Education and Voting:
Explaining Differences in Electoral Participation

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Andreas Videbæk Jensen
Aarhus
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Preface

This report summarizes my PhD dissertation *Education and Voting: Explaining Differences in Electoral Participation*, which consists of this summary report and the four research papers listed below. The summary provides an overview of the theoretical arguments, the methodological approaches, as well as the main findings in each of the four papers and combines the findings into a theoretical framework of the relationship between education and voting. Detailed accounts and specific descriptions of the data, designs, further analyses and robustness tests are available in the individual papers and their appendices.

- **Paper 1.** "Educating For Democracy: Going to College Increases Political Participation" [Invited to Revise and Resubmit in *British Journal of Political Science*]
- **Paper 2.** "What You Study Affects Political Participation: Political Socialization and Resource Accumulation Across College Fields of Study" [Working Paper]
- **Paper 3.** "From Voice to Vote? Encouraging Voters to Use Their Political Voice Had Positive and Negative Effects on Voter Turnout" with Simon Calmar Andersen [Under Review]
- **Paper 4.** "What Makes Voters Prefer Highly Educated Candidates? Unpacking Demand-Side Drivers of Unequal Descriptive Representation" with Mathias Kruse [Working Paper]

Chapter 1
Introduction

There is probably no single variable in the survey repertoire that generates as substantial correlations in such a variety of directions in political behavior material as level of formal education.
(Converse 1972, 324)

Why do people with different levels of education behave so differently in the realm of politics - specifically elections and voting? Educational lines structure many aspects of people's lives in politics and elsewhere. For example, we know that a person with a higher education is more likely to earn higher salaries, be more healthy, and find a partner and friends with higher education compared to a person without higher education (Maralani and Portier 2021; Eika, Mogstad, and Zafar 2019; Heckman, Lochner, and Todd 2008; Grimard and Parent 2007). This pattern is especially strong in the realm of public opinion and political behavior. Citizens with less education are less likely to vote, more likely to have low political trust and hold authoritarian views (see e.g. Converse 1972; Persson 2015; Stubager 2008). More educated citizens know more about politics, and their demographics and opinions are more represented among elected politicians (Galston 2001; Statistics Denmark 2020). Accordingly, at the aggregate level, we can see that group boundaries defined by education are structuring the way resources and influence are allocated in society. On the one hand, the fact that education is associated with higher levels of voter turnout constitutes a political inequality between citizens with different levels of educational attainment, which may negatively affect democratic responsiveness, legitimacy and representation (Dahl 1989; Lijphart 1997; Putnam, Leonardi, and Nanetti 1993). On the other hand, democratic theorists have long placed great faith in educational institutions' ability to sustain democracy by building a citizenry that participates in politics (Aristotle, n.d.; Lipset 1959; Wolfinger and Rosenstone 1980). It is therefore of both scientific and democratic impor-

tance to produce knowledge on the possible explanations of the empirical association between education and voting: Are the large disparities in voting behavior between educational groups a reflection of educational institutions doing their job, i.e. producing good democratic citizens, or are they caused by other factors associated with education? In sum, in this dissertation, I seek to answer the following research question: *How can we explain the differences in electoral participation between educational groups?*

This question has already sparked theorizing and empirical research across the social sciences. Generally, two views of the education-voting relationship have been pitted against each other, namely the causal view and the selection or proxy view. I argue that these views are both valid, and I contend that we need a third perspective to understand educational divisions in electoral participation. According to the causal view, there are strong theoretical reasons to expect that higher education has a causal effect on voter turnout and voter preferences (Verba, Schlozman, and Brady 1995; Lewis-Beck et al. 2008; Hillygus 2005; Condon 2015). Theoretically, educational attainment may provide students with resources that facilitate electoral participation such as knowledge, social skills, social relations and wealth (Brady, Verba, and Schlozman 1995; Holbein and Hillygus 2020; Hansen and Tyner 2021; Galston 2001). However, there are equally strong theoretical reasons to expect that education is a proxy for a host of other factors that determine voter turnout and voter preferences, such as family's socioeconomic status, political socialization in the home, cognitive ability and genetics (Kam and Palmer 2008; Jennings and Niemi 1974; Alford, Funk, and Hibbing 2005; Highton 2009). This selection view states that education does not exert a causal influence on voter behavior, but that pre-adult factors determine both educational attainment and voter behavior. While empirical research has made great progress by increasing internal validity in order to decide between these two perspectives, the literature is in an undecided state where equally credible studies reach contradicting results (Persson 2015; Willeck and Mendelberg 2022).

In this dissertation, I claim to advance this standstill theoretically, methodologically and empirically. In terms of theory, I argue that the causal and selection views are actually mutually compatible, and drawing on the get-out-the-vote literature, I argue that we need to include a third perspective – the heterogeneity view – to obtain a complete picture of the causal processes that may generate educational differences in voting. In brief, this view states that societal groups delineated by educational attainment respond differently to voter mobilization efforts, which

influences the aggregate educational gap in voting. Methodologically, I argue that the field has faced three meta-scientific challenges when concluding from empirics to theory and that these challenges to varying degrees have impeded our ability to assess and decide between the three explanatory perspectives on educational differences in voting. The first challenge concerns the potential pitfall of assuming mutual exclusiveness between explanations. As described above, selection and causation are not mutually exclusive, which makes it a pitfall to take empirical evidence of selection to imply absence of causation. Second, if statistical power is limited, theory of precision in estimation states that it is a potential pitfall to conclude from lack of a statistically significant effect to the absence of causation (Rainey 2014). Concretely, I argue that while prior studies have made impressive progress by increasing internal validity, statistical uncertainty has meant that when these studies arrive at statistically insignificant estimates, we still cannot rule out rather large effects of college. The third pitfall is assuming causal homogeneity (i.e. that average effects are representative for all subgroups) when there are theoretical reasons to expect causal heterogeneity (Bryan, Tipton, and Yeager 2021). Finally, this dissertation advances the literature empirically. Each of the four research papers conducts empirical investigations that shed light on educational divisions in voting from different angles. Papers 1 and 2 investigate the causal effect of college education on voter turnout and use non-experimental data to shed light on the causal and selection views of the education-voting relationship. Paper 1 combines prior research with new longitudinal evidence to get at the overall causal effect of college. Paper 2 uses college admission data and administrative voting records in a regression discontinuity framework to examine the causal mechanisms that may drive the turnout effect of college education. Papers 3 and 4 move beyond estimating the causal effect of education. Specifically, Paper 3 moves to contextual explanations that are independent of whether education causes voting and uses a field experiment to test the third theoretical view, namely the heterogeneity view. According to this view, descriptive voter groups in society defined by education attainment differ in sensitivity to the turnout-stimulating effects of get-out-the-vote interventions, and this causal heterogeneity creates educational differences in voter turnout. Finally, Paper 4 moves from the causes of educational differences in turnout to the consequences of these differences. Specifically, it uses an augmented conjoint experimental design to investigate how voters' preferences for candidates with different education may cause educational inequality in turnout to translate into educational inequality in political representation.

Results from Paper 1 show that going to college does indeed increase electoral participation among college-goers – especially in the short run. I find that this impact replicates across different decades and across citizens with different initial propensity to vote. The paper illustrates the concurrent existence of large selection into education and an additional independent effect of college among college-goers. Furthermore, it compares the findings to prior estimates and shows that the mixed picture of existing evidence is attributable to a lack of statistical power that has arguably concealed these civic returns to college education. Finally, I find initial evidence of a compensation effect of college that is greatest among those who were initially unlikely to vote.

In Paper 2, I test the theoretical claim that different fields of study in college, due to their differences in educational content, peer composition, and post-college economic returns, have substantively different effects on electoral participation. I find that enrollment in social science, health, and humanities significantly increases voter turnout among those who apply with those specific fields as their preferred option. In contrast, enrollment in science and technology (STEM) has a precise null effect. Investigating mechanisms, I show that the turnout-stimulating fields do not increase economic income, whereas enrolling in STEM fields yield substantive economic returns. Thus, I fail to find any evidence of economic mechanisms, i.e. that turnout increases due to the economic resources brought about by education. Moreover, I find that being admitted to social science or health substantively increases students' exposure to social norms of voting. This may explain that these fields increase turnout in the short run. The findings are compatible with socialization theories of the education-participation relationship and suggest that, from an education policy perspective, there may be a trade-off between civic and economic returns to education.

In Paper 3, we test whether voter groups defined by different levels of educational attainment vary in the degree to which they benefit from voter mobilization efforts. Results show that citizens with higher education are more likely to respond to get-out-the-vote interventions, which in our case skewed political participation further between educational group. Our findings suggest that not only are privileged groups more likely to benefit from interventions (which is in line with prior work), less privileged groups may even be demobilized. This supports the heterogeneity explanation of educational differences in voter turnout put forth in the theory section. We find tentative evidence that heterogeneity in effects is explained by differences in attentiveness and self-efficacy in

voters with and without college education, which predict how much they benefit from voter mobilization efforts.

Moving to the consequences of educational differences in voting, results in Paper 4 show that both voters with and without college education prefer candidates with an educational background similar to their own. This same-group preference is especially strong and persistent among highly educated voters. Accordingly, if citizens with higher education are over-represented in turnout statistics, this will produce an over-representation of highly educated elected office-holders. Thus, educational inequality in participation - partly driven by education effects - is likely to spill over into inequality in representation.

The dissertation advances our understanding of the education-voting relationship by distinguishing between three kinds of causal processes that may give rise to educational differences in voting and by showing the theoretical and empirical compatibility between the three theoretical perspectives they represent, which I label the causal perspective, the selection perspective and the heterogeneity perspective. Furthermore, it identifies how educational differences in voting may translate into unequal political representation. These findings generate three sets of implications for our understanding of the dynamics underlying inequalities in political participation and representation. The first set relates to the causal impact of education on voter turnout: The findings support the general idea that educational institutions sustain democratic institutions by creating an engaged citizenry (Lipset 1959; Aristotle, n.d.; Wolfinger and Rosenstone 1980). This implies that expanding college uptake to those who are less likely to vote has the potential to reduce inequalities in political participation. Furthermore, my findings suggest that policy-makers may even adjust the supply of education in specific fields of study to improve political participation. The second set of implications underlines that voter mobilization efforts may significantly affect inequality in participation in the short run, even by demobilizing specific groups, and emphasizes the need to take causal heterogeneity into account when designing behavioral interventions situated at the heart of democratic elections (Enos, Fowler, and Vavreck 2014; Bryan, Tipton, and Yeager 2021). Finally, moving beyond turnout inequality, the fourth paper implies that inequality in participation spills over into the political over-representation of highly educated voters, further testifying to the key role played by education in structuring the electoral landscape in modern democracies.

The remainder of this summary report is structured as follows: In Chapter 2, I present the theoretical framework and define the disserta-

tion's focus on college education and voter turnout. I present and distinguish between different theoretical arguments for why and how education may – and may not – impact voting and the causal models they imply. Furthermore, I discuss why we may expect causal heterogeneity when comparing groups with different levels of education. In Chapter 3, I identify the main challenges and pitfalls involved when we seek to produce knowledge about education effects and explain how the challenges are addressed by the studies in the dissertation, including an account of the research designs. In Chapter 4, I outline the empirical findings of each paper and consider how the findings in conjunction shed light on the theoretical framework outlined in Chapter 2. In Chapter 5, I briefly summarize the dissertation's conclusions before discussing the limitations to the dissertation's findings and the questions about education and voting that are left unanswered.

Chapter 2
Theoretical Framework

The research question of this dissertation is *"How can we explain the differences in electoral participation between educational groups?"* What I mean by "explain" is the following: To develop and decide between potential causal processes that may give rise to educational differences in electoral participation. This section is concerned with theoretically developing and distinguishing three such causal processes, which I label the causal explanation, the selection explanation and the heterogeneity explanation. The two former explanations revolve around whether education causally affects voter turnout, whereas the latter explanation concerns how the social groups defined by education may respond differently to exogenous interventions that affect voter turnout. These three explanatory perspectives in conjunction constitute this dissertation's theoretical framework for understanding educational differences in voting. I begin this chapter by defining the key concepts of education and voting. Then I present the general behavioral model of voter turnout and its drivers, which underlies this dissertation. With these prerequisites in place, I introduce the three theoretical perspectives and the joint framework that links voter turnout to education.

2.1 Concepts

Within the topic of education and voting, this dissertation focuses specifically on the relationship between higher education or college education and voter turnout. The terms higher education, college education, university education and tertiary education will be used interchangeably throughout the summary report. Voter turnout is the main voting-related concept that the studies revolve around. I use the terms electoral participation, voter turnout and voting interchangeably throughout. The focus on college within the concept of education and the focus on voter turnout within the concept of voter behavior constitute the bounding scope of the

dissertation. Below, I define and motivate these boundaries in greater detail before turning to a behavioral model of political participation.

2.1.1 Voting

This dissertation focuses on explaining differences in electoral participation. I use this term to mean voter turnout, i.e. whether or not an an individual casts a vote when there is an election. As described in the introduction, I use studies about voter turnout to produce inferences about the broader concepts of (1) democratic participation as well as (2) political equality. Below, I discuss how voter turnout can be seen as instances of these phenomena and discuss the limitations of focusing on voter turnout in relation to democratic participation and political equality.

Depending on the underlying ideal of democracy, different types of participation can be considered necessary in a democracy – from the slim electoral act of voting to more comprehensive activities such as civic volunteering and deliberative public discussions (Elster 1998; Putnam, Leonardi, and Nanetti 1993; Sartori 1987; Schumpeter 1976). In the broader literature on participation in democracy, voter turnout is often used as one way of measuring a broader concept of *political* participation, which in my view is a sub-concept of democratic participation (see e.g. Fowler, Baker, and Dawes 2008; Velez and Newman 2019; Stoker and Jennings 1995). Within the broader category of democratic participation, we may distinguish forms of participation that are explicitly concerned with elections and party politics (political participation) from forms that are not (Mutz 2013). In that view, political participation is defined as activities that are concerned with elections and party politics, including voting, donating to a party and campaigning (Zukin et al. 2006). In contrast stand more civic forms of participation such as volunteering and donating in civic society, i.e. engaging with organizations and causes that are not related to party politics and elections (Zukin et al. 2006). While I focus on electoral participation and voter turnout here, I do subscribe to the view of participation as a composite concept, which has implications for the inferences that can be drawn from the dissertation. There are a number of advantages to focusing on voter turnout to study political participation. First, voter turnout concerns a core democratic institution, namely elections, and testing whether education is consequential for this core element of political participation is important in its own right. Second, voter turnout is a form of political participation that can be measured objectively and at large scale, making it possible to attain mea-

surement validity and external validity with relevance for broad swaths of democratic populations compared to e.g. more rare forms of political participation such as campaigning. However, while the specific participatory act of turning out to vote is indeed political participation, it is not in itself representative of the broader concept. Thus, while the findings of this dissertation may serve as proof of concept of the relationship between education and participation, it does leave education's relationship with a number of aspects of political participation unanswered. I take a couple of steps towards broader understandings of political participation in this dissertation. In Paper 3, we use a get-out-the-vote intervention to investigate the link between non-electoral participation and electoral participation. Specifically, we seek to motivate citizens to vote by giving them a chance to voice their opinions towards politicians.

Differences in electoral participation can also be indicators of political inequality (Dahl 2006; Verba, Schlozman, and Brady 1995). High and equal turnout has been argued to be important in its own right and a requisite for democratic legitimacy (Lijphart 1997; Dahl 1989). Moving beyond participatory equality, Paper 4 investigates how unequal turnout may translate into unequal representation. Thus, by understanding the relationship between education and voter turnout, we also advance our understanding of political equality more generally.

2.1.2 Education

This dissertation focuses on explaining differences between groups defined by education, specifically higher education. Below, I define education and the distinction between different stages of education and briefly discuss college education as an instance of education more generally and the inferential advantages and limitations of this choice.

I define education at the individual level as spending time attending an educational institution as an enrolled student. This minimalist definition allows me to be open to many mechanisms through which education may affect students' attitudes and behavior, e.g. exposure to different social contexts, internalization of norms, acquisition of different skills and obtaining monetary returns to education (Bullock, 2020). More specifically, I focus on college education or "higher" education, that is education at a college or university, a so-called tertiary educational institution. At the operational level, I use different ways of measuring time spent attending an educational institution as an enrolled student. In some studies, I have access to enrollment data at the monthly level or even more fine-grained. In other studies, I use measures of educational attainment, i.e.

whether a person has obtained a college degree or not, as a measure of college education. I argue that this is a valid measurement strategy because attaining a college degree implies spending a quite specific amount of time attending a college institution as an enrolled student.

I contend that when studying the political effects of education, it is necessary to distinguish between different stages of education, namely basic education (schools), upper-secondary education (high schools) and higher education (college/university). A large part of existing work on education in political science is occupied with generalizing findings to education as a general phenomenon, a focus that can be labeled "the effect of schooling" (Persson 2015). In this sense, schooling can be studied based on differences in the length of basic education, upper-secondary education and higher education (e.g. Dee 2004; Dinesen et al. 2016; Milligan, Moretti, and Oreopoulos 2004). However, I argue that several differences between different stages of education require researchers to study these educational stages as distinct phenomena. One relevant difference is timing. Basic education, secondary education and higher education take place when students are at different developmental stages from childhood to adulthood. Studies need to account for this in terms of theory: What are the ways in which each stage may or may not contribute to building an engaged citizenry? And in terms of empirical studies: We should test the effects of each stage in its own right and take care in generalizing across stages. Accordingly, if education is generally different across stages, then a study that falsifies an overall effect of higher education is not necessarily at odds with a study that finds a substantial effect of upper-secondary education (Berinsky and Lenz 2011; Gill et al. 2020).

