Is education still the universal solvent?

Why personality traits, intelligence and social context complicate our understanding of the role of education for good democratic citizenship

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Why personality traits, intelligence and social context complicate our understanding of the role of education for good democratic citizenship
Acknowledgements

Much of the effort put into this dissertation stems from pure frustration; not so much from writing the dissertation, although that has at times been frustrating too, but from how political science has traditionally conceived of individuals as either rational agents or as over socialized blank slates. If anything this dissertation clearly demonstrates that in fact individuals are just that: Individuals, not simply hedonic utility maximizers only constrained by institutional rules and incentives nor empty vessels highly influenced by societal norms and values.

Another frustration that has made me work overtime on many occasions, and thus also increased the effort going in to the dissertation, is the issue of measurement, which quite frankly is something that political scientists need to pay much closer attention to. Working in the field of public opinion most acknowledge that measurement error is rampant and that different operationalizations of the same construct can lead to different results and implications in different studies. Nonetheless researchers still recite the literature as if the results from different studies using different operationalizations of the same construct could somehow be compared seamlessly and researchers still ignore the issue of measurement error on a daily basis as if it didn’t exist. An old saying goes that “something beats nothing” but if researchers aren’t using the same measures and if most of the measures are very weak then “something equals nothing”.

A final frustration has come from discussions with my twin brother, who is currently doing a PhD on microRNA and cancer stem cells, who keeps on insisting that political science isn’t really a science. Nonetheless he has been willing, from time to time, to read some of my work and discuss various topics related to the field of political science, which he refers to as “reading newspapers”. His “support” has helped me understand some of the limitations of the field political science and to sharpen my arguments when needed.
I cannot claim to have found the magic panacea that allows me to magically sidestep these frustrations but at least I have tried to take the challenges of individuality, measurement and the “science” in political science seriously, which hopefully challenges other researchers to do the same. Perhaps a project borne out frustration is not how the idealized social scientist ought to work but on the other hand the experience of writing this dissertation has taught me that science is, although an ideal to aspire to, not always conducted according to the ideal.

Along the way many people have contributed to the project and according to custom I will therefore list the academic contributors first and then turn to the more social parts of the process of giving thanks. First and foremost I would like to thank my main advisor professor Asbjørn Sonne Nørgaard who has helped me every step of the way as well as challenged me time and again to be more precise, ambitious and meticulous; as well as to keep my focus on the political side of political psychology. He has commented on various drafts of the papers innumerable times and provided both theoretical and substantive critique, and what at times seemed to be nitpicky comments about the “wording of the last sentence in footnote 23”, has helped all articles be more complete works by his very keen eye for details.

People sometimes write in their acknowledgements that their advisor “had faith in the project throughout” but, at least for this project, that would certainly be a misnomer as the “project” has changed time and again. In fact all articles have been written during my last year as a PhD student, with some minor editing afterwards, because I decided, after consultation with my advisor Asbjørn, to change the theme of the project for the last time within the last year. The first time I met Asbjørn was at a café in Copenhagen in 2010, for a job talk as a PhD student together with Peter Thisted Dinesen, where we discussed the heritability of individual differences and ended up discussing why people hadn’t focused on the construct intelligence in political science seeing as this is also a highly
heritable construct and thus potentially important for understanding how and when genes impact political behavior. Asbjørn ended up hiring me and I started to work on intelligence and political behavior. To me this is a much more realistic view of science and of life in general: It is randomness, chance events, and chance encounters which lead to scientific progress and novel insights.

There has of course been other people involved in the project who, in chronological order, has also commented on the project in its various phases: Peter Thisted Dinesen, who was initially my co-advisor, helped in the initial stages of the project, setting up the questionnaire, and commenting on relevant themes to include and exclude as well as the overall research project. Robert Klemmensen’s gregarious personality, and his great knowledge of literally anything and everyone, from the do’s and don’ts of being an academic, to detailed knowledge of every soccer game Brøndby has ever played, has made the experience of being a PhD student at SDU a great pleasure. Pete Hatemi has also commented on various parts on my project from the very beginning, from theoretical contributions to comments on how best to conduct hierarchical factor analysis; his help has been much appreciated. I owe a special debt of gratitude to Professor Matt McGue who invited me to visit the University of Minnesota’s department of psychology in the fall of 2012. Matt is academically a giant in his field and in addition also one of the most generous and helpful persons I have ever met. The U of M’s department of psychology is, within the field of individual differences and behavioral genetics, one of the leading departments in the world and my stay there was a great pleasure as the academic environment is simply excellent. While I was there I also had the chance to discuss my project with various people among others Colin DeYoung, who helped my understanding of the theoretical underpinnings as well as the measurement of the Big Five tremendously. Christopher Federico, an expert in the field of political expertise, also helped further my understanding of this important political construct, and I was also so fortunate that he had the chance to comment on my paper on political sophistication which improved the paper significantly. Paul Sniderman
commented on the design and contents of my questions on political tolerance during his visit to
SDU and Christopher Dawes helped me improve my paper on political sophistication quite a lot by
his insightful comments; both deserve great thanks. My second co-advisor Michael Bang Petersen,
has also read and commented on several papers, as well as the project in its entirety and his creative
playfulness and insightful comments have been both helpful and frustrating. Finally, a great thanks
should go out to SDU which has provided an excellent place to be for a PhD student such as myself
with a welcoming working environment and professional assistance when needed even though I had
never set foot on SDU before my first day as a PhD student. A personal thanks also goes out to
Poul Skov Dahl, who let me work out of my home in Copenhagen for an extended period of time,
when personal circumstances demanded my attention elsewhere than SDU.

I owe a special debt of gratitude to my wife who has been a great support throughout the project,
and didn’t complain when I told her that we had to go to Minnesota for a semester and didn’t
complain a lot when I told her I had to attend a week long course in Colorado two weeks after our
second child was born. This dissertation would not have been possible to do without her. On the
25th of April 2012 my first son was born and on the 6th of February 2014 my second son was born.
Having children has been a, quite literally, life-changing experience. It would probably go too far to
say that terrible sleep and moody outbursts have actually helped me in completing my dissertation,
but they have probably provided a healthy distraction. This dissertation is dedicated to them.
Needless to say all remaining errors and omissions are mine.

Copenhagen 2014

Stig Hebbelstrup Rye Rasmussen
Preface

This report is part of my PhD dissertation “Is education still the universal solvent? Why personality traits, intelligence and social context complicate our understanding of the role of education for good democratic citizenship”, written at the Department of Political Science at the University of Southern Denmark. The PhD project studies to what extent and why, or why not, education still remains “the universal solvent” with regards to good democratic citizenship when we take into account that people differ in their personality traits and intelligence. The project consists of four papers:

1. Rasmussen, Stig Hebbelstrup Rye (2013): Education or personality traits as determinants of political sophistication (Working paper)
3. Rasmussen, Stig Hebbelstrup Rye (2014): Disentangling the role of education, intelligence and political knowledge in policy voting (Under review)

This report primarily summarizes what the papers have in common and not what is particular to each of the papers or to paraphrase the inventor of factor analysis, Charles Spearman’s notion of the general factor of intelligence $g$ (Spearman 1904, 284): “all branches of intellectual activity have in common one function (or group of functions), whereas the remaining or specific elements of the activity seem in every case to be wholly different from that in the others.”

Chapter 1 discusses the overall framework and outlines the research questions addressed in this dissertation. Chapter 2 outlines the causal framework. Chapter 3 discusses how to study the
theoretical framework and chapter 4 outlines the contents of the two important constructs personality traits and intelligence; in terms of what the construct of education actually is I will return to that in chapters 6 and 7. Chapter 5 describes the datasets used. Chapter 6 discusses the main findings and chapter 7 outlines the main implications of the findings.
Chapter 1 Introduction and research questions

Is education the universal solvent?

Traditionally education has been conceived as a democratic liberator: Many political scientists in the 1950s and 1960s foresaw a more democratic society pending the upcoming educational revolution (Brody 1978; Converse 1972; Stouffer [1955] 2009; Sullivan and Hendriks 2009). Current consensus in political science has it that those who are more educated are more politically tolerant, sophisticated, politically engaged and participate more at all levels; in short, the educated citizen is the democratic citizen (Carpini and Keeter 1996; Nie, Junn, and Stehlik-Barry 1996; Sullivan and Hendriks 2009; Verba, Schlozman, and Brady 1995). This line of reasoning was most forcefully argued by Philip Converse in 1972 whose quite famous quote, has served as a leitmotiv for this dissertation (1972, 324):

“Whether one is dealing with cognitive matters such as level of factual information about politics or conceptual sophistication in its assessment; or such motivational matters as degree of attention paid to politics and emotional involvement in political affairs; or questions of actual behavior such as engagement in any variety of political activities from party work to vote turnout itself: education is everywhere the universal solvent and the relationship is everywhere in the same direction.”

Some years later Richard Brody, writing about political participation, was puzzled why levels of turnout had not increased despite sizeable increases in levels of education (Brody 1978). Although not completely forgotten in the meantime, this debate on what can be termed “the causal effect” of education has had something of a renaissance in recent years.

There are critics who argue that the traditional effect ascribed to education is in fact confounded by predispositions and preadult experiences i.e. that predispositions and preadult experiences affects differences in levels of education as well as differences in political outcomes (Elwert 2013); I will elaborate on this point in chapter 2. Two of the most outspoken exponents of this view are Kam and Palmer who, using a matching procedure, study the effect of higher education on political
participation (2008, 616, emphasis added): “We suggest that the same preadult experiences and predispositions (values, intelligence and/or cognitive skills, and personality traits) that propel individuals to pursue education might also propel them into political participation in later life”. Their argument is that education is not a “cause” but a “proxy” for preadult experiences, such as parental socioeconomic status, and predispositions such as personality traits and intelligence (Kam and Palmer 2008). Somewhat similar findings on political participation has been presented by Berinsky and Lenz, using an instrumental variables technique (Berinsky and Lenz 2010), and Benjamin Highton also reports no effect of post-secondary education on political sophistication using panel data (Highton 2009).

There has of course been counter claims and counter critics. For instance Sondheimer and Green, using a field experiment, do find an effect of differences in education on turnout, (Sondheimer and Green 2010) and the study by Milligan, Moretti and Oreopoulous as well as the study by Dee, both studies use an instrumental variables technique, find an impact of education on participation and civic engagement respectively (Dee 2004; Milligan, Moretti, and Oreopoulous 2004). The major problem with all these referenced studies is that none of them actually have any measures of the factors that are purportedly confounding the effect of education on political outcomes. A major goal of this dissertation was therefore to theorize when and how education is likely to be confounded by personality traits and intelligence, as well as to actually test the theorized hypotheses by directly measuring and including the hypothesized traits into empirical models.

The increased focus on the potential confounding of education by predispositions is supported by a general focus on the role of personality traits in political behavior. Most political scientists, and most personality psychologists as well, take their point of departure in the consensus model for personality traits which state that most of individual differences in personality can be described by
five basic traits, the so-called Big Five model (John, Naumann, and Soto 2008). The traits are Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. I will elaborate on the contents of the traits in chapter 4 but the labels used to describe them provide an intuitive understanding of what they represent.

Political scientists have e.g. studied the effect of personality traits on political participation (Mondak and Halperin 2008; Mondak et al. 2010) ideology, vote choice and partisanship (Caprara, Barbaranelli, and Zimbardo 1999; Gerber et al. 2011d; Gerber et al. 2010) and political knowledge and political discussions (Gerber et al. 2011b; Gerber et al. 2012; Hibbing, Ritchie, and Anderson 2011). These studies have not had as their main goal to investigate the relationship between education and personality traits across different political outcomes although this topic has also been addressed at a general level. For instance Gerber et al., studying the effect of personality traits on political ideology, argue that (Gerber et al. 2010, abstract): “…the effect of Big Five traits is often as large as that of education or income” and Mondak has analyzed the overlap between personality traits and demographics and argued that the overlap is, generally speaking, fairly small (Mondak 2010, chapter 3). This finding would seem to imply that Kam and Palmer are necessarily incorrect when they assert that education might be a “proxy”, but as argued below, we need to assess the overlap between education and predispositions on a case by case basis.

This dissertation builds on the results of this research in order to better understand the relationship between education and predispositions by focusing on the important predispositions personality traits and intelligence. In order to grasp the relationship between education and personality traits we need to first of all understand why education affects political outcomes. Two
primary reasons have been used: Because education affects (1) *motivations* and *cognitions*¹ and (2) because education affects *social positioning* (Converse 1972; Nie, Junn, and Stehlik-Barry 1996).²

In terms of the first explanation, that education affects motivations and cognitions, we know that those who are more educated are more politically interested (Carpini and Keeter 1996; Verba, Schlozman, and Brady 1995), which is the archetypical example of a motivational factor in politics, and we also know that those who are more educated are more politically sophisticated (Bennet 1989; Carpini and Keeter 1996; Jennings 1996; Lambert et al. 1988; Neuman 1986; Nie, Junn, and Stehlik-Barry 1996; Smith 1989), the archetypical example of a cognitive factor.

Personality traits are directly tapping into cognitive, motivational and affective factors. In fact personality can be defined as (Caprara et al. 2006, 3):

> “a set of dynamic, self-regulatory systems that emerge and operate over the life course in the service of personal adaptations (Caprara & Cervone, 2000). These internal systems guide affective, cognitive, and motivational processes, directing people toward achieving individual and collective goals.”

Personality traits are intimately linked to cognitive, motivational and affective factors. In fact they are, by definition, exponents of cognitive, motivational and affective factors. Seen in this light it is no wonder if they confound the effect of education. Furthermore intelligence, perhaps the most important cognitive factor, is clearly also important to take into account if we want to understand whether education has any independent impact on cognitive factors. Intelligence has been defined thus (Gottfredson 1997, 13):

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¹ This taxonomy consisting of cognitive and motivational factors builds on the distinction between cognitive, conative and affective factors (Hilgard 1980), but education has not traditionally been ascribed to affective factors in political behavior and I will therefore simply note that this is an important difference between education and personality traits as affective factors for personality traits have been integral.

² These two ways education affects politics roughly corresponds to what Converse termed “the education driven model” versus education as an expression of a “relative pecking order” (Converse 1972) and what Nie, Junn and Stehlik-Barry terms “the absolute education model” versus the “sorting model” of education (Nie, Junn, and Stehlik-Barry 1996).
“Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience.”

Intelligence is clearly a cognitive construct. Although both personality traits and intelligence are, to some extent, both cognitive constructs, there are also important differences between them. Intelligence has primarily been used as a measure of cognitive abilities (Jensen 1998), and is usually related to maximal performance (Cronbach 1949), whereas personality traits have traditionally been used as measures of cognitive styles and are usually related to typical performance (DeYoung 2011). For those constructs which are highly cognitively demanding in terms of processing power there is a good chance the effect of education is therefore confounded by intelligence. For instance, it is reasonable to speculate that those who are more intelligent are better able to link their ideological affinities to a party choice which matches their preferences, i.e. to deduce how best to link abstract ideological principles to a specific party choice. Since I have measures of both personality traits and intelligence I am therefore able to investigate whether the effect on political outcomes is more confounded by: (1) Personality traits, i.e. motivations and cognitive styles, or (2) intelligence, i.e. cognitive abilities. Whenever I am referring to “motivations and cognitions”, in the following, I am referring to the influence of both intelligence and personality traits. Only when I am explicitly using the terms cognitive styles and cognitive abilities am I referring to either personality traits or intelligence.

The sternest advocates of the second explanation, that education affects social positioning, are Nie, Junn and Stehlik-Barry in their landmark book on education and democratic citizenship. Here they argue that education grants people resources in the forms of status, access and influence primarily via central social network positions (Nie, Junn, and Stehlik-Barry 1996). This framework has since been further tested and elaborated (Campbell 2009; Helliwell and Putnam 2007; Persson 2011; Tenn 2005) but many of the main premises still stand. Whereas personality traits and intelligence are likely
to confound the effect of education when it comes to motivations and cognitions there is less theoretical reason to expect them to confound the effect of education when it comes to the effect education has on social positioning. It has been demonstrated that e.g. Extroversion affects the size of a person’s network (Mondak 2010; Mondak et al. 2010) but as put succinctly in paper 4 (Paper 4, 6): “Even though being extrovert will help you gain friends and, hence, attain a larger social network, only education will ensure that these friends are people with proximity to political power. While personality will help you get friends, education will help you get the ‘right’ sort of friends.”

There is an important difference in the way education is theorized to affect social positioning versus how education is theorized to affect cognitive and motivational factors: Education can have a relative effect on social positioning whereas it should only have an absolute effect on cognitive and motivational factors (Campbell 2009; Nie, Junn, and Stehlik-Barry 1996; Persson 2011; Tenn 2005). I will elaborate on this below but an example can illustrate the point. In paper 4 it is argued that the effect of education on internal efficacy, the feeling of competence in politics, is primarily cognitive and motivational whereas the effect of education on external efficacy, the perception that government is response to one’s needs, is primarily positional. In a given society there are only a finite number of important positions. This means that as more and more people are educated, wealthy or rich, the competition over the fixed number of positions increases and the effect of education on external efficacy decreases. In short education has a relative effect on external efficacy. Conversely, just because a person feels that he understands politics, i.e. is internally efficacious, does not imply that others cannot feel the same way: The effect of education on internal efficacy is absolute.

The effect of education on social positioning is only theorized to be relative when the construct itself is competitive however. The reason why the effect of education on external efficacy is theorized
to be relative is because there are only so many people toward which government can be responsive at the same time (Baumgartner and Jones 2009; Jones and Baumgartner 2005; Nie, Junn, and Stehlik-Barry 1996). The fact that education grants people access to networks is also likely to affect the opportunity to become politically informed (Carpini and Keeter 1996; Luskin 1990). However, political information is clearly not a competitive construct; just because my neighbor knows who the prime minister, is does not imply that I cannot be aware of this fact.

This discussion highlights three important points: (1) The effect of education on cognitive and motivational factors is theorized to be absolute. The effect of education on social positioning is theorized to be (2) relative when it is a competitive context, i.e. the effect of education is moderated by the degree of competition, (3) absolute in a non-competitive context, i.e. the effect of education is not moderated in this setting.

Converse’ original universal solvent claim, as well as many current discussions of the claim, is fairly broad in scope, and therefore difficult to subject to empirical investigation. The phrase “the universal solvent” was originally used to describe a substance able to dissolve all other substances, while itself remaining unaffected, and was very much sought after by the alchemists; the so-called alkahest. Although education potentially has many effects on political outcomes, most current studies on the universal solvent claim have focused on constructs related to democratic citizenship, and for good reason. One of the reasons why education is such an important construct to study is precisely because of its democratic promise: More education leads to more democratic citizens. This dissertation therefore investigates the effect of education on democratic citizenship to investigate the universal solvent claim. More to the point, whereas most studies have focused on a single construct related to democratic citizenship, such as political participation I investigate different aspects of

3 http://www.merriam-webster.com/dictionary/alkahest
democratic citizenship in order to understand in a more systematic fashion, when and why the effect of education on democratic citizenship is likely to be confounded.

According to Nie, Junn and Stehlik-Barry democratic citizenship consists of the two elements political *engagement* and political *enlightenment*, which they, explain thus (Nie, Junn, and Stehlik-Barry 1996, 20): “We describe the two dimensions of enlightened political engagement as the capability of identifying and acting on political interest and the recognition of democratic principles and the rights of all citizens to hold and express interests”. When a person is both politically engaged and enlightened I refer to this as “good democratic citizenship” (GDC). In this investigation these two elements of GDC are operationalized by studying the effect of education on the following constructs:

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition of construct</th>
<th>Measurement</th>
<th>Element of GDC</th>
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<tbody>
<tr>
<td>Political sophistication</td>
<td>“the range of factual information about politics that is stored in long-term memory” (Carpini and Keeter 1996, 10)</td>
<td>13 questions on factual knowledge of politics covering the areas “people's and players”, “the substance of politics”, and the “rules of the game” (c.f. Carpini and Keeter 1996, chapter 2)</td>
<td>Political enlightenment/ political engagement</td>
</tr>
<tr>
<td>Political tolerance</td>
<td>“tolerance means putting up with that which one disagrees. It means allowing one’s political enemies to compete openly for political power. A tolerant citizen is one who would not support unreasonable or discriminatory restrictions on the rights of groups to participate in politics” (Gibson 2006, 23)</td>
<td>Four items on granting civil liberties towards the Neo Nazis or the Far Right</td>
<td>Political enlightenment</td>
</tr>
<tr>
<td>Policy rating</td>
<td>Casting a vote which is based on ideological principles (Goren 2013)</td>
<td>The correspondence between a person’s ideological principles, measured using a six item scale on left-right differences, and a person’s vote and ideological self-identification</td>
<td>Political engagement</td>
</tr>
<tr>
<td>Internal efficacy</td>
<td>The extent to which individuals find that they understand politics and the process of governing (Balch 1974; Converse 1972; Craig 1979; Craig and Maggioro 1982; Craig, Niemi, and Silver 1990; Niemi, Craig, and Mattei 1991)</td>
<td>Three item index of which two are the so-called UNDERSTAND and COMPLEX items (Niemi, Craig, and Mattei 1991)</td>
<td>Political engagement</td>
</tr>
<tr>
<td>External efficacy</td>
<td>The extent to which individuals perceive the government to be responsive to one’s needs (Balch 1974; Converse 1972; Craig 1979; Craig and Maggioro 1982; Craig, Niemi, and Silver 1990; Niemi, Craig, and Mattei 1991)</td>
<td>Two item index using the so-called NOSAY and NOCARE items (Niemi, Craig, and Mattei 1991)</td>
<td>Political enlightenment</td>
</tr>
</tbody>
</table>
Not all constructs neatly fit into either of the categories of democratic citizenship but they are all related to the overall construct GDC. Three points deserve elaboration. First of all political knowledge relates to both dimensions of GDC since the knowledge battery measures both “people’s and players” in politics, the “substance of politics”, as well as the “rules of the game” i.e. institutional rules in the process of government such as who is eligible to be a minister in Denmark (Carpini and Keeter 1996, chapter 2). The first two elements are part of the political engagement dimension whereas the last element is part of the enlightenment dimension (Nie, Junn, and Stehlik-Barry 1996, chapter 2). Besides, becoming knowledgeable about politics requires effort.

Secondly, Nie, Junn and Stehlik-Barry write that external efficacy (Nie, Junn, and Stehlik-Barry 1996, chapter 2, footnote 22): “may be more closely related to the democratic enlightenment dimension, but we did not include it because it does not signify a commitment to democratic values and principles”. Plenty of other scholars do however regard external efficacy as a measure of system support (Easton and Dennis 1967; Iyengar 1980; Sullivan and Riedel 2001).

The third and final comment concerns political participation, which I have not directly studied in this dissertation, although this construct is part and parcel of GDC. I do however reflect on the likely impact of education on this construct in light of the findings and the theoretical apparatus in the conclusion. Also, in the study of policy voting I cover at least one aspect of political participation, i.e. vote intention.
Summing up this PhD builds on and extends current research investigating the confounding of education and the role of personality traits in politics by:

- Investigating specifically the relationship between predispositions and education rather than the relationship between socio-demographics and personality traits generally.
- Including *intelligence* as an important predisposition whereas previous literature has primarily focused on personality traits.
- Focusing explicitly on the effect of education on different aspects of good democratic citizenship after personality traits and intelligence are held constant.

Based on the discussion above this dissertation set out to answer the following, so far unanswered, research questions:

- To what extent does education influence good democratic citizenship, when we take into account that individuals differ in terms of their predispositions, independent of their level of education?
- What explains the influence, or lack of influence, of education on good democratic citizenship?

The framework for understanding the confounding of education by predispositions is outlined in the figure below, as well as where the different papers fit in. The figure illustrates the three different *pathways* education has traditionally been perceived to affect GDC, i.e. its effect on social positioning, its effect on cognitive styles and motivations, and its effect on cognitive faculties.
Figure 1: Framework for understanding the confounding of education on good democratic citizenship by predispositions

Social positioning
Less likely to be confounded by predispositions

Cognitive styles and motivational factors
Potentially confounded by personality traits

Cognitive ability
Potentially confounded by intelligence

Situational factors
(Competitive situations moderate the effect of education, but non-competitive situations do not)

Political knowledge (Paper 1)
External efficacy (Paper 4)

Political knowledge (Paper 1)
Internal efficacy (Paper 4)

Political tolerance (Paper 2)
Policy voting (Paper 3)

Good democratic citizenship
Political knowledge (Paper 1)
Political tolerance (Paper 2)
Policy voting (Paper 3)
Political efficacy (Paper 4)
Chapter 2: Causal framework

This section discusses the overall causal model. The main focus here is on how the different elements of the causal model are related whereas the contents of the different elements will be discussed in the coming chapters. The figure below illustrates:

Figure 2: Causal model for understanding the confounding of education by predispositions

The causal model is primarily based on the framework outlined by Mondak and collaborators on traits in political behavior (Mondak et al. 2010), as this is the most relevant for this political science dissertation but in fact very similar frameworks have been proposed in psychology some years ago (McAdams and Pals 2006; McCrae and Costa 2003). A full account of this and similar frameworks can be found in (McAdams and Pals 2006; McCrae and Costa 2003; Mondak et al. 2010).

The main argument in this dissertation is that the effect of education on GDC is confounded by the predispositions personality traits and intelligence when it comes to the effect of education on cognitions and motivations. More technically this implies that education is, at least partially, caused by differences in predispositions and that, part of the reason, why education is associated with GDC is because of predispositions giving rise to both differences in levels education and differences in

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4 Only the elements from (Mondak et al. 2010) with direct impact on this investigation are included; their framework is somewhat more general in scope and more detailed. Furthermore following the convention in graphical causal models this general framework does not make any assumptions about the parameterization of the causal framework, such as the importance of interaction effects, or any other type of relationship between variables (Elwert 2013). The parameterizations used can be found in the individual papers.
levels of GDC. This is also the reason why this type of relationship is called *common cause* confounding since predispositions is the common cause affecting both levels of education and levels of GDC (Elwert 2013). This is a theoretical assertion but it does have some testable implications which allow us to assess some of the implications of this hypothesized theoretical model.

First of all education and predispositions should be related, and secondly the aspect of GDC studied should be related to both education and predispositions. These preconditions are a necessary but not sufficient condition. In terms of the second requirement there are already, as discussed in the introduction, a multitude of studies demonstrating the importance of personality traits for political outcomes (Caprara, Barbaranelli, and Zimbardo 1999; Gerber et al. 2011a; Gerber et al. 2011c; Gerber et al. 2010; Mondak 2010; Mondak and Halperin 2008; Mondak et al. 2010). Although less frequently used, there are also beginning to be studies on the importance of intelligence in terms of explaining differences e.g. vote choice and political ideology (Bouchard et al. 2003; Deary, Batty, and Gale 2008; Hodson and Busseri 2012; Stankov 2009). There are literally hundreds, if not thousands, of studies on the effect of education on the different aspects of GDC that I am focusing on here. Some overviews are found in (Abramson 1983; Carpini and Keeter 1996; Goren 2013; Sullivan and Riedel 2001; Sullivan and Hendriks 2009).

In terms of the first requirement, that education and personality traits should be related, there is also evidence of this fact (Goldberg et al. 1998). Below I have reproduced the correlations from an American study reporting correlations between years of education and the Big Five (Goldberg et al. 1998). In addition I have calculated the same correlations for the two samples used in this dissertation. I will elaborate on the two samples below but they can for the purposes of the comparison below briefly be described in the following manner:
The first sample is a representative sample of the Danish population employing a standardized measure of personality traits and also includes a measure of years of schooling.

The second sample is an age restricted sample, consisting of young men and women primarily in the age group 19-23, which employs the same standardized measure of personality traits as in the representative sample, but also includes the intelligence test from the time they were drafted to the military, which is why this sample is termed the “draftee sample”. This sample also employs a very similar measure of years of schooling to the one used in the representative sample.

<table>
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<tr>
<th></th>
<th>Goldberg et al</th>
<th>Draftee sample</th>
<th>Representative sample</th>
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<tbody>
<tr>
<td>Openness</td>
<td>0.34</td>
<td>0.19</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>(0.12 – 0.25)</td>
<td>(0.22 – 0.29)</td>
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</tr>
<tr>
<td>Conscientiousness</td>
<td>0.11</td>
<td>0.08</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>(0.01 – 0.15)</td>
<td>(0.08 – 0.14)</td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>-0.03</td>
<td>0.05</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>(-0.02 – 0.12)</td>
<td>(0.07 – 0.13)</td>
<td></td>
</tr>
<tr>
<td>Agreeableness</td>
<td>-0.12</td>
<td>0.10</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>(0.03 – 0.17)</td>
<td>(-0.01 – 0.06)</td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-0.06</td>
<td>-0.03</td>
<td>-0.06</td>
</tr>
<tr>
<td></td>
<td>(-0.10 – 0.04)</td>
<td>(-0.10 – (-0.03))</td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td>Not available</td>
<td>0.32</td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.24 – 0.41)</td>
<td></td>
</tr>
</tbody>
</table>

*The correlations between years of schooling and the Big Five personality traits are based on the scale scores of the Big Five as outlined in the scoring manual. The correlation between years of schooling and the intelligence test is based on the total test score from the draft test.

The correlations between the draftee samples and the representative sample are fairly similar in terms of size and in all cases the sign is the same. The largest differences are between the correlations between years of schooling and Openness and between years of schooling and Conscientiousness but in both cases the confidence intervals overlap, so the differences could simply be a matter of sampling variation.

There are some differences between the Goldberg et al sample and the two samples used in this investigation. First of all the correlation between Openness and years of schooling seems to be higher in the Goldberg et al sample although they do not report confidence intervals so it is difficult
to know how precise their measurement is. Secondly the correlation between Agreeableness, as well as Extroversion and years of schooling is negative in the American sample.

These somewhat low to moderate relationships between personality traits and education could lead us to the same conclusion as Mondak, who focuses on demographics generally, and argues that there is (Mondak 2010, 83): “only a minimal overlap between personality and the demographic variables”, in his samples. The problem is of course that education, or any other demographic variable, is never explaining close to all of the variation in any of the constructs related to good democratic citizenship either; in fact far from it. For instance in paper 4 the correlation between education and internal efficacy is .17 and it would not take extreme amounts of confounding by personality traits to reduce the effect size of education on internal efficacy substantially. In fact we find that the effect of education on internal efficacy in the representative sample decreases roughly fifty percent after personality traits are taken into account. The correlations between education and personality traits need not be extremely large for the combined confounding to be substantial.

The correlation between years of schooling is .32 in the draftee sample which is slightly lower than typically reported since the correlation between these two constructs is usually estimated at around .5 (Deary and Johnson 2010). A likely reason for this discrepancy is that the draftee sample is young and the full variation in educational attainment has not yet been achieved. This is an important caveat which needs to be kept in mind and I will return to this point in the conclusion.

**Causal ordering**

The two requirements outlined above, i.e. that predispositions are correlated with both education and GDC, only provide the minimum requirement that the predispositions can confound the effect of education but not that this is the correct causal ordering. There are several pieces of empirical evidence in favor of choosing the causal ordering in figure 2 above, where predispositions are
influencing both differences in levels of education as well as differences in levels of GDC; this phenomenon is called common cause confounding since predispositions are theorized to be the underlying common cause of the relationship between education and GDC (Elwert 2013).

First of all personality traits and intelligence are established early in life (Fagan 2011; Rose and Fisher 2011; Shiner and DeYoung 2013). In relationship to personality traits Shiner and DeYoung argue that something resembling the Big Five personality traits, except Openness, are already present when children are toddlers or in the preschool years (Shiner and DeYoung 2013) and differences in intelligence are already present in infancy and childhood (Fagan 2011; Rose and Fisher 2011). That differences in personality and intelligence are already present at an early age would matter little if these were not stable over time. If there is a large amount of stability this would suggest that later-in-life changes such as education is likely to have a more limited impact on differences in personality and intelligence compared to those already established. This is also generally confirmed and in line with most of current theorizing and empirical evidence. For instance two recent studies demonstrated a corrected correlation between intelligence scores at age 11 and intelligence scores at age 77 and 80 of .73 (Deary et al. 2000; Deary et al. 2004). Personality traits are also very stable but less so than intelligence (Almlund et al. 2011, 121-122): “Rank-order stability in measured personality increases steadily over the lifespan…7-year test–retest stability estimates for personality plateau at r = 0.74, which is about the same level as terminal stability estimates for IQ…However, measured personality does not reach this plateau until at least age 50, whereas IQ reaches this plateau by age six or eight”. This does not imply that the rank order correlation for personality traits is low in adolescence or young adulthood; as this is around .5-.6 (Roberts and DelVecchio 2000). Furthermore a recent longitudinal study spanning 20 years, from age 30 to age 50, demonstrated a

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5 Different types of stability can be assessed (Roberts, Wood, and Caspi 2008). Here the focus is on rank-order stability since the main goal of this dissertation is to investigate whether individual differences in personality traits and intelligence in a given population explain differences in GDC.
median rank order consistency of .65 (Terracciano, Costa, and McCrae 2006). Thus although the stability of personality is slightly lower and established somewhat later, compared to intelligence, it is still (Roberts, Wood, and Caspi 2008, 378): “remarkably high”.

Biological factors also have an impact on the discussion of stability; especially the concept of heritability. Heritability is an estimate of the amount of individual variation which in a given population at a given point in time is due to genetic variation (Plomin 1990, 43). Both personality traits and intelligence are highly heritable; estimates of the heritability of intelligence and personality traits are typically around 50 percent (Bouchard and McGue 2003). Furthermore, for intelligence the heritability increases with age, to around 70 percent in adulthood (Deary and Johnson 2010), which could suggest that environmental factors becomes less salient as individuals become independent and able to choose the environmental stimuli they prefer based on their genetic predispositions (McGue et al. 1993; Scarr and McCartney 1983). The timing of the intelligence test used, is also ideally suited for using the framework in figure 2. At the time the respondents are tested they are around 18, which means there is, for most respondents, two years of differences in levels of education as people usually enter primary school when they are around two years old and leave this compulsory educational system when they are sixteen. This implies that most educational differences are post their intelligence testing since all the respondents answer the survey after they completed the test. Conversely there is also a fair amount of variation on the time from the draft board test until the time they took the survey to investigate the effect of education on political GDC; on average there is 3.5 years from the time they took the draft board test till the time they participated in the survey with a minimum of .8 years and a maximum of 6.1 years. Still, as already mentioned we are relying on a sample of young people, so the full educational variation has not yet been achieved.

6 It is important to stress that heritability does not imply immutability; the classical example is height, which has a heritability estimate of around .8 but nonetheless there have been secular increases in height in many countries (Visscher, Hill, and Wray 2008). Furthermore heritability is a measure of the phenotypic variation in a given population due to genetic variation not of the absolute levels of a studied outcome.
Furthermore there are multivariate genetic studies which suggest that much, but not all, of the shared covariance between education and intelligence is genetic (Bartels et al. 2002; Johnson, McGue, and Iacono 2006), which could suggest that the effect of education on GDC is, at least partially, “genetically confounded”. This obviously needs to be determined on a case by case basis, i.e. depending on which aspect of GDC is studied.

