migratieachtergrond (2020)

Looking at these tables and what should be noted is that while there are some differences between the sample and the Dutch population. However, the biggest difference of 10 percentage points, does not pose too big of a thread to the representativeness of the sample. For education level, since we are only looking at the separate relationships, and will not compare them statistically, the differences in representation will not influence the conclusion much. To conclude, the analysis will proceed, and the limits described above will be addressed when drawing conclusions on the basis of this study

4.2 VAA Usage

To continue with the main aim for the research, we will now get into the first differences between the three identified education levels. To answer the research question: ‘*How does education level influence the intention to vote when using a VAA?*’ it is relevant to know how many people in the sample used a VAA. This analysis will be divided into the three education levels to look at a first difference. As described before, the sample was selected on the basis of whether they used a VAA. Also the question whether people knew of VAAs was asked in the survey. Using a VAA and knowing of one, or more, are two very different things. Since you have to know of VAAs in order to make the decision to use them, we will first look at those numbers, seen in Table 3.

Table 3 - Education level and knowledge of VAAs

	Knowledge of VAA		Total
	No	Yes	
Low education	53.8 (348)	46.2 (299)	100.0 (647)
Medium education	26.4 (260)	73.6 (726)	100.0 (986)
High education	16.3 (197)	83.7 (1014)	100.0 (1211)
Total	28.3 (805)	71.7 (2039)	100.0 (2844)

*Note: Entries are percentages; frequencies in parentheses
Source: Adapted from DPES (2017)*

Looking at these results, it is very obvious that lower educated people seem to know of VAAs much less than high educated people. The number for low educated people that do not know of VAAs is 53.8 percent, while for high education this number lies at 28.3 percent. That is a difference of about 25 percentage points. At first glance, this could, in itself, have a big influence on whether low educated people use VAAs. In Table 4 the numbers for VAA usages are shown.

Table 4 – Education level and VAA usage

	VAA usage		Total
	No	Yes	
Low education	72.6 (470)	27.4 (177)	100.0 (647)
Medium education	43.5 (429)	56.5 (557)	100.0 (986)
High education	38.3 (464)	61.7 (747)	100.0 (1211)
Total	47.9 (1363)	52.1 (1481)	100.0 (2844)

*Note: Entries are percentages; frequencies in parentheses
Source: Adapted from DPES (2017)*

The most obvious irregularity is the fact the group low educated people used the VAA a lot less than medium or high educated people. The difference is almost 20 percent points. This is a big difference, but considering that for low educated people a lot less people made the actual choice of using a VAA (because they did know they exist). It may be the case the low educated people are more likely to choose to use a VAA when they know they exist. Unfortunately, these number do not give any statistical evidence to prove this.

This brief analysis of knowledge of VAAs between the different education levels gives us an indication of why low educated people have used a VAA less. After examining tables 3 and 4, we can establish that the percentage of people not knowing of VAAs is much higher for low education and is also rising the lower education level is. This could be a simple explanation for the relatively low percentage of low educated people that used a VAA. To be able to say something for certain about the relationship between knowledge of VAAs and VAA usage, an additional analysis was conducted. Below in Table 5, an analysis of the relationship between VAA knowledge and VAA usage is shown.

Table 5 – Analysis of the relationship between knowledge of VAAs and VAA usage

		VAA usage		Total
		Yes	No	
Knowledge of VAAs	Yes	72.6	27.4	100.0 (2039)
	No	0.0	100.0	100.0 (8.05)
	Total	100.0 (1481)	100.0 (1363)	

Chi-Square = 1220.021, df = 1, p < 0.001
φ (phi) = 0.655

Note: Entries are percentages; frequencies in parentheses
Source: Adapted from DPES (2017)

Seeing the numbers for the correlation between knowledge of VAAs and VAA usage, the conclusion can be drawn that there is a positive relationship between the two, since phi is > 0.025 the strength of the relationship is categorized as ‘strong’. This means that when someone knows of VAAs, there is a big chance they would choose to use it. Since so many low educated people do not know of VAAs there is a possibility that the VAA usage is not representative of what it would be if more people made the active choice. This is an important limit to this research that will be discussed in the conclusion more extensively. This will have implications for the conclusions to be drawn from this study.