I choose to focus on the college education stage for a number of reasons. First, I argue that the literature on the causal effect of education on political participation is more established in terms of the pre-adult stages of education (Sondheimer and Green 2010; Gill et al. 2020; Dinesen et al. 2016; Lindgren, Oskarsson, and Persson 2019; Milligan, Moretti, and Oreopoulos 2004). Studies using strong identification based on compulsory schooling, admission lotteries and even experimentally induced high school attendance find a positive effect of high school on voter turnout. As I show in Paper 1, the literature is undecided on the effect of college education, and causal identification has proven a lot harder to find (Persson 2015).

Theoretically, the case of college education also constitutes an important case. First, in terms of timing, it is a key argument in the socialization literature that different aspects of attitudes and norms are malleable at different stages in life. One view is that adolescence constitutes the for-

mative years when citizens' views of society and the world are formed. After these years, our views remain relatively stable (Kiley and Vaisey 2020; Li and Jones 2020; Sears and Funk 1999). From this perspective, the expectation would be that the high school years are highly important in explaining political attitudes and behaviors, whereas higher education, which students mostly attend after adolescence, would matter less for these outcomes. In this sense, college is a critical case for education effects on electoral participation. Second, peer effects are likely very different across stages due to the composition of the student population. A core mechanism that is expected to be at play in educational effects on turnout is the influence of social norms (Fieldhouse and Cutts 2021). In this regard, I expect that norms about politics would be more prevalent in higher education than in earlier stages (Gillion, Ladd, and Meredith 2020; Hansen and Tyner 2021) . In college, peers may be politically engaged voters, and thereby a given student is more likely to be exposed to political values and issues from peers. Furthermore, the higher the educational stage, the more homogeneously selected we would expect the student population to be.[1]

Finally, in terms of inferences related to political inequality, college education constitutes an especially interesting case because the educational stages preceding college are generally broadly expanded in the population. In 2021, 91 percent of the U.S. population aged 25 and above had graduated from high school or more, and only 38 percent had attained a college bachelor or more (US Census Bureau 2021). This highlights how education may indeed be a double-edged sword in terms of securing equality in participation. First, if there are participatory returns to college education, they are not equally distributed in the democratic demos. Second, college expansion is an ongoing process – for instance, college attainment in the US has almost doubled since 1991 (US Census Bureau 1991; Trow 2007). Knowledge on college effects may help us predict the effects of this expansion on political participation at the aggregate level (Stevens, Armstrong, and Arum 2008). Thus, on the one hand, the fact that college education is unequally distributed in society may contribute to particpatory inequality. On the other hand, compensatory effects and expansion effects may decrease inequality.

In this dissertation, I study how we may explain the relationship between college education and electoral participation. In the preceding

1. This difference across stages also relates to the compensation hypothesis: We expect that a large share of students in higher education are already democratically engaged and that this increases the social pressure on non-engaged students to adopt this behavior (Fieldhouse and Cutts 2021)

section, I defined and discussed the conceptual boundaries of the dissertation. To develop a theoretical framework for educational differences in electoral participation, we also need a general model of the drivers of electoral participation at the individual level. Below, I present such a model and derive the framework's three explanations for educational differences in political participation.

2.2 What Drives Electoral Participation?

To explain differences in electoral participation, I draw upon a theoretical view that participation behaviors require (1) intention to participate (i.e. motivation) and (2) ability to follow through on such intentions (i.e. resources) (Holbein and Hillygus 2020). This formulation, I argue, is helpful for describing the processes that produce electoral participation and can also be used to capture prior arguments focusing on resources, costs and benefits of voting and even norms of civic duty (Brady, Verba, and Schlozman 1995; Downs 1957; Blais 2000; Fieldhouse and Cutts 2021).

This two-part model of participation has recently been advocated by scholars applying a psychological approach to participation, emphasizing the importance of being able to follow through on your participatory intentions, for example by having self-control (Condon and Holleque 2013; S. J. Hill 2020; Holbein and Hillygus 2020; Holbein 2017; Holbein et al. 2020). Importantly, the model seems compatible with prior perspectives and a tradition of studying participation as a phenomenon that involves costs and benefits (Downs 1957; Wolfinger and Rosenstone 1980). Explanations or causes of participation can be viewed as factors that change the costs or benefits associated with participation, such as voting. One important perspective is that the resources that facilitate participation are time, money and civic skills (Brady, Verba, and Schlozman 1995). Some scholarship has focused on political knowledge, political efficacy and political interest as resources that enable citizens to overcome the costs of political participation (Jackson 1995; Verba, Schlozman, and Brady 1995). More recent perspectives have convincingly shown that organizational and social skills that enable citizens to follow through on their intention to vote are at least as important (Holbein 2017; S. J. Hill 2020). A key claim in this latter perspective is that voting is a task like any other, which requires that people follow through on the tasks they set out to do. This requires self-control, planning and grit, and people

who posses such skills are more likely to get things done, including going to their voting station and casting a ballot.

Forming an intention to participate in an election requires motivation, and I distinguish between social motivation and political motivation in this regard. With socially motivated participation, I mean the broad category of instances where citizens form an intention to participate based on a tendency to derive value from contributing to and feeling like a member of their communities (Bekkers 2005; Fowler and Kam 2007). This category also captures the civic duty perspective that citizens are motivated to vote because they feel a duty to do so (Riker and Ordeshook 1968; Blais 2000). More recently, the social aspect of civic duty has been thoroughly theorized (Fieldhouse and Cutts 2021; Hansen and Tyner 2021; Bhatti, Fieldhouse, and Hansen 2020). Specifically, social relations that entail a social norm of civic duty may increase the benefits of voting by increasing the social costs of not voting. By politically motivated participation, I refer to instances where citizens are mobilized on the basis of ideology and political issue positions. Both can be said to relate to the benefits of voting. In terms of voting, I expect that both political and social motivations may underlie an intention to vote. Citizens may form an intention to "do their civic duty" and vote in an election based on a general orientation towards taking part in society, even though they do not initially have an idea of whom to vote for. Similarly, citizens may form an intention to vote because they want to support a particular party or political cause, i.e. an instance of political motivation.

Recall that this dissertation investigates how we may explain educational differences in voting. The above review of the drivers of political participation illustrates how the causes of voter turnout can be expressed as factors that affect either the motivation and benefits of voting or the ability to overcome the costs of voting. Below, I use this formulation of the drivers of political participation to derive the three perspectives that I label causation, selection, and heterogeneity. These perspectives imply different kinds of causal processes that, if true, may give rise to educational differences in electoral participation. I close the chapter by combining the three perspectives into a joint framework.

2.3 The Causal Perspective: How Education May Affect Electoral Participation

This perspective simply states that college education has a causal effect on electoral participation and that this effect is positive. It is a longstand-

ing thought in the scholarship of democracy that educational institutions may sustain democracy by instilling civic virtues in students and thereby producing an engaged citizenry that participates in democracy (Aristotle, n.d.; Lipset 1959; Wolfinger and Rosenstone 1980). Below, I discuss three mechanism through which college education may have a positive effect on electoral participation among college-goers. The first relates to the skills and human capital a college education may provide. The second relates to the pecuniary (economic) resources that may be obtained as a consequence of education. The third is social mechanisms where students are influenced by peers by internalizing norms of voting. Figure 2.1 illustrates the causal perspective on the education-voting relationship.

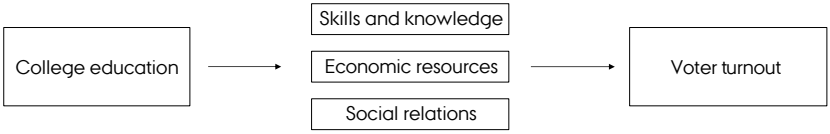


Figure 2.1: The Causal Perspective on the Education-Voting Relationship

2.3.1 Mechanism 1: Skills and Human Capital

First, higher education is expected to impact political participation by providing students with human capital resources that are relevant for participation (Brady, Verba, and Schlozman 1995). In the short run, these include relevant knowledge as well as verbal and psycho-social skills that enable citizens to follow through on their intention to vote (Holbein and Hillygus 2020; Condon 2015; Hillygus 2005). There are generally two strands of theorizing in this human capital perspective.

The first focuses on a set of general (non-political) psychological skills labeled non-cognitive or psycho-social skills[2] (Holbein et al. 2020; Holbein 2017; Holbein and Hillygus 2020; S. J. Hill 2017; Condon and Holleque 2013). As mentioned in section 2.2, these skills are argued to improve people's general ability to follow through on their goals and intentions (Duckworth et al. 2007; Heckman and Kautz 2013). Voting requires effort like many other tasks, and these skills are expected to im-

2. Non-cognitive skills are defined as having in common that they (1) relate to either self-regulation or the ability to work with others, and (2) are distinct from cognitive skills e.g. math and reading (Heckman and Kautz 2013; Holbein 2017).

pact people's ability to follow through on voting. Why should college education foster such skills in students? Educational performance and attainment are likely to require some level of self-control and organizational skills (Eskreis-Winkler et al. 2014; Duckworth and Gross 2014; Duckworth et al. 2013). Therefore, it is plausible that college students, regardless of field of study, follow study technique programs, train (themselves) and learn from fellow students to follow through on handing in assignments and preparing for exams.

The second strand of theorizing in human capital concerns skills that are more directly relevant to politics. They may also be labeled curriculum effects and are expected to be specifically related to fields of study in humanities or social sciences (Hillygus 2005; Condon 2015). A central argument is that language skills or verbal communication skills are key elements in the human capital mechanism linking education and political participation in general (Condon 2015; Verba, Schlozman, and Brady 1995; Nie, Junn, and Stehlik-Barry 1996). Focusing on a broad definition of political participation, Condon (2015) argues that the content of participation (e.g. discussing politics, reading news, contacting politicians) is inherently political, however, the skills required for participation are more general communication skills. "And when verbal skills help individuals discuss politics and acquire information, they may lower the cost and increase the likelihood of behaviors like voting" (Condon 2015, 821). Thus, we should expect that the college effect on political participation should be substantial for students attending a field that focuses on general language and communication skills as opposed to e.g. matematical skills (Nie, Junn, and Stehlik-Barry 1996, 41). Hillygus (2005, 28) provides an even more clear-cut curriculum-based argument regarding political and social science knowledge: "It is a civic or social science curriculum that imparts the skills and resources necessary to be active in the political realm". Specifically, students develop a concrete understanding of the political process, acquiring practical knowledge about participation, coupled with a conceptual comprehension of democratic principles and the logical connection between supporting democracy and engaging in activities like participating in elections (Hillygus 2005; Galston 2001; Stubager 2008). A related mechanism that I propose is that by obtaining politically relevant knowledge – e.g. about societal issues or international conflicts – students may be politically motivated to change structures or conflicts in society. That is, the acquisition of knowledge about issues causes students to reflect upon societal issues and form an intention to do something about them e.g. by voting. Again, this latter mechanism is an obvious case where we would expect different fields of education

to have different effects. Social science or humanities students would be more exposed to academic content related to social and political issues than STEM students.

In sum, college education is expected to increase political participation by providing language skills and politically relevant knowledge. These effects should be more pronounced in the social sciences and humanities than in the STEM fields.

2.3.2 Mechanism 2: Allocation Effects and Pecuniary Returns to Education

Second, college education is expected to impact political participation in the long run by improving the overall wealth of those who obtain a college degree. As outlined in section 2.2, economic resources are expected to facilitate political participation (Brady, Verba, and Schlozman 1995). For instance, if college education leads to better paying jobs, such jobs are often more flexible allowing voters to take the time to vote on election day while having the economic means for transportation etc. The economic/pecuniary returns to education have been widely studied and documented in economics research, however it can be hard to empirically disentangle non-pecuniary effects of education (such as voting effects) from pecuniary returns (Oreopoulos and Salvanes 2011), which is one focus area in Paper 2.

2.3.3 Mechanism 3: Socialization Effects, Peers and the Social Norms of Voting

Third, college education is expected to affect political participation through peer effects and internalization of social norms. Specifically, education may increase social motivations to vote through exposure to social norms from peers or teachers that induce a feeling of obligation or social pressure to vote (Hansen and Tyner 2021). A social norm may be the injunctive norm of civic duty, i.e. the normative belief that all citizens ought to vote in elections. Exposure to this belief may motivate a student to vote in order to gain social approval by those holding it (Fieldhouse and Cutts 2021). Alternatively, social norms may be descriptive norms, i.e. the descriptive fact that most peers vote in elections may be a motivation to conform to the norm and vote (Fieldhouse and Cutts 2021). Both norm mechanisms alter the benefits of voting by increasing the (perceived) social costs of not voting. It is generally plausible that college is a key arena for political socialization effects and peer effects,

since education generally entails intense and long-lasting peer exposure (Mendelberg et al. 2021; Strother et al. 2021).

The causal perspective posits that groups with different levels of education participate to different extents because education increases participation and voter turnout by affecting skills, pecuniary resources and internalization of social norms.

2.3.4 The Compensation Hypothesis

Before turning to the selection perspective, I briefly introduce an important extension to the causal perspective below, which argues that the causal effect of college education may be especially pronounced among students who are initially less likely to vote. I test this argument in Paper 1.

The theoretical argument is that education may compensate for lack of political socialization in the family and thereby have a stronger influence on those who come from homes with low political socialization, typically due to socioeconomic differences in education and income (Neundorf, Niemi, and Smets 2016; Niemi and Jennings 1991; Robinson 2020; Lindgren, Oskarsson, and Persson 2019). Specifically, education may offer access to requisites and resources for participation that were not transferred from parents. It may also be that students from disadvantaged homes to a lesser extent have internalized a normative belief that voting is a civic duty. Conversely, a ceiling effect on such outcomes may be present among students from highly resourceful homes who already have these resources and beliefs. Heterogeneity in the effect of education is very important because it concerns the potential of education to reduce participatory inequality.[3] In an exemplary study, Lindgren et al. (2019) find that an extra year of vocational training does not affect voter turnout on average. However, when they include heterogeneous effects of family background, they find that education does increase turnout for students from the most disadvantaged homes but does not affect students from privileged social backgrounds. Such a compensation effect on turnout remains untested at other educational stages. Note that the socialization mechanism outlined above (cf. section 2.3.3) is indeed compatible with the compensation hypothesis: The behaviors and attitudes of students from homes with a higher degree of political socialization spill over to students who were not previously exposed to them to the same extent.

3. Importantly, a compensation effect may often be concealed in studies that only estimate overall average treatment effects or very local average treatment effects (Angrist and Pischke 2009).

2.4 The Selection Perspective: How Pre-adult Factors May Create Turnout Gaps

This perspective states that underlying factors that affect both college attainment and voter turnout create differences in participation between educational groups. From this perspective, educational attainment is "a proxy for preadult experiences and influences, not a cause of political participation" (Kam and Palmer 2008, 612). This corresponds to the confounding causal pattern depicted in Figure 2.2. Below, I briefly situate this perspective in the literature before elaborating on the theoretical arguments it entails.

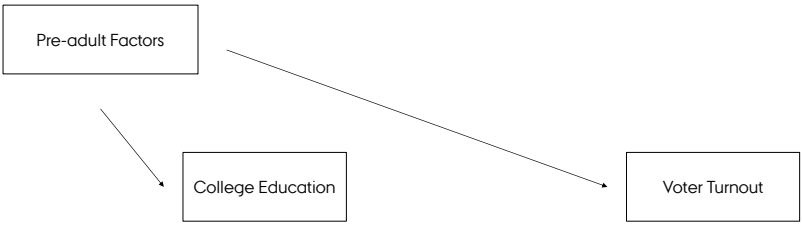


Figure 2.2: The Selection Perspective on the Education-Voting Relationship

The literature on education and participation has experienced, along with many social science fields, a credibility revolution leading to an increased focus on empirical identification of causal effects (Angrist and Pischke 2010; Persson 2015). Much of the high-quality theorizing on the ways in which education may causally increase voter turnout was empirically tested using methods that do not enable confident conclusions about whether the association is causal or not (Persson 2015). A revisionist wave of studies found that when the association between education and voting was compared using more and less causally credible research design, the association was generally weaker in the more well-identified studies (Kam and Palmer 2008; Berinsky and Lenz 2011; Dinesen et al. 2016; Persson 2014). This sparked the theoretical view often referred to as the "proxy view" (this dissertation denotes it "the selection view"), which focuses on pre-adult factors that may account for the fact that people select into higher education and score higher on democrat-

ically valuable behaviors such as political participation and knowledge (Kam and Palmer 2008; Highton 2009). In other words, education as a variable is a proxy for these pre-adult factors. Note that the dissertation seeks to reconcile the causal view and the revisionist selection view. First, causal and selection theories are not mutually exclusive, but what really reconciles these different contributions to the literature is, as I will return to later, the fact that not only the underlying theoretical models but also their empirical results are largely compatible.[4]

A number of pre-adult factors are highlighted within the selection perspective as factors that may be drivers of both educational attainment and voter turnout (Jennings and Niemi 1974; Kam and Palmer 2008). The first category is the genetic heritability of both education and voter turnout, which makes children of parents with high educational attainment and high participation more likely to achieve the same education status and participation rates (Alford, Funk, and Hibbing 2005; Kam and Palmer 2008; Fowler, Baker, and Dawes 2008). This perspective states that biologically determined factors such as cognitive ability foster both educational success and political engagement (Highton 2009). Another factor is personality traits such as patience, extroversion and conscientiousness, which have genetic components and are associated with both education and voter turnout (Kam and Palmer 2008; Fowler and Kam 2006). Specific genes have been identified that predict both outcomes (Aarøe et al. 2021). Interestingly, the study by Aarøe et al. (2021) suggests that education may be part of a causal pathway from genes to participation, further emphasizing that selection and causation are not necessarily mutually exclusive. The second category of pre-adult factors highlighted in the selection perspective concerns the ways parents may influence children through the pre-adult environment they provide, i.e. non-genetic aspects of family background. This set of factors may also be labeled a pre-adult socialization theory. First, children of parents who are politically engaged may adopt a disposition to participate because parents discuss politics in the home (Highton 2009). A key component in this perspective is that the parents' socioeconomic status (SES) is a commonly identified cause of childrens' educational attainment. As high-SES parents are often more resourceful, their children may obtain

4. In short, some studies that find evidence for the selection view claim that this is also evidence against the causal view. I show how this conclusion is seldom warranted and is largely due to statistical power issues in those studies. This reconciliation provides an optimistic view of scientific progress in the field, which has been largely stated to be at a standstill leaving "a frustrating, divided picture and we are left without a clear answer as to whether education causes political participation" (Persson 2015, 699). The brief answer seems to be yes, but education is also a proxy.

resources that faciliate participation, including economic and social capital (Akee et al. 2020). Moreoever, since socioeconomic status is generally associated with political participation, high-SES parents are more likely to serve as role models to their children and transmit both educational attainment and participation onto their children (Kam and Palmer 2008).