In addition, longitudinal behavioral genetic studies of change and stability for personality traits demonstrate a large genetic component to both change and stability, whereas the environmental factors which contribute to change and stability are primarily those unique to each individual (Bleidorn et al. 2009; Blonigen et al. 2008; Bratko and Butkovic 2007; Hopwood et al. 2011; Johnson, McGue, and Krueger 2005; McGue, Bacon, and Lykken 1993). That genes can be a cause of change might at first seem counterintuitive, since a person’s DNA does not change over the course of a life time. On second thought however, we are all familiar with biological changes encoded in our DNA such as aging, sexual maturation, and children’s cognitive development. Much the same line of reasoning has been applied to the development of personality traits as most people, seem to follow the same pattern of development: As people get older they become more conscientiousness, agreeable, socially dominant7 and less neurotic (Caspi, Roberts, and Shiner 2005; Roberts, Walton, and Viechtbauer 2006); this process of development has been termed the maturity principle.

Just because most of the changes in personality traits are genetic in origin or unique to an individual does not rule out that education can have an effect on changes in personality traits e.g. through those factors unique to each individual, although to my knowledge no studies have so far investigated this possibility. If most of the observed changes in personality traits should be attributed

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7 Social dominance is an aspect of the broader trait Extraversion
to differences in levels of education this would probably imply that the changes caused by education should be large. A recent study demonstrated different trajectories for personality traits depending on whether they went to college or not but the changes observed were relatively small and only significant for Conscientiousness and Agreeableness (Ludtke et al. 2011) and a similar study documented that other factors than education, such as relationship quality, are also associated with changes in personality traits (Parker et al. 2012) lending further credence to the fact that it is unlikely that all, or even most, of the changes in personality traits are associated with different educational experiences. In fact it is plausible that these changes could also be, at least partially, genetic in nature, since we know that a major part of differences in educational attainment are due to genetic dispositions and very little is due to unique environmental factors (Branigan, McCallum, and Freese 2013), which would cast doubt on the size of the independent effect of education on personality traits. As for intelligence the shared overlap between education, personality and GDC needs to be determined on a case by case basis. Until the evidence is more conclusive on the nature of the effect of education on predispositions, arrow 3 remains dotted however. Or in the words by Mondak outlining a similar framework to the one depicted above: (Mondak et al. 2010, 90):

“In our view, the empirical record supports three conclusions. First, biological factors account for the vast majority of influence on personality traits, and especially on the five-factor structure. Second, environmental forces that operate through alteration of biological processes are acknowledged. Third, direct environmental influences on personality may occur…however, to produce discernible impact on personality, the change in environment apparently must be quite stark.”
Chapter 3 Theoretical expectations and enquiries

This chapter discusses how best to investigate the theoretical framework outlined in chapter 1 and taking the causal framework discussed in chapter 2 as a given.

The first implication of the theoretical framework is that the degree of confounding should vary according to whether the effect of education on GDC is based on social positioning vs. cognitive and motivational factors. Personality traits and intelligence are prime examples of cognitive and motivational factors and are thus theorized to primarily confound the effect of education when the effect of education is cognitive and motivational. Conversely the effect of education should be less confounded when its effect is based on social positioning.

This is primarily investigated in paper 4 by comparing the effect education has on internal efficacy, where the effect of education is primarily theorized to be cognitive and motivational, and external efficacy, where the effect of education is primarily theorized to be based on social positioning, when personality traits are taken into account.

In paper 1 it is also indirectly investigated whether education affects political sophistication through social positioning i.e. in a context which is not competitive. Since both differences in motivations, cognitive styles, and abilities are held constant by including personality traits and intelligence; whatever educational effect is left, is likely to be partly related to social positioning such as the opportunity to become informed through social networks.

The second implication has to do with the distinction made above between cognitive styles and motivational factors versus cognitive abilities. Education has been theorized to affect both cognitive styles and motivational matters as well as cognitive abilities. Since I have measures of both intelligence, which is primarily measuring cognitive abilities, and personality traits, which are primarily measuring cognitive styles and motivational factors, we have a way to test which of these are
mainly confounding the effect of education. This is investigated throughout the papers where different papers address specific aspects of this relationship.

- Paper 1 studies the determinants of political sophistication, operationalized as political knowledge and includes both measures of personality traits and intelligence, and is therefore able to investigate the relative degree of confounding by personality traits vs. intelligence for this political construct
- Paper 2 studying the determinants of political tolerance also includes measures of both personality traits and intelligence as is therefore also able to assess the relative degree of confounding by personality traits vs. intelligence for this political construct
- Paper 3 investigates why some people are policy voters, by focusing on differences in levels of education and intelligence and thus also addresses the relative influence of learned styles of cognition vs. deep-seated cognitive abilities.

The third and final implication of the framework is the importance of social positioning:

- In paper 1 it is investigated whether education affects the opportunity to become politically sophisticated through social positioning such as social networks.
- In paper 3 the effect education has on the opportunity and to become informed is also investigated in relationship to policy voting, the effect of education on policy voting mediated by political information is investigated.
- In paper 4 it is investigated whether the effect of education on external efficacy decreases when the competition over public attention increases. This would indicate that the effect of education on social positioning is relative when the construct is competitive.
The table below outlines the papers:

<table>
<thead>
<tr>
<th>Paper #</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>Education or personality traits as determinants of political sophistication?</td>
<td>Intelligence is an overlooked but important source of political tolerance</td>
<td>Disentangling the role of education, intelligence and political knowledge in policy voting</td>
<td>Disentangling the role of education and personality traits for political behavior: Cognition and motivations vs. resource effects in external and internal efficacy</td>
</tr>
<tr>
<td><strong>Dataset(s) used</strong></td>
<td>Draftee sample</td>
<td>Draftee sample</td>
<td>Draftee sample</td>
<td>Representative sample</td>
</tr>
<tr>
<td><strong>Research question</strong></td>
<td>What is the effect of education on political sophistication when personality traits and intelligence are taken into account?</td>
<td>Are those who are more intelligent more politically tolerant?</td>
<td>Why are those who are more politically sophisticated policy voters?</td>
<td>When is the effect of education on political outcomes highly confounded by personality traits and when is it not?</td>
</tr>
<tr>
<td><strong>Dependent variable(s)</strong></td>
<td>Political sophistication</td>
<td>Political tolerance</td>
<td>Policy voting (Attitude centrality, Position matching)</td>
<td>Political efficacy (Internal efficacy, external efficacy)</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td>Age</td>
<td>Age</td>
<td>Age</td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>Gender</td>
<td>Gender</td>
<td>Gender</td>
</tr>
<tr>
<td></td>
<td>Personal income</td>
<td>Personal income</td>
<td>Personal income</td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>Education</td>
<td>Education</td>
<td>Personality traits</td>
</tr>
<tr>
<td></td>
<td>Personality traits</td>
<td>Intelligence</td>
<td>Intelligence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intelligence</td>
<td>Perceptions of group threat</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Statistical method used</strong></td>
<td>SEM in Mplus version 7 using the MLR estimator</td>
<td>SEM in Mplus version 7 using the MLR estimator</td>
<td>SEM in Mplus version 7 using bootstrapped standard errors</td>
<td>Multilevel analysis with cross-level interaction using Mplus version 7’s MLR estimator</td>
</tr>
</tbody>
</table>
Chapter 4 Important constructs

This section briefly outlines the contents of the constructs personality traits and intelligence.

**Personality traits**

Personality can be defined as (Caprara et al. 2006, 3):

“a set of dynamic, self-regulatory systems that emerge and operate over the life course in the service of personal adaptations (Caprara & Cervone, 2000). These internal systems guide affective, cognitive, and motivational processes, directing people toward achieving individual and collective goals.”

In personality research it is customary to distinguish between traits and characteristic adaptations. Traits, such as personality traits, are stable, general dispositions to act, think and feel in a systematic fashion, whereas characteristic adaptations are less stable, specific structures, which develop as a function of traits in concrete situations (McAdams and Pals 2006; McCrae and Costa 2003). General examples of characteristic adaptations are beliefs, values and attitudes, and all the political constructs studied in this dissertation are also examples of characteristic adaptations.

Although there is potentially an infinite amount of differences between human beings, researchers have in recent years settled on a consensus model of five basic traits which capture most of individual differences in personality traits; the so-called Big Five model (Matthews, Deary, and Whiteman 2009). This consensus model is so well established that some speak of a “paradigm shift” to the Big Five (John, Naumann, and Soto 2008). The Big Five traits are Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism.

The theorizing on the Big Five is still in its infancy but there are some promising developments in psychology to devise a theoretical explanation for the ontogenetic (Shiner and DeYoung 2013) and

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8 For historical overviews of the process leading to the Big Five model see e.g. (John, Naumann, and Soto 2008; Matthews, Deary, and Whiteman 2009)
phylogenetic basis (Nettle 2006) of the traits as well as their likely biological underpinnings (DeYoung and Gray 2009). In addition the Big Five can also be explained in terms of a cybernetic control system (Van Egeren 2009). Below I outline the main features of the traits drawing on recent theoretical advances.

The Big Five traits

The main characteristic of Extraversion is sensitivity to reward and positive affect and perhaps not surprisingly Extraversion has been associated with approach behaviour (Denissen and Penke 2008; DeYoung and Gray 2009; Nettle 2006; Van Egeren 2009). There are quite a few studies demonstrating that Extraversion is linked to positive emotions and sensitivity to reward (Depue and Collins 1999; Depue and Morrone-Strupinsky 2005).

The main characteristic of Neuroticism is sensitivity to threat and the tendency to experience negative emotions, which means that Neuroticism is helpful in terms of error detection (Denissen and Penke 2008; DeYoung and Gray 2009; Nettle 2006; Van Egeren 2009). More specifically there have been studies researching the link between Neuroticism and various negative emotions, such as sadness, depression, anxiety and fear (DeYoung and Gray 2009; Kotov et al. 2010).

Whereas Neuroticism and Extraversion are mainly emotional traits, Conscientiousness is a trait concerned with constraint and top-down control (Denissen and Penke 2008; DeYoung and Gray 2009; Nettle 2006; Van Egeren 2009). This means that Conscientiousness is concerned with error control as opposed to error detection as with Neuroticism (Van Egeren 2009). Whereas a multitude of studies point at a possible links between the traits Neuroticism and Extraversion and various biological systems, there is much less research on the trait Conscientiousness from this perspective, which is also the case for Agreeableness, and Openness (DeYoung and Gray 2009).
Agreeableness is a trait mainly dealing with the regulation of social interactions and is thus in the service of attaining the help of others in the pursuit of an individual’s personal goals attainment (Denissen and Penke 2008; DeYoung and Gray 2009; Nettle 2006; Van Egeren 2009). In addition those who are more agreeable are generally more compassionate and polite (DeYoung, Quilty, and Peterson 2007); although a recent study demonstrated that these two aspects of Agreeableness are differentially related to political ideology leading the author’s to use the labels “compassionate liberals” and “polite conservatives” (Hirsh et al. 2010).

The personality trait Openness/Intellect is mainly concerned with the exploration of a person’s environment (Denissen and Penke 2008; DeYoung and Gray 2009; Nettle 2006; Van Egeren 2009). Those who are open to experience are more likely to discover new opportunities arising, as well as thinking about the world in novel ways. It is no surprise that this personality trait has often been used in the literature on politics and personality traits since the cognitive style of intellectual reflection and engagement is often paramount in explaining political differences; most obviously in relationship to political interest and political knowledge (Gerber et al. 2011b) but as discussed in paper 2 also in relationship to political tolerance.

Intelligence

I will take my point of departure in this rather lengthy consensus definition of intelligence to understand this important cognitive construct (Gottfredson 1997, 13):

“Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather it reflects a broader and deeper capability for comprehending our surroundings—“catching on,” “making sense” of things, or “figuring out” what to do”.

As the definition makes clear intelligence is a very general mental ability; put more concretely those who are good at math are also likely to be fairly good at learning a new language. This tendency for
people who are good at one type of mental task to also be good at other types of mental tasks is also why intelligence researchers use the word general intelligence to denote the construct intelligence and to distinguish this concept from various sub-types of intelligence identified below this general level. At the level of psychometrics this general factor of intelligence, or g factor as it is also called, usually accounts for around 40 percent of the variance in intelligence test scores (Deary, Penke, and Johnson 2010) which makes it a very decisive construct if we want to understand individual differences in cognitive abilities. Conversely this also implies that roughly 60 percent of individual differences consist of specific abilities which are not captured by the general factor of intelligence.\(^9\)

As for the Big Five model there is so far no widely accepted theory of human abilities, although both cognitive and biological theories exist (Detterman 2002). In the words of a recent review on the history of intelligence: (Mackintosh 2011, 11): “Although most intelligence researchers today probably accept the general factor is here to stay they remain, sharply divided on its explanation”.

It is not difficult to imagine that those who are more intelligent are also more likely to gain knowledge of politics, which is investigated in paper 1, since many topics and discussions in politics are fairly complex and difficult to understand. There is however an even closer conceptual affinity between intelligence and policy voting. Those who are more intelligent are better at the (Spearman 1927, 164-166): “eduction of relations and correlates”, which is exactly what policy voting entails (Goren 2013): Deducing how to link one’s general ideological principles to a vote choice which matches those principles in the best possible way.

**Intelligence and personality traits**

Personality traits and intelligence are usually considered separate constructs. There are three dichotomies, which are used to conceptually differentiate the concepts, all of which can be

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\(^9\) There are currently a number of different taxonomies for specific abilities (Carroll 2003; Johnson and Bouchard 2005; McGrew 2009).
questioned, where the first term of the dichotomies refer to attributes usually attributed to intelligence, and the second attributes usually attributed to personality (DeYoung 2011).

- Cognitive vs. non-cognitive traits
- Ability tests vs. questionnaire tests
- Maximal performance vs. typical performance

The differences between personality traits and intelligence are a matter of degree rather than kind as both personality traits and intelligence possess the above attributes to some extent (DeYoung 2011). What is important however, is the distinction between cognitive abilities and cognitive styles made above in figure 1. Insofar as personality traits are relevant for cognition, as in the case of Openness, they are primarily representing habitual styles whereas intelligence is primarily representing maximum ability. This distinction between cognitive styles and cognitive abilities builds on how personality traits and intelligence have typically been conceived as constructs.

In terms of the empirical findings on the correlations between intelligence and personality there has to date only been a single meta-analysis of the relationship between intelligence and personality traits (Ackerman and Heggestad 1997). The most consistent finding is between Openness and general intelligence, with a correlation of .33 in the meta analysis. There are no sizeable correlations between general intelligence and the rest of the personality traits.
Chapter 5 Samples, data and measures

In order to investigate the confounding of education by predispositions in terms of the framework outlined above I have made use of two datasets: (1) A representative sample, and (2) what I above referred to as the draftee sample. The draftee data on the draftee sample was primarily collected for this investigation and I will therefore outline in some detail the process of collecting data on this sample.

Draftee sample

The intelligence test data was obtained from a random sample of 4400 Danish men from the Danish draft registry, as well as all the women in the registry; this data also included information on their current address. The sampling strategy pursued was one of simple random sampling but done separately for men and women because whereas the men are a random sample of the whole population, the women are not, since they are not subject to mandatory military service and therefore self-select into the military. This is also why all women were initially included in the sample from the Danish draft registry; to get an estimate of how many women self-select into the military.

In order to test the questionnaire a pilot study was conducted. Based on the results a few adjustments to the final questionnaire were made. A combination of a postal survey and an online survey was used. The sample participants were sent a letter with an invitation to participate in the survey, stating that they could access it online by using the password and webpage provided in the letter. If they participated they entered into a competition to win an iPhone. The questionnaire contained data on political attitudes and behaviors, a host of socio-demographic variables, as well as measures of personality traits; the measurement of personality traits are elaborated on below.
The draftee sample has a response rate of 27 percent. In order to deal with unit non response a series of sampling weights were created by running a logistic regression, where the dependent variable is response and non-response, and the predictors are those demographics contained in the sample from Danish draft registry i.e. gender, age, years of schooling at the time of the draft, region dummy, a dummy indicating whether people were fit to perform military duty, and finally their score on the intelligence test (Iannacchione, Milne, and Folsom 1991).
Representative sample

The representative sample (N=3612) is an internet panel used by TNS Gallup and is constructed to be an accurate reflection of the entire Danish population. This study was originally fielded between May 25 and June 6, 2010 and has a response rate of approximately 45 percent. In order to deal with unit non response I have used the weights provided by TNS Gallup in the analyses where I am using this sample.

As for the draftee sample the dataset from this sample contains measures of political attitudes and behaviors, as well as personality traits. This sample does not contain a measure of intelligence.

Comparison of draftee sample and representative sample

Descriptive statistics for personality traits, intelligence and demographics are outlined in the table below:

Table 4: Descriptive statistics for draftee sample and representative sample

<table>
<thead>
<tr>
<th></th>
<th>Draftee sample</th>
<th>Full representative sample</th>
<th>Representative sample ages 19-27</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Standard</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>Income</td>
<td>1.8 .89 5 1</td>
<td>1010</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>23 1.9 33 19</td>
<td>1072</td>
<td></td>
</tr>
<tr>
<td>Gender (Male=1)</td>
<td>.46 .5 1 0</td>
<td>1072</td>
<td></td>
</tr>
<tr>
<td>Openness</td>
<td>27 6.3 46 10</td>
<td>1072</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>32 6.1 48 12</td>
<td>1072</td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>33 6.5 48 5</td>
<td>1072</td>
<td></td>
</tr>
<tr>
<td>Agreeableness</td>
<td>29 6.6 45 5</td>
<td>1072</td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>22 7.5 44 3</td>
<td>1072</td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td>46 8 69 13</td>
<td>1071</td>
<td></td>
</tr>
</tbody>
</table>

*The measures of personal income and education are coded according to paper 1 whereas the personality traits and measure of intelligence are following the original scaling
The draftee sample is, in terms of personality traits and demographics, very similar to the representative sample when the same age group is being compared, i.e. those in the ages of 19-27, which in the draftee sample includes 95 percent of the respondents. In fact, in terms of personality traits, the full representative sample and the draftee sample are also very similar in terms of descriptive statistics. The largest difference between the full representative sample and the draftee sample is in terms of personal income, which is higher in the full representative sample, and education which is lower in the representative sample which reflects that young people in Denmark today are receiving more education than previously.

Measurement of personality traits, intelligence and education

This study follows the consensus on how to study personality by using the Big Five Model. This will be done by using a short version of the NEO-PI-R, which has 60 questions, 12 for each domain, rather than the 240 questions that are included in the full questionnaire (Costa et al. 2003). There are several short versions of the NEO-PI-R. The most popular is the NEO-FFI, which is constructed by taking the items with the highest loadings on the five domains (Costa et al. 2003). I have used the Danish NEO-PI-R Short version, which also has 60 items, but where the items with the highest loadings on the facets of the big five domains are chosen. The test is an appropriate measure for people aged 17 and above (Costa et al. 2003, 11). The correlations between each of the five domains with the full Danish NEO-PI-R are .9 and above, which indicates that you can just as confidently use the short version as the full version if you only want to measure the domains (Costa et al. 2003, 74). The same questionnaire is employed in both samples.

The \textit{g factor} accounts for the single largest part of the variance in typical intelligence tests (Jensen 1998); typically around 40 percent (Deary, Penke, and Johnson 2010). In the famous Wechsler Adult Intelligence Scale (WAIS), \textit{g} accounts for about 30-37 percent of the variance, and the tests total
score has a correlation of .95 with $g$ (Jensen 1998, 90). The test I am employing, Børge Priens Prove (BPP), has a correlation of .82 with the full WAIS score (Mortensen, Reinisch, and Teasdale 1989), and a general intelligence factor accounts for approximately 50-60% of the variance in the BPP (Hartmann and Teasdale 2004). This of course also implies that there is much of the variation, which is ability specific, and it is therefore also very interesting to investigate the effect of specific abilities or group factors as determinants of political attitudes and behaviors. The total BPP score has a correlation of .99 with $g$, which makes it an excellent measure of $g$ (Hartmann and Teasdale 2004).

**Context**

There is a final issue of relevance to the discussion on the relationship between education and predispositions which is related to the research design. The context is the country Denmark as the two studies used have sampled their respondents here. Two issues are important in this regard.

First of all Denmark represents a least likely case for the effect of education on GDC after predispositions are taken into account. Since Denmark has an educational system in which education is free and students receive a monthly stipend to cover living expenditures predispositions are likely to have a large impact on levels of education; i.e. most can pursue the level of education they are cognitively capable of finishing, intelligence, and have the inclination to pursue, personality traits. If education therefore has an effect in this context it is strong evidence that education is not completely confounded by predispositions.

Secondly, the educational system in Denmark is centered around a universal primary school in which most young people have typically attended. For this particular age group the percentage of students in private school is around 12-13 percent, with some regional differences;\(^{10}\) a number that

\(^{10}\) [http://www.noegletal.dk/](http://www.noegletal.dk/)
by 2013 had risen to around 16 percent. That primary school is universal makes it less likely that educational experiences have very *different* effects on cognitive skills and personality traits as the goals, values and standards are very similar across the country. Furthermore, a recent analysis has demonstrated that between-school differences have very little effect on differences in graduation grades in primary school although in a given year there are some between schools effects on grades they are not particularly stable over time (Rangvid 2008) which suggests that educational experiences are likely to be homogeneous in terms of their cognitive effect.
Chapter 6 Findings

This section outlines the main findings from the four papers in terms of the relevance for the overall research questions. Operationalization and definitions of constructs can be found in table 1 above. First the individual papers are briefly presented. After that the research questions are addressed i.e. whether, why and when education has an effect on GDC.

Brief overview of papers

In order to understand the summary of the overall research findings a brief overview of the individual papers is presented.

Paper 1 investigates whether education still has an effect on political sophistication, operationalized as political knowledge, after personality traits and intelligence are held constant. Both the representative sample and the draftee sample are used to investigate this research question. In both samples, education not only has an effect on political sophistication, but in fact the largest effect on political sophistication is represented by education. Being more intelligent, more open to experience as well as emotionally stable, is also associated with higher levels of political sophistication. It is speculated that part of the reason why those who are more educated are more sophisticated, even holding personality traits and intelligence constant, is because of the effect of education on the opportunity to become informed such as though social networks i.e. its effect on social positioning.

In paper 2 it is investigated whether cognitive abilities, in the form of general intelligence, have an effect on political tolerance. Political tolerance is measured by asking respondents whether they are willing to grant civil liberties, such as freedom of speech, to the Neo Nazis or the Far Right. In order to make as comprehensive an investigation of the possible of the effect of intelligence on political tolerance both cognitive styles, in the form of Openness and emotional factors, in the form of the
personality traits Extraversion and Neuroticism and in the form of feelings of threat, as well as socio-demographics, most notably education, are included in the final model specification. We find the predisposition having the largest effect on political tolerance is intelligence but that those more open to experience and more introverted are also more tolerant; feeling threatened by the groups are strongly predicting intolerance, which is in accordance with the established literature. Furthermore intelligence moderates the degree to which respondents are willing to also grant civil liberties to the extreme group the Neo Nazis and not only the Far Right: Those who are highly cognitively able are equally likely to grant civil liberties to the Far Right and Neo Nazis whereas those who are less cognitively able are more likely to grant civil liberties only to the Far Right. We speculate that the reason for this finding is that those who are more intelligent are better able to perform “principled reasoning”; i.e. deduce that civil liberties should be granted to all groups, also those who are potentially threatening, violent and anti-democratic. The graph below illustrates the difference in levels of tolerance toward the Neo-Nazis or the Far Right as measured by a dummy variable; the Far Right is the reference group. The graph illustrates that as people become more and more intelligent they are more and more willing to also grant civil liberties to the Neo Nazis as evidenced by the effect in the size of the difference getting smaller and smaller; in fact it becomes insignificant at very high levels of intelligence.
In paper 3 it is investigated why those who are more politically sophisticated are policy voters, by focusing on the two antecedents of political sophistication: intelligence and education. Policy voting is measured in two ways: The correspondence between a measure of left-right ideological principles and ideological self-identification and the correspondence between the same measure of ideological principles and vote choice; the larger the correspondence is between the measure of ideological principles on the one hand and ideological self-identification and vote choice on the other, the larger the degree of policy voting. It is investigated whether education or intelligence moderates the degree of policy voting i.e. whether those who are more educated and/or intelligent are more likely to policy. It is argued that education primarily affects political sophistication via the motivation and opportunity to become informed, i.e. via political knowledge, whereas intelligence primarily affects political sophistication via the ability to structure a person’s belief system. These predictions are largely confirmed, since the effect of education is mediated by political knowledge, whereas intelligence is not. Furthermore there is a much larger moderating effect of intelligence on policy
voting compared to the moderating effect of education; an effect that is even equal to the moderating effect of political knowledge on policy voting.

Finally in paper 4 the differential effect of education on internal and external efficacy is investigated. Internal efficacy, the subjective feeling of competence in politics, is measured using a three item index based on standard items, and external efficacy, the perception of government responsiveness, is measured using a two item index also using standard items. As already argued, the effect of education is theorized to be confounded by personality traits when its effect is based on cognitive and motivational factors, such as its effect on internal efficacy. Conversely the effect of education should be less confounded by personality traits when it comes to the effect education has on social positioning i.e. its effect on external efficacy. These predictions are confirmed as the effect of education on internal efficacy is more highly confounded by personality traits compared to the effect of education on external efficacy. Openness is positively associated with feeling both externally and internally efficacious and Neuroticism is negatively associated with both external and internal efficacy. In addition those who are more agreeable and conscientious are more internally efficacious and those who are more extroverted are more externally efficacious.

The theorized mechanisms underlying the differential effect of education on internal and external efficacy, i.e. cognitions and motivations vs. social positioning, was subject to an empirical test. This was done by investigating whether the effect of education decreases when the amount of environmental competition, as measured by municipal wealth, income, average level of education and an index of the three, increases. Since external efficacy is a competitive construct the effect of education on this construct should decrease if its effect is based on social positioning whereas its effect on internal efficacy should remain constant if its effect is based on cognitions and
motivations. This is confirmed for all four measures of competitive environments. The figure below illustrates the effect of education as the index of environmental competition increases.

Does education influence good democratic citizenship?

This paragraph summarizes the main results for the first research question i.e. whether education influences good democratic citizenship when we take into account that people also differ in terms of their personality traits and level of intelligence independent of their level of education. The main results from this investigation are summarized in the table below. The table contains four pieces of information: (1) Whether education still exerts a significant influence on the GDC after taking into account differences in predispositions, indicated by a plus, meaning education exerts a positive influence on the construct, or a minus, meaning education exerts a negative influence on the construct or is non-significant (N.S); (2) the zero-order correlation\(^\text{11}\) between education and

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\(^{11}\) Strictly speaking these are model implied correlations which means there can be some differences between these two figures (Bollen 1989). However they convey the same type of information and all models are well fitting which means there is, generally speaking, a small difference between the model implied correlations and the \(z\) correlations. In addition for those models where the constructs are
predispositions and the construct studied, the first number in parentheses; (3) the standardized coefficient for education and predispositions without including the other, the second number in parentheses; and (4) finally the standardized coefficient for education and predispositions in the model in which they are both included, the last number in the parenthesis.

The general strategy used to investigate the extent to which the effect of education on GDC is confounded by predispositions followed a three pronged approach: First it was demonstrated that those who are more educated are more tolerant, sophisticated, internally and externally efficacious and more likely policy voters which is in accordance with the established literature. Secondly theoretical expectations were derived for the likely impact of one or more predispositions on the political constructs studied. These expectations were then tested in a model, without including education, to investigate whether they, independently of education significantly affected differences in GDC. Finally a full model in which both education and predispositions were simultaneously included was estimated, to investigate whether education still exerted a significant influence after differences in personality traits and intelligence were held constant.

In terms of the first analysis, education is in all cases positively associated with all the political constructs representing GDC as demonstrated by the zero-order order correlations for education ranging from .41 for political sophistication in the draftee sample to .12 for political tolerance also in the draftee sample; see the first number in parentheses in table 5 above. Education is also positively associated with all the political constructs studied after the effect of age, gender and income is held constant; the second number in parenthesis in table 5 above. The first part of the story, that education is associated with political tolerance, political sophistication, political efficacy and policy voting is thus confirmed. Put differently, the two samples used to investigate the first research
question are confirming the results of literally hundreds of studies on the effect of education on GDC.

This is only half of the story. The other half is whether predispositions are also important constructs to take into account when explaining differences in GDC. As mentioned in the introduction there are already quite a few studies demonstrating that personality traits are important if we want to understand individual differences in e.g. political ideology, vote choice, partisanship, political participation, political discussion rates and political knowledge (Gerber et al. 2011a, 2011b; Gerber et al. 2011d; Gerber et al. 2010; Mondak 2010; Mondak et al. 2010). This is also confirmed here as illustrated in the table above. Especially Openness to experience and intelligence are predicting differences in GDC, those who are more intelligent and open to experience are more likely to ascribe to GDC; Extraversion, Conscientiousness and Neuroticism are also predicting differences in GDC although less consistently.
Table 5: Findings from the four papers

<table>
<thead>
<tr>
<th>Sample</th>
<th>Political sophistication</th>
<th>Tolerance</th>
<th>Policy voting (position matching)</th>
<th>Policy voting (Attitude centrality)</th>
<th>Internal efficacy</th>
<th>External efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>Draftee sample</td>
<td>Representative sample</td>
<td>Draftee sample</td>
<td>Draftee sample</td>
<td>Representative sample</td>
<td>Representatve sample</td>
</tr>
<tr>
<td>Openness</td>
<td>+ (0.15/0.15/0.13)</td>
<td>+ (0.08/0.12/0.08)</td>
<td>+ (0.17/0.14/0.14)</td>
<td>Not investigated</td>
<td>Not investigated</td>
<td>+ (0.20/0.20/0.18)</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>+ (0.14/0.16/0.13)</td>
<td>N.S. (0.06/0.03/0.03)</td>
<td>N.S. (-0.04/0.04/0.04)</td>
<td>Not investigated</td>
<td>Not investigated</td>
<td>+ (0.24/0.13/0.13)</td>
</tr>
<tr>
<td>Extraversion</td>
<td>N.S. (-0.00/-0.04/-0.05)</td>
<td>N.S. (-0.01/-0.07/-0.05)</td>
<td>- (-0.15/-0.10/-0.10)</td>
<td>Not investigated</td>
<td>Not investigated</td>
<td>N.S. (0.23/0.03/0.03)</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>N.S. (-0.03/-0.03/-0.02)</td>
<td>N.S. (-0.01/-0.02/-0.02)</td>
<td>N.S. (-0.08/-0.03/-0.03)</td>
<td>Not investigated</td>
<td>Not investigated</td>
<td>- (-0.07/-0.07/-0.07)</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>- (-0.22/-0.15/-0.14)</td>
<td>N.S. (-0.12/-0.08/-0.07)</td>
<td>N.S. (0.03/0.02/0.02)</td>
<td>Not investigated</td>
<td>Not investigated</td>
<td>- (-0.28/-0.16/-0.16)</td>
</tr>
<tr>
<td>Intelligence</td>
<td>+ (0.39/0.36/0.26)</td>
<td>Not investigated</td>
<td>+ (0.22/0.16/0.16)</td>
<td>+ (0.51/0.51/0.45)</td>
<td>+ (0.42/0.61/0.57)</td>
<td>Not investigated</td>
</tr>
<tr>
<td>Education</td>
<td>+ (0.41/0.43/0.32)</td>
<td>+ (0.15/0.17/0.14)</td>
<td>N.S. (0.12/0.08/0.03)</td>
<td>N.S. (0.37/0.25/0.17)</td>
<td>N.S. (0.29/0.20/0.10)</td>
<td>+ (0.17/0.15/0.09)</td>
</tr>
</tbody>
</table>

*Three numbers are referenced in the parentheses. The first number is the zero order correlations between the dependent and independent variables. The second number is the standardized coefficient for a model including only education or predispositions. The final number is the standardized coefficient for the model including both predispositions and education. For policy voting the numbers refers to the interaction term for education and intelligence. A + signifies the coefficient is significant at a .05 level and positively associated with the dependent variable in the model specification including both education and predispositions, whereas a – signifies it is negatively associated with the dependent variable.
The third and final part of the investigation was to investigate whether there was still an effect of education on the GDC after predispositions were included i.e. whether the effect of education is confounded by predispositions. The results are mixed in terms of the degree of confounding, I will elaborate on some of the specifics in the next paragraphs, but for all political constructs studied the degree of confounding is quite substantial as evidenced by the differences in coefficients between the last and the second to last number in table 5 above. It is difficult to compare the changes in the effect size for education across constructs since the above estimates are standardized coefficients, and thus cannot be directly be compared across constructs, but they provide a general idea of the degree of confounding.

*What explains the influence, or lack of influence of education, on good democratic citizenship?*

The primary mechanisms through which education has traditionally been theorized to affect GDC, using the terminology introduced above in figure 1, are:

- Through social positioning
- Through cognitive styles and motivational factors
- Through cognitive abilities

In order to understand when and why education influences GDC it is necessary to recap the results and terminology from paper 4. In this paper it is demonstrated that the effect of education on internal efficacy is highly confounded by personality traits whereas the effect of education on external efficacy is less confounded by personality traits. This difference in the degree of confounding is explained by making a distinction between the effect of education on (1) cognitive and motivational factors and (2) social positioning. Since personality traits are directly tapping into cognitive and motivational factors this is what we would expect. Conversely the reason why those who are more educated are more externally efficacious is because of social positioning, primarily
social network centrality, which is important because (Nie, Junn, and Stehlik-Barry 1996, 45): “Centrality in politics is defined by proximity to governmental incumbents and political actors who make public policy and to those in the mass media who disseminate and interpret the issues, events, and activities of people in politics”. It thus seems that the effect of education is more highly confounded when its effect is based on cognitive and motivational factors as opposed to social positioning.

This is further corroborated in paper 1 on political sophistication. In paper 1 I find that, not only is education still an important determinant of individual differences in political sophistication after personality traits and intelligence are accounted for, it is in fact the strongest determinant of differences in political sophistication. This might initially seem puzzling since political sophistication is also a highly cognitive construct and there was not a large effect of education on policy voting after differences in intelligence was accounted for in paper 3. Combining the findings from papers 1 and 3 provides a possible answer. A much cited definition of political sophistication posits that (Luskin 1987, p860): “A person is politically sophisticated to the extent to which his or her PBS [political belief system] is large, wide-ranging, and highly constrained”. Political sophistication is operationalized as political knowledge in paper 1 i.e. the size part of the definition. As demonstrated in paper 3 constraint is primarily affected by intelligence whereas knowledge is primarily affected by education. Social positioning, is likely to have a larger effect on political knowledge than on policy voting which is in large part a measure of constraint: Although you can gain knowledge of politics by being in the right information environment, i.e. via social positioning, or because you are interested in politics and therefore read the newspaper, i.e. via motivational factors, this does not mean that you can accurately use that information to link it to a party that matches your preferences i.e. policy vote. The reason why education still has such a large effect on political knowledge in paper 1 is therefore likely to be because the effect education has on social positioning.
Using the framework outlined above in figure 1 we can elaborate on the finding that the effect of education on GDC is more confounded by cognitive and motivational factors compared to its effect on social positioning. We need to divide the effect of education into (1) cognitive styles and motivational factors, i.e. when the effect of education is confounded by personality traits, (2) and cognitive abilities, i.e. when the effect of education is confounded by intelligence.

