Competing for the Same Value Segments: Insight into a Volatile Political Landscape

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Abstract

Human values drive different kinds of abstract behaviour, while established value scales are pervasive in survey research. We focus on analyzing the relationship between human values and voting in elections, introducing a new methodology to analyze how value profiles relate to political support over time. To illustrate our procedure, we investigate the Dutch multi-party political system. Values measured using rating scales over five waves of the European Social Survey, spanning 2002 until 2010, are analysed. Whilst previous research have focused on values separately, we (1) relate all political parties participating in the election to human values using a segmentation approach in which value profiles are used instead of individual values; (2) compare voting over time; (3) include non-voters; and (4) adjust for individual differences in response style. The adjustment for response styles allow us to uncover valid insights into the relationship between values and voting. We find evidence that specific value profiles are related to voting for certain political parties and that non-voters can also be distinguished by unique value profiles.

Recent years have seen substantial changes to political landscapes in many countries (Van der Meer, van Elsas, Lubbe, and van der Brug, 2015), including the Netherlands. Major political parties such as the CDA (Christian Democrats) have lost ground to new parties, most notably the LPF (Pim Fortuyn List) and the populist PVV (Party for Freedom), which launched in 2002 and 2006 respectively. Concurrently, the proportion of the electorate choosing to abstain from voting is on the rise, possibly due to a growing separation between voters and political parties as the latter fail to align their political agendas with voters' values.

Human values are deeply ingrained in a people's psyche and direct their behaviour, especially abstract behaviour such as voting in elections (Schwartz, Caprara, and Vecchione, 2010; Caprara, Schwartz, Capanna, Vecchione, and Barbaranelli, 2006; Barnea and Schwartz, 1998). Political parties appeal to political values such as safety and security, freedom of speech and concern for one's fellow man that closely resemble human values such as security, self-direction and universalism (Schwartz, Caprara, Vecchione, Bain, Bianchi, Caprara, Cieciuch, Kirmanoglu, Baslevent, Lönnqvist et al., 2013). It is therefore to be expected that people will be more likely to vote for the political party that best reflects their own values. Previous research have focused on relationships between human values and choosing whether to vote or abstain (Caprara, Vecchione, and Schwartz, 2012), the left-right dimension in politics (Thorisdottir, Jost, Liviatan, and Shrout, 2007), and value preferences of people voting for specific political parties (Barnea and Schwartz, 1998).

This study reports an empirical investigation into the relationship between human values and political preference in the Netherlands. All political parties and values are considered simultaneously, using data collected for five waves of the European Social Survey. Schwartz (1992)'s Human Values Scale is used to assess individuals' values, comprising of 21 survey items measured on 6-point Likert (1932) scales. Self-reported voting behaviour in national elections is also available. These

data span the years 2002 until 2010, giving insight into concurrent changes in voting behaviour and human values. Whilst until now research have focused on values separately (Schwartz et al., 2010; Barnea and Schwartz, 1998), we interpret combinations of values that together influence voting behaviour. Such combinations of values are termed 'value segments' hereafter.

The established method of measuring human values is by using rating scales. This requires correcting for response styles (Schwartz, 2007), since comparing responses between different survey participants should account for the heterogeneous use of rating scales pervasive in such studies (e.g. Van Vaerenbergh and Thomas, 2013; Baumgartner and Steenkamp, 2001). Only after disentangling these response styles from substantive content can valid comparisons be made. However, few studies correct for response styles as it is difficult and content-related information might be removed in the process (Schoonees, van de Velden, and Groenen, 2015). Recently, more advanced alternatives to the commonly used response style indices advocated by Baumgartner and Steenkamp (2001) have been developed. Specifically, we use the latent-class bilinear multinomial logit (LC-BML) model of Van Rosmalen, Van Herk, and Groenen (2010), which allows us to estimate value segments while at the same time correcting for differences in response style. This correction results in more valid value segments.

The questions we pose in this study are as follows: How many content-based value segments are there in the Dutch population and how are these value segments related to voting behaviour? How stable is the relationship between the value segments and the political parties over time? What effect do individual differences in response style have on content-based value segments? We start by giving an overview of political dimensions and cultural value theory applied to Dutch politics, a short summary of important recent events affecting voting, and an overview of our research propositions. Then we will further describe the LC-BML model and present our results. We end

with a discussion and show the relevance of our method to study political change in other multi-party political systems.

Dutch Politics and Political Orientation

Dutch politics have seen a number of important events during the first decade of the 21st century. Populist parties such as Liveable Netherlands (LN), the LPF and the PVV have emerged, placing great emphasis on issues surrounding ethnic groups, immigration, Islam and asylum seekers. Especially the PVV has successfully elevated immigration to a salient issue, whilst also harbouring strong anti-European sentiments. They are particularly concerned that any benefits likely to be brought on by the expansion of the European Union will be offset by problems associated with increased immigration, a belief also shared with the Socialist Party (SP). An overview of Dutch political parties, past and present, is given in Table 1.

Other events, such as the September 11 attacks in the United States in 2001, the assassination of the LPF leader Pim Fortuyn shortly before the general election in 2002 (May 6), and the murder of film director Theo van Gogh[1] (November 2, 2004) have strengthened the call for increased security across society. Fundamental shifts in the population's most pressing issues have occurred too (Aarts and Thomassen, 2008). Before 1998, unemployment was a key issue but it hardly featured as a factor for voters in the first decade of this century. The predominant issues were found by Aarts and Thomassen (2008) to be minorities and asylum, followed by healthcare, law and order as well as security. All of these issues feature prominently in the manifestos of the newly emerging populist parties.

[1] Van Gogh, critical of aspects of Islam in his work, was murdered by radical Dutch Muslim Mohammed Bouyeri, sparking a number of retaliatory incidents.

A useful shorthand classification of the orientation of political parties is the customary distinction between left and right. In countries or regions with a two-party system, it can also be an accurate reflection of the political situation. However, in countries which have multi-party systems, such as the Netherlands, the left-right political spectrum is often too simplistic. Therefore a second dimension is sometimes added to distinguish between authoritarian and libertarian parties (Evans, Heath, and Lalljee, 1996).

Aarts and Thomassen (2008) identify three dimensions: left versus right, authoritarian versus libertarian and religious versus secular. In their context, left (right) indicates opposition to (support for) differences in social equality between people and support for (opposition to) a strong role for government in society. Here the right is primarily opposed to the state having a strong influence on the economy: it considers private enterprise important and accepts inequality in society. Authoritarian versus libertarian primarily relates to dealing with people from other cultures and law enforcement. On the libertarian side, people are open to other cultures and non-conformist practices such as abortion or euthanasia, whereas authoritarians are more traditional, less open to foreign cultures and consider law enforcement to be important. Finally, the religion dimension concerns the role that the church should play in society on moral issues. Aarts and Thomassen (2008) show that the authoritarian versus libertarian dimension has become increasingly important in deciding which party to vote for between 1989 and 2006.

Specific to the Netherlands, the religious factor distinguishes the strictly religious SGP (Reformed Political Party), the CU (Christian Union) and to a lesser extent the CDA (Christian Democrats) from the other parties. The libertarian versus authoritarian factor distinguishes the D66 (Democrats 1966) and the GL (Green Left) from the other parties, and from the liberal VVD (People's Party for Freedom and Democracy) in particular. The left-right factor distinguishes GL,

the SP and to a lesser extent the PvdA (Labour Party) from the VVD and the new populist parties, such as the PVV. Each of these parties has political values that might be related to human values deemed important by the electorate (Schwartz et al., 2013).

For a long time there have been three main political parties: CDA, PvdA and VVD. Together these parties have enjoyed over 60% of the votes. Since 2008, other parties have become larger, such as the SP (9.8% in 2010) and the PVV (15%). The growth of these latter parties came at the expense of the three long-established parties. In the 2010 elections, five parties received about 80% of the votes; the political landscape became more diverse.