In sum, the selection perspective contends that educational groups participate to different extents because pre-adult factors including genetics, cognitive ability and socialization in the home exert a positive effect on both college attainment and voter turnout.

2.5 The Heterogeneity Perspective: How Educational Groups May Respond Differently to Turnout-Stimulating Interventions

I contend that in order to understand differences in electoral participation across educational lines, we need a third perspective in addition to the causal and selection views. This perspective, which I label the heterogeneity perspective, highlights a third type of causal process that may give rise to an educational gap in participation. Drawing on the literature on get-out-the-vote interventions, I posit that efforts to boost voter turnout may have differential effects for participants with different educational background, and this may alter the inter-group differences in turnout. Thus, the perspective uses causal heterogeneity (i.e. that causal effects may vary between groups) to explain differences in voter turnout. It thereby moves the focus away from whether or not education has a causal effect on turnout and points to the possibility that factors that are more feasible to manipulate than educational attainment, may explain turnout differences and may be used to reduce participatory inequality. Figure 2.3 illustrates this perspective.

It is clear that if a voter mobilization intervention has a positive effect on turnout in one group of voters and a small or zero effect in another, then the gap between the two groups would be widened since turnout in the latter group would remain largely unchanged, while turnout would increase in the former (Enos, Fowler, and Vavreck 2014). This means that if the causal effects of voter mobilization interventions differ across educational groups, then such efforts alter the educational gap in electoral participation. I employ three theoretical arguments why we should expect educational groups to have differential benefits from get-out-the-

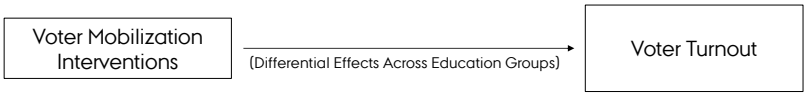


Figure 2.3: The Heterogeneity Perspective on the Education-Voting Relationship

vote interventions. Below, I introduce the important distinction between causal interaction and effect modification and elaborate on the three arguments for heterogeneous effects between educational groups.

2.5.1 Causal Heterogeneity as Causal Interaction or Effect Modification

By causal heterogeneity in education effects I denote the absence of causal homogeneity. Causal homogeneity would be a situation where the effect of education is the same across groups. Accordingly, when there is causal heterogeneity, the effect of education is different across groups. This means that groups may experience effects of different magnitude and even different sign. Causal heterogeneity may be explained using the concepts of causal interaction or effect modification (VanderWeele 2009; Keele and Stevenson 2020). Causal intereaction denotes a situation where the assignment of one treatment alters the effect of another (Keele and Stevenson 2020). An example is if education has a causal effect on the magnitude of the effect of voter mobilization interventions on voter turnout. In other words, education may cause students to be more or less sensitive to the turnout stimulating material provided in the intervention. Causal modification denotes a situation where "(...) the effect of one intervention [is] varying across strata of a second variable. Effect modification can be present with no interaction; interaction can be present with no effect modification." (VanderWeele 2009, 863). Using their terms, it is exactly effect modification across strata defined by education that the heterogeneity perspective focuses on. Importantly such effect modification may be due to a causal interaction between education and get-out-the-vote interventions but it may also be present in

the absence of such a causal interaction. This latter case would e.g. be a situation where there are factors associated with education (such as socio-economic background) that causally interacts with the intervention. Importantly, the causal heterogeneity perspective proposed in this dissertation does not assume causal interaction where differential effects are a causal consequence of education. Thereby, the explanatory power of the causal heterogeneity perspective does not depend on statements about the causal (interaction) effects of education[5]. Educational groups may respond differently to external inputs as a consequence of their education, or as a consequence of factors associated with education.

2.5.2 Causal Heterogeneity Due to Attentiveness, Ceiling Effects or Differences in Skills and Resources

Below, I lay out the three theoretical arguments why we should expect educational groups to have differential benefits from get-out-the-vote interventions.

The first argument stems from the get-out-the-vote literature where causal heterogeneity has previously been attributed to the fact that citizens differ in their attentiveness to interventions and how hard they are to reach with a given intervention (Enos, Fowler, and Vavreck 2014; Arceneaux and Nickerson 2009). Specifically, socially disadvantaged participants may be less interested in politics and therefore pay less attention to encouragements to vote. In a re-analysis of prior get-out-the-vote interventions, Enos, Fowler, and Vavreck (2014) find that the causal effects generally are larger among participants with a higher initial propensity to vote.[6] Because highly educated voters are generally more likely to vote, this argument gives rise to the expectation that the effect of get-out-the-vote interventions will be positive among highly educated voters and smaller or zero among less educated voters because interventions fail to reach them or capture their attention (Enos, Fowler, and Vavreck

5. While empirical evaluations of the selection and causal perspectives outlined above require causal identificaiton of the effects of education, empirical evaluations of the heterogeneity perspective does not. Instead it requires research designs that identify the effect of voter mobilization efforts and a test of whether this effect varies across the values of educaction as a covariate

6. Note that the study by Enos, Fowler, and Vavreck (2014) only includes get-out-the-vote studies in their re-analysis that exhibits a positive average treatment effect. Studies with null average effects are discarded. This means that negative subgroup effects are much less likely in their dataset. This further motivates the meta-analyses conducted in Paper 3.

2014; Arceneaux and Nickerson 2009). This implies that get-out-the-vote interventions may increase the turnout gap between voters with high and low education and that such adverse effects can be corrected by ensuring that interventions actually reach citizens who are hard to reach.

The second argument states that groups benefit from get-out-the-vote interventions to varying degrees because of ceiling effects in participation or factors that facilitate it. Exactly due to the arguments provided above regarding the causal perspective and selection perspectives, voters with higher educational attainment are more likely to already posses the resources and motivations to vote. Therefore, encouragements to vote will be less effective among college-educated citizens. Similarly, interventions to lower the costs of voting by e.g. providing practical information may be less effective when the costs are already low. This argument gives rise to the expectation that get-out-the-vote interventions will be less effective among citizens with higher education and thereby reduce the educational gap in political participation.

The third argument relates specifically to the ability to follow through on an intention to vote and citizens' perception of their ability to do so, i.e. their internal political efficacy. Specifically, if we suppose that a get-out-the-vote intervention is successful in motivating participants to vote, then participants with different levels of educational attainment may differ in their (self-perceived) ability to follow through on this motivation. If voters with high education are confident in their ability to follow through, they are plausibly more likely to attempt to participate because their expectation of success is high. Additionally, in response to the negative subgroup findings in Paper 3, we theorize that voters' perception of their ability to participate in politics may predict negative intervention effects. When voters with low levels of internal political efficacy receive intervention material that pressures or encourages them to vote, perhaps by arguing that voting is a civic duty, they may feel bad because they do not think they are able to live up to that expectation or duty. This may make them associate the election with a feeling of stress (Rivera, Hughes, and Gell-Redman 2022), and it may decrease their internal efficacy by constituting a setback experience. Accordingly, this argument gives rise to the expectation that get-out-the-vote interventions may be less effective among – or even demobilize – lower educational groups and thereby increase the turnout gap between voters with high and low education.

Overall, the heterogeneity perspective posits that social groups defined by education attainment have different levels of voter turnout because their sensitivity to the turnout-stimulating effects of get-out-the-vote interventions differs. This is because educational groups vary in

attentiveness to interventions, propensity to vote and belief that they are able to participate. These differences in effects may be a consequence of education or of factors associated with education.

2.5.3 A Novel Perspective on Educational Differences in Voter Turnout

I argue that the heterogeneity perspective is novel in the sense that it expands the set of ways in which we may comprehend educational gaps in voting. It does so by pointing to how voter mobilization interventions may act as gap changers that affect differences between educational groups. It can be argued that this perspective can be formulated as specific instances of the two former perspectives, since the differential effects of voter mobilization interventions are either a causal effect of education (causal perspective) or of factors associated with education (selection perspective). However, the heterogeneity perspective makes explicit that it is not just the voting behavior directly associated with education that produces gaps, but that the differential sensitivity to turnout effects associated with education may contribute as well. Thus, it is not voter turnout in itself that varies due to selection or causation in this perspective; it is the way voters respond to interventions. I argue that this perspective broadens and nuances the way we view the education-voting relationship. Importantly, this also means that we may extend the heterogeneity perspective more generally to factors at the systemic level that impact voting. As soon as such factors have differential effects across educational groups, they have an impact on gaps in behavior between educational groups. Scholars may theorize whether educational groups may vary in their sensitivity to the effects of these other factors such as changes to the way elections are conducted, reducing the costs of voting via automatic voter registration, reorganizing polling stations. While there are limits to the generalizability of the case of get-out-the-vote interventions studied in this dissertation, the idea that external factors or modifications to the way elections are run may have heterogeneous effects and thereby impact turnout inequality is an important insight for democratic policy-makers.

Below, I consider the three perspectives in conjunction and combine them into one framework of educational differences in electoral participation.

2.6 A Joint Framework of Compatible Perspectives

Recall that the aim of this dissertation is to explain differences in political participation between educational groups. By explain I mean to develop and decide between potential causal processes that may give rise to educational differences in electoral participation. The above three perspectives each constitute a distinct causal process that, if true, gives rise to differences in voting between educational groups. A key point in this dissertation is that while the three perspectives are distinct, they are *not* mutually exclusive. In a nutshell, it may be true that people who opt into college education are already more likely to vote *and* that attending college increases their propensity to vote.[7] Similarly, it is completely plausible that while education may have a direct effect on voter turnout, groups defined by education may be affected differently by voter mobilization interventions. Figure 2.4 combines the three perspectives into a joint framework illustrating the causal processes that may generate educational differences in voting (the figure constitutes a directed acyclic graph, cf. Pearl and Mackenzie (2018) and Elwert and Winship (2014)). Specifically, it illustrates how the association between college

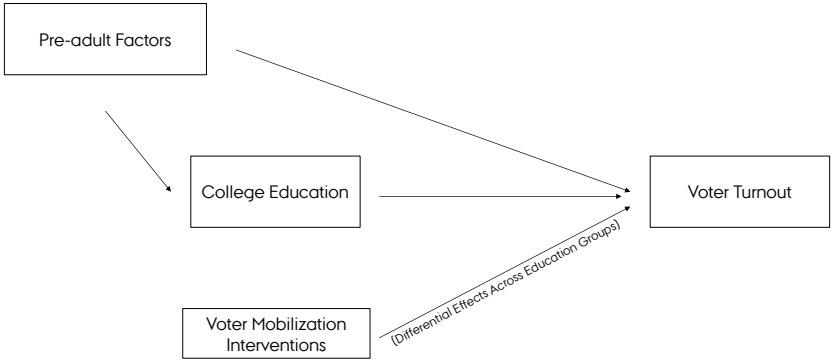


Figure 2.4: A Joint Framework for Educational Differences in Electoral Participation

7. Stated more formally, it is perfectly possible that those who attend college, even though they are already more likely to vote than other people, would be less likely to vote if they did not attend college.

education and voter turnout may reflect (1) a causal path between education and turnout, (2) a backdoor path between college education and voter turnout through pre-adult factors and (3) the fact that voter mobilization interventions may have differential effects across educational groups.[8] Besides the substantial arguments for the mutual compatibility of the three perspectives discussed above, the graph in itself illustrates that the three perspectives are not mutually exclusive.

The joint framework constitutes a stylized tool for reconciling the literature on the education-participation relationship: Studies that find support for (1) selection into education and (2) an independent effect of education are not contradictory. Indeed, viewing them in conjunction may shed light on the *relative* explanatory power of the different processes in the framework in Figure 2.4. Instead of being incompatible contributions from different theoretical trenches (selection vs. causality), they become data points that help us decompose the educational gap in turnout into parts that may be explained by the different perspectives.

8. Note that formally, directed acyclic graphs (DAGs) do not imply any assumptions about whether causal effects captured by the graph are homogeneous, i.e. the associations implied are non-parametric (Pearl and Mackenzie 2018). Therefore I annotate the graph to explicate that the third part of the framework concerns heterogeneous (differential) effects of voter mobilization interventions across educational groups. Various notations have been suggested for these kinds of relationships in DAGs but are not an agreed upon part of the formalism (Nilsson et al. 2021; Attia, Holliday, and Oldmeadow 2022). Moreover, notations for interactions are mostly concerned with causal interaction (e.g. whether education has a causal effect on the magnitude of the effect of voter mobilization interventions on voter turnout, cf. section 2.5.1). However, as mentioned above, the causal heterogeneity perspective proposed in this dissertation does not assume that such differential effects are a causal consequence of education. As long as interventions have differential effects, they will create differences between educational group whether the differential effects are consequences of education or factors associated with education.

Chapter 3
Methodology and Research Designs

Chapter 2 theoretically developed and distinguished between a set of causal processes that may produce educational differences in electoral participation. To answer the research question of how we may explain actual occurrences of these differences, it is necessary to develop a methodological framework that enables us to empirically evaluate the validity of these theoretical processes. Specifically, this boils down to two empirical tasks. First, to evaluate the causal and selection perspectives, we need research designs that enable us to get at the causal effect of college education on voter turnout. To evaluate the heterogeneity perspective, we need research designs that identify the causal effect of voter mobilization interventions and allow us to asses how the effect of these interventions varies across strata defined by education and thereby may affect the educational gap in voter turnout. Second, in addition to such research designs, we need to be aware of the general epistemic challenges when we use the evidence obtained from these designs to draw inferences about and compare the three perspectives. Put briefly, research designs suited for causal inference are not the only methodological prerequisite for answering the research question of this dissertation. Even when such designs are obtained, we need to be careful what inferences we draw given the statistical estimates they yield. As I argue in the introduction, part of the disagreement and mixed evidence in the literature on the causal effect of education can be attributed to a set of meta-scientific challenges and pitfalls when drawing inferences about education effects. Specifically, I argue that scholarship of education and political behavior (including this dissertation) needs to carefully discuss (1) the (non)compatibility of theories, (2) statistical power, and (3) causal heterogeneity. I consider the insights about how we can produce knowledge in this field an important part of this dissertation's contributions – i.e. a meta-scientific contribution to the field of education and political behavior. In this chapter, I introduce the general challenge of conducting causal inference in the field of education effects. I present the three meta-scientific pitfalls and argue

how they to varying extents have impeded the accumulative knowledge production in the field. I present the research designs used in the four papers of the dissertation and how they address these challenges. I close the chapter by discussing the choices and limitations regarding the data types used and the countries and cases studied.

3.1 The Challenges of Causal Inference About Education

3.1.1 Educational Effects Are Inherently Difficult to Study

Education as a causal phenomenon is inherently difficult to study. As Bullock (2021) recently wrote, "Credible findings about educations' effects remain scarce". Understandably, the gold standard of causal inference, the randomized experiment where participants are randomly assigned to different treatments, is largely infeasible when one is studying the effect of college in the real world. Imagine a randomized experiment where specific high school graduates were randomly assigned to take a college bachelor, and others randomly assigned to enter the work force. Such a research design is both highly infeasible and ethically questionable.[1] As a consequence, researchers are forced to rely on naturally occurring differences in education. This means that studies face the key challenges to internal validity posed by selection, omitted variables and post-treatment bias (Angrist and Pischke 2009; Schwerdt and Woessmann 2020; Elwert and Winship 2014). Specifically, due to the vast number of factors that may influence educational attainment, non-experimental approaches face the challenge of distinguishing between the effects of education and the effects of the factors that correlate with education (Bullock 2021). For instance, studies have shown that large differences in political knowledge and behavior are already in place before college enrollment (see e.g. Highton, 2009 and Paper 1 of this dissertation). Moreover, some studies that by design are more credible in meeting the causal identification assumptions trade increased internal validity for decreased external validity (Findley, Kikuta, and Denly 2021), for example because

1. However, entry lotteries exist to some kinds of education, e.g. charter schools (cf. Gill et al. 2020), which produces some lucky students and some happy education scholars.

they study very specific populations for which the causal effect can be identified, such as when IV-designs estimate local treatment effects.[2]

In order to credibly estimate the causal effect of college education, it is the goal of the research designs applied in Papers 1 and 2 to overcome the problem of selection into education.

3.1.2 ... and So Are the Causal Mechanisms

As I elaborate below, the literature has made great progress in overcoming the challenge of causal identification of education effects. Scholarly work has used various kinds of natural experiments to produce estimates of the overall turnout effect of education. However, causally credible evidence on the mechanisms that drive this relationship remains scarce (for an important exception in the context of affluent colleges, see Mendelberg et al. (2021)). This is in part because assessing *how* education affects voter turnout is subject to selection problems just like when we study overall college effects: When people select their field of study and elect courses etc., they end up in a peer group with similar preferences. Accordingly, the type, content and peer makeup of education are rarely random. To make it even more challenging, the dissertation's theoretical perspectives regarding why education may influence participation are largely concerned with mediation mechanisms, i.e. that education may affect skills, which in turn increases participation. Some initial steps have been taken to get at the causal mechanisms underlying the political effects of college education (Hillygus 2005; Condon 2015). However, mediation has proven generally hard to measure because the assumptions for the identification of mediation effects are even more restrictive (Bullock, Green, and Ha 2010; Acharya, Blackwell, and Sen 2018, 2016). The dissertation acknowledges these challenges and adheres to the view that something can indeed be learned about mediation. First, some necessary implications of mediation can be observed. For instance, if M mediates the effect of X on Y,[3] it follows that we need to observe a causal effect of X on both Y and M. Moreover, we may seek to manipulate M to see if it affects Y. We may even study whether manipulating M in addition to X reduces the overall effect of X (Acharya, Blackwell, and Sen 2018, 2016). Or we may study different versions of X that to some extent contain different amounts of the things we believe affect M (Bullock, Green, and Ha 2010). Paper 2 seeks to overcome these challenges when studying how

2. For example when Berinsky and Lenz (2011) estimate the effect of college for men (compliers) who were induced to enroll in college because of the Vietnam draft.