The general result from papers 2-3 is that when the effect of education on the political construct studied is primarily related to cognitive abilities there is a large degree of confounding of the effect of education. In papers two and three, investigating political tolerance and policy voting, the effect of education is either small or not significant after individual differences in intelligence are held constant. At the same time the effect of intelligence is very strong and significant constant after education is held constant. Although different explanations have been set forth for why people differ in their degree of political tolerance and policy voting most explanations of why education should be linked to these also stress cognitive abilities. For instance in relationship to tolerance many have stressed that the ability to apply abstract principles of civil liberties to concrete applications toward specific groups is a major component of determining who becomes politically tolerant (Lawrence 1976; McClosky and Brill 1983; Prothro and Grigg 1960) what some have termed “cognitive sophistication” (Bobo and Licari 1989) and others “principled tolerance” (Sniderman et al. 1989).

Turning to policy voting this can, at an abstract level, be compared to the process of making tolerance judgments. Both require the ability to deduce the relationships between abstract principles and concrete applications; Political tolerance requires the ability to deduce the link between abstract notions of civil liberties and concrete groups whereas policy voting requires the ability to deduce the link between a person’s ideological standpoints and a party choice which reflects that standpoint. An
important part of being intelligent is that it makes one capable of the “eduction of correlates and relations” (Spearman 1927). It is therefore no surprise that the effect of education on policy voting and political tolerance decreases once differences in intelligence are held constant since we are in essence holding the ability to deduce the connections between abstract principles and concrete applications constant.

Internal efficacy is clearly also a cognitive construct but likely more related to cognitive styles rather than cognitive abilities. Whether people feel they understand politics and feels it is complicated i.e. are internally efficacious (Balch 1974; Converse 1972; Craig 1979; Craig and Maggiotto 1982; Craig, Niemi, and Silver 1990; Lipset and Schneider 1983; Niemi, Craig, and Mattei 1991) could of course be related to abilities, but it is not a test of whether they actually understand it but rather whether they perceive they understand it. Arguably, general perceptions of one’s own capacities are more related to personality traits than actual ability. The correlation between intelligence and self-perceived intelligence is also fairly low and generally no higher than .3 (Chamorro-Premuzic, Moutafi, and Furnham 2005; Paulhaus, Lysy, and Yik 1998). The zero order correlation between intelligence and internal efficacy in the draftee sample, although not reported in any of the papers, is also very low with a correlation of .03.

The results seem to suggest that the degree of confounding is largest when the effect of education on GDC is primarily based on cognitive abilities, somewhat smaller when its effect is primarily based on cognitive and motivational factors, and finally smallest when the effect is based on social positioning. This is illustrated in the figure below.
A brief elaboration on what the figure depicts is needed. It summarizes, what this dissertation have argued, are the primary reasons why education is associated with the different aspects of GDC studied. For instance, the primary reason why education is associated with policy voting is because it is confounded by intelligence, thus creating a partly spurious association; this paper also demonstrates that some of the effect is mediated by its effect on political knowledge, i.e. via political knowledge, so the word “primary” is important. Secondly it depicts when the degree of confounding is largest, illustrated by the height of the boxes and the increasing arrow. Focusing again on policy voting, it demonstrates that the effect of education on this construct is highly confounded, whereas the effect of education on political sophistication in paper 1 is primarily based on social positioning and the degree of confounding is therefore smaller.
In addition to those constructs investigated in this dissertation I have also added political participation to the figure since this is probably the most discussed and researched constructs in relationship to the debate on the causal effect of education although not addressed in this dissertation. Most researchers have argued that an important part of the reason why those who are more educated are also more likely to participate more is because they have a central network position (Rosenstone and Hansen 1993; Verba, Schlozman, and Brady 1995) and in fact, recent studies have demonstrated that, for some types of political participation, education has a relative effect when competition increases which suggests that this construct is also based on social positioning (Campbell 2009; Nie, Junn, and Stehlik-Barry 1996; Persson 2011; Tenn 2005). We can therefore speculate that it is unlikely to be highly confounded by predispositions.
Chapter 7 Discussion and implications

Is education still the universal solvent?

So based on the results, what have we learned about education and its political effects? Two general lessons present themselves. First of all, that the effect of education on GDC is highly confounded by predispositions when education’s effect is based on cognitive and motivational factors; especially for those constructs where the primary reason why more educated people differ in them is because of cognitive abilities. This is the case with, for example, policy voting and political tolerance. Secondly, that there is still a large effect of education on political knowledge and external efficacy. This is likely to be because the effect education has on social positioning such as the opportunity to become informed and gain political knowledge and to get access, influence and status and feel externally efficacious.

The results in this dissertation suggest that the most likely function of education in politics is a social distributor. Education is e.g. an important determinant of network centrality, as well as an important determinant of status, power and access in a given society and by implication affects a host of important political constructs such as external efficacy, political knowledge, and most likely political participation, since education affects all of these via positional factors. Although this line of reasoning is not typical in political science it is becoming more frequent (Campbell 2009; Helliwell and Putnam 2007; Nie, Junn, and Stehlik-Barry 1996; Persson 2011; Tenn 2005), and it is not uncommon to use this way of theorizing education in economics e.g. the signaling model (Spence 1973) nor in sociology e.g. in functionalist theories and critical theories (Collins 1971; Davis and Moore 1945).
Democratic implications

What are the democratic implications of the findings that education exerts a smaller effect on cognitive and motivational matters than previously held and that the primary function of education is on social positioning? To answer this question we can return to its overall effect on GDC.

Originally Nie, Junn and Stehlik-Barry argued that, the primary function of education differed for the two components of GDC, political engagement, i.e. “the capability of identifying and acting on political interest”, and political enlightenment, i.e. “the recognition of democratic principles and rights of all citizens to hold and express interests”. The primary effect of education on political engagement was *sorting*, whereas education has an *absolute* effect on political enlightenment. This distinction was actually already proposed by Converse in his famous 1972 article (Converse 1972) in which he distinguishes between a context in which education has an absolute effect what he termed “the education driven model” and a context in which education has a relative effect, what he termed “the sorting model” (Converse 1972). These two types of effects correspond to the effect of education on internal and external efficacy respectively. This means that the primary way education *enhances* GDC is through political enlightenment according to Nie, Junn and Stehlik-Barry. What we have added to this story is that democratic enlightenment, can be highly confounded by predispositions such as the effect of education on political tolerance. On the face of it, this dissertation thus limits the scope of education as a force for good democratic citizenship even further. Things are however more complicated than Nie, Junn, and Stehlik-Barry originally suggested.

As argued forcefully by Campbell their statement that education only affects political engagement through sorting, is too sweeping and needs theoretical refinement (Campbell 2009). The most important refinement in the present context is the argument that not all constructs related to
political engagement are competitive and thus not subject to sorting effects. We demonstrated above that the effect of education on external efficacy decreased when the proportion of rich, wealthy or educated persons in a given municipality increases but this only happens because external efficacy is a competitive construct. Education generally grants a person access, influence and power in the form of social network positions, and therefore makes people feel more externally efficacious, but when the proportion of rich, wealthy and educated persons in a municipality increases, any individual's education no longer has as strong an impact on social network centrality and the effect on external efficacy decreases.

Another more technical way to frame it is to say that external efficacy is a zero-sum construct (Nie, Junn, and Stehlik-Barry 1996). Not all political engagement constructs are zero-sum based however. For instance political knowledge, which is partly reflecting the political engagement construct, is not a zero-sum construct: Knowing who is prime minister does not negatively affect other's knowledge of this fact. This is clearly a positive sum outcome.

Thus although some of the effect of education on GDC is confounded by predispositions, notably constructs where the effect is based on cognitive abilities, there is still an absolute effect of education on GDC through social positioning as long as the construct is not competitive, such as for political knowledge. Furthermore we cannot, based on the data at hand, rule out that mass levels of education has, over the course of the last hundreds of years, affected mass levels of GDC although education in the relatively affluent country of Denmark does not seem to affect individual differences in levels of GDC today.

Limitations and directions for future research

Although this dissertation has relied on excellent measures of personality traits and intelligence, and covered most aspects of its effect on GDC after personality traits and intelligence are held constant
a few limitations and directions for future research are in order. The limitations are mentioned in bullet form below and are in essence a summary of the limitations already mentioned in this document and other limitations mentioned in the individual papers. General limitations, such as the fact that the results need to be replicated and that the generalizability is pending empirical verification are not mentioned.

<table>
<thead>
<tr>
<th>Limitation</th>
<th>Directions for future research</th>
</tr>
</thead>
<tbody>
<tr>
<td>This dissertation has relied on a general terminology consisting of cognitive and motivational factors and situational factors to describe the interplay between predispositions and education</td>
<td>Develop a more elaborate theoretical model accounting for whether education affects specific cognitive, motivational or situational factors</td>
</tr>
<tr>
<td>The variance for the level of education in the draftee sample is somewhat lower than in the population at large which could attenuate the effects of education on GDC.</td>
<td>Confirm the results using samples where the variation in the level of education is larger</td>
</tr>
<tr>
<td>The samples are cross-sectional and the full interplay between the development of differences in levels of education and predispositions and GDC are not observed</td>
<td>Conduct panel study of young adults before differences in levels of education are large including measures of GDC and predispositions</td>
</tr>
<tr>
<td>Personality traits and intelligence are broad traits and the effect of education could be confounded by lower level attributes of these broad traits</td>
<td>Conduct study including measures of lower order traits + see elaboration below</td>
</tr>
<tr>
<td>There are other important predispositions to consider other than personality traits and intelligence</td>
<td>Conduct study including measures of different predispositions + see elaboration below</td>
</tr>
<tr>
<td>Another important source of confounding is pre-adult experiences such as parental socio-economic status</td>
<td>Conduct study including measures of preadult experiences + see elaboration below</td>
</tr>
</tbody>
</table>

My dissertation has investigated whether education still has an effect on political tolerance, political sophistication, political efficacy and issue voting after the predispositions personality traits and intelligence are accounted for. I find significant partial confounding, which suggests that the educational effect found in most studies is substantially inflated.

However, there are more to predispositions and pre-adult influences than personality traits and intelligence, although these broad traits are capturing a very large part of individual differences. A complete account of the effect of education on political behaviors requires methods that take into account, more generally, how people differ genetically as well as in their family background before
entering secondary and post-secondary education (Branigan, McCallum, and Freese 2013). Investigating genetic confounding and the importance of pre-adult socialization can be done by studying monozygotic (MZ) and dizygotic (DZ) twins. Using twins, it is possible to estimate the degree of confounding, i.e. does education retain some or all of its explanatory power, and to distinguish between genetic and environmental sources of confounding. Using twin methods to investigate the causal effect of education on GDC would thus provide an important direction for future research.
Bibliography


English summary

This dissertation explores the extent to which education influences good democratic citizenship (GDC) after taking into account that people also differ in terms of their personality traits and intelligence, independent of their level of education, and what explains this influence or lack of influence.

Classic studies of political behavior have argued that education is important for a host of political behaviors and attitudes, which are all aspects of GDC, such as political sophistication, political tolerance, policy voting, and internal and external efficacy. In fact to such an extent that education was termed “the universal solvent”. Recent studies have questioned this consensus and argued that those factors which lead people to pursue higher levels of education are the same factors which lead people to also possess GDC. More to the point it has been suggested that personality traits and intelligence are confounding the effect of education on GDC. So far no one has however thoroughly investigated this claim and this dissertation therefore set out to do just that, by focusing on the aspects of GDC mentioned above.

The results demonstrate that in most cases there is still an influence of education on GDC but that it depends on the political construct studied. In order to explain the divergent results it is necessary to distinguish between whether the effect of education on the political construct is based on education affecting: (1) Cognitive abilities, (2) cognitive styles and motivations, or (3) social positioning. When the effect education on the aspect of GDC is primarily based on cognitive abilities, such as its effect on political tolerance and policy voting, there is a high degree of confounding. When the effect of education on GDC is primarily based on cognitive styles and motivational factors, such as the effect of education on internal efficacy, there is a moderate degree of confounding and finally when the effect of education on GDC, is based on social positioning,
such as the effect of education on external efficacy, the degree of confounding is fairly low. In other words the effect of education on GDC is highly confounded by intelligence (cognitive abilities), moderately confounded by personality traits (cognitive styles and motivational factors) and less confounded in terms of social positioning. These results suggest that the impact on education on cognitive and motivational factors is less than previously held but that education is still important in terms of ensuring access, influence and status via. social networks i.e. social positioning.

The democratic implications of the finding that some of the effect of education on GDC is confounded and that education primarily acts as a social distributor are discussed.
Danish summary/dansk resume

Jeg undersøger i denne afhandling i hvilken grad uddannelse påvirker,”godt demokratisk medborgerskab”, (GDM) når man tager højde for, at mennesker også er udstyret med forskellige personligheder og niveauer af intelligens, samt hvad der forklarer hvorfor, eller hvorfor ikke, uddannelse påvirker GDM.

Klassiske studier af politisk adfærd har argumenteret for, at uddannelse er vigtigt for en række politiske adfærdsformer og holdninger så som politisk sofistikation, politisk tolerance, et konsistent partivalg, om man føler sig kompetent i politik, samt om man føler, at regeringen er responsiv. Nyere studier har stillet spørgsmålstegn ved denne udlægning og argumenteret for, at de faktorer der gør, at man får en højere uddannelse, er de samme faktorer som påvirker GDM. Nogle forskere har argumenteret for, at personlighedsstræk og intelligens både påvirker uddannelse og GDM, og de er den egentlige årsag til, at uddannelse er forbundet med GDM. Indtil videre har ingen dog undersøgt denne påstand, hvilket denne afhandling derfor gør, ved at fokusere på de ovennævnte aspekter ved GDM.

Jeg demonstrerer i afhandlingen, at uddannelse i de fleste tilfælde stadig påvirker de forskellige aspekter af GDM, men at det afhænger af, hvilket aspekt af GDM, man undersøger. For at forklare resultaterne, er det nødvendigt at skelne mellem, om effekten af uddannelse på GDM er baseret på en påvirkning af: (1) Kognitive evner, (2) kognitiv stil eller motivationelle faktorer, eller (3) social positionering. Når effekten af uddannelse på GDM primært er baseret på påvirkning af kognitive evner, såsom effekten af uddannelse på politisk tolerance, og at foretage et konsistent partivalg, har uddannelse en lille effekt, når vi tager højde for personlighed og intelligens. Når effekten af uddannelse på GDM primært er baseret på påvirkning af kognitiv stil eller motivationelle faktorer, så som effekten af uddannelse på, om man føler sig i stand til at forstå politik, er der en moderat effekt.
af uddannelse, når vi tager højde for intelligens og personlighed. Endelig når effekten af uddannelse på GDM primært er baseret på social positionering, påvirkes effekten af uddannelse på GDC ikke meget af at tage højde for personlighed og intelligens. Effekten af intelligens på GDM er således meget påvirket af, om effekten af uddannelse er baseret på kognitive evner, kognitiv stil og motivationelle faktorer, eller social positionering. Resultaterne demonstrerer, at effekten af uddannelse således er mindre ift. kognitive og motivationelle effekter, men at uddannelse stadig har en effekt ift. at sikre adgang, indflydelse og status via sociale netværk dvs. via social positionering.

De demokratiske implikationer af, at effekten af uddannelse i noget omfang skyldes personlighedstræk og intelligens, og at uddannelse primært er vigtig ift. social positionering diskuteres.
Education or personality traits and intelligence as determinants of political sophistication?

Abstract

Recently the causal influence of education on political sophistication has been questioned. Rather, pre-adult predispositions such as personality traits and intelligence are proposed as the real causal agents. This article investigates in two studies whether education retains its explanatory power on political sophistication when personality traits and intelligence are taken into account. One study draws on a draftee sample and has excellent measures of both personality traits and intelligence; the other study draws on a representative sample and has excellent measures of personality traits. Openness to experience and intelligence are found to be positive predictors of political sophistication and Neuroticism a negative predictor of political sophistication. In both studies education remains the single strongest predictor of political sophistication.
Introduction

Education, the consensus was for decades, fosters a host of valued political behaviors, including political sophistication. As phrased by Philip Converse (1972, 324):

“Whether one is dealing with cognitive matters such as level of factual information about politics or conceptual sophistication in its assessment; or such motivational matters as degree of attention paid to politics and emotional involvement in political affairs; or questions of actual behavior such as engagement in any variety of political activities from party work to vote turnout itself: education is everywhere the universal solvent and the relationship is everywhere in the same direction.”

Attention paid to, and factual information about, politics, are both necessary to be politically sophisticated. Thus, following Converse ‘cognitive matters’ and ‘motivational matters’ are essential in accounting for why education influences political sophistication. Richard Luskin also stresses ability and motivation, in addition to opportunity, in his AMO model of political sophistication (Luskin 1990). Focusing on education, Delli Carpini and Keeter argue: “the primacy of formal education as a facilitator of political knowledge lies in its relevance to all the components of the opportunity-motivation-ability triad” (1996, 190). The question is, however, if the causal role of education can be sustained?

In a recent panel study, Benjamin Highton showed that most differences in political sophistication are already present before people enter college (Highton 2009). Highton speculates that pre-adult experiences and dispositions such as cognitive ability may partly explain why education does not have the causal effect often found in cross-sectional studies. In a study of political participation, Kam and Palmer also highlight confounding and selection problems: “predispositions (values, intelligence and/or
cognitive skills, and personality traits) that propel individuals to pursue education might also propel them into political participation in later life” (Kam and Palmer 2008, 616).¹

Even if sophistication is important for several behaviors related to “good democratic citizenship” (Carpini and Keeter 1996; Nie, Junn, and Stehlik-Barry 1996), so far no one has examined if motivational and cognitive predispositions confound the effect of education on sophistication. Extant research shows that an individual’s intelligence and personality traits are largely set in late adolescence (Caspi, Roberts, and Shiner 2005; Deary et al. 2004; Roberts and DelVecchio 2000; Shiner and DeYoung 2013), i.e. before deciding whether to enter post-secondary education. Besides, both intelligence and personality traits are important predictors of educational attainment (Deary et al. 2007; Poropat 2009). Thus, as the recent literature argues these two constructs are among the most likely candidates of pre-adult motivational and cognitive dispositions to explain why education may not matter to political sophistication.² The present analysis is the first to explicitly address the question: What is the effect of education on political sophistication when personality traits and intelligence are taken into account?

The analyses use two independent samples to examine this question. Both samples include the 60-item NEO-PI-R test of personality, and one of them includes an extensive and highly validated intelligence test, the so-called Danish intelligence test Børge Priens Prøve (BPP), which is administered to all draftees appearing before the Danish draft board.³ The analyses show that intelligence and personality partially confound the effect of education on political sophistication, but in both studies education retains its predictive power and remains the single strongest determinant of

¹ See also (Berinsky and Lenz 2010)
² Like in most studies, I operationalize political sophistication as political knowledge. I therefore use “political knowledge” and “political sophistication” interchangeably.
³ The BPP score has a correlation of .82 with one of the most used and validated measures of intelligence, the Wechsler Adult Intelligence Scale (WAIS) score; cf. (Mortensen, Reinisch, and Teasdale 1989)
sophistication. In addition, most individual differences in levels of education are not explained by predispositions.

Education and the determinants of political sophistication

According to Robert Luskin, political sophistication is a function of three interrelated causes (Luskin 1990): ability, opportunity and motivation (AMO). The first element in the ability-opportunity-motivation triad is *ability*. Motivation and opportunity are not enough, if the ability to process and store the political knowledge is lacking (Luskin 1990). Some facts in politics are difficult to learn if they cannot be comprehended in the first place or put into their right context. The *motivation* to learn about politics is important because motivated people will seek out political information and therefore be more likely to learn more political facts. They also spend more time thinking about politics when they encounter political information (Chaiken 1980) and are thus more likely to actually store the knowledge in long-term memory. The last element in the ability-motivation-opportunity triad *opportunity* refers to context such as the *availability* of information (Carpini and Keeter 1996; Jerit, Barabas, and Bolsen 2006). We can use this framework to understand both the role of education and individual predispositions as determinants of political sophistication as discussed below.

Verba, Schlozman and Brady argue that (1995, 514): “educational attainment…has consequences for the acquisition of…income earned on the job; skills acquired at work, in organizations, and to a lesser extent, in church; psychological engagement with politics…”. Although Verba, Schlozman and Brady mainly focus on political participation in their landmark book, it nicely summarizes the important pathways between education and political sophistication, which are also stressed in the AMO model.
In fact, the empirical evidence in favor of viewing education as an important construct explaining differences in political sophistication is overwhelming, as numerous studies find a strong, significant effect of education on political sophistication (Bennet 1989; Carpini and Keeter 1996; Jennings 1996; Lambert et al. 1988; Neuman 1986; Nie, Junn, and Stehlik-Barry 1996; Smith 1989). The link between education and sophistication has cogently been phrased in AMO concepts by Carpini and Keeter (1996, 190):

“…it [education] promotes the opportunity to learn about politics by transmitting specific information and influencing career paths and social networks; it increases motivation by socializing students to the political world and stimulating their interest in it and it develops the cognitive ability necessary for effective learning”.

**Personality traits as causes of political sophistication**

Although not traditionally included in studies of political sophistication, there are, using the AMO model, very good theoretical reasons to consider the potential influence of personality traits and intelligence. There are two reasons why taking predispositions into account may imply that education does not exert an independent influence on sophistication as traditionally argued. First of all, the relationship between education and political sophistication might simply be spurious. In the extreme case in which the effect of education on political sophistication is completely *confounded* by personality traits and intelligence, the relationship between education and political sophistication should disappear after controlling for predispositions.

Secondly, educational differences might be explained by differences in predispositions. In the extreme case in which individual differences in education are completely determined by predispositions, we should get a very high R-square when using predispositions as predictors of differences in levels of education. Both explanations, ‘predispositions as confounders’ and ‘predispositions as determinants of education’, will be entertained in the analyses below.
Personality traits are theorized as general inclinations and dispositions or, as it were, a person’s general motivational structure (Denissen and Penke 2008). As such, there is a good theoretical rationale for including them as motivational determinants also of political sophistication. In recent years, researchers have converged on five basic traits, which capture the most important individual differences in personality traits; in fact to such a degree that some speak of a paradigm shift toward the Big Five (John, Naumann, and Soto 2008): Openness/Intellect, Conscientiousness, Extraversion, Agreeableness and Neuroticism. All five traits may to varying degrees contribute to a fuller explanation of differences in political sophistication.

Individuals who score high on Openness to experience value intellectual matters and are generally open to new experiences (Denissen and Penke 2008; DeYoung 2010; DeYoung and Gray 2009; McCrae and Costa 2003; Nettle 2006; Van Egeren 2009). Politics often deals with the exchange of new ideas and abstract constructs such as ideology and fiscal crises. People who are open to experience are therefore more likely to be politically engaged and thus gain knowledge of politics, irrespective of their level of education as recent studies also demonstrate (Gerber et al. 2011; Mondak 2010; Mondak and Halperin 2008). We know that people who are more open to experience are more likely to excel academically (Poropat 2009; Richardson, Abraham, and Bond 2012). Openness is therefore a likely confounder of the relationship between education and political sophistication as well as a likely determinant of education.

Conscientiousness taps into the personality dimensions of productivity and aspiration, i.e. a person who has a large drive for issues that are deemed important (Denissen and Penke 2008; DeYoung 2010; DeYoung and Gray 2009; McCrae and Costa 2003; Nettle 2006; Van Egeren 2009). However, politics may or may not be seen as important to conscientious individuals. There is thus no reason to unconditionally expect
conscientious people to be more politically knowledgeable, which is in accord with recent evidence (Gerber et al. 2011; Mondak 2010; Mondak and Halperin 2008). Although Conscientiousness is not likely to influence political sophistication, it does influence educational attainment (Poropat 2009; Richardson, Abraham, and Bond 2012). Conscientiousness may therefore partially explain differences in education but it is not a likely confounder of the relationship between education and political sophistication.

*Extraversion* is sensitivity to reward and positive affect and deals with approach behaviour such as liking social situations and being assertive (Denissen and Penke 2008; Depue and Collins 1999; Depue and Morrone-Strupinsky 2005; DeYoung 2010; DeYoung and Gray 2009; McCrae and Costa 2003; Nettle 2006; Van Egeren 2009). Being social and being assertive does not necessarily make you more knowledgeable. In addition, being sensitive to reward does not make you unconditionally more likely to be knowledgeable (Gerber et al. 2011; Mondak 2010; Mondak and Halperin 2008). People who are more extraverted generally perform more poorly academically speaking (Poropat 2009; Richardson, Abraham, and Bond 2012). While Extraversion is not a likely confounder of the relationship between education and political sophistication, it may be a potential determinant of education.

*Neuroticism* is sensitivity to threat and the tendency to experience negative emotions such as depression and anxiety. Neurotic people also have a tendency to be irritable and self-conscious (Denissen and Penke 2008; DeYoung 2010; DeYoung and Gray 2009; McCrae and Costa 2003; Nettle 2006; Van Egeren 2009). Because politics is combative and conflict-ridden they therefore are likely to disengage from politics and to have little interest in politics. The findings so far on the relationship between Neuroticism and political knowledge are indeterminate, however (Gerber et al. 2011; Mondak 2010; Mondak and Halperin 2008). Individuals who are neurotic are less likely to excel
academically (Poropat 2009; Richardson, Abraham, and Bond 2012) and more likely to experience test anxiety (Ackerman and Heggestad 1997). Neuroticism is thus a potential confounder of the relationship between education and political sophistication as well as a likely determinant of differences in levels of education.

Finally, the personality trait Agreeableness deals with the regulation of social interactions; people who are more agreeable are more cooperative and altruistic (Denissen and Penke 2008; DeYoung 2010; DeYoung and Gray 2009; McCrae and Costa 2003; Nettle 2006; Van Egeren 2009). There is little reason to expect people who are agreeable to be more politically knowledgeable; this has been confirmed in previous studies (Gerber et al. 2011; Mondak 2010; Mondak and Halperin 2008). Being more agreeable is, however, associated with the ability to excel academically (Poropat 2009; Richardson, Abraham, and Bond 2012). Whereas Agreeableness is not likely to influence political knowledge directly and, thus, confound the educational effect, it is likely to affect differences in levels of education.

**Intelligence as a cause of political sophistication**

In addition to personality traits, the predisposition most often referred to in the literature on the causal role of education for political behaviors is cognitive ability or intelligence. According to a common definition (Gottfredson 1997, 13): “Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience...”.

Intelligence thus tracks closely with the AMO model’s focus on ability. The human ability measured in this study is general intelligence, or $g$ as it is also called, which is arguably what most people have in mind when they think about the construct intelligence (Mackintosh 2011, 11). People with a high level of $g$ are better able to rotate mental objects in their mind’s eye, are perceptually faster, have a larger memory, a better
ability to acquire knowledge as well as apply it in new and novel settings. The list could go on (Carroll 2003; Johnson and Bouchard 2005; McGrew 2009). This positive manifold, i.e. the tendency for people who are cognitively able in one type of the mental domain to also be cognitively able in another mental domain, is exactly what general intelligence is all about (Jensen 1998). This is arguably what most laypeople think about when discussing the construct intelligence: Intelligent people are simply “smart” when it comes to solving mental tasks. General intelligence usually explains approximately 40 % of the variance in test scores, which means that we are able to account for most of the important individual differences in intelligence by focusing on general intelligence (Deary, Penke, and Johnson 2010).4

At a conceptual level, personality traits and intelligence are usually considered separate constructs: Personality traits are mostly non-cognitive, less focused on ability and more concerned about inclinations and motivations. Besides, personality traits are usually seen as relevant for “typical performance”, whereas intelligence relates to “maximal performance”, irrespective of motivations (DeYoung 2011). Empirically, intelligence and personality traits are fairly separate constructs, thus lending credence to the conceptual differentiation, although studies have demonstrated a small overlap between Openness and Intelligence (Ackerman and Heggestad 1997).5

Research demonstrates that people who are more intelligent are also more politically sophisticated (Hamil and Lodge 1986; Harvey and Harvey 1970; Luskin 1990; Neuman 1986; Neuman, Just, and Crigler 1992). Sticking to the AMO model, we would indeed expect this to be the case: People who are more intelligent are more able to “comprehend complex ideas” and “think abstractly”, which a full understanding of

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4 In this test it is around 50-60% as discussed below
5 Their meta-analytic estimate is .3. In this sample the correlation is 0.1.
politics requires, to paraphrase the definition of intelligence above. We also know that those who are more intelligent are also more likely to excel academically (Deary et al. 2007; Poropat 2009; Richardson, Abraham, and Bond 2012). Intelligence is thus both a potential confounder as well as a potential determinant of individual differences in education.

**Environments and predispositions**

Personality traits are highly stable over time (Roberts and DelVecchio 2000; Roberts, Walton, and Viechtbauer 2006) and established early in life (Shiner and DeYoung 2013), to some extent even genetically influenced in terms of change and stability (Bleidorn et al. 2009; Hopwood et al. 2011), although current evidence suggests that important environmental changes might be associated with changes in personality traits (Bleidorn et al. 2009; Hopwood et al. 2011; Ludtke et al. 2011; McCrae et al. 1998; Roberts, Caspi, and Moffitt 2003; Roberts and Helson 1997; Specht, Egloff, and Schmukle 2011; Sutin and Costa 2010) but in most cases only to a limited, extent. In general, however, for most people in most situations personality traits crystallize early in life and remain stable over the life course (Shiner and DeYoung 2013). Studies also show that the amount of schooling also affects your level of intelligence, although the relationship between these two constructs is complicated (Deary and Johnson 2010; Nisbett et al. 2012). Thus, the causal direction is notably from personality to later in life experiences, achievements and political sophistication. I will return to this point in the discussion. The table below summarizes on the expectations:

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Hypotheses</th>
</tr>
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<tbody>
<tr>
<td>Political knowledge</td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td>+</td>
</tr>
<tr>
<td>Openness</td>
<td>+</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>N.A.</td>
</tr>
<tr>
<td>Extraversion</td>
<td>N.A.</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>N.A.</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-</td>
</tr>
<tr>
<td>Education</td>
<td>+</td>
</tr>
</tbody>
</table>

N.A. refers to no association hypothesized
Datasets and measures of constructs

The analysis draws on two independent datasets; a representative sample of the Danish population and a draftee sample, which consists of young people in Denmark; the mean age for this sample is 23 years. The representative sample (N=3612) is an internet panel, fielded between May 25 and June 6, 2010 with a response rate of approximately 45 percent. The draftee sample was contacted by regular mail and asked to take the survey online. The survey was fielded in the period March 2 to April 10, 2012. The sample size is 1072 with a response rate of approximately 28 percent. The males are a random sample of the Danish population for the draftee sample, the women are not. The reason is that the dataset consisting of young people is drawn from the Danish draft registry, and all males in Denmark are required to appear before the draft board when they are 18, whereas women are not. They are thus by definition a self-selected group. However, they are representative in terms of personality traits and demographics compared to the appropriate age group in the representative sample, as discussed in appendix 1.

The data for the analysis basically consists of three types of variables: Measures of predispositions, measures of political sophistication, and measures of environmental variables and controls. In terms of individual predispositions, the draftee sample has data on personality traits and intelligence, whereas the representative sample has data on personality traits.

The Big Five are in both samples measured by the perhaps most used personality inventory in psychology namely the NEO-PI-R, more specifically the 60 item NEO-PI-R (Costa and McCrae 2003). Correlations between each of the five domains with the full Danish NEO-PI-R are .9 and above (Costa and McCrae 2003, 74). We are thus relying on a validated and highly reliable measure of personality traits in this
investigation (Costa and McCrae 2003, 78). In addition, the reliability of the instrument is taken into account by the use of structural equation modelling as discussed above.

The measure of intelligence is called Børge Priens Prøve (BPP) and is a test all Danish men have to take when they appear before the military draft board. The women who self-select into the military also take the test. The general factor of intelligence accounts for around 50-60% of the total variance in BPP scores (Hartmann and Teasdale 2004; Teasdale et al. 2011). The total BPP score has a correlation of around .99 with g both for high and low ability groups. BPP has a correlation of .82 with the full Wechsler Adult Intelligence Scale (WAIS) score (Mortensen, Reinisch, and Teasdale 1989). The test is highly valid and reliable (Hartmann and Teasdale 2005; Kousgaard 2003; Rasch 1980; Teasdale et al. 2011).

Political sophistication is measured in the same way in the two surveys, namely by asking a series of factual questions in the two surveys, which is the most common measurement method for assessing levels of political knowledge (Carpini and Keeter 1996). Thus, political sophistication is operationalized as political knowledge.

Measures of income and education are also fairly similar across the two samples. In both cases a measure of personal income is included. The measure of personal income in the draftee sample is recoded to match the categories in the representative sample. The educational variables in the draftee sample are recoded into one continuous variable to match the educational variable in the representative sample. Descriptive statistics and full question wording are outlined in appendix 1.

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6 Actually, some 5% do not take the test, mainly on documented medical grounds, stating they are unfit for military duty. (Teasdale and Owen 1989)

7 This approach is debated: (Gibson and Caldeira 2009; Luskin and Bullock 2011; McGlone, Aronson, and Kobrynowicz 2006; Mondak and Davis 2001; Prior and Lupia 2008)

8 Carpini and Keeter’s definition of political knowledge as: “the range of factual information about politics that is stored in long-term memory” is the most cited (Carpini and Keeter 1996, 10)
In terms of scaling, all individual predispositions and our measure of political knowledge are rescaled to have a range of 0-1, as they do not have a natural metric. In order to ease comparison of coefficients, education is also rescaled to have a range of 0-1. The scaling and metric of the other constructs can be found in appendix 1.

**Model estimation**

Structural equation modeling (SEM) is used to estimate the models.\(^9\) This allows us to take into account measurement error of our constructs, which leads to less parameter bias (Bollen 1989).\(^10\) As recently demonstrated by Ansolabehere, Rodden and Snyder, measurement error can have very substantive implications for how we understand traditional issues studied in political science such as stability of policy preferences (Ansolabehere, Rodden, and Snyder 2008). Using SEM also allows us to use a strong technique for handling missing data, namely full information maximum likelihood (FIML) (Schafer and Graham 2002; Yuan, Yang-Wallentin, and Bentler 2012).\(^11\) Unless missing data are Missing Completely at Random (MCAR), i.e. completely independent of observables and unobservables, we obtain biased parameter estimates and standard errors if we use listwise deletion (Little and Rubin 1987). FIML only requires the assumption of Missing at Random (MAR), i.e. that the missing values of the dependent variable are unrelated to the values of the dependent variable conditional on observables (Enders 2010).

A number of constructs are usually included as either predictors or controls in studies of the determinants of political sophistication, namely: education, income or occupational group, gender, and age (Bennet 1989; Carpini and Keeter 1996; Jennings

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\(^9\) The results of an OLS regression with robust standard errors, using listwise deletion, provide similar results. Available upon request.

\(^10\) In addition, survey weights are used in both samples.

\(^11\)
1996; Lambert et al. 1988; Neuman 1986; Smith 1989). For this analysis, personal income, age, and gender are included in all models as controls.

Traditional studies illustrating the effect of education on political knowledge and the ability, motivation and opportunity to be informed, do not control for individual predispositions. The few studies that do include personality traits generally confirm that education is still important for explaining differences in political sophistication (Gerber et al. 2011; Mondak 2010; Mondak and Halperin 2008). No studies so far have included both the Big Five personality traits and intelligence to explain individual differences in political sophistication.

To test the “predispositions as confounders explanation”, I will estimate three models: one with individual predispositions and controls, one with education and controls, and one with individual predispositions and education as well as controls. To test the “predispositions as determinants of education” explanation model, I will specify education as a dependent variable; the variance explained in education, measured by R-squared, should be high once personality traits and intelligence are used as explanatory constructs, if the “predispositions as determinants of education” is correct.

