Sorting your way out
Perceived party positions, political knowledge and polarization*

Federico Vegetti[†1], Zoltán Fazekas[‡2], and Zsombor Méder[§3]

[1]Central European University
[2]University of Oslo
[3]Singapore University of Technology and Design

Abstract

Political knowledge is one of the most important constructs for political behavior research, although scholars often ignore how general knowledge translates into specific information that citizens use to evaluate the party supply. This task is even more complex in multi-party systems. We analyze the accuracy of voter-party placements benchmarked to expert placements in 24 European multi-party systems focusing on the role of general political knowledge given party system characteristics. Our results indicate that while more knowledgeable voters view the party system more similarly to experts, this difference is substantially smaller in ideologically polarized party systems. Thus, the required general political knowledge for an accurate ordering of parties on the left-right scale are much lower in polarized party systems. Our findings have important implications for our understanding of how competition can fulfill its function of linking citizens and political elites at the moment of democratic elections.

*Working paper currently under review. Replication materials will be posted upon publication. Earlier versions were presented and discussed at the Information and Electoral Competition Workshop, Social Science Research Center Berlin; the Comparative Politics Research Group Meeting, University of Southern Denmark; and the Political Behavior Research Group Meeting, Central European University. We are grateful for comments by all attendees, especially Susan Banducci, Heiko Giebler, Sylvia Kritzinger, and also David Fortunato, Martin Ejnar Hansen and Sebastian Popa. Please feel free to cite this work or contact us for an updated version.

[†]fede.vegetti@gmail.com
[‡]zoltan.fazekas@gmail.com
[§]mederzsombor@gmail.com

Political knowledge is one of the most researched topics in political science, for a simple reason: Without being informed about political facts and actors, individuals can hardly fulfill their role as democratic citizens in a meaningful way (Berelson, Lazarsfeld, & McPhee, 1954; Delli Carpini & Keeter, 1996; Galston, 2001; Popkin & Dimock, 1999; Zaller, 1992). Over the years, several studies have shown that political information can significantly impact how citizens turn new inputs and experiences into attitudes and preferences, with substantial consequences at the aggregate level (see Althaus, 1998; Arnold, 2012; Bartels, 1996; Singh & Roy, 2014). Thus, understanding the mechanisms that prompt citizens to acquire political information, as well as the circumstances that make acquisition easier or more desirable, is one of the primary tasks of political research.

Several factors have been pointed out as important determinants of citizens' political knowledge. The most common framework on which scholars have converged concentrates on three types of characteristics, namely citizens' cognitive *ability*, their *motivation* to acquire political knowledge, and the *availability* of political information in their environment (Delli Carpini & Keeter, 1996; Luskin, 1990). While early studies have focused on individual characteristics, such as education, gender and interest for politics, more recently scholars have started taking into account the informational environment in which citizens operate, with a particular focus on the media, as well as other features of the political context (Barabas, Jerit, Pollock, & Rainey, 2014; Delli Carpini & Keeter, 1996; Curran, Iyengar, Lund, & Salovaara-Moring, 2009; Fortunato, Stevenson, & Vonnahme, 2015; Fraile, 2013; Gordon & Segura, 1997; Jerit, Barabas, & Bolsen, 2006; Luskin, 1990). Most scholars have targeted a general definition of political knowledge spanning several different domains, though some studies have dealt with specific and particularly relevant facets such as policy-specific knowledge (Barabas & Jerit, 2009; Gilens, 2001).

In this study we expand this research in two different directions. First, we analyze a particular dimension of sophistication that is crucial for political decision making, namely *party system expertise*. Such a dimension focuses on citizens' ability to cor-

rectly sort the political parties on a political dimension of interest – in this case, the left-right spectrum (Converse, 1964; Delli Carpini & Keeter, 1996; Luskin, 1987). By focusing on this construct, we specifically address the kind of information that reflects voters' understanding of the party ideological landscape, that is, their ability to distinguish the policy alternatives offered by parties in terms of left-right. Second, we ask what are the contextual circumstances that can favor citizens' party system expertise, holding constant their individual incentives to acquire political information. We argue that a characteristic of political competition, namely the degree of party polarization, influences citizens' party system expertise, and reduces the gap between the most and the least knowledgeable. We test our hypotheses across 23 European democracies using data from the European Election Studies 2009 (van Egmond, van der Brug, Hobolt, Franklin, & Sapir, 2009).

General political knowledge and party system expertise

Understanding a complex system such as politics requires great amounts of information. Moreover, being knowledgeable about some aspects of the political game, for instance the rules governing the institutional process, does not imply being proficient with others, like the actors competing for power or the issues at stake. In his essay on political sophistication, Luskin (1987) points out two crucial dimensions that are directly related to this point: politically sophisticated citizens are characterized by the *size* of their expertise, that is, the amount of information that they can successfully recall, and its *range*, that is, the number of areas or political subfields among which their knowledge is spread.[1] Such a generalized approach has been adopted by many scholars. In their highly influential study, Delli Carpini and Keeter (1996, p. 10) define political knowledge as "the range of factual information about politics that is

[1] A third dimension is *constraint*, which refers to the presence of a logically consistent criterion underlying a person's evaluations and attitudes (Converse, 1964; Luskin, 1987). Rather than the amount of knowledge or information, this dimension regards the way it is organized. Note also that the term political 'sophistication, which is often used interchangeably with 'knowledge', is sometimes defined in broader terms, including also political interest, engagement, and cognitive ability (see Zaller, 1992).

stored in long-term memory". The rationale is that people scoring high on general political knowledge are more likely to possess also the specific expertise necessary to express consistent political judgements (Althaus, 1998; Gilens, 2001). This view has been supported by empirical analyses showing that a unidimensional model of political knowledge fits the data almost as well as multidimensional constructs (Delli Carpini & Keeter, 1993). Many scholars have adopted this perspective when devising tools to measure political information, either using the five-item battery suggested by Delli Carpini and Keeter (1993, 1996) or more generally, by observing the number of correct responses to general factual political knowledge questions (for a recent example see the appendix in Prior & Lupia, 2008).

Other scholars have focused on specific types of knowledge. For instance, in a recent study Shaker (2012) focuses on local politics, finding substantial differences in citizens' information about political facts at the national and at the local level. A more widely investigated type of knowledge is, for obvious reasons, policy-specific information. As it is often discussed, standards of general political knowledge might be *too* general to capture the types of information that are most relevant for citizens' evaluations. Accordingly, scholars have come to differentiate policy-specific from general knowledge, often finding variation across the two constructs in terms of factors of influence and impact on attitudes (Barabas et al., 2014; Gilens, 2001).

Another type of specific knowledge that is crucial for political decision making is party system expertise. This construct refers to the ability to recognize the positions taken by parties on the relevant issue dimensions, whether concrete policies or more abstract ideological concepts. Knowing where parties stand in respect to one another implies, at least theoretically, being able to predict *who is likely to do what* if elected. This allows citizens to match their own preferences with those of the parties, and make decisions that can best serve their own interests (Downs, 1957). Thus, party system expertise is crucial for the vote choice.

Students of political sophistication often include a measure of party system expertise in their scales. This is true for all those relying on the five-item battery devised by

Delli Carpini and Keeter (1993). However, this specific dimension of political knowledge has a much longer tradition and a much more pragmatic orientation compared to other general knowledge items. Converse (1964) uses the ability to position the Republican party on the right of the Democrat party on a liberal-conservative dimension as an indicator of *recognition* and *understanding* of ideological concepts (Luskin, 1987). Being able to position political objects correctly on a given dimension implies having a certain amount of shared understanding of the meaning of such a dimension. This in turn entails being able to integrate new information about the topic in a coherent way. In Converse's view this applies to ideological concepts such as liberal and conservative, but the same logic could be generalized to any policy issue.

One approach of party system expertise measures how far citizens see parties in respect to their *true* position. For instance, in their comparative study of political knowledge based on Euro-Barometer data, Gordon and Segura (1997) look at the distance between respondents' perceived party placement and the sample mean. However, focusing on *absolute* instead of *relative* party positions seems unnecessarily demanding. Placing a party (or, *a fortiori*, all parties) one point away from their true position on an 11-point scale might merely indicate a different interpretation of the left-right space by the respondent. As such, a measure based on absolute party positions is more sensitive to distortions affecting quantitative judgments, and can misrepresent the party system expertise of respondents.

This paper uses an alternative methodology which focuses on the correct *sorting* of parties on the left-right space.[2] Measures of correct party sorting have been used previously in the US context, sometimes as indicators of a partisan mindset (Hamill,

[2]By way of analogy, one can consider the reinterpretation of the notion of 'utility' within economics. For 19th century economists, the term 'utility' carried a substantive meaning, the – potentially measurable – sum of pleasure and pain that an item causes an individual to experience. When this conception of 'utility' broke down, it has been reinterpreted as an arbitrary number assigned to elements of a set, with the property that whenever two elements are considered, the one preferred by the individual will be associated with a higher 'utility'. Utility values are thus arbitrary, insofar as their monotone transformations would represent the same preferences. Abstracting away from precise party positions to orders on the left-right scale allows party system expertise measures to become independent from monotone transformations of the scale. As such, focusing on left-right *sorting* allows methodological transparency in conveying an essential feature of party configuration without simultaneously being overly restrictive.

