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The Curse of Knowledge? Education, Corruption, and Politics

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Abstract Education has consistently been found to be positively related to political participation, electoral turnout, civic engagement, political knowledge, and democratic attitudes and opinions. Previous research has, however, not sufficiently acknowledged the large existing between- and within-country variations in institutional quality when studying this relationship. This study asks the question: how do highly educated, well-informed, and critical citizens react to a political system with low-quality institutions; a system with high levels of corruption? Researchers have in recent years started to acknowledge corruption as a relevant factor in explaining democratic attitudes and behavior. However, how corruption interacts with individual characteristics in shaping political behavior is largely unexplored in the literature. This paper focuses on the interaction between corruption and education with regard to different political attitudes and democratic behavior. Using both individual- and country-level data from 31 democracies the results show that corruption thwarts many of the positive effects of education with regard to politics: The results indicate that when corruption is high, educated and politically sophisticated citizens are as likely as low-educated citizens to feel resignation with regard to formal political institutions. This, in turn, is likely to affect patterns of political participation among these citizens.

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Introduction

The positive relationship between individual education and various desirable political variables, like political participation, is probably the most well-established finding in political science (Persson 2015). While undoubtedly valid in some contexts, it is not clear how *general* these findings are. Can we expect to find this positive association in all democracies?

This paper argues that previous research on education and political attitudes/ behavior in democratic societies has largely overlooked one important factor: *institutional quality*. It is now understood that *corruption*, arguably the most blatant example of poor institutional quality, is a pathology that is likely to be found thriving not only in autocratic states but also, to different degrees, in developed democracies (Charron et al. 2015; Warren 2004). This endemic has shown to be unexpectedly persistent, and very few, if any, of the world's countries can pride themselves on being completely free from corruption in public institutions (Rothstein 2011). Can the highly educated be expected to be competent, active, and critical political actors even in a context of high corruption?

I argue that the level of corruption in society has strong implications for the relationship between education and political attitudes and behavior, and that we should expect the highly educated to be *particularly* affected when institutions are weak. The patterns found in settings with high-quality institutions, where the educated have been shown to have high institutional trust (Curini et al. 2012), high political efficacy (Jackson 1995), and high rates of political participation (Verba et al. 1995; Wolfinger and Rosenstone 1982), should not be expected to look the same in a setting with low institutional quality. A large body of research shows that corruption can have strong negative consequences for the workings of democracy (e.g. Chong et al. 2015). Studies also suggest that citizens with higher education are more likely to be attentive to and well-informed about deficiencies of public institutions (Charron and Rothstein 2016; Hakhverdian and Mayne 2012; Seligson 2002; Van der Brug and van Praag 2007). In addition, the highly educated have been shown to react more strongly to corruption in society in general (Anduiza et al. 2013; Caillier 2010). Therefore, in contexts where corruption is pervasive and the implementation of policy is distorted by corrupt officials (Warren 2004), being highly educated and politically sophisticated will not translate into high institutional trust and a feeling that one can affect political outcomes by using established political channels. Rather, being well educated in such a context is likely to induce a feeling of *resignation* with regard to formal institutions (Bauhr and Grimes 2014).

My argument has two parts: First, I study the interaction between education and corruption with regard to two different sets of well-studied political attitudes: *self-regarding attitudes*, including indicators like internal political efficacy and political interest, and *institutional attitudes*, including indicators like external political efficacy and satisfaction with democracy. I argue that, compared to well-educated citizens in low-corruption societies, citizens with higher education in corrupt societies are strongly affected in their institutional attitudes. When corruption is high, these citizens are likely to feel dissatisfied with the way democracy works, and

are also likely to feel disempowered with regard to formal political institutions. That is, in a context of high corruption it will often be the case that the highly educated at the same time feel politically competent (positive self-regarding attitudes), but have low trust in formal institutions (negative institutional attitudes).

Second, given that political attitudes matter for political participation (Abramson and Aldrich 1982; Craig et al. 1990; Hayes and Bean 1993; Karp and Banducci 2008), I propose that changes in the relationship between education and institutional attitudes also can be expected to strongly influence and change patterns of political participation among citizens with high education in high-corruption contexts. Given their positive self-regarding attitudes, the highly educated will still seek to voice their discontent in these contexts (Botero et al. 2013). However, they choose a mode of participation that they perceive to be effective (Scartascini and Tommasi 2012). Under weak and corrupt institutions, this means de-emphasizing formal political participation and resorting to more unconventional, non-institutionalized means of participation (Machado et al. 2011).

Data from the International Social Survey Program (ISSP),[1] covering 31 democratic countries, lends support for the argument. The study contributes to the large literature on education and political attitudes and behavior (e.g. Almond and Verba 1963; Jackson 1995; Verba et al. 1995; Verba and Nie 1972), and the literature on the differential impact of education in varying contexts (Gallego 2010; Hakhverdian and Mayne 2012). In line with previous research, the results show that the relationship between education and all different measures of political attitudes is positive and strong in contexts with low corruption; highly educated individuals view themselves as politically competent, and also believe in their ability to influence politics through formal institutions. However, in contexts of high corruption the positive relationship between education and institutional attitudes diminishes dramatically, to the point where it even becomes *negative* in some cases. The implications for political participation are multifaceted, and show a more complex picture than research assuming that the educated always will use their political capabilities to hold officials accountable. This study adds to the literature by showing that corruption can have substantial influence on the relationship between education and electoral participation: The results show that the strong and positive relationship between education and voter turnout that has been highlighted in the literature is absent in contexts with high levels of corruption. This suggests that the highly educated tend to de-emphasize formal political participation when institutions are inefficient and unresponsive. At the same time, non-institutionalized participation (like demonstrations and boycotts) seems not to be affected in the same way. The relationship between education and this sort of participation is consistently strong and positive throughout all models—some results even indicate that this association might be *more pronounced* in high-corruption contexts.

The study thus builds and expands on previous work by Hakhverdian and Mayne (2012) that suggests that the positive relationship between education and institutional trust is moderated by corruption. By incorporating internal and external *political efficacy* into the models in this paper I take a broader view of the

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[1] www.issp.org

consequences of corruption that also extends to *political behavior*. This ties several research literatures together and provides a more complete overall argument that has important implications for how we should understand the relationship between education and political attitudes and behavior in contexts with different institutional quality. The positive effects of education with regard to politics cannot be taken for granted when public institutions work poorly. In such a context highly educated citizens are as likely as citizens with low education to feel disempowered and dissatisfied with formal institutions. Overall, this suggests that politically competent citizens might be the *most affected* when they perceive that corruption is high, and that the positive association between individual education and many desirable political variables might not be as general as many researchers have assumed.

Central Concepts

Before turning to the overall argument, I will briefly discuss and define the central concepts involved. I distinguish between two categories of political attitudes: self-regarding and institutional. Most of the well-studied variables in the literature could be classified under these labels. The distinction is important because I argue that corruption is related in different ways to these sets of attitudes, and I also expect the interaction between education and corruption to play out differently with regard to the two concepts.

Self-regarding attitudes is simply beliefs an individual holds about him or herself as a political actor, and can be summarized as an individual's perceived political capabilities plus how much attention an individual pays to politics overall. These attitudes come close to the concept of *internal political efficacy* (see Beaumont 2011; Craig et al. 1990; Morrell 2003), defined in the literature as beliefs about one's own competence to understand and to participate effectively in politics (Niemi et al. 1991). However, I aim for a somewhat broader definition that also includes an individual's *political attentiveness* and hence things like *political interest*.

Institutional attitudes tap into beliefs an individual has about political institutions, and can be summarized as how an individual perceive the responsiveness and general performance of current institutions. This resembles the notion of *external political efficacy* (see Craig et al. 1990; Finkel 1985; Niemi et al. 1991), capturing beliefs about the responsiveness of governmental authorities and institutions to citizen demands (Balch 1974). Again, my definition is somewhat broader to also capture how individuals perceive the performance of the current system, and political actors within the system, in more general terms (see Linde and Ekman 2003). This means that I also count things like *satisfaction with democracy* [diffuse regime support (Easton 1975)] to this category. The operationalization of these two concepts is discussed further in the "Data" section.

