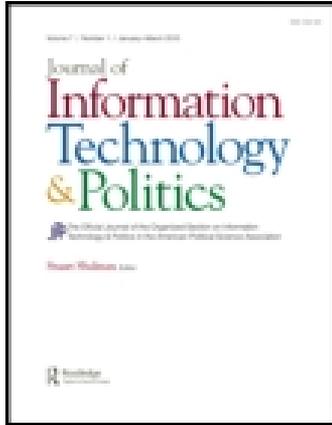


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Beyond Young, Highly Educated Males: A Typology of VAA Users

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ABSTRACT. Voting Advice Applications (VAAs) are Web tools that are used to inform increasing numbers of voters during elections. This increasing usage indicates that VAAs fulfill voters' needs, but what these needs are is unknown. Previous research has shown that such tools are primarily used by young males and highly educated citizens. This suggests that VAAs are generally used by citizens who are already well-informed about politics and may not need the assistance of a VAA to make voting decisions. To analyze the functions that VAAs have for their users, this study utilizes unique user data from a popular Dutch VAA to identify different user types according to their cognitive characteristics and motivations. A latent class analysis (LCA) resulted in three distinct user types that vary in efficacy, vote certainty, and interest: doubters, checkers, and seekers. Each group uses the VAA for different reasons at different points in time. Seekers' use of VAAs increases as Election Day approaches; less efficacious and less certain voters are more likely to use the tool to become informed.

KEYWORDS. Campaign dynamics, latent class analysis, user typology, VAAs

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INTRODUCTION

Over the past decade, Voting Advice Applications (VAAs) have played an increasingly important role in many countries' elections. These online communication tools generate personalized voting advice for their users by matching users' opinions about a selection of policy issues to party stances. Such voting recommendations are being provided to increasingly large numbers of voters. For instance, in 2009, the German *Wahl-O-Mat* provided advice to 6.7 million people; the Dutch *StemWijzer* (Vote Match) was consulted by 38% of the electorate in 2012; and the Swiss *Smartvote* attracted over 1.2 million users in 2011 (Garzia & Marschall, 2012). VAAs influence their users in several ways: They have been found to motivate people to participate in politics and to increase election turnout (Marschall & Schulze, 2012; Mykkänen & Moring, 2006; Ruusuvirta & Rosema, 2009). In addition, they prompt users to search for more information about politics (Marschall & Schmidt, 2010). Crucially, they have also been found to exert an influence on users' actual voting choices (Marschall & Schmidt, 2010; Walgrave, van Aelst, & Nuytemans, 2008; Wall, Krouwel, & Vitiello, 2012).

To better understand the societal and electoral effects and their implications for the role of VAAs in election campaigns, it is necessary to know *who* is using these applications and *why*. According to several previous VAA studies, a typical VAA user is a male, highly educated, young, and politically interested voter (e.g., Boogers & Voerman, 2003; Dumont & Kies, 2012; Hirzalla, van Zoonen, & de Ridder, 2010; Hooghe & Teepe, 2007; Marschall, 2014; Marschall & Schmidt, 2010; Ruusuvirta & Rosema, 2009). Voters who are still in doubt about their vote close to Election Day relatively often use VAAs (van der Kolk, Aarts, & Rosema, 2007), and citizens more likely use a VAA if they are involved in other forms of political communication, such as reading newspapers and visiting political events (Hanel & Schultze, 2014). However, because VAAs serve millions of users who comprise a significant proportion of countries' electorates, it is unlikely

that this profile provides a comprehensive and accurate impression of people using VAAs and the reasons they use them. It is therefore necessary to depart from studying the demographics of a one-dimensional typical user and instead research *types* of users. This study investigates a set of motivational and cognitive characteristics to identify different user types and to study their reasons for using VAAs. This classification of user types will be compared with socio-demographic features examined in previous studies.

To put the typology to the test, we assess how VAA usage differs between groups over time. Literature on the timing of voting decisions suggests that those who are more unsure about their vote and less interested in politics generally make their voting decision later than more certain and more interested voters, often only days before Election Day or on Election Day itself (McAllister, 2002; Fournier, Nadeau, Blais, Gidengil, & Nevitte, 2004; Irwin & van Holsteyn, 2008; Schmitt-Beck & Partheymüller, 2012). VAAs might be particularly helpful for those who are still in doubt (van der Kolk et al., 2007). The time at which a VAA is consulted relative to the election is an important and thus far overlooked factor in understanding VAA usage. Voters who are certain about their party preferences may have different motivations for using a VAA and may consult it earlier than those who make their decision in the final days before an election. In other words, VAAs might function as decision aids for some voters but have another utility for others.

Identifying the different types of VAA users will not only provide more insight into the mechanisms of VAAs' effects on voter turnout and vote choice, but will also help researchers understand how and when different types of citizens determine whom to vote for. VAA developers and policy makers could use this knowledge to improve the supply and presentation of information to citizens during elections.