4.3 Testing the Relationship

The next step in this research, is to look at our formulated hypotheses and to assess whether they could be accepted or rejected on the basis of this research. To do this, we need to analyse the relationship between the independent variable VAA usage and the dependent variable voter turnout for the different education levels, to see whether the variable education level has a moderating effect. To keep this research clear, all tests will be conducted first for low education, then for medium education and lastly for high education. After we have established all relevant statistical values, the outcomes will be compared according to the hypotheses in the last part of this chapter.

4.3.1 Low Education

The first group to be looked at is low education. This is the group that had to lowest VAA usage. What is expected is that the VAA usage has a significant relationship with voter turnout. All low education cases (N= 647) were selected and a crosstabulation was constructed, as well as the before mentioned Chi-Square test and phi coefficient to analyse the characteristics of the relationship. Results are shown below in Table 6

Table 6 – Analysis of the relationship between VAA usage and voter turnout for low education

		Voter turnout		
		Yes	No	Total
VAA usage	Yes	95.5	4.5	100.0 (177)
	No	85.3	14.7	100.0 (470)
	Total	88.1 (570)	11.9 (77)	100.0 (647)

Chi-Square= 12.662, df =1 , p < 0.001
 ϕ (phi) = 0.140

*Note: Entries are percentages; frequencies in parentheses
 Source: Adapted from DPES (2017)*

Results in Table 7 show that the relationship between VAA usage and voter turnout is statistically significant at an α level of 5% ($\chi^2 = 12.662$, N = 647, p < 0.001). This means that VAA usage has a significant influence on the decision to vote in the elections for low education. Next, assessing the value of ϕ (= 0.140) this means that VAA usage and voter turnout have a positive moderate relationship for lower educated people.

4.3.2 Medium Education

The same analysis has been done for the cases that are medium educated (N = 986). The results are shown below for Table 7, on the next page, which includes the crosstabulation for VAA usage and voter turnout as well as the outcomes for the Chi-Square test and value of the phi coefficient.

Table 7 - Analysis of the relationship between VAA usage and voter turnout for medium education

		Voter turnout		
		Yes	No	Total
VAA usage	Yes	96.9	3.1	100.0 (557)
	No	87.4	54	100.0 (429)
	Total	92.8 (915)	7.2 (7.2)	100.0 (986)

Chi-Square = 32.975, $df = 1$, $p < 0.001$
 ϕ (phi) = 0.183

Note: Entries are percentages; frequencies in parentheses
 Source: Adapted from DPES (2017)

For this education group, the relationship between VAA usage and voter turnout is calculated to be significant with a p-value (< 0.001) of less than the alpha of 5%. The relationship for medium educated people has a phi of 0.183, shown in Table 7. This means the relationship is deemed strong ($\phi > 0.015$) according to the measurements identified in the method section. This comes down to a strong relationship for the medium education group, a stronger relationship than for low education, which contradicts the expectation. This will be explored further in 4.3.4 Evaluating the hypotheses.

4.3.3 High Education

Lastly, this study will calculate the same results for the third education level, high education (N = 1211). This is the group where the highest level of VAA usage is measured, but because they are highly educated it is expected that the VAAs have the smallest influence on voter turnout. Below the results can be found. Shown in Table 8, the crosstabulation between VAA usage and voter turnout, the Chi-Square test result and lastly the calculated measure of association (phi) can be seen.

Table 8 - Analysis of the relationship between VAA usage and voter turnout for high education

		Voter turnout		
		Yes	No	Total
VAA usage	Yes	97.9	2.1	100.0 (767)
	No	92.2	7.8	100.0 (464)
	Total	95.7 (1159)	4.3 (52)	100.0 (1211)

Chi-Square= 21.972, $df = 1$, $p < 0.001$
 ϕ (phi) = 0.135

Note: Entries are percentages; frequencies in parentheses
 Source: Adapted from DPES (2017)

For the relationship between VAA usage and voter turnout for high education, almost the same can be concluded as for the last two education levels. The relationship is significant ($p < 0.05$) as expected. For this group as well, the measure of association, phi, is positive at 0.135. Just like for the low education group, this relationship strength is established as moderate ($\phi > 0.10$). This is not consistent with the expectation. This will be evaluated in the next part of this paper.