With regard to political participation, I distinguish between *institutionalized* and *non-institutionalized* participation. This in line with previous literature, arguing that there are substantial differences in the democratic meaning of institutionalized (that is, organized by the political system or the political elite) and non-institutionalized (that is, elite-challenging) forms of participation (Klingemann and Fuchs 1995).

More concretely, I use *voting* as an example of the former, and things like boycotting, demonstrations and petition-signing as examples of the latter.

Lastly, *corruption* is a concept that has received increased attention in recent decades, and this is my main measure of the general functioning of the system in which an individual is situated. In line with the broad research literature, I define corruption as the abuse (or misuse) of public office for private gain. This includes public officials being involved in bribery (for example to circumvent public policies and regulations), but also things like patronage and nepotism (see World Bank 1997).

Education and Political Attitudes and Behavior

Education is often considered the most important factor with regard to political attitudes and behavior (Verba et al. 1995). It is widely recognized that education is positively related to a range of (generally considered desirable) individual-level political attitudes and outcomes. Highly educated citizens have repeatedly been shown to be more *politically sophisticated*; that is, more politically knowledgeable and competent (Almond and Verba 1963; Delli Carpini and Keeter 1996; Hillygus 2005; Jennings 1996; Nie et al. 1996; Verba and Nie 1972; Wolfinger and Rosenstone 1982). The educated also participate more in politics. In a review article, Persson (2015, p. 689) suggests that 'the relationship between education and political participation is perhaps the most well-established relationship that exists in research on political behavior.'

Previous research has often connected education to satisfaction with democracy, and many studies have observed a positive relationship between the two variables (Anderson and Tverdova 2003; Curini et al. 2012; Dahlberg and Holmberg 2014; Linde and Erlingsson 2013). The same is true for education and political interest and news media consumption (Dee 2004; Hillygus 2005), and education and political efficacy (see Almond and Verba 1963; Beaumont 2011; Campbell et al. 1960; Craig et al. 1990). Jackson (1995, p. 280) summarizes the latter finding: 'Education increases the sense of political efficacy in individuals. Schooling enhances both the belief that the potential voter can influence what the government does (external efficacy) and the belief that the potential voter has the competence to understand and participate in politics (internal efficacy)' (see also Hayes and Bean 1993). Converse (1972, p. 324) summarized the research on education and political behavior when he famously stated that education 'is everywhere the universal solvent, and the relationship is always in the same direction. The higher the education, the greater the "good" values of the variable'.

While still very much a current topic in the research literature, most of the recent debate has centered around the *nature* of the relationship between education and political behavior; to what extent the relationship is causal and what exact mechanisms drive the association (see Persson (2015) for an overview).[2] At the

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[2] See Appendix 2 for further discussion on the nature of the relationship between education and political participation.

same time, there is a strong consensus that there exists a robust positive association between education on the one hand, and various individual-level political variables on the other. In sum, previous research suggests that education is strongly positively related to self-regarding attitudes, institutional attitudes, and both institutionalized and non-institutionalized political participation.

Corruption and Education in Democracies

How *general* is the positive association between education and the various political outcomes described in the previous section? This is an important question if we want to understand how the relationship can be expected to look in different democratic contexts.

One factor that previous studies have not sufficiently taken into account is the large between-country (and within-country) variation that exist in democratic countries with regard to institutional quality and corruption (see Charron et al. 2015; Warren 2004). A growing body of literature has observed that corruption can have profound consequences for the workings of democracy. Warren (2004, p.328) argues that corruption violates several fundamental democratic principles:

> Corruption, it is increasingly noted, breaks the link between collective decision making and people's powers to influence collective decisions through speaking and voting, the very link that defines democracy. Corruption reduces the effective domain of public action, and thus the reach of democracy, by reducing public agencies of collective action to instruments of private benefit. (...) When people lose confidence that public decisions are taken for reasons that are publicly available and justifiable, they often become cynical about public speech and deliberation.

Corruption in a democracy constitutes a form of *disempowerment* of the electorate, where the corrupt use their control over resources to achieve gains at the expense of the majority of citizens (Warren 2004). Research has shown that corruption is negatively related to citizens' belief and trust in democratic institutions (Anderson and Tverdova 2003; Linde and Erlingsson 2013; Mishler and Rose 2001; Seligson 2002; Wagner et al. 2009). Dahlberg and Holmberg (2014) argue that citizens' evaluation of how democracy works is substantially more affected by the presence of effective, impartial and professional governmental institutions than by things like ideological congruence between voters and representatives and different electoral system characteristics. Research also shows that corruption perceptions can affect external political efficacy (Kostadinova 2009), voter turnout (Stockemer et al. 2013), and vote choice (Agerberg 2017). What implications does this research have for the relationship between education and political behavior?

I argue that the highly educated living in a context of high corruption in many ways are different types of political actors than the highly educated living in a context of well-functioning public institutions. My argument builds on the notion that corruption can be expected to affect the political behavior of citizens with high education *most strongly*. First, in a high-corruption context the educated are likely to

be better informed about the deficiencies of public institutions. In a study of 21 European democracies, Hakhverdian and Mayne (2012) show that the relationship between education and political trust is conditional on country-levels of corruption. While being positively related to political trust in clean societies, education is negatively related to political trust in corrupt societies. The authors argue that this result stems from the ability of citizens with higher education to accurately assess the level of corruption, together with their stronger commitment to democratic values. In a study of four Latin American countries with high corruption Seligson (2002) finds education to be negatively related to beliefs about the legitimacy of the political system. According to the author, this is not surprising: 'More highly educated individuals are likely to know more about the political system than those who are less well informed and, consequently, are more likely to be in a position to be critical of it when those systems do not perform well' (Seligson 2002, p. 423).

Second; apart from being better informed about corruption in general, the educated are also more likely to have experienced corruption *directly* during their years in the educational system. Several studies show that corruption is a serious problem in higher education in countries with weak institutions (Botero et al. 2013; Mungiu-Pippidi and Dusu 2011). Charron and Rothstein (2016, p. 61) note that 'Since the implementation of any large scale public educational policy entails lots of administrative discretion, the sector seems to be a textbook case for spurring favoritism and corruption.' The years in the education system is a concrete experience with a (usually) state-run institution. Experience of the moral standard of the educational system will impact not only how the individual views this system, but also the individual's confidence and trust in the state (see Rothstein 2009).

This suggests that the political behavior of the highly educated might be particularly affected when public institutions work poorly (Van der Brug and van Praag 2007). I argue that the relationship between education and self-regarding attitudes should be expected to be positive and strong regardless of the prevalence of corruption, since these attitudes are not directly related to the external context. This is assumed, but not tested, in Hakhverdian and Mayne (2012).[3] However, I argue that the positive relationship between education and institutional attitudes should be substantively mitigated when corruption is high. While schooling on a general level can be expected to be strongly connected to individual political sophistication, the translation of this capacity into a feeling that one actually can influence what the government does is not deterministic. Rather, the translation is dependent on institutional quality. Bauhr and Grimes (2014) show how being well-informed in a context of high corruption might induce a feeling of resignation among citizens: If people become aware of corruption, but see no available means of changing dysfunctional institutions, and see that potential collaborators routinely act in a self-

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[3] While this might seem 'obvious', research has not established *empirically* that this is in fact the case. It is of course theoretically possible that corruption is negatively associated with all sorts of political attitudes; people might simply care less about, and be less interested in, politics overall in a corrupt setting. Hakhverdian and Mayne (2012) make the assumption that the highly educated will be more well-informed and attentive even in a high-corruption context. Since this is an important part of my (and their) argument, I include this in my analysis and discuss it further in the "Data and Methods" sections below.

interested manner, being cognizant of corruption will not spur political engagement (see also Letki 2006).

