

## **It Is Not What You Know, It Is What You Make Of It:**

### **Direct and Indirect Effects of Cognitive Ability on Various Measures of Political Knowledge <sup>1</sup>**

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#### **Abstract:**

*It has become commonplace to use the ability-motivation-opportunity triad (Luskin, 1990) as a theoretical background for studies on political knowledge. Very little scholarly work was done in the direction of empirically testing the proposed model; more often than not, authors have chosen to operationalize the elements in the triad using suboptimal proxies readily available in large N surveys. Our paper introduces a direct measurement of cognitive ability and tests its applicability to the triadic model of knowledge acquisition. Our results suggest that the traditional operationalization of cognitive ability as education may produce inaccurate estimates of its effect on political knowledge. The use of a direct measure of cognitive ability allows us to fit the triadic model to the 2012 wave of the Dutch Vote Compass panel, specify meaningful interaction effects and shed light upon the directionality of the associations between the elements of the triad and the acquisition of political knowledge. Finally, we find that cognitive ability moderates the effect of motivation and opportunity on political knowledge; all effects are stronger for the high-ability subsample than for the low-ability one.*

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## Introduction

Normative theories of representative democracy claim that a politically knowledgeable populace is crucial for the functioning of democratic institutions, that democratic elections require informed decisions from the part of the citizens (Dahl, 1979). Our most basic intuitions tend to agree with such a claim; whoever knows the rules of the game, the players and their strategies, is more likely to play a good game or coach a good team. Far from being a strictly esoteric and high-brow idea, the need for a cognitively politically engaged citizenry resonates strongly in many if not all social strata. In the words of little Lisa Simpson from the popular TV show *The Simpsons*, “the price of freedom is eternal vigilance”. Whether political knowledge is indeed important for democracy is an empirical question that has been often addressed in the social scientific literature with various degrees of success.

Where does political knowledge come from? Who are the people who acquire political knowledge and what drives them to pay attention to political news and occupy their minds with political information? The classic model proposed by Robert Luskin (1990) links the acquisition of political knowledge to a triad of interconnected individual-level factors: citizens have different cognitive abilities to aid their understanding of politics, they are unequally motivated and do not have equal opportunities to get informed. Challenging the accuracy of the theoretical model is beyond the scope of this research paper; however, we question the validity of some subsequent operationalizations of the triad, namely the use of “education” as a proxy for cognitive ability (Carpini and Keeter, 1996).

We contend that the positive relationship between education and political knowledge, consistently reported in the political science literature, is not indicative of the association between cognitive ability and the acquisition of political knowledge. We argue that the pursuit of higher education is associated with more exposure to democratic socialization, making educated people more prone to acquire political knowledge. Without denying that cognitive ability assists citizens in their decision to get politically informed and in the process of acquiring and understanding political information, we assert that its effect is overestimated by the education proxy.

We designed a short cognitive ability test that we included in a panel survey conducted in the Netherlands with Kieskompas in March 2012 on a sample of 3466 respondents. We use regression models to test the capability – opportunity – motivation model; show that the effect of education on political knowledge remains when controlling for cognitive ability, and that there is very little

additional predictive power that cognitive ability adds to our models explaining political knowledge. Additionally, we find that the effects specified are highly interdependent even when replacing the education proxy with the more direct measure of cognitive ability.

### **Political Knowledge and the *Capability – Opportunity – Motivation* model**

Political knowledge refers to the amount of factually correct information stored in the conscious memory of citizens (Carpini and Keeter, 1996). As opposed to political attitudes or personal evaluations of things political, political knowledge concerns the degree to which the beliefs held by citizens conform to an objective or intersubjective political reality. That the European Union has 27 member states is a political fact that can constitute the content of a political knowledge quiz; however, that religion plays too strong a role in American politics is a subjective statement the correctness of which cannot be checked without resorting to subjective standards.

The utility of political knowledge is manifold and very well documented in the political science literature. More informed citizens are more likely to be aware of the political alternatives facing them (Fournier, 2002, Bartels, 2005; Sturgis and Smith, 2010) and to vote for parties and candidates who are politically closer to their personal political beliefs (Luskin, 1990; Fishkin and Luskin, 1999; Lau and Redlawsk, 2001; Lau et al., 2008). Even more importantly from a normative democratic point of view, levels of political information were often found to be significant predictors of the strength and direction of political attitudes, beliefs, vote choice on the individual level and election results on the aggregate level (Johnston et al, 1996; Bartels, 1996; Althaus, 1998; Fishkin and Luskin, 1999; Crampton, 2009).