Human Values

Human values are abstract and context-free, in contrast to attitudes which are more closely related to various life domains. The seminal framework of Schwartz (1992) comprises ten fundamental value domains. These value domains can each be defined based on their central goal: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security (Schwartz and Rubel, 2005). Table 2 provides a brief summary of these domains.

Schwartz represented these ten value domains in a circular structure – see Figure 1. Domains with adjoining positions are closely related while opposing positions indicate incompatible values. For example, power and achievement are complementary but generally incompatible with universalism and benevolence. Hence the theory predicts that persons who attach high value to universalism and benevolence will find power and achievement much less important, and vice versa. A further example of incongruent values are conformity and stimulation; however, stimulation is compatible with the adjacent self-direction because people who enjoy challenges are also more likely to be

Abbr.	Name	Left–Right	Authoritarian–Libertarian–Religious	Description
VVD	Party for Freedom and Democracy	Right (Conservatives)	Authoritarian	Right-wing liberal party emphasizing freedom, self-initiative and small government. Also harbours progressive views on ethical matters, for example.
PvdA	Labour Party	Left		Progressive, traditional social democratic party which is in favour of an active government.
PVV	Party for Freedom	New right		Nationalistic populist party with both conservative, liberal, rightist and leftist views. Against immigrants, Islam, European integration and broad leftist thinking in general, such as subsidies and development.
CDA	Christian Democrats	Centre	Religious	A centrist party that unifies three Christian parties, two Protestant and one Catholic. Conservative with an emphasis on family values and taking care of the needy.
SP	Socialist Party	Left		Left-wing socialist and Eurosceptic protest party with an emphasis on blue collar workers.
D66	Democrats 1966		Libertarian	Reformist social liberal party with a social democratic touch.
GL	Green Left	Left	Libertarian	Small social democratic left-wing party placing emphasis on sustainability and nature. A fusion of four small left-wing part parties, including pacifist and communist parties.
CU	Christian Union		Religious	Christian democrats with stronger Christian values than the CDA and more social democratic policies for nonreligious items. Progressive views on social and ecological matters.
SGP	Reformed Political Party		Religious (strict)	Small right-wing conservative Protestant Christian party with a very stable electorate.
PvdD	Party for the Animals	New left	Libertarian	Small social democratic party with emphasis on animal welfare, animal rights and sustainability.
TON	Proud of the Netherlands	New right	Authoritarian	Populist right-wing conservative party.
LPF	Pim Fortuyn List	New right	Authoritarian	Former populist right-wing conservative party emphasizing problems with immigration.
LN	Liveable Netherlands	New right	Authoritarian	Former small populist national party.

Table 1: Explanation of current and past Dutch political parties and their abbreviations, based on the authors' own views and those expressed by the political scientists at www.parlement.com (Dutch only). Current parties are ordered from largest to smallest with respect to the proportion of votes received in the national election of 2010. We indicate the political orientations of these parties where there is a clear classification.

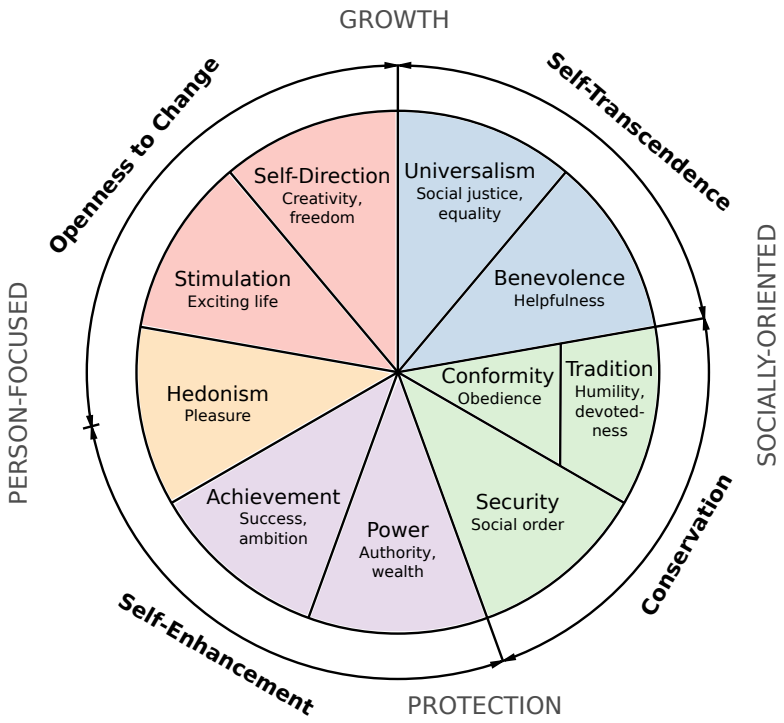

Figure 1: Schwartz's value circumplex.

Value	Code	Description
Power	PO	Social status and prestige, control or dominance over people and things.
Achievement	AC	Demonstrating personal success by displaying competences considered to be socially valuable.
Hedonism	HE	Enjoyment and sensual self-reward.
Stimulation	ST	Doing exciting, new and challenging things.
Self-direction	SD	Thinking independently and opting for action, being creative and investigative.
Universalism	UN	Showing understanding, and appreciating, tolerating and protecting all people and the natural world.
Benevolence	BE	Protecting and improving the well-being of people with whom one has frequent personal contact.
Tradition	TR	Respect for, involvement in and acceptance of ideas that traditional culture or religion offers people.
Conformity	CO	Refraining from action, tendencies and impulses that can disrupt or hurt others and which conflict with social standards and expectations.
Security	SE	Safety, security, harmony and stability of the community, relationships and one's self.

Table 2: An overview of the ten fundamental value domains of Schwartz and Rubel (2005).

creative and investigative.

These ten individual value domains can be merged into four different higher-order domains (Schwartz, 1992), namely self-enhancement, self-transcendence, conservation and openness-to-change. This is also depicted in Figure 1. Fontaine, Poortinga, Delbeke, and Schwartz (2008) further distinguished person-focused (self-enhancement and openness-to-change), socially-oriented (self-transcendence and conservation), protection (power and security) and growth (self-direction and universalism). For example, growth is associated with independent thought and action, and people who find these values important will therefore accept a diverse society. Those who emphasize protection will in contrast aim to maintain the power that they have and expect good security.

Various studies have used individual values or their higher-order domains to predict attitudes and behaviour. Those who score high on openness-to-change were found to be more innovative

(Steenkamp, ter Hofstede, and Wedel, 1999), less religious (Schwartz and Huismans, 1995) and more likely to vote left (Thorisdottir et al., 2007). The opposite applies to people who score high on conservation. Those who score high on achievement and power are more materialistic (Burroughs and Rindfleisch, 2002) and those who score high on self-transcendence are generally more environmentally aware (Schultz, Gouveia, Cameron, Tankha, Schmuck, and Franěk, 2005). Human values have also been used to link specific political parties to individual values (Barnea and Schwartz, 1998; Caprara et al., 2006; Schwartz et al., 2010). Conservative values were found to be more important to those who voted for right-wing parties, and universalism more important to those who voted left.

Although benevolence has been shown to be the most important value in general, the relative importance of values differ among people (Schwartz and Bardi, 2001). This hierarchy may depend on demographic characteristics and personal circumstance. In addition, some people draw a firm distinction between values – finding some to be very important while explicitly rejecting others – whereas others consider most values to be more or less equally important. These differences result in several distinct groups of people sharing the same value preferences. In this research, we aim to identify segments of people with such similar value profiles and to explore the role these profiles play in determining which political party an individual votes for. We also provide insight into the value profiles of people who did not vote. To find valid segments, a correction for differences in rating scale use will be made (Van Vaerenbergh and Thomas, 2013).

Values and Voting

Values are linked to political orientation and determine the political choices that individuals make (Barnea and Schwartz, 1998; Thorisdottir et al., 2007). People tend to vote for the party which best reflects their own values. While group values are relatively stable over time (Schwartz, 2006), the emergence and disappearance of political parties in the Netherlands in recent years suggest that for some groups of voters their best-fitting political parties have changed. Most people aim to achieve congruence between their values and attitudes on the one hand and behaviour on the other (Edwards and Cable, 2009).