This shows that being better educated and more politically informed is not a panacea in a context of dysfunctional public institutions; while highly educated citizens still perceive themselves as politically sophisticated in such a context, they will feel disempowered and dissatisfied. This will create a discrepancy that in turn leads to feelings of resignation with regard to formal political institutions. Higher education gives these citizens a better opportunity to effectively acquire and process information about the responsiveness and performance of formal institutions, while the years in the educational system give them a first hand experience with the functioning of a big and important state-run institution. In a context with pervasive corruption the highly educated will (correctly) conclude that public institutions work poorly and inefficiently. My first hypothesis can thus be stated as:

H1   Corruption weakens the positive relationship between education and institutional attitudes, but does not weaken the relationship between education and self-regarding attitudes.

What implications does this have for political behavior? Scartascini and Tommasi (2012) argue that citizens choose between institutionalized and non-institutionalized political actions based on their perceived effectiveness. For instance, Machado et al. (2011) show that where institutions are strong, actors are likely to participate in the political process through institutionalized arenas. But when institutions are weak, actors are more likely to resort to protests and other unconventional means of participation. An individual who is well-informed about the unresponsiveness and ineffectiveness of formal institutions will find it less rational to channel his or her engagement through these institutions. Previous research, in part, supports this argument: In a field experiment in Mexico Chong et al. (2015) provided corruption information to randomly selected voting districts. The authors observed a significant decrease in turnout in districts receiving the information treatment. The authors conclude: 'If the exposure of corruption leads voters to believe that voting will not benefit them (...) then they are likely to abstain' (Chong et al. 2015, p. 55). Similarly, Caillier (2010) finds that voters who perceived that corruption was on the rise were less likely to vote. The study was conducted in Louisiana, a state with a long history of corruption (Caillier 2010, p. 1019). The author also finds that citizens with high education were the most likely to have low trust in government when they perceived corruption to be high (see also Anduiza et al. 2013).

At the same time, research has shown that educated citizens still are more likely to voice their discontent in countries with poor public institutions (Botero et al. 2013). Previous studies have found a connection between corruption perceptions and more unconventional means of participation, like protests and demonstration (Cornell and Grimes 2015; Gingerich 2009; McCann and Domínguez 1998). Given their disillusionment with formal political institutions, I propose that citizens with higher education instead are more likely to use non-institutionalized forms of participation to channel their political engagement when corruption is high. That is, in a corrupt system the highly educated are more prone to engage in *system-challenging* political behavior (Klingemann and Fuchs 1995).
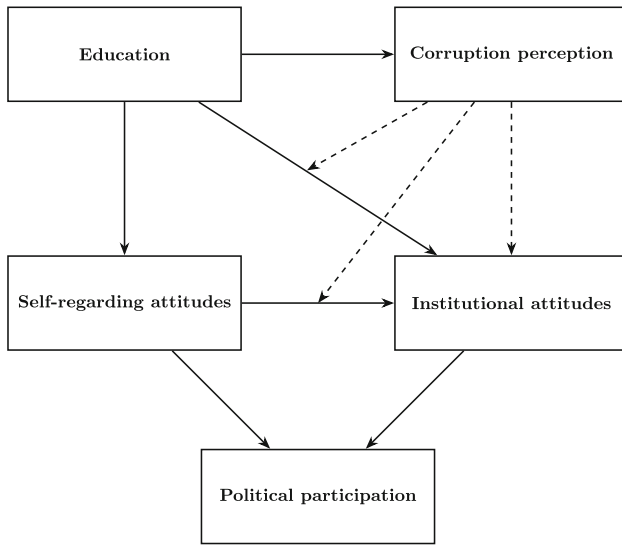
Fig. 1 The theoretical argument

This leads to my second hypothesis:

H2 Corruption weakens the positive relationship between education and institutionalized political participation, but does not weaken the relationship between education and non-institutionalized participation.

The main relationships contained in my argument are illustrated in Fig. 1.[4]

Data and Methods

Part of the difficulty in studying corruption and political behavior is the lack of good data. While several studies rely on aggregated data in studying things like corruption and voter turnout, ultimately these are questions about *individual political behavior* that ideally are studied using individual-level data. A relevant data set also has to contain the right questions about political efficacy, political attitudes and corruption perceptions, preferably in a range of different countries. In relation to this, new data from the ISSP show great promise. The data come from individual level surveys collected between 2013 and 2016 as part of the study *Citizenship II* (ISSP Research Group 2016). The data set covers 31 different democratic countries[5] and contains a wide range of questions regarding political attitudes and behavior, relevant questions about political efficacy, as well as a

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[4] The figure should be viewed as an illustration of my theoretical argument, rather than a complete description of reality. I test two basic empirical implications of this model in *H*1 and *H*2.

[5] My overall argument is concerned with democratic societies. Therefore, Russia and Venezuela were excluded from the analysis due to their unclear democratic status.

question on perceptions about corruption. This makes the data set ideal for this study. A list of all included countries is available in the supplementary materials.

Dependent Variables

My main dependent variables for measuring political attitudes consist of two indicies. Each index consists of four different items aiming at capturing internal political efficacy and political attentiveness, in the case of self-regarding attitudes, and external political efficacy and perceptions of system performance, in the case of institutional attitudes.

The index measuring self-regarding attitudes uses two questions measuring a respondent's perceived understanding of political questions to capture the internal political efficacy dimension (see Beaumont 2011; Craig et al. 1990; Morrell 2003). In addition, the index also includes a respondent's stated political interest and frequency of political media consumption (see Lee et al. 2015).

In line with the recommendations of American National Election Studies (ANES),[6] the index measuring institutional attitudes uses two standard questions to capture an individual's external political efficacy (or perceived system responsiveness) (see Craig et al. 1990; Morrell 2003; Niemi et al. 1991). The index also contains a standard question on satisfaction with democracy, as well as a question asking if the respondent thinks that politicians are in politics only for personal profit. The latter two questions aim at capturing respondents' view of the performance of the overall political system, and the actors in the system. The exact questions used are available in the Appendix.

Do these indicators of political attitudes actually measure two different concepts (corresponding to self-regarding and institutional attitudes)? To check for this I ran a simple factor analysis with all eight political attitude variables.

As shown in Table 1, the different groups of indicators clearly load onto two different factors. I take this as initial evidence that my suggested categorization of these variables into self-regarding and institutional attitudes has some bearing. Each individual component was standardized before added together into the two indicies. Each final index was then standardized again ($mean = 0, sd = 1$). Higher values indicate more positive self-regarding and institutional attitudes, respectively.

The first part of $H2$ is concerned with institutionalized political participation, which is operationalized by the respondents' reported electoral participation. It is well known that measuring past electoral participation via surveys can be problematic, in part due to social desirability bias (e.g. Granberg and Holmberg 1991; Holbrook and Krosnick 2010). The ISSP team uses a question about past electoral participation that is designed to minimize bias: "Some people don't vote nowadays for one reason or another. Did you vote in the last [respondent's country] national election in [month/year]?" Affirmative answers were coded as 1 and negative as 0. Other answers (like don't know) were excluded.

The second part of $H2$ regards non-institutionalized political participation (NIPP). I measure this with 7 different questions asking if the respondent in the past

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[6] www.electionstudies.org/nesguide/nesguide.htm

Table 1 Varimax rotated factor loadings: political attitudes *Source* ISSP Research Group (2016). The statistics are calculated for the overall sample

	Factor1 Institutional	Factor2 Self-regarding
External political efficacy 1	0.71	0.084
External political efficacy 2	0.81	0.027
Satisfaction with democracy	0.59	0.11
Personal profit (politicians)	0.68	0.096
Internal political efficacy 1	− 0.065	0.73
Internal political efficacy 2	0.26	0.55
Political interest	0.15	0.77
Political news consumption	0.035	0.58
Eigenvalue	2.07	1.79
Cronbach's α for index	0.69	0.6
Observations	37,256	

did: sign a petition, boycott certain products, take part in a demonstration, attend a political meeting, donate money to a social or political activity, contact the media, or express views on the internet. Each question comes with 4 different response alternatives, ranging from "Have done in the last year" to "Would never do". For my main model I coded each question as 1 if the respondent report that he or she did an activity in the last year, and 0 otherwise. I then combined all variables into an index, ranging from 0 to 7.[7] I consider different coding choices and modeling strategies with regard to this variable in the Appendix.

