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**Political Interest, Cognitive Ability and Personality:  
Determinants of Voter Turnout in Britain**

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# Political Interest, Cognitive Ability and Personality: Determinants of Voter Turnout in Britain \*

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## Abstract

This paper uses longitudinal data from the National Cohort Development Study (NCDS) to investigate the determinants of voter turnout in the 1997 British General Election. It introduces measures of cognitive ability and personality into models of electoral participation and finds that firstly, their inclusion reduces the impact of education and secondly, that standard turnout models may be biased by the inclusion of the much used “interest in politics” measure. A bivariate probit model of turnout and interest then shows that individuals with high ability, an aggressive personality and a sense of civic duty are more likely to both turn out to vote and to have an interest in politics.

**Keywords:** Turnout, Education, Ability, Personality

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## 1. Introduction

Electoral participation, also referred to as voter turnout, is one of the most widely studied topics in political science. While the right to vote is universal in advanced democracies not everyone exercises this right and the voluminous literature on voter turnout attempts to gauge both why people vote and what type of people vote. It generally concludes that electoral participation is influenced by the cost of voting, in regards processing information, forming decisions and the going to the polls, and benefits of voting, which are derived from fulfilling a civic duty and the policy benefits from the election outcome. It is well documented that electoral participation is not random and that individuals possessing certain characteristics have a greater propensity to vote, with age, education, political knowledge and civic duty all increasing voter turnout.<sup>1</sup>

Recently these widely accepted relationships have been called into question due to concerns that the associations between variables such as education and political interest on outcomes such as voter turnout may not be causal (see Dee, 2003; Milligan, Moretti and Oreopoulos, 2003; Larcinese, 2002; Dreyer Lassen, 2004). It is argued that the decision to vote and the decision to acquire political information are jointly determined by some common factors. The above studies address this issue by using two-step methods, such as Instrumental Variables, which economists commonly use to deal with such spurious correlations (where it is called “endogeneity bias”). Applications of this approach are few in the political science literature perhaps as the exclusions restrictions that are necessary to estimate the model are often hard to identify. For example, it is very difficult to find a factor which influences political interest, while having no direct impact on voter turnout.

This paper therefore, adopts an alternative approach by seeking to identify the characteristics that drive both outcomes. In one sense this is a standard omitted variable problem, however it is particularly important when theory about the mechanism through which a particular variable works is imprecise. The solution to this problem is to get better data. This present study deals with this issue by using the National Child Development Survey (NCDS), which is a unique longitudinal dataset containing information on a cohort of children born in Britain during the week of

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<sup>1</sup> For a review of the literature on voter turnout see Nie, Junn and Stehlik-Barry (1996).

March 3<sup>rd</sup> to 9<sup>th</sup> in 1958. This rich dataset, which has yet to be used to examine voting behaviour, allows us to include a number of psychological factors measured in childhood that may influence future political behaviour.

The paper develops the existing literature in the following three ways. First, it introduces measures of cognitive ability into voting literature. One of the most consistent relationships in the turnout literature is that of education and electoral participation. Numerous studies have found that higher education has a positive influence on voter turnout (Wolfinger and Rosenstone, 1980; Rosenstone and Hansen, 1993; Nie, Junn and Stehlik-Barry, 1996). Education is believed to increase electoral participation through increasing voters' cognitive skills which in turn enables them to process complex information about the political system and to enhance feelings of civic duty. However, few papers directly use measures of cognitive skills and education may be a poor proxy for them as well as having an independent effect *conditional* on cognitive ability. Recent studies (Dee, 2003; Milligan *et al.*, 2003) however have noted that the relationship between education and turnout may be spurious rather than causal, whereby some unobserved characteristics drives both educational attainment and electoral participation. While a small number of papers have used cognitive ability, these measures are based on tests taken contemporaneously with the voting data (e.g. Luskin, 1993; Verba *et al.* 1995; Nie, Junn and Stehlik-Barry, 1996; Neuman, 1996; Hauser, 2000) and are more likely to reflect *acquired* ability (i.e. influenced by environmental factors such as education and socialisation) rather than *innate* ability. This paper overcomes this problem by including measures of cognitive ability which are taken at age 11. We estimate a series of probit models to analyse the impact on cognitive ability on voter turnout in the 1997 British election and how this in turn affects the relationship between education and electoral participation.

Secondly, this paper introduces measures of personality/temperament into the turnout literature. Several studies have found a direct relationship between personality types and ideological beliefs (Van Hiel, Kossowska and Mervielde, 2000), personality types and political party choice (Caprara, Barbaranelli and Zimbardo, 1999; Schumann, 2002), personality types and volunteering (Elshaug and Metzer, 2001; Carlos *et al.*, 2005) and individual values and voting behaviour (Barnea and Schwartz, 1998). One may argue that personality may also affect electoral participation as it can

influence how voters perceive and process the costs and benefits of voting. In this paper we utilise six measures of personality – Cautious/Impulsive, Moody/Even-tempered, Timid/Aggressive, Flexible/Rigid, Sociable/Withdrawn and Lazy/Hardworking – to examine whether personality has a direct impact on the probability on voting. This innovation is partly a contribution to the growing interest in political psychology but it also directly addresses the omitted variable bias issue discussed above. For example, lazy people are less likely to be educated and are less likely to vote (since it takes effort).