Lodge, & Blake, 1985), though more often as indicators of knowledge (Delli Carpini & Keeter, 1993). However, attempts to employ such a measure of party system expertise into a broader comparative context have been limited. This is most likely due to the difficulty to devise an indicator of correct party sorting in complex multiparty systems. One approach to overcome this obstacle is a recent study by Fortunato and colleagues, based on two-by-two comparisons of party relative positions on the left-right in a wide range of different political systems (Fortunato et al., 2015). This implies a process of stacking party-dyad observations within individuals (see also Fortunato & Stevenson, 2013). In this paper, we establish a framework of comparing left-right orders which is, in its simplest form, equivalent to the one used by Fortunato et al. (2015), while presenting some advantages that we discuss below.

One important property of party system expertise is that it captures a type of information that is immediately related to the political environment where citizens make their choices. In this respect, it should have a shorter life span than other dimensions of knowledge (such as, for instance, knowing the number of MPs or the functions of the President), as it represents no more than a snapshot of the political landscape at a given point in time. At the same time, it should be also easier to retrieve than other types of political information, assuming that parties have strong incentives to relay their relative positions as they compete for the votes. Thus, observing citizens' party system expertise not only tells us something about how much and what kind of information flows from the elites to the public, but also allows us to infer what are the relevant aspects of political discourse in a given context. We focus here on this property, asking how citizens' party system expertise can be affected by the style of political competition. We rely on a measure of party system expertise that prompts a straightforward interpretation of the observed degrees of knowledge, both at the individual and at the country level. While past findings suggest that this construct is highly dependent on citizens' general knowledge (Delli Carpini & Keeter, 1993), we argue here that the strength of their correlation can vary as a function of the broader political environment. This has important implications for our understanding of how

competition can fulfill its function of linking citizens and political elites at the moment of democratic elections.

Party system expertise and political competition

The most prevalent model of citizens' political knowledge focuses on three broad factors referring to their ability, motivation and opportunity (Delli Carpini & Keeter, 1996; Luskin, 1987, 1990). *Ability* refers to individuals' cognitive skills, which should favor any type of learning, including the one of specific political facts. *Motivation* is driven by interest for politics, which prompts citizens to actively seek for new information and makes them more likely to pay attention to political events. Finally, *opportunity* refers to the accessibility of political information in one's environment, and for this reason it is more a feature of the context rather than of single individuals. While these three factors have been associated to several typical predictors of general political knowledge (e.g. intelligence, education, interest for politics) most of the empirical studies to date have focused on individual characteristics. Moreover, the impact of different mechanisms on specific types of knowledge has been largely ignored (for an exception, see Barabas et al., 2014).

Recent studies have expanded in these directions. Jerit et al. (2006) investigate the effect of media exposure, a variable directly related to the availability of information, while Barabas and Jerit (2009) focus on citizens' policy-specific knowledge. Fortunato and colleagues deviate somewhat from the ability-motivation-opportunity triad, and focus on the heuristic function of the left-right in different political context to explain party system expertise. They find that citizens' ability to sort parties correctly on the left-right is strongly enhanced in those political contexts where the use of the dimension helps people understand the structure of political alliances (Fortunato et al., 2015). Gordon and Segura (1997) find that some institutional factors, including the type of electoral system, and characteristics of the party system, such as the effective number of parties, significantly affect the structure of incentives and information accessibility faced by the citizens of several European countries.

Other studies have investigated the influence of the context on general political knowledge. Grönlund and Milner (2006) find that the impact of education on knowledge can be moderated by contextual characteristics such as the number of parties and the degree of income inequalities. More recently, Fraile (2013) finds that the degree of social protection and press freedom decrease the differences in political knowledge between the most and the least educated citizens, next to having a direct positive impact of citizens' average level of information. Similarly, Curran et al. (2009) discuss the role of media systems in presenting news and ultimately fostering the reduction of the knowledge gap under certain circumstances. Finally, Popa (2013) compares groups of partisans in Central-Eastern Europe, finding substantive differences in political knowledge between supporters of different types of parties.

With the exception of Gordon and Segura (1997) and Fortunato et al. (2015), all the studies taking into account characteristics of the context have focused on general political knowledge. However, party system expertise should be one of the facets that are most sensitive to the political environment. Knowing what stances parties take on issues depends of course on individual motivation and ability to abstract from concrete pieces of information, such as political statements, to relative *positions*. Yet, parties can make it easier or harder to make this conceptual step by emphasizing or deemphasizing their position in respect to one another in their communication. This largely depends on the style of competition. In particular, it might be a function of how *polarized* party competition is in a given context.

Scholars have repeatedly shown that party disagreement has a strong *salience effect* on the citizens: the higher the degree of polarization over a certain issue, the more the issue will play a central role in the political debate. This mechanism was cleverly described by Key (1966) with the metaphor of the 'echo chamber': citizens' political choices merely reflect the alternatives that are offered to them. For instance, if parties disagree about immigration policies but hold similar views about nuclear power plants, citizens will rather concentrate on immigration than on nuclear power when they evaluate candidates' platforms.

This theory implicitly assumes a top-down mechanism describing the impact of the informational environment on the voters (Zaller, 1992). Parties take diverging or converging positions on different issues, presumably following strategic incentives (Adams, Merrill, & Grofman, 2005). Thus, points of disagreement will be the most advertised in the public debate, as they provide reasons to choose one candidate instead of another. This would increase the availability of information regarding the disputed topic, making it more relevant in the eyes of the voters, and clarifying the differences between parties and candidates (Alvarez & Nagler, 2004; Lachat, 2011). The same logic has been applied to the left-right: the more the parties are polarized on arguments involving left and right considerations, the more such considerations will guide citizens in their political decisions (Dalton, 2008, 2011; Ensley, 2007; Kroh, 2009; Lachat, 2008; van der Eijk, Schmitt, & Binder, 2005).

The validity of the salience effect of party polarization has been tested in the greatest majority of the cases by relying on a spatial utility framework, whether based on proximity considerations (Lachat, 2008), directional considerations (Pardos-Prado & Dinas, 2010, 6), or both (Fazekas & Méder, 2013).[3] One important assumption on which spatial models are based, is that voters know what positions parties take on the most salient policy issues, and that such positions can be mapped into an abstract ideological continuum (Adams et al., 2005; Downs, 1957). This assumption is typically incorporated in the empirical models by using exogenous party positions, often by imputing the mean of the respondents' perceptions, other times by relying on expert judgements. However, while this approach assumes a certain degree of shared knowledge about where parties stand in respect to one another, there is evidence that citizens' individual perceptions of party proximity can be affected by different biases (Brody & Page, 1972), and that such biases increase as a function of party polarization (Vegetti, 2014). Thus, it is important to take into serious consideration a 'middle step'

[3]With this respect, note that empirical studies find that polarization is associated with greater relative importance of directional considerations, confirming the original intuition of Rabinowitz and MacDonald (1989) that more extreme parties provide more emotional stimulation to the voters with regard to issues. This is consistent with our expectation discussed here.

in the salience mechanism, by testing whether citizens' knowledge of party positions is affected by polarization.

The salience mechanism posits that the more the parties are polarized on a given political dimension, the more the environment will be rich of information about that topic. In other words, as polarization increases, so does the *availability* of party-related information. As a consequence, people should be better able to sort parties correctly on the dimension of disagreement. This expectation is also driven by a second possible mechanism. As Carmines and Stimson (1986) point out in their theory of 'issue evolution', a crucial step in the elite-mass transmission is an increased *clarity* of the elite positions. As parties take clearer and more differentiated stances, it should just be easier for the citizens to recognize their positions. From these expectations we devise our first hypothesis.

Availability hypothesis: Greater party polarization corresponds to higher party system expertise on the dimension where parties are polarized.

A second implication of the same mechanism is that individual citizens will need less ability and motivation to attain party system expertise in polarized contexts. At the same time, there are no reasons to expect the relevance of these two factors for general political knowledge to become weaker. Thus, while general political knowledge should maintain its variation regardless how polarized parties are, party system expertise should become more evenly distributed. As a consequence, the association between general political knowledge and party system expertise should become weaker as parties get more polarized. In other words, to use the terminology of Delli Carpini and Keeter (1993), the *discriminating power* of party system expertise as an item of the general political knowledge construct should be reduced. Because in polarized contexts *all* citizens are more expert about the configuration of the party system, to observe great party system expertise will not necessary imply great general political knowledge. This leads to our second hypothesis:

Less is enough hypothesis: Greater party polarization corresponds to a smaller gap in party system expertise between the more and the less politically knowledgeable citizens.