4.3.4 Evaluating the Hypotheses

As the results have been reported on the relationship for all three education groups, this paper will now look back at our hypotheses. The most obvious observation to point out based on this research, is the fact that there are not really any big differences between the three education levels. Since it was the case that for all three education levels the relationship between VAA usage and voter turnout was significant, all three were even significant at the $\alpha = 1\%$ level, we can draw some conclusions on the differences in relationship strength.

The first hypothesis, ‘the effect of VAAs on voter turnout will be less strong on higher educated people than on medium educated people’, addresses the differences of the relationship between medium educated people and high educated people. The strength of the relationship as measured by the phi coefficient were 0.183 and 0.135 for respectively medium- and high education. Although this is not a big difference, the line between a moderate and strong relationship lies in between at $\phi = |0.15|$. In this case, for this study, H1 can be accepted as true, as the relationship between VAA usage and voter turnout for high education was calculated to be moderate, while the relationship for medium education was deemed to be moderate. However, the other results of this analysis lead to think that this may not be a difference that would be significant. Why this is the case, is something I will get into in the conclusion and discussion chapter.

Looking at H2, ‘the effect of VAAs on voter turnout is stronger for lower educated people than medium educated people’, the phi value for the relationship between VAA usage and voter turnout for low- and medium education will be relevant. These values were for low education 0.140, and, as established above, 0.183 for medium education. Also mentioned above is the upper border for a moderate relationship, which lies at $\phi = |0.15|$. The lower border for a moderate relationship lies at $\phi = |0.10|$. This values the relationship for low between the variables as a moderate relationship, while the relationship for low education, as formerly mentioned, is valued as strong. Therefore, H2 is rejected on the basis of this research, as medium education shows a stronger relationship than the relationship in the group of low education.

Inherent to H1 and H2, the relationship for low education was expected to be stronger than high education. To take a brief look at the differences: the strength of the relationship of both education levels, low education ($\phi = 0.140$) and high education ($\phi = 0.135$) lie very closely together. Both phi values mark the strength of the relationship as moderate. For both education groups the relationship is deemed significant at $\alpha = 1\%$.

To conclude, the analysis of the significant relationship between VAA usage and voter turnout for three education levels, has shown that the differences between the groups high and low education are minimal. At least for the strength and direction of the relationship. Unfortunately, this research does not give any statistical results for the question whether the differences, or lack thereof, are statistically significant. This could be explored in further research. However, the spike in the measure of association for medium education is interesting.

The relationship for medium education is higher for both low and high education, with an indication of a strong positive relationship.

In the context of this research, the answer to the research would be simple, there does not seem to be any difference between the education levels low and high and therefore, education level does not really influence the relationship between VAA usage and voter turnout in a positive way. Medium education has a stronger relationship between VAA usage and voter turnout. What still needs to be explored however, is whether this conclusion is accurate for this study and sample only, or whether medium educated people are more influenced by VAA usage. What also needs to be researched further, is whether the first part of this analysis has an influence on the outcome. The part where the relationship between knowledge of VAAs and VAA usage is analyzed. This part suggests that if more low educated people would know of VAAs, more people would use them and therefore the effects seen in this sample are not what they would be if the knowledge of VAAs would be proportionate for every education level. Since there is a very big gap in VAA knowledge for the low education levels. Why this information poses a big limit to the interpretation of this research will be explored in the next chapter.