This study's analyses rely on data from the 2012 Dutch parliamentary elections made available by the Dutch VAA *Kieskompas*. We employ user log files ($N = 52,999$) to perform a latent class analysis (LCA) on a set of users' cognitive characteristics and motivations and develop

a user typology. This typology is used to test our hypothesis about the diverse ways in which different user types used the VAA during the election. Unlike other VAA studies that focused on the electorate in general (e.g., determinants of VAA usage; see Vassil, 2011), this study explicitly focuses on VAA users—voters who do not represent the electorate as a whole.

CHARACTERISTICS AND MOTIVATIONS OF VAA USERS

Most VAAs were developed in the early 2000s (Cedroni & Garzia, 2010). Consequentially, research on VAAs is also in its early stages, even though the tools are now used by millions of citizens. From the start, many studies focused on users and typically investigated their background, socio-demographic characteristics, and level of political interest. Insights into the use and function of VAAs, however, cannot be based on age, sex, and education alone. This resonates with a point made earlier by scholars in the uses and gratifications tradition: To understand media use, we should go beyond the question of who is using the media and study *why* people use it (Katz, Blumler, & Gurevitch, 1973; Kaye & Johnson, 2004; McLeod & Becker, 1981). The assumption that people choose to use media based on rational, goal-directed considerations, which is at the core of this theoretical perspective, is especially relevant for the study of VAA usage. After all, it takes time and cognitive effort to work oneself through the list of statements before receiving the results; it is an active task, not a passive activity such as watching television. Users will be aware of the needs they expect to gratify by using a VAA, and these needs can differ depending on people's predispositions and interests (Katz et al., 1973). For instance, Kaye & Johnson (2002) identified several motivations for political Internet use—for example, guidance, information seeking, and social utility—that are related to attitudes toward politics. Social utility relates strongly to interest in politics and information-seeking relates to political efficacy.

To study the diverse use of Voting Advice Applications and to identify different types of users, the present research takes into account a set of cognitive characteristics and motivations that have not yet been studied in the context of VAA use (with the exception of interest; e.g., Fivaz & Nadig, 2010). To identify different types of users, the characteristics of political efficacy and political interest are considered, in addition to whether the users had already decided how they would vote at the moment of their VAA visit and their reason for using the VAA. We hypothesize that different combinations of characteristics and motivations would identify types of users. The indicators used in this study are based on previous research into (political) media use and use typologies (e.g., Baldassarri & Schadee, 2006; Brandtzæg, 2010; Kenski & Stroud, 2006; Liu & Eveland, 2005). The indicators will be discussed later.

Political interest may explain a citizen's motivation to be informed about politics. This factor has been found to be highly stable over time (Prior, 2007). VAA use may be related to high levels and to low levels of political interest. Citizens with high political interest may show higher levels of VAA use in the early stages of a VAA's release; because they follow political news closely, they will be among the first to notice the availability of a VAA. It is also likely that greater political interest leads to higher VAA use in general, as found in previous studies (Hooghe & Teepe, 2007; Marschall & Schmidt, 2010; Walgrave et al., 2008).

However, VAAs might also be interesting to those with *less* political interest who want to make a (partially) issue-based, informed voting decision. Becoming informed requires a voter to (1) invest time and effort in gathering, selecting, and transmitting information; (2) invest time and effort in analyzing the information; and (3) accept the cost of relating the obtained information to specific goals to evaluate one's decision (Carmines & Huckfeldt, 1996). This process becomes increasingly complex when multiple parties are running in an election and when multiple issues are important to the voter. Voters who have little political interest may not want to invest much time and may stay home on Election Day. VAAs reduce the cost of participation by

offering a clear and comprehensive overview of election-relevant information that is tailored to the individual user.¹ Therefore, VAAs might be attractive to less politically interested citizens because they offer such voters an opportunity to easily make a (relatively) informed voting decision. As Alvarez, Levin, Trechsel, and Vassil (2012) found, VAAs are perceived to be most useful by people who view politics as complex. Considering users' political interest might therefore help distinguish between groups of users. Less interested users might use a VAA later than interested users because they do not follow the election campaign closely and only decide who to vote for shortly before Election Day.

Certainty of one's vote decision may be another important factor that explains VAA use. The number of uncertain and floating voters has increased in recent years (Irwin & van Holsteyn, 2008). This development is associated with an international trend of decreased party loyalty and increased electoral volatility (Fournier et al., 2004; Krouwel, 2012; McAllister, 2002), which is especially pronounced in the Netherlands (Mair, 2008; van der Meer, van Elsas, Lubbe, & van der Brug, 2013). This trend may be related to voters' increasing need for other cues when deciding how to vote, such as information about a party's platform and other relevant issues (Garzia, 2010), which VAAs can provide. Voter uncertainty is found to be higher among citizens with lower political interest (Adriaansen, 2011; Dassonneville, 2011; van der Meer et al., 2013). These citizens may therefore be attracted to VAAs.