In sum, we argue that party system expertise can vary as a function of the style of party competition, relatively independently from general political knowledge, and we suggest that polarization is one important aspect of this process. When we talk about 'polarized contexts' we always refer to contexts where parties are polarized over a specific dimension of disagreement. We focus here on the left-right, as the most general dimension of political competition in Western democracies.

Data and measurement

To test our hypotheses, we use survey data from the European Election Study 2009 (van Egmond et al., 2009) fielded simultaneously in 27 EU countries after the elections for the European Parliament. Because our measure of party system expertise relies on correct sorting of the parties on the left-right, we need, first, to observe how citizens place the parties on the left-right, and second, a benchmark for the *objective* position of parties to which citizens' views can be compared. For the first, we rely on the variables about general left-right party placement, asked for the most important parties in every country in the EES data. For the second, we use data from the 2010 Chapel Hill expert survey (Bakker et al., 2012). For each party, the objective party position is calculated as a simple average across all experts from a country that positioned the party in question. In both datasets, left-right party positions are measured on the same scale, going from 0 (extreme left) to 10 (extreme right). Because the Chapel Hill dataset includes expert party placements that can match with only 23 countries in our sample, our final number of countries for the empirical analysis will also be 23.[4] However, we split Belgium into two political systems (Flanders and Wallonia),

[4]Malta, Cyprus, Luxembourg while available in the EES they were not available in the Chapel Hill dataset. Furthemore, while Latvia was available in both datasets, we had to exclude it from the analyses because between 2009 and 2010 most of the parties changed.

resulting in 24 contextual units. In total, there are 166 political parties that were placed by both experts and voters on the left-right ideological dimension. We report detailed country level descriptive statistics in Appendix 1 and placement question wording in Appendix 2.

Measuring party system expertise

To assess citizens' party system expertise, we present a simple distance measure between orderings of a finite set. Let $N = \{1, \ldots, n\}$ denote the set of parties in a particular country. We use a permutation π for the left-right ordering of these parties, with $\pi : N \to N$. With such a permutation, $\pi(i) = p$ if party p occupies position i on the left-right scale. Specifically, $\pi(1)$ and $\pi(n)$ identify the leftmost and rightmost party, respectively. Such a permutation can be represented simply by a sequence of numbers. For example, let $n = 6$, and $\pi = (5, 1, 3, 2, 6, 4)$, so that $\pi(1) = 5,\ \pi(2) = 1, \ldots, \pi(6) = 4$. This means that party 5 is the leftmost, followed by party 1, ..., and, finally, party 4 is the rightmost party. Given a permutation π, we can also define π^{-1}, the so-called inverse permutation: $\pi^{-1}(p) = i$, if party p occupies position i. For example, with $\pi = (5, 1, 3, 2, 6, 4)$, we get $\pi^{-1} = (2, 4, 3, 6, 1, 5)$, so that $\pi(1) = 2,\ \pi(2) = 4, \ldots, \pi(6) = 5$. This can be read as: 'party 1 is the 2^{nd} leftmost', 'party 2 is the 4^{th} leftmost', ..., 'party 6 is the 5^{th} leftmost'.

Individual party placements on the left-right ideological axis were collected on a *discrete* scale. Thus, respondents were allowed to place several parties to the same position, in essence providing a non-strict linear ordering of parties from left to right. We will return to the question of ties shortly; for now, consider a respondent that assigned a unique ideological position to each party that she answered. It is also possible that a respondent did not position all parties asked, but only a subset $N_j^a \subseteq N$. In this case, we consider the set of answered parties N_j^a, as well as the restriction of the objective ordering on this set. Again, for simplicity, assume that our respondent provided an answer for all parties, so that $N_j^a = N$.

Given a subjective party placement π_j and an objective party position $\bar{\pi}$, our goal

is to define a measure of discrepancy or distance, $d(\pi_j, \bar{\pi})$. Mostly because it has a straightforward interpretation, the normalized Kemény distance is one of the most commonly used distance measures over orderings. It represents the share of pairs of elements for which the two orderings differ. Specifically, we first define the notion of a 'reversal':

$$R(\pi, \bar{\pi}, p, q) = \begin{cases} 1 & \pi^{-1}(p) < \pi^{-1}(q) \ \& \ \bar{\pi}^{-1}(p) > \bar{\pi}^{-1}(q), \\ 0 & \text{otherwise.} \end{cases}$$

Intuitively, $R(\pi, \bar{\pi}, p, q)$ take a value of 1, if according to π, but not according to $\bar{\pi}$, party p is to the left of party q. Based on this, we can define the normalized Kemény distance as:

$$d_K(\pi, \bar{\pi}) =_{\text{def}} \frac{2}{(n-1)n} \cdot \sum_{p,q} R(\pi, \bar{\pi}, p, q),$$

Note that d_K reaches its maximum when π and $\bar{\pi}$ are the opposite orderings, so that each pair (p, q) is reversed. In this case, $d_K(\pi, \bar{\pi}) = 1$. Thus, $0 \leq d_K(\pi, \bar{\pi}) \leq 1$ for all $\pi, \bar{\pi}$.

To see δ_K at work, consider the following hypothetical example. Suppose again we have $n = 6$ parties, $\pi_j = (1, 5, 6, 2, 3, 4)$ and $\bar{\pi} = (5, 1, 3, 2, 6, 4)$. We get the inverse permutations by checking for the left-right position of party 1, 2, etc., getting $\pi_j^{-1} = (1, 4, 5, 6, 2, 3)$ and $\bar{\pi}^{-1} = (2, 4, 3, 6, 1, 5)$. At the next step, we identify all pairs (p, q) for which p is to the left of q according to π_j, but not according to $\bar{\pi}$, i.e., we look for for (p, q) with $R(\pi_j, \bar{\pi}, p, q) = 1$. We find a total of 4 such pairs: $(1, 5), (2, 3), (6, 2)$ and $(6, 3)$ (see Table 1). The normalization factor – the maximum possible number of inverted pairs – is $\frac{2}{(n-1)n} \approx 0.067$. Thus, $\delta_K(\pi_j, \bar{\pi}) \approx 0.067 \cdot 4 \approx 0.267$.

The normalized Kemény distance satisfies the standard requirements of a distance function (non-negativity, identity of indiscernibles, symmetry, and the triangular inequality, see Burak, 2014). Importantly, it has a very natural probabilistic interpretation. Suppose we choose two parties uniformly at random. Then, the normalized

$$\pi_j = (1, 5, 6, 2, 3, 4)$$
$$\pi_j^{-1} = (1, 4, 5, 6, 2, 3)$$
$$\bar{\pi} = (5, 1, 3, 2, 6, 4)$$
$$\bar{\pi}^{-1} = (2, 4, 3, 6, 1, 5)$$

	1	2	3	4	5	6
1	–	–	–	–	1	–
2	–	–	1	–	–	–
3	–	–	–	–	–	–
4	–	–	–	–	–	–
5	–	–	–	–	–	–
6	–	1	1	–	–	–

Table 1: Calculating the normalized Kemény distance: element (p, q) is 1 indicates a reverse order between p and q for π_j and $\bar{\pi}$.

Kemény distance expresses the probability that the respondent gives an *incorrect* left-right ordering for those two parties. On the other hand, its simplicity carries some disadvantages. Most importantly, it treats mistakes in the orderings of any two parties equally. However it could be argued that the correct relative placement of large parties is a much more important factor of party system expertise than that of small, marginal parties. Another drawback is that it disregards the ideological distance of the incorrectly ordered parties. Being mistaken about parties that are ideologically close reflects systemic noise, rather than the lack of party system expertise. With the present approach, these features can be incorporated as a set of weights in the calculation of the party system expertise, turning some limitations into potentially interesting substantive tests (see for more details Méder, Vegetti, & Fazekas, 2015). For our current data set, however, accounting for these limitations has merely a marginal effect on the empirical results of this paper, with no substantive implications.

We can now return to the problem of ties. Respondents were asked to place parties to integer positions on a $[0, 10]$-scale. Thus, several parties could be placed to identical positions, leading to a not necessarily strict left-right ordering of parties. Several tie-breaking rules can be used to generate a strict ordering from a non-strict one (Fortunato et al., 2015). It can be assumed that in all such cases, the respondent got the objective ordering of parties correctly or incorrectly. However, because our data is discrete, this would lead to biasing if favor of responses in *less* polarized party systems, as in that case, we can expect a larger share of the parties to occupy the same position. A more fair stochastic procedure allows for generating a compatible strict order from

the responses using randomization. However, we wanted to avoid introducing noise to our data, therefore, we took the average of the distances of all strict orders compatible with the responses to the objective order. This is equivalent to taking the average of the minimum and the maximum distances between the response-compatible and the objective orders.