3. That is, X causes Y because X causes M, which in turn causes Y

voters' education (X) may impact voting (Y) through exposure to norms (M1) and acquisition of resources (M2). Paper 4 uses state of the art survey-experimental methods in this methodological field to study how information about candidates' education level (X) affects voters' preferences for candidates (Y) by altering voters' perceptions of the candidates' quality (M1) and ingroup favoritism (M2).

3.2 Meta-scientific Challenges and Pitfalls When Inferring from Empirics to Theory

Should we find research designs that allow us to assess the effects of education with high internal validity, we still face a number of challenges when trying to infer from these empirical assessments to the validity of different theoretical views. Below, I briefly introduce three meta-scientific challenges that have been central in the studies that make up this dissertation.

3.2.1 Challenge 1: Assuming That Theories Are Mutually Exclusive

The first challenge is whether to assume mutual exclusiveness between explanations. As discussed above, selection and causation are not mutually exclusive, which makes it a pitfall to take empirical evidence of selection to imply absence of causation. The studies in this dissertation need to take this into account. It would be a straw man for the literature to say that it is the full consensus that the selection and causal perspectives are mutually exclusive. However, the differences between the two is sometimes stated as if the views are alternatives in direct opposition (Persson 2014; Kam and Palmer 2008; Highton 2009). Accordingly, it may seem logical to conclude from the presence of selection to the absence of causation. Note that the empirical detection of selection into education (i.e. the fact that the association between education and turnout is reduced when confounding factors are controlled for) is highly valuable as it speaks to the relative importance of selection and causation by illustrating that an important share of variation between educational groups is due to selection (Gidengil et al. 2019). Indeed, it is mainly in conjunction with the second pitfall (outlined below) that studies that find selection also conclude that there is no causation. This denotes instances where the effect of education, after removing (some) selection, becomes statistically insignificant with large statistical uncertainty (Kam

and Palmer 2008; Dinesen et al. 2016; Persson 2014). Without precise estimates of the causal effect of education, studies that detect selection cannot infer the absence of causation.

In the theory section, I outlined how the selection perspective became more prevalent in the context of the credibility revolution (Angrist and Pischke 2010; Imbens 2024). It is a well established idea that there is some degree of gotcha-bias in scientific publication, which in broad terms entails that replication articles are more likely to be published if they conclude that what we thought before was wrong (Berinsky, Druckman, and Yamamoto 2021). Thus, the mechanisms of publication may have contributed to the fact that in the literature, positive findings are often followed by negative findings: "The published record of research therefore overly emphasizes replications that run counter to existing findings, as compared to the true distribution of the research record" (Berinsky, Druckman, and Yamamoto 2021, 373).

In sum, it is important for the studies in this dissertation to argue ex ante for the mutual (non)compatibility of the theoretical perspectives that we seek to evaluate and to not overstate the implications of findings across theoretical perspectives.

3.2.2 Challenge 2: Statistical Power and Inferences Based on Imprecise Null Effects

The second challenge relates to the fact that if statistical power is limited, theory of precision in estimation states that it is a second pitfall to conclude from lack of a statistically significant effect to the absence of causation (Lakens, Scheel, and Isager 2018; Rainey 2014). First, the higher the statistical uncertainty of an effect estimate, the less likely it is to reject a false null hypothesis of no effect. Generally, introducing the concept of a minimum detectable effect size (MDE) allows us to compare the statistical power of different studies and their ability to confidently conclude on the absence of a causal effect (Bloom 1995). This quantity can be calculated to arrive at the smallest effect size that, if true, a given study has a specific probability (e.g. 80%) to detect with statistical significance when the study is conducted. This means that, all else equal, the larger the MDE (i.e. the lower the statistical power of the study), the less we learn from insignificant estimates. Paper 1 argues that this phenomenon serves to explain the mixed pattern of findings in the literature on the effect of college on voter turnout. Specifically, it argues that a lack of statistical power in individual studies has concealed a causal effect of college on voter turnout. The challenge of statistical power is

especially related to the difference between conclusions based on individual studies compared to bodies of research. Individual studies where the statistical precision is arguably a bit too high to draw strong conclusions on insignificant findings may be compared to other studies to assess the general pattern or perform meta-analyses (cf. Papers 1 and 4).

In sum, the studies of this dissertation need to carefully assess statistical power of prior and new estimates in order to aggregate the evidence and judge whether null effects are precise or imprecise.

3.2.3 Challenge 3: Causal Heterogeneity and Average Treatment Effects

The third challenge concerns assumptions about causal homogeneity (i.e. that average effects are representative of subgroups) when there are theoretical reasons to expect causal heterogeneity. For instance, few studies have investigated heterogeneities in terms of different recipients of education. But if such heterogeneities exist, then estimates of overall causal effects are not necessarily indicative of the causal effect for any group (Gelman 2015; Tipton et al. 2019; Gelman, Hullman, and Kennedy 2023). For instance, a positive average effect may reflect the aggregation of null effects for some groups and larger positive effects for others. Similarly, a null average effect may reflect the aggregation of a positive effect for one group and a negative effect for another. A crucial example of heterogeneity in education effects is the exemplary study by Lindgren, Oskarsson, and Persson (2019), in which they find that, on average, an extra year of vocational training does not affect voter turnout. But when they allow for heterogeneous effects by family background, they find that education does increase turnout for students from the most disadvantaged homes but does not affect students from privileged social backgrounds. The fact that they use the compensation hypothesis to investigate heterogeneous treatment effects transforms the conclusions completely compared to if they had relied on the average effect to learn about the way education impacts electoral participation.

Generally, these insights on causal heterogeneity have several implications for the study of education effects. First, as mentioned, the compensation hypothesis (cf. section 2.3.4) states that the effect of education may mainly be pronounced among less privileged students and may be zero in privileged subgroups. Second, many non-experimental research designs for causal inference produce local effect estimates (e.g. from IV-designs) (Schwerdt and Woessmann 2020). This means that these designs – which are often used in education research – estimate the effect

for a specific group within the sample, namely compliers, i.e. those who for example are close to the cutoff in an RD design or change their education behavior as a consequence of compulsory schooling laws or draft instruments (Apfeld et al. 2022a; Berinsky and Lenz 2011; Dee 2004). I argue that inference from empirics to theory is most challenging when we combine local estimates with null findings: If a study finds that the local average treatment effect of education is null, then we can only infer that education is inconsequential for the compliers in the study. In other words, if local effect estimates (e.g. from IV-designs) indicate a null effect, this only constitutes a falsification of the overall causal hypothesis if we assume causal homogeneity. Third, there is good reason to expect causal heterogeneity. As outlined in section 2.3.4, the compensation hypothesis states that education has different effects depending on the student's background. Moroever, section 2.5 argues that exactly because education correlates with skills and resources, there are strong reasons to believe that get-out-the-vote effects may vary across educational groups. Both kinds of theoretically expected heterogeneity mean that empirical investigations of the theories on education effects need to take heterogeneity into account. Specifically, this calls for research designs with the ability to study both representative samples and theoretically well-specified sub-groups. This is in line with recent calls for a heterogeneity revolution in social science (Bryan, Tipton, and Yeager 2021).

3.3 Research Designs

Table 3.1 summarizes the research designs used in the four papers of the dissertation. Below, I outline the research designs used and how they address the methodological challenges discussed above.

3.3.1 Paper 1's Research Design

In Paper 1, I employ three sets of analyses in order to assess the effect of college education on voter turnout. First, I analyze two panel datasets of $N \approx 10,000$ young US voters, each using a well-powered difference-in-differences design. Using the first data set's years as an example, the identification strategy leverages that the panelists both graduated high school and became eligible to vote in 2004, and the survey spanned the 2004 and 2008 presidential elections. This allows me to compare the change in turnout rates from 2004 to 2008 between respon-

Table 3.1: Overview of Research Designs and Data

Study	Research question	Design	Dependent variable	Primary independent variable	Sample	Data source
1	Does college education affect voter turnout?	Comparison of prior studies + panel study	Voter turnout	College education	US cohort panel of $N \approx 10,000$ 9th graders	Longitudinal survey data combined with administrative data on educational enrollment
2	How does college education affect voter turnout?	Regression discontinuity design	Voter turnout	College field of study	Denmark: Population of applicants to tertiary education from 2010 to 2022. $N \approx 80,000$	Danish administrative data on (1) college applications & admissions and (2) municipal and parliamentary voter turnout
3	Do voter mobilization efforts affect inequality in voter turnout?	Randomized field experiment	Voter turnout	An intervention aimed at increasing turnout by appealing to use of voice	Denmark: Population of citizens in City of Aarhus aged 18 to 30 years. $N \approx 90,000$	Administrative data on municipal voter turnout
4	How may gaps in participation translate into gaps in representation?	Conjoint survey experiment	Candidate choice	Candidate education $\times$ voter Education	Representative sample of Danish adults $N \approx 4,000$	Cross-sectional survey data (YouGov)

dents who went to college in this period and respondents who did not. Without a randomly assigned shock to college enrollment, this design relies on the assumption of parallel trends. This assumption requires that college attendees – had they not gone to college – would have experienced the same development over time in voter turnout as non-attendees. The difference-in-differences approach avoids bias from time-invariant effects of both observed and unobserved confounders that are fixed over time (Huntington-Klein 2022). I also address the remaining challenge from dynamic (time-variant) effects of fixed confounders as well as time-varying confounders in various ways. Specifically, I employ covariate-specific time trends, which allow observed fixed covariates to have dynamic effects, and I use a matching approach that also relaxes the assumption of no dynamic effects of fixed covariates (Sant'Anna and Zhao 2020). Finally, the cohort panel allows me, by design, to hold constant a lot of common age, cohort, and maturation effects between treated and untreated respondents. I pay special attention to scrutinizing the identifying assumption of parallel trends in several ways. Importantly, I use the subgroup of panelists who attended college *after* 2008 to perform a placebo test, which indicates that turnout trends from 2004 to 2008 were parallel for future college attendees and future non-attendees. While the design is not perfect, the similarity of results across different models with different assumptions – and across samples – supports a causal interpretation of the results. Finally, if the identifying assumptions are met, these analyses of nationally representative cohorts estimate the average effect of going to college among all college goers in the sample. This constitutes an improvement of external validity compared to estimates of local complier effects (Apfeld et al. 2022a; Berinsky and Lenz 2011; Dee 2004). Second, I use the same research design to test the compensation hypothesis among college goers. Specifically, I test whether college is equally effective in increasing turnout among those who voted before enrolling in college and those who did not. This addresses the heterogeneity challenge outlined in section 3.2.3. In the third set of analyses, I aggregate and compare existing estimates of the causal effect of college education on voter turnout along with their associated statistical uncertainty. I compare the point estimates and confidence intervals of prior studies in conjunction with my own estimates. In relation to this, I conduct a power analysis of each study to assess whether prior insignificant estimates are compatible with the effects I obtain.

3.3.2 Paper 2's Research Design

In Paper 2, I employ a regression discontinuity design (RDD) to elucidate the mechanisms through which college education may impact voter turnout. More specifically, I test the theories of whether specific fields of study are more likely to increase turnout than others. These fields are theorized to be effective due to peer effects and the educational content and skills they provide. The underlying assumption is that we can test the theories by testing field of study as a treatment, even though a field of study is a composite treatment in the sense that fields differ in terms of peer composition and educational content at the same time. Leveraging population data on Danish applicants to tertiary education from 2009 to 2022, I present three main sets of analyses in addition to analyses testing the validity of the research design. The design leverages regression discontinuities in university admissions in Denmark that effectively randomize applicants into different majors. The identifying assumption is that in the absence of an effect of field of study, the outcome (voter turnout) as a function of the running variable (grade point average) would be continuous across the cutoff. Linking population-wide administrative data on college applications and voter turnout, I am able to estimate the causal effect of being admitted to a specific field of study on voter turnout. In particular, I analyze applicants who submitted applications with the same preferred major, but found themselves either slightly above or below the unpredictable grade-point cut-off for their desired field of study. The first set of analyses estimates the effect of field of study on voter turnout. The second set separately estimates these effects in the short vs. the longer run. Under the assumption that peer effects are mainly present in the short run, the short-run analyses constitute a test of the peer effect mechanism. Moreover, allocation effects are not likely in the short run. However, if there are no effects in the longer run, this arguably rejects the allocation mechanism. Finally, I try to close in even further on the mechanisms by estimating the effect of field of study on (1) the peer composition to which students are exposed (using pretreatment turnout as a measure of civic norms) and (2) participants' income later in life to asses underlying assumptions of the socialization and allocation mechanisms respectively.

3.3.3 Paper 3's Research Design

In Paper 3, we study the heterogeneity perspective outlined in section 2.5. We employ a field experiment to estimate the effect of a get-out-the-vote intervention and link information on treatment assignment with

administrative data on voter turnout and background characteristics of participants in order to asses whether the effect of the intervention varied across strata defined by education. Specifically, we conducted a field experiment in the context of a large local government election in Denmark in the fall of 2021. The municipality sent e-letters to the participants ($N = 93,269$) five days before the election.[4] The trial followed a simple between-subject design, with all residents aged between 18 and 30 years with voting rights randomly and evenly allocated to one of three experimental conditions: A control condition or one of two treatments containing treatments of different intensity. In the first treatment group, voters were reminded of the upcoming election and encouraged to voice their opinion. In the second treatment group, the encouragement was combined with a highlighted link to a website where voters could share their opinions. The paper presents three sets of analysis based on the data generated by the field experiment. The first two sets were preregistered, whereas the third set is exploratory. The first set of analyses estimate the average intention-to-treat effect of the two treatments compared to a control group that did not receive an e-letter. The effect is identified under the assumption that the randomization led to the three groups being balanced on all pretreatment variables (Green, McGrath, and Aronow 2013). The second set of analyses estimate whether the effect of the treatment varied across educational groups. This means that we simply interact the treatment variables with the education variable to obtain the estimated effect for each subgroup. We perform two sets of significance tests in this regard: (1) We test whether the joint interaction term is statistically significant. This provides a statistical test of the null hypothesis that effects are equal across educational groups (causal homogeneity). (2) We produce confidence intervals for the causal effect in each of the three educational groups. While test (1) regards a joint claim for all educational groups, the tests in (2) are related to one inferential claim per educational group: "What was the effect of the intervention for this specific group". In terms of statistical power, we subscribe to the view that error rates should be adjusted at the level of the claim (Rubin 2021; Lakens 2022). The third set of analyses are exploratory and aim to elucidate why the treatments impact educational groups differently. We estimate the complier average causal effect (CACE) for each educational group to identify the effect of clicking the link in our treatments. Further-

4. The study received ethical approval from the Internal Review Board at Aarhus University before the intervention. We anticipated no negative effects for participants. The experiment, hypotheses and non-exploratory aspects were preregistered at https://aspredicted.org/XF4_79Y

more, we use data on participants' behavior on the website to compare time spent, words written as well as political efficacy among compliers with different levels of education. This sheds light on some of the potential mechanisms underlying heterogeneity related to attentiveness as political efficacy.

3.3.4 Paper 4's Research Design

In Paper 4, we study a potential way in which an educational gap in voter turnout may translate into an educational gap in political end descriptive representation. We do this by investigating how educational groups differ in their preferences for different candidates in terms of the candidates' educational attainment, qualities as well as their favoritism towards educational groups. We use a conjoint survey experimental design where participants were asked to rate pairs of hypothetical political candidates who differed in terms of their educational attainment. Each respondent was randomly assigned to one of seven information conditions. These conditions varied the amount of information about candidates that was available in addition to education. Table 3.2 illustrates the research design. For instance, the first information condition (the baseline group) receives information about the candidates' education, age, gender and party affiliation. The second group (the competence group) receives the same information and additional information on the candidates' competence. We present three sets of analyses based on this data. The first set regresses overall candidate preference on an indicator for the candidate's educational level to estimate whether voters place a premium on highly educated candidates. In the second set, we interact the education treatment with respondents' educational attainment to test whether educational groups vary in the degree to which they prefer highly educated candidates. If this is the case, then changes in the relative voter turnout between educational groups would alter the descriptive representation of different educational groups. In the third set of analyses, we study the underlying causal mechanisms that may produce the ingroup favoritism that we find in the second set of analyses. As outlined in the section on studying causal mechanisms (cf. section 3.1.2), there are a number of ways to test the implications of causal mediations. Specifically, we hypothesize that voters' preferences for candidates with specific educational levels are due to the fact that information on candidate education is followed by inferences in the voters' minds about the candidate's (1) competence, (2) warmth, (3) policy-related ingroup favoritism and (4) status-related ingroup favoritism. That is, when voters learn about a can-

Table 3.2: Research Design in Paper 4: Varying The Number of Conjoint Attributes Across Respondents

Candidate attributes	1. Baseline group	2. Competence group	3. Warmth group	4. Policy appeal group	5. Group praise group	6. Full info. group	7. Placebo group
Education	✓	✓	✓	✓	✓	✓	✓
Age, gender, party affiliation	✓	✓	✓	✓	✓	✓	✓
Competence		✓				✓	
Warmth			✓			✓	
Policy appeal				✓		✓	
Group praise					✓	✓	
Full information						✓	
Placebo attribute (TV habits)							✓

didate's education, they infer for example how much the candidate will favor their group or how competent they are, which in turn should affect their preference for the candidate.

We test whether candidate education affects voters' perceptions of the candidates on these four dimensions (the effect of X on M). Then we test whether providing information on these dimensions has an effect on preferences (the effect of M on Y). Finally we test whether adding information on the dimensions reduces the effect of education on preferences.