A three-pronged approach to data analysis was applied: First a well-fitting measurement model at the item level for personality traits and political knowledge was created.\[12\] This involved doing an exploratory factor analysis to determine the number of factors for the constructs, as well as determine the performance of the items. Based on this first step, item parcels were created in order to better approximate our normality assumption, which requires special modeling techniques\[13\] or the use of item parcels. The knowledge items have fewer than five categories, which are needed when we use an

\[12\] Results of these analyses are available upon request.

\[13\] Such as the robust categorical least squares.
estimator that relies on multivariate normality (Rhemtulla, Brosseau-Liard, and Savalei 2012). Furthermore, we are able to reduce the idiosyncratic noise of the items and to simplify our model estimation considerably when using parcels. The third and last step consists of estimating the measurement models and structural model simultaneously.

All analyses were performed in Mplus version 7. Unless otherwise noted, Mplus’ MLR estimator is used, which provides robust standard errors and robust fit statistics (Browne and Cudeck 1992). Appendix 2 outlines fit statistics for the various models, as well as the measurement models for the latent constructs.

**Study 1: Personality traits and intelligence – draftee sample**

First we will investigate the “predispositions as confounders” explanation and then turn to the “predispositions as determinants of education” explanation. The results of the model estimation for the draftee sample are illustrated in the table below:

<table>
<thead>
<tr>
<th>Construct</th>
<th>Only education</th>
<th>Only personality traits and intelligence</th>
<th>All predictors included</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unstandardized coefficient</td>
<td>Unstandardized coefficient</td>
<td>Unstandardized coefficient</td>
</tr>
<tr>
<td>Openness (0-1)</td>
<td>0.199*** (0.061)</td>
<td>0.169*** (0.056)</td>
<td>0.133</td>
</tr>
<tr>
<td>Conscientiousness (0-1)</td>
<td>0.288*** (0.103)</td>
<td>0.224** (0.100)</td>
<td>0.127</td>
</tr>
<tr>
<td>Extraversion (0-1)</td>
<td>-0.055 (0.072)</td>
<td>-0.063 (0.068)</td>
<td>-0.047</td>
</tr>
<tr>
<td>Agreeableness (0-1)</td>
<td>0.033 (0.059)</td>
<td>0.026 (0.055)</td>
<td>0.021</td>
</tr>
<tr>
<td>Neuroticism (0-1)</td>
<td>-0.159*** (0.066)</td>
<td>-0.146** (0.062)</td>
<td>-0.137</td>
</tr>
<tr>
<td>Intelligence (0-1)</td>
<td>0.597*** (0.085)</td>
<td>0.425*** (0.076)</td>
<td>0.260</td>
</tr>
<tr>
<td>Education (0-1)</td>
<td>0.301*** (0.034)</td>
<td>0.233*** (0.031)</td>
<td>0.319</td>
</tr>
</tbody>
</table>

Standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01. Controls are age, gender, and personal income in all models.

In terms of individual predispositions, most but not all of our expectations are met. Openness is associated with being more politically knowledgeable in both models, and
Neuroticism is as expected associated with being less politically knowledgeable. Agreeableness and Extraversion are not significantly associated with being more or less politically knowledgeable. Being more conscientious is associated with having more political knowledge, which we did not expect.

More importantly, for our discussion above about the relative importance of education and individual predispositions, we notice that education still exerts a strong influence on political sophistication after controlling for intelligence and personality traits, although the coefficient decreases by approximately .068 on our zero to one scale, after controlling for individual predispositions. If we only include personality traits and leave out intelligence, the effect of education decreases by .026. The rest of the drop, i.e. a decrease of .042, is thus due to intelligence. Education is therefore partially confounded by predispositions but retains a strong independent impact on sophistication.

Education still has the largest effect with a standardized effect size of .319. The second largest effect sizes are represented by Intelligence and Openness with standardized effect sizes of .260 and .133, respectively. Not only is education still significant after controlling for the effects of personality traits and intelligence, it is in fact still the single strongest determinant of political knowledge.

We now return to the “predispositions as determinants of education” explanation. In order to further test whether education is determined by predispositions, it is specified as a dependent variable and predispositions as the independent variables. When this is done we get an R-squared of 0.129 for education. Based on this we cannot claim that most of the variance in education, generally speaking, is accounted for by using predispositions as predictors of education. In fact, around 87 percent of the variance is
unaccounted for, while there is plenty of room for the effect of education to have an independent effect on political sophistication.

We are of course left wondering whether these results are replicable across the entire population and not just our draftee sample. This will be investigated in the following with the caveat that the replication sample does not have a measure of intelligence.

Study 2: Only personality traits – representative sample

The same procedure for analyzing the effect of education on political sophistication will be pursued here: First we will look at the “predispositions as confounders” explanation and then turn to the “predispositions as determinants of education” explanation.

Table 3: Determinants of political knowledge for the representative sample

<table>
<thead>
<tr>
<th>Construct</th>
<th>Only education</th>
<th>Only personality traits</th>
<th>All predictors included</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unstandardized coefficient</td>
<td>Unstandardized coefficient</td>
<td>Unstandardized coefficient</td>
</tr>
<tr>
<td>Openness (0-1)</td>
<td>0.195 ***</td>
<td>0.125 ***</td>
<td>0.078</td>
</tr>
<tr>
<td></td>
<td>(0.049)</td>
<td>(0.052)</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness (0-1)</td>
<td>0.096</td>
<td>0.079</td>
<td>0.028</td>
</tr>
<tr>
<td></td>
<td>(0.102)</td>
<td>(0.101)</td>
<td></td>
</tr>
<tr>
<td>Extraversion (0-1)</td>
<td>-0.123 **</td>
<td>-0.093</td>
<td>-0.053</td>
</tr>
<tr>
<td></td>
<td>(0.057)</td>
<td>(0.057)</td>
<td></td>
</tr>
<tr>
<td>Agreeableness (0-1)</td>
<td>0.040</td>
<td>0.036</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>(0.053)</td>
<td>(0.052)</td>
<td></td>
</tr>
<tr>
<td>Neuroticism (0-1)</td>
<td>-0.141 **</td>
<td>-0.115 *</td>
<td>-0.065</td>
</tr>
<tr>
<td></td>
<td>(0.069)</td>
<td>(0.068)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.163 ***</td>
<td>0.132 ***</td>
<td>0.138</td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td>(0.024)</td>
<td></td>
</tr>
</tbody>
</table>

Standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01. Controls are age, gender, and personal income in all models.

In terms of our predictions regarding personality traits, Openness is strongly associated with being more politically knowledgeable; people who are more open to experience are also more politically knowledgeable. Neuroticism is negatively associated with being politically knowledgeable, although not after control for education. The effect of Conscientiousness and of Agreeableness is not statistically significant in any of the models for this sample. Extraversion is a negative predictor in the model that only
includes personality traits but not at a .05 level once we have controlled for differences in education.

Education is still associated with having a higher level of political knowledge after also controlling for personality traits in this study. The coefficient of education decreases by .031 once personality traits are included, which is almost exactly the same decrease as above of .026 when personality traits are included, and this sample thus confirms this finding quite nicely. In terms of effect sizes, education is still the single strongest determinant with a standardized effect size of .138, and Openness is the second largest predictor with a standardized effect size of .078. Here, we are able to confirm the finding above: Education is partially confounded by predispositions but retains a strong independent impact on sophistication.

When we specify education as a dependent variable and the predispositions as independent variables as above, we get an R-squared for education of 0.114, the “predispositions as determinants of education” explanation can thus not unconditionally be confirmed here either. In fact, this estimate is fairly similar to the estimate above, so the relationship between education and predispositions found in the draftee sample is replicable in this study. It is, of course, likely that R-squared would increase further if we also included intelligence as a predictor.

**Similarities and differences across samples and generality of findings**

The results for the effects of education and individual predispositions on political knowledge are very similar in the two samples also in terms of size of coefficients. In only one case is a hypothesized relationship not significant in both samples, although the direction and magnitude are very similar; the effect of Neuroticism is only just not significant after controlling for education in the representative sample (p=0.089).
This also applies to our controls in both samples as shown in appendix 3, which illustrates the effects of our controls in the “classic model”, which only includes controls and education. The coefficients are very similar in magnitude across the two samples. For both samples, the results of the controls are very much in accordance with the established findings in the established international and Danish literature on sophistication: Being older, male and having a higher personal income are all positive predictors of political knowledge (Bennet 1989; Carpini and Keeter 1996; Lambert et al. 1988; Neuman 1986; Smith 1989).14

Two constructs stand out with markedly different coefficients: Education and Conscientiousness. I will only focus on education, as this is our primary construct of investigation. The effect of education, which is measured in the same way in both studies, on political knowledge is .233 in the draftee sample and .132 in the representative sample. The effect is thus almost two times larger in the draftee sample. We might speculate that the effect is different across the two samples because it is moderated. Even though the two samples differ according to socio-demographics, e.g. by income, the most obvious moderator is age, as the draftee sample only consists of young people. Furthermore, a recent study demonstrated that the effect of education on political sophistication is likely to diminish with age.15 I have therefore created an interaction term for education and age in the representative sample, as this has the larger age span. The interaction term is statistically significant (p=0.003) and negative with an unstandardized coefficient of -0.004.

14 And also in accordance with the Danish election studies’ results, see (Hansen 2007). Age is not significant in the draftee sample but in the representative sample, probably because of the restriction in range in this variable in the draftee sample. See appendix 3.
15 (Highton 2009)
The mean age in the draftee sample is approximately 23 years. The impact of education on political knowledge for those aged 23 in the representative sample is 0.267 (95% CI [0.157, 0.378], which is very close to the estimate of .233 (95% CI [0.172, 0.293]) in the draftee sample. In other words, we are able to reproduce, within a margin of error, the same effect size across samples for the same age cohort. The results for our draftee sample are thus likely to be fairly representative of the entire population for this particular age group. The graph below illustrates the marginal effect of education as a function of age in the representative sample.

**Figure 1:** The marginal effect of education on political knowledge as a function of age with 95% confidence bands

**Discussion**

In this study we have demonstrated that education is still very important, if we want to understand individual differences in sophistication. This is a quite different result than Highton, who essentially demonstrated that differences in levels of sophistication are already in place by the time people enter college (Highton 2009). There may be three reasons why the results diverge.

First of all, the education measure is different. Highton only focuses on college education, i.e. whether people have some college or an actual bachelor’s degree or not. In the present analysis education is treated as a continuous variable, from those with only primary school to those having a master’s degree, and we are therefore capturing a
greater amount of differences in schooling. If we only focus on college education, i.e. treat education as a dummy variable in the full model specifications above, we obtain an unstandardized coefficient for the representative sample of 0.041 (p=0.013), which is much smaller than the effect of 0.132 obtained above. By only focusing on college education and not the full extent of educational differences, Highton thus underestimates the full effect of differences in levels of education. Or, to paraphrase, the effect of education in the present study is smaller but remains when we employ a concept similar to Highton.

Secondly, the knowledge battery he uses does not have many items and the mean political knowledge for those with a college education is already at three point five on a five point scale when they enter the panel (Highton 2009), and the potential for within variation over time is thus very small; in essence, he is estimating whether more people gets the last two questions right without making a single mistake. A larger sampling of knowledge questions would be appropriate and with a larger potential for within variation, Highton’s results may have been different.

Thirdly, we need to acknowledge that this investigation has been a specific investigation of the effect of education on political sophistication after taking into account personality traits and intelligence (2011, 657). This does not prevent that education might be confounded by other predispositions of course, or preadult experiences. Personality traits and intelligence are probably the most likely candidates as confounders, however. In addition, when we control for father’s level of education in

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16 I.e. those with a medium-term long education in the Danish educational system. For further discussion on the coding of the variables see appendix 1.
17 Doing this for the draftee sample makes less sense as not all have had time to finish a medium-term education as the sample is young. Here it is more relevant to only investigate the effect of increases in levels of education i.e. the slope, as we have done above.
the two samples, to control for some of the preadult experiences highlighted by Highton and Kam and Palmer, the effect of education on political sophistication decreases, but only very little: The effect of education in the representative sample is then 0.120 (p= 0.000), compared to 0.132 above, and in the draftee sample 0.218 (p=0.000), compared to 0.233 above. This does not exclude other preadult experiences of course but goes some way in terms of controlling for preadult experiences as well.

Conclusion

This study has engaged the larger debate on the role of education as a universal solvent with a specific focus on the effect of education on political sophistication. The skeptics argue that the effect of education on political sophistication might be confounded by predispositions such as personality traits and intelligence. No studies have been able to test this supposition, however. We find that education is still an important construct to consider if we want to explain differences in political sophistication. Even when we control for father’s level of education, the effect of education on political sophistication is strong. The findings regarding the “predispositions as confounders” explanation as well as the results for education are summarized in the table below:

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Political knowledge</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hypotheses</td>
<td>Finding</td>
</tr>
<tr>
<td>Intelligence</td>
<td>+</td>
<td>+ (2/2)</td>
</tr>
<tr>
<td>Openness</td>
<td>+</td>
<td>+ (4/4)</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>N.A.</td>
<td>N.A. (2/4)</td>
</tr>
<tr>
<td>Extraversion</td>
<td>N.A.</td>
<td>N.A. (3/4)</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>N.A.</td>
<td>N.A. (4/4)</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-</td>
<td>- (3/4)</td>
</tr>
<tr>
<td>Education</td>
<td>+</td>
<td>+ (4/4)</td>
</tr>
</tbody>
</table>

* The ratio refers to the number of times a finding is confirmed out of the potential number of times it was possible to confirm it.

The personality traits Openness and Neuroticism account for some of the motivational predispositions to be politically informed usually attributed to education, and the effect

---

18 The representative sample asks for the level of education for the "main provider" which in 83 percent of cases is the father. Full results of these analyses are available upon request.
of education decreases after control for these traits. Openness is associated with being more politically knowledgeable, and Neuroticism is associated with being less politically knowledgeable. Intelligence accounts for some of the ability needed to become politically informed which is usually ascribed to education, and the effect of education decreases in size after including intelligence; people who are more intelligent are also more politically informed. The most important result is, however, that education is still a significant and strong determinant of political knowledge, even after controlling for individual predispositions. In fact, the single strongest effect on political knowledge in both samples is education. This model specification is likely to overestimate the effect of predispositions on education as we know that there is some, even if limited, reverse causality between education and intelligence and education and personality traits. To fully tease out the relationship between predispositions and education, a logical next step is to use panel data as discussed below.

Regarding the “predispositions as determinants of education” explanation we can also confirm the independent contribution of education on political sophistication. Most of the variance in education is left unexplained, and there is therefore plenty of room for education to play an independent role in explaining differences in political sophistication.

This finding, that education still matters, of course calls into question why education still matters. Using the AMO framework, three candidates come to mind – one more obvious, the other two less so: First of all we have not touched upon the issue of opportunity in this investigation, and we know that education socializes people into different networks which give them opportunities to be exposed to political facts and become politically engaged (Nie, Junn, and Stehlik-Barry 1996)
This is therefore a very likely candidate for how education affects levels of political sophistication. Secondly, there is obviously more to motivation and ability than personality traits and intelligence. It is possible that education affects specific abilities and facts, such as how to understand politics by reading a newspaper, or education teaches specifically how parliament works, above and beyond the effect of personality traits and intelligence (Carpini and Keeter 1996, chapter 5). Finally, it is also likely that education affects specific motivational aspects of importance to gaining knowledge of politics above and beyond the effect personality traits and intelligence have on political sophistication, e.g. the importance of keeping up to date on current affairs by following the news. Studies on the effect of education on either the importance of networks or the importance of specific abilities or motivational factors on gaining political knowledge after taking into account personality traits and intelligence are well worth undertaking.

We have examined the interplay between education and predispositions in a setting which arguably makes it extremely difficult to demonstrate a strong and consistent effect of education on political sophistication: In Denmark, education is free and higher education is supported by a general tax-financed stipend covering costs of living. Hence, if anywhere, Denmark is a place where almost everybody should be able to attain education according to his or her abilities and motivation. In this sense, Denmark is a least-likely case for demonstrating the effect of education on political sophistication (Gerring 2007). Even in this context we still find a strong relationship between education and sophistication. We therefore expect that the findings hold far and beyond the Danish case and thus also in the US where most current studies on education and sophistication are conducted. There are two caveats however; one regarding intelligence and one regarding timing.
Both personality traits and intelligence work in tandem to reduce the effect of education on political knowledge, but the effect of education is still significant and substantial. The effect of education on political sophistication is reduced by almost the same amount after taking into account personality traits in two independent studies, and we can therefore be fairly certain that this is a reproducible finding. Our measure of intelligence is not included in the representative sample, and we are, therefore, unable to determine whether the effect of intelligence is also moderated by age. However, as the effect sizes and significance of our constructs and controls are very similar across the two samples, the most likely finding is that the effect of intelligence on sophistication is not moderated markedly by age.

The second caveat concerns timing. One of the main points of the skeptics of the causal effect of education such as Kam and Palmer and Highton is that educational attainment is largely a result of preadult experiences and predispositions. Although we argued above that both personality traits and intelligence are established early in life and remain stable across the lifespan, we would ideally like to use panel data to further investigate the interplay between personality traits, intelligence and education in determining political behaviors. Although Highton has panel data on political sophistication, he does not have panel data on personality traits and intelligence. Ideally we would therefore need a panel design which also has measures of personality traits and intelligence, i.e. a combination of this study and Highton’s study. The timing of such a study is of course crucial; preferably, adolescents should be surveyed at the time compulsory education ends, and when differences in levels of education become relevant; which in Denmark is by the end of primary school. Seeing as there is ample evidence that personality traits and intelligence are established early in life and remain quite stable throughout life, it would be surprising if the results of a panel study at a substantial level
differed markedly from those obtained here. As discussed above, several environmental changes are also associated with changes in personality traits, among others differences in schooling. If anything, we are therefore *underestimating* the effect of education on political sophistication by not taking this reverse causation into account.

To reach a more nuanced understanding of the role of education as the universal solvent, we need to research the effect of education on other important political behaviors after taking predispositions into account. Although education is important for acquiring political knowledge, it is far from obvious whether education is also important for explaining differences in political behaviors which are more *distally* related to education, such as internal efficacy, which we know is established early in life and exhibits characteristics closely resembling those ascribed to personality traits.

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19 The intelligence test used for the draftee sample is taken when respondents are 18 years old. The largest differences in schooling are post-18 years in Denmark. We can therefore be fairly certain that our measure of intelligence is not overly influenced by differences in schooling.

20 (Ludtke et al. 2011)

21 (Abramson 1983; Easton and Dennis 1967)
Bibliography


Appendix 1: Descriptive statistics and question wording

The NEO-PI-R short version is copyrighted so questions from this battery are not shown. Also the BPP battery is protected against publication.

Question wording for draftee sample

Questions measuring political knowledge

Here is a series of questions about politics generally speaking. Politics can be complicated but try to answer the following questions as best you can.

How large do you think the expenditures for the health care sector in Denmark were as a percentage of GDP in 2009?
Approximately 5 %
Approximately 12 %
Approximately 22 %
Approximately 54 %
Don’t know

Which of the following are referred to as the executive power?
The Ministry of Justice
The Police
The government
The Parliament
Don’t know
Which of the following persons is Denmark’s minister of finance?

A  B  C  D

Is it a requirement that you are a Member of Parliament (Folketinget) in order to be eligible for cabinet minister in Denmark?

Yes
No
Don’t know
Which party is the politician in the picture a member of?

The Social Democrats
The Danish Social-Liberal party
The Conservative People’s Party
The Socialist People’s Party
Liberal Alliance
The Christian Democrats
The Danish People’s Party
The Liberal Party of Denmark
The Red-Green Alliance
Don’t remember party

Which of the following parties would you consider to be most rightist?

The Liberal Party of Denmark
The Social Democrats
The Socialist People’s Party
The Red-Green Alliance
Don’t know
What percentage of GDP do you think Denmark spent on foreign aid in 2010?
Approximately 0.9 %
Approximately 0.5 %
Approximately 2.4 %
Approximately 5.1 %
Don’t know

Who was Denmark’s Prime Minister from 1982-1993?
Poul Schlüter
Poul Nyrup Rasmussen
Anker Jørgensen
Poul Hartling
Don’t know

How many members does Parliament have if we do not include the four from Greenland and the Faroe Islands?
Number__________
Don’t know

Which of the following persons is not a member of Parliament?

A B C D
What is the number of member states in the EU?

Number ________
Don’t know

Which party do you think the politician Mette Frederiksen is a member of?
The Social Democrats
The Danish Social-Liberal party
The Conservative People’s Party
The Socialist People’s Party
Liberal Alliance
The Christian Democrats
The Danish People's Party
The Liberal Party of Denmark
The Red-Green Alliance
Don’t know

Which party do you think the politician Søren Pind is a member of?
The Social Democrats
The Danish Social-Liberal party
The Conservative People’s Party
The Socialist People’s Party
Liberal Alliance
The Christian Democrats
The Danish People's Party
The Liberal Party of Denmark
The Red-Green Alliance
Don’t know
Questions measuring education and controls

**Approximately how large is your yearly gross income i.e. the total income before taxes and other deductibles but including salary, pension and other incomes?**

Below 100,000 DKK
100,000-124,999 DKK
125,000-149,999 DKK
150,000-174,999 DKK
175,000-199,999 DKK
200,000-249,999 DKK
250,000-274,999 DKK
275,000-299,999 DKK
300,000-324,999 DKK
325,000-349,999 DKK
350,000-374,999 DKK
375,000-399,999 DKK
400,000 DKK or above.
Don’t know

**What is your schooling?**

Primary school 7 years or less
Primary school 8/9 years
10th grade
High school
Don’t know

---

1 The two educational variables are recoded to fit the recoded educational variable for the representative sample. This strategy is chosen to reflect the “years of school education” also used to categorize people according in the representative sample. The categories are:

1. 9 Years or less (Primary school)
2. 10-11 Years (Basic vocational education and vocational education)
3. 11-12 years of education (High school)
4. 13-14 years of education (Short-term higher education)
5. 14-16 years of education (Medium term higher education)
6. 17-18 years of education (Long-Term higher education)
Which vocational or higher education have you completed or are in the process of completing apart from your schooling?

(If you have taken multiple degrees, please only indicate the highest level of education).

- Basic vocational education
- Vocational education
- Short-term higher education (1-2 years)
- Medium term higher education (3-4 years)
- Long-term higher education (more than 4 years)
- None
- Don’t know

Question wording for representative sample of Danish population

Questions measuring political knowledge

Which parties are ruling parties in the current government?

- The Social Democrats
- The Liberal Party of Denmark, The Conservative People’s Party
- The Liberal Party, The Conservative People’s Party, The Danish People’s Party
- The Social Democrats, The Socialist People’s Party
- The Social Democrats, The Socialist People’s Party, The Red Green Alliance
- The Social Democrats, The Socialist People’s Party, The Danish Social Liberal Party
- Don’t know

How many members does Parliament have if we disregard the four from Greenland and the Faroe Islands?

- 171
- 175
- 179
- 183
- 187
- Don’t know
Which party is Troels Lund Poulsen a member of?
The Liberal Party of Denmark
The Social Democrats
The Danish People’s Party
The Danish Social Liberal Party
The Socialist People’s Party

Which party is Christine Antorini a member of?
The Liberal Party of Denmark
The Social Democrats
The Danish People’s Party
The Danish Social Liberal Party
The Socialist People’s Party
Questions measuring controls and education

What is your last finished education?

Primary school
High school
High school (Vocational highschool)
Vocational education
Short-term higher education (1-2 years)
Medium term higher education (3-4 years)
Bachelor (3-4 years)
Long-term higher education (more than 4 years)
Researcher/PhD

---

2 This question was not asked but ascertained through registry data. The variable is recoded to reflect “years of school education”, which means “Vocational education” and “High school” changes place. The two high school categories are collapsed and the “Researcher/PhD” category is combined with the long-term higher education as this category does not exist in the draftee sample. The categories are:

1. 9 Years or less (Primary school)
2. 10-11 Years (Vocational education)
3. 11-12 years of education (High school + vocational high school)
4. 13-14 years of education (Short-term higher education)
5. 14-16 years of education (Medium term higher education + Bachelor)
6. 17-18 years of education (Long-Term higher education + Researcher/PhD)
What is your current personal income before taxes?

Up to 99,999 DKK,
100,000 – 199,999 DKK
200,000 – 299,999 DKK
300,000 – 399,999 DKK
400,000 – 499,999 DKK
500,000 – 599,999 DKK
600,000 – 699,999 DKK
700,000 - 799,999 DKK
800,000 - 899,999 DKK
900,000 - 999,999 DKK
1,000,000 DKK and above
Don’t know/don’t want to answer
### Descriptive statistics

Descriptive statistics for the representative sample of the Danish population

<table>
<thead>
<tr>
<th>Construct</th>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political knowledge</td>
<td>Political knowledge item 1 (Ruling parties)</td>
<td>1972</td>
<td>0.92</td>
<td>0.27</td>
<td>0</td>
<td>1</td>
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<tr>
<td></td>
<td>Political knowledge item 2 (Members of government)</td>
<td>1972</td>
<td>0.46</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Political knowledge item 3 (Troels Lund Poulsen)</td>
<td>1972</td>
<td>0.82</td>
<td>0.38</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Political knowledge item 4 (Christine Antorini)</td>
<td>1972</td>
<td>0.68</td>
<td>0.47</td>
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<tr>
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<td>0.26</td>
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<tr>
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<tr>
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<tr>
<td>Neuroticism</td>
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<td>0.38</td>
<td>0.19</td>
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<tr>
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<td>Neuroticism parcel 2</td>
<td>3612</td>
<td>0.39</td>
<td>0.20</td>
<td>0</td>
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<tr>
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<td>0.67</td>
<td>0.15</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Conscientiousness parcel 2</td>
<td>3612</td>
<td>0.63</td>
<td>0.18</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Conscientiousness parcel 3</td>
<td>3612</td>
<td>0.73</td>
<td>0.15</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Extraversion</td>
<td>Extraversion parcel 1</td>
<td>3612</td>
<td>0.63</td>
<td>0.18</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Extraversion parcel 2</td>
<td>3612</td>
<td>0.71</td>
<td>0.16</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Extraversion parcel 3</td>
<td>3612</td>
<td>0.63</td>
<td>0.19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>Agreeableness parcel 1</td>
<td>3612</td>
<td>0.62</td>
<td>0.19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Agreeableness parcel 2</td>
<td>3612</td>
<td>0.62</td>
<td>0.19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Agreeableness parcel 3</td>
<td>3612</td>
<td>0.64</td>
<td>0.19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
<td>Education</td>
<td>3612</td>
<td>0.45</td>
<td>0.26</td>
<td>0.17</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>3612</td>
<td>52.58</td>
<td>16.19</td>
<td>18</td>
<td>90</td>
</tr>
<tr>
<td>Gender</td>
<td>Gender (male=1)</td>
<td>3612</td>
<td>0.53</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Personal income</td>
<td>Personal income</td>
<td>3437</td>
<td>3.47</td>
<td>1.67</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

The measures of political knowledge in the representative sample are collected at a second point in time, starting in October 2011, which not all participants in the first survey answered. See appendix 1 for the number of observations.
Comparison of descriptive statistics for draftee sample and representative sample

In order to compare the demographics and personality traits for the draftee sample and the representative sample this comparison is done separately for men and women, as the women are self-selected and thus might be hypothesized to distort the comparison. I only compare in the age group of 19-27 since 95% of the draftee sample is between the ages 19 and 27, although the total age span is 19-38. This gives an N of 118 for men and an N of 134 for women in the representative sample. For the demographics, simple descriptive statistics are used to illustrate similarities and differences, but for personality traits we are able to investigate measurement invariance. I will look at the last thing first.
Representativeness of personality traits in the draftee sample

When we compare constructs we need to make sure that they actually measure the same thing in the groups we are employing them in, so that we with some confidence can say that they are referring to the same construct. This might seem obvious but is seldom done. There are different ways of discussing measurement invariance and there is not total agreement on the necessary steps and tests involved. I will focus on configural invariance, metric invariance and scalar invariance as these are the most frequently used terms in the measurement invariance literature.

The weakest level of measurement invariance is configural invariance (Horn and McArdle 1992; Steenkamp and Baumgartner 1998), which means that the model we use to measure our constructs has the same general structure, e.g. a five factor model with regard to personality traits, all contexts. The second level of invariance is termed metric invariance and deals with equality of the scale, in different contexts. More concretely it requires that people respond to the items in the same way, so that we can say the same construct is being measured in the different contexts and thus that they understand it the same way. This can be tested by imposing equality of factor loadings, across contexts. The third level is scalar invariance, which deals with whether it makes sense to make comparisons of latent factor means. This is done by imposing equality of item intercepts, and at the same time constraining factor latent factor means to zero in one of the groups. An example where this is not the case is termed additive bias, which happens when for a given level of the latent mean score, one group has a higher mean overall because of a larger intercept in this group for a particular item (Meredith 1993).

There are basically two approaches to assessing measurement invariance. One is a classical hypothesis test, using a chi-square test to test for a significant decrease in fit, and one looks at fit
indices. The problem with the first approach is basically the same as in our discussion of model test statistics in appendix 2, when discussing fit statistics: For larger $N$ it becomes difficult to not reject the null hypotheses of a non-significant decrease in model fit (Chen 2007; Cheung and Rensvold 2002; French and Finch 2006). The following guidelines for when to impose measurement invariance have been suggested: a change in CFI of $\leq .01$ and a change of $\geq .015$ in RMSEA, and $\geq .030$ in SRMR for sample sizes above 300 for testing metric invariance; and a change in CFI of $\leq .01$ and a change of $\geq .015$ in RMSEA, and $\geq .010$ in SRMR for sample sizes above 300 for testing scalar invariance (Chen 2007). It is also possible to have partial measurement invariance, where one or more items are not invariant, and still compare factor latent factor means (Byrne, Shavelson, and Muthen 1989). There is some debate on exactly how many items are needed to be invariant for it to make sense to still compare latent factor means.\(^5\) The table below summarizes the results:

**Model fit for different measurement invariance models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Chi-square</th>
<th>Scaling correction</th>
<th>Degrees of freedom</th>
<th>$\Delta df$</th>
<th>Difference test scaling correction</th>
<th>Satorra-Bentler scaled chi-square difference</th>
<th>CFI</th>
<th>TLI</th>
<th>RMS EA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configural invariance</td>
<td>340.545</td>
<td>1.1208</td>
<td>160</td>
<td>0</td>
<td></td>
<td>0.922</td>
<td>0.898</td>
<td>0.061</td>
<td>0.056</td>
<td></td>
</tr>
<tr>
<td>Metric invariance</td>
<td>342.606</td>
<td>1.1370</td>
<td>170</td>
<td>10</td>
<td>1.396</td>
<td>5.630</td>
<td>0.926</td>
<td>0.908</td>
<td>0.057</td>
<td>0.057</td>
</tr>
<tr>
<td>Scalar invariance</td>
<td>366.107</td>
<td>1.1349</td>
<td>180</td>
<td>10</td>
<td>1.99</td>
<td>25.610</td>
<td>0.920</td>
<td>0.907</td>
<td>0.059</td>
<td>0.059</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configural invariance</td>
<td>351.725</td>
<td>1.2003</td>
<td>160</td>
<td>0</td>
<td></td>
<td>0.921</td>
<td>0.896</td>
<td>0.058</td>
<td>0.058</td>
<td></td>
</tr>
<tr>
<td>Metric invariance</td>
<td>359.626</td>
<td>1.2041</td>
<td>170</td>
<td>10</td>
<td>1.222</td>
<td>8.104</td>
<td>0.922</td>
<td>0.903</td>
<td>0.056</td>
<td>0.059</td>
</tr>
<tr>
<td>Scalar invariance</td>
<td>371.164</td>
<td>1.1980</td>
<td>180</td>
<td>10</td>
<td>1.094</td>
<td>10.627</td>
<td>0.921</td>
<td>0.908</td>
<td>0.055</td>
<td>0.059</td>
</tr>
</tbody>
</table>

Based on fit indices we cannot reject neither metric nor scalar invariance. $\Delta$CFI is never above .01, $\Delta$RMSEA is less than .015 and $\Delta$SRMR is less than .030. We can therefore conclude that there is measurement invariance. The table below outlines the differences in latent means:

---

5 Some say that only one item, in addition to the item constrained to equality for identification purposes, is needed: (Byrne, Shavelson, and Muthen 1989); and others that a majority should be invariant: (Reise, Widaman, and Pugh 1993). The same parcels are created in the two groups to compare the results.
Differences in latent factor means

<table>
<thead>
<tr>
<th>Trait</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openness</td>
<td>-0.030</td>
<td>0.042*</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.028*</td>
<td>0.042*</td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.068*</td>
<td>0.077*</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>-0.025</td>
<td>-0.051*</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-0.031</td>
<td>-0.034</td>
</tr>
</tbody>
</table>

*Reference category with latent mean constrained to zero is the comparison sample

The differences between the two samples are very slight given that the scale on which they are compared is ranging from zero to one; although the differences for extraversion are slightly larger than for the other traits for both women and men. Somewhat surprising more of the differences are significant in the sample comparing our two samples of men, as only the men are a non-random sample of the Danish population in the draftee sample. All in all there are no huge latent mean differences, and in terms of personality traits this sample seems to be fairly representative of this particular age group. To sum up, personality traits are measured on the same scale, metric invariance, and the items are equally difficult, scalar invariance, and finally there are no large differences in latent factor means.

Representativeness of demographics

Descriptive statistics for women in the draftee sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal income</td>
<td>535</td>
<td>1.78</td>
<td>0.78</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Education</td>
<td>569</td>
<td>0.71</td>
<td>0.25</td>
<td>0.17</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>574</td>
<td>22.98</td>
<td>1.96</td>
<td>19.17</td>
<td>31.58</td>
</tr>
</tbody>
</table>

Descriptive statistics for women in the representative sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal income</td>
<td>119</td>
<td>1.70</td>
<td>0.85</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Education</td>
<td>134</td>
<td>0.55</td>
<td>0.23</td>
<td>0.17</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>134</td>
<td>23.23</td>
<td>1.88</td>
<td>20</td>
<td>26</td>
</tr>
</tbody>
</table>
Descriptive statistics for men in the draftee sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal income</td>
<td>475</td>
<td>1.87</td>
<td>1.00</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Education</td>
<td>487</td>
<td>0.70</td>
<td>0.28</td>
<td>0.17</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>498</td>
<td>22.86</td>
<td>1.91</td>
<td>19.50</td>
<td>33.31</td>
</tr>
</tbody>
</table>

Descriptive statistics for men in the representative sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal income</td>
<td>112</td>
<td>1.78</td>
<td>1.02</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Education</td>
<td>118</td>
<td>0.51</td>
<td>0.17</td>
<td>0.17</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>118</td>
<td>23.38</td>
<td>1.77</td>
<td>20</td>
<td>26</td>
</tr>
</tbody>
</table>

As we can see from the age variables, by restricting the comparison to the 19-27 age group, the mean of the age is roughly the same across the two samples. Also the mean and standard deviation of the personal income variable is extremely similar across the two samples both for men and women. The mean of the educational variable is higher in the draftee sample for both men and women. This probably has to do with the question wording in the two samples and the fact that we are not using sampling weights here, as we are in the model estimation. The question on education in the draftee sample asks about both the highest current level of education and finished education, so we would expect the mean to be a bit higher since not all have finished their highest level of education when we contact them. In the representative sample we are only looking at finished level of education. If we restrict the sample in the draftee sample to only those who say they have finished their degree and use sampling weights in both samples we end up with this table:

Comparison of men and women in draftee sample and representative sample restricting the sample in the draftee sample to only those who have finished their degree and using sampling weights

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>CI</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women representative sample</td>
<td>0.54</td>
<td>(0.50-0.58)</td>
<td>134</td>
</tr>
<tr>
<td>Women draftee sample</td>
<td>0.47</td>
<td>(0.44-0.51)</td>
<td>143</td>
</tr>
<tr>
<td>Men representative sample</td>
<td>0.50</td>
<td>(0.47-0.53)</td>
<td>118</td>
</tr>
<tr>
<td>Men draftee sample</td>
<td>0.42</td>
<td>(0.38-0.45)</td>
<td>142</td>
</tr>
</tbody>
</table>
Although the confidence intervals do not overlap for men, the differences are very slight. The rest of the difference could simply be due to sampling error – the sample sizes are quite small in the comparison above.