5. Discussion and Conclusion

This study aims to review the difference in the relationship between VAA usage and voter turnout for three different relationship levels. By looking at this relationship, one of the goals of this paper is to assess whether VAAs can close the information gap that seems to be apparent between lower and higher educated citizens. This is a relevant question since education level seems to be a deciding factor when discussing whether all people are well equipped enough to participate in politics. In this research, the effect VAAs have on voter turnout was analyzed for low, medium and high education. What was expected, is that the low education people had a lot more to gain in terms of information to vote, and that the VAA would contribute to this. Therefore, it was expected that the relationship for low education was the strongest, while the relationship for high education was lower, since this group has already made up their minds as to what they will vote, and have much less to gain in terms of information. They seem to use the applications mainly for entertainment purposes. The relationships were tested to be significant, but the main differences can be found in the strength of the positive relationship.

Only small differences in the relationship between the low and high education levels are present according to this study. This is a result that contradicts the initial hypotheses as shown in the analysis. Instead of a positive linear relationship, the medium education level seemed to be influenced the strongest according to this study. The difference in strength is big enough to stand out, although this research has not gone into whether the differences are statistically significant. This is a finding that may give a first insight in the true influence of education levels. It could be that not just higher educated people are hard to influence because they already made up their minds, but low educated people could be hard to influence because it is harder for them to grasp political concepts, or hard to understand the language used in VAAs. These are all topics that could, and should, be topics for further research into the true effects of education level on the influence of VAAs on political participation.

This spike in strength for medium education is very interesting, since most literature strongly claims that low education people should have more to gain, and therefore a stronger relationship would be expected. As mentioned in the theory chapter, both studies by Gemenis

and Rosema (2014) and (Mahéo, 2017) suggest that education level should have an influence on voter turnout. While the existence of the relationship between VAAs and voter turnout has been proven many times of the last two decades, this moderation has been indicated in some research, but not yet proven sufficiently. Research has not yet looked into the influence of socioeconomic factors and therefore, some things need to be considered when drawing final conclusions on the basis of this research.

First of all, the results in Table 3 show us that a disproportionately low part of low educated people know of VAAs in the first place. This is a big explanatory factor for the low usage numbers in table. Especially since the analysis of this relationship, Table 5, suggests that more people would actually use the VAAs. Because so little people know that they could use a voting advice application, it is very logical that they would not. This problem may have a big influence on the strength of the relationship between VAA usage and voter turnout for the low education group. When it is the case that not enough people have the opportunity to consciously make the decision whether to use a VAA, the statistical analysis will be influenced by it. Influenced in a way where we still do not know whether more people would choose to vote instead of not voting had they used a VAA and gotten more information. The difference in VAA usage for this sample is so large, low education usage at only 27.4 percent and high education at 61.7 percent that it likely skewed the outcome of the analysis to some extent. This is confirmed by the fact that for low education, the people that did use a VAA actually had a voter turnout of 95.5 percent. This is 10 percent higher than the non VAA users. For high education, this difference is only 5 percentage points. The analysis of the relationship between knowledge and VAA usage supports this as well. However, I cannot say for certain whether the outcome would be different if the problem was to be solved.

To estimate the true effect of education, a research where the same amount of people used a VAA could be helpful, or maybe a study like Mahéo (2017), where an experimental study was conducted, but with a bigger sample size, as also suggested in their research. The latter would probably happen sooner, since this situation is easier simulated than the chance that the percentages of people that use VAA between different education levels line up in the near future. To be able to make research like this possible, it would be desirable that there is a change in VAA profiling. Right now, high educated people are mostly using VAAs for entertainment purposes (van de Pol et al., 2014; van de Pol et al., 2019), the same group where the VAAs are widely known and accepted, while low education does not know of VAAs. They could benefit way more than the group that uses the VAAs at this point. It would be wise for governments to see if there are ways to close this gap a bit more, since an unequal voter turnout will produce politics that's not representative of the population (Lijphart, 1997). One of the possible ways to do this, is by using VAAs in education a research by Fivaz and Nadig (2010) discusses how education has picked up on using the VAAs in education, as a tool to explain political topics, this might be a way to bring VAAs to the attention of a wider audience.