The assumption is that if we observe a reduction in the effect of education when providing additional information (e.g. regarding competence), this means that we can attribute some of the effect of education to inferences made by voters concerning candidates' competence. This is referred to as the eliminated effect approach, as proposed by Acharya, Blackwell, and Sen (2018). In essence, the existence of an eliminated effect (i.e., a reduction in effect) is an necessary empirical implication of mediation. It's crucial to note, however, that a reduction in effect doesn't necessarily imply mediation; it could also stem from an interaction between the treatment and the hypothesized mediator (Acharya, Blackwell, and Sen 2018). In the paper we perform additional analyses to discern whether the eliminated effects we observe are a result of interaction or mediation.

This chapter has outlined the challenges that scholars of education and political behavior face when seeking to perform causal identification and infer from empirics to theories, and it has outlined the specific research designs applied in the papers. Before turning to a chapter on the findings of the individual papers, I discuss two additional methodological topics in the final section of this chapter: case selection as well as measurement and data.

3.4 Case Selection and Measurement

In section 2.1, I discussed the case of college education and the dissertation's focus on a specific subtype of political participation, namely turnout. In this section, I discuss the case selection in terms of the samples and data sets used in the four papers (cf. table 3.1). I also discuss the key issue of measurement, which is closely related to the cases and datasources used. As mentioned earlier in this chapter, studies of causal estimands often face trade-offs between different scientific criteria such as internal validity, generalizability, measurement validity and statistical precision. Below, I highlight some strenghts and weaknesses in terms of these criteria.

3.4.1 Paper 1 - College Effects in the US

Paper 1 focuses on the US case and studies the overall effect – as well as the compensation effect – of going to college on voter turnout. Specifically, I leverage two large cohort panel studies that are part of the US Department of Education program of educational longitudinal studies, specifically the Education Longitudinal Study of 2002 (ELS:2002) and the National Education Longitudinal Study of 1988 (NELS:88). The focus on cohort panel data in the US has some strengths and weaknesses. First, as outlined in section 3.3, the panels have a particular timing that improves the conditions for causal inference. Moreover, a key aspect of this data is that the ELS and NELS datasets were representatively sampled and intensively followed up (Curtin et al. 2002; Ingels et al. 2021). In conjunction with the difference-in-differences design, which yields estimates of the average treatment effect on the treated (ATT) that is representative of all college-goers in the sample, this means that the estimated effects are representative of US college-goers at large in the respective cohorts. A drawback in terms of external and temporal validity is that the estimated effect is rather short term in that it measures voter turnout only 4 years after college enrollment. This means that we may not use the data to generalize for long-term effects. Indeed, the effects are estimated for individuals who may still be in college. Drawing on knowledge on the habitual nature of voting and formative years, we may expect the effects to be somewhat lasting, although the degree to which the rather large estimates will tamper off with time is unknown (Plutzer 2002; Coppock and Green 2016; Gerber, Green, and Shachar 2003). Finally, the ELS:2002 study has a remarkably high retention rate of 77.8% for the full set of survey waves but the sample is not fully rep-

resentative. A final point on external and temporal validity in Paper 1 concerns the part that focuses on the aggregation of prior evidence. An important strength of this comparison of prior and new evidence is that it uses studies from different contexts, including the US, Romania, UK, Denmark and Sweden, as well as different periods and time frames (long and short term). This gives an overview of the evidence for these different cases. It also constitutes a drawback in the sense that the studies become less meta-analytically comparable due to these differing circumstances (Slough and Tyson 2023). This makes a formal meta-analysis less feasible due to the assumptions underlying the formal statistical pooling of the evidence (Slough and Tyson 2023). In terms of measurement, the ELS and NELS provide survey data from 4 waves, which was coupled with objective administrative data on the educational enrollment of respondents at the monthly level. The objective measurement of college education with precision in terms of time allows me to obtain high measurement validity on the treatment status and treatment timing of respondents. The surveys include self-reported turnout. I use the changes in this variable over time as outcome in the study. There are important limitations when using self-reported turnout related to over-reporting and non-response.[5] Specifically, turnout levels in self-reports are likely inflated due to non-response and overreporting (Burden 2000; Bernstein, Chadha, and Montjoy 2001). Although the individual fixed-effects design eliminates precollege differences in overreporting, there is a possibility of a causal effect of college on overreporting, which could bias the estimates in this study upward. I demonstrate that for the study's results to be driven by a college effect on overreporting, it must be larger than the education-based differences in overreporting identified in previous studies (e.g. Hansen and Tyner 2021), *and* attenuation effects (such as differential non-response increasing turnout inflation among non-college-goers) must be zero. The latter, based on prior studies, is also unlikely (Lahtinen et al. 2019; Dahlgaard et al. 2019).

3.4.2 Paper 2: College Mechanisms in Denmark

Like the remaining studies in this dissertation, Paper 2 studies the case of Denmark. Again, the data on this case provides some important advantages for several research criteria. I rely on administrative data on applications, admissions, citizens' background and voter turnout. In terms of statistical power and external validity, this is good news because the data constitutes population data. It also provides advantages in terms of mea-

5. I discuss this in detail in appendix H of Paper 1

surement validity. Specifically, Papers 2 and 3 use Danish administrative data on voter turnout collected in relation to the municipal elections in 2021 and the parliamentary election in 2022 and thus avoid the weaknesses of self-reported turnout outlined above.

Two important aspects of the case selection in Paper 2 are worth highlighting. First, the case of Denmark is arguably not representative of democracies at large. In terms of elections and voting, turnout is generally high in Denmark, and the obstacles to voting are low (Møller Hansen 2020, 2018). For instance, turnout was 84.1% in the 2022 parliamentary election and 67.2% in the 2021 municipal election. Voter registration is automatic, and there is ample opportunity for mail-in voting. Second, the education system in Denmark is quite different compared to other countries. Most tertiary education is public and free, and students receive a transfer income from the state each month. Moreover, those who apply to college are a different stratum of society because the costs of enrollment are low in Denmark. Taken together, these features of the Danish case do limit the external validity. Specifically, we would expect baseline turnout to be lower and the costs of voting to be higher in e.g. the US, which is the case under study in Paper 1. However, these features of the Danish case also control some theoretically relevant variables when we draw inferences about causal mechanisms in education. First, due to the low costs of voting, we can plausibly assume that it is a least likely case for the allocation mechanism to be at play. In other words, time and money do not constitute as big of a prerequisite for voting as in other contexts. I argue that this means that it is, especially in the absence of income effects, more plausible to attribute education effects to the two remaining perspectives, namely socialization and skill and human capital accumulation. Second, the high baseline turnout may give rise to ceiling affects and lower the chances of observing any education effect. In this sense, the case may produce conservative estimates of education effects in other countries.

More generally, the evidence in Paper 2 constitutes causal evidence of the mechanisms in the political effects of education and is in many respects the first of its kind. While, as outlined above, the case selection has some advantages, the evidence is local to compliers in the RD design and confined to the case of Denmark. This means that there are important limitations to the generalizability of the findings. In sum, I argue that the findings in Paper 2 constitute proof of concept for the tested mechanisms rather than a systematic test of their prevalence across different students and different countries. Future studies may investigate similar variation in different cases.

Finally, an important valuable aspect of the local estimates in the case of Paper 2 is that the IV-estimated effects are specific to individuals who barely make it into their preferred field of study. This means that the estimates are highly informative regarding what would occur if policy-makers made incremental changes in the supply of education in different fields of study (Kirkeboen, Leuven, and Mogstad 2016).

3.4.3 Paper 3: Heterogeneous Get-Out-The-Vote Effects in Denmark

Paper 3 uses the case of a Danish municipal election to study how voter mobilization interventions may affect differences in voter turnout between educational groups. The points about measurement validity in administrative data as well as the above discussion of the conditions for electoral participation in Denmark also apply here. Moreover, collaboration with the local government ensured a high degree of ecological validity in the treatments: Specifically, the local government sent out the e-letters encouraging voters to participate, which minimized the experience of being part of a scientific study among participants. A key issue in the context of Paper 3 is external validity. The study tests whether the voter mobilization intervention increased inequality in voter turnout, and it estimates the subgroup effect for each educational subgroup. This makes it key to discuss the external validity of these tests. Do we have reason to expect that other interventions in other contexts would also (1) impact voter groups differently and (2) even demobilize some educational groups? Because we cannot be certain that the results obtained in Paper 3 were not just a statistical fluke or idiosyncratic to the case and treatment materials employed, we argue that future get-out-the-vote studies should both try to prevent such effects and make sure to test for them ex post. This precaution is in line with the important study by Rivera, Hughes, and Gell-Redman (2022), which found a comparable demobilizing effect of email-messages when sent to black and Hispanic voters. We also take some important steps in order to assess whether our results are likely to apply in other settings. Initially, we designed and preregistered our intervention with the aim of making an intervention that provided the necessary requisites for both privileged and less privileged voters to participate. Specifically, our intervention encouraged voters to share their opinions and gave them an opportunity to do this through a channel provided by us. This was exactly to alleviate the concern that some voters would not have the knowledge and resources to do this. Nevertheless, we find that the intervention increases inequality

in turnout. We discuss whether the treatment materials might be especially prone to heterogeneous and negative effects. The literature on get-out-the-vote interventions encompasses a broad spectrum of intervention types, ranging from simple billboard messages to canvassing campaigns that impose relatively high demands on the participation and involvement of respondents. Mobilization efforts with lower demands may be less likely to decrease voter turnout among underrepresented population subgroups. Our preliminary findings on the underlying mechanisms suggest that a more demanding intervention could potentially strengthen a negative self-perception regarding political efficacy. However, upon reviewing existing literature, we find negative effects associated with both more demanding interventions (Nickerson and Rogers 2010, and Paper 3) and less demanding interventions (Rivera, Hughes, and Gell-Redman 2022). Finally and most importantly, we collect public data sets from prior get-out-the-vote interventions that also contain background information on participants. Reanalyzing these data, we conclude that prior studies are not incompatible with the results found in our intervention.

3.4.4 Paper 4: Voter's Preferences for Candidate Education in Denmark

Paper 4 also uses the case of Denmark to study how turnout inequality between educational groups may translate into unequal political and descriptive representation. The study was conducted in the summer of 2023. In Denmark, education has been politically salient in the years leading up to the data collection (ritzau 2021, 2023; Schrøder 2021). Specifically, the social democratic prime minister initiated a reform reducing the average duration of higher education and has emphasized the importance and necessity of improving and growing vocational training. Theoretically, due to the political environment where education policy has featured on the main stage, Denmark may be a most likely case at this time for some of the mechanisms. Specifically, with this agenda, it is likely that people expect that politicians differ in how much they favor, symbolically and policy-wise, different educational groups. Another important issue for generalizability is that the educational system and the population distribution across educational groups are different: In 2021, 38% of the US population above 25 years had a college bachelor or more compared to only 17% in Denmark (US Census Bureau 2021; Statistics Denmark 2020), and more than half of this age group in the US had attended at least some college. Moreover, the large distinct category of medium-length educations in Denmark has implications for the way

citizens may identify with their educational group. Specifically, college-educated Danes may consider themselves a distinct minority group and therefore put more weight on belonging to this group. Finally, the educational distribution in parliament is quite different. 94 and 99% of house and senate members, respectively, in the US hold a college degree or more compared to 55% in the Danish parliament. Thus, lower education voters in Denmark may, first of all, find it more realistic to expect that there are any co-educated candidates available. Furthermore, they may also plausibly expect that some of them are even elected.

Chapter 4
Findings

This chapter summarizes the empirical findings of the four papers. Because each paper thoroughly discusses the results and investigates their robustness, this chapter focuses on the overall findings. Below, I start by summarizing the results presented in Paper 1 and Paper 2, both of which empirically investigate whether and how college education affects voter turnout – that is, they shed light on the selection and causal perspectives. Afterwards, I turn to Paper 3, which investigates how get-out-the-vote interventions affect turnout inequality and thereby tests the heterogeneity perspective. Then, I discuss Paper 4, which investigates how and why educational groups differ in their preferences for educated political candidates and thereby empirically tests how an education gap in turnout may affect political and descriptive representation. In the final section of this chapter, I discuss how the findings in conjunction shed light on the theoretical framework outlined in Chapter 2 and synthesize their implications for the education-voting relationship.

4.1 Papers 1 and 2: Does College Education Affect Voter Turnout and How?

Papers 1 and 2 provide empirical evidence as to whether and how college education affects voter turnout. They explicitly test the causal perspective and contribute with evidence on the degree of selection into education. Thereby, they add to the high-quality body of existing empirical work on the selection perspective.

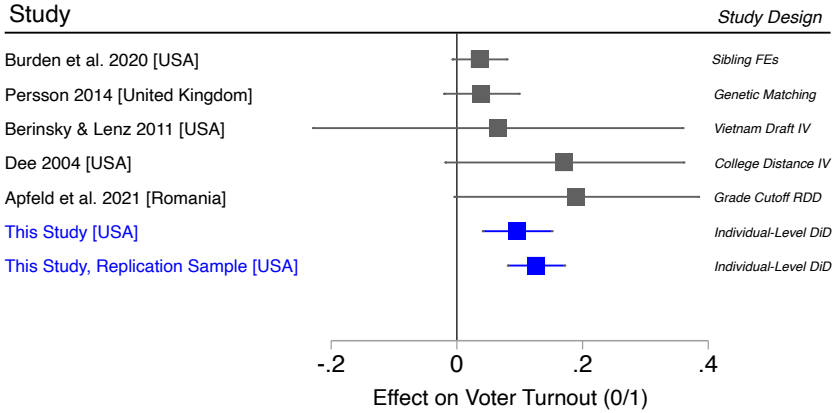
4.1.1 Paper 1: The Causal Effect of College Education on Voter Turnout

In Paper 1, I advance two claims. Specifically, I argue that the selection and causal perspectives are theoretically and empirically compatible,

and that a lack of statistical power in previous studies likely explains the mixed existing evidence. The latter argument means that statistical uncertainty in previous studies is likely to have concealed substantive civic returns to college education. Below, I highlight the two main findings from the paper, backing each of these two claims.

Figure 4.1 compares the estimates and confidence intervals regarding the effect of college on voter turnout from prior studies and Paper 1. The figure clearly shows that the causally credible previous studies are actually compatible with a sizable positive impact of college education. Notably, all prior estimates are positive, and they are centered around the effect size found in this study. Specifically, the study's estimate falls within four of the five confidence intervals of previous studies. Importantly, this is the pattern we would anticipate if college education did have an effect that was concealed by statistical uncertainty in earlier research.

Figure 4.1: Effects of College on Voter Turnout: Comparing New and Prior Estimates



Note: Estimated effects of college education on voter turnout in the literature. Appendix C2 of Paper 1 provides details on the studies, and Appendix C3 compares their statistical power. Appendix C1 displays the similar mixed pattern among studies that have an index of participatory acts as outcome rather than turnout

The remaining analyses in Paper 1 derive estimates of the effect of college education through difference-in-differences analysis of two longitudinal data sets on US high school graduates (cf. section 3.3). Table 4.1 presents

the estimates for the main sample (ELS:2002) obtained through different versions of the difference-in-difference model that vary in terms of the comparison group used and the assumptions they require. Specifically, I compare college-goers with three distinct comparison groups: all untreated respondents (models 1–3), future college-goers (models 4–6, labeled "restricted") and a matched untreated group (models 7–8). Across these models, I consistently observe similar results. I argue that models 4-6 should be our preferred models as they yield the most conservative estimates and arguably improve internal validity the most.[1] In these models, I estimate that attending college leads to an increase in voter turnout ranging between 8.9 and 10.6 percentage points ($p \leq 0.004$). Analyzing the statistical power of the analyses post hoc yields minimum detectable effect sizes between 3.7 and 7.7 percentage points (at 70% power and a 95% confidence level) – a remarkable improvement compared to previous studies. Furthermore, replicating these analyses using an independent sample of 1992 high school graduates produces a similarly sized positive average effect of college (cf. Appendix B of Paper 1).

Moreover, the data used in Paper 1 testifies to the importance of credible causal research designs by providing concrete data on the degree of selection into college education. Indeed, the two groups (college-attendees and non-attendees) defined by the main independent variable of this study do differ substantially on precollege (2004) turnout. Specifically, 2004 non-voters constitute a majority in the untreated group but a minority in the college-going group: In 2004, 61% of respondents who pursued college between 2004 and 2008 turned out to vote compared to only 35% of those who did not attend college.

1. Models 4-6 have the following identifying assumptions: Model 4 compares respondents who go to college at different points in time. Specifically, we assume parallel trends in the absence of treatment when we compare those who go to college between 2004 and 2008 with those who go to college after 2008. The logic is that this restricted comparison group shares more features with the treated group than those who never go to college. Model 5 further relaxes this assumption by controlling for time-varying covariates. This allows trends to differ due to alternative events that are potentially correlated with attending college, such as residential mobility, marital status and crime victimization (Sønderskov et al. 2022; Hansen 2016). Due to potential collider bias, I present the results both with and without post-treatment covariates (Elwert and Winship 2014). Finally, model 6 allows differential trends due to observed pretreatment differences between treated and untreated respondents, which addresses concerns about bias from dynamic effects of fixed covariates (see e.g. Hall and Yoder 2022; Schafer et al. 2022; Hainmueller and Hangartner 2013). These observed differences are cognitive skills, gender, race and parental socioeconomic status. This logic addresses an important threat to identification in this case, namely if precollege differences between college attendees and non-attendees, such as parental resources, led them to differential rates of growth in turnout.