Summarizing, we can therefore say that the draftee sample is very representative of the entire population when compared to the appropriate age group in the representative sample. Personality traits are extremely similar in terms of latent means and measure the same constructs as illustrated above using measurement invariance as a technique to compare the two samples. In terms of demographics, the two samples are extremely similar on personal income and also quite similar on levels of education.

References


Appendix 2: Results for measurement models and fit statistics

Fit statistics

The classic model test statistic is model chi-square, which measures the difference between the actual covariance or correlation matrix and the covariance or correlation matrix implied by the model. If the difference is larger than would be expected by chance chi-square is rejected; optimally we would therefore not like to reject the so-called exact-fit hypothesis. There are many problems with this test - the two main problems concern sample size and parameters – and it is not used widely in practical applications as a criterion for judging whether a model has failed or not. It is easier not to reject the exact-fit hypothesis with a small sample size, which is an undesirable property. If we just add more paths and correlations the likelihood of not rejecting the exact fit hypothesis also increases. Finally it is unrealistic that any model is without error (Browne and Cudeck 1992). Many applied researchers therefore turn to so-called approximate fit indices.

Below are reported various approximate fit statistics for the different models. There is some controversy regarding what information they actually convey. I agree with Kline that they are best regarded as qualitative measures of fit and should not be used to either support or reject a certain type of model (Kline 2011, 205). Even so, it is common practice to assess them according to various “cut points”. When using Mplus’s MLR estimator, we also get fit statistics which are adjusted according to the degree of non-normality.

In terms of the value of RMSEA a perfectly fitting model has a value of 0, which happens when the degree of misfit is zero. Some argue that a value of $\text{RMSEA} \leq 0.06$ indicates excellent fit and acceptable model fit is between 0.06-0.08 (Hu and Bentler 1999), and others a value of .05 (Browne

---

6 C.f. also (Marsh, Hau, and Wen 2004)

7 Or rather “set to zero” if it is less than zero
and Cudeck 1992), when using ML estimation techniques for model estimation. For SRMR some have argued that an SRMR≤0.08 indicates acceptable fit (Hu and Bentler 1999), and for CFI some argue that a value of .95 (Hu and Bentler 1999) indicates great fit, although earlier work suggested that a value of .90 was sufficient (Bentler 1990). All fit statistics take their point of departure in a robust chi-square (Satorra and Bentler 1994).

**Fit statistics for different models:**

<table>
<thead>
<tr>
<th>Number</th>
<th>Model</th>
<th>CFI</th>
<th>RMSEA</th>
<th>SRMR</th>
<th>Model chi-square (df), P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Draftee sample only education</td>
<td>0.966</td>
<td>0.052</td>
<td>0.027</td>
<td>31.005 (8), 0.0001</td>
</tr>
<tr>
<td>2</td>
<td>Draftee sample only personality traits and general intelligence</td>
<td>0.915</td>
<td>0.045</td>
<td>0.044</td>
<td>536.905 (168), 0.0000</td>
</tr>
<tr>
<td>3</td>
<td>Draftee sample both personality traits, general intelligence and education</td>
<td>0.914</td>
<td>0.045</td>
<td>0.044</td>
<td>576.015 (180), 0.0000</td>
</tr>
<tr>
<td>4</td>
<td>Representative sample only education (saturated model)</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000 (0), 0.0000</td>
</tr>
<tr>
<td>5</td>
<td>Representative sample only personality traits</td>
<td>0.920</td>
<td>0.050</td>
<td>0.041</td>
<td>1198.845 (120), 0.0000</td>
</tr>
<tr>
<td>6</td>
<td>Representative sample both personality traits and education</td>
<td>0.919</td>
<td>0.049</td>
<td>0.040</td>
<td>1275.609 (130), 0.0000</td>
</tr>
<tr>
<td>7</td>
<td>Representative sample with moderation education moderated by age</td>
<td>0.946</td>
<td>0.048</td>
<td>0.039</td>
<td>1294.640 (140), 0.0000</td>
</tr>
</tbody>
</table>

In no cases can we accept the close-fit hypothesis as signified by our non-significant p-value. Approximate fit indices all look fine for the draftee sample i.e. CFI above .9, RMSEA below .05 and SRMR below .08. SRMR is fine for all models, and RMSEA is below or equal .05 in all but one model. CFI is above .9 in all models and in one case above .95. The saturated model has a perfect fit and fit indices and chi-square are thus uninteresting to look at. In a sense the most important fit statistics to look at are those for the final model specifications, model 3 for the draftee sample and model 7 for the representative sample. For both models fit statistics are fine according to all criteria.

**Measurement models**

Only the measurement models for the final model specification are illustrated. The results for the other models are very similar.
### Results for measurement models for draftee sample

<table>
<thead>
<tr>
<th>Latent construct</th>
<th>Item</th>
<th>Unstandardized coefficient</th>
<th>P-value</th>
<th>Standardized coefficient</th>
<th>Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Political knowledge</strong></td>
<td>Parcel 1 (0-1)</td>
<td>1.000 (0.000)</td>
<td>Not defined</td>
<td>0.640</td>
<td>0.049</td>
</tr>
<tr>
<td></td>
<td>Parcel 2 (0-1)</td>
<td>0.898 (0.083)</td>
<td>0.00</td>
<td>0.576</td>
<td>0.339</td>
</tr>
<tr>
<td></td>
<td>Parcel 3 (0-1)</td>
<td>0.966 (0.081)</td>
<td>0.00</td>
<td>0.683</td>
<td>0.055</td>
</tr>
<tr>
<td><strong>Openness</strong></td>
<td>Parcel 1 (0-1)</td>
<td>1.000 (0.000)</td>
<td>Not defined</td>
<td>0.742</td>
<td>0.517</td>
</tr>
<tr>
<td></td>
<td>Parcel 2 (0-1)</td>
<td>1.093 (0.115)</td>
<td>0.00</td>
<td>0.695</td>
<td>0.511</td>
</tr>
<tr>
<td></td>
<td>Parcel 3 (0-1)</td>
<td>0.877 (0.072)</td>
<td>0.00</td>
<td>0.566</td>
<td>0.600</td>
</tr>
<tr>
<td><strong>Conscientiousness</strong></td>
<td>Parcel 1 (0-1)</td>
<td>1.000 (0.000)</td>
<td>Not defined</td>
<td>0.685</td>
<td>0.733</td>
</tr>
<tr>
<td></td>
<td>Parcel 2 (0-1)</td>
<td>1.252 (0.087)</td>
<td>0.00</td>
<td>0.786</td>
<td>0.705</td>
</tr>
<tr>
<td></td>
<td>Parcel 3 (0-1)</td>
<td>0.908 (0.067)</td>
<td>0.00</td>
<td>0.645</td>
<td>0.756</td>
</tr>
<tr>
<td><strong>Extraversion</strong></td>
<td>Parcel 1 (0-1)</td>
<td>1.000 (0.000)</td>
<td>Not defined</td>
<td>0.806</td>
<td>0.748</td>
</tr>
<tr>
<td></td>
<td>Parcel 2 (0-1)</td>
<td>0.846 (0.050)</td>
<td>0.00</td>
<td>0.708</td>
<td>0.787</td>
</tr>
<tr>
<td></td>
<td>Parcel 3 (0-1)</td>
<td>0.974 (0.030)</td>
<td>0.00</td>
<td>0.743</td>
<td>0.722</td>
</tr>
<tr>
<td><strong>Agreeableness</strong></td>
<td>Parcel 1 (0-1)</td>
<td>1.000 (0.000)</td>
<td>Not defined</td>
<td>0.721</td>
<td>0.609</td>
</tr>
<tr>
<td></td>
<td>Parcel 2 (0-1)</td>
<td>1.017 (0.075)</td>
<td>0.00</td>
<td>0.756</td>
<td>0.661</td>
</tr>
<tr>
<td></td>
<td>Parcel 3 (0-1)</td>
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<td>0.00</td>
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*Standard errors in parentheses.

### Results for measurement models for representative sample of population

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<th>Latent construct</th>
<th>Item</th>
<th>Unstandardized coefficient</th>
<th>P-value</th>
<th>Standardized coefficient</th>
<th>Intercept</th>
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*Standard errors in parentheses.
References


Appendix 3: Coefficients for controls

Regression coefficients for controls in the draftee sample and the representative sample for the “education only” model

<table>
<thead>
<tr>
<th>Control</th>
<th>Representative sample Unstandardized coefficient</th>
<th>Representative sample Unstandardized coefficient</th>
<th>Draftee sample Unstandardized coefficient</th>
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<td>Personal income</td>
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<td>0.010 (-0.015, 0.035)</td>
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<td>Age</td>
<td>0.001* (0.002, 0.002)</td>
<td>0.002 (-0.008, 0.006)</td>
<td>0.002 (-0.008, 0.006)</td>
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<tr>
<td>Gender</td>
<td>0.075* (0.053, 0.104)</td>
<td>0.111* (0.078, 0.146)</td>
<td>0.111* (0.078, 0.146)</td>
</tr>
</tbody>
</table>

A single star signifies the effect is significant at a .05 level. 95% confidence intervals in parentheses.
Abstract

This study investigates the role of cognitive abilities in making tolerance judgments, toward Neo Nazis and the Far Right, using a standardized and validated measure of intelligence. We also include measures of habitual cognitive styles and emotional reactions, in the form of the Big Five personality traits, sociotropic threat and social ideology; all of which we know are related to political tolerance. We find that intelligence has a strong effect on political tolerance, even after accounting for differences in personality traits, perceptions of threat, and social ideology. Furthermore, those who are more cognitively able are equally likely to extend civil liberties to the Neo Nazis, an extreme group, as to the Far Right, a non-extreme group, whereas those who are less cognitively able are more likely to extend civil liberties only to the non-extreme group. We speculate that the reason why those who are more intelligent are more politically tolerant is because they are able to engage in “principled reasoning” i.e. the ability to link abstract notions of civil liberties also to disliked and extreme groups such as the Neo Nazis.
Political tolerance is essentially about which rights and liberties political groups you dislike should enjoy (Sullivan, Piereson, and Marcus 1982; Sullivan, Piereson, and Marcus 1979). Without some amount of political tolerance liberal democracy in large complex societies is impossible, but individuals vary considerably in the extent to which they tolerate diversity, difference and dissenting views, notably because their psychological and political dispositions vary. Individual predispositions and values have been featured as important determinants of individual variation in political tolerance. Constructs like ‘rigidity of categorization’, authoritarianism, dogmatism, ethnocentrism, social conformity and self-esteem are all related to political intolerance (Altemeyer 1981; Feldman 2003; Feldman and Stenner 1997; Kinder and Kam 2010; Sniderman 1975; Stenner 2005; Stouffer [1955] 2009; Sullivan et al. 1981). Depending on conceptualization these individual predispositions include blends of motivational, cognitive and emotional factors that more or less habitually influence political tolerance and related concepts such as prejudice, negative stereotyping and social conservatism. There is, in the study of political tolerance, an increasing focus on getting a fuller understanding of the deeper psychological roots of political tolerance and the role of emotions and cognition (Kuklinski and Riggle 1991; Marcus et al. 2005; Marcus et al. 1995). Constructs like authoritarianism and ethnocentrism are influenced by more deep-seated individual differences in personality traits (Duckitt and Sibley 2009; Sibley and Duckitt 2008; Stenner 2005) and so is political tolerance (Marcus et al. 1995).

In the exploration of the deeper psychological roots of the individual variation in political tolerance it is somewhat surprising that little attention has been devoted to examining the role of one of the most prominent deep-seated dispositions, cognitive ability or intelligence (cf. however Stenner 2005). Intelligence is associated with a cognitive (Gottfredson 1997, 13) “ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience”. One of the ‘mental routes to tolerance judgments’ (Kuklinski and Riggle 1991), the cognitive route, presumes a capacity of “principled reasoning” (Sniderman et al. 1989)
i.e. an ability to link abstract democratic principles to concrete application, even to political groups one dislikes. Although reasoning in tolerance is targeted a particular object, the least liked groups, the faculties involved in tolerant thinking strongly resemble the construct of intelligence. That, of course, does not automatically imply that individuals of high cognitive ability will use their faculties to develop more tolerant attitudes. Capacity does not guarantee use, and conscious reflection may lose to more reflexive reactions. Habitual cognitive styles and emotional dispositions may be more important. Whether cognitive ability matters for individual variation in political tolerance is an empirical question. A question we will try to answer in this paper. We will make the argument and show that the cognitive ability route to political tolerance has been neglected in recent research on the deep-seated sources of political tolerance.

To do so we have to entertain competing explanations of individual differences in political tolerance, notably personality traits and emotional dispositions associated with perception of threat. In addition we know intelligence is associated with holding social liberal values (Deary, Batty, and Gale 2008; Schoon et al. 2010), which is therefore also an explanation for why intelligence might be associated with political tolerance that needs to be investigated. Our purpose is not to demonstrate the detailed mechanisms involved in the emotional paths to political tolerance, a topic that has received much attention in recent years (e.g. Kuklinski and Riggle 1991; Marcus et al. 2005; Marcus et al. 1995; Sullivan, Piereson, and Marcus 1982), but to interrogate the cognitive antecedents of political tolerance and examine when cognitive ability matters. Demonstrating the precise mechanism involved in using cognitive abilities to arrive at political attitudes and judgment we will leave for future research.

In the following we first review the literature on the role of psychological dispositions for political tolerance. When the focus is deep-seated individual antecedents of tolerance we argue that personality traits as conceptualized in the Big Five Model, which has become the dominant framework in both in personality psychology (John, Naumann, and Soto 2008) and political science (Mondak 2010; Mondak et al. 2010), is the best point of departure. The Big Five Model
both includes traits associated with cognitive style, notably Openness to Experience, and traits more strongly associated with emotional dispositions, notably Extraversion and Neuroticism. Therefore, by entertaining the Big Five Model we test the argument about the role of cognitive ability in the most rigorous way. We will also discuss the influence of sociotropic threat, and its relationship with intelligence, since this is one of the most important predictors of differences in political tolerance (Gibson and Gouws 2003). Then we explicate why cognitive ability, intelligence, is also a likely source of political tolerance and we consider when intelligence should matter most. Next we present measures of central constructs, data and the method of estimation. The analysis that follows shows that intelligence strongly predicts differences in political tolerance; its positive effect on political tolerance is larger than any personality trait and is even larger than sociotropic threat, which in the literature on political tolerance is one of the most consistent and largest predictors of political tolerance (Gibson 2007).

We also demonstrate that intelligence matters most when tolerance judgments are most challenged: Those who have high cognitive abilities are able to resist the impulse to deny civil liberties to the most extreme, undemocratic groups, in this study Neo-Nazis, as compared to other disliked groups such as the Far Right. We take these findings to imply that those who are more intelligent are more tolerant because they engage in principled reasoning and that this effect is most pronounced when individuals are asked about the extent to which civil liberties should be granted to extreme groups that they profoundly dislike such as Neo-Nazis. The conclusion outlines the implications for our understanding of the role of intelligence in making political tolerance judgments.

**Predispositions**

Authoritarianism is probably the predisposition most often found to be associated with political intolerance, and authoritarianism is also related to concepts like prejudice, negative stereotyping
and punitiveness. In Adorno and associates classic treaty *The Authoritarian Personality* authoritarianism, and ethnocentrism, was seen as a personality syndrome rooted in Freudian dynamics (Adorno et al. 1950). In Freudian psychodynamics it is hard to distinguish emotional from cognitive dispositions. Both on empirical and theoretical grounds this conceptualization has been heavily criticized (Feldman 2003).

Subsequent work by Rokeach (1960) emphasized dogmatism and closed-mindedness as the predispositions associated with constructs like intolerance. Altemeyer’s work in the 1980s (1988; 1981) redirected the focus to the authoritarianism construct, but he re-conceptualized it as a cluster of social and political attitudes rooted in social learning and socialization (Altemeyer 1996). Now the ‘syndrome’ was not a personality characteristic but associated with a package of values and attitudes and a general hostility towards (minority) groups. As argued by Feldman (2003) and Stenner (2005) Altemeyer succeeded in separating authoritarianism from personality and Freudianism, but in doing so he created a host of new theoretical and empirical problems where he ended up predicting social and political attitudes with these very same attitudes, hence the reference to ‘syndrome’.

More recent work has argued that authoritarianism is an individual predisposition associated with varying perceived needs for social conformity (Feldman 2003) and group authority (Stenner 2005) rather than individual autonomy and diversity (cf. also Duckitt 1989). However, as argued by Feldman (2003) and shown by Stenner (2005) authoritarianism conceptualized in this way may be associated with a general intolerance of ambiguity as a component of the more deep-seated Big Five personality trait, ‘openness to experience’. Lack of ‘openness to experience is both substantially related to authoritarianism, however it is measured, and characterized by a variety of traits that can reasonably be supposed to figure prominently in inclining one to intolerance of difference” (Stenner 2005, 146).
A recent meta-analysis by psychologists Duckitt and Sibley corroborate this finding. Focusing on prejudice rather than political tolerance the substantial effect of openness on prejudice is strongly mediated by authoritarianism, conceptualized as Right Wing Authoritarianism (RWA) (Duckitt and Sibley 2009; Sibley and Duckitt 2008, 2009). Examining the direct effects of personality traits on political tolerance Marcus, Sullivan, Theiss-Morse and Wood (1995) found a substantial effect of openness to experience, neuroticism and enthusiasm on individual differences in political tolerance.

**Personality Traits**

The literature increasingly agrees that deep-seated personality traits influence the predispositions often found to be associated with political tolerance. But so far we have not explicitly discussed what personality traits are, nor have we discussed more specifically which Big Five traits may be related to political tolerance and how.

Personality traits can be conceptualized as “broad individual differences in behavior, thought, and feeling that account for general consistencies across situations and over time” (McAdams and Pals 2006, 212). Traits are general dispositions that have behavioral implications in concrete situations, or “characteristic adaptations” as it coined in the literature (McAdams and Pals 2006; McCrae and Costa 2003). This is not the place to discuss in detail the sources of these deep-seated individual differences in personality traits, but research in behavioral genetics has consistently shown that personality traits is partially heritable, with the genetic component accounting for about half of the individual variation in personality traits, depending on trait, and it is the major source of stability in personality traits across time (Krueger and Johnson 2008).

Three things concerning personality traits are important to note here.

First, in personality psychology it is fully to be expected that individual behavior and judgment is also informed by situations and that individuals occasionally engage in “contra-trait
behaviors” (Gallagher, Fleeson, and Hoyle 2011) or experience contra-trait emotions (Wolak and Marcus 2007), but personality traits imply that individuals maintain stable average ways of acting (Gallagher, Fleeson, and Hoyle 2011). Personality traits reflect habitual and typical ways of thinking, feeling and behaving (McAdams and Pals 2006; McCrae and Costa 2003), which, of course, does not imply that individuals who are low in neuroticism never experience anxiety and negative emotionality. By implication, more transient and contemporaneous considerations, e.g. emotions, may play a role no matter which personality traits (Wolak and Marcus 2007) or other dispositions, e.g. authoritarianism, one holds (e.g. Sullivan et al. 1981). We will have more to say about emotions and threat below.

Second, personality traits involve motivational, emotional and cognitive aspects (Denissen and Penke 2008; DeYoung 2010a; DeYoung 2010b, 2011). Some personality traits, like neuroticism with its proneness to experience negative emotionality, anxiety and sensitivity towards punishment or extraversion with its tendency to experience positive emotionality and reward sensitivity, have a strong affective component (Krueger and Johnson 2008; Watson and Clark 1992). Neuroticism and extraversion have consistently been found to relate to mood and correlate strongly with avoidance behavior, the Behavioral Inhibition System (BIS), and approach behavior, the Behavioral Approach System (BAS), respectively (DeYoung 2010b; Watson and Clark 1992). Openness to experience, and in particular the ‘intellect’ aspect of the trait, has a strong cognitive component and people who are high on openness to experience have been found to have a higher ‘need for cognition’ (DeYoung 2011), and it is not related to moods or basic emotional dispositions (Watson and Clark 1992).

If neuroticism and extraversion are related to individual variation in political tolerance, which has been suggested (Marcus et al. 1995), we see this as an indication of the fact that mood or emotional dispositions are important. Meta-analyses on related constructs like prejudice have been able to reproduce the findings by Marcus and associates for extraversion, but not consistently for neuroticism (Duckitt and Sibley 2010; Sibley and Duckitt 2008). Regarding the
directional effect of extraversion on political tolerance, it is not quite clear what to expect. We have to remember that tolerance by definition concerns the rights an individual finds that groups they dislike should enjoy. Thus, per definition you cannot be enthusiastic and experience positive emotions towards these groups. Marcus and colleagues find a negative association between extraversion and political tolerance and argue that this likely is because the intolerant are more intense in their attitudes and extraverts are dispositionally inclined to experience more intense feelings (Marcus et al. 1995, 165).

Third, personality traits concern typical and habitual motivations, thoughts and behaviors, not maximum performance which is the essence of cognitive ability constructs such as intelligence (Cronbach 1949). Scholars who have focused on the importance of cognitive factors for political tolerance usually stress the habitual character of these predispositions. In Rokeach’s work authoritarianism was seen as a closed-minded, cognitive style (1960). In Altemeyer’s learning perspective authoritarianism and political intolerance were related to a general, habitual lack of cognitive thinking (1996). In Sidanius work on constructs related to political tolerance the focus is on “cognitive functioning” (complexity and flexibility) conceptualized as a trait-like attribute (1985). Therefore, it is not surprising that in particular openness to experience can be seen as an antecedent to these constructs.

If openness to experience influences political tolerance we see this as lending support to the hypotheses on the importance of habitual cognitive styles. Much research supports this proposition. Not only did Marcus and colleagues find Openness to predict variation in political tolerance (Marcus et al. 1995). Openness is empirically related to other constructs related to cognitive styles, which are all predictors of political tolerance, such as authoritarianism (McClosky and Brill 1983; Stenner 2005), RWA (Crawford and Pilanski 2013; Duckitt and Farre 1994; Sibley and Duckitt 2008) and dogmatism (McCrae 1996; Sullivan et al. 1981; Sullivan, Piereson, and Marcus 1982), intolerance of ambiguity (McClosky and Brill 1983; McCrae 1996) as well as conceptually linked to Stouffer’s ‘rigidity of categorization’ (Stouffer [1955] 2009). In
addition, openness is positively associated with support for democratic values (Mondak and Halperin 2008), one of the strongest predictors of political tolerance (Sullivan, Piereson, and Marcus 1982).

We do not have strong expectations concerning the effects of agreeableness and conscientiousness on political tolerance, the last two Big Five traits we have not discussed so far. Neither of these traits is associated with cognitive ability (DeYoung 2011), and they are only weakly related to experiencing positive and negative emotionality (DeYoung 2010b; Watson and Clark 1992). We know that conscientiousness is related to (social) conservatism (Gerber et al. 2010; Mondak 2010) and attitudes towards immigration (Dinesen, Klemmensen, and Nørgaard 2014) and perhaps also moral traditionalism and judgment (Mondak 2010-135), but it does not seem to be related to authoritarianism (Stenner 2005, chapter 6). Agreeableness is moderately, negatively associated with habitual feelings of anger and hostility (Watson and Clark 1992), but it is not related to ideology or moral judgment (Mondak 2010). We arguably tap general feeling of hostility towards groups when we include perception of threat in our models. Therefore, it is not clear if we can expect an additional dispositional effect of agreeableness on political tolerance. Even if we do not have strong expectations regarding the effect of conscientiousness and agreeableness on political tolerance we include them in the analyses below in order to have as comprehensive a control of habitual dispositions as possible.

**Threat**

Whatever the source of your inclination to be politically tolerant towards a group that you do not like, if you also feel threatened by that group your dispositional motivations and reactions may be strained (Stouffer [1955] 2009; see also Marcus et al. 1995; Sullivan, Piereson, and Marcus 1982). In Sullivan and associates seminal paper *The Sources of Political Tolerance* (Sullivan et al. 1981)
the perception of feeling threatened by the least liked group for which tolerance was assessed was the single strongest predictor of tolerance and it was not related to psychological disposition.

So far, a general theory of differences in threat perceptions seems to be lacking (Gibson 2006, 24). In a recent review of the literature on political tolerance Sullivan and Hendricks conclude that the important role (Sullivan and Hendricks 2009, 379) “that political threat plays in shaping levels of political tolerance appears to be largely a subjective one, as perceived levels of threat do not correspond well with more objective measures” of individual differences. Also in this study the correlations between threat perception and predispositions and controls are very low as outlined in table 1 below.

Still, the importance of threat for political tolerance has been theorized and modeled in different ways in the literature. Some argue that normative collective threat is activating and thus moderating individual predispositions such as authoritarianism (Feldman 2003; Feldman and Stenner 1997; Stenner 2005). Others argue that perception of threat and seeing the world as a dangerous place is mediating the influence of individual disposition on attitudinal manifestations akin to political tolerance (Sibley and Duckitt 2009; Wolak and Marcus 2007). Of particular relevance in this context is Affective Intelligence Theory, AIT, because the theory argues that threatening stimuli fuel thinking and cognitive effort.

In AIT all individuals posses the ability to reason and deliberate if habits and routines operating in the ‘disposition system’ are challenged by threats or unforeseen events. Threats in AIT make us anxious and attentive, and anxiety activates our ‘surveillance system’ that enhances cognitive functioning, thoughtfulness and information processing (Marcus et al. 2000, 53-57; MacKuen et al. 2010). Following this line of reasoning all people can engage in cognitive reasoning when they feel threatened, and Wolak and Marcus have shown that threat stimuli induced anxiety reactions were (largely) unrelated to individual predispositions, including personality traits (Wolak and Marcus 2007). However, so far nobody has examined if cognitive
ability conditions how individuals respond to threats. The fact that all can engage in cognitive reasoning does not imply that all are equally good at it and make the same inferences. If the gist of AIT is correct emotional and cognitive processes are interwoven, and only in conjunction with feelings of threat can we expect differences in cognitive ability to influence political tolerance judgments: without threat no principled reasoning.

As argued above it is fully to be expected that individuals no matter their habitual dispositions can experience different feelings towards groups depending on group characteristics. That is, if one is feeling threatened by a group that one dislikes this feeling may override habitual dispositional influences on political tolerance as well as the (potential) effect of cognitive ability. But as implicitly suggested in AIT feelings of threat may also catalyze cognitive processes and make differences in cognitive ability more important. Therefore, we both have to control for perceptions of threat and examine if an interaction between threat and intelligence influence political tolerance judgments.

The current consensus is that sociotropic threats i.e. collective threats aimed at society or groups, is a stronger predictor of intolerance than egocentric threat i.e. threats aimed at an individual’s safety and well-being (Davis and Silver 2004; Gibson and Gouws 2003). The importance of social threats, as opposed to personal threats, has also been found in the literature on the relationship between threat and authoritarianism (Feldman and Stenner 1997). We therefore focus on sociotropic threat.

**Intelligence**

There are good reasons to expect intelligence to be positively associated with political tolerance, and a number of studies of constructs related to political tolerance suggest that cognitive ability is an important source of individual variation in dispositions and tolerance judgment. But first what is cognitive ability as represented by the intelligence construct?
Those who are more intelligent are generally speaking more cognitively able and have a larger capacity to “reason, plan, solve problems, think abstractly, comprehend complex ideas” (Gottfredson 1997, 13). Although intelligence includes group factors of abilities (Carroll 1993; Johnson and Bouchard 2005; McGrew 2009) these group factors tend to correlate strongly. The notion that there is a general factor of intelligence, \( g \), is broadly accepted today (Deary, Penke, and Johnson 2010; Johnson et al. 2004; Mackintosh 2011).

This is not the place to discuss the sources of intelligence at length, but the consensus is that intelligence is highly heritable with heritability estimates accounting for at least half of the individual variation in intelligence (Bouchard and McGue 2003). Environmental influences, and early-in-life interventions, are more important among children/individuals of parents of low social status (Nisbett et al. 2012). Also, and more importantly, general intelligence gets increasingly stable through childhood and early adolescence (Neisser et al. 1996).

The most obvious reason why intelligence may be a source of political tolerance is the fact that the cognitive mental route to tolerance judgments presumes a capacity of “principled reasoning” (Sniderman et al. 1989) and the application of general norms to concrete situations and groups. Charles Spearman argued that those with higher levels of general intelligence are better at “the eduction of relations and correlates” (Spearman 1927, 164-166). To be able to deduce the relationship between abstract norms and concrete applications as well as to actually grasp that the two are related on principle is exactly what the cognitive route to being politically tolerant presumes.

Traditionally, the literature on political tolerance has attributed this cognitive capacity (and inclination) to educational achievement (Jackman 1978; McClosky 1964; McClosky and Brill 1983; Prothro and Grigg 1960). Sniderman and collaborators demonstrate that those who are more educated are more likely to be tolerant on principle (Sniderman et al. 1989); in their study

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1 The correlation between intelligence and various measures of educational achievement is usually 0.4–0.5 in the United States (Neisser et al. 1996; Strenze 2007). In the sample used here level of education correlates .28 with intelligence, cf. table 1 below.
of civil liberties McClosky and Brill found that ‘intellectuality’ was positively related to level of
education (McClosky and Brill 1983); and Bobo and Licari argued that the educational effect on
political tolerance towards concrete, disliked groups was substantially mediated by cognitively
sophisticated styles of reasoning (Bobo and Licari 1989). Concepts like cognitive styles and
intellectuality are associated with habitual, cognitive reasoning as discussed above and therefore
probably more closely related to openness to experience, but they may be related to intelligence
as well. However, none of the cited studies examined if cognitive ability confounds the proposed
educational effect, nor did they include comprehensive measures of personality traits, most
importantly Openness to experience.

As already argued, ability does not guarantee use. However, collaborative evidence on a host
of constructs that correlate with political tolerance suggests that cognitive abilities are put to use
when individuals form political attitudes and judgments. McCourt and associates found that
those who are more intelligent are less likely to be right wing authoritarians (McCourt et al.
1999; see also Heaven, Ciarrochi & Leeson 2011). A recent meta-analysis estimates the
correlation between RWA and intelligence at -0.26 (Van Hiel, Onraet, and De Pauw 2010).
Recent studies demonstrate that intelligence is associated with pro-democratic norms and social
liberal values (Deary, Batty, and Gale 2008; Schoon et al. 2010). Hodson and Busseri found
socially conservatism and prejudice to be associated with lower levels of intelligence (Hodson
and Busseri 2012). Holding socially liberal attitudes and favouring pro-democratic norms are
both positively associated with political tolerance (Golebiowska 1995; Sullivan and Hendriks
2009; Sullivan, Piereson, and Marcus 1982). If intelligence is based on principled reasoning,
rather than based on holding social liberal values, its effect on political tolerance should remain
even after controlling for social liberalism.

However, when it comes to establishing a theoretical and empirical link between cognitive
ability and political tolerance Karen Stenner’s book The Authoritarian Dynamic (2005) offers the
most compelling arguments and suggestive evidence. Focusing on authoritarianism as a more
proximate antecedent to political tolerance than cognitive ability and distinguishing carefully between dispositions, situational triggers and attitudinal and judgmental consequences Stenner shows that cognitive ability (measured by verbal ability) is the single strongest predictor of authoritarianism (2005, 169): “cognitive ability to deal with complexity and difference plays a major role, if not the primary role, in the development of the authoritarian predisposition”.

More importantly the effect of predispositions, Stenner argues, is not invariant across situations (cf. Feldman and Stenner 1997; Feldman 2003). Authoritarianism will only influence normative judgment when authoritarians experience threats towards the normative order and social conformity (Stenner 2005; cf. Feldman 2003). Although Stenner focuses on the mediated effect of cognitive ability through authoritarianism normative threat may also activate principled reasoning and cognitive abilities. Leaving aside the emotional reactions that threat may trigger, which we have already discussed above, intelligence and a capacity to principled reasoning may be most important when normative threat is most pronounced. In general, political tolerance judgments are only relevant when they concern disliked groups. However, some disliked groups are more extreme and pose a larger threat towards society and democracy than others. It is very likely that differences in cognitive ability matter most when tolerance concerns the most extreme and normatively threatening groups. That is, when the principled reasoning involved in extending civil liberties to groups is mostly challenged.

**Political tolerance**

Following James Gibson (Gibson 2006, 23): “tolerance means putting up with that which one disagrees. It means allowing one’s political enemies to compete openly for political power. A tolerant citizen is one who would not support unreasonable or discriminatory restrictions on the rights of groups to participate in politics”. As already argued, this implies that political tolerance has to be ascertained in relation to political groups that one dislikes, perhaps even those that one dislikes the most.
In order to assess whether people are in fact tolerant on principle we need to gauge the *breadth* of tolerance (Gibson 2007; Petersen et al. 2010; Sniderman et al. 1989). If people are tolerant towards both extreme and non-extreme groups that they dislike this would indicate that they are tolerant on the democratic principle that *all* groups should be granted the same set of civil liberties. Besides, it may very well be in relation to the most extreme groups that the more intelligent differ in their tolerance judgments because in these situations principled reasoning is most challenged. To interrogate the possible effects of intelligence on principled reasoning in relationship to political tolerance two steps have been taken.

First, we know that intelligence is mainly associated with left-wing political orientations and the least liked groups are therefore right-wing political groups. We have chosen Neo-Nazis and the Far Right, as our two examples of right-wing groups. In addition, we only include those respondents who explicitly dislike the groups (cf. below). If intelligence has an effect in relation to the two right-wing groups, the Far Right and Neo-Nazis, it is a strong indication that intelligence is associated with differences in principled reasoning in forming tolerance judgments.

Second, we also have to rule out that consistent tolerance judgments merely reflect consistency in answering patterns. To this end we have randomly assigned the one of the two right-wing groups to half of the respondents. Had we adopted the so-called fixed group approach (Bobo and Licari 1989; Gibson 2013; Petersen et al. 2010; Sniderman et al. 1989) in which all respondents make tolerance judgments for both groups we would not be able to rule out that the more intelligent simply are giving more consistent answers across groups.

The choice of Neo-Nazis and the Far Right as our target groups also enables us to examine if intelligence moderates the negative effect of normative threat on political tolerance judgments that we discussed above. A recent study using the same methodology and same questions as we do here found that Neo-Nazis were perceived as much more extreme and undemocratic than the Far Right (Petersen et al. 2010). After controlling for sociotropic threat, and a host of other
controls, the study found that the average citizen was still much less tolerant towards the more extreme Neo-Nazis compared to the Far Right, because this group is more extreme and undemocratic.