Independent Variables

I employ two different measures of corruption. The first comes from a question in the ISSP survey that asks "How widespread do you think corruption is in the public service in [respondent's country]?". Five alternatives were given to the respondents, ranging from "Hardly anyone is involved" to "Almost everyone is involved". This question is obviously a very direct measure of the respondent's general perception of corruption in the public sector. However, one could reasonably worry that a measure based on a question like this is not exogenous to the individual-level outcome measures. For instance, some underlying individual (unmeasured) characteristic might potentially influence the responses on both questions (that is, on both the independent and the dependent variable).[8] Therefore, I also use a country-level measure of corruption that is intended to capture the same concept as the individual corruption question, but on an aggregate level. The predictions using this measure are the same as with the individual measure, although the interpretation is slightly different (this is discussed more below). The measure comes from the

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[7] Cronbach's α = 0.64

[8] Still, I think it is an obvious advantage to include a individual-level measure of corruption. After all, it is how an individual *perceive* the level of corruption in the current system that should affect his or her attitudes and actions. Having this individual-level measure is an advantage in relation to similar studies, like Hakhverdian and Mayne (2012).

V-dem data set (Coppedge et al. 2016), where the V-dem experts were asked to assess the level of public sector corruption in a certain country.[9] The variable was recoded to range from 0 (low corruption) to 10 (high corruption).[10]

These corruption measures are thus capturing corruption within the public administration in a country. I think this is the type of corruption that is most relevant to my argument. First, citizens' encounters with the public administration is often the most *concrete* way they experience the political system, and therefore decisive for how the system is viewed (Rothstein 2009). Second, the public administration is also an area where voters have very little direct democratic influence.[11] Therefore, malfeasance in this area, where democratic decisions are supposed to be implemented, is likely to cause resignation with regard to formal institutions among citizens.

I use years of schooling as my education measure.[12] While not exempt from problems, this measure is frequently used in comparative studies and constitutes the best alternative given the data at hand (see Gallego 2010).

Figure 2 shows mean values of the main independent variables, corruption and education, for all included countries. It is clear from the figure that there exists quite large variation in corruption between countries. It is also clear that the expert assessments of corruption (the V-dem measure) and the aggregated individual perceptions are not always in perfect agreement. However, the overall picture shows that countries classified as 'clean' by the experts also tend to have low individual-level scores (e.g. Finland, Denmark, Sweden, Switzerland), and vice versa.

Control Variables

I use a number of individual-level controls from the ISSP survey that are standard in research on political attitudes and behavior. These include income (a three-category variable), gender, age (with an age-squared term included as well), place of living (urban or rural, measured with a five-category variable), and marital status (married or not). I also control for whether the respondent is an *incumbent voter*. Studies suggests that belonging to the political majority can affect satisfaction with democracy and potentially political efficacy (Craig et al. 1990). In addition, Anderson and Tverdova (2003) argue that political majority-minority status might affect perceptions of corruption. This variable were coded based on whether the respondent reported that they in the last election voted for a party that was part of the government at the time of the interview.

For the multilevel models (see below) I control for a number of contextual factors that have been argued to affect political attitudes and behavior. These include election system (proportional, majoritarian or mixed), and the effective number of

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[9] The experts were asked the following question: "To what extent do public sector employees grant favors in exchange for bribes, kickbacks, or other material inducements, and how often do they steal, embezzle, or misappropriate public funds or other state resources for personal or family use?" For details, see Coppedge et al. (2016).

[10] Aggregating the individual corruption measure to the country level, the two corruption measures correlate at $r = 0.77$.

[11] Rothstein (1998) refers to this as 'the black hole of democracy'.

[12] I excluded a few respondents who stated that they have more than 30 years of formal education.
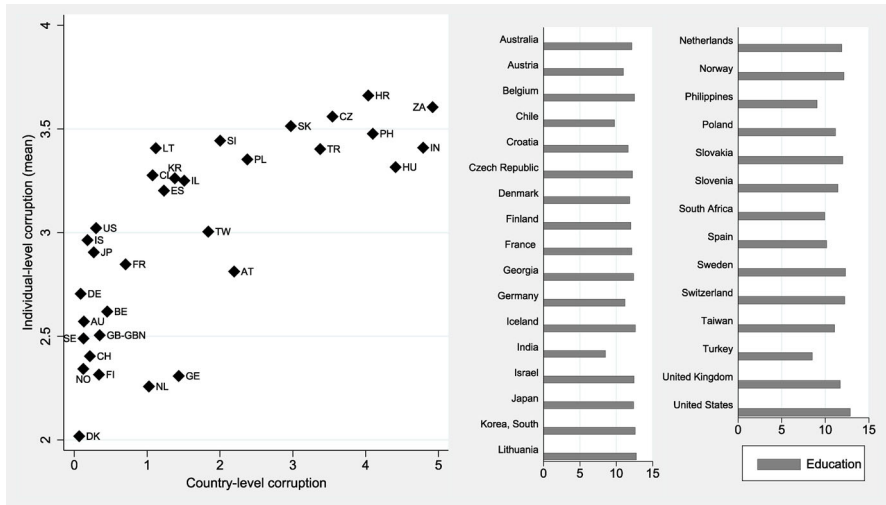
Fig. 2 Mean values of the main independent variables, for all included countries. Individual-level corruption is measured on a scale from 1 to 5, while country-level corruption ranges from 0 to a theoretical maximum of 10. 'Education' shows the mean years of education in a country, based on the ISSP survey

parties (parliamentary or legislative) (see Karp and Banducci 2008). There exists variation with regard to the general level of development in my country sample. I therefore control for GDP per capita (logged) and for level of democracy [as measured by V-dem's *polyarchy index* (Coppedge et al. 2016)]. Finally, in the models estimating political participation I include a dummy for whether voting is compulsory in a country. Descriptive statistics for all included variables is available in the Appendix.

Models

I estimate two different sets of models. In the first set I use the individual measure of corruption described above, measuring the respondent's perception of corruption in the public administration. Institutional and contextual factors are known to be influential, both when it comes to political attitudes and electoral participation (see Gallego 2010; Karp and Banducci 2008). I therefore use country-fixed effects to completely account for any country heterogenities. I use OLS to estimate the models predicting political attitudes. I use logistic regression for the vote-models with binary outcomes, and Poisson regression for the models predicting non-institution-alized participation.[13]

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[13] I treat NIPP as a *count variable* where the respondent either did or did not participate in a political activity last year. In the Appendix I consider other modeling and coding options with regard to this variable, none of which affect the results substantially.

Both $H1$ and $H2$ implies an interaction effect between education and corruption (with regard to institutional attitudes and voting). The full specification for the country-fixed effects model can thus be stated as:

$$y_{ic} = \alpha_c + \beta_1 corr_{ic} + \beta_2 edu_{ic} + \beta_3 (corr_{ic} \times edu_{ic}) + \mathbf{X}'_{ic}\lambda + \epsilon_{ic} \qquad (1)$$

where y_{ic} is the the dependent variable (political attitudes or political participation) for individual i in country c, α_c is a set of country dummies, $corr_{ic}$ is the individual-level perception of corruption, edu_{ic} is an individual's years of schooling, $\mathbf{X}'_{ic}$ is a vector of individual-level covariates, and ϵ_{ic} is the error term. The standard errors are clustered at the country-level.