Left-wing parties emphasize equality, tolerance and a strong governmental role. These first two issues are congruent with the human values universalism and self-direction (Schwartz et al., 2010) and, for more traditional left-wing parties, environment-related security (Thorisdottir et al., 2007). We therefore expect that a segment considering these values relatively more important than other segments will vote for left-wing parties such as the PvdA and to a lesser extent GL; voters of SP are expected to emphasize security values more than the other left-wing parties. In contrast, right-wing parties consider inequality in society, maintenance of the status quo, and economic freedom important. These issues are associated with the values power, achievement and to a lesser extent self-direction (Thorisdottir et al., 2007; Caprara et al., 2006). We expect that a segment prioritising these values will vote for a right-wing party such as the VVD.

Libertarian parties emphasize equal opportunities and taking initiative, which is compatible with universalism, self-direction and stimulation but incompatible with security and conformity. People who consider the values universalism and self-direction and to a lesser extent benevolence essential have a positive stance toward immigration (Davidov, Schmidt, and Schwartz, 2008; Schwartz et al., 2010); accepting immigrants is specifically associated with libertarian parties. We therefore

expect that there is a segment considering benevolence, universalism, self-direction and stimulation of particular importance, which predominantly votes for parties such as GL, D66 and the PvdD. Authoritarian parties emphasize maintenance of the status quo, inequality in society and strict rules, which relates to power, security and tradition but not to universalism and self-direction. Such a segment would be anticipated to vote for parties such as the conservative VVD and the populist LPF and PVV. The latter parties also emphasize the negative side of immigration, which is compatible with security, tradition and conformity. Finally, religious parties consider the role of the church in society of key importance, relating to traditional (gender) roles, conformity to rules, and taking care of people. Religiousness is therefore related to human values in the conservation domain (Schwartz and Huismans, 1995). Specifically, it is expected that there is a segment highlighting conformity, tradition, and security as highly important and self-direction, stimulation, and hedonism as unimportant. This segment would tend to vote for the religious parties SGP, CU and to a lesser extent the CDA. They would consider benevolence to be more important than universalism as benevolence emphasizes the traditional in-group more.

Summarizing, we expect to find a small number of segments differing in value importance, which we link to voting behaviour. We expect this relation to exist for people with clear value profiles; however, the value profiles are derived solely from the data and therefore the segments are not guaranteed to adhere to the Schwartz theory of compatibilities and incompatibilities among values.

The LC-BML Model

To determine the value segments free from response styles, we use the latent-class bilinear multinomial logit model (LC-BML model; Van Rosmalen et al., 2010). This model is a multivariate generalization of the standard multinomial (or baseline-category) logit model for multinomial responses (e.g. Agresti, 2002), which in turn is the multicategory extension of logistic regression. The multinomial logit model describes the probability that a respondent answers a single item with a given rating. The LC-BML model combines such models for multiple items in order to describe the responses of a respondent on all items simultaneously.

Furthermore, the model allows for respondents to be segmented into two types of segments (or latent classes), namely value and response style segments. This is done by allowing the model parameters to vary between segments. The response style segments correct for the differences in response styles, while the value segments indicate differences in the importance attached to the respective values. Hence each person is assigned simultaneously to both a response style segment and a value segment by the LC-BML model. Another feature is the use of a bilinear decomposition of the model parameters so that the effects can be summarized parsimoniously with the help of biplots (e.g. Gower, Gardner-Lubbe, and Le Roux, 2011).

Describing the LC-BML model in more detail requires some notation. Let Y_{ij} be the random variable denoting the response of respondent i ($i = 1, \ldots, N$) to item j. Index by k ($k = 1, \ldots, K$) the common rating scale used for all J items. Missing responses are included by adding a dedicated 'Missing' category to the rating scale. Let there be R and S latent classes for the response style and value segments respectively. Supposing that π_{rs} is the prior probability that any respondent belongs

to segments r and s, it follows that

$$\mathsf{P}(Y_{ij} = k) = \sum_{r=1}^{R} \sum_{s=1}^{S} \pi_{rs} \mathsf{P}(Y_{ij} = k \,|\, r, s). \tag{1}$$

In the LC-BML model, the segment-specific probabilities follow multinomial logit models such that

$$\mathsf{P}(Y_{ij} = k \,|\, r, s) = \frac{\exp\left(\eta_{ijk\,|\,r,s}\right)}{\sum_{k=1}^{K} \exp\left(\eta_{ijk\,|\,r,s}\right)}, \tag{2}$$

where $\eta_{ijk\,|\,r,s}$ is a segment-specific linear predictor. The basic form of the linear predictor is

$$\eta_{ijk\,|\,r,s} = \alpha_{k\,|\,r} + \sum_{l=1}^{L} \boldsymbol{\beta}_{kl}^{'} \boldsymbol{x}_{il} + \gamma_{jk\,|\,s}. \tag{3}$$

Here $\alpha_{k\,|\,r}$ is the attractiveness of rating k in response style segment r, $\boldsymbol{x}_{il}$ is an indicator vector indicating which category of the (discretized) socio-demographic variable l ($l = 1, \ldots, L$) person i belongs to, $\boldsymbol{\beta}_{kl}^{'}$ is the transpose of the vector of effects for this socio-demographic variable on category k, and $\gamma_{jk\,|\,s}$ is the effect of rating k on item j in value segment s. Finally, a bilinear decomposition is applied to the parameters in (3), a description of which is deferred to the Appendix. This decomposition serves two purposes, namely to reduce the number of parameters to be estimated and to allows for all effects to be interpreted graphically in biplots. Note that the dimensionality P of this decomposition determines the dimensionality of these biplots.

For a given choice of the number of segments R and S, and dimensionality P, the LC-BML model is estimated by maximum likelihood via the Expectation-Maximization (EM; Dempster,

Laird, and Rubin, 1977) algorithm. The likelihood contribution of person i is given by

$$\sum_{r=1}^{R}\sum_{s=1}^{S}\pi_{rs}\prod_{j=1}^{J}\prod_{k=1}^{K}\mathsf{P}(Y_{ij}=k\,|\,r,s)^{I(y_{ij}=k)}, \tag{4}$$

with y_{ij} being the realized value of Y_{ij} and $I(\cdot)$ the indicator function. An important by-product of the estimation algorithm is the estimated posterior probabilities of each person belonging to each of the $R \times S$ latent classes, which can be calculated as

$$\pi_{rs}(i) = \frac{\pi_{rs}\prod_{j=1}^{J}\prod_{k=1}^{K}\mathsf{P}(Y_{ij}=k\,|\,r,s)^{I(y_{ij}=k)}}{\sum_{r=1}^{R}\sum_{s=1}^{S}\pi_{rs}\prod_{j=1}^{J}\prod_{k=1}^{K}\mathsf{P}(Y_{ij}=k\,|\,r,s)^{I(y_{ij}=k)}}. \tag{5}$$

This gives a posterior measure of class membership for all persons. These can for instance be aggregated over the respondents' self-reported voting behaviour to establish how people within each segment voted. Information criteria, such as the Akaike Information Criterion (AIC; Akaike, 1974) or Schwarz's Bayesian Information Criterion (BIC; Schwarz, 1978) can be used to select the number of segments R and S, as well as the dimensionality P. An alternative is the graphical CHull procedure of Ceulemans, Timmerman, and Kiers (2011). We opt for a combination of the BIC and the CHull procedure. The BIC has been shown to work well in conjunction with the LC-BML model (Van Rosmalen et al., 2010).