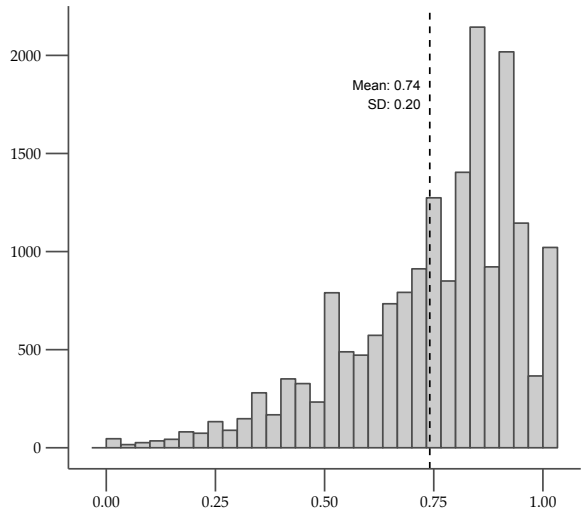


Figure 1: Party system expertise–Distribution of party system expertise.

To assure a more intuitive interpretation of our index of party system expertise, we report the reversed version of the measure described above ($1 - \delta_K$), thus 0 stands for a complete mismatch (or no expertise), whereas 1 for full accordance with the experts (maximum expertise). Figure 1 shows the overall distribution of our outcome variable (separate country level distributions are displayed in Appendix 1).

Individual level factors

The central individual level predictor is general political knowledge (political knowledge from now on). We measure political knowledge using a battery of seven True or False questions included in the EES 2009 data. The questions asked are identical in all countries (with inserted country specific information). Correct answers were assigned the score of 1, whereas incorrect answers or 'don't know' answers, 0. Throughout

the paper, we will use the sum of correct answers to these seven questions for each individual as the measure of political knowledge.[5]

Our final models include a set of explanatory variables regarded as controls. Based on prior literature it would be possible to formulate hypotheses for some of these individual features, however, we treat them currently as *controls* in our multivariate models. Additionally, we do not model potential cross-country variation of the coefficients estimated for these predictors. Following the triad model (Delli Carpini & Keeter, 1996; Luskin, 1987, 1990), we include interest in politics (*To what extent would you say you are interested in politics? Very, somewhat, a little, or not at all?*, ranging from 0 = not at all to 1 = very) as proxy for motivation and the respondent's level of education (coded as 0 = pre-primary/primary/lower-secondary education, 1 = upper-secondary/post-secondary education, 2 = first or second-stage tertiary education) as proxy for ability. These are the two fundamental knowledge relevant controls. Furthermore, we include a dichotomous predictor for whether the respondent feels close to a party (*Do you consider yourself to be close to any particular party? If so, which party do you feel close to?*, 0 = no, does not feel close to any party, 1 = if any party reported), in order to capture some potential differences between partisans and non-partisans. As gender and age differences–both substantively and from a measurement perspective–in terms of political knowledge or political engagement are well documented in the literature (see for example Dolan, 2011; Mondak & Anderson, 2004), we include a control for gender (1 for women) and the respondent's age. Descriptive statistics for these variables are reported in Appendix 4.

Macro level

Our main predictor at the contextual level, party polarization, is calculated by taking the average party positions on the left-right as perceived by the respondents in our sample. These estimates of party positions are arguably the most proximate to the voters' perceptions, and therefore they should impact on their attitudes and behaviors

[5]See Appendix 3 for the question wording and reliability tests for the index.

more directly than alternative measures, such as expert estimations or content analysis of party manifestos. For this reason, they are widely employed by studies interested in macro-level measures of party polarization (among many others see Dalton, 2008; van der Eijk et al., 2005). The party weights reflect the vote share of each party based on the current elections and aim to capture a party's relative importance at the moment of the interview. We restrict our polarization measure calculation to the parties that were included in the expert survey, and the vote shares used as weights were normalized such as their sum in one country equals 1.[6] More formally, party polarization for a party system with K number of parties is defined as:

$$\text{Polarization} = \sum_{i=1}^{K} w_i |LR_i - \overline{LR}|$$

where:

$\overline{LR}$ = the weighted mean of the parties' placement on the left-right scale;

LR_i = the position of party i on the left-right scale;

W_i = the weight attached to party i, given by its relative vote share at the time of the election observed.

Statistical model

We have a sample of n individuals in J countries. Based on our theory, the effect of knowledge is expected to vary across countries, and this variance–together with the variation of the country mean expertise scores–will be modeled as a linear function of party polarization, a country-level predictor. This is a rather straightforward cross-level interaction model. Along knowledge, we include M additional control variables at the individual level (detailed above). In the notation of our statistical model, we follow Gelman and Hill (2007) and use the following general hierarchical model specification for K varying coefficients and L country-level predictors:

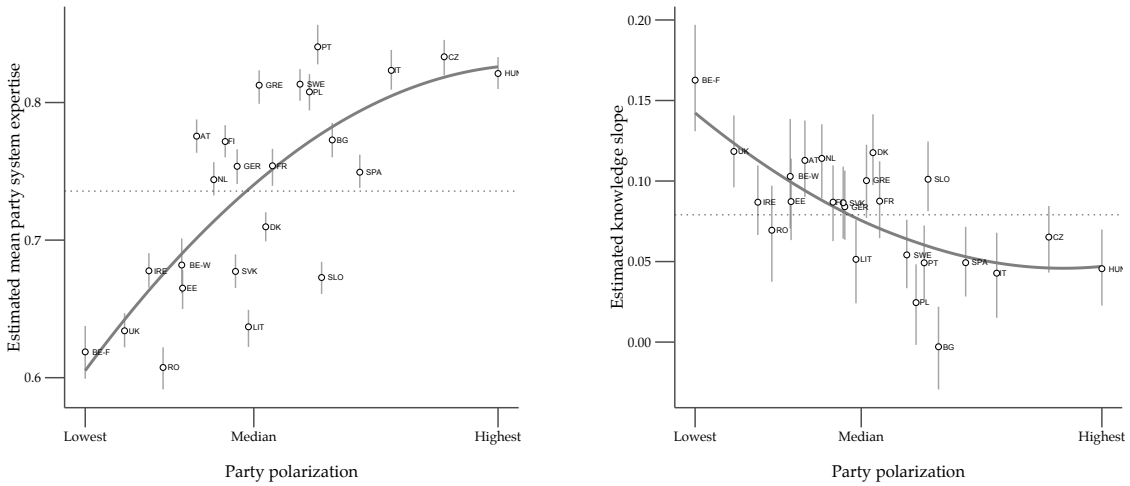
[6] This decision does not influence our results in any way: for a polarization measure calculated using **all** parties included in the voter survey our results are identical.

$$\begin{aligned} \text{party expertise}_i &\sim N(X_i^0\beta^0 + X_i B_{j[i]}, \sigma_y^2), \text{ for } i = 1, \ldots, n \\ B_j &\sim N(U_j G, \Sigma_B), \text{ for } j = 1, \ldots, J \end{aligned}$$

where X is an $n \times K$ matrix of predictors (including intercept, 1); B is the $J \times K$ matrix of individual-level coefficients, U is the $J \times L$ matrix of country-level predictors (including intercept, 1), and G is the $L \times K$ matrix of country-level coefficients (including grand-means). X^0 is the $n \times M$ matrix of predictors with unmodeled individual-level coefficients, and β^0 is the vector of coefficients (with length of M), constant across countries. Finally, Σ_B is the $K \times K$ variance-covariance matrix.

This model is estimated in a Bayesian framework, whose main advantages–especially for cross-country comparisons with few group-level observations– reviewed extensively elsewhere (see Jackman, 2009; Gelman et al., 2014; Stegmueller, 2013). One particular aspect of this framework is the need for specifying prior distributions for the model parameters estimated. In order to reflect the idea that we do not have any strong prior expectations about the parameters estimated, we use noninformative priors for all parameters of the model. Accordingly, for all coefficient type parameters we use a normal prior with mean of 0 and standard deviation of 100 and for the variance parameter priors we use a uniform distribution defined on the range $(0, 100)$ (see Gelman, 2006; Gelman et al., 2014). We also model the correlated residuals at the country-level (for the random intercept and slope), using a scaled inverse-Wishart covariance prior (with identity scale-matrix and 3 degrees of freedom).

In order to facilitate interpretation, comparison of coefficient magnitudes, and get cleaner estimates for the varying slope, all individual-level predictors were group-mean centered and divided by two standard deviations (Enders & Tofighi, 2007; Gelman & Hill, 2007). The country-level predictor was mean centered and also divided by two standard deviations.



(a) The (unmodeled) relationship between party polarization and estimated mean (mean posterior distribution) party system expertise. Point ranges are 95% credible interval.

(b) The (unmodeled) relationship between party polarization and estimated knowledge slope (mean posterior distribution) for party system expertise. Point ranges are 95% credible interval.

Figure 2: Cross-country variation and contextual factors

Results

We start our analyses simple and fit a baseline model (varying intercept) to better understand the cross-country differences in expected average party system expertise. Next, we fit a varying intercept and varying slope model where political knowledge is the sole predictor of party system expertise. These two initial models help us evaluate the cross-country differences in terms of the party system expertise and its relationship with political knowledge, and they are displayed together with party polarization in Figure 2.