The second set of models is estimated using multilevel modeling where I instead treat corruption as a *contextual factor* (see Gelman and Hill 2007). While it is an advantage to be able to measure corruption directly at the individual level, this can, as noted above, also be problematic. Treating corruption as a contextual factor means that I am, for example, predicting that the effect of education on institutional attitudes and electoral participation will be lower *on average* in countries with higher corruption (as measured by the V-dem expert assessment). The full specification for the multilevel models thus includes a cross-level interaction term between country-level corruption and education (see Aguinis et al. 2013), and can be stated as:

$$y_{ic} = \gamma_{00} + \gamma_1 corr_c + \gamma_2 edu_{ic} + \gamma_3 (corr_c \times edu_{ic}) + \mathbf{X}'_{ic}\lambda + \mathbf{Z}'_c\delta + U_{0c} + R_{1c} + \eta_{ic}$$
$$(2)$$

where y_{ic} is the the dependent variable (political attitudes or political participation) for individual i in country c, γ_{00} is the average individual-level intercept, $corr_c$ is the country-level corruption, edu_{ic} is an individual's years of schooling, and $\mathbf{X}'_{ic}$ and $\mathbf{Z}'_c$ are vectors of individual-level and country-level covariates respectively. Finally, U_{0c} is the intercept variance, R_{1c} is the slope variance (for edu_{ic}), and η_{ic} is the individual-level error term.

Although the measures and specifications differ between the first and second set of models, the predictions are analogous. I consider this two different ways of testing the same hypotheses, that both have specific pros and cons. $H1$ and $H2$ are directly tested by estimating β_3 and γ_3 for the interaction term ($corr_{(i)c} \times edu_{ic}$) in equation (1) and (2). The next section reports the results from these models.

Results

Results for Political Attitudes

I present each model first *without* the interaction term, to be able to compare what happens when the interaction term is added in the subsequent model. Table 2 reports the results for my two measures of political attitudes. Education shows a consistently strong and positive association with self-regarding attitudes. A one year increase in education is estimated to increase the score on the index by about

Table 2 Predicting political attitudes: individual- and country-level corruption

	Self-regarding attitudes				Institutional attitudes			
	Individual-level corruption		Country-level corruption		Individual-level corruption		Country-level corruption	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education	0.058***	0.056***	0.065***	0.068***	0.023***	0.042***	0.035***	0.047***
	(0.0046)	(0.0073)	(0.0043)	(0.0058)	(0.0043)	(0.0043)	(0.0049)	(0.0049)
Low corruption	− 0.064	− 0.040			− 0.21***	− 0.12		
(Ref: no corruption)	(0.039)	(0.096)			(0.057)	(0.086)		
Moderate corruption	− 0.11**	− 0.17			− 0.53***	− 0.32*		
	(0.040)	(0.093)			(0.081)	(0.12)		
High corruption	− 0.11*	− 0.16			− 0.83***	− 0.37*		
	(0.043)	(0.11)			(0.094)	(0.14)		
Very high corruption	− 0.21**	− 0.25			− 1.06***	− 0.40*		
	(0.069)	(0.14)			(0.11)	(0.16)		
Low corruption * Education		− 0.0018				− 0.0071		
		(0.0053)				(0.0042)		
Moderate corruption * Education		0.0048				− 0.016*		
		(0.0053)				(0.0058)		
High corruption * Education		0.0041				− 0.036***		
		(0.0060)				(0.0066)		
Very high corruption * Education		0.0032				− 0.055***		
		(0.0081)				(0.0097)		
Corruption			− 0.022	0.015			− 0.21***	− 0.075
			(0.043)	(0.080)			(0.048)	(0.072)
Corruption * Education				− 0.0021				− 0.0083*
				(0.0041)				(0.0034)

Table 2 continued

	Self-regarding attitudes				Institutional attitudes			
	Individual-level corruption		Country-level corruption		Individual-level corruption		Country-level corruption	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Random intercept (var)			0.18	0.18			0.28	0.24
			(0.051)	(0.047)			(0.13)	(0.075)
Random slope (var)			0.00043	0.00041			0.00065	0.00050
			(0.00013)	(0.00012)			(0.00015)	(0.00014)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls			Yes	Yes			Yes	Yes
Country-fixed effects	Yes	Yes			Yes	Yes		
R2	0.23	0.23			0.32	0.32		
Log likelihood			− 39,260.3	− 39,260.0			− 38,580.9	− 38,577.9
Observations	32,222	32,222	30,511	30,511	32,222	32,222	30,127	30,127
Countries	31	31	29	29	31	31	29	29

Robust standard errors in parentheses. Models 1, 2, 5, and 6 were estimated using OLS regression, and models 3, 4, 7, and 8 were estimated using multilevel regression. Individual-level controls include: income, gender, age, age ^{2}, place of living, marital status, and incumbent support

Country-level controls include GDP per capita (logged), level of democracy, effective number of parties, and electoral system. *p < 0.05; **p < 0.01; ***p < 0.001

0.06–0.07, equaling 6–7% of a standard deviation. Corruption perceptions and country corruption is related to this outcome variable in some of the models, although not consistently (models 1–4). What is more, the estimates show no strong indication of education being *conditional* on corruption in any of the models predicting self-regarding attitudes. That is, none of the interaction effects are statistically different from zero (models 2 and 4).

Corruption is, on the other hand, strongly related to institutional attitudes, both at the individual and the country level. For instance, model 5 shows that respondents in the *very high corruption* category on average score about one standard deviation below (-1.061) respondents in the *no corruption* category on the institutional attitudes index. The country-level corruption measure points in the same direction and indicates that respondents in more corrupt countries score substantively lower on the index (model 7).

Education is, again, positively related to the outcome variable. However, the results also show a strong interaction effect between education and corruption. When conditioning on corruption, the association between education and institutional attitudes is clearly strongest *when corruption is low*. Moving from the *no corruption category* to the *very high corruption category* (model 6) is estimated to decrease the education coefficient from 0.042 to -0.013 (0.042–0.055), holding other variables constant. The cross-level interaction term shows similar results (model 8): moving from a country with 0 country-level corruption (roughly corresponding to Denmark or Sweden), to a country with 5 on this corruption measure (roughly corresponding to India or South Africa) is estimated to decrease education coefficient from 0.047 to 0.0051 ($0.047 - (0.0083 \times 5)$)—an effect not distinguishable from 0.

Another way of viewing the interaction results is that the 'corruption effect' is significantly less pronounced for respondents with low education (see Berry et al. 2012). For example, in model 8 the corruption coefficient indicate the effect of corruption on the outcome variable *when education is 0*. This coefficient (-0.075) is not statistically different from 0. Increasing the respondents education to 12 years (roughly the mean value in the sample) is estimated to increase the size of this coefficient to -0.18 ($-0.075 - (0.0083 \times 12)$)—a coefficient that is 2.3 times larger.

In sum, the estimated models lend strong support for *H*1. Education is strongly positively associated with the outcome variables in all models. However, when the effect is conditioned on corruption, the positive education-effect disappears (or even becomes negative) for institutional attitudes as corruption gets higher. This suggests that while individuals with higher education still perceive themselves as politically competent in a context with high corruption (positive self-regarding attitudes), they show substantively lower confidence in formal institutions compared to highly educated individuals in a low-corruption setting. Figure 3 illustrates these results graphically, plotting the effect of education (a one year increase) on the dependent variables, conditional on different individual- and country-levels of corruption (model 2, 4, 6, and 8).
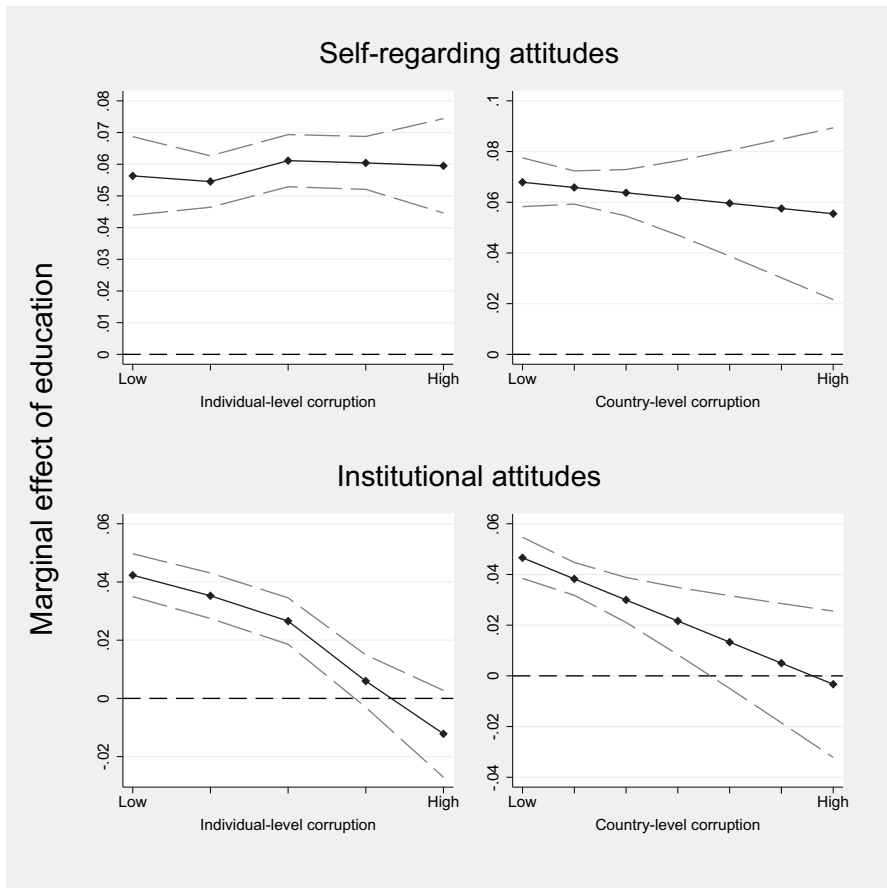
Fig. 3 The relationship between education and institutional attitudes, conditioned on different individual- and country-levels of corruption. The figures indicate the effect of a one year increase in education on the outcome variables. Based on Table 2; model 2, 4, 6, and 8