The recent literature in the field contends that political knowledge springs from a triad of nonorthogonal factors that jointly contribute to most of the variation in knowledge across individuals: *capability* or ability – cognitive ability; *opportunity* and *motivation* (Luskin, 1990; Carpini and Keeter, 1996). The *capability – opportunity – motivation* (henceforth the triad) triad was proposed by Robert Luskin primarily as a theoretical model with the main purpose of clarifying conceptual aspects related to political knowledge (Luskin, 1990); its empirical use is often hindered by the scarcity of available data and the operational complexity of the concepts it employs.

One proxy commonly used for cognitive ability is the level of educational attainment, which explains up to half of the variance in political knowledge that we can account for. Opportunity refers to people's

exposure to political news and newspapers; while it is theoretically an environment-level variable (Luskin, 1990), it is often operationalized with variables related to news media consumption and socioeconomic status (Jerit, Barabas and Bolsen, 2006). Motivation refers to the eclectic set of incentives for acquiring political knowledge, offered by the social and political environment of citizens (Carpini and Keeter, 1996). The effect of such disparate factors may sometimes be direct (in which case it translates into “opportunity”, rather than motivation), but more often it is filtered through the subjective perceptions of citizens before it translates into behavioral outputs such as the acquisition of political knowledge. In this latter case we operationalize motivation as “political interest” which is, arguably, the main pathway through which the socio-political and economic environment can influence one's propensity to get politically informed (Lazarsfeld et al., 1948: 4; Campbell et al., 1960: 102; Van Deth, 2000; Miller and Rahn, 2002; and Delli-Carpini and Keeter, 1996)

It is worth noting that there is no established operationalization of the triad; while some would use education as a proxy for capability (Carpini and Keeter, 1996), others would look at SAT scores (Boudreau, 2009) or rely on the survey interviewers' assessments of the respondents' cognitive abilities (Bennett, 2002). Opportunity is a chiefly structural element of the triad; it incorporates the effects of the media environment (Hutchings, 2003) and of the position individuals hold in the social structure: gender, income, education (Jerit, Barabas and Bolsen, 2006). The more available political information is in one's environment, the more likely it is that they will become knowledgeable about political matters. Motivation may also overlap with opportunity and capability in its operationalization; while political interest is the measure of motivation generally agreed upon (Carpini and Keeter, 1996; Kwak, 1999), it is not uncommon to see it as a function of education and media consumption (Kwak, 1999).

### **The effect of education**

The association between educational attainment and various political behaviors, attitudes and the democratic desideratum is well documented in the political science literature. Educated people are more likely than their less educated peers to conform to most if not all democratic principles that the normative literature put forward throughout the years: educated people have a higher propensity to engage in all forms of political participation (Putnam, 2000), they express less prejudice towards minorities (Wagner and Zick, 1995) and are generally more politically knowledgeable than their uneducated or less educated counterparts (Converse, 1964; Carpini and Keeter, 1996). In light of these well corroborated empirical findings, Converse even concludes that all “positive” values, attitudes and

behaviors are fostered by high levels of educational attainment (Converse, 1972).

There is little doubt that higher education covaries with multiple democratic attitudes and behaviors; however, the evidence for a causal connection between the former and the latter is not conclusive. It can be argued that one's level of education is merely a reflection of their pre-adult socialization and experiences, social class and cognitive abilities. Hence, educational attainment may be merely a channel through which distal variables affect our outcomes of interest (Kam and Palmer, 2008). It comes as no surprise, thus, that education stands out so often in political science studies as a strong predictor of any given political attitude or behavior.

The questionable causality is particularly consequential in modeling the acquisition of political knowledge. Alongside political interest and education, political knowledge tends to correlate positively with democratic values and SES, but there is no straightforward theory or robust evidence for the direction of the causality underlying the relationships between these variables. The use of education as a proxy for cognitive ability in the triad hinders our ability to distinguish between the direct, indirect and spurious associations between the elements of the triad and produces inaccurate estimates of the effects of ability, motivation and opportunity on the acquisition of political knowledge. We therefore need to strip the model of the endogeneity caused by the ambiguous status of education in order to see how cognitive ability interacts with opportunity and motivation in influencing the acquisition of knowledge. We therefore propose a more direct measurement of cognitive ability that improves on the existing operationalization in terms of both construct and discriminant validity at the cost of a moderate loss of reliability.