We find that, indeed, the estimated levels of party system expertise are higher in more polarized systems. Conversely, we find that the relationship between political knowledge and party system expertise is weaker in the aforementioned systems.[7] These are only suggestive baseline analyses as party polarization was not included as a predictor in these models, we simply cross-referenced the estimated country-means for expertise (model based) with the observed party polarization scores.

[7]The correlation estimate between the country level variance parameters is $\rho = -0.443$ (95% credible intervals: $-0.740, -0.053$).

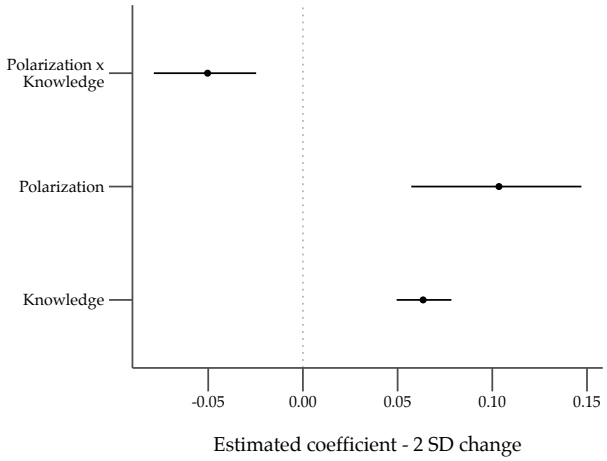


Figure 3: Results summary–Estimated effect of knowledge, polarization and interaction of these two on party expertise. Point are the mean posterior distribution, lines are 95% credible interval.

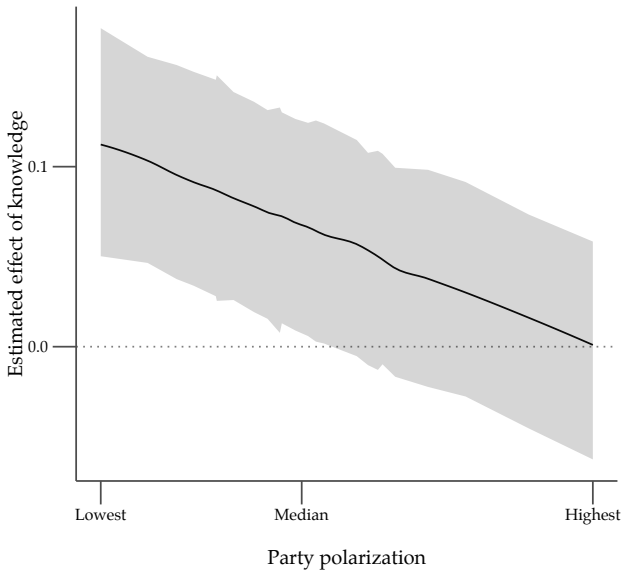


Figure 4: Changing effect of political knowledge–Estimated effect of knowledge on party expertise as a function of party polarization. Solid line for mean posterior distribution, shaded area 95% credible interval.

To assess our hypotheses in a more rigorous manner, we fitted the model described in the previous section to the data with the relevant results displayed in Figure 3, whereas full model results reported in Appendix 5. We find reinforcement that, on average, party expertise is higher in more polarized countries (Availability hypothesis), more knowledgeable individuals are expected to have better expertise, but the role of

knowledge diminishes in polarized party systems (see also Figure 4).

This translates into the following overall finding: in more polarized countries between individual differences for more knowledgeable compared to less knowledgeable citizens are smaller (Less is enough hypothesis). To put it differently, while in less polarized systems general political knowledge translates more directly into political supply relevant expertise that ultimately informs electoral decisions, in polarized party systems general knowledge differences are less likely to explain why some people do better at ideologically sorting the parties competing for their votes.

Robustness checks

One alternative explanation for the positive correlation between party polarization and citizens' party system expertise is that the observed effect is mechanical. Polarization is observed using aggregates of party positions based on the perceptions of the respondents in the sample. One could argue that greater party polarization measured in this way implies less overlap between perceived party positions. Thus, in more polarized contexts, people are obviously less likely to mistake the ordering of the parties. This would also translate into a mechanism that is not driven by the salience of the given dimension on which we measure polarization, but more by a certain *ease* of positioning the parties. In order to consider this explanation, for each political system we have calculated the distances between a party and its ideologically closest neighbor. We then calculated the average of these neighbor distances for a political system. We used the expert left-right positions of the parties to calculate this measure and re-specified our main model including the *average neighboring distance* as a country-level predictor of party expertise and the slope of knowledge.

Secondly, while we found no worrisome aspects related to the measurement of political knowledge (see Appendix 3), there are undoubtedly systematic differences in the reliability of the measure across countries, with better reliability in more polarized systems. Thus, we re-specified our main model, including as a country-level predictor the polychoric Cronbach's alpha score of knowledge. We use this measure as a predictor

for both party system expertise and the slope of knowledge.

Finally, one factor that should correlate with citizens' party system expertise in a given context is the 'fluidity' of the party system, that is, how often new parties enter into the arena and how often known parties disappear. Clearly enough, in some political systems people are used to see the same parties over the years, and thus they have more time and chances to make an accurate assessment of their ordering. In other contexts, however, parties can change so frequently that is very hard for the citizens to keep track of who is to the left or right of whom. To control for this difference, we create a country-level variable that measures the median party age in each political system. Party age is calculated for each party as a difference in years between 2009 and the time they first obtained at least 1% of vote share in national elections. This is by no means a perfect measure. As Litton (2013) argues, calculating party age is not a trivial issue with its own complexities. While a rough and aggregated measure, it suffices for the purposes of a robustness check. In general, citizens evaluating a system with preponderantly older parties should be better able to sort them correctly, regardless the level of polarization. Identical to the previous two models, we use the median party age in a system as a second level predictor for both our outcome variable and the slope of knowledge. We report the relevant robustness check results from these three models with additional macro level predictors in Figure 5 and full results table in Appendix 6.

These results indicate that once neighboring parties are more distant from each other on the left-right continuum, the average expertise is higher, possibly because of less difficulty, or more clarity. However, this distance does not influence the role of knowledge in the model and our results regarding polarization still hold, but the magnitude decreases. This suggests that indeed, polarization might also capture some difficulty related features in terms of party supply positioning. This test is not yet ideal, as naturally, the two country-level predictors are correlated ($\rho = 0.61$), so multi-collinearity issues can play a role here. Nevertheless, at their face-value, these results

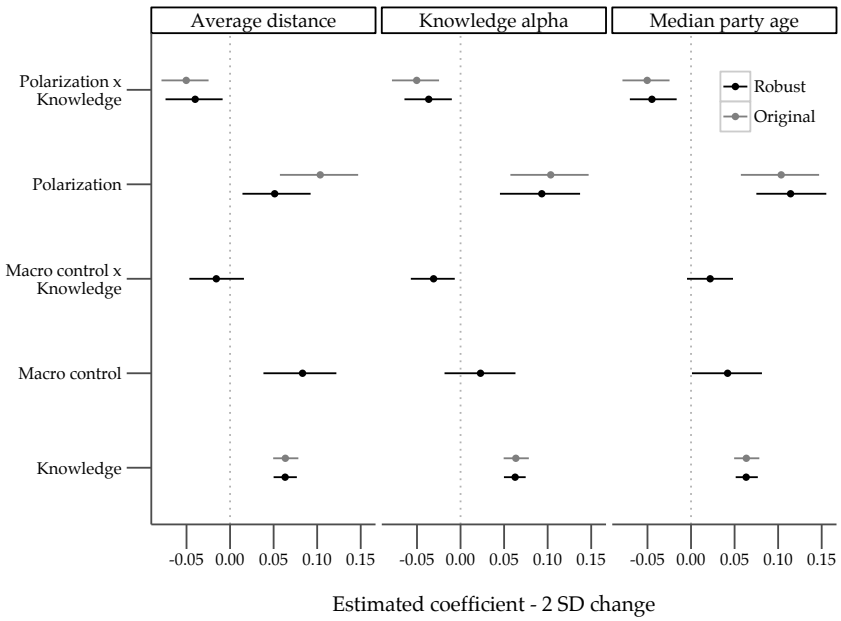


Figure 5: Robustness check summary–Parameter estimates (mean posterior distribution) and 95% credible interval for three robustness checks. Estimates from the our final model in the previous section are displayed with grey in order to facilitate comparison.

give us further belief in the robustness of our findings.[8]

We see that our results hold when it comes to incorporating knowledge measurement related aspects, but yet again, in this case the polarization interaction effect is slightly diminished. Furthermore, our model indicates that with better knowledge measurement we also find weaker effects in terms of translation of political knowledge into party expertise. Finally, on average, individuals have better expertise in party systems with older competing parties, while the role of knowledge does not appear to change as a function of party age.[9] Most importantly, in all robustness checks the new point estimates for our predictors of interest (polarization and knowledge) are only slightly different from the original ones, with overlapping uncertainty.