Results for Political Participation

My argument holds that these results should have consequences for political participation, especially for the relationship between education and political participation. This positive association is one of the most consistent results in political science. However, my argument suggests that this association might be conditional on institutional quality. The following analysis sets out to test this claim.

Following the procedure of the previous section, Table 3 reports the results for the models with and without the interaction term. The table displays the results for both the models using individual- and country-level corruption, and for both measures of political participation (voting and NIPP).

Starting with the voting-models, corruption is negatively associated with the probability of voting both for the individual-level measure (model 1) and for the

Table 3 Predicting political participation: individual- and country-level corruption

	Voting				Non-institutionalized participation			
	Individual-level corruption		Country-level corruption		Individual-level corruption		Country-level corruption	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education	0.069***	0.073**	0.098***	0.12***	0.068***	0.043**	0.085***	0.082***
	(0.016)	(0.023)	(0.014)	(0.018)	(0.0064)	(0.015)	(0.0071)	(0.010)
Low corruption	− 0.16*	− 0.22			− 0.052	− 0.31		
(Ref: no corruption)	(0.075)	(0.24)			(0.045)	(0.22)		
Moderate corruption	− 0.35***	− 0.45			− 0.076	− 0.57*		
	(0.083)	(0.27)			(0.053)	(0.23)		
High corruption	− 0.47***	− 0.35			− 0.040	− 0.65*		
	(0.077)	(0.25)			(0.070)	(0.28)		
Very high corruption	− 0.59***	− 0.092			0.0060	− 0.36		
	(0.074)	(0.22)			(0.078)	(0.20)		
Low corruption * Education		0.0043				0.017		
		(0.018)				(0.013)		
Moderate corruption * Education		0.0082				0.033*		
		(0.021)				(0.013)		
High corruption * Education		− 0.0096				0.042*		
		(0.020)				(0.017)		
Very high corruption * Education		− 0.043*				0.024		
		(0.019)				(0.013)		
Corruption			− 0.24	0.075			− 0.073	− 0.12
			(0.13)	(0.21)			(0.061)	(0.12)
Corruption * Education				− 0.018*				0.0021
				(0.0086)				(0.0051)

Table 3 continued

	Voting				Non-institutionalized participation			
	Individual-level corruption		Country-level corruption		Individual-level corruption		Country-level corruption	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Random intercept (var)			0.97	0.80			0.64	0.63
			(3.30)	(2.82)			(0.18)	(0.18)
Random slope (var)			0.0022	0.0017			0.0013	0.0013
			(0.0078)	(0.0066)			(0.00038)	(0.00038)
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls			Yes	Yes			Yes	Yes
Country-fixed effects	Yes	Yes			Yes	Yes		
Pseudo R^2	0.13	0.13						
Log likelihood			− 11,769.7	− 11,767.8	− 39,488.6	− 39,455.4	− 38,100.5	− 38,100.4
Observations	31,176	31,176	29,935	29,935	31,206	31,206	29,647	29,647
Countries	30	30	30	30	31	31	29	29

Robust standard errors in parentheses. Models 1 and 2 were estimated using logistic regression, and models 3 and 4 were estimated using multilevel logistic regression. Models 5 and 6 were estimated using Poisson regression, and models 7 and 8 were estimated using multilevel Poisson regression

Individual-level controls include: Income, gender, age, age^2, place of living, marital status, and incumbent support. Country-level controls include GDP per capita (logged), level of democracy, effective number of parties, electoral system, and compulsory voting. *p < 0.05; **p < 0.01; ***p < 0.001

country-level measure (model 3).[14] As expected, education shows a strong positive relationship with the dependent variable throughout all models. Adding the interaction term between education and corruption substantively affects the voting-model using country-level corruption. For a country with zero corruption the effect of a one year increase in education on the log odds of voting is estimated to be 0.12 (or a 13 percent increase in the odds), holding other variables constant. For a country with a 5 on the V-dem corruption scale, this association is instead estimated to be 0.03 $(0.12 - (0.018 \times 5))$, and not statistically distinguishable from 0.

While pointing in the same direction, the interaction-results are weaker for the individual-level corruption measure (model 2). Only the highest corruption category ('very high corruption') shows a significant interaction effect with education. However, moving from the 'no corruption' category to this category still means going from a strongly positive education-coefficient (0.073) to a weaker coefficient (0.03) that is not statistically different from 0.

The results for NIPP show some interesting patterns. When holding other variables constant, none of the corruption measures show a significant association with this measure, while the education-coefficients are positive and significant (model 5 and 7). A one year longer education is generally estimated to positively affect the log of the expected NIPP score ('the count') by around $0.070 - 0.080$. For the individual-level corruption measure, adding the interaction term *increases* the association between education and the dependent variable as corruption perceptions get higher (model 6). For the country-level corruption measure the education-coefficient remains strongly positive and significant when adding the interaction term. The interaction term itself is, however, not significant (model 8).

Overall, the results lend support to the assertion that corruption interacts with the relationship between education and political participation. First, the positive effect of education on voting essentially disappears in countries with high corruption, and for individuals who perceive corruption levels to be very high. For example, the estimated difference in probability of voting between an individual with (approximately) primary education (6 years of schooling) and an individual with some university degree (15 years of schooling) is 16 percentage points in a low-corruption country, whereas the same difference in a high-corruption country is 4 percentage points. At the same time, corruption does not seem to have the same negative effect on NIPP; the full models do not in general find a negative relationship between corruption and NIPP. Furthermore, the effect of education is *stronger* for individuals who perceive corruption levels to be high (model 6). Here, the difference between an individual with 15 years of education and an individual with 6 years of education is estimated to be 0.4 non-institutionalized political activities per year (the mean number of activities in the whole sample is 0.85). The same difference for individuals who perceive corruption to be low is 0.3.[15] While the interaction effect is not significant on the country-level, the association between education and NIPP does not seem to diminish in countries with high corruption. Taken together, this

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[14] The baseline estimate for the country-level model (model 3) is in the expected direction but does barely miss conventional level of statistical significance ($p = 0.06$).

[15] The estimates were calculated using Stata's *margins* command.

suggests that individuals with higher education put more emphasis on non-institutionalized participation when corruption is high. All in all, these results are consistent with *H2*. The results from the interaction models (2, 4, 6, and 8) are presented graphically in Fig. 4.