Table 4.1: Difference-in-Differences Estimates of the Effect of College Education on Voter Turnout

	Full Sample			Restricted Untr.Grp.			Matched	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Attended College × Post Period	0.137***	0.130***	0.107***	0.096***	0.106***	0.089**	0.116***	0.101***
	(0.014)	(0.016)	(0.016)	(0.028)	(0.031)	(0.031)	(0.026)	(0.027)
Time FEs & Individual FEs	✓	✓	✓	✓	✓	✓	✓	✓
Pre-college Voting × Time FEs	✓	✓	✓	✓	✓	✓	✓	✓
Time-varying Controls		✓	✓		✓	✓		✓
Additional Pre-college Covariates × Time FEs			✓			✓		
Units	10,426	9,652	9,554	9,360	8,717	8,644	9,289	8,582
Observations	19,813	18,298	18,118	17,842	16,593	16,454	18,578	17,068

Note: Difference-in-differences estimates of how turnout among college-goers changed between the 2004 and 2008 elections compared to turnout among non-attendees. In models 4–6, the untreated group is restricted to untreated respondents who eventually go to college. Models 7–8 use a matched comparison group. Time-varying controls include residential mobility, living with parents, getting married, crime victimization, becoming seriously ill or disabled, job loss, having children, parental divorce, parental job loss, serious illness in the family, parent died, and relative or friend died. All models include time trends that are specific to whether a respondent voted in the precollege election or not. Models 3 and 6 further interact time fixed effects with precollege cognitive skills, gender, race, and parental education and income. OLS estimates with robust standard errors clustered by individual in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Finally, I test the compensation hypothesis that the effect of education is larger among less privileged students as it compensates for a lack of political socialization in the home. I investigate this proposition by formally testing whether the impact of college is greater among students without prior experience with electoral participation. Results show that the effect is approximately 7 percentage points higher $(p \leq 0.025)$ among those who had not previously participated in voting. The analyses in NELS:88 data do not replicate this finding. However, in both the voter and non-voter subgroups across the samples, I identify a substantial positive effect. This observation suggests that we may expect college to have civic returns both in high-turnout and low-turnout populations.

In sum, Paper 1 provides unique panel evidence on the effect of college on voter turnout. Furthermore, the paper synthesizes this evidence with existing studies. The paper finds that attending college increases voter turnout. The findings lend support to the selection perspective and the causal perspective and constitutes a case in point for their mutual compatibility by indicating the simultaneous existence of precollege differences in voter turnout and an independent effect of attending college

among college-goers. Moreover, I show that the identified effect of college is compatible with the statistically uncertain but positive effect estimates produced by previous studies. Thus, the findings help reconcile the ongoing debate regarding whether college education actually influences voter turnout (for a review, see Aarøe et al. 2021; Persson 2015; Willeck and Mendelberg 2022). Specifically, the conflicting nature of existing evidence may be attributed to inadequate statistical power, which likely conceals the civic returns to college education.

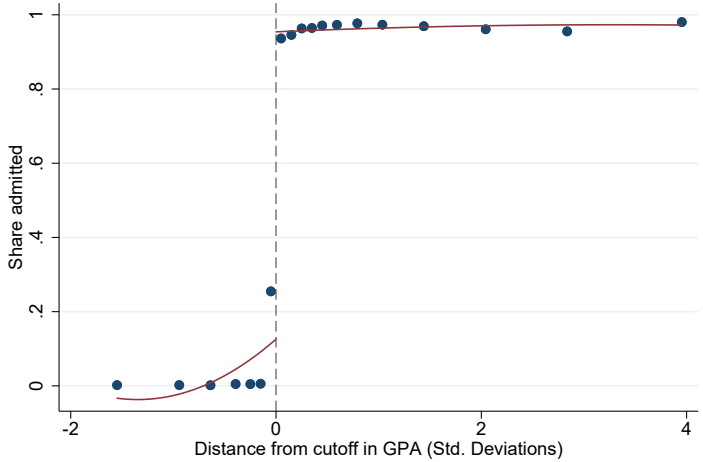
4.1.2 Paper 2: How Does College Education Affect Voter Turnout?

Paper 2 investigates why college education may affect voter turnout by testing implications of different causal mechanisms. In the paper, I make the theoretical claim that we should expect different fields of study in college to have substantively different effects on electoral participation due their differences in educational content, peer composition, and post-college economic returns. Below I highlight the main findings of the paper testing different aspects of this claim.

To briefly reiterate the research design, I use a regression discontinuity in post-secondary admissions to estimate the causal effect of being admitted to a broad field of study on voter turnout. Figure 4.2 shows the first-stage results, i.e. how being above the required grade point average for admission to the preferred field of study affects the probability of enrolling in it. This shows that the cutoff utilized in the RD design increases admission to the preferred field by around 75 percentage points. To estimate the civic returns to different fields of study, I categorize fields of study into four broad groups based on prior work studying the same institutional setup (Gandil and Leuven 2022). These categories are: Humanities, social science, health, and STEM (science, technology, engineering and mathematics).

The first set of results show a significant effect of being admitted to humanities, social science and health among those who prefer these fields. Interestingly, these are the fields associated with the smallest economic returns in the literature as well as the current data (Kirkeboen, Leuven, and Mogstad 2016). Conversely, the evidence suggests that there is virtually no effect on voter turnout of being admitted to the core STEM fields, eventhough they provide substantive economic returns.Figure 4.3 illustrates the identified effects by plotting the degree to which voter turnout changes discontinuously across the cutoff among applicants to each of the four fields of study. The first horizontal panel (a) of Table

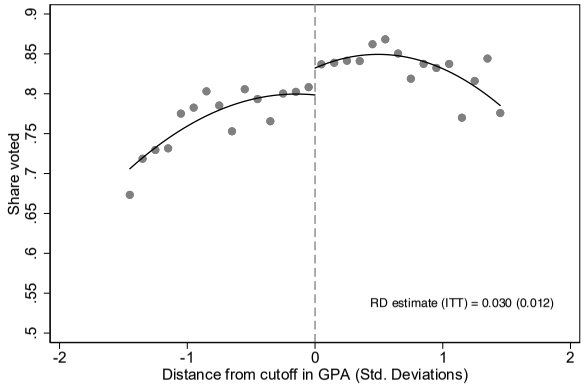
Figure 4.2: Admission Effects for Applicants Crossing the GPA Cutoff to Their Preferred Field of Study



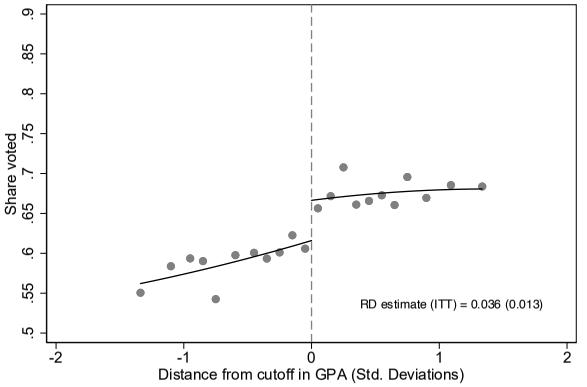
Note: The figure shows the share of applicants who are offered their preferred field of study at different values of the grade point average with which they applied. GPAs are standardized and centered around zero indicating the cutoff for preferred field. The plot shows binned means and a quadratic fit on each side of the cutoff.

4.2 reports the fuzzy RD estimates for each field of study. These estimates take into account the imperfect compliance and thereby denote the estimated effect of being admitted to the field of study among those admitted. In line with the above summary, the table shows a significant effect of being admitted to social science, humanities and health among those admitted, as well as a precisely estimated null effect of being admitted to STEM.

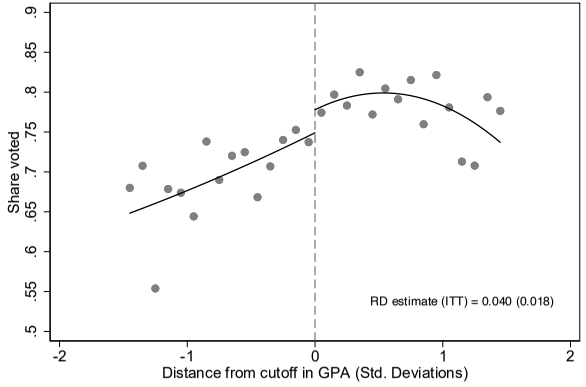
Second, I test the long- vs. short-term validity of these findings. These results are reported in the second (b) and third (c) horizontal panels of table 4.2. I find that the effect of social science and health is prevalent in the short term (boundary is 4 years after enrollment). However, the humanities effect is zero in the short run but significantly positive in the long run. I argue that in order for the human capital accumulation mechanism as well as the allocation mechanism to be at play, we need to see long-term effects. To further test the allocation mechanism, I estimate the effect of admission on income in the long run and find, in line with prior studies, that neither of the three fields that exhibit civic returns has a positive effect on income (Kirkeboen, Leuven, and Mogstad 2016). This



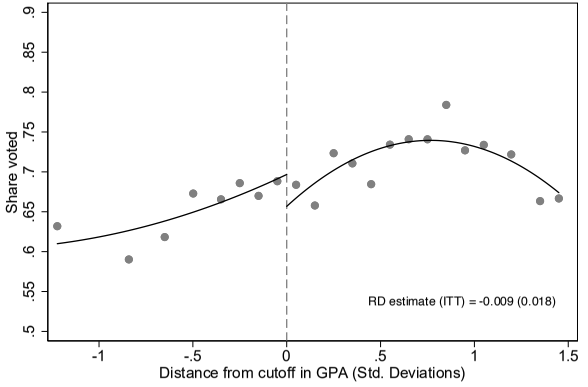
(a) Social Sciences



(b) Health



(c) Humanities



(d) STEM

Figure 4.3: Average Turnout around Admission Cutoffs

The figures plot binned mean voter turnout (circles) for applicants across the running variable (distance from cutoff in GPA standard deviations. Solid lines represent quadratic regressions of turnout on GPA for each side of the cutoff. Panel a uses data from applicants with social science as preferred field of study. Panels b, c, and d use data from applicants with health, humanities and STEM as preferred field of study, respectively.

Table 4.2: Complier Average Causal Effects of Enrollment in Fields of Study on Voter Turnout

	Preferred Field of Study (Subsample)			
	(1) Social Science	(2) Health	(3) Humanities	(4) STEM
(a) All years	0.037*	0.045**	0.050*	-0.011
	(0.015)	(0.016)	(0.022)	(0.022)
Observations	12864	17725	8154	15083
(b) Short Term (Enrollment + 0-4 years)	0.058*	0.083**	-0.001	-0.013
	(0.026)	(0.029)	(0.022)	(0.042)
Observations	3902	5082	1863	5154
(c) Long Term (Enrollment + 5-13 years)	0.028	0.029	0.064*	-0.010
	(0.018)	(0.019)	(0.026)	(0.027)
Observations	8962	12643	6291	9929

Note: Fuzzy RD estimates of the complier average causal effect of enrollment in preferred field of study among those who apply with each field of study as their preferred field. The dependent variable is voter turnout (0/1) in all models. Effect estimates in column (1) pertain to those who apply with social science as preferred field of study and another field as alternative. Each horizontal panel (a-c) estimates the effects for the full set of years, the short term and the long term, respectively. Standard errors in parentheses. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

means that being admitted to these fields, compared to the second-best field for the specific applicant, improved voter turnout but not economic resources.

Finally, I show that being admitted to social science and health increases exposure to participatory norms by six to ten percent (as measured by the average pretreatment turnout among peers) in the short run. This may explain the short-term turnout effect of social science and health, and it corroborates the socialization perspective. Norms were not impacted in the humanities field. The fact that humanities exhibits neither short-term voting effects nor an effect on peer exposure is also consistent with the socialization perspective.

Taken together, the findings provide strong evidence that allocation of economic resources does not explain why field of study affects voter turnout in the Danish case. Moreover, the findings support the notion that a high-participation peer environment is conducive to political par-

ticipation in line with socialization theories of political participation. Finally, the findings are compatible with a human capital explanation of the long-term turnout effect identified among those admitted to humanities, although this mechanism cannot be discerned from alternative explanations other than the allocation and college peer mechanisms.

4.2 Paper 3: Do Voter Mobilization Efforts Affect Inequality in Voter Turnout?

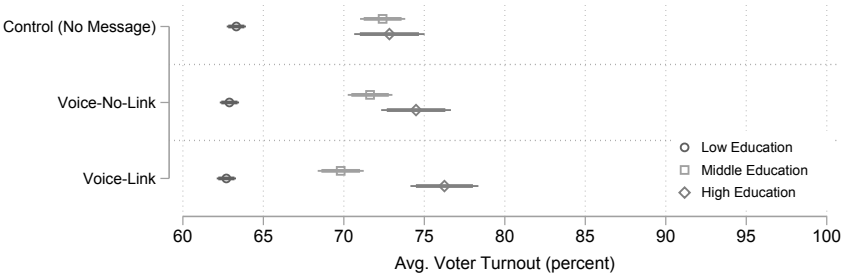
In Paper 3, we conduct an empirical test of the causal heterogeneity assumption underlying the heterogeneity perspective outlined in section 2.5. We use a preregistered field experiment to test whether voter groups defined by different levels of educational attainment vary in the degree to which they benefit from a voter mobilization intervention. As we find both positive and negative subgroup effects, we provide exploratory evidence on why this the case.

Results show that the intervention did not affect voter turnout on average. However, in a preregistered analysis of causal heterogeneity by education, we find that groups defined by educational attainment reacted very differently to the intervention. Figure 4.5 plots the average turnout for each of the three educational groups (low, middle and high) across the three experimental conditions. As captured in the plot, the full treatment (the Voice-Link treatment) had a significant positive effect among highly educated voters (3.4 percentage points) but a significant negative effect among middle education voters (-2.6 percentage points). Finally, the intervention had a precise null effect among voters with low levels of education. These are intention-to-treat effects (ITT). The plot also illustrates that the differential effects widen the gap between the high-education group and the two groups with lower education levels. The joint F-test for the Voice-Link$\times$Education term yields $p < 0.013$ both with and without covariates. This means that we can reject the null hypothesis of causal homogeneity. In contrast to what prior work has found, it is not only that privileged groups are more likely to benefit from interventions; less privileged groups may even be demobilized. To assess whether this finding is likely to be an anomaly or a statistical fluke, we reanalyze data from previous get-out-the-vote studies to assess whether prior studies are compatible with the negative subgroup effects for education- and race-based groups found here and in Rivera, Hughes, and Gell-Redman (2022). We find that most studies do not have data on salient sociodemographic groups, and that four out of five studies containing such data

do not have sufficient statistical power to reject (or detect) negative effects of the size that we find in the new study. However, in the study that does have sufficient statistical power (Nickerson and Rogers 2010), our reanalysis finds a negative effect among black voters similar to that found in Rivera, Hughes, and Gell-Redman (2022). Additionally, the identified interaction coefficients are compatible with the estimates found here. In sum, our evidence lends support to the heterogeneity perspective, and we fail to reject heterogeneity in our reanalysis of prior studies.

Finally, the paper provides some exploratory evidence on the mechanisms that may explain the heterogeneous effects. Generally, we find tentative evidence that the heterogeneity can be explained by differences in attentiveness and self-efficacy in voters with and without college education, which predicts how much they benefit from voter mobilization efforts. In one set of exploratory analyses, we use data on how participants interacted with the webpage to compare how the different educational groups behaved. Here we explore two interesting patterns. First, the low-education group, which had a null subgroup effect, was least likely to click the link, and they spent the least time on the web page. This is in line with the theoretical strand in the heterogeneity perspective arguing that null effects are due to some voters being inattentive to the intervention or hard to reach. Second, we find that ranking the groups in terms of political efficacy corresponds to ranking them in terms of the degree to which they benefit from the interventions. Specifically, the group with a negative treatment effect also had the lowest internal political efficacy among compliers (33% reporting a negative efficacy), whereas the group with a positive treatment effect had the highest internal political efficacy

Figure 4.5: Causal Heterogeneity: Average Voter Turnout by Education and Experimental Condition



Note: Average levels of voter turnout by education and treatment status. Horizontal lines show 90% and 95% confidence intervals.

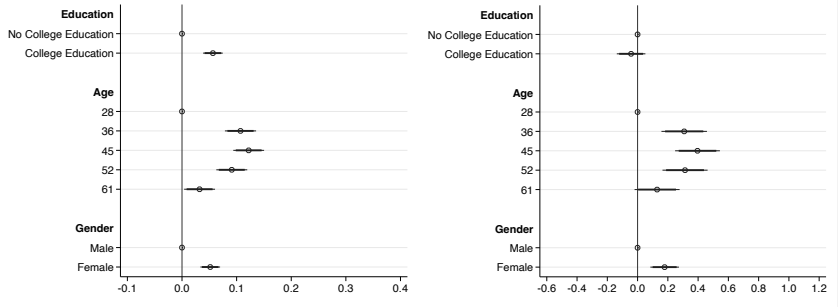
among compliers (only 13% reporting a negative efficacy). We argue that this evidence suggests that negative and positive effects happen when an intervention reinforces voters' negative or positive self-image as capable of participating in politics. In another set of exploratory analyses, we test whether the online channel for voicing (a webpage), which we provided in the full treatment, was the driver of both the positive and the negative effects. When we designed the experiment, we expected that offering the webpage would reduce the costs of voicing and thereby increase the positive effect of the treatment for everyone. In contrast to expectations, we find that the link amplified both positive and negative effects in the respective subgroups.

In sum, the findings in Paper 3 suggest that our intervention did not affect the overall level of turnout. However, this null effect reflected the aggregation of oppositely directed subgroup effects due to significant causal heterogeneity between strata defined by educational attainment. The fact that the intervention significantly increased the gap between highly educated and less educated voters is an example of the heterogeneity explanation of educational gaps where exogenous contextual factors create an educational gap in turnout by affecting educational groups differently. We reanalyze prior studies and are unable to reject that such effects on inequality in turnout – including demobilizing effects – may be present in other interventions with minor average effects in the literature (see also Rivera, Hughes, and Gell-Redman 2022; Bennion and Nickerson 2011). Overall, this suggests that it is crucial to take causal heterogeneity into account when designing get-out-the-vote interventions in the future. Moreover, the findings challenge the assumption in previous studies that failing to motivate hard-to-reach voters is the worst plausible scenario for mass mobilization interventions (Enos 2014; Arceneaux and Nickerson 2009).