This design allows us to arbitrate between the two possible paths through which intelligence may influence tolerance judgments. If Affective Intelligence Theory is correct we should only, or at least primarily, see an effect of intelligence when individuals feel sociotropically threatened and engage in conscious thinking. That is, the emotional trigger, in this paper conceptualized as feelings of threat, is what activates the cognitive mental route to political tolerance and may make intelligence important. Emotional and cognitive paths are interwoven. If, on the other hand, principled reasoning is unrelated to emotions but particularly pertinent when principles are challenged the most we expect intelligence to dampen the target group effect according to which Neo-Nazis are less tolerated than the Far Right in the average citizen. The more intelligent should be able to extend the principles of tolerance to the more extreme group irrespective of how they feel about Neo-Nazis. The cognitive route to tolerance judgments is unrelated to emotional triggers such as feeling threatened.

Datasets and measures
To examine if cognitive ability influences political tolerance even when controlling for competing explanations we need solid measures of all constructs. In particular good measures of intelligence are not readily available in representative samples of the general population because intelligence tests have to comply with detailed protocols and time restrictions. To our knowledge, this is the first study of political tolerance that includes both a standardized, validated battery of all the Big Five personality traits and an excellent measure of intelligence.
The sample used in the analysis is a sample of draftees drawn from the Danish draft registry, which means it is a representative sample of young males as all Danish men go to the draft board when they are about 18 years old. The registry has only been in operation since 2006 so most are young at the time when they were surveyed in 2012, and the mean age is around 23. A sizeable number of women, who self-select into the military, also take the test. Both men and women are however fairly representative in terms of demographics and personality traits when compared to the general population.

The survey was fielded in the period 2nd of March 2012 to the 10th of April 2012. The total sample size is 1072 and has a response rate of roughly 28 percent.

The Big Five personality traits are measured using the 60 item NEO-PI-R (Costa and McCrae 2003). For all traits correlations between the 60 item battery and the full personality battery are .9 and above (Costa and McCrae 2003, 74). The NEO-PI-R is a highly validated and reliable measure of the Big Five personality traits (Costa and McCrae 2003).

The intelligence test used in the analysis is called Børge Priens Prøve (BPP) which all draftees appearing for the draftee board have to take before being admitted to military service (Kousgaard 2003). The test is highly g loaded as 50-60 percent of the total variance in BPP scores is accounted for by g (Hartmann and Teasdale 2004); this means that our measure of intelligence comes close to the construct of intelligence by relying on a test which is highly g loaded. Furthermore the BPP has a correlation of .82 with the full Wechsler Adult Intelligence Scale (WAIS) (Mortensen, Reinisch, and Teasdale 1989), one of the most used and validated intelligence tests available. Thus, the validity and reliability of the test is very high (Hartmann and Teasdale 2005; Kousgaard 2003; Rasch 1980; Teasdale et al. 2011).

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2 Around 5-15% do not take the test, primarily on medical grounds. (Teasdale et al. 2011; Teasdale and Owen 1989)
3 See appendix 2
Education is measured using two questions, one asking about schooling up to high school and another asking about further education; these variables are coded into one continuous variable, to reflect total years of school education.

Political tolerance is measured by asking four questions about the rights of groups, dealing with freedom of speech, freedom of assembly, the right to speak at right schools and whether the police ought to have better opportunities to wiretap the phones from the group in question. The two groups used are the Neo-Nazis and the Far Right.

We also include a measure of sociotropic threat similar to the one used in previous studies (Petersen et al. 2010). This is measured by asking people how large a threat the two groups pose to Danish society on a zero to ten scale.

Finally our measure of social ideology is constructed using five items asking questions on attitudes toward punishment of violent crimes, preserving national customs, protecting the environment, taxes on gas, and finally whether crime is best prevented through rehabilitation, using a likert format.

Education, personality traits, threat, intelligence and our measure of social ideology, are all recoded to range from 0-1. Correlations between all important construct and controls are shown in table 1. Full question wording as well as descriptive statistics for these main variables as well as the controls can be found in appendix 1.
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<td>(7) Social ideology</td>
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<tr>
<td>(9) Intelligence x threat</td>
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<td>-0.014</td>
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<td>(10) Threat</td>
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<td>0.025</td>
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<td>(11) Age</td>
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<td>-0.015</td>
<td>0.077</td>
<td>-0.080</td>
<td>0.048</td>
<td>-0.013</td>
<td>-0.007</td>
<td>0.004</td>
<td>0.020</td>
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<td>(12) Education</td>
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<td>-0.027</td>
<td>0.020</td>
<td>0.034</td>
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<td>(13) Income</td>
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<td>0.091</td>
<td>-0.098</td>
<td>-0.157</td>
<td>-0.301</td>
<td>-0.040</td>
<td>-0.074</td>
<td>-0.017</td>
<td>0.315</td>
<td>-0.268</td>
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<tr>
<td>(14) Intelligence</td>
<td>0.214</td>
<td>0.066</td>
<td>-0.118</td>
<td>-0.114</td>
<td>0.044</td>
<td>-0.052</td>
<td>0.304</td>
<td>0.298</td>
<td>0.348</td>
<td>-0.060</td>
<td>0.017</td>
<td>0.283</td>
<td>-0.095</td>
<td>1</td>
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<td>(15) Target group</td>
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<td>0.000</td>
<td>0.000</td>
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<td>(16) Gender</td>
<td>0.160</td>
<td>-0.030</td>
<td>-0.060</td>
<td>-0.082</td>
<td>-0.287</td>
<td>-0.270</td>
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<td>0.016</td>
<td>-0.102</td>
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<td>0.123</td>
<td>0.046</td>
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</table>

*This correlation table is based on model (4) below*
Model estimation

All models are estimated using structural equation modeling (SEM) via the statistical software Mplus version 7 using the MLR estimator that assumes multivariate normality and provides robust standard errors and robust test statistics.\footnote{Sampling weights are used to account for unit nonresponse. Fit statistics for the various models can be found in appendix 2.}

SEM takes the measurement error of our constructs into account and in this way avoid biased parameter estimates (Bollen 1989).\footnote{Measurement models are available upon request as are the analyses of the items leading to the measurement model for personality traits.} By using SEM we also use a strong technique for handling missing values, i.e. full information maximum likelihood (FIML). This technique only requires the assumption of Missing at Random (MAR) i.e. that the missing values of the dependent variable are unrelated to the values on the dependent variable conditional on observables (Enders 2010).

The controls in this analysis are gender, age and personal income, and a dummy variable indicating whether respondents were assigned to either the Neo-Nazis or the far right in the experimental conditions; using these control variables are fairly standard in the literature on political tolerance (Gibson 2013). Social ideology, democratic rights or any other political source of political tolerance are not included as controls in the initial model because they are hypothesized to be endogenous to the psychological variables (Sullivan et al. 1981), i.e. political orientations are seen as “characteristic adaptations” of social and psychological sources in a given context (McAdams and Pals 2006; McCrae and Costa 2003). Somewhat similarly Marcus and associates argue that predispositions, a general term which for them also includes education, are the most stable long-term factors in determining tolerance judgments, and that both tolerance judgments and “standing decisions”, such as attitudes about democratic principles, are partly the outcome of these causally prior and stable predispositions (Marcus et al. 1995). We do
however investigate whether the effect of intelligence on political tolerance is mediated by its effect on new social ideology. We implement this in a model in which we control for ideology.

In the analyses we examine if intelligence predicts political tolerance after personality traits, sociotropic threat, group membership, and education are taken into account. Four models are estimated: (1) a baseline model including only intelligence and the standard set of controls; (2) a model adding personality traits, a target group dummy, and sociotropic threat; and (3) a model in which social ideology is added. In model (4) we include interactions between intelligence and target group and between intelligence and threat to examine (a) if intelligence moderate the negative target group effect associated with extremism and (b) if threat activates reasoning and thus moderate the effect of intelligence.

In line with current practice we are only including those respondents in our analysis who express dislike towards the group as political tolerance by definition requires that the group is disliked, as argued by Sullivan and others (Sullivan, Piereson, and Marcus 1982). Only those respondents who indicated they disliked the group i.e. had a score below our midpoint of 5 on our sympathy variable were included.

---

6 There is also a methodological advantage of this approach as argued by Gibson in an analysis of different approaches towards measuring political tolerance (Gibson 2013, 54): “Perhaps the general lesson is that the larger the percentages of the respondents not disliking the groups—i.e., groups not satisfying the “objection precondition”—the more measurement error is introduced into the indicators…”

7 Changing the threshold to a lower point does not change our findings for intelligence but does increase the standard error because the sample size decreases.
## Results

**Table 2: Effect of intelligence on political tolerance in alternative model specifications**

<table>
<thead>
<tr>
<th>Constructs</th>
<th>(1) Intelligence and controls</th>
<th>(2) Adding predispositions and threat</th>
<th>(3) Adding social ideology</th>
<th>(4) Adding interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructs</td>
<td>Unstandardized coefficient</td>
<td>Unstandardized coefficient</td>
<td>Unstandardized coefficient</td>
<td>Unstandardized coefficient</td>
</tr>
<tr>
<td>Intelligence (0-1)</td>
<td>0.175***</td>
<td>0.149***</td>
<td>0.104**</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>(0.049)</td>
<td>(0.044)</td>
<td>(0.046)</td>
<td>(0.079)</td>
</tr>
<tr>
<td>Education (0-1)</td>
<td>0.021</td>
<td>0.013</td>
<td>-0.017</td>
<td>-0.016</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.018)</td>
<td>(0.019)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>Gender</td>
<td>0.046***</td>
<td>0.036***</td>
<td>0.028**</td>
<td>0.027**</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>Age</td>
<td>0.003</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
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<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
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<tr>
<td>Income</td>
<td>-0.018*</td>
<td>-0.011</td>
<td>-0.004</td>
<td>-0.003</td>
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<td></td>
<td>(0.009)</td>
<td>(0.010)</td>
<td>(0.010)</td>
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<tr>
<td>Openness (0-1)</td>
<td>0.122**</td>
<td>0.009</td>
<td>0.008**</td>
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<tr>
<td></td>
<td>(0.049)</td>
<td>(0.053)</td>
<td>(0.053)</td>
<td>(0.053)</td>
</tr>
<tr>
<td>Conscientiousness (0-1)</td>
<td>0.065</td>
<td>0.162**</td>
<td>0.166**</td>
<td>0.166**</td>
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<tr>
<td></td>
<td>(0.063)</td>
<td>(0.071)</td>
<td>(0.072)</td>
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<tr>
<td>Extraversion (0-1)</td>
<td>-0.089**</td>
<td>-0.064</td>
<td>-0.058</td>
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<td>(0.046)</td>
<td>(0.046)</td>
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<tr>
<td>Agreeableness (0-1)</td>
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<td>-0.060</td>
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<td>(0.039)</td>
<td>(0.042)</td>
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<tr>
<td>Neuroticism (0-1)</td>
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<td>(0.040)</td>
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<tr>
<td>Sociotropic threat (0-1)</td>
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<td>-0.104***</td>
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<td>(Reference group: Far Right)</td>
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<td>(0.012)</td>
<td>(0.048)</td>
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<tr>
<td>Social ideology (0-1)</td>
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<td></td>
<td>(0.057)</td>
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<tr>
<td>Sociotropic threat x intelligence</td>
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<tr>
<td>Target group x intelligence</td>
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<td></td>
<td>-0.085</td>
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<td></td>
<td>(0.132)</td>
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<td></td>
<td>0.180**</td>
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<td>(0.075)</td>
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N = 838

Standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01.
In the first model we notice that intelligence exerts a positive and significant impact on political tolerance even after controlling for educational differences 0.175 (p<0.000). There is also an important non-finding in model (1): Education does not exert a statistically significant influence on political tolerance; in fact it does not exert an independent impact on political tolerance in any of the models. This is quite surprising given the rather large literature pointing to education as an important construct to take into account if we want to understand individual differences in political tolerance judgments. If we exclude intelligence from model 1 above education becomes significant (p=0.036) and the unstandardized effect of education on political tolerance increases to 0.039, roughly double the size of the effect of 0.021 in model (1).

In model (2) including both personality traits, feelings of threat, and the effect of target group membership the effect of intelligence decreases somewhat to 0.149 but the effect is still strong and highly significant (p=0.001). Although there is thus some overlap between intelligence, predispositions and emotional responses toward tolerance of the Far Right and Neo-Nazis, most of the effect of intelligence on political tolerance is not overlapping with these constructs. Note in particular that the effect of intelligence is still strong and significant after we include Openness to Experience that taps habitual cognitive styles. As discussed above Openness is conceptually and empirically related to a host of constructs related to cognitive styles and ways of thinking such as intolerance of ambiguity, dogmatism, and authoritarianism.

In terms of the effect of personality traits on political tolerance there has, to our knowledge, only been a single study using validated measures of three of the Big Five on political tolerance namely the study by Marcus and collaborators (Marcus et al. 1995). The results of their analyses are to some extent reproducible here in model 3 and 4 above: Those who are more open to experience are more politically tolerant 0.122 (p=0.013) and those who are more extroverted are less politically tolerant -0.089 (p=0.050). Contrary to the results from Marcus and associates Neuroticism is not a predictor of political tolerance in this sample (p=0.612). The findings are thus more in line with those of Sibley and Duckitt in relation to prejudice, where Neuroticism is
not consistently predicting differences in this conceptually related construct (Duckitt and Sibley 2010; Sibley and Duckitt 2008).

In terms of effect sizes intelligence is the strongest predictor of political tolerance with an unstandardized coefficient of 0.149, but also sociotropic threat (coefficient=-0.104), and Openness (coefficient= 0.122) strongly predicts political tolerance. These effect sizes are directly comparable as they are all scaled to range from zero to one. They thus represent the effect on political tolerance of going from minimum to maximum for the respective constructs.

As expected there is also a quite large negative effect of being asked to be tolerant towards the Neo Nazis compared to the Far Right, which is the reference group, as evidenced by the significant and negative target group dummy -0.086 (p<0.000). In fact the effect is almost unchanged after including social ideology in model (3). We are thus able to reproduce the finding by Petersen et al. (Petersen et al. 2010): people are less tolerant towards extreme groups, even after sociotropic threat and important additional controls like personality traits are included.

In model (3) we include a measure of social ideology to investigate whether differences in ideological orientation is the reason why those who are more intelligent are more politically tolerant. However, most of the intelligence effect is retained in model (3). The effect of intelligence is still strong and significant (p=0.025) with a coefficient 0.104 compared to the effect of 0.149. Some of the effect of intelligence is mediated by social ideology which is consistent with the findings in the literature that intelligence is associated with holding social liberal values (Deary, Batty, and Gale 2008; Schoon et al. 2010). But most of the intelligence effect is not shared with social ideology.

The direct effects of the personality traits Openness to experience and Extraversion on political tolerance disappear after including social ideology in the model. A number of previous studies have shown in particular Openness is strongly associated with social liberalism (Gerber et al. 2011; Gerber et al. 2010; Mondak 2010; Mondak and Halperin 2008; Mondak et al. 2010) and
ideology seems to fully mediate these personality effects on political tolerance. A similar kind of
attitudinal/ideological mediation has been demonstrated for a number of other political
behaviors (Blais and St-Vincent 2011; Gallego and Oberski 2012). Somewhat surprisingly,
Conscientiousness becomes significant after controlling for the variance that is shared with social
ideology.

**Intelligence, threat and principled reasoning**

So far we have ruled out three alternative explanations for why those who those who are more
intelligent are more tolerant. It is *not* because they are more educated, i.e. model (1); because they
possess a certain set of behavioral tendencies and habitual dispositions, i.e. model (2); or because
they are more likely to hold social liberal values, i.e. model (3). In addition there is still an effect
of intelligence even though the groups are perceived as sociotropically threatening. The results
support the proposition that intelligence is associated with principled reasoning and represents a
distinct cognitive route towards tolerance judgments. However, we have not examined if the
inclination to use ones cognitive abilities is conditional which we may expect according to the
literature. Those who are more intelligent may be more politically tolerant because they are better
able to link abstract notions of civil liberties to the most extreme and disliked groups, i.e. when
challenged the most they are more capable of “principled reasoning” than the average citizen.
Alternatively, following the ideas in AIT the effect of differences in cognitive ability is
contingent upon feelings of threat that make individuals rely less on habitual disposition and
more on effortful thinking.

In model (4) we have included interaction terms between intelligence and target group as well
as sociotropic threat. A significant interaction term for either of these would imply that cognitive
ability is important in forming tolerance judgments but the interpretation would differ.. Since we
include both interaction terms simultaneously the target group term is not associated with sociotropic feelings of threat.

We find a significant interaction between intelligence and target group 0.180 (p=0.017) but not between intelligence and sociotropic threat -0.085 (p=0.522). This suggests that the effect of intelligence on tolerance judgments is strongest when the inclination to be tolerant is challenged the most. By any account, Neo-Nazis are more extremist and less democratic than populist Far Right groups (cf. Petersen et al. 2010). The implication of AIT does not find support. The effect of cognitive ability is not contingent upon feeling threatened. This suggests – but does not prove – that the cognitive, principled route to tolerance judgments is distinct and different from the emotional route. We will elaborate on this in the conclusion.

Figure 1 below illustrates the marginal effect of the target group effect as levels of intelligence increases. This figure demonstrates that for those with lesser cognitive abilities, there is a large negative effect of being asked to be tolerant towards the Neo-Nazis, compared to being asked to be tolerant towards the Far Right. As levels of intelligence increase people are more and more willing to also grant civil liberties to this extreme and highly disliked group. In fact, among the most intelligent there is no target group effect at all, as evidenced by the confidence bands crossing the zero point at a level of intelligence around .8. The general inclination to be less tolerant towards extreme groups is not found by the most cognitively able who, like most other people, strongly disagree with Neo-Nazis but still defend their civil liberties and rights to speak in public.
Conclusion and discussion

We have long known that social sources, primarily education, and psychological sources, such as authoritarianism and “rigidity of categorization” are important sources of tolerance (Finkel, Sigelman, and Humphries 1999; Stouffer [1955] 2009; Sullivan and Hendriks 2009; Sullivan, Piereson, and Marcus 1982). Although previous research has focused on what might be termed cognitive styles, such as authoritarianism, dogmatism, and Openness to experience, this study demonstrates that differences in people’s cognitive abilities also matter for tolerance judgments. This is demonstrated after taking into account both habitual predispositions, in the form of personality traits, education, which has traditionally been perceived as an important social source of tolerance, as well as social ideology, which is an important political source of tolerance (Sullivan, Piereson, and Marcus 1982).

The fact that intelligence is a strong predictor of tolerance has implications for our understanding of the construct political tolerance. As Sniderman and associates and others have argued there is a difference between “principled tolerance” and tolerance based on emotions
Most agree that political tolerance is a prerequisite for “the marketplace of ideas” to function efficiently which is an integral part of a liberal democracy (Gibson 2007; Mill [1859] 2002). In terms of how deeply the support for democracy is engrained, being tolerant on principle, as opposed to being tolerant or intolerant based on emotional attachments and detachments, speaks positively toward the degree of support for democracy.

This study has demonstrated that there are in fact people, primarily those with high levels intelligence, who are tolerant on principle. We are able to infer this from the four steps we have taken to examine if cognitive ability was associated with a principled standpoint on political tolerance: First, we argued and showed that the construct intelligence defined as (Spearman 1927) “the eduction of relations and correlates” comes very close to what principled reasoning implies: The ability to deduce the link between abstract notions of civil liberties and their concrete applications and extend this to groups which one dislikes. Second, we have focused on right wing groups, which are the most disliked groups for intelligent people that tend to be liberal. In doing so we provided a prima facie strong test for the application of principled reasoning, but in addition only the respondents who indicated they disliked the group were included in the analyses. Third, through experimental manipulation we randomly assigned respondents to different right wing groups that varied in terms of their extremism and how much they challenge democratic norms. In doing so we avoid response set effects and yet maintain the possibility to test if intelligence moderates the widespread negative reactions to extremist, undemocratic groups. Fourth, we were able to rule out three alternative explanations of why those who are more intelligent are more politically tolerant: Habitual dispositions as ascertained by personality traits, social liberal ideology and education were not able to account for the majority of the positive association between intelligence and political tolerance. Although previous studies have suggested that some people are tolerant on principle (Sniderman et al. 1989) or because they are “cognitively sophisticated” (Bobo and Licari 1989), they have not
included the same set of exhaustive controls that we have adopted here nor have they examined if differences in cognitive ability may be the source of sophisticated reasoning.

The embedded survey experiment allowed us to test the argument on principled reasoning in more detail. For the average citizen it is more difficult to express tolerance for politically extremist groups (Petersen et al. 2010). However, the most cognitively able were willing to extend their tolerance towards least-liked extremist groups like Neo-Nazis because, as we argue, on principle all groups should enjoy the same rights. In addition, this reasoned judgment does not seem to be triggered by emotions since we found no interaction between feelings of threat and intelligence on political tolerance. This suggests that intelligence represent a cognitive pathway separate from the emotional pathway to tolerance and intolerance.

On the one hand this is at stake with the general idea in Affective Intelligence Theory that reasoning and deliberate thinking should be activated by threats (as mediated through anxiety) (Marcus et al., 2000, 2005). Hence, we could expect the more intelligent to be better able at principled reasoning when their surveillance system is activated. On the other hand the findings here are compatible with the idea that anxiety reactions are found to be unrelated to personality and other individual dispositions (Wolak and Marcus 2007). The present study does not examine in detail which emotions are triggered by feeling threatened nor does it fully explore the complex interrelations that may exist between emotional and cognitive routes towards tolerance. Although we can rule out that the effect of cognitive ability on political tolerance is moderated by feelings of threat we remain agnostic to exactly which emotions threats are triggering. More research on the complex relations between different emotions and principled reasoning as well as the different pathways is needed. But before embarking on this formidable research agenda future research should take into account that differences in cognitive ability may play a role in how individuals process information and what mental route they are likely to take when they form opinions and make judgments.
In a democratic and normative perspective our findings may both be seen as promising and potentially dismaying. On the potentially pessimistic side the fact that principled tolerance is related to deep-seated individual differences in cognitive ability is somewhat disheartening. However, that depends. If cognitive ability matters because intelligent people are more politically knowledgeable as research seems to suggest (Hamil and Lodge 1986; Harvey and Harvey 1970; Luskin 1990; Neuman 1986; Neuman, Just, and Crigler 1992) the results may not be that discouraging – because all people can become more politically knowledgeable. If cognitive ability is associated with harder and more effortful thinking and information processing there is also reason for cautious optimism – because given the right incentives and situations all people can engage in effortful thinking (Marcus et al., 2010; Valentino et al. 2009). Thus, also for normative reasons it is important to learn more about what principled reasoning implies and what the cognitive route to political tolerance comprises.

On the optimistic side it is comforting to note that not all people base tolerance judgments on negative emotions and gut-feeling reactions; individuals may also take a principled stance. In the aggregate and from a democratic perspective this implies that both emotional and cognitive appeals carry some weight in influencing public opinion. Compared to a situation in which only emotional appeals matter this is clearly preferable in a democracy that thrives on pluralism, arguments and a well-functioning marketplace of ideas.
Bibliography


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Appendix 1

Questions measuring political tolerance

*The police should have better opportunities for tapping telephones owned by [group]*

Agree completely

Agree somewhat

Disagree somewhat

Disagree completely

Don’t know

N/a

*Representatives for [group] should have the right to speak at high schools or the like*

Agree completely

Agree somewhat

Disagree somewhat

Disagree completely

Don’t know

N/a
[Group] should be allowed to hold demonstrations.
Agree completely
Agree somewhat
Disagree somewhat
Disagree completely
Don’t know
N/a

Representatives for [group] should be allowed to express themselves in public debate
Agree completely
Agree somewhat
Disagree somewhat
Disagree completely
Don’t know
N/a
Measure of personal income

Approximately how large is your yearly gross income i.e. the total income before taxes and other deductibles but including salary, pension and other incomes?

Below 100,000 DKK
100,000-124,999 DKK
125,000-149,999 DKK
150,000-174,999 DKK
175,000-199,999 DKK
200,000-249,999 DKK
250,000-274,999 DKK
275,000-299,999 DKK
300,000-324,999 DKK
325,000-349,999 DKK
350,000-374,999 DKK
375,000-399,999 DKK
400,000 DKK or above.

Don’t know
Measures of education

What is your schooling?

Primary school 7 years or less
Primary school 8/9 years
10th grade
High school
Don’t know

Which vocational or higher education have you completed or are in the process of completing apart from your schooling?

(If you have taken multiple degrees, please only indicate the highest level of education).

Basic vocational education
Vocational education
Short-term higher education (1-2 years)
Medium term higher education (3-4 years)
Long-term higher education (more than 4 years)
None
Don’t know

1 The two educational variables are recoded into one continuous variable. This strategy is chosen to reflect the “years of school education”. The categories are:
1. 9 years or less (primary school)
2. 10-11 years (basic vocational education and vocational education)
3. 11-12 years of education (high school)
4. 13-14 years of education (short-term higher education)
5. 14-16 years of education (medium term higher education)
6. 17-18 years of education (long-term higher education)
Questions measuring ideological differences

For each of the ideological variables the answer categories were:

Totally agree, agree, disagree, totally disagree, don’t know

Crime is best prevented through rehabilitation

Taxes on gas should be increased

Protecting the environment must not hurt private business

In Denmark we should protect our national traditions

Crime is best prevented through rehabilitation

Sympathy

To what extent do you like the following groups on a scale from 0 to 10 where 0 indicates you like the group very much and 10 indicates you dislike the group?

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<td>6</td>
<td>7</td>
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<td>3</td>
<td>4</td>
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<td>9</td>
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Perceived group threat

*How great a threat do you believe the following groups pose to Danish society?*

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Appendix 2

The draftee sample is in the following compared to a random sample of the entire Danish population. For further information on this sample see (Dinesen, Nørgaard, and Klemmensen Forthcoming). In addition age groups 19-27 are also separately compared since 95% of the draftee sample are in this age group. First I will compare demographics and then compare personality traits.

Demographics

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<td>.53 .5 1 0 3612</td>
<td>.47 .5 1 0 252</td>
</tr>
<tr>
<td>Education</td>
<td>4.2 1.6 6 1 1056</td>
<td>2.7 1.7 1 6 3612</td>
<td>3.2 1.2 6 1 252</td>
</tr>
</tbody>
</table>

Demographics are similar when the same age group is compared although it seems the draftee sample is slightly better educated than the representative sample when comparing the same age group. Obviously the mean and standard deviation in the full representative sample is larger.

Personality traits

The table below illustrates the differences in latent factor means across the representative sample and the draftee sample. As is clear, the differences are very slight given the range of the variable is one.\(^1\)

\(^1\) Before comparing latent means we have to impose metric invariance and scalar invariance, which is indeed possible to do. Results of these analyses are available upon request.
Differences in latent factor means

<table>
<thead>
<tr>
<th>Factor</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openness</td>
<td>-0.030</td>
<td>0.042*</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.028*</td>
<td>0.042*</td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.068*</td>
<td>0.077*</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>-0.025</td>
<td>-0.051*</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-0.031</td>
<td>-0.034</td>
</tr>
</tbody>
</table>

*Reference category with latent mean constrained to zero is the comparison sample.
Fit statistics

Different interpretations of approximate fit statistic exist. The approach taken here is one where they are considered *qualitative* measures of fit (Kline 2011, 205; Marsh, Hau, and Wen 2004). The table below outlines some “heuristics” used when determining how well fitting the models are.

<table>
<thead>
<tr>
<th>Test statistic</th>
<th>Measure of good/acceptable fit</th>
<th>Measure of excellent fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMSEA</td>
<td>0.06-0.08 (Hu and Bentler 1999)</td>
<td>RMSEA ≤ 0.06 (Hu and Bentler 1999)</td>
</tr>
<tr>
<td>SRMR</td>
<td>SRMR ≤ 0.08 (Hu and Bentler 1999)</td>
<td>RMSEA ≤ 0.05 (Browne and Cudeck 1992)</td>
</tr>
<tr>
<td>CFI</td>
<td>≥ .90 (Bentler 1990)</td>
<td>≥ .95 (Hu and Bentler 1999)</td>
</tr>
</tbody>
</table>

According to the guidelines outlined above all models either display excellent or good/acceptable fit, although the CFI for model 3 is slightly low. This is however not the final model.

Bibliography


Disentangling the role of education, intelligence and political knowledge in policy voting

Abstract

We know that those who are more politically sophisticated are more likely to cast a vote which best represents their ideological principles, i.e. policy vote, but few have investigated why. This study demonstrates that there are different paths to policy voting: Those who are more educated gain more political knowledge through their motivation and opportunity to become informed and those who are more intelligent are better able to link abstract ideological principles to a concrete vote choice i.e. they are more constrained. The results demonstrate being more intelligent is more effect full, than being more highly educated, in terms of ensuring a consistent vote choice. Furthermore, being intelligent has an effect on policy voting above and being politically knowledgeable. The implications for our understanding of education, intelligence and political sophistication and their roles in a democratic society are discussed.
To ensure the stability and development of a democratic society the demos need to possess a certain set of skills in addition to their general participation in political life.¹ For quite some time the conventional wisdom in political science has been that the sophisticated citizen is also the democratic citizen, or as Delli Carpini and Keeter put it in one of the most comprehensive investigations on political sophistication and its implications (Carpini and Keeter 1996, 272):

“...informed citizens are demonstrably better citizens, as judged by the standards of democratic theory and practice underpinning the American system. They are more likely to participate in politics, more likely to have meaningful, stable attitudes on issues, better able to link their interests with their attitudes, more likely to choose candidates who are consistent with their own attitudes, and more likely to support democratic norms, such as extending basic civil liberties to members of unpopular groups”.

This investigation takes as its point of departure the established wisdom that the political judgment of sophisticates are different from that of the mass electorate (Carpini and Keeter 1996; Goren 1997; Neuman 1986; Sniderman, Glaser, and Griffin 1990; Zaller 1992), what Paul Goren has recently termed the “sophistication interaction” model (Goren 2013). This article takes a step back to ask why this is. As outlined by Delli Carpini and Keeter above, there are many positive consequences of being sophisticated. This study will focus on one of the most important elements in ensuring a democratic process on which sophisticates and non-sophisticates differ, namely their degree of policy voting (Goren 2013).

As discussed by Robert Dahl, “voting equality at the decisive stage” is extremely important in terms of ensuring a democratic process (Dahl 1989, chapter 8). As Dahl also discusses, however, voting equality is not enough if it is not based on a full understanding of what the vote choice entails and whether the vote choice is in line with the interests of the voter; what Dahl terms “enlightened understanding” (Dahl 1989, chapter 8).

We know that those who are more politically sophisticated are more likely to be policy voters, i.e. vote for a party that best represents their ideological positions (Carpini and Keeter 1996; Goren

¹ Especially for so-called “developmental” models of democracy (Held 1996).
1997, 2013; Sniderman, Glaser, and Griffin 1990), but we do not quite know why. This will be investigated by studying how education and intelligence affect consistent party choice. Education is an important predictor of political sophistication (Bennet 1989; Carpini and Keeter 1996; Jennings 1996; Lambert et al. 1988; Neuman 1986; Nie, Junn, and Stehlik-Barry 1996; Smith 1989) as is intelligence (Hamil and Lodge 1986; Harvey and Harvey 1970; Luskin 1990; Neuman 1986; Neuman, Just, and Crigler 1992). Investigating the impact of these causally prior constructs on policy voting allows us to take a step back in the causal chain to examine why political sophisticates are more likely policy voters.

Nowadays political sophistication is most often operationalized using a measure of political information (Luskin 2002), although a common definition of political sophistication posits that (Luskin 1987, p860): “A person is politically sophisticated to the extent to which his or her PBS [political belief system] is large, wide-ranging, and highly constrained”. The reason empirical studies employ a measure of political information is thus not only that political information is an important attribute of political sophistication, but also that those who are politically informed tend to possess constraint as well (Luskin 1987; Luskin 2002). By investigating the effects of intelligence and education on policy voting, we will thus get a better grasp of which elements of the construct sophistication, information or constraint is most likely to affect an individual’s degree of policy voting as each construct primarily relates to one of the elements of sophistication.

According to a mainstream definition (Gottfredson 1997, 13): “Intelligence is a very general mental capacity that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience”. If intelligence is therefore important for ensuring a consistent vote choice, this would imply that the ability to deduce the link between abstract principles and concrete applications is what primarily drives the relationship in the “sophistication interaction” model. Intelligence mostly speaks to the constraint
part of political sophistication. If education is important for individual differences in vote choice consistency, this suggests that the information part of political sophistication drives the relationship. As argued by Luskin (Luskin 1990, p335): “…most of education’s effect [on political sophistication] must be informational. Classes, informal discussions, and readings expose many students to large quantities of political information”.

The results demonstrate that both intelligence and education moderate the degree of policy voting, although intelligence has a comparatively larger moderating effect than education. This suggests that there are different pathways to policy voting: One based on differences in ability and one based on differences in opportunities and motivations. Furthermore, intelligence moderates the effect of ideology on policy voting even after differences in political knowledge are taken into account. In fact, the moderating effect of intelligence on policy voting is as large as the moderating effect of political knowledge and in some cases even larger.

The article will progress in the following manner: First, three conditions for policy voting are introduced, and the likely effects of education and intelligence on each of the conditions are outlined based on current literature. After this, the measures, dataset, model estimation and results are presented. The discussion and conclusion outline the implications for our understanding of the importance and contents of education, political knowledge and intelligence as well as the democratic implications.

**Policy voting**

According to Paul Goren’s recent review and elaboration on the role of political sophistication in policy voting, three conditions must be met for a person to policy vote (Goren 2013): (1) “attitude availability”: a voter has a genuine attitude on the matter investigated; (2) “attitude centrality”: the attitude studied functions as a central heuristic in a person’s belief system; (3) “position matching”: a voter figures out which party bests reflects her own position. I will briefly discuss how each
condition is addressed in the present investigation with focus on the effects of education and intelligence; see Goren’s book length treatment for a full account and elaboration of the model (Goren 2013).

Regarding attitude availability, it has been posited ever since Converse’s original claim that much of the electorate possesses non-attitudes (Converse 1964, 1970) and, following this conclusion, that there are no meaningful ideological differences between left and right (Jost 2006); a claim most researchers will see as an exaggeration (Jost, Federico, and Napier 2009). This condition will be addressed by using multiple items for my measure of ideological principles since a good case can be made that a large part of the perceived instability in attitudes is due to measurement error, which decreases with the number of items in an index (Achen 1975; Ansolabehere, Rodden, and Snyder 2008); in addition there is no great difference between sophisticates and non-sophisticates with regard to measurement error (Achen 1975; Ansolabehere, Rodden, and Snyder 2008) although see (Feldman 1989; Norpoth and Lodge 1985). Although this does not alleviate all problems concerning the non-attitude debate, it does seek to address it in the best way possible.