European Social Survey Data

This study focuses on five rounds of the European Social Survey (ESS), namely those of 2002, 2004, 2006, 2008 and 2010. In each round, the ESS included the 21 PVQ-based value items (Portrait Values Questionnaire; Schwartz and Bardi, 2001; Schwartz, 2007). These statements are gender-

specific and operationalized by posing statements such as 'Thinking up new ideas and being creative is important for her. She likes to do things in her own original way.' The responses to each statement were based on a 6-point Likert scale, ranging from 1 ('Very much like me') to 6 ('Not like me at all'). More information and average ratings can be found in Table 3. We control for the socio-demographics Gender, Education Years and Age. Since discrete covariates are required for the LC-BML model, both Education Years and Age were discretized into three categories. For years of education, the categories were low (1 to 10 years; comparable to ISCED[2] levels 1 and 2), intermediate (11 to 15 years; ISCED levels 3 – 5) and high (16+ years; ISCED level 6 or higher). Age was divided into the categories 15 to 34 years, 35 to 59 years and 60 to 96 years.

A total of 9607 respondents from the Netherlands were available across the 5 ESS waves. Respondents with missing values for the abovementioned socio-demographic variables were removed from the analysis (85 persons), together with respondents who used the same rating to answer all 21 value items (11 persons). After removing these respondents, 9511 observations were used in the analysis. The numbers of respondents per ESS wave were 2323, 1854, 1845, 1713 and 1776 respectively. Note that although sampling weights are applicable in the ESS, it was not possible to apply them in the LC-BML analysis due to software limitations. We do however apply post-stratification weights in summary statistics, which corrects for the sampling design and unit nonresponse.

In the ESS, respondents were also asked to indicate whether they voted in the most recent elections for the Second Chamber of Parliament[3], and, if so, for which political party. For the 2002 survey, this concerned the Dutch elections of 6 May 2002, for 2004 the elections of 22 January 2003, for both 2006[4] and 2008 the elections of 22 November 2006 and for 2010 the elections of 9

[2]See http://www.uis.unesco.org/Education/Documents/isced-2011-en.pdf.

[3]This is the main legislative body of the Netherlands.

[4]Data collection for the third ESS wave started in September 2006, before the election took place in November. Respondents interviewed before the election were asked who they intended to vote for. After the election they were

June 2010. The official election results are given in Table 7 in the Appendix.

Voting is not mandatory in the Netherlands. In recent elections, roughly 20% to 25% of the electorate chose not to vote. The weighted proportion of eligible respondents in our sample who indicated that they voted is slightly higher at 86.4%, 82.4%, 83.3%, 86.1% and 84.4% for the 5 ESS waves respectively. We include an explicit group for persons who chose not to vote in our analyses of the reported voting behaviour. Besides these individuals, approximately 7.1% of the respondents were not eligible to vote, mostly on account of being younger than 18 at the time of the election. Moreover, the ESS asked respondents which political parties they voted for. The disclosure rates for those who indicated that they voted were quite high at 97.9%, 96.6%, 95.1%, 96.4% and 96.0% respectively.

Since the results of the relevant elections are known at the population level (see Table 7), we use these to recalibrate the post-stratification weights from the ESS before analyzing the voting behaviour. These recalibrated weights are constructed so that the proportion of votes for all competing parties as well as the proportion of nonvoters in the observed sample match the official election results as closely as possible. Iterative proportional fitting, also known as raking, was used to construct these weights separately for each wave of the ESS (see Chapter 8 of Lohr, 1999, for example). These weights are subsequently used whenever voting behaviour is considered. This recalibration procedure also adjusts for the respondents not eligible to vote in the elections, as well as the small proportion who did vote but either chose not to disclose for which party they voted, or could not recall which party they supported. This is done by increasing the weights of the remaining respondents such that the total weight for the eligible voters equals that of the entire sample.

asked who they actually voted for. Roughly half the sample were interviewed before the election. In the questionnaire, LN was still given as a voting option. However, LN disbanded before the 2006 elections, hence we do not consider LN when interpreting voting behaviour after 2004.

Results

A mean hierarchy of human values often exists in society. Schwartz and Bardi (2001) identified pan-cultural norms, in other words norms that apply generally in every society. According to their findings, people across the world consider values such as benevolence, self-direction and universalism to be the most important; power, tradition and stimulation are considered the least important. This is also true in the Netherlands, as the weighted mean ratings reported in Table 3 shows. Dutch people consider values such as self-direction (SD1; average score 2.11), universalism (UN1; 2.11) and benevolence (BE2; 2.16) to be important. Power (PO2; 3.40) and stimulation (ST2; 3.72) are considered to be relatively unimportant. The least important is power (PO1; 4.18). This ordering of the average responses is stable over time: the minimum Spearman rank correlation of the average rating score per item between the various ESS rounds is 0.98. We use the LC-BML model to find more refined subsets of respondents who exhibit different value hierarchies.

MODEL SELECTION

In order to select the most appropriate model, we fitted the LC-BML model for $R = 1, 2, \ldots, 20$ response style segments, $S = 1, 2, \ldots, 12$ value segments, and $P = 1, 2$ dimensions. In total 480 different models were considered; however 9 models did not converge in the allotted number of EM iterations (10 000) and were discarded. A numerical convergence criterion of 10^{-5} was used. The EM algorithm is however only guaranteed to find a local optimum of the likelihood function. We therefore estimated each of these models for 20 different random starts to increase our chances of finding the global optimum. Only the start which resulted in the highest value of the likelihood function is retained.

Value	Code	Item	Description	Average Rating
Benevolence	BE1	It's very important to him to help the people around him. He wants to care for their well-being.	Help others	2.27
	BE2	It is important to her to be loyal to her friends. She wants to devote herself to people close to her.	Loyalty	2.16
Universalism	UN1	He thinks it is important that every person in the world should be treated equally. He believes everyone should have equal opportunities in life.	Equality	2.11
	UN2	It is important to him to listen to people who are different from him. Even when he disagrees with them, he still wants to understand them.	Understand others	2.43
	UN3	She strongly believes that people should care for nature. Looking after the environment is important to her.	Care for nature	2.31
Self-Direction	SD1	It is important to her to make her own decisions about what she does. She likes to be free and not depend on others.	Independent	2.11
	SD2	Thinking up new ideas and being creative is important to her. She likes to do things in her own original way.	Creative	2.46
Stimulation	ST1	He likes surprises and is always looking for new things to do. He thinks it is important to do lots of different things in life.	Look for new things	2.85
	ST2	He looks for adventures and likes to take risks. He wants to have an exciting life.	Excitement	3.72
Hedonism	HE1	Having a good time is important to her. She likes to spoil herself.	Have a good time	3.04
	HE2	He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.	Have fun	2.52
Achievement	AC1	It's important to her to show her abilities. She wants people to admire what she does.	Be admired	3.27
	AC2	Being very successful is important to him. He hopes people will recognise his achievements.	Be successful	3.26
Power	PO1	It is important to her to be rich. She wants to have a lot of money and expensive things.	Be rich	4.18
	PO2	It is important to her to get respect from others. She wants people to do what she says.	Get respect	3.40
Security	SE1	It is important to him to live in secure surroundings. He avoids anything that might endanger his safety.	Security	2.80
	SE2	It is important to her that the government ensures her safety against all threats. She wants the state to be strong so it can defend its citizens.	Strong government	2.73
Conformity	CO1	He believes that people should do what they're told. He thinks people should follow rules at all times, even when no-one is watching.	Follow rules	2.95
	CO2	It is important to her always to behave properly. She wants to avoid doing anything people would say is wrong.	Behave properly	2.85
Tradition	TR1	Tradition is important to her. She tries to follow the customs handed down by her religion or her family.	Tradition	2.86
	TR2	It is important to him to be humble and modest. He tries not to draw attention to himself.	Modesty	3.29

Table 3: The 21 value items from the ESS and their weighted average ratings for the Dutch sample. The unadjusted post-stratification weights supplied in the ESS were used to calculate the weighted averages.