To go back one last time to answer our initial research question: '*How does education level influence the relationship between VAA usage and voter turnout?*', we must take the limitations into account. Firstly, the fact the VAAs are a little-known concept for low educated people, which makes the estimation of the true effect of education level on the relationship between VAA usage and voter turnout a lot more difficult. When taking some sample characteristics into account, the question should be answered a little differently. Knowing the characteristics, the results show that the relationship is of similar strength while the percentage of people that know VAAs is lower. This indicates that the relationship could be even more

strong when those percentages would be more or less the same for every education level. Since the question of who has the right capabilities to vote has become a relevant political question, it should be important to make sure that all population groups have the opportunity to get the same levels of information. As spoken about in the theory section, information gain will make sure people vote sooner, which will make the voter population more representative. For now, the influence of education level on the effectiveness for VAAs in terms of boosting voter turnout remains in the dark. Due to the limitations, it is hard to establish a true answer, however VAAs could play a big role in providing the information some disadvantaged citizens are missing in order to enable them to cast a vote. However, in order to make this work VAAs should aim for this as well.

6. References

- Akoglu, H. (2018). User's guide to correlation coefficients. *Turkish Journal of Emergency Medicine*, 18. doi:10.1016/j.tjem.2018.08.001
- Andreadis, I. (2013). *Voting advice applications: a successful nexus between informatics and political science*. Paper presented at the Proceedings of the 6th Balkan Conference in Informatics, Thessaloniki, Greece. <https://doi.org/10.1145/2490257.2490263>
- Blais, A., Massicotte, L., & Yoshinaka, A. (2001). Deciding who has the right to vote: a comparative analysis of election laws. *Electoral Studies*, 20(1), 41-62. doi:[https://doi.org/10.1016/S0261-3794\(99\)00062-1](https://doi.org/10.1016/S0261-3794(99)00062-1)
- Burden, B. (2009). The dynamic effects of education on voter turnout. *Electoral Studies - ELECT STUD*, 28. doi:10.1016/j.electstud.2009.05.027
- Cedroni, L., & Garzia, D. (2010). *Voting Advice Applications in Europe: The State of the Art*.
- Centraal Bureau voor de Statistiek. (2019). Opleidingsniveau. Retrieved from <https://www.cbs.nl/nl-nl/nieuws/2019/33/verschil-levensverwachting-hoog-en-laagopgeleid-groeit/opleidingsniveau>
- Eveland, W. P., & Scheufele, D. A. (2000). Connecting News Media Use with Gaps in Knowledge and Participation. *Political Communication*, 17(3), 215-237. doi:10.1080/105846000414250
- Fivaz, J., & Nadig, G. (2010). Impact of Voting Advice Applications (VAAs) on Voter Turnout and Their Potential Use for Civic Education. *Policy & Internet*, 2. doi:10.2202/1944-2866.1025
- Garzia, D. (2010). The Effects of VAAs on Users' Voting Behaviour: An Overview. In (pp. 13-47).
- Garzia, D., De Angelis, A., & Pianzola, J. (2014). The Impact of Voting Advice Applications on Electoral Participation. In (pp. 105-114).
- Garzia, D., & Marschall, S. (2014). *Matching Voters With Parties and Candidates. Voting Advice Applications in a Comparative Perspective*.
- Gemenis, K., & Rosema, M. (2014). Voting Advice Applications and electoral turnout. *Electoral Studies*, 36, 281-289. doi:<https://doi.org/10.1016/j.electstud.2014.06.010>
- Kam, C. D., & Palmer, C. L. (2008). Reconsidering the Effects of Education on Political Participation. *The Journal of Politics*, 70(3), 612-631. doi:10.1017/S0022381608080651
- Ladner, A., Fivaz, J., & Pianzola, J. (2012). Voting advice applications and party choice: evidence from smartvote users in Switzerland. *International Journal of Electronic Governance*, 5(3-4), 367-387.
- Ladner, A., & Pianzola, J. (2010). *Do Voting Advice Applications Have an Effect on Electoral Participation and Voter Turnout? Evidence from the 2007 Swiss Federal Elections*, Berlin, Heidelberg.
- Lijphart, A. (1997). Unequal Participation: Democracy's Unresolved Dilemma. *The American Political Science Review*, 91(1), 1-14. doi:10.2307/2952255
- Mahéo, V.-A. (2017). Information Campaigns and (Under)Privileged Citizens: An Experiment on the Differential Effects of a Voting Advice Application. *Political Communication*, 34(4), 511-529. doi:10.1080/10584609.2017.1282560
- Marschall, S., & Schultze, M. (2012). Voting Advice Applications and Their Effect on Voter Turnout: The Case of the German Wahl-O-Mat. *Int. J. of Electronic Governance*, 5, 349-366. doi:10.1504/IJEG.2012.051314
- Mayer, A. K. (2011). Does Education Increase Political Participation? *The Journal of Politics*, 73(3), 633-645. doi:10.1017/S002238161100034X
- Meer, prof. dr., T. W. G. v. d., (University of Amsterdam), K., dr. H. van der, (University of Twente), Rekker, d. R., & (University of Amsterdam). (2017). *Dutch Parliamentary Election Study 2017 (DPES/NKO 2017)*.