4.3 Paper 4: How Voter Preferences For Educated Candidates may Translate Turnout Gaps Into Unequal Representation

Paper 4 advances the claim that voters prefer candidates with the same level of educational attainment as themselves and tests a number of causal mechanisms that may explain this preference. The results have im-

Figure 4.6: Average Marginal Component Effects of Candidate Education on Voter Preference.



Panel A: Forced choice

Panel B: Rating

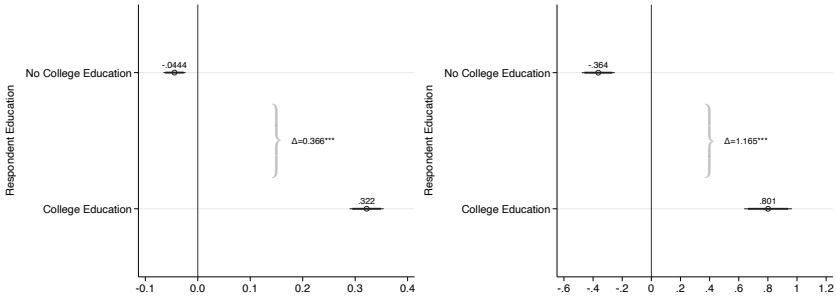
Note: The models are based on the baseline treatment condition. Bars indicate 90 and 95% confidence intervals. N = 11,860.

portant implications for how unequal voter turnout between educational groups may affect representational inequality due to these preferences.

As outlined in section 3.3, Paper 4 presents three main sets of analyses. First, we identify an overall pattern compatible with prior studies, namely that voters on average tend to favor candidates with a college degree. However, we only find an average effect on forced choice preferences and not on the outcome measure where respondents rated their support for candidates on a continuous scale. Figure 4.6 shows the estimated effect of each conjoint attribute in the baseline groups (cf. the information conditions outlined in Table 3.2 of section 3.3). Panel A of the figure shows that the average preference for college-educated candidates is comparable to the effect of candidate gender on the forced choice outcome. However, we do not find an average preference for college-educated candidates using the ratings outcome.

Second, the paper tests whether voters with and voters without a college degree differ in their preferences for educated candidates. Figure 4.7 plots the effect of seeing a college-educated candidate on voter preference, and this effect is plotted separately for voters with no college education (upper estimates) and voters with college education (bottom estimates). Moreover, the difference in effect size (Δ) between the two groups is shown. The results show that the overall advantage of college-educated candidates is driven by the preferences among college-educated voters. Moreover, the individual estimates show that both vot-

Figure 4.7: Average Marginal Component Effects of Candidate Education on Voter Preference across Voter Education Level.



Panel A: Forced choice Panel B: Rating

Note: The models are based on the baseline treatment condition. Bars indicate 90 and 95% confidence intervals. N = 11,860.

ers with and without college education prefer candidates with an educational background similar to their own – i.e. a same-group preference. In the forced choice analyses, we find that the magnitude of this preference is 4.4 percentage points among voters without college education and an astounding 32.2 percentage points among voters with a college degree. The difference in effect size between the two groups is substantial and statistically significant across outcomes.

The third set of analyses provide evidence on the mechanisms underlying the effect of candidate education on voter preferences. We find that inferences about candidate competence, warmth and group appeal explain voters' same-group preferences in terms of education. Specifically, we hypothesize that when voters receive information about a candidate's educational attainment, they make inferences about the candidate's (1) competence, (2) warmth, (3) policy-related ingroup favoritism and (4) status-related ingroup favoritism, which in turn affect favorability. A critical implication of these mechanisms is that the effect of candidate education should be reduced when information on these four dimensions is provided. To test this, we calculate the eliminated effect (i.e. the reduction in effect size resulting from the introduction of additional information) for each mechanism. Table 4.3 reports these estimates for the ratings-based outcome analyses. Whereas we find an average same-group preference of 0.483 scale points (cf. the "Total Effect" column of table 4.3) in the baseline condition, more than 80 percent of this effect is

Table 4.3: Eliminated Effects Across Mediators Among Voters, Ratings.

Mediator	Total effect (AMCE)	Eliminated effect (AMCIE)	Percent eliminated
Competence	0.483***	-0.404**	83.7%
Warmth	0.483***	-0.421**	87.1%
Policy appeal	0.483***	-0.314*	65.1%
Group praise	0.483***	-0.147	30.5%
Full information	0.483***	-0.429**	88.8%

Note: * p ¡ 0.05, ** p ¡ 0.01, *** p ¡ 0.001. For estimates of the eliminated effects, standard errors are clustered at the respondent level.

eliminated when we introduce information on either candidate competence or candidate warmth. Moreover, it is reduced by 65 percent when we provide information on the candidates' policy appeal to different educational groups. This constitutes strong support for the competence, warmth and policy appeal explanations. We do not find support for the status-related group praise mechanism.

In sum, Danish voters prefer candidates who are similar to them in terms of educational attainment. This preference is stronger and more persistent among highly educated voters, which means that on average, less educated candidates face an electoral disadvantage compared to candidates with college education. Both findings about voters' preferences suggest that the relative turnout for voters with and without college education is highly consequential for descriptive representation. Moreover, we find that voters' educational preferences are explained by inferences they make about candidates' policy-related ingroup favoritism as well as competence and warmth. This further corroborates the view that voter preferences and turnout are closely related to unequal political representation. The findings support recent advances indicating that not only the supply of candidates but also voter turnout and preferences cause the over-representation of socioeconomically advantaged candidates (Simon and Turnbull-Dugarte 2023; Bovens and Wille 2017).

4.4 The Findings in Conjunction: Do Education and Interventions Help or Hurt?

The empirical findings in Papers 1-3 shed light on different aspects of the theoretical framework outlined in section 2.6. Paper 4 suggests how unequal turnout matters for other dimensions of political equality. Viewing the findings in conjunction allows us to assess which factors in the framework we may hold responsible for inequality in turnout and representation between educational groups. It also allows us to make conjectures about how policy-makers can mitigate such differences in the future. This section discusses these issues to synthesize the findings of the dissertation.

4.4.1 Persistent Inequality: Education Helps at the Individual Level, But a Skewed Distribution of Education Hurts

Paper 1 elucidates the causal and selection perspectives on educational differences in electoral participation. Specifically, we find that before college entry, college-goers were 26 percentage points more likely to turn out to vote in a presidential election than those who did not go to college. Accordingly, a substantial part of the educational gap in turnout can be ascribed to selection and non-college pre-adult factors. Paper 3 also finds descriptive differences in turnout between voters with and without college education, which have a magnitude of ≈ 10 percentage points. In both cases, the educational gaps are substantial. Moreover, evidence in Papers 1 and 2 supports the causal perspective and theories of a causal college effect, independent of selection into education. This tells us that across empirical cases, the education-based inequality in voter turnout is substantial. Moreover, it shows that citizens who are already likely to vote are over-represented among those who enroll in college, which means that the civic effects of education are also unequally distributed. In this sense, the education system is "part of the problem" in a causal way: The civic returns of college explain part of the turnout gap between socioeconomic groups. To illustrate: If we assume an uneven distribution of education, then it is true that if college did not have a causal effect on turnout – compared to when it does have a causal effect on turnout – the turnout gap between those with and without college education would be smaller, all else equal. On the other hand, the dis-

sertation also points to a counteracting mechanism in the role played by education in these inequalities. First, Paper 1 finds evidence of a compensating effect of college education in the most recent sample (concerning the 2004 and 2008 elections) – that is, going to college increased turnout especially among those without previous experience with political participation. This means that education helps at the individual level. Second, as outlined in the discussion of the concept of education (cf. section 2.1), college education is and has been undergoing a process of mass expansion in recent decades. For instance, the share of US youth who attends college has almost doubled in the last 40 years, resulting in a broadened and diversified student population. With this expansion, less privileged strata of society are increasingly represented among college goers (Stevens, Armstrong, and Arum 2008). Importantly, this group may theoretically, due to the compensation hypothesis, be more prone to the civic benefits of education. In conjunction with the fact that college increases turnout – especially for those who are less likely to vote – the expansion of college uptake highlights the potential that college education can reduce inequalities in electoral participation. In other words, given the starting point of unequal participation, which is partially a consequence of education effects, education is likely to play an inequality-reducing role going forward due to the expansion of college uptake. In sum, a skewed distribution of college enrollment is a part of the problem, but college education will likely be part of the solution to broader socioeconomic inequalities in electoral participation.

4.4.2 External Remedies: Turnout Equality That Can Be Controlled

Paper 3 provides new evidence supporting the heterogeneity perspective on educational differences in voter turnout and compares it to the scarce existing evidence on unequal effects of get-out-the-vote interventions on sociodemographic voter groups. Taken together, the findings from Papers 1-3 illustrate that the three perspectives selection, causality and heterogeneity are mutually compatible and may each explain part of the educational disparities in voter turnout that we observe in the real world. Zooming out, the three papers provide evidence of three broad categories of factors that influence the educational gap in turnout. First, based on prior literature – and the fact that the causal and heterogeneity perspectives do not account for the full difference observed – precollege factors such as genetics, parental transmission and socialization affect turnout inequality. Second, the causal effect of college accounts for a

share of the observed inequality. Third, exogenous interventions that aim to increase voter turnout exert a causal effect on inequality as well. An important observation is that the three categories of factors are manipulable to substantially different degrees – that is, they differ in the extent to which they constitute a potential point of intervention (Watts 2017). It is arguably easier to intervene with a get-out-the-vote intervention than to intervene on parental transmission or genetics. Similarly, it seems disproportionate for policy-makers to expand college education with the sole aim of increasing turnout equality. Accordingly, I argue that the empirical support for the heterogeneity perspective has two important implications as to how turnout inequality may feasibly be mitigated in the future.

The first implication relates to get-out-the-vote interventions specifically. On the one hand, the direct outcome of the get-out-the-vote intervention investigated in this dissertation was not democratically attractive in terms of the distribution of political participation. As in prior studies, it seems that most broad audience turnout interventions skew turnout towards increased inequality (Arceneaux and Nickerson 2009; Enos, Fowler, and Vavreck 2014). On the other hand, interventions have proven to be relatively cheap and feasible and to stimulate turnout in many contexts (Green and Gerber 2019). Both facts make it hard to ignore the potential of such interventions as a feasible means of obtaining higher and more equal rates of participation. At least, the heterogeneity perspective suggests that we should use the framework of causal heterogeneity to thoroughly evaluate this potential. Paper 3 takes some initial steps in mapping out the characteristics that may predict how much voters benefit from a given intervention, pointing towards low internal political efficacy as a proximate factor that may inhibit voter mobilization. It enhances our knowledge about factors that may enable the development of customized interventions aimed at boosting these factors and thereby increasing the chances of successfully mobilizing the social strata that are less likely to vote. Taking causal heterogeneity seriously constitutes the first important step in developing scientific guidance for future interventions (Bryan, Tipton, and Yeager 2021).

The second implication is that if get-out-the-vote interventions impact turnout inequality, then other exogenous and contextual factors may do so as well. The heterogeneity perspective's main point is that voter groups defined by educational attainment have different levels of voter turnout because their sensitivity to turnout-stimulating effects varies. Theoretically, we may therefore expect that if we, for instance, change the ways we conduct elections in a democracy, and these changes af-

fect turnout, then this effect may be different for different educational groups. For instance, changes to voter registration, voter identification, voting age, or the geographic distribution of voting stations are likely to impact voter turnout, and they constitute rather feasible points of intervention (Highton 2004; Hajnal, Lajevardi, and Nielson 2017; Ansolabehere and Konisky 2006; Stiers, Hooghe, and Dassonneville 2020; Dyck and Gimpel 2005; Haspel and Knotts 2005). More importantly, such changes may have different effects on different groups due to variation in their resources and motivation. For instance, reducing the costs of voting may only be effective among individuals with a minimum of motivation to vote. The heterogeneity perspective suggests that it may be fruitful for future research to (1) theoretically and empirically assess the degree to which such changes may have heterogeneous effects across socioeconomic groups and (2) derive implications for how policy-makers may use this knowledge to attain both higher and more equal participation using policies in these areas.

Chapter 5
Conclusion and Discussion

The greatest thing of everything that has been mentioned
for preserving a system of government,
although this is the thing everyone slights,
is providing education in accordance with the system of government.
(Aristotle, n.d.)

How can we explain the differences in electoral participation between educational groups? The four individual articles contained in the dissertation each shed light on this question, building on important prior work (e.g. Persson 2015; Berinsky and Lenz 2011; Condon 2015; Converse 1972; Kam and Palmer 2008; Lindgren, Oskarsson, and Persson 2019; Mendelberg et al. 2021; Neundorf, Niemi, and Smets 2016; Willeck and Mendelberg 2022; Enos, Fowler, and Vavreck 2014). In this final chapter of the summary report, I summarize the key findings and implications of the dissertation, discuss limitations to the findings and point to questions that remain unanswered.

5.1 Key Findings and Contributions

In this dissertation, I have put forward the theoretical argument that in order to understand the empirical relationship between education and electoral participation, we need to take three distinct causal processes into account. Specifically, educational differences may arise due to selection into education (selection), due to the turnout-increasing effects of going to college (causality) or due to contextual factors such as get-out-the-vote interventions that affect turnout differently for different educational groups (heterogeneity). I argue that these three processes of selection, causality and heterogeneity are mutually compatible, and I combine them in a joint framework for explaining educational differences in political participation. The four papers in the dissertation shed light on

different parts of this joint framework and each make their individual contribution.

Paper 1 demonstrates the theoretical and empirical compatibility of the two former perspectives based on unique panel evidence on the causal effect of college education on voter turnout and by synthesizing this evidence with existing studies. It finds a substantial effect of going to college on college-goers across cohorts and groups with different initial propensity to vote. The paper finds that statistical uncertainty in previous studies is likely to have concealed substantive civic returns to college education. Thus, by aggregating prior causally credible studies that use a variety of research designs, the study reconciles the unsettled debate about whether college causes voter turnout or not (Willeck and Mendelberg 2022; Persson 2015; Aarøe et al. 2021). It provides optimism in terms of the broader democratic idea that educational institutions sustain democratic institutions by creating an engaged citizenry (Lipset 1959) and implies that college expansion may reduce inequalities in political participation.

Paper 2 sheds light on the causal mechanisms that may drive the turnout effect of college education and finds that some college fields of study have higher civic returns than others. In contrast to the STEM fields, the fields of social sciences, humanities and health each exert a positive effect on voter turnout among those who apply with those specific fields as their preferred option. In terms of the causal mechanisms, these fields also exhibit the smallest economic returns for students on the margin of admission. The paper thus fails to find evidence of allocation effects, i.e. that turnout increases due to the economic resources brought about by a specific field of study. Moreover, I find that the short-term effects of social science and health are likely attributable to the fact that being admitted to these fields of study substantively increases students' exposure to civic norms of voting. The paper is among the first to produce causally credible evidence that enables us to peek into the black box constituting the causal link between education and voting. Specifically, it lends support to socialization theories of political participation (Finkel and Smith 2011; Highton and Wolfinger 2001; Fieldhouse and Cutts 2021). The findings imply that from the perspective of education policy-makers who control the supply of education in different fields, there may be a trade-off between economic returns and civic returns to education.

Paper 3 shows that different educational groups respond differently to voter mobilization efforts. The results indicate that individuals with higher education are more likely to benefit from such interventions,

further widening the gap in political participation between educational groups. Moreover, voters with mid-level education were actually demobilized by the intervention. We reanalyze prior get-out-the-vote studies to assess whether negative subgroup effects should be considered an anomaly. The results offer a new perspective on the get-out-the-vote literature by showing that small average effects may reflect the aggregation of subgroup effects that are oppositely directed. This further emphasizes that average effects in previous evaluations of get-out-the-vote efforts may have concealed significant causal heterogeneity, which has important implications for democratic elections (Enos, Fowler, and Vavreck 2014; Rivera, Hughes, and Gell-Redman 2022; Arceneaux and Nickerson 2009). More broadly, the study responds to a general call for a heterogeneity revolution in behavioral social science: Designing interventions requires theorizing and testing causal heterogeneity. Finally, the findings have important implications for democratic policy-makers who seek to improve electoral participation. Future interventions should be designed with a view towards identifying groups that may potentially be negatively affected.

Paper 4 moves beyond the antecedents of electoral participation and reveals that Danish citizens, regardless of educational background, tend to favor candidates with similar educational backgrounds. This preference is particularly strong among highly educated voters and suggests that the over-representation of college-educated citizens in voter statistics is a likely contributor to the descriptive over-representation of highly educated groups in elected offices. Furthermore, the study reveals that voters' education-related preferences stem from their inferences about and perceptions of the policy-related in-group favoritism of candidates as well as the competence and warmth of candidates with different levels of education. This further corroborates the view that voter preferences and turnout are closely related to unequal political representation. Both findings support recent advances indicating that the unequal supply of candidates is not the only cause of inequality in descriptive representation; voters' turnout and preferences also contribute to the over-representation of socioeconomically advantaged candidates (Simon and Turnbull-Dugarte 2023; Bovens and Wille 2017; Arceneaux and Vander Wielen 2023). Importantly, Paper 4 provides a theoretical synthesis of and highly credible evidence on the causal mechanisms underlying this demand-side explanation of descriptive representation. The finding that the relative turnout for voters with and without college education is highly consequential for descriptive representation implies that if we care about inequality in descriptive representation, we should care about inequality in electoral

participation. This also means that interventions that improve turnout equality might constitute a way of improving representative equality. Finally, the findings suggest that providing information about candidates, e.g. through voting advice applications, may alter the strength of ingroup preferences and thereby the effect of voter preferences on representation.

5.2 Limitations and Questions Left Unanswered

The contributions and answers in this dissertation carry some limitations and raise new questions to be investigated. This section discusses these limitations and points to avenues for future research.