### **Cognitive ability and the triad**

Cognitive ability is said to be one of the main determinants of political knowledge (Luskin, 1990) and, arguably, the most causally straightforward predictor of political literacy in general: political matters are often too esoteric and obscure for the population at large to grasp, understanding them often requires the assistance of cognitive faculties that are unequally distributed across individuals. Much like education (Johnson et al., 2009; Arceneaux et al., 2012) and political sophistication (Arceneaux et al., 2012), cognitive ability is highly heritable, with additive genetic components explaining at least half of its variation (Devlin et al., 1997) and up to 80 percent (Plomin et al., 1994). It is rightfully assumed in the political science literature that cognitive ability and education should be positively

correlated (Luskin, 1990; Carpini and Keeter, 1996), it is a corroborated fact (Johnson et al., 2009). Also, it is not hard to establish the causal direction of the relationship: while people's levels of education increase from zero to a non-negative value at a relatively young age and remain stable after a local maximum is reached, cognitive ability is surprisingly stable on the age interval that we associate with institutionalized education. It increases slowly up to the age of 26 and only starts to drop sharply at old age (McArdle et al., 2000); yet IQ does not vary much during childhood and young adulthood. The within – individual variation of educational attainment cannot be causally prior to cognitive ability.

Cognitive ability or other measures of intelligence were previously found to correlate positively with indicators of job performance, educational attainment and achievement, income (Jensen, 1998), prosocial attitudes, openness to experience, pro-democratic values (Hodson and Busseri, 2012) and negatively with religiosity (Nyborg, 2009) and delinquency (Jensen, 1998). It appears that what Converse concluded about education is true for cognitive ability; most “desirable” outcomes in the social and political sphere seem to associate positively with various operationalizations of intelligence. Given its relative invariance and temporal precedence to socio-political, attitudinal, behavioral and economic indicators, we argue that cognitive ability is an exceptionally useful concept that is likely to aid our understanding of directional theories of political knowledge and reduce the inherent endogeneity of extant operationalizations of the triad.

The most commonly used test for cognitive ability (or Spearman's *g*, which is an equivalent concept) is currently the Raven's Progressive Matrices (Raven, 2000), with its variants Standard Progressive Matrices (SPM), Colored Progressive Matrices (CPM) and Advanced Progressive Matrices (APM). They measure two main components of cognitive ability: *eductive* and *reproductive* ability (Raven, 2000); in other words the ability to make sense of complex non-verbal information and to absorb and reproduce information. Cognitive ability tests are often contested for alleged problems of validity and reliability, yet correlations between cognitive ability scores obtained from different measurement tools are usually strong and always positive (Court and Raven, 1995).

We argue that political knowledge stems from a specific constellation of direct and conditional effects that fall in the broad categories of the capability – opportunity – motivation triad. Issues of endogeneity in the extant operationalizations of the theoretical model have thus far made it painstakingly hard to isolate the effects of individual variables on the acquisition of political knowledge. We contend that education is particularly problematic as a proxy for cognitive ability; interaction effects between

cognitive ability and motivation or opportunity cannot be estimated accurately if ability is measured with education. A reduced reliance on proxies will enable us to distinguish between the variation in political knowledge that is causally linked to cognitive ability and the variation that was previously wrongly attributed to it.

For illustrative purposes, we propose a brief discussion of the consequences of a mismeasure of cognitive ability in modeling the acquisition of political knowledge with the triad. If cognitive ability, operationalized as education, is found to be the strongest predictor of political knowledge, we can be tempted to conclude that the variation in political literacy is mostly caused by individual differences that cannot be easily changed throughout one's life. While people's position in the social, political and economic community can be improved with affirmative action policies<sup>2</sup>, cognitive ability is mostly invariant within the individual and its effects on any given political outcome can hardly be manipulated without a radical reshuffling of the rules of functioning of the political community. Can we make politics easier to grasp to enable citizens with lower levels of cognitive ability to participate meaningfully in its workings? Rather unlikely. Educational attainment is associated with motivation and opportunity as well, and its inclusion in the triadic model as proxy for cognitive ability would bias downwards the estimates for the effects of motivation and opportunity and bias upwards the estimate for the effect of cognitive ability. Of course, statistically equivalent outcomes are expected if we use educational attainment as indicator of motivation or opportunity in absence of a direct measure of cognitive ability.

Take, for instance, the theory of “knowledge gaps” (Tichenor et al., 1970), which is particularly relevant in the context of the triadic model. The theory states that there are systemic disadvantages that various social groups have, that make them unequally responsive to efforts made at improving their political literacy by feasible means. Knowledge is acquired as a result of the interactive effects of time-invariant indicators and less stable ones; the external manipulation of one of the main effects will have divergent consequences on knowledge for individuals that differ on the other main effect. This applies very well to our situation: cognitive ability is largely invariant, however, one's interest in politics, their news consumption and even their income are likely to vary over the course of one's life (Prior, 2005). Since cognitive ability is likely to influence the knowledge of citizens by enabling them to understand otherwise highly abstract pieces of political information (Luskin, 1990), it is very likely that for any

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<sup>2</sup> Of course, affirmative action policies will not change someone's gender or age, but they can reduce the structural advantage of currently dominant socio-demographically defined groups.

given level of opportunity, increases in motivation will cause unequal gains in political knowledge for cognitively unequal people. This enables a feedback loop that, in time, should broaden the gap in knowledge between the more informed and the less informed (Jerit, Barabas, and Bolsen, 2006). It is precisely this type of inferences that can be tested by reducing the reliance on questionable proxies in the operationalization of the triadic model.