Finally, interest in politics is another consistent determinant of voter turnout. Voters with a greater interest in politics are shown to have higher turnout rates (Verba, Schlozman and Brady, 1995). Being interested in politics significantly reduces the cost of voting, as the voter already possesses information about the political process. In addition political interest may also increase the benefits of voting as such individuals derive greater psychological rewards from voting.<sup>2</sup> In this paper we demonstrate that the observed relationship between interest in politics and voter turnout is problematic and may well not be causal, with interest in politics and participating in elections being jointly determined by some additional factors. We address this by estimating a simultaneous equations model to explain both variables using a bivariate probit regression.

The paper is structured as follows: Section 2 presents an overview of the determinants of turnout and reveals how this paper develops the current literature Sections 2.1, 2.2, 2.3 and 2.4 analyse the relationship between voter turnout and education, ability, personality and political interest, respectively. Section 3 introduces the NCDS data and the methodology employed in the analysis. Section 4 presents the results of the analysis and finally section 5 concludes.

## 2. The Determinants of Voter Turnout

The literature on electoral participation has established a number of key factors that influence voter turnout. This section discusses the impact of education, ability, personality and interest in politics on electoral participation in detail.

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<sup>2</sup> Acevedo and Krueger (2004) in discussing the Voter's Illusion and the Personal Relevance hypotheses argue that individuals vote as they derive psychological benefits from voting.

## 2.1 Education and Turnout

Education is one of the most often cited explanations of electoral participation; individuals with higher education generally have a higher propensity to vote (Campbell, Converse, Miller and Stokes, 1960; Wolfinger and Rosen, 1980; Nie, Junn and Stehlik-Barry, 1996). Education has been shown to affect turnout through various channels. First, it reduces both the cognitive and material costs of voting. Education develops the necessary cognitive skills that help voters to process complex political information, such as deciphering political rhetoric, understanding the issues at stake, and selecting the appropriate candidate/party. It also improves the socio-economic position of individuals which in turn may lead to higher participation as these groups have a greater vested interest in the election outcomes. Education may also instil a sense of civic duty (Wolfinger and Rosenstone, 1980) by fostering democratic values and beliefs and encouraging participation in socially orientated activities. Campbell (2005) shows that turnout is influenced by the civic culture that prevailed in the high school that the individual attended. Education has also been shown to provide individuals with the necessary skills to deal with the bureaucracy of voting (Rosenstone and Hansen, 1993). Finally, education may also increase political interest (Verba, Schlozman and Brady, 1995). Education can therefore serve to both reduce the costs of voting (by providing information resources), while increasing the benefits (through increasing feelings of civic duty).

While the relationship between education and electoral participation is well determined in the empirical literature, the confounding fact that educational attainment in the US and many other established democracies has been increasing while turnout has been in decline has led to a resurgence of studies investigating the link between education and participation. Several recent studies (Dee, 2003; Milligan *et al.*, 2003) have noted that the apparent relationship between education and turnout may not be causal and argue that it rather represents a spurious correlation, whereby some unobserved characteristics drive individuals to both obtain more education and to vote.

Dee (2003) states that the relationship between education and civic participation may reflect unobserved family and community traits or indeed unobservable individual traits. For example, parental socialisation plays an obvious

role, parents who encourage their children to stay in school are also likely to instil a sense of civic duty, promote political interest and encourage voter turnout. Dee's paper attempts to address this potential endogeneity problem by investigating the impact of education on voter turnout and civic engagement using Instrumental Variable (IV) estimation. He uses US state government variation in compulsory schooling laws as instruments, that is these changes act as variables which exogenously change the level of education for some but have no direct effect on turnout. It is found that the instrumental variable estimates on voter participation are twice as big as in the OLS estimates, whereby an additional year of schooling causes a 6% higher probability of voting. However, for the effect of education on membership of/or participation in groups, he finds that the instrumental variable estimates are lower than OLS, with marginal effects falling from around .22 to about .15. This suggests that least squares model over-estimates the impact of education as it is positively correlated with some omitted variable which also has a positive effect on voting.

Milligan *et al.* (2003) analyse the impact of education on turnout and political participation in both the US and the UK using child labour laws and changes in the minimum schooling leaving age as instruments. They find a robust relationship between education and voting in the US but not in the UK. For the most part the use of IV increases or does not change the marginal effect of education on the probability of voting but this depends on whether one conditions on whether individuals are registered to vote. When the US sample is restricted to registered voters the effect of education is significantly reduced.<sup>3</sup>

## 2.2 Ability and Turnout

Both the above studies adopt an instrumental variable technique to account for unobserved characteristics that cause the possible spurious correlation between

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<sup>3</sup> Neither of the above papers present tests for endogeneity. This is important because there is a price to be paid for using IV: much lower precision typically and small sample bias. That education is endogenous in an earnings equation (say) does not imply that it is endogenous with regard to some other outcome and a "good instrument" for education in a wage equation is not necessarily a good one in a turnout equation.

educational attainment and electoral participation, rather than searching for or including such “unobserved” characteristics. A small number of studies (Luskin, 1993; Verba *et al.* 1995; Nie, Junn and Stehlik-Barry, 1996; Neuman, 1996; Hauser, 2000) have attempted to uncover such unobserved traits and question whether the impact of education on civic participation is overstated due to the absence of “cognitive ability” which may affect both educational attainment and electoral participation. Within the human capital literature, models of the returns to education typically find that education may be a proxy for innate or cognitive ability and that including measures of ability reduces the impact of education on earnings.