Papers 1 and 2 zoom in on the causal effect of college education on voter turnout. A key limitation in Paper 1 is that it draws on evidence, both new and prior, that relies on non-experimental variation in education as well as self-reported turnout. The scarcity of random variation in college enrollment means that this literature – put simply – cannot get enough replication studies of the college effect on voter turnout. The assumptions of causal inference in the non-experimental cases are not directly testable, which means that we cannot ascribe decisive weight to an individual study. Therefore, future studies should continue to seek out (quasi-)random shocks that affect college enrollment directly, even though these are rare (Berinsky and Lenz 2011; Apfeld et al. 2022a, 2022b, 2022c). Second, future studies would benefit from using administrative voting data to avoid the limitations of self-reported turnout (cf. section 3.4). More broadly, as Paper 2 illustrates, administrative data on both enrollment and voting may enable comparison of even more restrictive counterfactual groups, further refining causal identification and avoiding non-response and attrition. In terms of external validity, the findings in Paper 1 face an important limitation along the dimension of short- vs. long-term effects. The estimated effects are short-term effects, and we cannot say whether they will decay in the years after college completion. Future work may also investigate effects of college in the longer term where e.g. the important mediator of income would have time to kick in (Marshall 2019).

This dissertation contributes to the body of evidence testing different causal mechanisms of mediation that may produce an effect of college on voter turnout. These contributions constitute initial steps towards opening the ”black box” of education and should be followed up accordingly (Hillygus 2005; Condon 2015). Specifically, I distinguish between the

provision of (1) skills and knowledge, (2) economic resources and (3) a peer environment with a norm of civic engagement. While Paper 3 provides tangible and causally credible evidence that supports the peer socialization mechanism, future studies should attempt to develop strong causal tests of the skills and knowledge mechanism. I do not find that the mechanism of economic allocation is at play in the Danish context, but this mechanism also deserves greater scrutiny in other contexts, ideally with greater costs and obstacles to voting (Schafer et al. 2022). In sum, the paper takes important first steps in producing an empirical basis for the study of education mechanisms. However, due to the local nature of the effect estimates as well as the lack of cross-case comparisons, the findings constitute proof of concept of the tested mechanisms rather than a systematic test of their prevalence across students and countries. Future studies may investigate similar variation in different cases.

Paper 3 finds heterogeneous effects of a voter mobilization intervention, which even entailed a negative subgroup effect demobilizing one of three educational groups. We preregistered an analysis of heterogeneous effects but did not expect a negative subgroup effect. We therefore assess, in a series of steps, whether this finding may constitute an anomaly. While we fail to find support for this objection, it remains a possibility, and therefore a limitation, that the negative subgroup effect reflects a false positive.

Based on this dissertation's theoretical and empirical work on the heterogeneity perspective, I will highlight two potential avenues for future research in this area. First, in order to guide the design of future get-out-the-vote interventions, further research should study the more proximate predictors of heterogeneous as well as negative effects. Paper 3 takes an initial step in pointing towards internal political efficacy in addition to attentiveness as proximate factors that may impact the degree to which individual voters benefit from interventions. Strengthening our knowledge on such factors will enable development of tailored interventions boosting these factors and thereby increase the likelihood that mobilizing benefits are reaped by all social strata, while avoiding assignment of voters to treatments that are expected to harm them.

Second, future research may benefit from broadening the scope of contextual factors which we may hypothesize to reduce turnout inequality (see also section 4.4.2). The get-out-the-vote literature has come a long way, but perhaps we could widen the repertoire of possible interventions further, rethinking the ways in which elections are implemented with the participation of less privileged strata of society in mind (Holbein and Hillygus 2020). Paper 4 tentatively suggests that reforms that

ensure more equal recruitment of political candidates from different societal groups may create a stronger motivation to vote among low education voters (Katz 1997). Political science has a tradition of studying the consequences of different electoral systems and rules (Lijphart 1994; Norris 2004; L. Hill 2006) – the heterogeneity perspective suggests that important insights may be gained from further studying how and why such systems differ in terms of their heterogeneous consequences for participation at the individual level.

Finally, external validity represents a potentially important limitation in Paper 4, which investigates the preferences for educated candidates across voter groups defined by education. As discussed in section 3.4, democratic societies differ substantially in terms of both educational and electoral systems. Importantly, studies finding an ingroup preference among less-educated voters constitute a minority in the literature (Simon and Turnbull-Dugarte 2023). However, education may be on the rise in terms of electoral salience. In any case, there is a need for testing whether the same-group preferences found in this study generalize to other countries.

5.3 Concluding Remarks

In order for a democracy to work, citizens need to participate in it. However, unequal participation between voter groups poses a challenge to democratic representation and legitimacy (Lijphart 1997; Dahl 1989; Putnam, Leonardi, and Nanetti 1993). The unequal political participation between groups defined by educational attainment constituted the starting point for this dissertation. Overall, the dissertation advances our understanding of the education-voting relationship, offering a nuanced understanding of underlying causal patterns and their implications. It underscores the importance of educational institutions in shaping democratic participation, emphasizes the need for careful consideration of causal heterogeneity in voter mobilization efforts and indicates a spillover effect from unequal participation to unequal representation. Overall, the dissertation helps us retrospectively understand the processes that have produced the differences in voter turnout between educational groups that we currently and historically can observe. These insights provide reason for prospective optimism in two ways: First, the findings indicate that college education is likely to reduce inequality in the future. College education is (currently) an unequally distributed resource in democratic societies, but it is indeed a resource by virtue of

its positive effect on turnout at the individual level. This implies that expanding college access to less privileged strata of society is likely to reduce inequalities in turnout. Second, the dissertation highlights that participatory inequality is affected by contextual factors such as get-out-the-vote interventions, which, importantly, have the potential to reduce inequality. Accordingly, they may – perhaps more feasibly than college uptake – be the target of policy-maker interventions seeking to improve electoral equality.

There is indeed more to be learned about why electoral participation differs between educational groups, based on the initial steps taken in this dissertation. However, what more importantly lies ahead seems to be the question what could and should be done about these differences in electoral participation.

English Summary

Participation in elections constitutes a crucial component of democracy. If different voter groups do not participate to the same extent, then this may create important political inequalities and threaten democratic legitimacy. This dissertation investigates how we may understand and explain such divisions in electoral participation between voter groups defined by education. It is a longstanding idea in democratic thought that educational institutions may sustain democratic institutions by producing citizens who participate in democracy. But while differences in electoral participation are substantial, our knowledge of why this is the case remains limited.

The dissertation attempts to advance our understanding of this by comparing and synthesizing three potential causal processes that may give rise to educational differences in electoral participation. Specifically, the educational gap in electoral participation may be due to causal effects of education, selection into education or heterogeneous effects of external factors. I combine these three explanations into a joint theoretical framework of educational differences in electoral participation and scrutinize different aspects of the framework in four self-contained research papers.

In Paper 1, I examine whether college education has a causal effect on voter turnout. Employing unique panel data, I find that going to college leads to a substantial increase in voter turnout among college-goers, and this finding replicates across cohorts and groups with different initial likelihood of voting. Importantly, these findings are compatible with the statistically uncertain but positive estimates of the effect found in previous studies. This provides a new perspective on the education-participation relationship and suggests that statistical uncertainty may have concealed substantive civic effects of college education in prior studies. Importantly, the paper demonstrates that the selection and causation explanations are compatible: It may both be true that college affects turnout and that background factors associated with education do the same.

In Paper 2, I focus on the mechanisms driving the college effect. Specifically, I examine how field of study shapes the impact of educa-

tion on voter turnout. Utilizing variation in field of study from a regression discontinuity in the centralized Danish college admission system, I further scrutinize three potential mechanisms, namely socialization, skill accumulation and allocation of economic resources. Using administrative data on voter turnout, college applications and admissions, I show that humanities, social science and health exert a positive effect on voter turnout among those who prioritize these fields in their application. Furthermore, I find empirical support that short-term effects are likely due to peer effects and exposure to civic norms of voting. Moreover, the fields with the smallest economic returns yield the highest civic returns. The study thus lends support to socialization theories of voter turnout and indicates that there may be a tradeoff between economic returns and civic returns to different fields of study.

Shifting the focus away from the causal effect of education, Paper 3 examines how different educational groups respond to voter mobilization efforts. The paper sheds light on how such efforts may impact different groups differently and thereby change participatory inequality at the aggregate level. Using a field experiment linked with administrative voting and background data, followed by a reanalysis of prior get-out-the-vote studies, we uncover substantial heterogeneity as well as tentative evidence on the risk of demobilizing effects among less privileged groups. Although these findings constitute initial steps, they emphasize the need for careful consideration of causal heterogeneity in voter mobilization efforts. They also highlight how factors that may – more feasibly than education – be intervened on have consequences for electoral equality.

With these insights on the antecedents of education gaps in voter turnout, I examine how these gaps may affect political representation more broadly in Paper 4. Specifically, we investigate the degree to which groups defined by education have different preferences for candidates based on the candidates' educational attainment. Using an augmented conjoint survey experiment varying the kinds of information available among respondents, we show that voters favor candidates with similar educational backgrounds. This same-group preference is particularly strong and persistent among highly educated voters, leading to an average disadvantage for less educated candidates. These findings on voter preferences underscore that the relative turnout for voters with and without college education is consequential for descriptive representation.

Taken together, the dissertation provides a comprehensive investigation of the different causal processes that may create an education gap in voter turnout and showcases the political importance of such gaps. In addition to a retrospective understanding of the education-participation

relationship, the findings provide prospective implications and cautious optimism in two ways: First, the findings lend support to a longstanding democratic ideal by showing that educational institutions sustain democratic institutions by creating an engaged citizenry. This implies that broader college expansion in the future may reduce inequalities in political participation. Second, the dissertation highlights that participatory inequality is affected by contextual factors such as get-out-the-vote interventions. While such interventions risk having adverse effects on participation and inequality, the findings point to potential avenues for investigating how contextual factors may eventually be used to reduce inequality in electoral participation.

The dissertation contributes with a reconciling examination of the causal relationship between college education and voter turnout; a causally credible test of the mechanisms in this effect, specifically the role of peers and economic resources; a new perspective on educational inequality in electoral participation, highlighting and showing the importance of contextual factors that have different effects on different groups; and a novel investigation of how differential turnout between educational groups is likely to impact political representation more broadly. On this basis, the dissertation advances our understanding of the education-voting relationship. While more can be learned about why electoral participation differs between educational groups, the dissertation also highlights that future research has to answer what could and should be done about these differences.

Dansk Resumé

Borgernes deltagelse ved valg udgør en afgørende del af demokratiet. Hvis forskellige vælgergrupper ikke deltager i samme omfang, kan det skabe væsentlige politiske uligheder og udfordre demokratiets legitimitet. Denne afhandling undersøger, hvordan vi kan forstå og forklare forskelle i valgdeltagelsen mellem samfundsgrupper med forskellige uddannelsesniveauer. Store demokratiske tænkere har længe haft den idé, at uddannelsesinstitutioner kan bidrage til og opretholde demokratiske institutioner ved at uddanne borgere, der deltager aktivt i demokratiet. Men selvom uddannelsesbaserede forskelle i valgdeltagelsen er betydelige, ved vi ikke nok om, hvorfor dette er tilfældet.

Denne afhandling forsøger at fremme vores forståelse af dette spørgsmål ved at sammenligne og forene tre potentielle kausale processer, som kan give anledning til, og dermed forklare, uddannnelsesmæssige forskelle i valgdeltagelse. Konkret kan forskellene skyldes en kausal effekt af uddannelse, selektion ind i uddannelse eller heterogene effekter af eksterne faktorer. Jeg kombinerer disse tre forklaringer i en fælles teoretisk ramme med henblik på at forklare uddannellesesmæssige forskelle i valgdeltagelse. Derudover undersøger jeg forskellige aspekter af den samlede teori i fire selvstændige forskningsartikler.

I den første artikel undersøger jeg, om universitetsuddannelse er årsag til øget valgdeltagelse for den enkelte vælger. Ved hjælp af data fra to panelundersøgelser viser jeg, hvordan det at gå på universitetet øger valgdeltagelse blandt universitetsstuderende betydeligt. Jeg genfinder dette resultat på tværs af uddannelsesårgange og grupper, der har vidt forskellig sandsynlighed for at stemme i udgangspunktet. Endnu vigtigere viser jeg, at disse resultater er forenelige med tidligere studier. Årsagen til, at tidligere studier primært finder, at effekten af uddannelse er insignifikant, er, at den statistiske usikkerhed generelt var for stor til at be- eller afkræfte, at der er en effekt. Dette giver et nyt perspektiv på sammenhængen mellem uddannelse og valgdeltagelse, idet resultaterne indikerer, at statistisk usikkerhed muligvis har skjult, at universitetsuddannelse indebærer betydelige demokratiske gevinster.

I den anden artikel fokuserer jeg på mekanismerne bag effekten af universitetsuddannelse. Mere konkret undersøger jeg, om fagområde har betydning for, om uddannelse påvirker valgdeltagelse. Ved at bruge data fra den koordinerede tilmelding til videregående uddannelser i Danmark kan jeg undersøge tre potentielle mekanismer, nemlig socialisering, tilegnelse af viden og færdigheder samt en allokeringsmekanisme, hvor uddannelse fører til øgede økonomiske ressourcer. Specifikt bruger jeg et såkaldt "regression discontinuity design" og viser ved hjælp af registerdata, at humaniora, samfundsvidenskab og sundhedsfag har en positiv effekt på stemmeprocenten blandt dem, der prioriterer disse fagområder i deres ansøgning. Desuden finder jeg empirisk støtte til, at kortsigtede effekter på valgdeltagelse sandsynligvis skyldes gruppeeffekter, hvor studerendes deltagelse smitter af på hinanden. Det er bemærkelsesværdigt, at de fagområder med de mindste økonomiske gevinster generelt har den største effekt på valgdeltagelsen. Resultaterne støtter dermed socialiseringsteorier om valgdeltagelse og indikerer, at der kan være et modsætningsforhold mellem økonomiske gevinster og demokratiske gevinster ved forskellige studieretninger.

Den tredje artikel undersøger, hvordan forskellige uddannelsesgrupper reagerer på indsatser, der forsøger at øge valgdeltagelse. Artiklen belyser, hvordan sådanne indsatser grundlæggende påvirker forskellige grupper forskelligt og dermed kan påvirke den overordnede ulighed i valgdeltagelsen. Artiklen bruger et felteksperiment, hvor vi sammenkobler administrative data om stemmeafgivning og baggrundsoplysninger og følger dette op med at genanalysere tidligere studier af denne type indsats. Samlet set viser artiklen, at virkningen af sådanne indsatser varierer betydeligt med konsekvenser for den samlede ulighed, samt at der er risiko for demobiliserende effekter blandt mindre priviligerede grupper. Selvom vores samlede viden om denne slags effekter fortsat er sparsom, så understreger resultaterne vigtigheden af at tage sådanne heterogene effekter med i overvejelserne, når man designer indsatser med henblik på at forbedre valgdeltagelsen.

I den fjerde og sidste artikel skifter jeg fokus fra årsagerne til ulige valgdeltagelse mellem uddannelsesgrupper til, hvordan disse forskelle kan påvirke politisk repræsentation mere bredt. Konkret undersøger vi, om grupper defineret på baggrund af uddannelse har forskellige præferencer for kandidater baseret på kandidaternes uddannelsesniveau. Ved hjælp af et udvidet såkaldt "conjoint-eksperiment", der varierer de typer af information, der er tilgængelige for deltagerne, viser vi, at vælgere foretrækker kandidater med samme uddannelsesbaggrund som dem selv. Denne indgruppepræference er særlig stærk blandt højtuddannede væl-

gere, hvilket resulterer i, at højtuddannede kandidater overordnet set har en fordel ved stemmeurnerne. Disse resultater understreger, hvordan forskelle i valgdeltagelse mellem vælgere med forskellige uddannelsesniveauer har væsentlig betydning for, hvordan forskellige vælgergrupper bliver repræsenteret i folkevalgte forsamlinger.

Samlet set udgør afhandlingen en omfattende undersøgelse af de forskellige kausalprocesser, der kan skabe uddannelsesbaserede forskelle i valgdeltagelse, og viser, hvordan sådanne forskelle har betydning for politisk repræsentation. Udover at give en bagudrettet forståelse af sammenhængen mellem uddannelse og valgdeltagelse har afhandlingen nogle fremadrettede implikationer, der indebærer forsigtig optimisme på to måder: For det første finder jeg opbakning til et gammelt demokratisk ideal ved at vise, at uddannelsesinstitutioner kan bidrage til og opretholde demokratiske institutioner ved at uddanne borgere, der deltager aktivt i demokratiet. Dette indikerer, at med en videre udbredelse af universitetsuddannelser i befolkningen, så kan uddannelsessystemet i fremtiden bidrage til at at reducere uligheder i politisk deltagelse. For det andet viser afhandlingen, at ulighed i deltagelse påvirkes af kontekstuelle faktorer såsom indsatser med henblik på at øge valgdeltagelsen. Selvom sådanne indsatser risikerer at have utilsigtede negative effekter på deltagelse og ulighed, så peger resultaterne i afhandlingen på, at kontekstuelle faktorer også potentielt kan bruges til i sidste ende at reducere ulighed i valgdeltagelse.

Afhandlingen bidrager med en opklarende og forenende undersøgelse af årsagssammenhængen mellem universitetsuddannelse og valgdeltagelse; en kausalt gyldig test af mekanismerne i denne effekt – konkret hvordan gruppeeffekter og økonomiske ressourcer spiller ind; et nyt perspektiv på uddannelsesbaseret ulighed i valgdeltagelse, der fremhæver og viser vigtigheden af, at kontekstuelle faktorer påvirker forskellige grupper forskelligt; samt en ny undersøgelse af hvordan politisk repræsentation bredere set påvirkes af ulige valgdeltagelse mellem uddannelsesgrupper.

På denne baggrund bidrager afhandlingen til vores forståelse af forholdet mellem uddannelse og politisk deltagelse. Selvom vi stadig kan lære mere om, hvorfor valgdeltagelsen varierer mellem uddannelsesgrupper, så peger denne afhandling på et behov for fremtidig forskning, der besvarer, hvad der kan og bør gøres ved disse forskelle.

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