## **Data**

We used a panel of respondents - Dutch citizens of age 18 and over - who left an email address and indicated consent for being occasionally re-contacted after completing a Dutch online Vote Advice Application ([www.kieskompas.nl](http://www.kieskompas.nl), see Krouwel 2012 et al for a full description). Users of this website – over 3 million voters - were asked to opt-in during the Dutch local elections in March 2010, while the other respondents opted into our panel during the parliamentary elections in May/June 2010. Since these respondents consented to renewed contact and have used an election website, we expect above average political interest and also higher propensities to respond to survey participation.

Our data was collected by recontacting this panel between March 5 and March 15, 2012 as a separate wave, using the online services of SurveyGizmo (<http://www.surveygizmo.com>). Out of the initial sample of 8145 respondents, 3466 participated in this wave of our panel, 70 percent of them filled out the questionnaire before we sent the first reminder on March 11. A second reminder was sent on March 13, and the survey was closed on March 15 when the daily increase in the response rate fell below 1 percent.

In line with our expectations, our sample is highly educated and more interested in politics than a random sample of Dutch citizens, they are predominantly male. Education was measured using a 6-category ordinal variable with labels corresponding to the educational qualifications specific to the Dutch education system. Education was used as continuous scale in all subsequent analyses. Sixty-four percent of our sample is in the highest two categories of education, twenty-six percent are in the middle categories and only ten percent in the first two. Six percent of our sample reported low and very low levels of political interest as opposed to fifty-eight percent who reported high and very high levels, while the remaining thirty-six percent are in the middle category of “moderately interested”. The average age in our sample is 49.7 and only 25.5 percent are female.

The questionnaire has four main batteries of questions. The first battery is a political knowledge quiz of seven questions with no variation of question formats across respondents. The second battery consists of eight political knowledge questions with formats (open ended, multiple choice and true/false) varying across respondents on a random basis. The assignment of question formats was done using the random generator tool provided by Surveygizmo. The third battery of items includes socio-economic, demographic and attitudinal variables; additionally, we asked the respondents whether they remember what they were doing on September 11, 2011 (with an open-ended follow up asking them to write a few words describing what they were doing) to tap into their memory skills. Finally, the 7 cognitive ability items were custom made, following the patterns found in the Raven's Advanced Progressive Matrices (Raven, 1936). We employed an aggressive strategy of discouraging non-responses using the “soft-required” option provided by SurveyGizmo: respondents were not allowed to leave answer fields blank unless they ignored a warning message popping up on top of the page upon first clicking the “next page” button. However, clicking the “next page” button the second time would let the respondents navigate away from the respective page regardless of the number of fields left blank. This helped us maximize the number of guesses, thus increasing the variance in the success of guessing.

Due to the time constraints associated with large N surveys, we used a reduced item cognitive ability test. It is worth noting, however, that our study relies on the statistical power of large samples to overcome the loss of reliability that comes with measuring a given construct with fewer items than the established norm. All seven items are listed in Appendix 1.