The use of the term “ability” overlooks what is in fact a set of complex questions which have generated much debate in social sciences and psychology. While this is not the place to rehearse those arguments, one can acknowledge some of the key issues. Firstly, identifying ability with *cognitive* ability assumes that there is no other type or none that is relevant for the question at hand. Some, for example Gardner (1983), have identified other forms of ability which may be important and which are not amenable to conventional psychometric testing (e.g. emotional intelligence). Secondly, even within the orthodox framework of cognitive ability, there is an issue of whether conventional testing does not generate biases due to culture or race for example. This was highlighted by some of the responses to Herrnstein and Murray’s (1994) monograph *The Bell Curve*.<sup>4</sup> Thirdly, in the labour economics literature which has made extensive use of ability data (in various forms), a distinction is made between *acquired* and *innate* ability. While individuals are likely to differ in their innate ability (due to genetic factors), their scores on any tests are likely to be also influenced by the quantity and quality of education in addition to other environmental influences. While collecting data on ability early in an individual’s life minimizes the influence of the environment it is unlikely that it can be eliminated completely.

Which form of ability one should be interested in is an open question. Say one’s theory is that individuals who are better able to process political information are more likely to vote. In that case, perhaps how they obtained that ability is immaterial and hence a measure that reflects both innate and acquired ability is desirable. If one

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<sup>4</sup> For example, Fischer *et al* (1996); Arrow, Bowles & Durlauf (2000).



is simply interested in ability as a fundamental characteristic of an individual – do intrinsically smarter people vote? – then an innate measure of ability is appropriate. Furthermore, acquired ability is likely to be correlated with socio-economic background, education and so on, hence there is a possibility that it will partly reflect these variables to the extent that one does not have perfect (or indeed any) controls for them.

Empirical work investigating the link between ability and electoral turnout is relatively scarce, however several studies have attempted to explore the relationship.<sup>5</sup> Nie *et al.* (1996) argue that education influences “democratic citizenship” by developing a voter’s verbal cognitive proficiency which helps them to understand political arguments and analyse their policy implications. They explicitly state that such verbal ability should have a greater impact on democratic citizenship than mathematical or spatial ability (this will be discussed in more detail later). Both Nie *et al.* (1996) and Verba *et al.* (1995) include measures of verbal ability in their analysis. Using the 1990 Citizens Participation Survey (US) they find that education influences voter participation through affecting the voter economic and social position and through increasing their verbal skills (as measured by a 10-item vocabulary test). Neuman (1996) in a study of 936 respondents from a San Francisco Bay Area Survey also finds that both education and verbal ability (as measured by a 12-item vocabulary test) influences political sophistication, however education has the dominant effect and the ability measures drops out when additional social and psychological variables are included. Hauser (2000) notes however that Newman’s results may be biased as individuals at the extremes of political engagement were over sampled.

These studies assume that verbal ability is an outcome of education and that the causality is uni-directional. One could argue however, that ability may have both a direct and indirect impact on participation. First, ability may influence participation indirectly by affecting education which then increases the voter’s cognitive skills and position in society (Hauser, 2000). Second, ability may also affect participation directly, as regardless of education, children with high ability will become adults with high ability, and such ability will reduce the cost of voting by providing skills which help process political information and make decisions.

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<sup>5</sup> Note that these studies all concern the United States, to date, no study has investigated the link between ability and political behaviour in Europe.

Herrnstein and Murray (1994) controversial work on the importance of intelligence argues that “*education predicts political involvement in America because it is primarily a proxy for cognitive ability*” (pg.253). They test the relationship between cognitive ability and political behaviour using the National Longitudinal Survey of Youth (NLSY), however as this dataset does not include a measure of political participation, they construct and use a middle-class values index. While they do indeed find that middle-class values are related to ability, by omitting education from their analysis their central hypothesis i.e. that ability is a proxy for education, cannot be tested. In addition, their middle-class values construct is not a true measure of political behaviour. Another study by Luskin (1993) uses the 1976 American Election Study to examine the impact on interviewer reported intelligence on political sophistication. It is found that education has no impact on sophistication when the intelligence measure is included, suggesting that the apparent relationship between education and participation may be due to individual traits such as intelligence.

One form of ability that is likely to mediate the effect of education on various forms of civic behaviour, especially voting, is functional literacy since many voluntary and political activities require mastering written documentation. Denny (2003) models the probability of an individual engaging in voluntary activity in around 20, mostly OECD, countries. He shows that the marginal effect of a year’s education on the probability of participation is typically halved when one includes a measure of literacy.