Besides political interest and vote certainty, a third possibly important factor is political efficacy—the extent to which citizens feel that they have the competence and power to affect political decision making. Internal efficacy refers to beliefs about one's own competence to understand and participate effectively in politics; external efficacy refers to one's beliefs about how well governments and institutions respond to individuals' needs and demands (Morrell, 2003; Niemi, Craig, & Mattei, 1991). Political use of the Internet has been found to relate to higher levels of efficacy, especially internal efficacy (Kenski & Stroud, 2006), which

leads us to expect generally high levels of internal efficacy among VAA users. However, by providing political information to their users, VAAs could increase voters' internal efficacy (Kenski & Stroud, 2006), which may be a reason why other groups of users are also attracted to tools such as VAAs.

Finally, citizens' reasons for using a VAA are explored. According to the uses and gratifications approach, people have concrete and different motivations for using particular media; they have expectations about the gratifications media can offer, and they rely on these expectations when deciding which media to use (Katz et al., 1973; McQuail, 2010). Kaye and Johnson (2002) studied users' motivations when using the Internet to obtain political information and found that the most important motivations were guidance (voting advice) and surveillance (information seeking). Less prominent motivations included social utility and entertainment. VAAs explicitly offer guidance to their users but may also satisfy those who are looking for surveillance, social utility, and entertainment. Kaye and Johnson (2002) also found that users with higher efficacy were more likely to report guidance and surveillance motivations when searching for political information online, but this result may not be generalizable to the relatively new phenomenon of VAAs. In their study of Eurofiler users during the 2009 European parliamentary elections, Alvarez et al. (2012) showed that those who felt less efficacious and those who were most interested rated VAAs most useful.

With the exception of political interest, the individual characteristics described above have not yet been applied to explain VAA usage. Studying them should increase researchers' understanding of VAA users; more specifically it should shed more light on how VAAs function for different types of users, as reflected by different moments of use. Our research questions are:

- RQ1: Can different types of VAA users be distinguished by looking at their political efficacy, political interest, vote certainty, and reason for using the VAA?

RQ2: Do these user types use VAAs at different moments in the election campaign?

H1: The most interested and efficacious voters use VAAs relatively early in the campaign, and the most uncertain voters use VAAs relatively late in the campaign.

USER TYPES AND CAMPAIGN DYNAMICS

The needs VAAs fulfill, and the types of users they attract, may change over the course of a campaign. One of the clearest findings in the campaign volatility literature is that voters who make their voting decisions in the final weeks or days before the elections are less partisan than voters who decided which party to vote for before the campaign began (Fournier et al., 2004; Gopoian & Hadjiharalambous, 1994; Irwin & van Holsteyn, 2008). Voters who visit VAA Web sites early in the campaign may therefore be less interested in a voting recommendation than voters using the tool closer to Election Day. A number of studies also found that campaign volatility and late decisions are generally associated with lower political interest and less attention to the election campaign (Adriaansen, 2011; Dassonneville, 2011; Fournier et al., 2004; Schmitt-Beck & Partheymüller, 2012).

Differences over time may also develop because politically interested citizens are the first to learn about the availability of VAAs, because these are applications that suit their interests. Hooghe and Teepe's research (2007) corroborates this supposition. They found that soon after the launch of a Belgian VAA, highly educated people, a group that is typically more politically interested, and men were overrepresented among the users. As Election Day came closer, users became more representative of the Belgian electorate and therefore more diverse. Meanwhile, party preferences did not crystallize; Belgians who used the VAA closer to Election Day generally did not have clearer party preferences than those who used the VAA 40 days before the election. This indicates that late users may be as certain about their vote choice as early users.

Based on these results, the following hypothesis was developed:

METHOD

Participants

Data gathered in collaboration with the Dutch VAA Kieskompas were used for the analysis (see Krouwel, Wall, & Vitiello, 2012). This is the second-most-popular VAA in the Netherlands, where VAAs originated and where they are used by relatively more voters than in any other country (Garzia & Marschall, 2012). These circumstances make Kieskompas a valuable case study. The VAA for the 2012 Dutch legislative elections was online for 29 days, from August 15 until Election Day, September 12. During this period, Kieskompas was accessed 1,215,916 times and fully completed 757,052 times. A log file was recorded for each visitor containing the answers given to all of the questions as well as additional information, including the advice provided by Kieskompas, the date and time of the visit, and the time it took the user to answer all of the questions. On the first page of the application, users were asked to report their gender, year of birth, highest level of education attained, and the certainty of their vote choice. Thirty political statements followed to which users could indicate their agreement. Kieskompas advice is based on users' responses to these statements. One minute after the advice appeared on the screen, an additional short survey appeared containing questions about users' political interest, political efficacy, and reason for using Kieskompas. This pop-up questionnaire was completed by 7% of the users ($N = 52,999$).