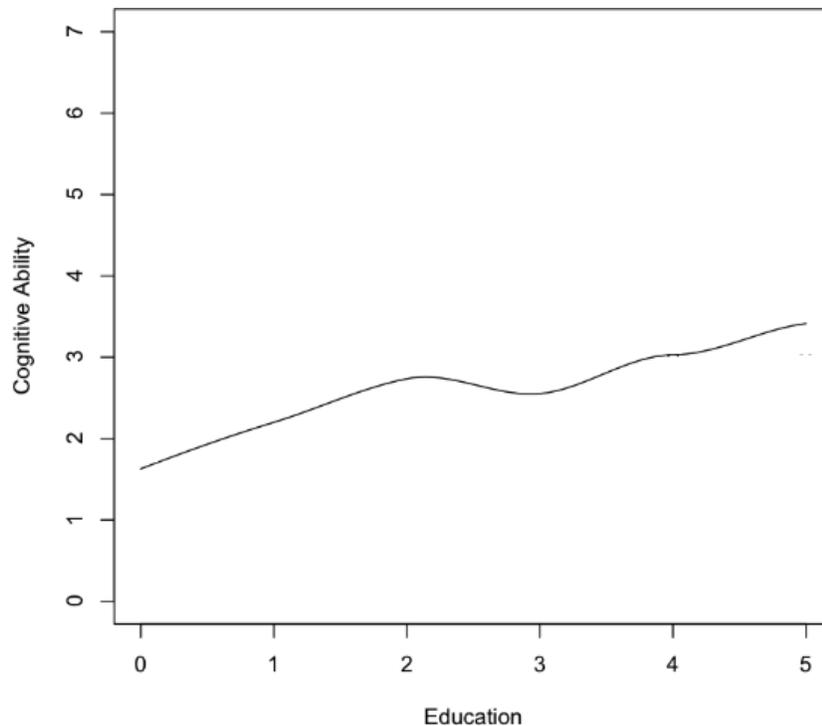
## **Method and Results**

We use the additive approach for constructing our main political knowledge scales and our cognitive ability scale. Due to the relatively large number of political knowledge items in our database, we could construct separate knowledge scales for the first battery of items (range: 0-7), the battery of items with randomized format (range: 0-8), as well as scales indicating the respondents' performance on open ended and closed-ended questions. The latter are constructed by dividing the row count of correct answers to open(closed)-ended questions by the number of open(closed)-ended questions assigned to each respondent; the reliability of these scales is heterogeneous due to the varying number of input variables resulting from the randomization of formats. We use the difference between the scores on these scales as a proxy for format effects on the respondents' performance on knowledge questions (henceforth performance differential); we rely on the exceptionally large size of our sample to

overcome the type II error induced by the design of our scales. Nine percent of all values on this variable are negative, indicating that in the vast majority of all cases, our respondents performed better on multiple choice and true-false questions than they did on open ended ones. This result calls for the inclusion of a control for format (the count of open ended variables per respondent) in all subsequent fitted models.

Cognitive ability was measured by counting the correct responses to 7 items. We obtained a normally distributed scale with a mean of 2.9 and a standard deviation of 1.63. The Cronbach's Alpha of .51 shows that the internal consistency of the scale is less than optimal (Cronbach, 1951), yet well above the value we would intuitively expect from a scale that combines less than one fifth of the number of items that constitute the norm in cognitive ability measurements (Carroll, 1993). Our scale correlates positively with education ( $r=.23$ , see Figure 1. below)<sup>3</sup>, the two TIPI (Gosling et al, 2003) “openness to experience” items ( $r=.08$ ) and negatively with age ( $r=-.33$ ) self-reported religiosity ( $r=-.12$ ) and is completely independent from gender ( $p=.9$ ).

**Figure 1. Smoothed line describing the relationship between education and cognitive ability**



<sup>3</sup> The literature on cognitive ability usually reports stronger correlations with educational attainment (for a comparable estimate,  $r=.32$ , see Johnson, Deary and Iacono, 2009). We attribute the weakness of our correlation to the reduced number of items for measuring cognitive ability, the strict focus on non-verbal abilities and to convenience sampling.

We run OLS regression models, with political knowledge as dependent and cognitive ability, education, interest and news consumption as predictors while controlling for age and gender differences. In line with previous literature on political knowledge, we find a significant positive relationship between education and political knowledge (see Table 1). The significant association remains even when controlling for cognitive ability, and including the joint effect of cognitive ability and education does not render either of the coefficients insignificant. We find that the same results hold if we use the other knowledge variables (the separate scales based on battery 1 and battery 2, discussed previously in this paper) as dependents and they are consistent across various model specifications. Furthermore, we find that the marginal effect of cognitive ability on model fit is modest at best; education is the better predictor of political knowledge, which may seem rather counterintuitive if it is indeed a mere proxy for the “cognitive ability” element of political knowledge. We interpret these results as corroborating evidence for our claim that the causal relationship between education and the acquisition of knowledge does not dwell in the association between education and cognitive ability, but rather in the intrinsic value of education in the formation of democratic citizens.

We find modest decreases in the effects of educational attainment when cognitive ability is controlled for; the effect of household income also drops, but the difference is substantively insignificant. The slope of age increases more sharply, which is likely due to the decrease in cognitive ability at old age and the positive relationship between age and political knowledge. The explanatory power of the models does not change by less than one percent when cognitive ability is included in the specification, leading to the conclusion that much of the effect of cognitive ability is already accounted for by the variance of educational attainment. However, given the very small differences between the slopes of education in our 3 pairs of nested models, cognitive ability cannot be the main determinant of political knowledge; the strong relationship between educational attainment and political knowledge is mostly due to other causal paths linking formal education to democratic citizenship.