By far the most comprehensive study of ability and civic engagement in the US was conducted by Hauser (2000). Using three datasets (the 1976 American National Election Study, (replicating Luskin, 1993); 1974-1990 General Social Surveys; and the Wisconsin Longitudinal Study) he tests the proposition that education is a proxy for cognitive ability. The measures of ability used include an interviewers rating of intelligence, a verbal ability measure and an ability measure taken prior to leaving high-school. He tests four possible models – 1. The ability/education/participation causal chain whereby the affect of ability on participation is indirect through education, 2. The education/ability/participation causal chain whereby education affects ability and in turn affects participation, 3. Education affects both participation and ability i.e. ability is a proxy for education, and 4. Ability affects both participation and education, i.e. education is a proxy for

ability. While he derives inconclusive results from the ANES data, the GSS and the WLS data reject the proxy hypothesis and accept both models 1 and 3. Hauser therefore concludes that education is not a proxy for ability, as education appears to have a consistent effect on civic engagement even when ability is controlled for. In addition, he states that if one had to make a choice between education and ability, then education is a better predictor.

We propose that the ability variables used by Hauser are unsatisfactory – given that they are measured when voters are either adults or about to finish high-school it is likely that these measures are influenced by years of education. A better measure of ability is one which is taken early enough so that it is unaffected by education and therefore reflects more innate ability. This paper tests the relationship between ability and voter turnout using a measure of cognitive ability that was taken when respondents were 11 years old. Unlike previous studies which only include one component of ability, namely verbal ability, our measure is divided into mathematical, comprehension, verbal and non-verbal ability. We propose that these measures, which are exogenous to education (unlike measures used in previous studies of ability and turnout), can better test both the direct and indirect relationship of ability on electoral participation.

### *2.3 Personality and Turnout*

This paper is concerned with determining the factors which influence the decision to vote. One possible explanation, which has previously gone unexplored in the literature, is the affect of individual personality types on electoral decisions. Recently the economics literature has noted the importance of personality types for earnings, with certain traits, such as conscientiousness and openness having a positive impact on earnings and neuroticism having a negative impact (Mueller and Plug, 2004; Bowles *at al.* 2001; Nyhus and Pons, 2002; Heckman, 2000). In addition, there is an evolving literature which finds that personality plays a major role in the formation of ideology and in determining political party affiliation (Caprara, Barbaranelli and Zimbardo, 1999; Caprara and Zimbardo, 2004; Schumann, 2002; Van Hiel, Kossowska and Mervielde, 2000; Van Hiel, Mervielde Fruyt, 2004). Caprara *et al.* (1999) find that centre-right voters in Italy tend to display more energy

and conscientiousness compared to centre-left voters who display greater agreeableness and openness. Van Hiel, Kossowska and Mervielde (2000) analyse personality and ideology in Belgium and Poland. They find a negative and strong relationship between openness and right-wing ideology in Belgium and a weakly negative relationship in Poland. However, the relationship was not replicated in a sample of political party members. Van Hiel, Mervielde and De Fruyt (2004) in an examination of right-wing ideology and maladjustment personality types, finds that neuroticism and disagreeableness are unrelated to right-wing ideology, while there is a positive relationship between compulsiveness and openness. The general consensus in the literature is that there is a negative relationship between openness to experience and conservatism (Trapnell, 1994; Riemann *et al.* 1993; McCrae, 1996).

Several studies have also found a relationship between personality types and volunteering, whereby individuals possessing certain personality traits have a greater tendency to participate in volunteering. Elshaug and Metzger (2001) examine the differences between the personality traits of volunteers and paid workers in Australia using the 5-factor model of personality. They find that extraversion and agreeableness typify volunteering personalities. Extroverts engage in more volunteering activities than introverts as they are friendly people who form close attachments with others and experience many positive emotions. While those with agreeable personalities, who score high on measures of altruism and tendermindedness, participate in volunteering due to their sympathetic and empathetic characters. Similar results were found in Carlos *et al.* (2005), which examines the impact of agreeableness, extraversion and prosocial value motivations on volunteering. They note that agreeable people are altruistic, straight-forward, trusting, soft-hearted, modest and compliant, and that such characteristics are conducive to volunteering. Likewise, as extroverts are sociable, assertive, gregarious, display positive emotions and warmth, they are more likely to engage in social interactions. Carlos *et al.* find both a direct and indirect effect (mediated through prosocial value motivation) of personality on volunteering. While volunteering differs from electoral participation they are both forms of social capital, however it should be noted that the personality traits that encourage volunteering and turnout may differ, for example, as voting is a personal and private act one would not necessarily expect extroversion, which favours social interactions, to affect the propensity to turnout.

A study by Fowler (2004) finds that patience may be another influential personality trait in regards turnout. He argues and demonstrates that as voters bear the cost of participation i.e., both before and on election day, before they see its effects then patience individuals who place more value on the future benefits of participation will turnout to vote, while impatient individuals who place greater value on the costs of participation will abstain from voting. Bizer *et al.* (2004) find that the personality trait known as the “Need to Evaluate”, which measure the extent to which people spontaneously evaluate objects or experiences as either good or bad, has a positive influence on voter turnout. Therefore, individuals who evaluate political candidates and issues have a greater propensity to vote as holding such evaluations, either positive or negative, drives people to vote either to help or hinder the candidates electoral chances.