- Norris, P. (2001). Preaching to the Converted? Pluralism, Participation, and Party Websites. *Harvard University, John F. Kennedy School of Government, Working Paper Series, 9*. doi:10.2139/ssrn.297160
- Selb, P., & Munzert, S. (2013). Voter overrepresentation, vote misreporting, and turnout bias in postelection surveys. *Electoral Studies, 32*(1), 186-196. doi:<https://doi.org/10.1016/j.electstud.2012.11.004>
- Shields, T. G., & Goidel, R. K. (1997). Participation Rates, Socioeconomic Class Biases, and Congressional Elections: A Crossvalidation. *American Journal of Political Science, 41*(2), 683-691. doi:10.2307/2111783
- Sunshine Hillygus, D. (2005). The MISSING LINK: Exploring the Relationship Between Higher Education and Political Engagement. *Political Behavior, 27*(1), 25-47. doi:10.1007/s11109-005-3075-8
- van de Pol, J., Holleman, B., Kamoen, N., Krouwel, A., & de Vreese, C. (2014). Beyond Young, Highly Educated Males: A Typology of VAA Users. *Journal of Information Technology & Politics, 11*(4), 397-411. doi:10.1080/19331681.2014.958794
- van de Pol, J., Kamoen, N., Krouwel, A., de Vreese, C., & Holleman, B. (2019). Same but different: A typology of Voting Advice Application users in first- and second-order elections. *Acta Politica : International Journal of Political Science, 54*(2), 225-244. doi:10.1057/s41269-018-0083-3
- van Deursen, A. J. A. M., van Dijk, J. A. G. M., & ten Klooster, P. M. (2015). Increasing inequalities in what we do online: A longitudinal cross sectional analysis of Internet activities among the Dutch population (2010 to 2013) over gender, age, education, and income. *Telematics and Informatics, 32*(2), 259-272. doi:<https://doi.org/10.1016/j.tele.2014.09.003>
- van Holsteyn, J. J. M. (2018). The Dutch parliamentary elections of March 2017. *West European Politics, 41*(6), 1364-1377. doi:10.1080/01402382.2018.1448556
- Walgrave, S., van Aelst, P., & Nuytemans, M. (2008). 'Do the Vote Test': The Electoral Effects of a Popular Vote Advice Application at the 2004 Belgian Elections. *Acta Politica, 43*(1), 50-70. doi:10.1057/palgrave.ap.5500209
- Wall, M., Sudulich, M. L., Costello, R., & Leon, E. (2009). Picking your party online – An investigation of Ireland's first online voting advice application. *Information Polity, 14*, 203-218. doi:10.3233/IP-2009-0179
- Weisburd, D., & Britt, C. (2014). Measures of Association for Nominal and Ordinal Variables. In D. Weisburd & C. Britt (Eds.), *Statistics in Criminal Justice* (pp. 351-397). Boston, MA: Springer US.
- Wolfinger, R. E., & Rosenstone, S. J. (1980). *Who Votes?* : Yale University Press.