**Table 1. Standardized OLS estimates for the effects of education and cognitive ability on knowledge in 3 pairs of nested models**

	Total knowledge	Total knowledge	Knowledge scale 1	Knowledge scale 1	Knowledge scale 2	Knowledge scale 2
Intercept	0.10	0.29*	-0.10	0.06	0.26*	0.33*
Cognitive Ability	0.06* (0.01)		0.05* (0.01)		0.04* (0.01)	
<i>Opportunity:</i>						
Gender	-0.17* (0.03)	-0.17* (0.03)	-0.03 (0.03)	-0.03 (0.03)	-0.23* (0.03)	-0.23* (0.03)
Age	0.11* (0.01)	0.08* (0.01)	0.11* (0.01)	0.08* (0.01)	0.06* (0.01)	0.04* (0.01)
Education	0.11* (0.01)	0.13* (0.01)	0.10* (0.01)	0.11* (0.01)	0.08* (0.01)	0.09* (0.01)
Income	0.07* (0.01)	0.08* (0.01)	0.06* (0.01)	0.06* (0.01)	0.05* (0.01)	0.06* (0.01)
<i>Motivation:</i>						
Newspaper	0.10* (0.01)	0.10* (0.01)	0.03 (0.01)	0.03 (0.01)	0.12* (0.01)	0.12* (0.01)
TV news	0.00 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	-0.00 (0.01)
Interest	0.15* (0.01)	0.15* (0.01)	0.11* (0.01)	0.11* (0.01)	0.13* (0.01)	0.13* (0.01)
Attention	0.55* (0.03)	0.56* (0.03)	0.65* (0.03)	0.66* (0.03)	0.24* (0.03)	0.24* (0.03)
<i>Controls:</i>						
Memory	0.18* (0.05)	0.18* (0.05)	0.14* (0.05)	0.14* (0.02)	0.14* (0.05)	0.14* (0.05)
Open-ended count	-0.08* (0.01)	-0.08* (0.01)			-0.11* (0.01)	-0.11* (0.01)
<i>Adjusted R<sup>2</sup></i>	0.235	0.226	0.177	0.170	0.150	0.146
<i>df</i>	3147	3148	3147	3148	3147	3148

“\*” =  $p < 0.05$

We move on to fitting the triadic model to our data for the different levels of cognitive ability separately. This will allow us to see whether the effects of opportunity and motivation are homogenous across ability-defined groups. We link this to the knowledge gap theory due to the relative invariance of cognitive ability across age (with the notable exception of old age, when steep decreases are likely to

occur) and to its virtual insensitivity to environmental manipulation. The feedback loop mentioned in the previous sections of this paper, should manifest itself by having stronger effects of opportunity and motivation for higher levels of cognitive ability. This would imply that people with higher levels of ability would benefit more from their opportunity to get informed, and their motivation will translate into knowledge more efficiently than in the case of subjects with lower capabilities.

**Table 2. OLS estimates for the triadic model by cognitive ability groups**

	Cognitive ability <= 1	Cognitive ability = 2	Cognitive ability = 3	Cognitive ability = 4	Cognitive ability = 5	Cognitive <sup>4</sup> ability >= 6
Intercept	0.09 (0.1)	0.28* (0.13)	0.24 (0.13)	0.19 (0.15)	0.46* (0.18)	0.37 (0.24)
<i>Opportunity:</i>						
Gender	-0.25* (0.08)	-0.18* (0.08)	-0.03 (0.07)	-0.11 (0.08)	-0.22* (0.08)	-0.37* (0.16)
Age	0.02 (0.03)	0.04 (0.03)	0.20* (0.03)	0.12* (0.04)	0.11* (0.04)	0.13 (0.08)
Education	0.12* (0.04)	0.12* (0.03)	0.17* (0.03)	0.11* (0.03)	0.00 (0.04)	0.03 (0.06)
Income	0.08* (0.03)	0.17* (0.03)	0.05 (0.03)	0.00 (0.03)	0.02 (0.04)	0.08 (0.07)
<i>Motivation:</i>						
Newspaper	0.08* (0.04)	0.15* (0.04)	0.08* (0.03)	0.10* (0.04)	0.07 (0.04)	0.15* (0.07)
TV news	-0.00 (0.03)	0.05 (0.03)	0.02 (0.03)	-0.04 (0.03)	-0.02 (0.04)	-0.00 (0.07)
Interest	0.12* (0.04)	0.14* (0.04)	0.13* (0.03)	0.22* (0.04)	0.19* (0.04)	0.08 (0.07)
Attention	0.48* (0.08)	0.48* (0.08)	0.59* (0.08)	0.49* (0.08)	0.67* (0.09)	0.85* (0.15)
<i>Controls:</i>						
Memory	0.11 (0.11)	0.11 (0.10)	0.30* (0.10)	0.19 (0.12)	0.12 (0.39)	0.17 (0.21)
Open-ended count	-0.06* (0.02)	-0.06* (0.02)	-0.10* (0.02)	-0.07* (0.02)	-0.10* (0.03)	-0.05 (0.05)
<i>Adjusted R<sup>2</sup></i>	0.157	0.267	0.258	0.207	0.236	0.352
<i>df</i>	608	601	648	631	460	145