The fact that both modeling strategies in general yield very similar output (for all models) strengthens my confidence in the patterns displayed in the results section. In addition, I check in a number of ways to make sure that the main results are not dependent on specific variable and modeling choices. I also check that the results are robust to a different *relative* measure of education. The main results are unaffected by these analyses. The robustness checks and an extended discussion of different education measures are available in Appendix 2 and in the supplementary material.
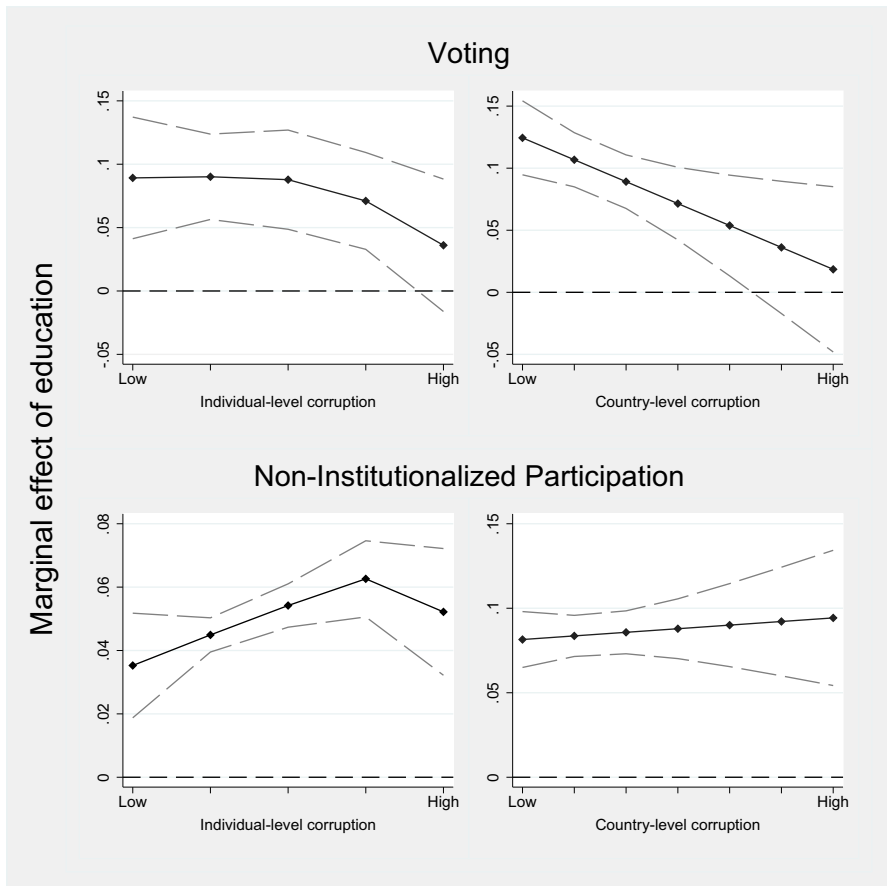

Fig. 4 The relationship between education and political participation, conditioned on different perceptions of corruption. The figures indicate the effect of a one year increase in education on the outcome variables. Based on Table 3; model 2, 4, 6, and 8

Conclusions

Education has consistently been found to be positively related to political participation, electoral turnout, civic engagement, political knowledge, and democratic attitudes and opinions. However, the findings in this paper suggest that this positive relationship is not always present. In particular, this study shows the importance of taking institutional quality and corruption into account when studying the relationship between education and political outcomes. It is increasingly clear that corruption is a problem affecting not only developing countries, but also established democracies (Warren 2004). Data show that even in western Europe—one of the most developed parts of the world—many regions face widespread corruption (Charron et al. 2015). Previous research has, however, not given sufficient attention to corruption as an important integral part in models of political attitudes, and has not considered how corruption interacts with traditional explanations for democratic behavior. I argue that this is especially important when it comes to education. Educated citizens are not only likely to be more well-informed about the actual workings of the current system, but are also often more critical (Botero et al. 2013; Norris 1999), and have been shown to react more strongly to a corrupt system that is clearly not working well (Anduiza et al. 2013; Caillier 2010; Chong et al. 2015; Seligson 2002).

By focusing on many different indicators of political attitudes and behavior this paper makes a more comprehensive argument about the intricate relationships between education, politics, and corruption than previous research. Empirically, this study shows that the relationship between education and political attitudes and behavior often is conditional on institutional quality. Here I build and expand on the work by Hakhverdian and Mayne (2012), and contribute to the vast literature on education and political behavior. For institutional attitudes, measuring external political efficacy and perceived system performance, the pattern is very salient: While education is associated with substantially more positive attitudes in low-corruption contexts, the positive relationship is completely absent (or even negative) in high-corruption contexts. On the other hand, the results do not indicate that citizens with higher education lose confidence in their own political abilities, or lose interests in politics generally, when corruption is high. This suggests that the highly educated are a special group of political actors in a high-corruption context; a well-informed group with positive beliefs about their own political ability, but with low expectation of the responsiveness of political institutions and the workings of democracy.

To return to a question posed in the introduction: are these citizens likely to be the much needed active and critical political actors in a society with high corruption? The answer to this question is multifaceted. On the one hand, the results suggest that the educated in a high-corruption setting are much more likely to withdraw from formal political participation, compared to educated citizens in a context of high-quality institutions. This result should give proponents of general education as a means of fighting corruption pause (for an overview, see Heather (2007)). Education cannot necessarily be expected to improve formal accountability

in a context of high corruption: It is the voters who are most likely to know about corruption, and who can be expected to react most strongly to corruption, that are most likely to withdraw from electoral participation. In a high-corruption setting these voters are no more likely to show up at the polls than citizens with low formal education [shown to care less about corruption in office (Anduiza et al. 2013)].

On the other hand, the results suggest that the highly educated in a high-corruption context are as active (or even more active) in the non-institutionalized political arena as citizens with high education in a low-corruption setting. This makes sense: citizens are likely to choose a mode of participation that they perceive as *effective* (Machado et al. 2011; Scartascini and Tommasi 2012). It is still an open question as to what extent this mode of participation is *in fact* is an effective way of holding politicians accountable and changing public institutions (see Hooghe and Marien 2014). However, recent protests in Romania show that non-institutional participation in a context with high corruption can be an effective means of influencing politics at the highest level and ousting corrupt politicians (The New York Times 2017). Future research should explore how stronger emphasis on non-institutional participation in high-corruption contexts affects the prospects for political accountability and institutional change, and what it means for political equality that the educated clearly are driving participation in the non-institutionalized, but not in the institutionalized political arena in such a context.

A study like this, resting on observational survey data, has of course its limitations. There exists no really good measure of corruption, and relying on citizen perceptions is known to have problems (Olken 2009). I have tried to tackle this problem by relying on two different modeling strategies. While no perfect solution, it is reassuring that the results from the individual- and country-level models show very similar patterns. Bias in self-reported voter turnout is another recurring issue without a good solution (Granberg and Holmberg 1991; Holbrook and Krosnick 2010). This warrants caution in the interpretation of the results on electoral participation. Still, I would argue that the overall results are intriguing, and that they open up several avenues for further research.

Future studies should also try to approach the question of the relationship between corruption and education with research designs directly aiming at detecting the *causal* effects of education in different contexts. Previous studies have, for instance, used exogenous shocks to education levels (new legislation) to detect such effects (e.g. Milligan et al. 2004). The prediction, based on the results in this paper, would be that such shocks have differential impact on political attitudes and engagement in countries with different levels of corruption. Finally, and most importantly, researchers should recognize that corruption and quality of government are important variables that shape political attitudes, interact with individual-level characteristics and resources, and that these variables need to be taken into account in future models on democratic attitudes and behavior.