Our final sample consists of the users who answered the posttest pop-up questionnaire. This sample differs from the overall population of Kieskompas users in several respects. The percentage of females was 40.8% in the overall user population and 31.2% in the final sample. The mean age was 39.7 among general users

and 45.7 in the sample. Of all users, 59.4% were highly educated compared to 63.8% in the sample. For this reason, we replicated the analyses on a weighted sample that was representative of all Kieskompas users. The focus of this study is VAA users, and we do not aspire to extrapolate and generalize our conclusions to the electorate at large.

Indicators

As mentioned above, the selection of indicators for analysis was based on previous VAA research and the literature on political news usage and user typologies. The selected motivations and cognitive characteristics have been found to explain political news use in general and online political news consumption in particular (e.g., Brandtzæg, 2010; Kenski & Stroud, 2006; Liu & Eveland, 2005). Because the survey had limited space, for several scales we relied on one item from validated question batteries. Political interest was measured according to the intensity of the respondents' campaign interest, as suggested by David (2009). The answer categories included very intense (9.7%), intense (44.5%), and not very intense/nonexistent (45.9%²). Internal political efficacy was operationalized with the statement, "I feel that I have a pretty good understanding of the important political issues facing our country" ($M = 3.7$, $SD = .89$, range = 1–5), one of four key items in the standard internal efficacy scale (Morrell, 2003) and the most applicable in the present context. External political efficacy was evaluated using the statement, "There are so many similar parties that it does not matter whom I vote for" ($M = 1.8$, $SD = .89$, range = 1–5), which has also been used by de Vreese and Semetko (2004). The citizens' reasons for using Kieskompas were measured using four answer categories inspired by Kaye and Johnson's (2004) factor analysis and adapted to VAAs: to gain more insight into the positions of the parties (15.9%); to check whether I agree with the party I intend to vote for (38.6%); to determine which party to vote for (17.2%); or as an entertaining test to think about or discuss with others (28.2%). Vote certainty was measured according to the following categories: "I

have already decided which party to vote for" (34.4%); "I am still deciding between a few parties" (49.7%); and "I do not know yet" (15.9%). A fourth category, "I will not vote at all," was also used, but because only 1% of the users chose this category, it was omitted. Internal and external political efficacy was measured using a 5-point scale on which respondents could indicate their agreement. Respondents who answered "I do not know" to any of these items were excluded. Reason to use the VAA, vote certainty, and political interest were treated as nominal variables; efficacy was treated as an interval variable.

Analysis

The first research question was answered by using a latent class analysis to distinguish between types of VAA users. The resulting classification of user types was then compared to the socio-demographic features examined in previous studies. The second research question was answered by analyzing to what extent different user types consult the VAA at different points in the campaign. For this purpose we regressed the relative VAA usage by each user type on time (the day in the campaign).

Latent class analysis is an exploratory statistical technique that identifies the underlying (latent) categories that explain the response patterns in a set of variables (Hagenaars & McCutcheon, 2002). Using this technique, different types of respondents can be identified based on their responses to a set of questions. LCA differs from other classification techniques, such as cluster analysis, because it fits a model to the data rather than providing an ad hoc classification of the given data. In other words, LCA searches for the classifying model with the best fit to the data, whereas cluster analysis arrives at a small number of classes, or types, by repeatedly (ad hoc) adding together smaller clusters that are more similar. In addition, LCA differs from factor analysis–related techniques such as multiple correspondence analysis because it searches for a categorical latent class structure rather than continuous dimensions (Gross & Manrique-Vallier, 2012). LCA uses an iterative approach to find underlying categories that explain the relationship between

the observed response patterns and the indicator variables; it assumes that within these categories, the indicators are independent. LCA seeks a solution in which the relationships between the indicator variables are explained completely by the classes. LCA is applied in this study to create a model of the associations among user characteristics that explains these relationships with a limited number of latent user types.

RESULTS

User Typology

To develop a typology of VAA users, LCA was applied on the cognitive characteristics and motivations under investigation (i.e., political interest, internal and external political efficacy, certainty of one's vote, and reason for using the VAA). A description of the procedure is given in the appendix. Several measure-of-fit tests (log-likelihood, the Bayesian Information Criterion (BIC), and a Bootstrapped Likelihood Ratio Test) were assessed. In addition, the classification quality entropy, the solution's interpretability and parsimoniousness, and the proportionality of the classes were assessed. The fit statistics and entropy values are shown in Table 1.