While the link between personality and ideology or voting behaviour is quite logical, such that political parties consist of a group of individuals who portray certain personalities, values and beliefs which may appeal to certain voters, the link between personality and voter turnout is less obvious. As seen above, individuals possessing certain characteristics, such as a sense of civic duty and higher ability, are more likely to turnout to vote, it is therefore possible that personality types may also play a role through affecting how voters perceive the costs and benefits of voting. For example, individuals with greater energy and conscientiousness may be more likely to turnout to vote than individuals who are lethargic and careless. In this paper we introduce six new measures of personality into the turnout literature. The majority of the above studies use the classic “Five-Factor” Model which Van Hiel *et al.* (2000) describes as “*a dimensional representation of personality structures referring to Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to experience*” (pg. 742). There is a large debate within psychology on the adequacy of this and other models of personality and the relationship between these “broad” constructs and “narrow” personality traits.<sup>6</sup>

The NCDS includes six “narrow” measures of personality which were reported by the individual’s teachers at the age of 16. Each personality trait is measured on a scale of 1 to 5 and include the following – Cautious/Impulsive,

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<sup>6</sup> For example, Lounsbury *et al.* (2005).

Moody/Even-Tempered, Timid/Aggressive, Flexible/Rigid, Sociable/Withdrawn and Lazy/Hardworking. While the personality studies above generally use contemporary personality measures taken from adults, an earlier personality measure is desirable. A contemporaneous measure is likely to reflect both an individual's underlying personality and more idiosyncratic attitudes and life experiences, for example dissatisfaction with the current political environment. An earlier measure will abstract from these short term factors. On the other hand, individual's personalities are subject to change over time (see Srivastava *et al.* 2003).<sup>7</sup> Therefore if any of these early personality measures predict voter turnout, it provides more striking evidence in favour of the proposition that personality matters. Studies by Alford, Funk and Hibbing (2005a, b) use data on monozygotic and dizygotic twins dataset to examine the impact of genetics on political attitudes. They find that both political orientations and personality are highly inheritable, therefore the age at which personality is measured may not matter.

#### *2.4 Political Interest and Turnout*

Another common explanation capturing variations in turnout rates is interest in politics. Numerous studies have found a positive relationship between political interest and electoral participation (Verba, Schlozmann and Brady, 1995; Parry, Moyser and Day, 1992). The theoretical and empirical literature have identified two main reasons why interest in politics may affect turnout. First, people with a high interest in politics are likely to possess more information about the political system, this in turn lowers the cost of voting and therefore increases the probability of voting. Second, Feddersen and Pesendorfer (1996) develop a game-theoretic model of voting to show that it can be optimal for an uninformed voter to abstain from voting even if they care about the outcome of the election, as by abstaining they defer the decision to the informed voters who, by definition, should vote for the correct policy. Another theoretical model developed by Matsusanka (1995) demonstrates how the decision to vote depends on how confident a voter feels about their choice – if the voter believes their choice of party/candidate is correct then they derive a higher utility from voting.

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<sup>7</sup> However there is a substantial body of evidence pointing to stability of personality over time though less so among younger adults, see Johnson, McGue and Krueger (2005) for example.

Therefore an individual with a greater interest in politics may believe that their choice is more informed which will increase their utility from voting i.e. the benefits, and hence their probability voting.

Two recent studies by Larcinese (2002) and Dreyer Lassen (2004) question the apparent causal relationship between political information and voter turnout. They propose that political information is endogenous, whereby the decisions to vote and the decision to seek out political information are related. In regards the British context Larcinese (2002) addresses the endogeneity problem by using several variables, including readership of quality newspapers, constituency-level BBC coverage on election night, constituency-level media coverage in the Guardian and constituency-level “big-shot politicians, to instrument political knowledge/information. Political knowledge was measured using true/false tests of the British political system and questions concerning candidates. Both the logit and Instrumental Variable logit models suggest that information is important for turnout, although its significance is reduced in the IV model. Dreyer Lassen (2004) also shows that information is endogenous and that there is a causal effect of being informed on the propensity to vote using a Danish natural experiment referendum on decentralization, where a random sample of the electorate was exogenously informed.

While these studies deal with political information, a similar result may evolve using political interest. Tilley, Sturgis and Allum (2004) investigate the link between political knowledge and political interest in Britain and find a uni-directional effect from interest to knowledge, whereby greater interest in politics leads to greater knowledge about political issues and the causality does not run in the opposite direction. Therefore, it is likely that political interest and turnout could also be jointly determined. Indeed, a study by Fowler (2004) which analyses the effect of “patience” on voter turnout also argues that political interest may not cause turnout. He demonstrates that patience is related to both political interest and turnout, however when both are included in a turnout model, only the patience measure is significant, suggesting that political interest is a proxy for patience. This paper proposes that political interest and voter turnout are both constructs of the same measure and therefore that neither determines the other. For this reason we estimate the determinants of both outcomes.