R	*S*	*P*	**DF**	**BIC**	*R*	*S*	*P*	**DF**	**BIC**
20	9	2	677	526 346	10	3	1	159	534 569
20	8	2	617	526 402	8	3	1	141	536 296
19	11	2	780	526 459	10	2	1	129	537 576
20	**7**	**2**	**557**	**526 501**	8	2	1	113	539 285
19	12	2	839	526 607	6	2	1	97	542 677
20	12	2	857	526 699	5	2	1	89	544 748
20	6	2	497	526 948	6	1	1	71	553 751
17	6	1	333	528 639	4	1	1	57	560 906
16	6	1	321	528 782	3	1	1	50	565 456
14	6	1	297	529 069	2	1	1	43	573 453
17	4	1	259	529 938	1	1	1	36	595 156
11	4	1	199	531 425					

Table 4: A summary of the 23 models lying on the convex hull considered in the final model selection step. Given are the number of segments R and S and dimensionality P, the number of degrees-of-freedom (DF), and the respective BIC values. The models are ordered from low to high BIC. The selected model is shown in boldface.

We plotted the maximized log-likelihood values against the model degrees-of-freedom for the 471 models. The convex hull enclosing the cloud of points can then be determined. We reduced the model selection problem by considering only the models that lie on this hull, similar to the CHull prodecure of Ceulemans et al. (2011). These models can be considered to present a good trade-off between complexity and data fit. The BIC values for the 23 models that lie on this hull are summarized in Table 4. Although it has only the fourth lowest BIC value, we selected the model with $R = 20$ response styles, $S = 7$ value segments and $P = 2$ dimensions, since we found this model to be more interpretable than the more complex models with slightly better BIC values. We now proceed to describe and interpret the results from this model.

	ESS Wave					
Segment	**2002**	**2004**	**2006**	**2008**	**2010**	**Overall**
1: Mainstream	21.4	22.2	22.5	21.2	22.7	22.0
2: Security Seekers	18.3	18.8	18.2	18.5	19.3	18.6
3: Traditionalists	16.1	15.2	13.6	14.9	12.3	14.5
4: Universalists	12.8	13.1	16.8	16.8	16.3	15.0
5: Indifferent	16.0	15.7	13.2	14.1	13.2	14.5
6: Entrepreneurs	14.3	13.9	15.0	13.4	14.7	14.3
7: Uninterested	1.1	1.1	0.8	1.1	1.6	1.1

Table 5: Segment sizes per year (in percentage), using unadjusted post-stratification weights.

VALUE SEGMENTS

As shown in Table 5, the sizes of the value segments are relatively stable over time. This is expected as values at a higher aggregation level hardly change (Schwartz, 2006). Segment 4 has grown somewhat over the years from 12.8% to 16.3%, whilst Segments 3 and 5 have decreased in size from 16.1% and 16.0% to 12.3% and 13.2% respectively. Overall, Segment 7 is estimated to contain only 1.1% of the population, while the other segments range in size from 14.3% to 22.0%. Table 6 shows the distribution of the demographic variables across the segments. These distributions are calculated by summing the post-stratification weights of all respondents who fall in a specific category (e.g. all males). Segment membership is incorporated by weighting the post-stratification weights with the estimates of each respondent's posterior segment-membership probabilities in (5). The segments differ with respect to socio-demographic characteristics. Segment 3 has a large group of people who are lower educated females, aged primarily above 60. In Segment 6, the majority is highly educated young males, while Segment 4 includes higher educated people, both male and female, who are mostly aged 35–59. Segment 5 includes more people with low education levels than average.

	Gender		Education Years			Age			
Segment	**Male**	**Female**	**1–10**	**11–15**	**16–30**	**15–34**	**35–59**	**60–96**	**Size**
1: Mainstream	38.9	61.1	28.4	50.1	21.5	18.6	52.0	29.5	22.0
2: Security Seekers	52.4	47.6	22.2	48.9	28.8	30.2	50.0	19.8	18.6
3: Traditionalists	43.7	56.3	40.6	44.7	14.6	12.8	45.3	42.0	14.5
4: Universalists	49.3	50.7	14.0	47.9	38.1	34.2	52.2	13.6	15.0
5: Indifferent	53.4	46.6	35.2	46.6	18.3	33.9	41.7	24.4	14.5
6: Entrepreneurs	63.3	36.7	15.1	51.6	33.3	62.0	33.6	4.4	14.3
7: Uninterested	42.7	57.3	29.7	53.9	16.4	26.3	41.1	32.6	1.1
Average	49.1	50.9	26.5	49.1	24.5	31.1	45.1	23.8	100.0

Table 6: The distribution of the socio-demographic variables across value segments, and the segment sizes. All values are expressed as percentages per row and variable, except for the segment sizes. Post-stratification weights are applied.

These seven value segments are based on different value priorities. To help interpret these priorities, all the response categories and values are represented jointly in a two-dimensional space using biplots (see Figures 2 – 4). The positions of the value items vary across all value segments, but the locations of the response categories remain the same. The magnitude of the effect of each item on the probability to endorse a specific rating category is determined by the inner product (also known as the scalar or dot product) between the position of the item in that segment and the vector representing the rating. This can be determined by multiplying the length of the projection of the item point onto the rating vector by the length of the rating vector. Simply put, items which have large positive projections are associated with large probabilities of endorsing that rating, and vice versa. For example, in Segment 1 the item PO1 has a very large positive projection on rating category 6 (“Not like me at all”), which implies that in Segment 1 people do not value this item highly. In contrast, UN1 has a large positive projection on rating category 1 (“Very much like me”), implying that this segment values this aspect of universalism most highly.

We first interpret each value segment, and then relate these to voting behaviour in the next section. To ease interpretation, names are assigned to the segments:

Segment 1: Mainstream. The 'Mainstream' group forms the largest segment comprising roughly 22.0% of the sample. From Figure 2, we see that this segment attaches great importance to values universalism (UN1: equal treatment and opportunities for everyone; and UN2: understanding others), benevolence (BE2: loyalty and devotion to friends and family; and BE1: helping others and caring about their well-being), and self-direction (SD1: being independent). Values such as power (PO1: being rich; and PO2: being respected by others), achievement (AC2: being successful; AC1: and being admired) as well as stimulation (ST2: living an exciting life), are considered to be completely unimportant. This is mostly in line with the pan-cultural hierarchy of Schwartz and Bardi (2001). We might consider this segment to represent the modal person in the Netherlands.

Segment 2: Security Seekers. The 'Security Seekers' (18.6%) do not have any pronounced preference for or aversion to any particular values. They consider all values to be of approximately equal importance. However, in comparison to the other segments, they consider security (SE1 and SE2) relatively more important. Further, benevolence (BE2: being loyal to friends and family) and self-direction (SD1: independence) are considered important. As in most other segments, they consider power (PO1: being rich) and stimulation (ST2: living an exciting life) to be relatively unimportant. Interestingly, tradition (TR2: modesty) is also considered to be relatively unimportant.