A three-class (i.e., three-type) solution best explained the relationships among the indicators. As Table 1 shows, the BIC decreased with every increase in the number of user types, and the Bootstrapped Likelihood Ratio Test also favored every solution over the one with less types. This is likely to be caused by the large

sample size, which led to an extremely powerful test. However, both the absolute log-likelihood value and the BIC did not decrease much after the three-class solution; their decrease appears to flatten out (see Nylund, Asparouhov, & Muthén, 2007). Moreover, entropy (classification quality) decreased for solutions with more than three classes. The three-class solution also facilitates a theoretically sensible interpretation. Later on, we briefly discuss the differences with alternative specifications.

Table 2 presents the profile of each type by showing the marginal distributions of the categorical variables (reason for using the VAA, vote certainty, intensity of interest in the campaign) and the means of the continuous variables (internal and external efficacy).³ The proportion of VAA users that comprises each type is displayed at the bottom of the table.

The first user type shown in Table 2 we will call *doubters*. They are characterized by uncertainty; citizens belonging to this group do not know whom to vote for. Although some of them have mild party preferences, only a few of them have already decided how to vote. This type of user cares little about politics; they are not much interested in following political news and have low external political efficacy, which indicates that they are unsure about their ability to influence politics. Users of this type access the VAA for many different reasons, but primarily to determine which party to vote for. This type comprises almost 10% of the VAA users.

The second type of VAA users, which we name *seekers*, generally have clear preferences for one or a limited number of parties, yet are still undecided how to vote. These users are the

TABLE 1. Fit Indices of Different LCA Solutions

No. of classes	LL	BIC	Npar	BLRT <i>p</i> -value	Entropy
1	-295983.479	592086.617	11	N/A	N/A
2	-286596.198	573420.834	21	0.000	0.795
3	-280822.279	561981.777	31	0.000	0.695
4	-278388.160	557222.319	41	0.000	0.690
5	-275971.983	552498.746	51	0.000	0.725
6	-274778.365	550220.290	61	0.000	0.677

Note: LL = log likelihood, BIC = Bayesian Information Criterion, Npar = number of parameters, BLRT = Bootstrapped Likelihood Ratio Test

TABLE 2. Distributions of Indicator Variables for Each User Type

	Doubters	Seekers	Checkers
	%/M	%/M	%/M
Reason for using the VAA			
To gain more insight into the positions of the parties	20%	18%	14%
To check whether I agree with the party I intend to vote for	27%	29%	46%
To determine which party to vote for	27%	41%	2%
Entertaining test to think about or discuss with others	25%	12%	38%
<i>Total</i>	100%	100%	100%
Vote certainty			
I have already decided which party to vote for	19%	3%	54%
I am still deciding between a few parties	45%	64%	43%
I do not know yet	36%	33%	3%
<i>Total</i>	100%	100%	100%
Internal efficacy	3.4	3.3	4.0
External efficacy	1.2	3.2	3.5
Intensity of campaign interest			
Very intense	7%	2%	14%
Intense	32%	30%	54%
Not very intense/nonexistent	62%	68%	31%
<i>Total</i>	100%	100%	100%
Proportion of each type	0.099	0.318	0.583

Note: Reason for using the VAA, vote certainty, and intensity of campaign interest are nominal variables; the percentages add up to 100 per variable. Internal and external efficacy are measured on a scale from 1 to 5. Higher values indicate greater efficaciousness.

least interested in the political campaign and rarely consider themselves able to understand politics well enough to effectively participate. However, they are not as pessimistic as the doubters about their ability to influence politics. This group contains the most serious VAA users; to a greater degree than other types, they use the application to determine which party to vote for, suggesting that the application has a significant influence on their decision. They also use the VAA as an entertaining test, but to a lesser degree than other types. Thirty-two percent of the users belong to this type.

A third and final type of VAA users we label *checkers*, and they are most interested in politics and certain of their vote. Half of them have already decided how to vote, and half of them have clear preferences. They also have the highest internal and external political efficacy values. Moreover, they are highly interested in politics and follow the election

campaign closely. Almost none of the users in this category used the VAA to determine which party to vote for. Instead, most of these users indicated that they used Kieskompas either to affirm that their views agreed with those of their favorite party or as an entertaining test, which suggests that they do not use the application with serious intentions. This group is the largest with 58%.

Robustness Check

To assess to what extent the results of this analysis are replicable among all VAA users, a similar set of analyses was performed on a subsample of the data that was representative of the general Kieskompas user population with respect to age, gender, and education. The response patterns and proportion of the population that belonged to each group were similar to the results presented in [Table 2](#).