### 3. Data & Methodology

#### 3.1 Data

Our analysis is based on the 1958 National Child Development Study (NCDS). This is a longitudinal study of all persons living in Great Britain who were born between 3<sup>rd</sup> and 9<sup>th</sup> of March 1958. The 1958 perinatal mortality survey has been followed by 6 subsequent waves (NCDS 1-6) at ages 7, 11, 16, 23, 33 and the most recent, at ages 41-42. NCDS 1-3 comprised of interviews with the child, his parent's, his school and the report of a medical examiner. This data is an exceptionally rich source on child development from birth to early adolescence, child care, medical care, health, physical statistics, home environment, educational progress, parental involvement, cognitive and social growth, family relationships, etc. NCDS 4-6 is based largely on interviews with the cohort member and his/her partner. They document economic activity, income, training, housing as well as the development of the cohort member's own family.

The last three waves also collected data on the political behaviour of the cohort, including past electoral participation, party alignment, vote choice and voting intentions. The fourth follow-up, conducted in 1981 when the cohort were aged 23, collected information on the 1979 general election; the fifth follow-up conducted in 1991 when the cohorts were 33, collected information on the 1987 general election; and finally the 1999/2000 follow-up, conducted when the cohorts were aged 41/42, collected information on the 1997 general election. The primary variable of interest in this study is voter turnout in the 1997 election and it is based on responses to the following question: "*Did you vote in the last General Election in May 1997?*".<sup>8</sup> In total, 79.6% of respondents in our sample (4,668) stated they did vote in the election. This is somewhat above the national aggregate turnout rate of 71%. This difference is somewhat less than is frequently found in other studies of individual turnout where participation is generally overestimated. Turnout may be overstated in survey data for several reasons, for example, respondents may misreport their turnout as they are

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<sup>8</sup> While the NCDS dataset contains information on the voting behaviour of the cohort overtime, we focus on the 1997 British general election as it experienced the lowest turnout in the post-war period of 71% (turnout continued to fall in the 2001 election where only 59.4% of the electorate voted). British electoral participation until recent years has been high compared to other advanced democracies, according to Clarke *et al.* (2002) average turnout in Britain between 1945 until 1997 has been 76%.



embarrassed about not fulfilling their civic duty, in addition, abstainers are less likely than voters to participate in surveys (Heath and Taylor, 1999). The low level of misreporting in our sample is in line with Swaddle and Heath (1989) findings that the 25-44 age group are less likely to misreport compared to other age groups. However, since the sample here is a particular age cohort (39 at the time of the election) there is no guarantee that it will reflect overall aggregate turnout. Our data also suggests the cohort is somewhat consistent in their electoral participation, with 79.69% voting in the 1987 election. If the respondents stated they did vote in the election, they are then asked which political party they voted for. The number of respondents reporting their actual vote choice in the 1997 election is somewhat lower (3,636) than those reporting turnout, however of these, 51.35% voted Labour, 29.43% voted Conservative and 14.25% voted for the Liberal Democrats. The survey also gauges voting intention by asking which political party the respondent would vote for if a general election were held the next day.

In order to investigate the determinants of electoral participation we include a number of explanatory variables, some of which are standard in the literature i.e. sex, education, and dummy variables for whether the individual is married, a union member or self employed. Two separate measures of education are included. The first is the year at which the respondent left full-time education. Table 1, which provides the descriptive statistics of the data, shows that the average school-leaving age was 17. The second educational measure is a dummy variable indicating whether the respondent stayed on beyond the minimum school leaving age of 16 – only about 40% did in this sample. As previous research has identified a relationship between turnout and the voter's social background in Britain (Parry *et al.* 1992; Crewe, 1981) we also include a categorical variable representing parental social class in 1958 (i.e. at birth). While we could have used this to generate a set of dummy variables, we found that treating it as a continuous variable was satisfactory in that the estimated parameters of

interest were invariant to this choice.<sup>9</sup> In addition, a set of 11 regional dummies at the level of standard economic regions is included.<sup>10</sup>

We also include a measure of the respondent's interest in politics. It is based on responses to the following question which was asked in the sixth follow-up in 2000: "*How interested would you say you are in politics?*" Table 1 shows that 43% of our sample stated they were interested in politics. Additionally, to capture the respondent's sense of civic duty we include a dummy variable indicating 1 if they are a member of one of the following organisations: political party, environmental charity/voluntary groups, other charity/voluntary groups, women's group, townswomen guild/women's institute, parents/school organisation, tenants/residents association. Overall, only 19% of our sample is a member of a voluntary organisation/group.<sup>11</sup> We also incorporate a number of variables which are not standard in the turnout literature; these include measures of cognitive ability and personality.

The measure of cognitive ability is based on the first principal component from four abilities measures: mathematics, comprehension, verbal and non-verbal abilities. These are based on tests administered when the individuals were 11 years old. In the estimated models, all four variables and the aggregate measure are standardised to have a mean of zero and a standard deviation of one. The NCDS includes six personality variables which are measured on a scale of 1 to 5. A value of 5 corresponds to the highest level of the characteristic given. The individual's teacher made these evaluations when the respondents were 16 years old.