“\*”= p<0.05

4 Most effects are not significant due to the low number of degrees of freedom; standard errors and effect sizes are included in the table for ease of comparison

We find mixed results. The effects of opportunity are generally strongest for respondents of lower cognitive ability; the impact of education and income on the acquisition of political knowledge drops sharply and almost monotonously from lower ability to higher ability respondents. The estimates are not significant in the last two models also because of the fewer degrees of freedom, but judging by the effect sizes relative to the standard errors of the estimates, we believe that the statistical insignificance is not just an artifact of sample size.

Rather interesting is that our indicators of motivation appear to have stronger effects for higher-ability people. Both political interest and news consumption have steeper slopes for the right hand side of the distribution of cognitive ability, and attentiveness to the political questionnaire appears to render a better performance on the knowledge quiz mostly for the respondents with higher levels of ability. It appears that low capabilities can partially be compensated with an increased exposure to political information (opportunity), but motivation rewards the more capable in a disproportionate manner. Were we to motivate the population at large to acquire political knowledge, the gap is likely to broaden.

Yet the most intriguing finding is the change in model fit: if we compare the explanatory power of the triadic model for the lowest category of ability to that of the highest category of ability, we find that the latter is increased more than two-fold. While model fit varies between .20 and .26 for the subsamples of ability higher than 1 and lower than 6, it is as low as .15 for the lowest ability group and as high as .35 for the highest ability group. This result entails that we can predict what drives the acquisition of political knowledge for people of high cognitive ability, but we can only guess what makes a low-ability respondent become knowledgeable.

## **Discussion and Conclusions**

We argued in this paper that the acquisition of political knowledge is driven by a triad of interrelated factors, broadly defined by Robert Luskin (1990) with the capability – opportunity – motivation model. Subsequent operationalizations of the triad employed educational attainment as proxy for capability or cognitive ability, mostly due to the virtual absence of direct measures of cognitive ability in large N surveys. We discussed at considerable lengths the likely implications of the use of imperfect proxies in such interactive models and demonstrated that improving the validity of the triadic model and reducing its inherent endogeneity problem is in fact feasible using large N surveys.

We designed a short test of cognitive ability that we included in a panel survey on a convenience sample of Dutch citizens. We fitted the triadic model to our data and found that most of the relevant predictors of political knowledge differ significantly across ability-defined groups. While the impact of motivation is stronger for high-ability respondents, the effect of opportunity appears to drop sharply with the increase in cognitive ability. Furthermore, we find that the political literacy of the more cognitively capable is a lot more predictable than that of their less cognitively capable peers.

Our findings have significant methodological, conceptual and normative implications. From the methodological point of view, we conclude that the intercorrelations between the indicators of the three elements of the triadic model make it virtually impossible with traditional statistical tools to discuss any causal relationships underlying the acquisition of political knowledge. Moreover, the use of education as a proxy for cognitive ability leads to the hasty conclusion that ability is the main driving force of political knowledge. Such overestimations of the impact of ability distorts our understanding of the origins of political literacy and contributes to a fatalistic view of the prospects of representative democracy (assuming that the functioning of democracy is contingent upon the political sophistication of its citizens); after all, cognitive ability is the one element of the triad that cannot be externally manipulated by any feasible means. In this regard, our results are mostly encouraging; cognitive ability has a rather weak contribution to the acquisition of political knowledge, and part of its impact lies in the moderation of the effect of motivation and that of opportunity.