Further more, alternative specifications of the model that had two, four, or five types yielded similar results. In the three-class solution discussed previously, the doubters and seekers share more similarities than the checkers, although there are notable differences between doubters and seekers, especially in external efficacy and reasons for using the VAA. The two-type solution results in one large group resembling the checkers and one smaller group that is a composite of the doubters and seekers—they are more uncertain, less interested in politics, less efficacious, and more interested in obtaining voting advice. The four- and five-type solutions similarly result in a larger group that is highly efficacious, certain, and interested and smaller groups that, to varying degrees, resemble the less interested, less efficacious, and more doubtful types.⁴

Relation to Socio-Demographic Characteristics

The relations among the user types identified through the LCA and users’ socio-demographic characteristics are depicted in Table 3. As the table shows, each type occurs in all age groups. However, the results showed a small positive correlation between age and being a doubter; seekers and checkers were typically slightly younger. There was a stronger effect for education, however. Highly educated users were more likely to be checkers than either of the other types. Furthermore, men were more likely to be checkers or doubters, and women were more likely to be seekers.

User Types and VAA Use Over Time

H1 puts forward that the most interested and efficacious type of voters use VAAs relatively early in a campaign and that the most doubtful voters use VAAs relatively late in a campaign. This means that—as the most interested and efficacious type—we expect the checkers to be relatively early users and the seekers and doubters to be relatively late users of VAAs.

Figure 1 shows the relative user traffic for each user type over the course of the campaign. As mentioned above, Kieskompas was online

for 29 days during the 2012 Dutch parliamentary election campaign. The final day in the plot represents Election Day (September 12, 2012). Figure 2 shows how often each user type completed the questionnaire. As in Figure 1, this figure is based on answers provided by users who filled out the exit survey. The percentage that did so was more or less stable each day, so Figure 2 also reflects the general trend in usage of Kieskompas.

Figure 1 shows that the checkers were the most prominent VAA users. However, several substantial changes in their usage patterns are visible over the course of the campaign. Just after the VAA became available, more than 70% of the users were checkers. Over time, this overrepresentation decreased until Election Day, on which 63% of the users were checkers. This decrease can primarily be attributed to the increase of seekers using the Web site. This result partially confirms the hypothesis. However, the presence of doubters, which was also expected to increase over time, remained stable. Table 4 presents the results of OLS regression analyses of the share of doubters, seekers, and checkers at each day of the campaign. The share of checkers decreases significantly, while seekers relatively more often use the VAA as Election Day approaches.

The frequency with which Kieskompas was consulted during the campaign varied greatly over time, as Figure 2 shows. The peak in the

TABLE 3. Socio-demographic Characteristics for Each User Type

	Checkers	Seekers	Doubters	Total
Age				
18–24	8.9%	8.9%	6.8%	8.7%
25–34	17.7%	16.6%	16.3%	17.2%
35–49	32.0%	34.8%	34.4%	33.1%
50–64	29.2%	29.6%	29.4%	29.3%
65+	12.2%	10.2%	13.2%	11.6%
Education				
Low education	5.8%	8.4%	11.6%	7.1%
Mid education	25.8%	34.2%	34.1%	29.1%
High education	68.5%	57.4%	54.3%	63.8%
Sex				
Male	74.1%	57.2%	72.1%	68.5%
Female	25.9%	42.8%	27.9%	31.5%

FIGURE 1. Percentage of user types visiting Kieskompas each day of the 2012 campaign.

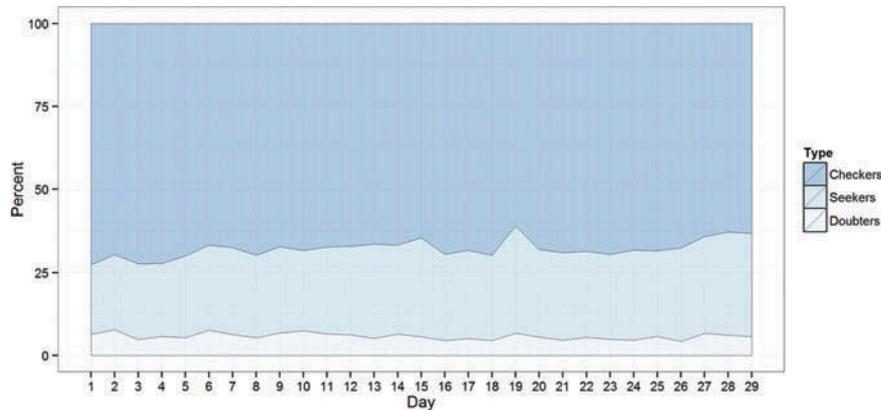


FIGURE 2. Frequency of visits per day of the 2012 campaign by user type.