As far as attitude centrality goes, a fairly extensive literature already demonstrates that those who are more sophisticated are also more vertically (Goren 2001; Jacoby 1991, 2006; Kuklinski, Metlay, and Kay 1982; Sniderman, Brody, and Kuklinski 1991) and horizontally (Carpini and Keeter 1996; Converse 1964) constrained. Here the focus is on vertical constraint. Vertical constraint concerns the extent to which those who are more educated and/or intelligent are also more likely to use

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2 As discussed by Luskin, it is also more methodologically sound to use individual level measures to investigate individual level constructs (Luskin 1987), which is possible to do when investigating vertical constraint, but difficult when estimating horizontal constraint, i.e. whether attitudes at the same level of abstraction are linked, as this is traditionally done by looking at constraint in different groupings of sophisticates, see e.g. (Carpini and Keeter 1996; Stimson 1975).
abstract principles when making concrete political judgments. As argued by Feldman, as well as Hurwitz and Peffley, abstract core values are important in explaining an individual’s concrete policy attitudes, or at least values are important for some individuals (Feldman 1988; Peffley and Jon 1985). Although some authors have used a person’s ideological self-identification as a proxy for core ideological values (e.g. (Zaller 1992), this is problematic insofar as the relationship between ideological values and ideological self-identification is stronger for those who are more sophisticated (Goren 2001), and generally speaking the correlations between opinions on concrete issues and ideological self-identification are fairly low (Levitin and Miller 1979; Stimson 1975). In addition, we also know that ideological self-identification is much less stable than indices based on multiple items, which is fairly counterintuitive if self-identification also denotes stable core principles (Ansolabehere, Rodden, and Snyder 2008). I will therefore use ideological self-identification as a measure of a concrete application of abstract ideological principles and investigate whether the correspondence between these differ for those who are more educated and/or intelligent.

Regarding position matching, we know from extant literature that those who are more sophisticated are also more likely to vote for a party that reflects their core principles (Carpini and Keeter 1996; Goren 1997, 2013; Knight 1985; Lau and Redlawsk 2006; Neuman 1986; Sniderman, Glaser, and Griffin 1990). We also know that in addition to sophistication, a host of important constructs contribute to a consistent party choice. For instance, we know that issue ownership, party cues, and schemas as well as informal channels and networks can help people decide when they make their vote choice (Conover and Feldman 1989; Feldman and Conover 1983; Huckfeldt and Sprague 1995; Lewis-Beck et al. 2008; Petrocik 1996). Knowing that sophistication is an important determinant of policy voting therefore does not imply that these other factors are unimportant in terms of making a consistent party choice; nor does it imply that this consistency is also indicative of consistent policy voting.
One of the first theoretical models of party choice is the “funnel of causality”, which details many important choices and determinants in making a party choice (Campbell et al. [1960] 1976; Lewis-Beck et al. 2008). Acknowledging that other aspects of the funnel are important, the focus here is on the impact of ideological differences on vote choice.

**Education and policy voting**

Some scholars have used education as a measure of political sophistication in their studies on “sophistication interaction”, e.g. (Sniderman, Glaser, and Griffin 1990), but this can be problematic (Goren 2013, 76 footnote): “Author’s sometimes employ education as a proxy for political sophistication, an admittedly crude, though empirically defensible approach as the correlation between education and knowledge scales typically lies in the neighborhood of .50”. However, and more correctly, education per se should not be seen as a proxy for political sophistication, but rather as a determinant and therefore causal prior of sophistication. In fact, most studies do see education as a causal prior to sophistication (Bennet 1989; Carpini and Keeter 1996; Jennings 1996; Lambert et al. 1988; Neuman 1986; Smith 1989).

Three reasons are usually given why education has an impact on political sophistication (Carpini and Keeter 1996; Nie, Junn, and Stehlik-Barry 1996; Verba, Schlozman, and Brady 1995): Education makes people more motivated to engage in politics, education confers people the cognitive skills to navigate in the political landscape and, finally, education grants the opportunity to become politically sophisticated through the formal and informal networks to which education grants people access. Since we are including a measure of general intelligence, most of the ability part of this threefold classification is therefore taken into account; at least for general and not specific abilities; more on this below. The other two reasons, motivation and opportunity, may therefore potentially explain why those who are more educated are more politically sophisticated. This also means that education most likely influences political sophistication on the information part as opposed to the constraint
part, as argued by Luskin in the quotation above (Luskin 1990). There are several reasons why education may influence the motivation and opportunity to become politically informed. First, educational institutions themselves convey political information to students through the curriculum they offer (Galston 2001). Second, most educational institutions, at least in modern, consolidated democracies embody democratic and usually liberal values and socialize their students to become active and enlightened citizens (Hyman and Wright 1979). Third, education grants access to social networks which provide opportunity and motivation to become politically informed (Carpini and Keeter 1996; Nie, Junn, and Stehlik-Barry 1996). Hence, education bolsters individuals’ opportunity and motivation to become politically informed in several ways.

The constraint aspect of political sophistication is about the use of abstract principles to organize a belief system (Converse 1964; Luskin 1987). The ability to deduce a link between abstract principles, in our case ideological position, and concrete applications, in our case an informed party choice, is more likely to be related to intelligence. And even if intelligent people also tend to be more highly educated, there is not a one to one correspondence between the two constructs (Deary and Johnson 2010).

**Intelligence and policy voting**

Previous studies have demonstrated that differences in intelligence predict individual differences in political attitudes (Bouchard and McGue 2003; Deary, Batty, and Gale 2008b; Hodson and Busseri 2012; Kemmelmeier 2008; Stankov 2009), turnout (Denny and Doyle 2008) and other forms of participation as well as vote choice (Deary, Batty, and Gale 2008a) and political sophistication (Hamil and Lodge 1986; Harvey and Harvey 1970; Luskin 1990; Neuman 1986; Neuman, Just, and Crigler 1992). Although intelligence is thus likely to be an important construct to consider in politics, no one has so far investigated the relationship between intelligence and policy voting.
As briefly discussed above, intelligence denotes the ability to “comprehend complex ideas” as well as “quickly learn from experience”; both the information aspect and the constraint aspect of political sophistication are thus likely to be affected by intelligence. The primary aspect of political sophistication that intelligence taps into is, however, the constraint aspect. In fact, there is a strong conceptual affinity between the core characteristic of intelligence and the constraint aspect of political sophistication. Charles Spearman, the father of modern intelligence research, argued that those who are more intelligent are better at deducing logical relationships between different constructs; what he termed “the eduction of correlates and relations” (Spearman 1927). This conception of intelligence is closely related to the focus among current intelligence researchers on so-called general intelligence or g (Jensen 1998). General intelligence denotes the tendency of those who are cognitively able in one type of mental domain, such as reading, to also be a cognitively able in another type of mental domain, such as algebra (Deary, Penke, and Johnson 2010; Jensen 1998); i.e. general intelligence denotes the ability to perform most types of mental tasks well. Most would agree with Spearman, perhaps phrased differently, that this general factor of intelligence includes “eduction of correlates and correlations”. Even if those who are more intelligent are more likely to learn from experience and thus gain knowledge of politics, they are not necessarily more interested and therefore not more motivated to be informed about politics than less intelligent individuals.

What really sets intelligent people apart, in relationship to policy voting, is their ability to structure,  

5 I do not mean to imply that specific abilities are not important. Although general intelligence usually accounts for around 40 percent of the variance in intelligence tests (Deary, Penke, and Johnson 2010), which makes it the single largest source of individual differences in intelligence, and thus of prime importance, this conversely also means that around 60 percent of the variance potentially consist of specific abilities. Different taxonomies exist for specific abilities (Carroll 2003; Johnson and Bouchard 2005; McGrew 2009).
organize and deduce relationships between constructs, issues and parties’ policy stances. Or put somewhat differently, independent of motivation and opportunity to be informed, and by implication for any level of political information, more intelligent people should be more able and inclined to see relations between abstract principles and values and policy preferences, i.e. attitude centrality, and they should be more able and inclined to choose the party that best corresponds with these values and preferences, i.e. position matching. Hence, general intelligence is more related to the constraint than the information aspect of political sophistication.

To sum up, intelligence and education are different constructs that tap different aspects of the political sophistication construct that may be important for the extent to which individual’s policy vote. This is not to say that education and intelligence are entirely unrelated. The correlation between education and intelligence is usually around .5, and in the sample used here they correlate at .3 (Deary and Johnson 2010). The fact that education and intelligence arguably tap different aspects of political sophistication allows us to achieve a more detailed and full understanding of why those who are more sophisticated are more likely to be policy voters. Although we could theorize that intelligence is causally prior to education, and in some respects it probably is, we also know that differences in levels of education can affect levels of intelligence (Deary and Johnson 2010). In fact, the causal sequence is not critical in this context precisely because they are theorized to tap different aspects of political sophistication. In this investigation they are therefore simply treated as “causal equals”. The table below summarizes the discussion above and sets forth the hypotheses to be tested.

[Insert table 1 here]
Dataset and measures

The dataset is based on an age-restricted random sample of the Danish population of males based on the Danish draft registry and is therefore representative of the Danish male population. Draftees have to take an intelligence test called Børge Priens Prøve (BPP), which is also used in the present investigation. The mean age of respondents is 23 since the registry has only been in operation since 2006, which means that most respondents are relatively young. Quite a few women self-select into the military and they also have to take the BPP. The men and women in the sample are quite representative in terms of personal income and education when compared to the general population. The survey was fielded in the period 2 March 2012 to 10 April 2012, i.e. not long after the national election on 15 September 2011. The sample size is 1072, and the response rate roughly 28 percent. People were contacted through regular mail and asked to fill out an online survey using the unique password in the letter they received.

Education is measured via a question about the respondent’s primary and secondary education and one about their tertiary education; the two questions are recoded into one continuous variable to reflect the total years of school education. The recoded categories are listed in appendix 1.

The intelligence test used in this article, BPP, has a correlation of .82 with the Wechsler Adult Intelligence Scale (WAIS), and the two tests thus measure the same construct to a very high extent (Mortensen, Reinisch, and Teasdale 1989). In addition, the test-retest reliability is .77, which speaks positively toward the reliability of the test. Finally, a general factor of intelligence accounts for

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4 Around 5-15 percent of Danish men are not drafted primarily on medical grounds (Teasdale 2009).

5 See appendix 2.

6 For further discussion on the reliability and validity of the test, see (Hartmann and Teasdale 2005; Kousgaard 2003; Rasch 1980; Teasdale et al. 2011)
roughly 50-60 of the variance in test scores, and the total BPP score, which is used in the present investigation, has a correlation of .99 with this general factor (Hartmann and Teasdale 2004).

Two measures of ideology are employed to assess policy voting: Ideological self-identification and a measure of general left-right ideology. The general left-right measure has six items with four response categories ranging from totally agree to totally disagree. A high score indicates a more leftist attitude. Ideological self-identification is measured by asking respondents to place themselves on a 0-10 scale, where 0 indicates leftist and 10 means rightist. This variable is also recoded so that a high score indicates a more left leaning attitude.

Political knowledge is measured using a series of 12 factual questions on politics, which is the most common way to measure political knowledge (Carpini and Keeter 1996). See appendix 1 for full question wording.

The measure of party choice is created as the mean score of the ideology variable for all respondents who voted for that particular party as done by Alvarez and Nagler in a similar context (Alvarez and Nagler 1998). This way we obtain an interval level variable instead of a nominal variable. A high score on this variable also indicates a more leftist party choice.

Descriptive statistics as well as full question wording for the constructs and controls can be found in appendix 1.

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7 Although this variable is based on this particular dataset, the relative positioning of the parties is very similar to that obtained from a representative sample, see appendix 2, using the same questions. In fact, the correlation between this variable and a variable based on a representative sample using the same technique is .97. Results are available upon request.
Model estimation

The models are estimated using the statistical software Mplus version 7. Missing data is handled using full information maximum likelihood (FIML), which is one of the best ways to handle missing data currently available (Enders and Bandalos 2001; Schafer and Graham 2002). Standard errors are estimated using a bootstraps procedure with 1000 repetitions since product terms are not normally distributed (Aroian 1947; Craig 1936) and in such cases a bootstrap procedure is superior to normality based inference (MacKinnon, Lockwood, and Williams 2004).

By using multiple items for our measure of ideology, we reduce the impact of measurement error that tends to provide biased parameter estimates (Ansolabehere, Rodden, and Snyder 2008; Bollen 1989). As mentioned above, peoples’ apparent non-attitudes can be mainly ascribed to measurement error. Using a multiple items scale rather than self-placement is our attempt to address this issue in the best way possible.

All models contain only a very limited number of controls including age, gender, and personal income. The goal is not to create a fully specified model of policy voting to assess the relative importance of e.g. retrospective evaluations (Fiorina 1981) vs. partisanship (Campbell et al. [1960] 1976). The goal is more modest, namely to investigate the moderated effect of ideology on vote choice. To ease interpretation, all variables are scaled to range from zero to one.

Three initial models are estimated in the analysis of attitude centrality: All models containing interaction terms between ideology and education, intelligence and political knowledge respectively. These three models serve as baseline models. Next, combinations of the models are presented

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8 For a recent attempt at surveying the factors influencing vote choice see e.g. (Krosnick, Visser, and Harder 2010).

9 This approach is very similar to Carpini and Keeter’s in their investigation of the moderating influence of political sophistication (Carpini and Keeter 1996, 254-261).
followed by a model including all interaction terms. This way we can track the changes in size and significance of the coefficients and thus the potential overlap in the explanatory power of the different constructs.

The subsequent analysis focuses on the position matching aspect of the sophistication effect using the same procedure as the one just outlined.

In both analyses which investigate the relationship between abstract principles and concrete applications, i.e. the investigations of attitude centrality and position matching, the presence of an interaction effect can be investigated by testing the significance of the interaction term since the model is linear (Franzese and Kam 2007).

**The link between abstract principles and concrete applications - attitude centrality**

This section outlines the results for the second condition for policy voting, namely that voters are vertically constrained. If policy principles are to shape vote choice they must exert a significant influence on other elements in a person’s belief system, i.e. act as a central organizing principle (Goren 2013). This is investigated by estimating the link between abstract ideological left-right principles and ideological self-identification. The results are outlined in the table below.

[Insert table 2 here]

The first three models investigate whether the effect of left-right ideology on ideological self-identification is moderated by education, intelligence or political knowledge when neither of the other two factors is held constant. This is confirmed in all three cases as indicated by the significant interaction terms. The next three models investigate the partial overlap between the constructs. First we will look at the interplay between education and intelligence and the interplay between political knowledge and intelligence and education respectively.

In model (4) there is no longer a moderated effect of education 0.139 (p=0.298) after the moderated effect of intelligence is included nor after political knowledge is included in model (5)
The moderated effect of intelligence in model (4) only decreases slightly after education is included. Education and intelligence are treated as causal equals, i.e. neither mediates the effect of the other, but the effect of one can confound the effect of the other as discussed above. The results suggest that the ability to apply abstract principles related to ideology to an individual’s ideological self-identification is only moderated by levels of intelligence, not by levels of education. But although the effect is no longer significant, the effect size is not zero; only in model (7), in which all interaction terms are included, is the effect close to zero 0.025 (p=0.851). It is notoriously difficult to estimate precise standard errors in models including interaction terms (Franzese and Kam 2007), and this problem is only exacerbated in models in which multiple interaction terms are included. It is thus most accurate to note that a major part of the effect of the moderating effect of education is confounded by intelligence, but the exact proportion is difficult to estimate.

Regarding the interplay between education or intelligence and political knowledge, the findings have somewhat different implications than those above. Education and intelligence are theorized to be causally prior to political knowledge and if they decrease in magnitude after the inclusion of an interaction term including political knowledge, they are theorized to be mediated by their effect on political knowledge. The expectations are also confirmed here: The effect of education decreases substantially, after the interaction term between political knowledge and general left-right orientation is included and is not statistically significant (p=0.467), whereas the moderating effect of intelligence is still highly significant (p=0.006). This confirms our hypothesis that the effect of education on political sophistication is primarily informational and the moderating effect of intelligence is primarily based on constraint. The size of the moderating effect of intelligence is on a par with political knowledge in model (7) with coefficients of 0.874 and 0.926 respectively.
The link between abstract principles and vote choice – position matching

The second and most important part of the test is whether those who are more educated, intelligent or politically knowledgeable are more likely to match their ideological principles to a party choice that matches their ideological orientation.

[Insert table 3 here]

The results mirror those obtained above: All three constructs moderate the effect of ideological principles on vote choice when considered separately. In addition, the effect of education decreases in size and significance after the moderating influence of intelligence is included in model (11) at 0.157 (p=0.207), whereas the moderating effect of intelligence is still much larger and highly significant at 1.037 (p<0.000). As above we can therefore confirm hypotheses 1 and 2, i.e. that constraint, as indicated by intelligence, exerts independent influence on policy voting after differences in opportunity and motivation, as measured by the education variable, are held constant, and that the effect of education has traditionally been overestimated.

As for the mediated effect of education and intelligence on political knowledge, we observe a pattern of results which echoes the findings above: The moderating effect of education is highly mediated by political knowledge since the size of the coefficient decreases to 0.188 and no longer significant (p= 0.152) in model (12), whereas the moderating effect of intelligence is still strong with a coefficient of 0.832 and highly significant (p=0.004) in model (13). The moderating effect of intelligence on position matching is even larger than the effect of political knowledge in model (14) with coefficients of 0.779 and 0.439 respectively.
Conclusion and discussion

All hypotheses have been confirmed, which means that the implications derived based on our theoretical apparatus have been corroborated. These results have implications for our understanding of the three constructs, education, intelligence and political knowledge, and they have democratic implications as well. I will touch upon them in turn.

This article has demonstrated that intelligence has a larger effect than education on differences in policy voting; both in terms of ensuring policy-attitude consistency, “attitude centrality”, and of ensuring a vote choice that is consistent with a person’s basic ideological principles, “position matching”. Hypothesis 2, that intelligence should have an independent impact on policy voting after differences in intelligence are accounted for, is thus confirmed. This means that ability, in the form of intelligence, and motivation and opportunity, in the form of education, are different pathways to policy voting.

In many cases education moderated the effect of ideological principles on policy voting when investigated separately, but the effect decreased substantially after differences in intelligence were held constant. We can therefore confirm hypothesis 1 that education as a moderator of policy voting has traditionally been overestimated. The reason it has traditionally been overestimated is that we are able to partial out the ability part, usually ascribed to education, by including intelligence in our model specification, thus only leaving motivation and opportunity as predictors of policy voting.

We also used the distinction between ability, motivation and opportunities to derive different hypotheses for the mediated effect of education and intelligence on our measure of political sophistication, which was operationalized as political knowledge. In fact, we hypothesized that education via its effect on motivation and opportunity was more likely to affect the knowledge aspect of political sophistication, whereas intelligence was more likely to affect the constraint aspect of political sophistication, i.e. implication 4. This was also confirmed insofar as the moderating
effect of education on policy voting was highly mediated by political knowledge, whereas the moderating effect of intelligence only changed to a smaller extent after the introduction of political knowledge.

These results have implications for our understanding of the multifaceted construct political sophistication, which Robert Luskin defined some years ago in terms of size, range and constraint (Luskin 1987). Education primarily explains differences in size and range of a political belief system, i.e. political knowledge, whereas intelligence primarily explains differences in constraint of a political belief system. Although most current studies operationalize political sophistication as political knowledge (Luskin 2002), this is mostly a matter of convenience, but arguably also because political knowledge to some extent taps the constraint aspect (Luskin 1987; Luskin 2002). This study demonstrates that we should be careful when interpreting the results using a knowledge battery: political knowledge means political knowledge and not necessarily the broader construct political sophistication. Furthermore there are already studies demonstrating that these different operationalizations can lead to different results (Weisberg and Nawara 2010). Of special relevance for this discussion, Goren has recently demonstrated that whereas abstract ideological differences between left and right are moderated by levels of political knowledge, lower order “policy principles” are not (Goren 2013). It remains to be demonstrated whether this is a function of his operationalization of political sophistication as political knowledge or whether “policy principles” are genuinely independent of political sophistication, i.e. also independent of constraint as measured by intelligence.

The finding that intelligence has an impact on policy voting above and beyond political knowledge, i.e. the confirmation of implication 3, also has implications for our understanding of the importance of intelligence in politics. Many recent studies in political science use personality traits as important constructs to consider for traditional political science constructs such as political
participation and political ideology (Caprara, Bararanelli, and Zimbardo 1999; Gerber et al. 2011; Gerber et al. 2010; Mondak et al. 2010), but very few have focused on the role of intelligence in politics; although see e.g. (Deary, Batty, and Gale 2008a; Denny and Doyle 2008). No one has so far investigated the effect of intelligence on policy voting. Not only are we able to demonstrate that intelligence exerts a significant influence on policy voting; its moderating effect is equal to that of political knowledge for attitude centrality, and its moderating effect is in fact larger than political knowledge for position matching. Intelligence is clearly an extremely important, but so far overlooked, source of policy voting. At a more theoretical level, the results suggest that intelligent people, independent of their level of political knowledge, are able to deduce the relationship between abstract principles and concrete applications in terms of ensuring a consistent party choice. Evidently there are different pathways to policy voting that need to be taken seriously.

Conversely, the fact that education exerts a smaller effect on individual differences in policy voting than previously held has implications for our understanding of this important political construct. This study, demonstrating the traditional view that the importance of education is overestimated, is situated within the current debate on the “causal effect of education”. A series of recent studies using various statistical techniques have demonstrated that there is no effect of education on political participation (Berinsky and Lenz 2010; Kam and Palmer 2008) and political sophistication (Highton 2009). Other studies question these results (Dee 2004; Milligan, Moretti, and Oreopoulos 2004), some even using field experiments (Sondheimer and Green 2010). The critics’ argument is that the effect of education is confounded by predispositions, such as intelligence and personality traits, and preadult experiences such as a person’s socioeconomic status while growing up. This study informs this debate in two ways: First of all, it demonstrates that the claim that “education is confounded by predispositions” is obviously too general in scope to further our understanding of the interplay between education and predispositions. Instead, we need to focus on
a specific political construct, in this case policy voting, and derive theoretically based implications for our understanding of the relationship between education and predispositions (Henderson and Chatfield 2011). Second, we are able to demonstrate that the ability aspect of education, which is especially important for policy voting, is likely to be confounded by intelligence. Still, we are able to demonstrate that education in fact does have an effect on policy voting since a large part of the effect is mediated by political knowledge since education affects the motivation and opportunity to become informed.

Finally there are democratic implications. Education has featured prominently in many theories of democracy (Held 1996). Contemporary studies on civic education focus on the role of formal education in terms of ensuring political knowledge (Galston 2001), in turn producing more democratic citizens. As discussed by Robert Dahl, “enlightened understanding” is important for a democratic process (Dahl 1989), and the fact that formal education does not predict policy voting to the extent previously thought might cause people to erroneously conclude that education does not play an important role in policy voting. First of all, this study is a snapshot in time of the country of Denmark with, comparatively speaking, few educational differences. Most people attend a common primary school “Folkeskolen”, which means a quite equal quality of education (Rangvid 2008). Most people are thus fairly educated, which means that the differences are caused by levels of intelligence, not by education. In the past, when educational differences where larger, education may have played a larger role. We can also not rule out that absolute levels of policy voting have increased over time as a function of mass education, although not creating differences between citizens. Second, the fact that the age group studied is fairly young means that the maximum variation is not obtained, thus perhaps attenuating the effect of education.
Bibliography


Table 1: Implications and hypotheses for the effect of education, intelligence and political knowledge on policy voting

<table>
<thead>
<tr>
<th></th>
<th>Education</th>
<th>Intelligence</th>
<th>Political knowledge</th>
<th>Implications</th>
<th>Hypotheses based on implications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Is theorized to affect political sophistication via</strong></td>
<td>Motivation</td>
<td>Ability</td>
<td>N.A.</td>
<td>I1: The moderating effect of education on attitude centrality and position matching has traditionally been overestimated.</td>
<td>H1: The interaction terms including education, when we estimate attitude centrality and position matching, should decrease after the interaction terms including intelligence are included.</td>
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<tr>
<td></td>
<td>Opportunity</td>
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<td></td>
<td>I2: The moderating effect of intelligence on attitude centrality and position matching should have an independent impact on attitude centrality and position matching.</td>
<td>H2: The interaction terms including intelligence, when we estimate attitude centrality and position matching, should remain significant after differences in education are taken into account.</td>
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<td><strong>Primarily taps which elements of political sophistication?</strong></td>
<td>Political information</td>
<td>Constraint</td>
<td>Political information</td>
<td>I3: Political knowledge only partially accounts for differences in attitude centrality and position matching.</td>
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<tr>
<td></td>
<td>(size and range)</td>
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<td>(size and range)</td>
<td>I4: The moderating effect of education on attitude centrality and position matching is mediated by political information.</td>
<td>H4: The interaction terms including education should become insignificant once we introduce interaction terms including political knowledge in the models estimating attitude centrality and position matching.</td>
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<td></td>
</tr>
<tr>
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<td>----------------</td>
<td>-------------------------------</td>
<td>----------------</td>
<td></td>
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<td>(1)</td>
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<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
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<td>New left ideology (0-1)</td>
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<td>0.084</td>
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Standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01. Controls are age, gender, personal income in all models.
Table 3: The moderated effect of ideological principles on vote choice

<table>
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<tr>
<th></th>
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<th>All predictors</th>
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<td>0.308*</td>
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<tr>
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<td>(0.075)</td>
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Standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01. Controls are age, gender, personal income in all models.
Appendix 1: Question wording and descriptive statistics

Descriptive statistics for recoded variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
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<td>Age</td>
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<td>1.92</td>
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<td>0.32</td>
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<td>Børge Priens Prove (BPP)</td>
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<td>45.56</td>
<td>8.03</td>
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<tr>
<td>General left-right ideology</td>
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<td>0.19</td>
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</table>

Crosstab of vote choice

<table>
<thead>
<tr>
<th>Party</th>
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<th>Percent</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>The Danish Social Liberal Party</td>
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<td>18.57</td>
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<td>The Conservative People’s Party</td>
<td>54</td>
<td>5.67</td>
</tr>
<tr>
<td>The Socialist People’s Party</td>
<td>93</td>
<td>9.76</td>
</tr>
<tr>
<td>Liberal Alliance</td>
<td>108</td>
<td>11.33</td>
</tr>
<tr>
<td>The Danish People’s Party</td>
<td>71</td>
<td>7.45</td>
</tr>
<tr>
<td>The Liberal Party of Denmark</td>
<td>209</td>
<td>21.93</td>
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<tr>
<td>The Red-Green Alliance</td>
<td>92</td>
<td>9.65</td>
</tr>
<tr>
<td>Total</td>
<td>953</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Question wording

The BPP battery is protected against publication so questions from this battery are not shown.

Questions measuring political knowledge

Here is a series of questions about politics in general. Politics can be complicated but try to answer the following questions as best you can.

How large do you think the expenditures for the health care sector in Denmark were as a percentage of GDP in 2009?
- Approximately 5 %
- Approximately 12 %
- Approximately 22 %
- Approximately 54 %
- Don’t know

Which of the following are referred to as the executive power?
- The Ministry of Justice
- The Police
- The government
- The Parliament
- Don’t know
Which of the following persons is Denmark’s minister of finance?

A  B  C  D

A  B  C  D

Do you have to be a Member of Parliament (Folketinget) to be eligible for cabinet minister in Denmark?
Yes
No
Don’t know
Which party is the politician in the picture a member of?

- The Social Democrats
- The Danish Social-Liberal party
- The Conservative People’s Party
- The Socialist People’s Party
- Liberal Alliance
- The Christian Democrats
- The Danish People’s Party
- The Liberal Party of Denmark
- The Red-Green Alliance
- Don’t remember party

Which of the following parties would you consider to be most rightist?

- The Liberal Party of Denmark
- The Social Democrats
- The Socialist People’s Party
- The Red-Green Alliance
- Don’t know
What percentage of GDP do you think Denmark spent on foreign aid in 2010?
- Approximately 0.9%
- Approximately 0.5%
- Approximately 2.4%
- Approximately 5.1%
- Don’t know

Who was Denmark’s Prime Minister from 1982-1993?
- Poul Schlüter
- Poul Nyrup Rasmussen
- Anker Jørgensen
- Poul Hartling
- Don’t know

How many members does Parliament have, not counting the four from Greenland and the Faroe Islands?
- Number __________
- Don’t know

Which of the following persons is *not* a member of Parliament?

A  B  C  D

A  B  C  D
What is the number of member states in the EU?

Number__________
Don’t know

Which party do you think the politician Mette Frederiksen is a member of?
The Social Democrats
The Danish Social-Liberal party
The Conservative People’s Party
The Socialist People’s Party
Liberal Alliance
The Christian Democrats
The Danish People’s Party
The Liberal Party of Denmark
The Red-Green Alliance
Don’t know

Which party do you think the politician Søren Pind is a member of?
The Social Democrats
The Danish Social-Liberal party
The Conservative People’s Party
The Socialist People’s Party
Liberal Alliance
The Christian Democrats
The Danish People’s Party
The Liberal Party of Denmark
The Red-Green Alliance
Don’t know
**Personal income**

Approximately how large is your yearly gross income i.e. the total income before taxes and other deductibles but including salary, pension and other incomes?

Below 100,000 DKK
100,000-124,999 DKK
125,000-149,999 DKK
150,000-174,999 DKK
175,000-199,999 DKK
200,000-249,999 DKK
250,000-274,999 DKK
275,000-299,999 DKK
300,000-324,999 DKK
325,000-349,999 DKK
350,000-374,999 DKK
375,000-399,999 DKK
400,000 DKK or above.
Don’t know
**Education**

*What is your schooling?*
- Primary school 7 years or less
- Primary school 8/9 years
- 10th grade
- High school
- Don’t know

*Which vocational or higher education have you completed or are in the process of completing apart from your schooling?*
*(If you have taken multiple degrees, please only indicate the highest level of education).*
- Basic vocational education
- Vocational education
- Short-term higher education (1-2 years)
- Medium term higher education (3-4 years)
- Long-term higher education (more than 4 years)
- None
- Don’t know

---

1 The two educational variables are recoded into one continuous variable. This strategy is chosen to reflect the “years of school education”. The categories are:

1. 9 years or less (primary school)
2. 10-11 years (basic vocational education and vocational education)
3. 11-12 years of education (high school)
4. 13-14 years of education (short-term higher education)
5. 14-16 years of education (medium term higher education)
6. 17-18 years of education (long-term higher education)
Questions measuring ideological differences

For each of the ideological variables the answer categories were:

   Totally agree, agree, disagree, totally disagree, don’t know

Crime is best prevented through rehabilitation

Taxes on gas should be increased

Protecting the environment must not hurt private business

Differences in income are too high. Therefore people with smaller incomes should have higher wage increases than others

Competition is healthy. It stimulates people to work hard

People earning high incomes pay too little in taxes

Ideological self-identification

Talking about politics people often use the phrases “leftist” and “rightist”. Where on this scale would you place yourself, if 0 means leftist and 10 means rightist?

<table>
<thead>
<tr>
<th></th>
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<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<td>Rightist</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Voting

Did you vote at the national election the 15th of September 2011?

Voted

Did not vote

Was not eligible to vote

Don’t remember

Refuse to answer
Which party did you vote for?²

The Social Democrats
The Danish Social Liberal Party
The Conservative People’s Party
The Socialist People’s Party
Liberal Alliance
The Christian Democrats
The Liberal Party of Denmark
The Red-Green Alliance
Don’t remember party
Voted blank

² The Christian Democrats.
Appendix 2: Comparison of demographics between the draftee sample and a representative sample

The draftee sample is in the following compared to a random sample of the entire Danish population. See (Dinesen, Nørgaard, and Klemmensen Forthcoming) for further information on this sample. Only the age groups 19-27 are compared since 95% of the draftee sample are in this age group. First I will compare demographics and then compare personality traits. The educational variable in the representative sample is recoded to fit the categories in the draftee sample.

**Demographics**

Descriptive statistics for women in the draftee sample

<table>
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<tr>
<th>Variable</th>
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<th>Max</th>
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<tbody>
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<td>6</td>
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<td>22.98</td>
<td>1.96</td>
<td>19.17</td>
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</table>

Descriptive statistics for women in the representative sample

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<tr>
<th>Variable</th>
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<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
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<td>Personal income</td>
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Descriptive statistics for men in the draftee sample

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<td>1.00</td>
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<td>1.91</td>
<td>19.50</td>
<td>33.31</td>
</tr>
</tbody>
</table>

Descriptive statistics for men in the representative sample
<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
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<td>112</td>
<td>1.78</td>
<td>1.02</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Education</td>
<td>118</td>
<td>2.62</td>
<td>1.15</td>
<td>1</td>
<td>6</td>
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<tr>
<td>Age</td>
<td>118</td>
<td>23.38</td>
<td>1.77</td>
<td>20</td>
<td>26</td>
</tr>
</tbody>
</table>

Most demographics look similar although it seems the draftee sample is better educated than the representative sample. This probably has to do with question wording. In the draftee sample people are asked whether they are currently *pursuing* or have a finished degree, whereas in the representative sample only actual educational attainment is ascertained. The table below therefore compares those in the draftee sample who have only finished their education and adds probability weights to increase the representativeness of the results. When we do this the differences are very slight.

Comparison of men and women in draftee sample and representative sample restricting the sample in the draftee sample to only those who have finished their degree and using sampling weights

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>CI</th>
<th>N</th>
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</thead>
<tbody>
<tr>
<td>Women representative sample</td>
<td>3.03</td>
<td>(2.78-3.28)</td>
<td>134</td>
</tr>
<tr>
<td>Women draftee sample</td>
<td>3.60</td>
<td>(3.46-3.74)</td>
<td>143</td>
</tr>
<tr>
<td>Men representative sample</td>
<td>2.70</td>
<td>(2.47-2.94)</td>
<td>118</td>
</tr>
<tr>
<td>Men draftee sample</td>
<td>3.35</td>
<td>(3.15-3.56)</td>
<td>142</td>
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</table>
Disentangling the Role of Education and Personality Traits for Political Behavior: Cognition and Motivations vs. Resource Effects in External and Internal Efficacy

Abstract

Recent studies have questioned that the effect of education on political behavior is as strong and unequivocal as traditionally held. In particular, personality traits have been argued to confound the effect of education. However, previous studies have not paid enough attention to the differential effects of education. Distinguishing between cognitive and motivational effects and relative resource effects we argue that personal predispositions confound the former, but not the latter. Focusing on internal and external efficacy we demonstrate: (a) the motivational and cognitive effect of education is strongly confounded by personality traits, whereas (b) the effect of education on resources is less confounded by personality traits. The theoretical and normative implications are discussed.
A burgeoning, but prolific literature has argued that personality traits are as important or even more important than traditional socio-economic resources like education in accounting for a host of political behaviors such as political ideology, vote choice, partisanship and political participation (Caprara, Barbaranelli, and Zimbardo 1999; Gerber et al. 2011; Gerber et al. 2010; Mondak and Halperin 2008; Mondak et al. 2010). In addition, recently a series of sophisticated studies have questioned the causal role of education for political behaviors and argued that dispositional traits that are established early in life, like personality traits, may be more important (Berinsky and Lenz 2010; Highton 2009; Kam and Palmer 2008; Tenn 2007). The rediscovery of personality as a potential confounder of the educational effect makes sense theoretically: Education has been argued to influence motivations and cognitions, such as political sophistication and political interest (Carpini and Keeter 1996; Neuman 1986; Verba, Schlozman, and Brady 1995), and personality traits also concern motivations and cognition (McAdams and Pals 2006; McCrae and Costa 2003). However, there is also more to the educational effect than motivation and cognition.