[8]Following the same logic of accounting for the 'ease' or 'difficulty' of placing parties, we specificed a model including as a second level predictor of the intercept and the knowledge slope the effective number of parties in a given political system. Our substantive results are unchanged: polarization 0.103(0.023), knowledge 0.063(0.006), effective number of parties −0.001(0.023), knowledge × polarization −0.046(0.014), and knowledge × effective number of parties 0.012(0.014).

[9]We have used three other operationalizations for party age (mean age, vote share weighted mean age, and a measure for youngest party [in years]) and found that none of these alternative measures influenced the robustness of our results.

Conclusions

In their classic essay on voting behavior, Berelson et al. (1954, p. 308) picture their ideal democratic citizen as someone who knows "what the issues are, what their history is, what the relevant facts are, what alternatives are proposed, what the party stands for, what the likely consequences are". While this view can be easily regarded as way too optimistic by anyone familiar with the last 60 years of research on political knowledge, there are subjects and circumstances where the citizens seem to show considerable proficiency. In this study we focus on party system expertise, a specific type of political knowledge that reflects people's understanding of what 'alternatives are proposed' and what 'the party stands for', as well as their shared comprehension of how parties' views translate into abstract positions on a political dimension (in our case, the left-right). The measurement that we propose, which focuses on respondents' ability to sort political parties in the same way as political experts do, reveals that European citizens have, on average, a fairly good understanding of where parties stand on the left-right (at least in terms of sides). Moreover, our statistical models show that citizens' expertise varies to a large extent as a function of *how* parties compete. In particular, we show that a more polarized political competition makes it easier for the citizens to see what the parties stand for, reducing the amount of information required to obtain the same degree of understanding in less polarized environments.

Our work contributes to the substantive discourse on the impact of the political context on citizens' attitudes and behaviors in several ways. First, our findings suggest that citizens can easily gain considerable expertise about the aspects of the political discourse that are most relevant in their context. In this sense, polarization relates directly to party system expertise as in highly conflictual contexts, such as in conditions of deep ideological disagreement, the focus of the debate is typically on the actors, rather than on the matter of disagreement. Thus, it is relatively straightforward to expect that the news reaching the citizens, as well as the notions that are most relevant for their common conversations about politics, will be mostly party-related.

Second, comparative research on spatial voting (Fazekas & Méder, 2013; Pardos-Prado & Dinas, 2010, 6; Singh & Roy, 2014) includes general political knowledge in the empirical models investigating the prevalence and the type of spatial voting in European democracies. This paper further refines those positive findings: if the most important knowledge for an *accurate* use of spatial preference formation and voting pertains the party supply, then the magnifying effect of polarization observed by such studies (see also Lachat, 2008) can be interpreted as an *information effect*. As citizens have a better understanding of the party positions, they will feel more confident in relying on them while making a choice. Of course, knowledge about *relative* party positions might affect some types of voting more than others: this might be the case of directional voting, where voting utilities are a direct function of party sorting. Proximity voting, on the other hand, would require an additional degree of sophistication, namely the ability to recognize *absolute* party positions. Whether this is the case, that is, whether party system expertise enhances to a larger extent proximity or directional voting, is an empirical question that we leave to further investigation. Finally, this study contributes to the literature on political knowledge in comparative perspective by discussing a valid and intuitive measure of party system expertise. Through the use of this measure, our findings are also valuable as they indicate under which particular political contexts is party expertise a more independent dimension of knowledge, and where does it integrate closely with general political knowledge. By discussing this measure, we also set up a potential measurement framework through which more refined operationalizations can help future research in testing empirically individual-level theories of party expertise. The next step will be then to assess how this type of knowledge performs as compared to general political knowledge when it gets to help the citizens make meaningful choices in democratic elections.

References

Adams, J., Merrill, S., & Grofman, B. (2005). *A unified theory of party competition. A cross-national analysis integrating spatial and behavioral factors*. New York: Cambridge University Press.

Althaus, S. L. (1998). Information effects in collective preferences. *American Political Science Review*, *92*(3), 545–558.

Alvarez, M. R. & Nagler, J. (2004). Party system compactness: Measurement and consequences. *Political Analysis*, *12*(1), 46–62.

Arnold, J. R. (2012). The electoral consequences of voter ignorance. *Electoral Studies*, *31*, 796–815.

Bakker, R., De Vries, C., Edwards, E., Hooghe, L., Jolly, S., Marks, G., ... Vachudova, M. A. (2012). Measuring party positions in Europe: The Chapel Hill expert survey trend file, 1999–2010. *Party Politics*, *EarlyView*.

Barabas, J. & Jerit, J. (2009). Estimating the causal effects of media coverage on policy-specific knowledge. *American Journal of Political Science*, *53*(1), 73–89.

Barabas, J., Jerit, J., Pollock, W., & Rainey, C. (2014). The question (s) of political knowledge. *American Political Science Review*, *Forthcoming*.

Bartels, L. M. (1996). Uninformed votes: information effects in presidential elections. *American Journal of Political Science*, *40*(1), 194–230.

Berelson, B., Lazarsfeld, P. F., & McPhee, W. N. (1954). *Voting: a study of opinion formation in a presidential campaign*. Chicago: University of Chicago Press.

Brody, R. A. & Page, B. I. (1972). The assessment of policy voting. *American Political Science Review*, *66*(2), 450–458.

Burak, C. (2014). Weighted distances between preferences. *Journal of Mathematical Economics*, *51*, 109–115.

Carmines, E. G. & Stimson, J. A. (1986). On the structure and sequence of issue evolution. *American Political Science Review*, *80*(3).

Converse, P. (1964). The nature and origin of belief systems in mass publics. In D. Apter (Ed.), *Ideology and discontent* (pp. 206–261). New York: Free Press.

Curran, J., Iyengar, S., Lund, A. B., & Salovaara-Moring, I. (2009). Media system, public knowledge and democracy: A comparative study. *European Journal of Communication*, *24*(1), 5–26.

Dalton, R. J. (2008). The quantity and the quality of party systems. *Comparative Political Studies*, *41*(7), 899–920.

Dalton, R. J. (2011). Left-right orientations, context, and voting choices. In R. J. Dalton & C. J. Anderson (Eds.), *Citizens, context, and choice. how context shapes citizens' electoral choices*. Oxford, UK: Oxford University Press.

Delli Carpini, M. X. & Keeter, S. (1993). Measuring political knowledge: Putting first things first. *American Journal of Political Science*, *37*(2), 1179–1206.

Delli Carpini, M. X. & Keeter, S. (1996). *What Americans know about politics and why it matters*. New Haven, CT: Yale University Press.

Dolan, K. (2011). Do women and men know different things? measuring gender differences in political knowledge. *Journal of Politics*, *73*(01), 97–107.

Downs, A. (1957). *An economic theory of democracy*. New York: Harper and Row.

Enders, C. K. & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: a new look at an old issue. *Psychological Methods*, *12*(2), 121–138.

Ensley, M. J. (2007). Candidate divergence, ideology, and vote choice in U.S. Senate elections. *American Politics Research*, *35*(1), 103–122.

Fazekas, Z. & Méder, Z. Z. (2013). Proximity and directional theory compared: taking discriminant positions seriously in multi-party systems. *Electoral Studies*, *32*(4), 693–707.

Fortunato, D. & Stevenson, R. T. (2013). Perceptions of partisan ideologies: The effect of coalition participation. *American Journal of Political Science*, *57*(2), 459–477.

Fortunato, D., Stevenson, R. T., & Vonnahme, G. (2015). Context and political knowledge: Explaining cross-national variation in partisan left-right knowledge. *Working Paper*.

Fraile, M. (2013). Do information-rich contexts reduce knowledge inequalities? The contextual determinants of political knowledge in Europe. *Acta Politica*, *48*(2), 119–143.

Galston, W. A. (2001). Political knowledge, political engagement, and civic education. *Annual Review of Political Science*, *4*, 217–234.

Gelman, A. (2006). Prior distributions for variance parameters in hierarchical models. *Bayesian Analysis*, *1*(3), 515–534.

Gelman, A., Carlin, J. B., Stern, H. S., Dunson, D. B., Vehtari, A., & Rubin, D. B. (2014). *Bayesian data analysis*. Boca Raton, FL: CRC press.

Gelman, A. & Hill, J. (2007). *Data analysis using regression and multilevel/hierarchical models*. Cambridge, New York: Cambridge University Press.

Gilens, M. (2001). Political ignorance and collective policy preferences. *American Political Science Review*, *95*(2), 379–396.

Gordon, S. B. & Segura, G. M. (1997). Cross-national variation in the political sophistication of individuals: Capability or choice? *Journal of Politics*, *59*(1), 126–147.