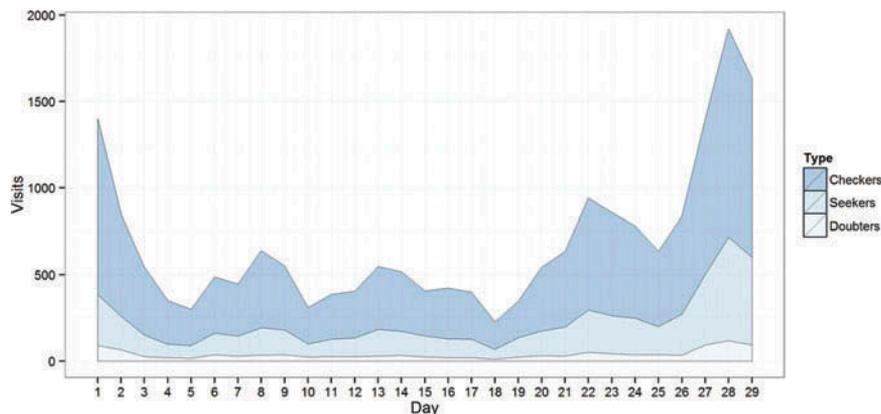


TABLE 4. Multivariate Regression of Time (Day) on the Relative VAA Usage by Different Types

	Doubters	Seekers	Checkers
Intercept	0.0641 (0.0035)**	0.2309 (0.007)**	0.7048 (0.0088)**
Day	-0.0004 (0.0002)*	0.0022 (0.0004)**	-0.0017 (0.0005)*
R^2	.14	.52	.31

Note: Unstandardized coefficients; Standard errors between brackets; * $p < 0.05$; ** $p < 0.01$

initial days is primarily due to the checkers. This confirms our expectations: Checkers would be the first to notice the availability of the VAA. There is a large peak in the last two or three days of the campaign (including Election Day),

which can be attributed to an increase in visits of all user types. However, in these final days before the elections, VAA usage increases faster for seekers than for checkers and doubters; they also show a relative increase. The peak in visits between the 8th and 4th days before the election was caused by increased visits by checkers. This peak may coincide with increased media attention for the campaign; there were two important TV debates during this period.

DISCUSSION

The use of VAAs has increased tremendously in the past decade. Our study shows that usage is more diverse than common wisdom and extant research might lead us to believe. Not all users of VAAs belong to the group of interested and efficacious voters; a large share of VAA users

is in need of information about politics in order to make their minds up before going to the ballots. They use VAAs to receive tailor-made information about parties' positions and their own position, and they increasingly often do so close to Election Day. This can be concluded from the typology of VAA users developed in this study, and the analysis of their usage of the VAA over the course of the election campaign.

By developing a user typology, we were able to analyze the reasons why voters used the VAA. Latent class analysis was used to identify three types of VAA users: (1) *doubters*, who are characterized by uncertainty about their vote choice and by low political interest and external political efficacy; (2) *seekers*, who are also uncertain about their vote and have little political interest but have clearer party preferences and are looking for guidance from the VAA; and (3) *checkers*, who are politically interested and efficacious, relatively certain which party they will vote for, and seem to use the VAA for entertainment purposes more than the other types do. They are least interested in the voting advice provided by the application. Checkers are also the most frequent VAA users: Approximately 58% of the VAA users belonged to this type, while the seekers represented 32% and the doubters 10%.

Subsequently, we examined the usage of the VAA over time. Based on the inter-election and campaign volatility literature (Fournier et al., 2004; van der Meer et al., 2013), we expected the checkers to be more prominent among the early users of the VAA and the doubters and seekers to be more prominently present near Election Day. The results supported these expectations with an exception for doubters; the presence of this relatively small group remained more or less stable over the course of the election campaign. These findings indicate that especially at the beginning of the campaign, in addition to serving an informing function, VAAs may also provide entertainment to people who do not base their voting decision on the tool's voting advice. However, as Election Day neared, VAAs were used increasingly often by voters who seem to take the voting advice more seriously and who appear to use the tool to become

more informed. In the final days before the election, there was a dramatic increase in VAA use, and this increase was largest among seekers, who seem to make their final voting decision relatively late. The association between user type and usage timing demonstrates the validity and relevance of this typology.

The results from this study correspond with findings from earlier studies of VAA users that found that young, highly educated men are overrepresented among VAA users and that VAA use is more common among politically interested individuals (e.g., Garzia & Marschall, 2012; Hooghe & Teepe, 2007). We found that men and highly educated people—and to a lesser extent young people—are indeed more likely to be checkers, the group to which the majority of users in this study belonged. Less-educated people and women are more likely to be seekers, the group that seems to profit the most from VAA use in terms of obtaining information about politics (see Hirzalla et al., 2010). However, the association between socio-demographic characteristics and user type is weak. Socio-demographics alone do not account for the diverse uses of and motivations for using VAAs.

This study demonstrates the value of analyzing VAA use from a broader perspective rather than only taking into account users' socio-demographic features. Political interest, vote certainty, efficacy, and usage motivation have been analyzed in media consumption research, and this study shows that these factors also explain VAA usage. Focusing on cognitive characteristics and motivational factors leads to greater insights. For example, the results of this study showed that during a campaign, VAAs seem to be an important source of political information for citizens who have low political efficacy and are uncertain how to vote. This result agrees with findings by Alvarez et al. (2012), who showed that VAAs are perceived to be most useful by voters who find politics “a complicated matter” (p. 26). Such users may profit the most from VAA usage in terms of increased knowledge and understanding. VAAs may be of special value in the final days before an election, when many uncertain voters decide how to vote.