Segment 3: Traditionalists. Compared to the other segments, the 'Traditionalists' (14.5%) emphasize the conservation values (security, conformity and tradition) far more than the other segments. People in this segment consider it to be especially important that the area in which they live is safe (SE1: security) and that traditions are respected (TR1: tradition). Contrary to many of the other segments, they consider the item gaining new experiences (ST1: stimulation) to be of only minor

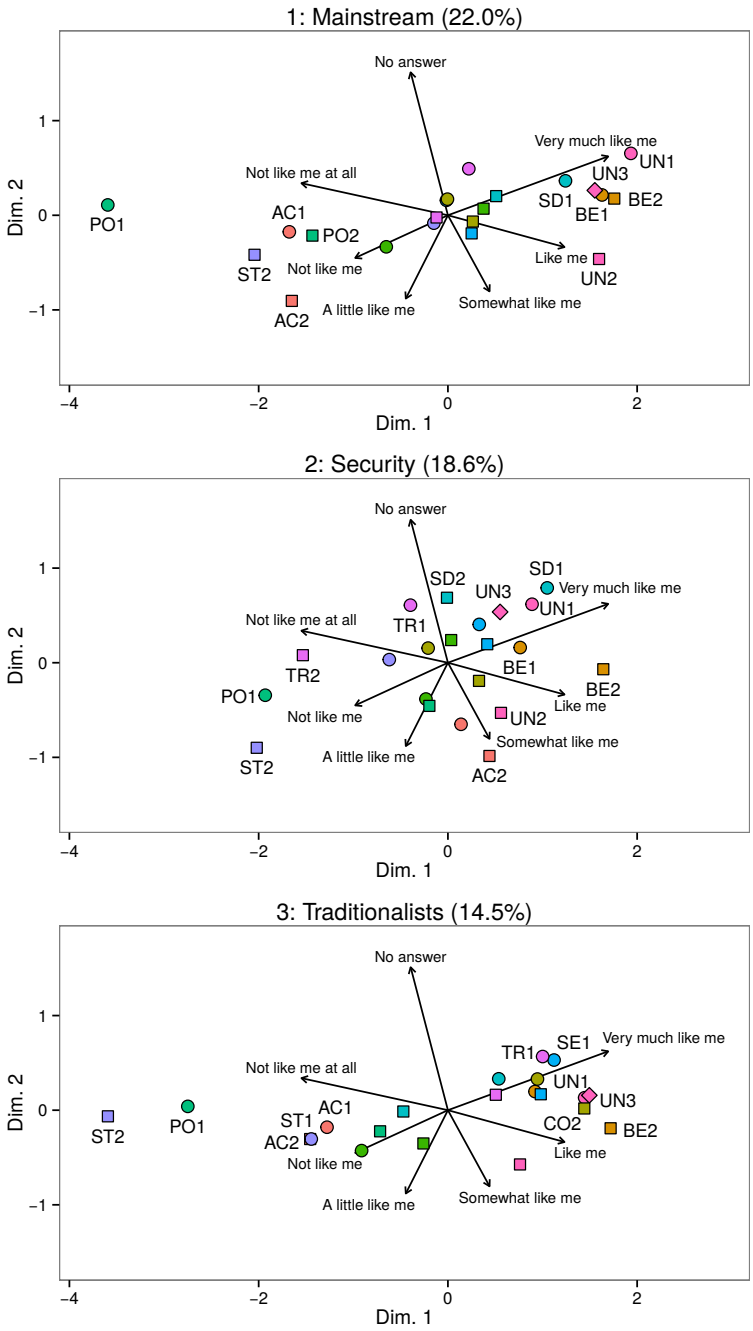

Figure 2: Biplots for value segments 1 – 3. The same colours and symbols apply in all plots, as explained in the legend in Figure 4.

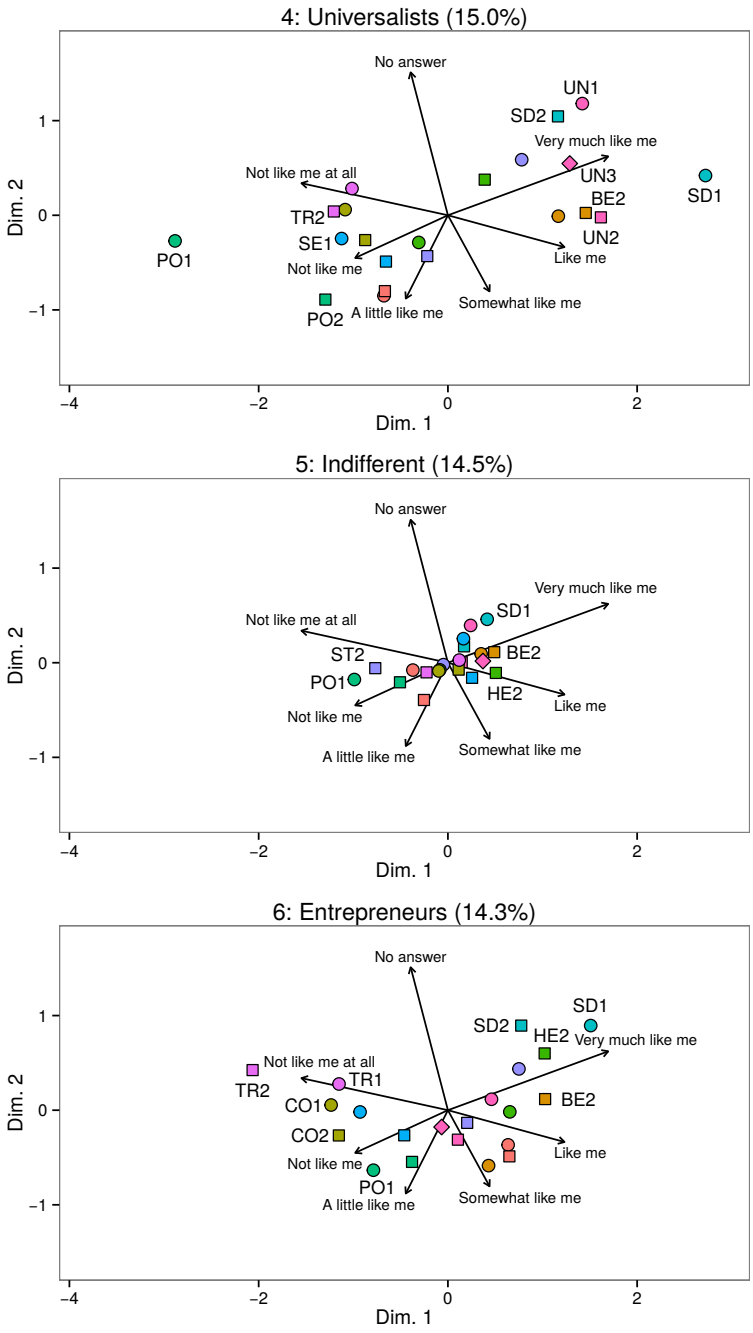

Figure 3: Biplots for value segments 4 – 6. The same colours and symbols apply in all plots, as explained in the legend in Figure 4.

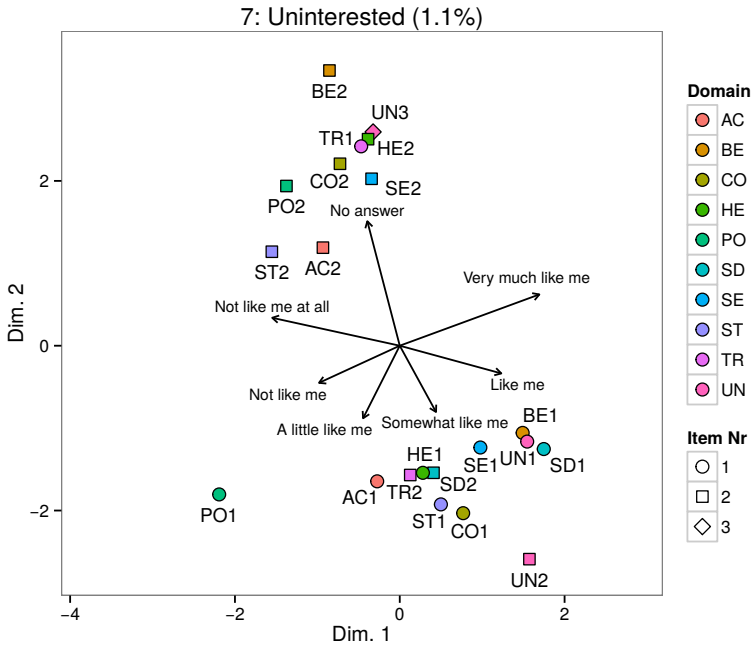

Figure 4: Biplot for value segment 7.

importance. The key motivation for people in this segment are conservation and socially-oriented values.

Segment 4: Universalists. The fourth value segment, the 'Universalists' (15.0%), places relatively great emphasis on self-direction (SD1: independence; and SD2: creativilty), universalism (UN1 to UN3), and also benevolence (BE2: loyalty to friends and family). Values in the conservation domain such as tradition (TR) and conformity (CO) are not considered important. Values representing growth are the motivation of people in this segment.