### 3.2 Methods

The statistical methods used in this paper are for the most part standard in the literature. The initial estimates reported in Table 2 use probit to model the individual's

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<sup>9</sup> The parental class variable is based on seven categories, ranging from Professional, Intermediate, Skilled non-manual, Skilled manual, Semi-skilled non-manual, Semi-skilled manual and Unskilled manual. The original variable was recoded such that higher values represent a higher social class. Note that this scale does not separately report the self-employed.

<sup>10</sup> While the literature on party choice in Britain often explicitly examines regional effects (e.g. McMahon, Heath, Harrop and Curtice, 1992), due to the historical dominance of certain parties in particular regions, in this paper we abstract from this issue and hence do not report the coefficients on the regional dummies.

<sup>11</sup> We use this measure as a proxy for civic duty as the more standard measures of civic duty, which typically include attitudes towards voting, are not available.

probability of voting. Rather than reporting the probit coefficients which only provide informative about the sign and the effect of the variable, the tables report the marginal effects: To recap: in a probit it is assumed that the probability of a “success” ( $y=1$ ) is

$$\Pr(y = 1) = F(\beta X) \quad (1)$$

where  $F$  is the cumulative normal distribution and  $\beta$  is 1 by  $k$  vector of the parameters to be estimated and  $X$  is a matrix of  $n$  observations on  $k$  variables (including a constant). The estimated marginal effect of a small change in the  $i$ 'th (continuous) variable in  $X$  on the probability of a success is:

$$\frac{\partial P(y = 1)}{\partial X_i} = \hat{\beta}_i \cdot f(\hat{\beta} X) \quad (2)$$

where  $\hat{\beta}$  are the maximum likelihood estimates of  $\beta$  and  $f(\cdot)$  is the normal density function.<sup>12</sup> Since this varies from observation to observation, the convention is either to evaluate at particular values of the  $X$ 's (such as the means) or to estimate at all observations and then take the mean of the marginal effects. The latter is obviously computationally more intensive. In many cases (including this paper) the two approaches yield very similar results. This paper presents marginal effects at the means.<sup>13</sup> The standard errors reported are asymptotic and are calculated using the delta method (see Wooldridge (2002) pp 406-407 for example).

The second set of results consists of estimating a bivariate probit model i.e. two simultaneous probits assuming the disturbance terms to be bivariate normally distributed. The two outcomes are turnout and whether individuals report being interested in politics. One can test for whether the disturbance terms are correlated processes. The sign of the correlation indicates whether, conditional on observables, unobserved heterogeneity is associated with respondents being more likely to have the same or different outcomes. As with the first set of results, we report marginal effects.

#### 4. Results

In Table 2 we present a sequence of models estimating the determinants of voter turnout. The first column shows a fairly conventional model of turnout focusing on the educational and demographic determinants, in addition to measures of civic

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<sup>12</sup> The extension to where the  $X$  variable is discrete (e.g. a dummy variable) is straightforward.

<sup>13</sup> Using the “dprobit” routine in Stata 9.

duty and political interest. The former has a large and well determined coefficient: an individual who reports an interest in politics is about 18% more likely to vote than otherwise. This is a multiple of any of the other estimated coefficients, and confirms previous work by Sabucedo and Cramer (1991), Clarke *et al.* (2002) who note the importance of political interest for voter turnout in the British context. Civic duty also has positive and significant impact, such that being a member of a voluntary organisation/group increases the probability of voting by 5.5%. Clarke *et al.* (2002) and Butler and Stokes (1971) also find that civic duty is one of the most powerful predictors of voter turnout in Britain.

The effect of education on turnout is non-linear: anyone who stays on beyond the minimum school leaving age is 3% more likely to vote than one who does not. Each additional year of education increases the probability of voting by 0.3%, that is, the marginal effect of education is less than the average effect. Typically, turnout models only include one educational measure so they fail to capture this non-linear effect.

Being married also increases the probability of voting by 6.1%. Married individuals may be more likely to vote if they perceive they have a greater stake in their community's future, for example, if they have children. Alternatively it could reflect unobserved heterogeneity: the type of people who get married are also the sort of people who are more likely to vote, for example, people who have higher levels of commitment to others or empathy. In addition, being male also reduces the probability of voting by about 4%, therefore confirming previous research which finds a gender gap in turnout. Pattie and Johnston (2001) note that since the 1979 election, women are more likely to vote than men in Britain, however their empirical analysis of the 1997 election using the British Election Survey does not confirm this hypothesis.

Model 1 also replicates the standard finding in the literature that union membership increases the probability of voting. Union members are typically more politicised. More specifically, the trade union movement has close connections with the Labour Party. Since the 1997 election followed 18 years of Conservative government, which had been unsympathetic to organised labour, it is not surprising that union members turned out in numbers, being almost 5% more likely to vote. Self employed workers are less likely to vote since there is a higher cost to voting – the opportunity cost of their time. While our measure of parental social class is simple, it

shows that those from higher socio-economic background are slightly more likely to turnout. This is in line with the findings of Crewe *et al.* (1977) and Crewe (1981) that the middle-class show higher participation rates than the lower classes.