Three limitations should be kept in mind when interpreting the results from this study's analyses. First, the sample consisted of self-selected users who completed the VAA exit survey. They are therefore not representative of Kieskompas users in general, and it is possible that Kieskompas users are not representative of VAA users in general. This problem was addressed by performing a robustness check on a subsample representative of all Kieskompas users. This analysis indicated that our results were not affected by our use of a nonrandom sample. Second, due to space limitations in the survey, internal and external efficacy were measured using only one item, whereas most studies use multiple-item scales to achieve more reliable measurements. However, the items we used were selected for their suitability to the subject. Third, a disadvantage of typology analyses is that the number of types chosen is often based on nonstandardized, diffuse criteria. However, a two-type or four-type solution of the latent class analysis would have yielded similar results.

Future research should focus on the extent to which VAAs increase users' understanding and knowledge of politics, a goal of many VAA developers (e.g., de Graaf, 2010). Our results indicate that users with lower political efficacy might profit the most from the tailored information VAAs offer. However, most voters reached by the VAA do not seem to be interested in learning something, because they are already well informed and do not necessarily need VAAs to make voting decisions. More research is therefore required to discover ways to tailor VAAs to the specific needs of the group of less interested and less efficacious users. Because political efficacy is related to voter turnout (e.g., Kaid, McKinney, & Tedesco, 2007), increasing the political understanding and efficacy of this group could result in increased political participation (see Moeller and de Vreese [2013] for a confirmation of this expectation). In addition, our findings suggest that the influence of VAA advice on eventual vote choice might be greatest among those who are least interested and efficacious, especially if they use the VAA shortly before voting. The effects of VAAs on both of these dimensions are still understudied and, perhaps, underestimated.

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NOTES

1. VAAs assume that users seek assistance to match their political opinions to a party platform. As Fossen, Anderson, and Tiemeijer (2012) remark, however, it is more often the case that users do not hold clear opinions on many issues and rather need assistance to define their own position.

2. These categories were combined because of the low number of people in the latter category (3.8%).

3. In an alternative specification of the model, we also included the personality trait Need for Cognition (NFC; Cacioppo & Petty, 1982). This trait reflects the motivation to inform oneself about news and politics (David, 2009). We tested whether including this trait in our analyses would contribute to differentiating between those who are more fundamentally interested and those who are in need of immediate information. However, because we measured this concept using a single item (it is typically measured using at least 18 items) and the measure failed to discriminate between groups of users, we omitted it from the final model. It is unclear whether the lack of discriminatory power has a substantial meaning for the role of NFC in the typology, or alternatively, is the result of suboptimal measurement.

4. A cluster analysis (performed using Ward's method and Gower's similarity coefficient) showed patterns that moderately resemble the type-specific patterns identified using the LCA. However, the distribution of users across types is different. According to the cluster analysis, each type represents about 33% of the users. Membership in a cluster analysis user type was moderately correlated with LCA type membership (Cramér's $V = .35, p < .001$).

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APPENDIX: LATENT CLASS ANALYSIS PROCEDURE

Using Mplus Version 6, we performed a latent class analysis (LCA) to identify the underlying VAA user types. The following variables were analyzed: political interest, internal and external political efficacy, vote certainty, and reason for using Kieskompas. Reason for using Kieskompas, vote certainty, and political interest were treated as nominal variables and the efficacy items as interval variables. The LCA was conducted six times to determine which solution best fit the data: the solution with one latent user type, two types, etc. To avoid local maxima, a well-known pitfall of LCA, multiple random starting values for estimated model parameters were specified.

There are a number of factors to consider when determining the optimal number of latent

classes (user types). First, several model fit statistics should be considered. The Bayesian Information Criterion (BIC) decreases as the fit improves; one should therefore assess whether the solution with more classes improves the fit substantively. In addition, a Bootstrapped Likelihood Ratio Test assesses whether a model with K classes is a significant improvement on the model with K-1 classes (Asparouhov & Muthén, 2012; Hageaars & McCutcheon, 2002; Nylund et al., 2007). A second method for determining which solution is best is to evaluate the entropy, which reflects how well an individual's class membership can be predicted based on his or her answers to the indicator questions. An entropy approaching 1 indicates higher classification certainty (Celeux & Soromenho, 1993; Hageaars & McCutcheon, 2002). A third consideration when deciding on the number of classes is the usefulness of the resulting model. Researchers should consider whether the types can be clearly interpreted, determine whether the model is parsimonious, and confirm that there is no type with a very small number of individuals (Nylund et al., 2007; Vaughn, DeLisi, Beaver, & Howard, 2008).