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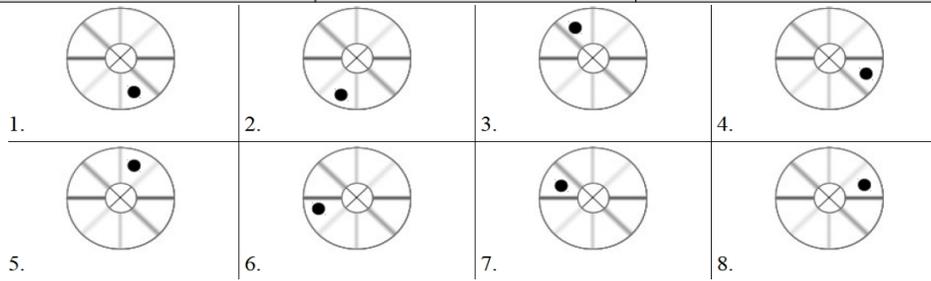
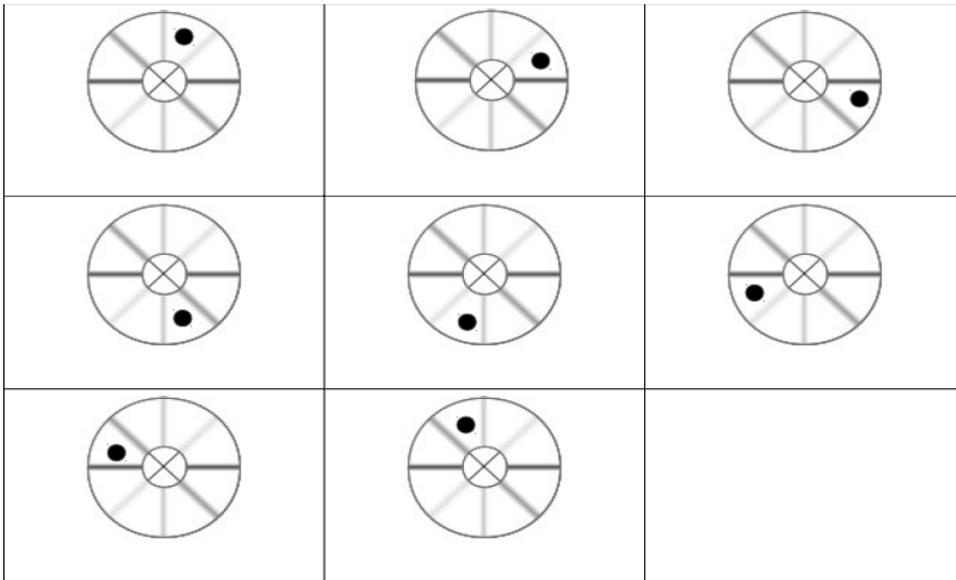
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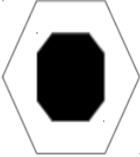
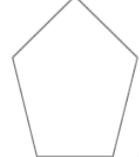
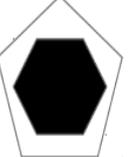
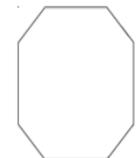
**Appendix 1.**

Cognitive ability battery:

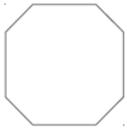
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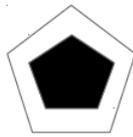
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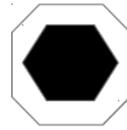
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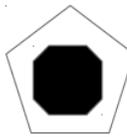
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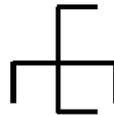
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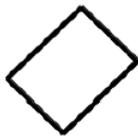
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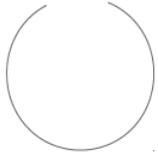
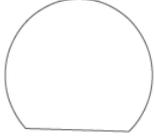
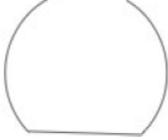
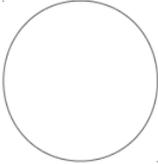
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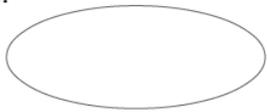
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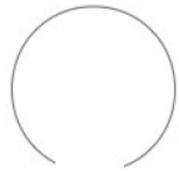
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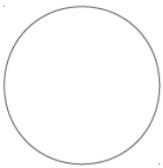
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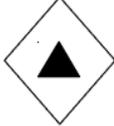
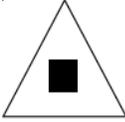
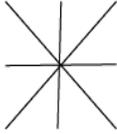
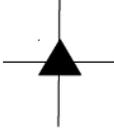
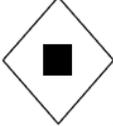
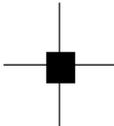
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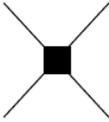
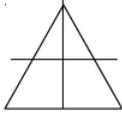
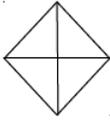
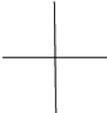
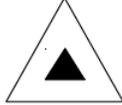


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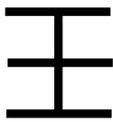
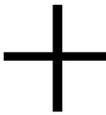
Item 5. Correct answer: 7

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Item 6. Correct answer: 8

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Item 7. Correct answer: 6

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