Grönlund, K. & Milner, H. (2006). The determinants of political knowledge in comparative perspective. *Scandinavian Political Studies*, *29*(4), 386–406.

Hamill, R., Lodge, M., & Blake, F. (1985). The breadth, depth, and utility of class, partisan, and ideological schemata. *American Journal of Political Science*, *29*(4), 850–870.

Jackman, S. (2009). *Bayesian analysis for the social sciences*. Chichester, UK: John Wiley & Sons.

Jerit, J., Barabas, J., & Bolsen, T. (2006). Citizens, knowledge, and the information environment. *American Journal of Political Science*, *50*(2), 266–282.

Key, V. (1966). *The responsible electorate. Rationality in presidential voting 1936-1960*. Cambridge: Harvard University Press.

Kroh, M. (2009). The ease of ideological voting: Voter sophistication and party system complexity. In H.-D. Klingemann (Ed.), *The comparative study of electoral systems*. New York: Oxford University Press.

Lachat, R. (2008). The impact of party polarization on ideological voting. *Electoral Studies*, *27*(4), 687–698.

Lachat, R. (2011). Electoral competitiveness and issue voting. *Political Behavior*, *33*(4), 645–663.

Litton, K. (2013). Party novelty: Conceptualization and measurement of party change. *Party Politics*, *FirstView*, 1–14.

Luskin, R. C. (1987). Measuring political sophistication. *American Journal of Political Science*, *31*(4), 856–899.

Luskin, R. C. (1990). Explaining political sophistication. *Political Behavior*, *12*(4), 331–361.

Méder, Z. Z., Vegetti, F., & Fazekas, Z. (2015). Measuring party system expertise in multi-party systems. *Working Paper.*

Mondak, J. J. & Anderson, M. R. (2004). The knowledge gap: A reexamination of gender-based differences in political knowledge. *Journal of Politics*, *66*(2), 492–512.

Pardos-Prado, S. & Dinas, E. (2010). Systemic polarisation and spatial voting. *European Journal of Political Research*, *49*, 759–786.

Popa, S. A. (2013). Political sophistication in Central and Eastern Europe: how can parties help? *Party Politics*, *Forthcoming*.

Popkin, S. L. & Dimock, M. A. (1999). Political knowledge and citizen competence. In S. L. Elkin & K. E. Soltan (Eds.), *Citizen competence and democratic institutions* (pp. 117–146). University Park, PA: The Pennsylvania State University Press.

Prior, M. & Lupia, A. (2008). Money, time, and political knowledge: Distinguishing quick recall and political learning skills. *American Journal of Political Science*, *52*(1), 169–183.

Rabinowitz, G. & MacDonald, S. E. (1989). A Directional Theory of Issue Voting. *American Political Science Review*, *83*(1), 93–121.

Shaker, L. (2012). Local political knowledge and assessments of citizen competence. *Public Opinion Quarterly*, *76*(3), 525–537.

Singh, S. P. & Roy, J. (2014). Political knowledge, the decision calculus, and proximity voting. *Electoral Studies*, *34*, 89–99.

Stegmueller, D. (2013). How many countries for multilevel modeling? a comparison of Frequentist and Bayesian approaches. *American Journal of Political Science*, *57*(3), 748–761.

van der Eijk, C., Schmitt, H., & Binder, T. (2005). Left-right orientation and party choice. In J. Thomassen (Ed.), *The European voter. A comparative study of modern democracies* (pp. 167–191). Oxford, UK: Oxford University Press.

van Egmond, M., van der Brug, W., Hobolt, S., Franklin, M., & Sapir, E. V. (2009). European Parliament Election Study 2009, Voter Study (v2). http://data.eui.eu/RSCAS/EUDO/piredeu/10026. doi:10.4232/1.10202

Vegetti, F. (2014). From political conflict to partisan evaluations: how citizens assess party ideology and competence in polarized elections. *Electoral Studies*, *35*, 230–241.

Weith, P. T. & Toka, G. (2011). The influence of question format on the reliability of political knowledge scales. *Conference paper Political Psychology Networking Conference for the Post-Communist Region, Budapest.*

Zaller, J. R. (1992). *The nature and origins of mass opinion.* Cambridge, UK: Cambridge University Press.

Appendices

Supplementary materials for "Sorting your way out: Perceived party positions, political knowledge and polarization".

1 Country level descriptive statistics

System	Parties	N	Pol. Info	Alpha	CFI	RMSEA
AT	6	846	4.63	0.72	0.94	0.05
BE-F	9	392	3.57	0.57	0.67	0.10
BE-W	5	322	3.66	0.65	0.84	0.07
BG	7	665	3.95	0.84	0.99	0.03
CZ	5	834	3.81	0.73	0.95	0.05
DK	7	916	4.87	0.73	0.98	0.03
EE	6	657	4.30	0.62	0.90	0.05
FI	8	849	4.45	0.69	0.98	0.03
FR	7	717	4.20	0.75	0.97	0.04
GER	5	811	4.18	0.74	0.88	0.08
GRE	6	875	4.46	0.69	0.95	0.04
HUN	6	814	4.12	0.74	0.95	0.05
IRE	5	860	3.92	0.73	0.98	0.03
IT	7	619	3.90	0.67	0.93	0.04
LIT	10	702	4.08	0.66	0.83	0.08
NL	10	874	4.29	0.75	0.97	0.04
PL	4	712	3.62	0.78	0.98	0.04
PT	5	760	4.36	0.83	0.99	0.03
RO	6	555	3.04	0.74	0.98	0.03
SLO	8	833	4.79	0.76	0.97	0.04
SPA	10	814	3.14	0.75	0.97	0.04
SVK	8	798	4.13	0.73	0.99	0.02
SWE	8	888	4.83	0.74	0.96	0.04
UK	8	843	3.40	0.70	0.97	0.03

Table 1.1: Country descriptive statistics–Party: number of parties in both voter and expert survey. Pol. Info = average level of political information. Alpha = Cronbach's alpha for the knowledge battery (polychoric). CFI = comparative fit index for a one-factor confirmatory model (robust estimate, ordered categorical). RMSEA = root mean square average error from the same confirmatory factor model.

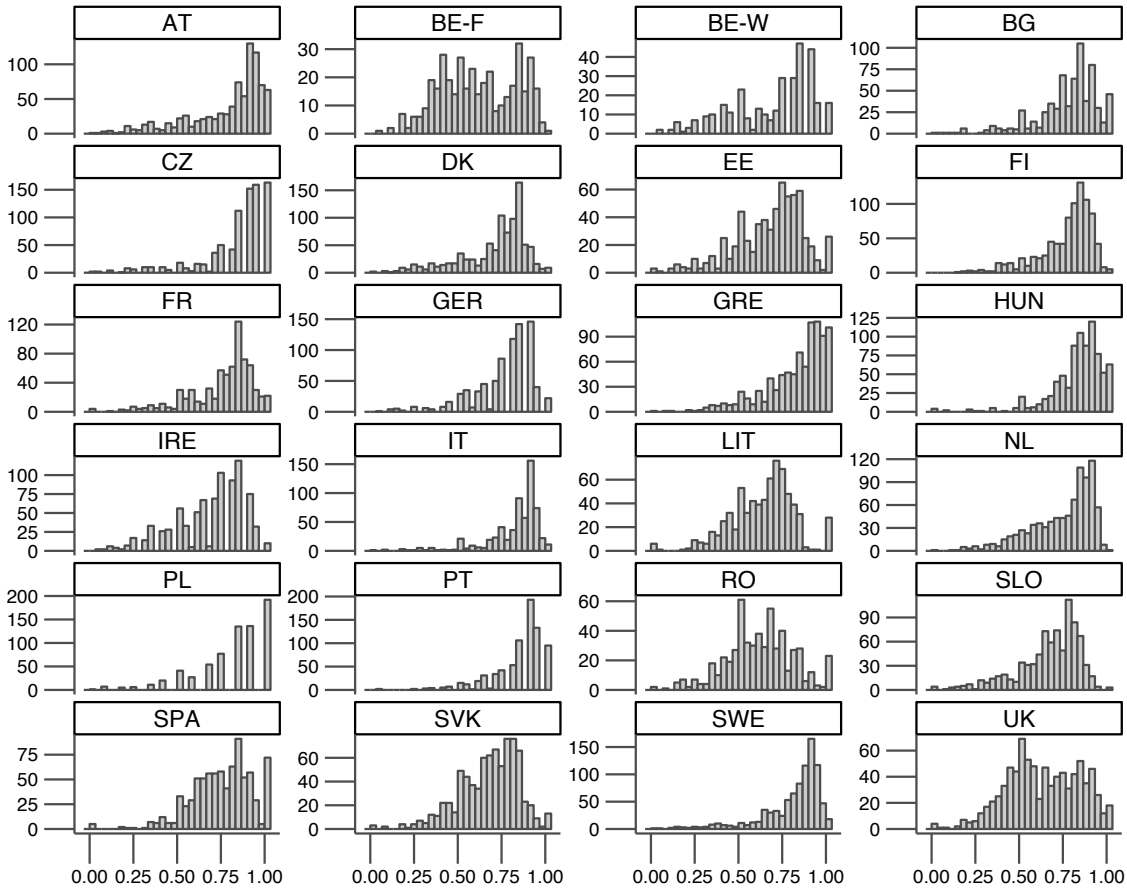


Figure 1.1: Distribution of party system expertise measure for each country separately. Values on the y-axes are counts, with units of observation being respondents. Note that the y-axes vary in order to facilitate visualization (especially given the smaller sample sizes in the two Belgian systems).