Appendix

Appendix 1: Descriptive Statistics

See Tables 4, 5, 6 and Fig. 5

Table 4 Questions for operationalizing political attitudes. *Source* ISSP Research Group (2016). To make higher values indicate more positive self-regarding and institutional attitudes respectively, *Internal political efficacy 1*, *Political interest*, and *Political news consumption* were reverse-coded

Item	Question	Answer alternatives
External political efficacy 1	To what extent do you agree or disagree with the following statements? People like me don't have any say about what the government does	(1) Strongly agree (5) Strongly disagree
External political efficacy 2	To what extent do you agree or disagree with the following statements? I don't think the government cares much what people like me think	(1) Strongly agree (5) Strongly disagree
Satisfaction with democracy	On the whole, on a scale of 0 to 10 where 0 is very poorly and 10 is very well How well does democracy work in [COUNTRY] today?	(0) Very poorly (10) Very well
Personal profit (politicians)	To what extent do you agree or disagree with the following statements? Most politicians are in politics only for what they can get out of it personally	(1) Strongly agree (5) Strongly disagree
Internal political efficacy 1	To what extent do you agree or disagree with the following statements? I feel I have a pretty good understanding of the important political issues facing [COUNTRY]	(1) Strongly agree (5) Strongly disagree
Internal political efficacy 2	To what extent do you agree or disagree with the following statements? I think most people in [COUNTRY] are better informed about politics and government than I am	(1) Strongly agree (5) Strongly disagree
Political interest	How interested would you say you personally are in politics?	(1) Very interested (4) Not at all interested
Political news consumption	How often do you use the media, including television, newspapers, radio and the internet, to get political news or information?	(1) Several times a day (7) Never

Table 5 Descriptive Statistics

Variable	Obs	Mean	SD	Min	Max
Individual level					
Self-regarding attitudes	40,296	0.014	1.00	-3.13	2.51
Institutional attitudes	39,768	− 0.0037	1.00	-2.16	2.75
Voting	39,679	0.83	0.38	0	1
Non-institutionalized part.	39,445	0.85	1.27	0	7
Corruption	40,472	3.00	1.08	1	5
Education	44,853	12.48	4.12	0	29
Relative education	44,853	0.010	1.01	− 3.09	5.41
Income	38,091	1.90	0.82	1	3
Age	44,750	48.24	17.64	15	102
Female	44,852	1.53	0.50	1	2
Urban/rural resident	44,429	2.65	1.29	1	5
Married	44,853	0.55	0.50	0	1
Incumbent voter	44,853	0.41	0.46	0	1
Country level					
Corruption	44,853	1.63	1.56	0.067	4.91
GDP/capita (logged)	42,982	10.22	0.62	8.49	11.06
Democracy	44,853	8.54	1.01	6.09	9.61
Effective number of parties	41,797	4.25	1.85	1.55	8.42
Electoral system	41,797	2.086	0.62	1	3
Compulsory voting	44,853	0.10	0.30	0	1

Table 6 Relative education

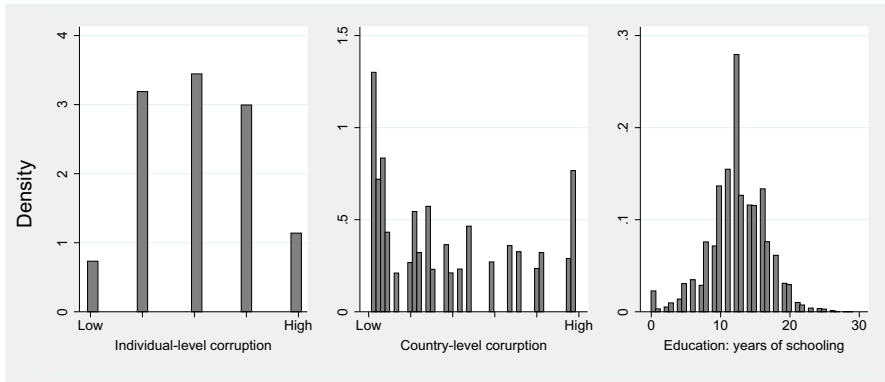| Age decile	Age		Years of schooling	
	Mean	SD	Mean	SD
1	21.61	3.00	12.91	2.89
2	28.56	3.69	14.05	3.54
3	34.81	4.36	14.00	3.82
4	40.40	4.89	13.36	3.87
5	46.02	5.06	12.99	3.82
6	51.43	5.27	12.63	3.99
7	56.68	5.19	12.13	3.88
8	62.25	4.68	11.62	4.10
9	68.50	4.53	10.87	4.38
10	78.11	5.90	9.82	4.83
Observations	44,750			

Fig. 5 Distribution of the main independent variables

Appendix 2: Robustness Checks

Sensitivity checks This section presents a number of robustness and sensitivity checks. In the interest of space, most of the results are reported in the supplementary material.

The exact composition of my indicies is not a given. I therefore re-estimated the main models in Table 2 with each individual component of the two indicies separately. The results for each individual component resemble the results for the overall index closely (reported in the supplementary materials). I also replicate the country-level results instead using Transparency international's CPI measure of corruption, and re-run all main models without excluding Russia and Venezuela from the sample. In addition, I estimate the NIPP-models using negative binomial regression as an alternative modeling strategy, and re-run the main multi-level models controlling for country-level *inequality*. Finally, the dataset contains a non-negligible amount of missing data. To alleviate concerns about this, I re-ran the main interaction models with imputed data. All results are available in the supplementary material and show no relevant deviation from the results presented in the main text.

Education and political participation As noted in the main text there exists a quite extensive debate about the nature of the relationship between education and political participation, and to what extent this should be regarded as a causal relationship (see Persson (2015) for an overview). Given the data used in the study at hand, the main contribution is not resolving the debate on causality with regard to this relationship. However, it is still important to consider what this debate implies for the general argument put forward in this paper.

Many authors argue that the relationship between education and political participation indeed, at least to some extent, is a causal relationship (e.g. Dee 2004; Mayer 2011). Other studies argue that the observed relationship is mostly the result of a selection effect (e.g. Berninsky and Lenz 2011). Many studies in the latter

category argue that the value of education with regard to political participation is *relative*, rather than *absolute* (e.g. Nie et al. 1996; Tenn 2005). In this model, education works as a 'positional good' that increases the likelihood of political participation, where individuals with high social status are more likely to be exposed to networks that encourage political participation. Here, education depends on the level of education in one's 'environment'. The value of individual education can thus for example change over time as the overall education environment changes (Persson 2015). The assumption in the paper at hand is an education model that most closely resembles the 'absolute education model', where education increases civic skills and political knowledge that in turn increase political participation. While there is an ongoing debate about which 'education model' best describes reality, it is reasonable to consider whether the results would be different if the 'relative education model' is true.

I argue that the empirical predictions are essentially the same, no matter which 'education model' is true. The 'relative education model' argues that effect of education is indirect, rather than direct. It is still true, however, that people with higher education have higher political knowledge and are more politically informed, even if this is not the primary *reason* for why they participate more politically. In a context with high corruption this creates a situation that is very similar to the main argument described in this paper: Highly educated have a higher propensity to participate politically in general (because they are encouraged by people in their network), but when corruption is high they also realize that formal political participation is inefficient (they are more likely to realize this because they are more well-informed). The empirical prediction in this case is thus essentially the same: the positive effect of (relative) education can be expected to be attenuated when corruption is high.[16]

To empirically test if a different measure of education affects the main results I re-estimated all main model using the following education measure:

$$RE_{iac} = \frac{edu_{iac}}{\overline{X}_{ac}} \tag{3}$$

where RE_{iac} is the relative education score of individual i, belonging to age decile a in country c. edu_{iac} is an individual's education in years, and $\overline{X}_{ac}$ is the mean years of education for age decile a in country c (as estimated from the data). This measure thus gives each individual an education score that is *relative* to his or her age decile in his or her country. The distribution (for the full sample) of the mean years of schooling in different age deciles is shown in Table 6. Using this new measure of relative education, I re-estimated all the main models. The full results are available in the supplementary material and do not deviate from the overall results presented in the main manuscript.

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[16] The discussion on absolute versus relative education most clearly relate to the topic of *political participation*. It is not obvious how (if at all) the 'relative education model' relates to the different political attitudes (self-regarding and institutional) that I discuss in the main text. However, for completeness, I rerun all my main models with a measure of *relative education* to explore empirically if this affects the results.

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