Segment 5: Indifferent. This segment, simply named 'Indifferent,' consists of individuals who hardly differentiated between the values. They comprise roughly 14.5% of the sample. All values are considered of average importance. Self-direction (SD1: being independent) and benevolence (BE2: being loyal to family and friends) are the values considered relatively most important to them.

Segment 6: Entrepreneurs. The 'Entrepreneurs' (14.3%) consider the values self-direction (SD1 and SD2), benevolence (BE2: loyalty to friends and family), and hedonism (HE2: having fun) to be extremely important. Universalism is considered relatively less important. Relative to the other segments, power and achievement are more important, while tradition and conformity are considered less important. Person-focused values are the key motivation for the people in this segment.

Segment 7: Uninterested. The smallest segment consists of 1.1% of individuals who are seemingly not interested in completing the entire value scale. This may have been an issue with the data collection or recording. In the ESS questionnaire, the values were divided over two pages and the respondents might have missed the second page. As is evident from the biplot in Figure 4, roughly half the items have been completed (the items in the lower half of the plot), while responses to the

remaining nine items are mostly missing. This corresponds to the order in which the items appeared in the questionnaire.

VALUE SEGMENTS AND POLITICAL PARTIES

To relate the value segments to voting over time we performed a correspondence analysis (CA; e.g. Hoffman and Franke, 1986; Greenacre, 2007). CA can be used to plot the value segments together with the political parties for which they voted. This makes it easier to interpret our results. For this analysis, a cross-tabulation of the individual posterior probabilities in Equation (5) was made with the value segments in the columns and the political parties, split into the five waves of the ESS, in the rows. The CA was used to visualize the links between the rows and columns in this table simultaneously (see Figure 5). The total inertia in the table can be effectively shown in two dimensions (78.3% of the inertia is explained in two dimensions).

Figure 5 shows the column-principal map of the CA (Greenacre, 2007), where each of the political parties are labelled. In addition, each year is indicated by a different symbol. Symbols for the same party are connected by lines. The black triangles represent the seven value segments. The darker the points, the better the explained inertia (fit) of the points – see Greenacre (2007) for more information on inertia. Across the five waves, three value segments are quite distinct, namely the Traditionalists, the Universalists, and the Entrepreneurs. The Mainstrean segment is located in between the Tradionalists and the Universalists and lie more towards the centre of the graph. The Indifferent and Uninterested segments lie close together; however, the Uninterested segment fits less well into the CA solution, suggesting possible measurement issues in this segment. Last, the Security Seekers also fit less well into the display and should therefore not be strongly interpreted.

The first dimension divides the Traditionalists from the Universalists and Entrepreneurs. In value

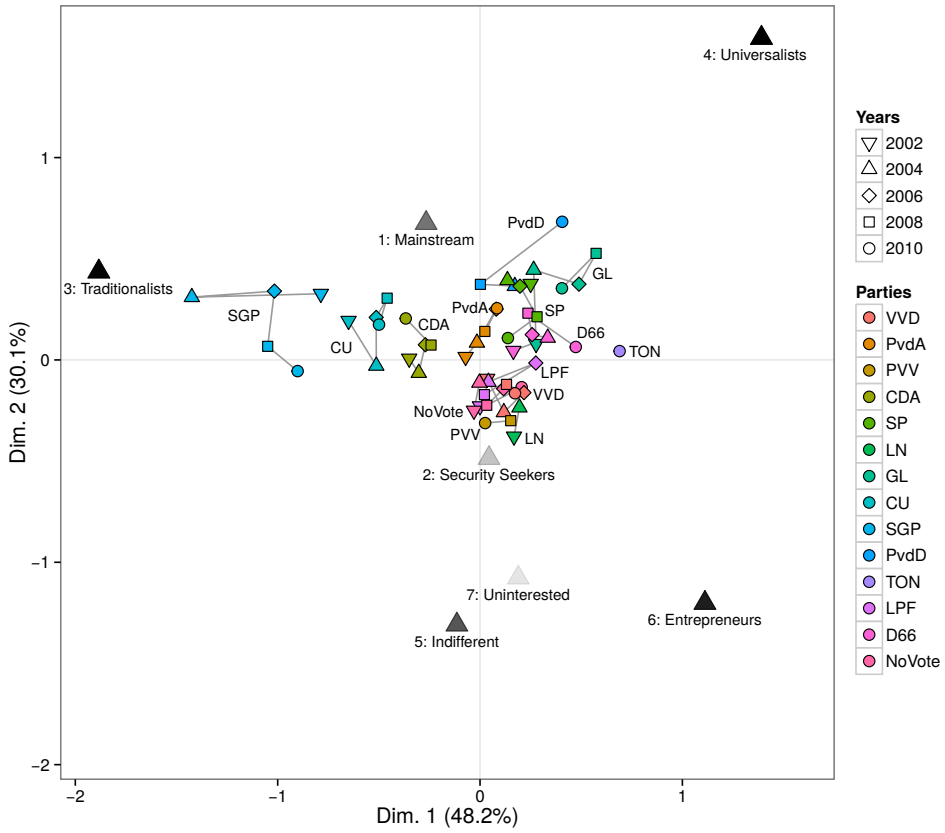

Figure 5: Correspondence analysis for the segments and reported votes, using the adjusted post-stratification weights applied to the posterior probabilities of Equation (5). The symbols for the segments are faded according to the explained inertia so that darker points fit better. No shading was done for the political parties.

terms this is a distinction between conservation and openness-to-change. The second dimension is a distinction between Universalists, and to a lesser extent Traditionalists, and the Entrepreneurs. This is a distinction between an emphasis on self-transcendence versus self-enhancement. The first dimension distinguishes the religious parties (SGP, CU and CDA) from the non-religious parties (e.g., GL and D66); this meets our expectation that segments considering conservation and self-transcendence important more often vote for religious parties.

The religious parties lie in the upper left quadrant, strongly associated with the Traditionalist segment. They are ordered from the most traditional SGP to the more moderate CDA, and clearly distinguished from the libertarian and authoritarian parties towards the right of the graph. The libertarian parties, namely the PvdD, D66, GL and PvdA, are located alongside each other to the top right quadrant of the figure. The more extreme libertarian parties, namely the GL and PvdD, are located in the upper right corner, whereas the more centrist PvdA are located towards the origin. The authoritarian parties form a tight cluster slightly below the centre. These parties (LPF, PVV, VVD and LN) have tight historical connections, as for instance the LPF was formed by a former member of LN, and the PVV leader similarly was a former member of parliament for the VVD.

Members of the Indifferent segment as well as the Entrepreneurs are the most avid supporters of the newly established authoritarian parties. In addition to voting for the VVD, in the elections in 2002 and 2003 these segments voted relatively often for LPF and LN, and since 2006 for the populist PVV. For the Entrepreneurs, universalism is relatively unimportant compared to the other segments. This is congruent with their preference for authoritarian parties, and our expectations. Individuals emphasizing conservation values tend to vote more often for religious parties, especially the SGP and CU. This is in line with our expectations.

As expected, the Universalist segment, which opposes the protection and conservation values

Figure 6: The proportion of ratings used in each response style segment.

and emphasizes growth and openness-to-change values, votes for libertarian parties such as GL.

RESPONSE STYLES

The value segments analyzed above are adjusted for response styles through the inclusion of the response style segments in the model. Figure 6 gives the proportion of responses in each response style segment that was attributed to each of the ratings. Colours are used to highlight larger values. It is evident that a variety of response styles have been detected. The largest styles (1 – 3) concentrate on using ratings one through five, but very few sixes. Response style 4 focuses on using ratings two and three, while response style 5 uses the breadth of the rating scale. Styles 9 and 10 can be described as midpoint scoring, while style 16 comprise extreme scoring focusing on categories 1 and 6. Response styles 18 and 20 contain a disproportionate number of missing values. These results show that there is indeed a lot of heterogeneity with respect to rating scale use.