2 Placement wording

As discussed in the paper, for each party, the expert party position is calculated as a simple average across all experts from a country that positioned the party in question, where the original task was formulated as follows:

We now turn to a few questions on the ideological positions of political parties in [COUNTRY] in 2010. Please tick the box that best describes each party's overall ideology on a scale ranging from 0 (extreme left) to 10 (extreme right).

For each voter, we use the reported party placement. For this item, the order in which parties were presented to respondents was randomized. These will serve as input for the calculation of the party expertise measure, and the original question wording is:

How about the (Party X)? Which number from 0 to 10, where 0 means 'left' and 10 means 'right' best describes (Party X)?

3 Knowledge operationalization

The seven political knowledge items in the EES were as follows.

- Switzerland is a member of the EU.
- The European Union has 25 member states.
- Every country in the EU elects the same number of representatives to the European Parliament.
- Every six months, a different Member State becomes president of the Council of the European Union.
- The [Specific Minister] is [Correct name].
- Individuals must be 25 or older to stand as candidates in [COUNTRY] elections.
- There are [150% of real number] members of the [COUNTRY Parliament].

Given the binary nature of the knowledge indicators, we use modified version of the original Cronbach's alpha (Weith & Toka, 2011). The reliability score is calculated as $\frac{kr}{1+(k-1)r}$, where k is the number of items, and r is the average inter-item polychoric correlation. The polychoric Cronbach's alpha of these 7 items for the pooled sample is 0.72. We have also fit a one-factor confirmatory model (items treated as ordered categorical, robust estimator) to the pooled data that yielded good fit: CFI = 0.962, RMSEA = 0.041 (90% CI, 0.038, 0.045). However, as displayed also in Appendix 1, there is variation across countries in terms of reliability. Our main concern was to rule out the possibility that in countries with more polarization our individual level predictor measurement is less reliable, biasing our results. However, as reported here in Figure 3.1 , we found the opposite.

While we have no reason to expect any systematic relationship between these two quantities, and ideally there should not be one, our data indicates that if anything, our political knowledge measurement is more reliable in polarized party systems (or the

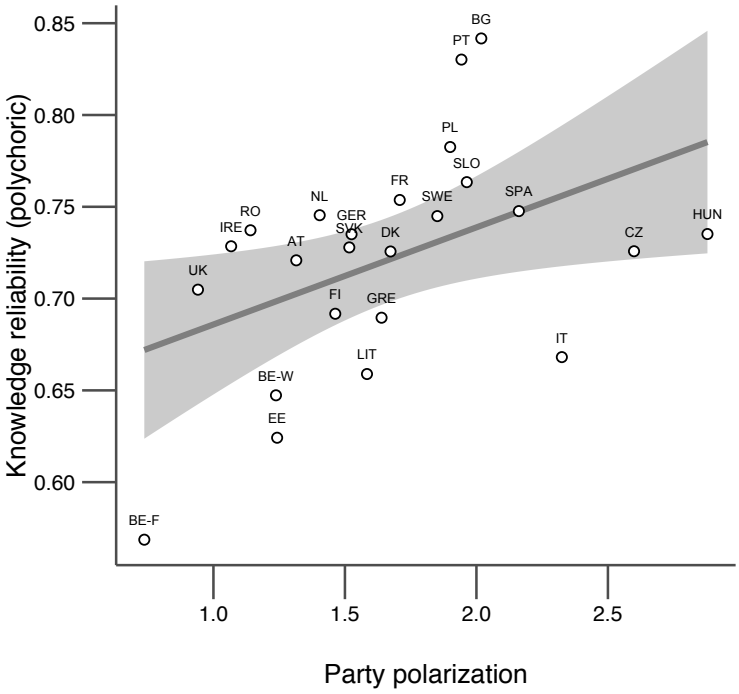


Figure 3.1: The relationship between party polarization and political knowledge battery reliability, Cronbach's alpha. The line represents a simple bivariate linear regression model, with shaded area for 95% confidence interval.

reliability measure overestimates reliability in these countries). In sum, we believe that our knowledge measurement is appropriate for the analysis [as also used by (Fraile, 2013), with some cross-country variation to which we will refered back in the the **Robustness checks** section.

We have also considered a two-factor solution, explicitly separating the four EU related items from those related to national politics, but we faced convergence issues with this confirmatory model. However, we calculated (and rescaled to range from 0 to 1) separate summed indexes using only EU and national knowledge questions. The pooled EU knowledge mean is 0.59, national politics knowledge mean is 0.60, and while the difference is statistically significant, we consider the magnitude of the difference unsubstantial (0 to 1 scale). We have also looked at each country separately, finding diverging patterns: in 5 countries no statistically significant difference, in 10 countries higher national political knowledge, and in the remaining countries higher

EU knowledge. Yet again, in terms of magnitude these differences are not substantial. More importantly, we checked whether there is a significant relationship between party polarization and the differences in topical (EU vs. national) knowledge scores at the country level, and found no indication of that. This suggests that it is unlikely to find individuals who systematically do better only on a subset of topically linked items. Furthermore, we believe that the items included in the survey were also meant to establish that in 2009 in European countries, a valid representation of one's level of political knowledge should include aspects related to the European Union.

4 Descriptive statistics for predictors

Variable	Mean	SD	Min	Max	N
Political interest	1.63	0.87	0.00	3.00	17956
Political Knowledge	4.12	1.78	0.00	7.00	17956
Age	50.48	16.72	18.00	96.00	17956
Gender (Female = 1)	0.53	0.50	0.00	1.00	17956
Education	1.32	0.61	0.00	2.00	17956
Party identifier	0.44	0.32	0.00	1.00	17956

Table 4.1: Predictor descriptive statistics

5 Results (table format)

	Party system expertise
Polarization	0.102
	0.020
Knowledge	0.063
	0.007
Polarization × Knowledge	-0.051
	0.013
Gender (Female = 1)	-0.003
	0.003
Age	-0.014
	0.003
Education	0.039
	0.003
Political interest	0.019
	0.003
Party id.	0.008
	0.003
Grand mean expertise	0.734
	0.011
Standard deviation: Intercept	0.050
	0.007
Standard deviation: Slope	0.030
	0.005
Standard deviation: Residual	0.175
	0.001
N	17,956
Deviance	150790. 23
DIC	150844.00

Table 5.1: Model results–For each parameter we report the mean posterior distribition and the standard deviation of the posterior distribution below. In order to facilitate estimation (avoid low numerical ranges) and covergence, we specified the model on data where the outcome variable was multipled by 100, deviance and DIC are calculated on that scale. However, in terms of parameters we report values scaled back (divded by 100) to the original [0, 1] range of the outcome variable.

6 Robustness checks

	Distance	Reliability	Party age
Political knowledge	0.063	0.063	0.063
	0.007	0.006	0.006
Polarization	0.052	0.093	0.115
	0.020	0.023	0.020
Polarization × Knowledge	-0.040	-0.036	-0.045
	0.016	0.013	0.014
Macro control	0.082	0.023	0.042
	0.021	0.021	0.021
Macro control × Knowledge	-0.016	-0.030	0.022
	0.017	0.012	0.014
Gender (Female = 1)	-0.004	-0.004	-0.003
	0.003	0.003	0.003
Age	-0.014	-0.014	-0.014
	0.003	0.003	0.003
Education	0.039	0.039	0.039
	0.003	0.003	0.003
Political interest	0.019	0.019	0.019
	0.003	0.003	0.003
Party id.	0.008	0.008	0.008
	0.003	0.003	0.003
Grand mean expertise	0.734	0.735	0.735
	0.009	0.011	0.010
Standard deviation: Intercept	0.039	0.051	0.048
	0.006	0.008	0.007
Standard deviation: Slope	0.029	0.027	0.028
	0.006	0.005	0.006
Standard deviation:	0.175	0.175	0.175
	0.001	0.001	0.001
N	17,956	17,956	17,956
Deviance	1150790.90	150790.73	150791.10
DIC	150848.5	150851.5	150852.4

Table 6.1: Robustness checks–For each parameter we report the mean posterior distribition and the standard deviation of the posterior distribution below. In order to facilitate estimation (avoid low numerical ranges) and covergence, we specified the models on data where the outcome variables were multipled by 100, deviance and DIC are calculated on that scale. However, in terms of parameters we report values scaled back (divded by 100) to the original [0, 1] range of the outcome variable.