Previous studies of the effect of personality traits on political behavior have paid little attention to these differential effects of education, and they have not examined if both the motivational and the resource effect is confounded by personality traits. Moreover, they have not examined if the educational and personality effects are context dependent. Examining internal and external political efficacy allows us to differentiate these effects. Education primarily matters for external efficacy, i.e. whether political elites and government are perceived to be responsive to your needs, (Balch 1974; Converse 1972; Craig 1979; Craig and Maggiotto 1982; Craig, Niemi, and Silver 1990; Niemi, Craig, and Mattei 1991), because it influences the resources and relative standing of individuals and the ease with which they can gain access to political decision makers and political networks (Nie, Junn, and Stehlik-Barry 1996; Rosenstone and Hansen 1993; Verba, Schlozman, and Brady 1995).
Furthermore, the advantage of having resources is dependent on the resources other commands; it is – at least partially – a zero-sum situation. Put short resources are competitive.

Conversely, education primarily matters for internal efficacy, i.e. the extent to which individuals find that they understand politics and the process of governing (Balch 1974; Converse 1972; Craig 1979; Craig and Maggiotto 1982; Craig, Niemi, and Silver 1990; Niemi, Craig, and Mattei 1991), because education influences motivational and cognitive factors. As opposed to external efficacy the effect of education on internal efficacy is not context dependent: my level of internal efficacy is not dependent on your level of internal efficacy; this is a positive-sum situation. Motivations and cognitions are thus non-competitive.

This paper argues and tests if personality traits confound the motivational and cognitive effects of education on internal efficacy to a higher degree than the resource effects of education on external efficacy. This is investigated in two ways: Firstly, we investigate whether education loses a larger part of its effect on internal efficacy, after controlling for personality traits as well as standard measures of motivation, i.e. political interest, and cognition, i.e. political knowledge, relative to education’s effect on external efficacy using the same set of controls.

Secondly we test the hypothesized mechanism underlying the effect of education on internal and external efficacy, i.e. motivations and cognitions versus resources, by taking advantage of the fact that resources are competitive, whereas cognitions and motivations are not. If the effect of education on external efficacy is indeed based on granting resources, the effect of education should decrease when the competitors are highly educated or otherwise resourceful; i.e. the effect of education is moderated by environmental competitiveness. Conversely, if the effect of education on internal efficacy is indeed cognitive and motivational, the effect of education on internal efficacy should not
be moderated by environmental competitiveness since cognitions and motivations are not competitive.

In testing these predictions we use a large representative sample from Denmark. The dataset includes highly reliable measures of personality traits, the 60-item NEO-PI-R, along with standard measures of internal and external efficacy. Furthermore we take advantage of the excellent registry data available in Denmark to obtain measures of actual environmental competitiveness, rather than an estimate of this construct.

As will be shown, we find substantial evidence for our arguments: Personality traits as well as political interest and political knowledge primarily reduce the educational effect on internal efficacy and less so for external efficacy. We are also able to confirm that the effect of education on internal and external efficacy is driven by different mechanisms i.e. cognitions and motivations versus resources respectively: Using four measures of environmental competitiveness, i.e. municipal levels of educational attainment, wealth, current income, and an index of the three, we demonstrate that in all four cases the effect of education on external efficacy decreases when environmental competitiveness increases, whereas the effect of education on internal efficacy is unaffected by environmental competitiveness. If the effect of external efficacy is indeed driven by resources, and the effect of education on internal efficacy by cognitions and motivations this is exactly what we would expect. We therefore conclude that personality traits strongly confound education when the effect of education is primarily driven by cognitions and motivations whereas the effect of education is minimally confounded when the effect is primarily driven by resources. The implications for the current debate on the causal power of education is outlined as are the democratic implications.
The structure of the paper follows conventions. We elaborate on the argument first and then present the hypotheses on internal and external efficacy. Discussion of data, measures and model estimation follows before we turn to the analyses and conclude.

Education, personality traits and political outcomes

There are two distinct reasons why education is potentially a cause of political outcomes: (1) Education influences cognitions, motivations and behaviors, and (2) education grants access, influence and status to highly educated individuals. In outlining these reasons we will contrast them with the reasons why personality traits are important for political outcomes.

Education has traditionally been thought to influence cognitions and motivations. For instance we know from extant research that those who are educated are more politically interested (Carpini and Keeter 1996; Verba, Schlozman, and Brady 1995), a motivational factor, as well as more knowledgeable and sophisticated (Carpini and Keeter 1996; Neuman 1986; Verba, Schlozman, and Brady 1995) a cognitive factor. As argued by Philip Converse (Converse 1972, 324, emphasis added): “Whether one is dealing with cognitive matters…[or]…motivational matters… education is everywhere the universal solvent”.

However, education is only an indirect measure of cognitions and conations; to measure these constructs, predispositions such as personality traits offer a more direct path. Personality can be defined as (Caprara et al. 2006, 3):

“a set of dynamic, self-regulatory systems that emerge and operate over the life course in the service of personal adaptations (Caprara & Cervone, 2000). These internal systems guide affective, cognitive, and motivational processes, directing people toward achieving individual and collective goals.”

It is in fact quite common to include cognitive and motivational processes in a definition of what personality traits are (Denissen and Penke 2008; McAdams and Pals 2006; McCrae and Costa 2003).
Personality traits are theorized to give rise to characteristic adaptations which are a person’s acquired set of skills, beliefs, and values and are developed as a function of a person’s general dispositional traits as well as by environmental and cultural influences (McAdams and Pals 2006; McCrae and Costa 2003). We know that personality traits are established early in life, stable across the life course (Caspi, Roberts, and Shiner 2005; Roberts and DelVecchio 2000; Shiner and DeYoung 2013) and genetically influenced (Bouchard and McGue 2003; Hopwood et al. 2011). Furthermore personality traits, especially Openness and Conscientiousness, are positively correlated with education (Poropat 2009; Richardson, Abraham, and Bond 2012). It is precisely these properties which make it likely that personality traits are confounding the effect of education.

In recent years personality trait researchers have settled on five basic traits, the so-called Big Five model (John, Naumann, and Soto 2008). The Big Five traits are Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. The Big Five model of personality traits has been the standard model in political science for studying the relationship between personality and political outcomes. Fairly consistently Openness and Conscientiousness have been shown to predict leftist and rightist ideological outlooks respectively (Caprara, Barbaranelli, and Zimbardo 1999; Carney et al. 2008; Gerber et al. 2010) and Extraversion has quite consistently been linked to political participation (Mondak 2010; Mondak and Halperin 2008; Mondak et al. 2010).

The second explanation of why education is linked to politics focuses on the role education plays for the attainment of resources such as access, influence and status. Having a college or a law degree increases a person’s status, job opportunities and life chances, being extrovert or conscientious does not. Whereas education directly affects access, influence and status, via social network centrality (Nie, Junn, and Stehlik-Barry 1996), personality traits only indirectly influence network position e.g. through the effect personality traits exert on network size (Mondak 2010; Mondak et al. 2010). Even though being extrovert will help you gain friends and, hence, attain a larger social network, only education...
will ensure that these friends are people with proximity to political power. While personality will help you get friends, education will help you get the ‘right’ sort of friends.

More specifically Nie, Junn and Stehlik-Barry argue that one of the most important determinants of social network centrality is education. Social network centrality is important (Nie, Junn, and Stehlik-Barry 1996, 45): “Centrality in politics is defined by proximity to governmental incumbents and political actors who make public policy and to those in the mass media who disseminate and interpret the issues, events, and activities of people in politics”. Focusing on mobilization and recruitment somewhat similar arguments have been put forth by Verba, Schlozman and Brady (Verba, Schlozman, and Brady 1995) and Rosenstone and Hansen (Rosenstone and Hansen 1993) regarding the effect of education on political participation. Thus, whereas education increases politically relevant resources personality traits do not, at least not in any direct and meaningful way.

**Internal and external efficacy – different educational effects**

We expect the educational effect on internal efficacy to be primarily motivational and cognitive, and therefore absolute, whereas the educational effect on external efficacy primarily is resource-based, and therefore relative and contingent upon competitive context.

Internal political efficacy refers to an individual’s subjective feeling of competence in the political realm and the extent to which a person sees politics as complicated whereas external efficacy refers to an individual’s perception of the extent to which government is responsive and care about “people like me” (Balch 1974; Converse 1972; Craig 1979; Craig and Maggiotto 1982; Craig, Niemi, and Silver 1990; Niemi, Craig, and Mattei 1991). Just because a person feels capable of understanding politics, i.e. is internally efficacious, it does not prevent others from feeling the same; internal efficacy is thus unrelated to the relative resources individuals possess. Since this is a positive-
sum situation, education should have an *absolute* effect on internal efficacy (Campbell 2009; Nie, Junn, and Stehlik-Barry 1996; Persson 2011; Tenn 2005).

External efficacy is different. Citizens compete for governmental attention (Baumgartner and Jones 2009; Jones and Baumgartner 2005; Nie, Junn, and Stehlik-Barry 1996) and if government is perceived to be responsive to “people like me” it cannot be equally responsive to people “unlike me”, at least this will be hard to sustain if people acknowledge the competitive character of politics. There are only so many people to which government can be responsive (Baumgartner and Jones 2009; Jones and Baumgartner 2005; Nie, Junn, and Stehlik-Barry 1996). Assuming that individuals are aware of this zero-sum character of government responsiveness, the extent to which people feel externally efficacious depends, at least partially, on the resources they can bring to bear on influencing decision makers and letting their voice be heard, and it depends on the amount of resources they have compared to other people. In other words the effect of education on external efficacy is *moderated* by environmental competitiveness. Motivations and cognitive capacity is not enough. Several studies have demonstrated this relative effect of education; primarily in relationship to political participation (Campbell 2009; Nie, Junn, and Stehlik-Barry 1996; Persson 2011; Tenn 2005).

In addition to providing an excellent test case for the varying effect of education on political attitudes and behaviors there is an added benefit to focus on political efficacy: By comparing the effect of education on internal and external efficacy we are not comparing apples and oranges. We know that internal and external efficacy are positively correlated (Acock, Clarke, and Stewart 1985; Craig 1979; Craig and Maggiotto 1982); in the sample used in the present analysis around .2. If we find that education has a different effect on these conceptually and empirically related but still distinct constructs we have a strong case for our argument. Put in methodological terms we are
maximizing the degree of similarity, i.e. using a most similar method (Gerring 2007, chapter 5), in order to be sure that the *primary* difference in the effect of education is in fact related to the theorized difference in the importance of the resource component in education vs. the cognitions and motivations aspect.

**Hypotheses: Education and personality effects on internal and external efficacy**

Ample evidence shows that those who are more educated are also more efficacious (Hayes and Bean 1993; Niemi, Craig, and Mattei 1991; Verba, Schlozman, and Brady 1995). Several more recent studies have also shown that personality traits play a role in determining who see themselves as politically efficacious (Anderson 2010; Mondak 2010; Mondak and Halperin 2008; Schoen and Steinbrecher 2013). Both personality traits and education are thus likely to predict differences in political efficacy, but previous studies have not carefully distinguished between the different effects on internal and external efficacy.

If the effect of education on internal efficacy is primarily due to cognitive and motivational factors the educational effect on internal efficacy should decrease when personality traits, which are a more direct expression of motivations and cognitions, are included. We expect a larger decrease in the effect of education on internal efficacy than on external efficacy, because the resource effect of education is more important for external than for internal efficacy and, by implication, because the relative significance of motivations and cognition matters less for external efficacy.

Related to this point, we also expect the effect of education on internal efficacy to decrease when we include political interest and political knowledge as predictors in our model of the effect of education on internal efficacy since these are the archetypical indicators of motivational and cognitive factors that education is supposed to bestow upon individuals. In this context the chain of causality between these constructs and education and internal efficacy is less important; what matters
is that their effect on internal efficacy should be shared with education. If the effect of education on internal efficacy is primarily driven by motivational and cognitive factors the effect should decrease substantially once these cognitive and motivational constructs are included. Conversely the effect of education on external efficacy should decrease to a lesser extent.

The last hypothesis concerns our distinction above between outcomes that reflect zero sum and positive sum situations and is a moderation hypothesis. Since external efficacy is theorized to be substantially influenced by resources like access, influence and status the effect of education should decrease when the comparative advantage of resources is reduced, i.e. when others possesses an equal amount of education or level of income or wealth. Conversely the effect of education on internal efficacy should remain unaffected when competition increases because relative resources are unimportant. The table below summarizes on the expectations:

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Internal Efficacy</th>
<th>External Efficacy</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>The effect of education on political efficacy is</td>
<td>Positive</td>
<td>Positive</td>
<td>H1</td>
</tr>
<tr>
<td></td>
<td>More confounded by personality traits</td>
<td>Less confounded by personality traits</td>
<td>H2</td>
</tr>
<tr>
<td>When political interest and political knowledge are included as predictors the effect of education on political efficacy</td>
<td>Decrease substantially</td>
<td>Remain relatively unaffected</td>
<td>H3</td>
</tr>
<tr>
<td>When the proportion of highly educated or rich people in a person’s surroundings increases the effect of education on political efficacy</td>
<td>Remain constant</td>
<td>Decrease</td>
<td>H4</td>
</tr>
</tbody>
</table>

**Dataset and measures**

The dataset is based on a Danish internet panel which was fielded between May 25 and June 6 2010 and has a response rate of around 45 percent, which gives a total number of respondents of 3612. The internet panel is a representative sample of the Danish population constructed by TNS Gallup.1

1 Sampling weights provided by TNS Gallup are used in the analyses below to deal with unit non-response. All dependent variables were screened for non-normality since we are relying on a normality based estimation technique (Bollen 1989). Using the rules of thumb that a skew larger than 2.0 and a kurtosis larger than 7.0, represents a potential problem (Curran, West, and Finch 1996) we transformed all the measures of competitive environments using the inverse
To measure personality traits we are relying on one of the best measures of the Big Five model currently available namely the 60 item version of the Neo-PI-R. There is a correlation of .9 and above between each of the traits in the 60 item version and the 240 item version, which means that if one is only interested in the broad personality traits and not any specific facet the 60 item version is a good choice (Costa and McCrae 2003). Scores are based on scoring in the manual. Cronbach’s alpha is above .7 for all personality traits.

Internal political efficacy is measured using three items and external efficacy is measured using two items. The first two items measuring internal efficacy are a Danish translation of the UNDERSTAND and COMPLEX items used by Niemi, Craig and Mattei (Niemi, Craig, and Mattei 1991). The last item is inspired by an item used in the European Social Survey and asks the respondents whether they find “it is difficult to make up one’s mind” about politics. Cronbach’s alpha is 0.72 for internal efficacy. The two items measuring external efficacy are those most often employed in the American National Election surveys; what Niemi, Craig and Mattei refer to as NOSAY and NOCARE (Niemi, Craig, and Mattei 1991). Cronbach’s alpha is .78 for this construct. For question wording see appendix 1.

Education is a continuous variable measuring last completed education based on registry data from Statistics Denmark on respondents. The categories can be seen in appendix 1. Before outlining our measures of competitive environments a brief elaboration on how this has been addressed in the literature is needed.

There has been different ways to specify the effect of relative versus absolute education (Campbell 2009; Nie, Junn, and Stehlik-Barry 1996; Persson 2011; Tenn 2005). A general consensus has emerged that we need to specify a geographically local context when we model the relative effect of function 1/X since these constructs were very positively skewed (Kline 2011, 63) except educational competitiveness as this did not pose a problem according to these guidelines.
education as competition does not take place at the national but the local level (Campbell 2009; Helliwell and Putnam 2007; Persson 2011). The argument is that competition for politicians attention, which is an important aspect of external efficacy, must be seen in a local context: Having a college degree does not necessarily make a person feel that politicians are relatively more responsive to him in the affluent municipality of Gentofte north of the Capitol Copenhagen but might have a rather large and highly different impact in a poor municipality in the western part of the peninsula Jutland. The most local measure available in the survey is the municipality respondents live in and this is the measure that is used in the current study.

There is also a general consensus that we need to take into account that usually citizens compete with each other in different age groupings when modeling competitive environments (Campbell 2009; Nie, Junn, and Stehlik-Barry 1996; Persson 2011; Tenn 2005). Tenn takes this argument to its logical endpoint and argues that we should disaggregate at year of birth (Tenn 2005), while Campbell divides the population into three age cohorts (Campbell 2009). Using the same argumentation as above the most precise measure of one’s competitors is obtained by a fairly narrow measure of competitors. The most disaggregated level of competition, based on data availability, is therefore chosen. Table 3 below lists the level of disaggregation for each of the measures.

We employ three measures of competitive environments. All three are based on data from public registries that provide information on the actual resources that other citizens have rather than estimated parameters based on survey data. We measure competitive environments on the municipality level that is the lowest administrative unit in the Danish political system. The first

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2 To test the effect of education as consisting of resources versus cognitions and motivations it makes most sense to only look at those who are likely to have had a chance of finishing their education and those still in the work force since these are those most likely to be affected by the competition (Campbell 2009; Persson 2011). Students or people outside the workforce that for the most part are retirees are therefore not included in the analysis. Besides, students cluster in a rather few municipalities, but many move upon completion of their education. See appendix 1 for the categories of the variable used to include respondents.
measure of a competitive environment is the educational environment in the Danish municipalities in different age groupings in 2010 based on data from Statistics Denmark. The other two measures of competitive environments are the wealth in the Danish municipalities, measured by land value, and the tax base i.e. income in the different municipalities in 2010. These are based on the municipalities’ key figures collected by the Ministry for Economic Affairs and the Interior. In addition, based on these three measures of competitive environments, we have created an index consisting of all three indicators to improve the reliability of the measure of competitiveness.

Personality traits, education, items measuring efficacy, and the measures of competitive environments, are rescaled to range from 0 to 1. Full question wording and original scaling can be found in appendix 1 and descriptive statistics for the recoded variables can be found in appendix 2. The competitive environments are scaled so that a higher score means the environment is more competitive.

Model estimation
The model is estimated using structural equation modeling in the statistical software Mplus version 7. Mplus’ so-called MLR estimator is used and assumes a multivariate normal distribution but provides robust standard errors (Browne and Cudeck 1992). We are thus able to use a strong technique for handling missing values namely full information maximum likelihood (FIML) (Schafer and Graham 2002; Yuan, Yang-Wallentin, and Bentler 2012). Missing values are a source of potentially biased parameter estimates (Enders 2010; Little and Rubin 1987) so if we use listwise deletion we are potentially introducing bias. In addition the SEM framework provides a flexible and

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3 www.statistikbanken.dk . Based on the same educational variable as in the survey and it is recoded in exactly the same way.
4 http://www.noegletal.dk/
5 In addition, clustering, based on age groups and geographical dispersion, is also taken into account when calculating the standard errors for the models estimating the effect of education in competitive environments.
general way of estimating multilevel models (Curran 2003; Rabe-Hesketh, Skrondal, and Pickles 2004).\footnote{For additional information on how this is implemented in Mplus see e.g. (Geiser 2013)}

To disentangle the relationship between education and personality traits only a very limited set of controls are employed; only those which are arguably exogenous to education and personality traits are included. This means that only age, and gender are included as controls, whereas for instance income, which is partly an outcome of educational differences, is not included as this would constitute bad control (Angrist and Pischke 2009, chapter 3). These controls are also fairly common in the literature on political efficacy; those who are older are generally less efficacious and men are generally more internally efficacious but less externally efficacious than women (Abramson 1983; Chamberlain 2013; Hayes and Bean 1993; Sullivan and Riedel 2001).\footnote{It is customary to control for whether people have recently moved in the investigation of environmental competitiveness. Unfortunately based on the current dataset we cannot control for this, but by excluding students we minimize the problem. If we find that the environmental competitiveness is an important moderator, even without this control, it is strong evidence that it is in fact important.} We include these controls in all models.

To investigate hypotheses 1-3 we estimate three models for internal and external efficacy: One including education and controls, one where we add personality traits and a final model where we also add political interest and political knowledge. In this way we are able to investigate the changes in the size of the coefficient of education on internal and external efficacy as more constructs are added to the model.\footnote{This is strictly speaking not the way the models are estimated, although the interpretation is exactly the same. In order to be able to conduct a statistical test of the differences in the effect of education before and after including personality traits, political interest, and political knowledge path analysis is used instead. The effect of education in the first model including only controls is calculated as the sum of the direct effect of education and the indirect effect of education through personality traits, although this might seem counterintuitive given our causal framework outlined above. The sum of the direct and indirect effect, i.e. the total effect, exactly corresponds to the effect of education on political efficacy in a model \textit{without} personality traits since this is a linear regression model (MacKinnon 2008, chapter 3). The indirect effect therefore corresponds to the degree of confounding and a test of the significance of this parameter is therefore easy in this model specification. In fact the results from estimating three separate models are, within rounding error, the same as the estimates obtained above. These results are available upon request.}
To investigate hypothesis 4, i.e. the relative effect of education in different competitive settings, we include a set of interactions between the environment and education (Campbell 2009; Persson 2011). A negative sign of the interaction signifies that the effect an individual’s level of education decreases as the competition increases. Since this is a multilevel context this interaction is also referred to as a cross-level interaction, which requires that we estimate a random intercept and random slope model in addition to including the cross-level interaction (Aguinis, Gottfredson, and Culpepper 2013). Only one competitive environment, education, income, wealth, is investigated at a time to reduce problems of multicollinearity, but we also include a composite measure of competitive environment that includes all three indicators.

The effect of education on internal and external efficacy: Confounding by personality traits

This section investigates hypothesis 1-3. The models shown in the first two columns test hypothesis 1, i.e. whether education has a positive effect on internal and external efficacy. The effect of education on external efficacy is 0.152 (p<0.000) and the effect of education on internal efficacy is 0.176 (p<0.000) which means those who are more educated are more internally and externally efficacious as expected. The effect of education in these model specifications includes the resource effect as well as the motivational and cognitive factors that we theorized to be mostly confounded by personality traits.

In model (3)-(4) we therefore control for the effect of personality traits. If the effect of education is primarily based on cognitive and motivational matters its effect should decrease once personality traits are accounted for because these traits more directly measure motivations and cognitions. Following our argument the confounding should be strongest for internal efficacy. This is confirmed: The effect of education on internal efficacy in model (4) decreases to 0.082 (p<0.000) whereas external efficacy only decreases to 0.126 (p<0.000). The difference in the sizes of the two
decreases is significant at a .05 level (p=0.022). Perhaps more informative are the percentage changes: The effect of education on internal efficacy, when not controlling for personality traits, is almost double the size, whereas the effect of education on external efficacy, when not controlling for personality is roughly fifty percent larger. This marked difference in the effect of education on the two dimensions of political efficacy, suggests that the effect of education on political outcomes is more confounded by personality traits when the education effect is based on motivations and cognitions.

Table 2: The effect of education on internal and external efficacy

<table>
<thead>
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<th>Construct</th>
<th>(1) External efficacy</th>
<th>(2) Internal efficacy</th>
<th>(3) External efficacy</th>
<th>(4) Internal efficacy</th>
<th>(5) External efficacy</th>
<th>(6) Internal efficacy</th>
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<tbody>
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<td></td>
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<td>Unstandardized</td>
<td>Unstandardized</td>
<td>Unstandardized</td>
<td>Unstandardized</td>
</tr>
<tr>
<td>Education (0-1)</td>
<td>0.176***</td>
<td>0.152***</td>
<td>0.126***</td>
<td>0.082***</td>
<td>0.103***</td>
<td>0.043***</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.016)</td>
<td>(0.021)</td>
<td>(0.016)</td>
<td>(0.022)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.017</td>
<td>0.061***</td>
<td>-0.017</td>
<td>0.077***</td>
<td>-0.033**</td>
<td>0.055***</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.013)</td>
<td>(0.009)</td>
</tr>
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<td>0.000</td>
<td>-0.001</td>
<td>-0.001***</td>
<td>-0.001***</td>
</tr>
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<td>(0.001)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
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N = 2167

Standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01.

To further substantiate our argument we included the two classical cognitive and motivational predictors of efficacy: Political knowledge and political interest. If the effect of education on internal efficacy is indeed driven by motivational and cognitive factors the effect of education should decrease further and more markedly for internal efficacy compared to external efficacy when we include political knowledge and interest in our models. This is not a test of the degree of confounding; it is a further test of why education is related to internal and external efficacy. As
models (5) and (6) illustrate we do indeed observe the expected pattern of results: The effect of education on external efficacy decreases to 0.103 (p<0.000), whereas the effect of internal efficacy decreases to 0.043 (p=0.006). The difference in the sizes of the decreases is again significant (p=0.049). As before the percentage changes are more informative: The effect of education on internal efficacy is almost double the size when not holding political interest and knowledge constant whereas the effect of education on external efficacy when not holding political interest and knowledge constant is only around twenty percent larger.

Taken together, education retains almost 60 percent of its effect on external efficacy but less than 30 percent on internal efficacy when controlling for personal predispositions, political interest and political knowledge.

The fact that personality traits do indeed measure motivational and cognitive effects is also evident by the fact that the effect of personality traits decreases substantially when including political interest and knowledge such as the effect of Openness in model 4 and 6. We will return to this point in the conclusion.

**The effect of education on external efficacy: Competitive context effects**

The analyses so far show that motivational and cognitive effects confound the educational effect less for external efficacy than internal efficacy. This suggests but does not test that the conjectured resource effect may be more important for external efficacy. If this is the case, the educational effect on external efficacy should be dependent on the competitive context in which educated individuals find themselves. Hypothesis 4 suggested that the effect of education on external efficacy but not internal efficacy differs across different competitive environments.

The models in table 3 below illustrates whether the effect of education decreases when the degree of competitiveness increases. In all cases for external efficacy the effect of education decreases when
the environmental competitiveness increases: There is a negative and significant cross-level interaction for all models. This confirms our theoretical expectation: When competition over a political outcome is a zero-sum game, such as external efficacy, and the effect of education on a political construct is caused by a resource effect, i.e. access, influence and status, the effect decreases when others possess a high level of resources, whether measured in terms of income or education.

As to the effect of education on internal efficacy we should, based on our theoretical framework, not expect the effect of education on internal efficacy to decrease just because others are educated or wealthy since internal efficacy is not a zero-sum game. This is also confirmed: None of the
interactions between education and the four competitive environment indicators are significant at conventional levels of significance. This corroborates our evidence that competition matters for the effect of education on external but not internal efficacy.

The graph below illustrates the effect of education on external efficacy for model (10) to illustrate the effect of education when the competitiveness increases as measured by the index of competitiveness.\(^9\) We notice for the graph displaying the marginal effect that the effect of increasing competitiveness is quite dramatic: When the degree of competitiveness is around .7 the effect of education on external efficacy ceases to matter as indicated by the confidence bands crossing the point zero.

*The marginal effect measures the effect of education on the conditional mean of external efficacy of a change in the index of environmental competition controlling for the other variables i.e. the partial derivative.*

\(^9\) Using the approach outlined by (Bauer and Curran 2005) as implemented in Mplus
Conclusion and discussion

In this article we have developed and tested an argument that posits that the effect of education on internal efficacy is highly confounded by personality traits since its effect is primarily based on cognitive and motivational factors. The effect of education on external efficacy will be less confounded by personality traits since its effect is primarily based on relative resources such as status, power and influence, and since personality traits only indirectly affect access, influence and status. When the relative resource effect is important the competitive context in which individuals find themselves conditions resource effects. Focusing on these differential effects of education on internal and external efficacy and relying on strong measures of both personality traits and competitive contexts we proposed several observable implications of the argument and found considerable support for its validity. There are at least four reasons why we find the evidence compelling.

First of all the effect of education on internal efficacy decreases substantially when personality traits are held constant and the effect decreases less on external efficacy. Because personality traits, by definition, measure motivations and cognitions that are more important for internal than external efficacy this suggests that the motivational and cognitive aspect of the educational effect on political behavior is considerably confounded by personality traits. Second, the effect of education on internal efficacy decreases further and more markedly than on external efficacy when we include more direct measures of motivation and cognition like political interest and political knowledge in our model specification. Also this suggests that a major part of the educational effect on internal efficacy is cognitive and motivational and it gives further credence to our argument.

Third, the effect of education is context dependent for external but not for internal efficacy. The effect of education on external efficacy decreases when the degree of competition increases whereas
for internal efficacy it does not. This provides additional evidence to the validity of our distinction between relative resource effects versus absolute cognitive and motivational effects. When the effect of education is based on resources, as in the case of external efficacy, its effect decreases in competitive environments because finite resources such as central network positions have a zero sum character. Conversely, when the effect of education is based on cognitive and motivational factors, such as the effect of education on internal efficacy, the effect does not depend on levels of competition: Just because I feel subjectively competent and capable of understanding the complexities of politics and government decision making this does not imply that others cannot feel the same way.

Fourth and finally, the case is well suited to test the more general argument on the differentiated effects of education. By focusing on internal and external efficacy, which are conceptually closely related, we are ensuring that the two constructs are most similar except regarding the theoretically conjectured, differential effect of education on these two constructs. In addition the context for the study, Denmark, is a least likely case for testing the effect of education on political efficacy after taking predispositions into account. Denmark is an extremely equal society, education is free, and there are relatively few social barriers to become educated. If, in this context, education still has an effect above and beyond predispositions and if we find the conjectured relative resource effect, it is likely that similar effects can be found in other contexts as well. However, needless to say more comparative analysis and cross-cultural replication is needed to examine whether our findings can be generalized beyond the Danish case.

The argument developed here is fairly general in scope and may shed light on the relationship between education and predispositions more generally. Future studies should seek to elaborate in two ways. First, in this article we have only set out the broad contours of a framework for starting to
understand the complex and multifaceted relationship between education and predispositions. Digging deeper into which types of cognitive and motivational dispositions are more or less affected by education, after predispositions are taken into account, would be an enterprise worth undertaking. Personality traits, it seems, do not confound all the motivational and cognitive effects of education that are important for political behaviour.

Second, other political behaviours related to our conceptual distinction between resource effects and motivational and cognitive effects ought to be investigated to examine the boundaries of the argument. A logical next step would be to examine the effect of personality traits and education on political participation. Network effects, such as recruitment and mobilization effects, are of prime importance for the effect of education on political participation (Rosenstone and Hansen 1993; Verba, Schlozman, and Brady 1995). Furthermore, current research has demonstrated that the effect of education on political participation decreases in a competitive educational environment which suggests the effect of education on this political construct is also related to resources rather than (merely) cognitive and motivational effects (Campbell 2009; Nie, Junn, and Stehlik-Barry 1996; Persson 2011; Tenn 2005). Hence, the education effect on political participation is unlikely to be strongly confounded by predispositions.

Our study also has democratic implications. Decades ago Philip Converse argued that education was the “universal solvent” pointing to its many positive effects on democratic citizenship such as political participation, political interest, political knowledge and political efficacy (Converse 1972). Some years later Nie, Junn, and Stehlik-Barry argued that democratic citizenship included two aspects, political engagement and political enlightenment (Nie, Junn, and Stehlik-Barry 1996). They argued that education had a relative effect for constructs related to political engagement, such as political participation, whereas it had an absolute effect when it came to political enlightenment.
Thus, although education only worked as a sorting mechanism for constructs related to political engagement, at least it still served to increase levels of political enlightenment in an absolute fashion, thus retaining the importance of education for good democratic citizenship. While we are able to reproduce the first part of the story in this article, we are also able to cast some serious doubt on the optimistic second part of the story: Cognitive and motivational factors, which are integral to their conceptualization of political enlightenment, are those factors which are most likely to be confounded by personal predispositions. This means that not only is the positive effect of education on political engagement conditional upon context, its effect on political enlightenment may also be exaggerated. Two brief notes of caution are needed before completely dismissing the importance of education for good democratic citizenship however.

First of all, the effect of education on internal efficacy remains significant across all model specifications. Thus although its effect size in relation to altering a person’s basic motivational and cognitive set up may have been inflated in previous studies that have not included personality traits this does not imply that there is no effect of education. Secondly we should also be humble about the fact that this study relies on cross-sectional data. Although education, in the relatively wealthy and educated country of Denmark contributes little to make people more or less internally efficacious, this does not imply that increasing mass levels of education over the last hundreds of years have not.
Bibliography


Appendix 1: Question wording

The NEO-PI-R short version is copyrighted so questions from this battery are not shown. Also the BPP battery is protected against publication.

Socio-demographics

What is your last finished education? 10

Primary school
High school
High school (Vocational high school)
Short-term higher education (1-2 years)
Medium term higher education (3-4 years)
Long-term higher education (more than 4 years)
Researcher/PhD

Questions measuring internal efficacy

Sometimes politics seem so complicated that a person like me can’t really understand what’s going on

Agree completely
Agree somewhat
Neither/nor
Disagree somewhat
Disagree completely
Don’t know

10 The educational variable is recoded to reflect “years of school education”. The categories are:
   1. 9 Years or less (Primary school)
   2. 10-11 Years (Basic vocational education and vocational education)
   3. 11-12 years of education (High school)
   4. 13-14 years of education (Short-term higher education)
   5. 14-16 years of education (Medium term higher education)
   6. 17-18 years of education (Long-Term higher education)
   7. 19 years of education (PhD)
I feel that I have a pretty good understanding of the important political issues facing our country

Agree completely
Agree somewhat
Neither/nor
Disagree somewhat
Disagree completely
Don’t know

I often think it is difficult to make up my mind about political issues

Agree completely
Agree somewhat
Neither/nor
Disagree somewhat
Disagree completely
Don’t know

Questions measuring external efficacy

People like me have don’t have any say about what government does

Agree completely
Agree somewhat
Neither/nor
Disagree somewhat
Disagree completely
Don’t know
I don’t think government cares much what people like me think

Agree completely
Agree somewhat
Neither/nor
Disagree somewhat
Disagree completely
Don’t know

Question measuring political interest

How interested are you in politics?

Very interested
Somewhat interested
Not particularly interested
Not at all interested

Questions measuring political knowledge

Which parties are ruling parties in the current government?

The Social Democrats
The Liberal Party of Denmark, The Conservative People’s Party
The Liberal Party, The Conservative People’s Party, The Danish People’s Party
The Social Democrats, The Socialist People’s Party
The Social Democrats, The Socialist People’s Party, The Red Green Alliance
The Social Democrats, The Socialist People’s Party, The Danish Social Liberal Party
Don’t know
How many members does Parliament have if we disregard the four from Greenland and the Faroe Islands?

171
175
179
183
187
Don’t know

Which party is Troels Lund Poulsen a member of?

The Liberal Party of Denmark
The Social Democrats
The Danish People’s Party
The Danish Social Liberal Party
The Socialist People’s Party

Which party is Christine Antorini a member of?

The Liberal Party of Denmark
The Social Democrats
The Danish People’s Party
The Danish Social Liberal Party
The Socialist People’s Party
Measures of competitive environments based on data from the Ministry for Economic Affairs and the Interior

Definition of tax base

The municipalities’ budgeted tax base from income taxes including taxes from foreigners with limited tax obligations in DKK per citizen 1st of January

Definition of land value

The municipalities’ budgeted land values which are levied in DKK per citizen 1st of January.

Question used to include people in the investigation of competitive environments

What is your current occupation?11

1. Worker, unskilled (not semi-skilled worker)
2. Worker, unskilled (semi-skilled worker)
3. Worker, skilled
4. Employee/civil servant, lower
5. Employee/civil servant, higher
6. Self-employed farmer/horticulture/fisheries
7. Self-employed retailer/craftsman
8. Self-employed, other
9. Apprentice/student
10. Student
11. Not in the labor force (retired, on pre-retirement benefits)
12. Married without own employment/housewife
13. Assisting spouse
14. Unemployed

11 Categories 9 through 11 are not included in the analysis
Appendix 2: Descriptive statistics

Descriptive statistics for full sample of respondents

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*The measure of political knowledge is collected at a second point in time, starting in October 2011, which not all participants in the first survey answered.*