Figure 7 shows the association between the response style and value segments. The percentages in each column sums to one, showing which segments each response style is associated with. Note

Figure 7: The distribution of each response style across all value segments.

that some response style segments are often strongly associated with a single value segment. This is especially true for the Indifferent and Uninterested segments. Specifically, the Uninterested segment associates strongly with response styles 18 and 20 (missing values), and the Indifferent segment with response styles 13 – 16 and 19. The latter include some well-known styles (see Baumgartner and Steenkamp, 2001, for example), such as response range (13), acquiescence (14 and 15), extreme responding (16) and disacquiescence (19).

Discussion and Conclusion

There is a clear link between the seven value segments based on Schwartz' values and people's voting behaviour for political parties. Our approach using the LC-BML model, followed by a correspondence analysis, clearly reveals the three factors identified in the literature according to which political parties in the Netherlands may be categorized (Aarts and Thomassen, 2008). We can see religious parties (SGP, CU and CDA), left-leaning (GL, SP, PvdD) versus right-leaning parties (VVD and PVV) and libertarian (D66, GL) versus more liberal and traditional parties. The division

between right and left applied widely in the literature is therefore too simplistic to effectively describe multi-party political systems, such as the Dutch system. Importantly, our method can be applied in other multi-party contexts too.

This study distinguishes itself from previous studies on values and voting in multiple ways. First, we focus on segments instead of considering the whole population as one group. Second, we relate value segments to voting for specific political parties. With our approach we are not only able to confirm established relationships between single values and political orientation, such as correlation between the universalism and a leftist orientation (e.g, Caprara et al., 2006), but also to determine which combinations of value items are related to voting behaviour. Third, we correct for response styles, which is a neglected issue in research on values and voting. It has however long been acknowledged as an issue in public opinion research (for example, Peter and Valkenburg, 2011; Greenleaf, 1992; Alwin and Krosnick, 1985; Bachman and O'Malley, 1984; Cunningham, Cunningham, and Green, 1977; O'Neill, 1967). Fourth, our study is the first that shows the relationship between values and voting behaviour over a period longer than a decade; the longitudinal study by Schwartz et al. (2010) covered one month.

Fifth, we treat all 21 value items separately, instead of reducing the items to the 10 values they set out to measure (Piurko, Schwartz, and Davidov, 2011; Caprara et al., 2006), or to their respective value domains, such as self-transcendence and conservation (Barnea and Schwartz, 1998). The value segments not only differ with respect to the importance they attach to values, but also with respect to specific items. For example, in most segments the two items measuring power are far apart, as are the items measuring universalism. The average for power and stimulation, as would be used when analysing value domains only, would have masked that a similar importance is attached to two different value items PO1 (rich) and ST2 (adventure). The LC-BML model accepts correlated

items, allowing us to treat items belonging to the same value separately.

The relations between the value segments and voting behaviour are quite stable over time. For example, the Traditionalists tend to vote for the religious parties (SGP and CU) relatively frequently, whereas the Entrepreneurs vote more frequently for the libertarian parties, such as D66 and VVD. A remarkable segment is the Indifferent segment. This segment either tends not to vote, or, when voting, likely votes for the newly emerging populist parties. Such behaviour is compatible with the results of the Dutch panel study by Van der Meer, Lubbe, van Elsas, Elff, and van der Brug (2012). However, the reason for their (non)-voting behaviour might be either substantive or methodological. One possible substantive reason is value incongruence with the existing parties, as suggested by Caprara et al. (2012). Another possibility is that populist parties are more engaging to lower educated citizens than the established parties (Hakhverdian, van der Brug, and de Vries, 2012). Disinterest or lack of cognitive capacity when answering the survey items, resulting in a response style, might be a methodological explanation.

The LC-BML model identified 20 different response style segments, providing further empirical evidence of the prevalence of response styles in rating scale data. Importantly, our results show that the value and response style segments are not independent. Two problematic value segments, namely the Indifferent and Disinterested segments, are closely associated with specific response styles. Together, these comprise 15.7% of the sample. Hence the answers of a significant number of respondents are mainly driven by specific response styles. In the other segments we might consider the way in which people use the rating scale a communication style. With a communication style, no adjustment, or simple adjustments, may suffice (He and Van De Vijver, 2015). Our study indicates that taking into account response styles in value measurement is important, since ignoring response styles can lead to segments that differ only with respect to rating scale use, and not in

value preference. Our study also suggests that the response styles present in empirical data are not limited to one specific style such as extreme responding (for example, Liu, Lee, and Conrad, 2015; De Jong, Steenkamp, Fox, and Baumgartner, 2008): people use many different response styles that all might invalidate our findings.

Appendix

The official national election results are shown in Table 7. We now describe the bilinear decomposition of the parameters used in the LC-BML model. In order to reduce the number of parameters in (3), Van Rosmalen et al. (2010) introduce bilinear decompositions which also make it possible to display all effects in P-dimensional graphs. Let $\mathbf{B}_l$ be the matrix with $\boldsymbol{\beta}_{1l}, \ldots, \boldsymbol{\beta}_{Kl}$ as rows, and gather the $\gamma_{jk|s}$ in the $J \times K$ matrix $\boldsymbol{\Gamma}_s$. The bilinear restrictions are imposed by requiring that

$$\mathbf{B}_l = \mathbf{F}\mathbf{G}_l^{'} \text{ and } \boldsymbol{\Gamma}_s^{'} = \mathbf{F}\mathbf{H}_s^{'}, \tag{6}$$

where $\mathbf{F}$, $\mathbf{G}_l$ and $\mathbf{H}_s$ has P columns. Typically, the dimensionality of the graphical representations is chosen to be $P = 1$, 2 or 3 so that it can be displayed easily. The matrix $\mathbf{F}$ contains the coordinates of the K rating categories, $\mathbf{G}_l$ the coordinates for the categories of socio-demographic variable l, and $\mathbf{H}_s$ the coordinates of the J items in value segment s in P-dimensional space. Under these bilinear restrictions, (3) becomes

$$\eta_{ijk|r,s} = \alpha_{k|r} + \sum_{l=1}^{L}\sum_{p=1}^{P} f_{kp}\boldsymbol{g}_{lp}^{'}\boldsymbol{x}_{il} + \sum_{p=1}^{P} f_{kp}h_{jp|s}, \tag{7}$$

	Election			
Party	**2002**	**2003**	**2006**	**2010**
VVD	15.4	17.9	14.7	20.5
PvdA	15.1	27.3	21.2	19.6
PVV	–	–	5.9	15.4
CDA	27.9	28.6	26.5	13.6
SP	5.9	6.3	16.6	9.8
D66	5.1	4.1	2.0	6.9
GL	7.0	5.1	4.6	6.7
CU	2.5	2.1	4.0	3.2
SGP	1.7	1.6	1.6	1.7
PvdD	–	0.5	1.8	1.3
TON	–	–	–	0.6
LPF	17.0	5.7	0.2	–
LN	1.6	0.4	–	–
Other	0.7	0.4	1.0	0.5
Subtotal	9 501 152	9 654 475	9 838 683	9 416 001
Blank/Invalid	14 074	12 127	16 315	26 976
Total	9 515 226	9 666 602	9 854 998	9 442 977
Electorate	12 035 935	12 076 711	12 264 503	12 524 152
Turnout	79.1%	80.0%	80.4%	75.4%

Table 7: The percentage of votes won by the different political parties in the four Dutch elections, as well as the total number of votes cast and the size of the electorate. (Source: www.verkiezingsuitslagen.nl)

with f_{kp} and $h_{tp|s}$ being the elements of $\mathbf{F}$ and $\mathbf{H}_s$ respectively, and $\boldsymbol{g}_{lp}$ the pth column of $\mathbf{G}_l$. Besides these bilinear restrictions, several identifiability contraints must be imposed on the parameters in (7) – details are given in Van Rosmalen et al. (2010).

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