The second specification takes model 1 and augments it by adding the six personality measures and the cognitive ability variable. Cognitive ability has a weakly significant effect on turnout; a one standard deviation increase in ability increases the probability of voting by 1.2%. Of the personality measures, only two are statistically significant. Individuals who are hardworking (as opposed to lazy) and who are even-tempered (as opposed to moody) are a little over 1% more likely to vote. One would expect that individuals with a predisposition towards laziness are less likely to vote than hardworking individuals since voting requires effort.

The interpretation of the “moody/even-tempered” variable is less obvious. While a literal interpretation of this continuum refers to the *variance* of one’s disposition around some mean, in common practice it seems to be frequently used as a statement about the *mean* i.e. moody people are usually in a bad mood and even-tempered people are of a generally happier disposition. The two interpretations are not necessarily independent or mutually exclusive. One person’s appraisal of someone else’s mood is likely to be asymmetric between good and bad moods. If one notices bad moods more than good moods (for example if the former are associated with anti-social behaviour) then a higher variance may be perceived as a worse mood on average – this “negativity bias” has been well documented in the psychology literature.

In the literal interpretation, it is arguable that even-tempered individuals have a greater tendency to vote than moody individuals, as they are more emotionally stable, and therefore more likely to engage in normal socially acceptable behaviour such as voting. It is less clear what to expect with the alternative interpretation however typically bad moods makes people less sociable and probably less likely to be altruistic. The only comparable finding in this area that we are aware of is Caprara *et al.* (1999) who find that emotional stability has no impact on support for political parties.

Including the personality and cognitive ability measures in model 2 significantly reduces the size of the two education coefficients. While both educational measures fail to reach conventional levels of statistical significance, they

are jointly statistically significant ( $p$  value=0.02). One might have expected that the reduced education effect is due to the inclusion of the cognitive ability measure, however this is not wholly the case. By including cognitive ability without the personality variables and vice versa it is clear that both the personality variables and the cognitive ability measure are driving this effect. The remaining socio-economic variables do not greatly differ from model 1.

As discussed in section 2.3, the positive association between political interest and turnout is unlikely to be causal as they are both reflections of the same underlying construct. That is, some people are more politicised than others and are therefore both more likely to vote and to express an interest in politics. In short, we would argue that the relationship between political interest and turnout in models 1 and 2 is largely non-causal. For this reason, the political interest variable is excluded in model 3. This specification generates several notable differences from the previous model. Firstly, the impact of cognitive ability has increased and is now significant at the 1% level. In effect the impact of an exogenous variable (ability) was being swamped by the inclusion of a variable which is correlated with it but is spuriously correlated with the outcome of interest (turnout). We demonstrate this further in Table 3.

The exclusion of the political interest variable also has an impact on the personality measures. While the hardworking and even-tempered measures remain much the same, there is now a positive and significant relationship between the aggressive measure and turnout. Since the variable is on a scale of 1 to 5, this implies that the most aggressive individual is roughly 8% ( $4 \times .02$ ) more likely to vote than the least aggressive (most timid) individual.

That aggression matters would come as no surprise to some: for Freud, aggression and sexual desire were the two fundamental driving forces in humans, though what this predicts for turnout is unclear. More recently – and more scientifically, Lorenz (1963) emphasized the biological bias of human aggression as being one of several instincts central to the survival of the species. This view has been widely criticized for omitting any cultural or social influences on behaviour and interactions between the environment and an individual's disposition. The implication, intended or otherwise, that warfare and conflict was in some sense innate to mankind has drawn a severe reaction and there are numerous alternative theories. Whatever the underlying mechanism for aggression it seems very plausible that

aggressive people are more likely to vote since it is one route to getting ones own way. To invert Clausewitz's famous dictum, "*politics is warfare by other means*". Aggressive people are also more likely to express themselves if they are less inhibited about revealing their preferences.

The remaining coefficients in model 3 remain largely unchanged with the exception of Male which is no longer significant.

Finally, model 4 replicates the previous specification, the only difference being that the overall ability measure is replaced with its individual components in order to see which specific abilities are driving the result. It is clear that the ability effect is driven by comprehension ability. This differs from existing findings which suggest that it is verbal ability that matters, although these studies do not include other measures of ability (Nie *et al.*, 1996; Verba *et al.*, 1995; Newman, 1996). Since the hypothesis is that it is an individual's ability to process political information that drives the turnout decision, our finding is as one would expect. All the other coefficients are very similar to the previous specification.

The argument for excluding political interest from the turnout model hinges on the hypothesis that the two variables are two sides of the same coin and that similar factors, both observed and unobserved, determine both. As an extreme example, an individuals demand for right shoes is very highly correlated with their demand for left shoes. However no one would seek to "explain" one outcome in terms of the other. We pursue this by estimating a bivariate probit model in which the disturbance terms are distributed bivariate normal. This is *not* a simultaneous model in the sense of, say, Two Stage Least Squares in that there is no feedback between the two endogenous variables. Rather, like Seemingly Unrelated Regression, it exploits the cross equation correlation. We use the same explanatory variables as in the last column of Table 2 for both outcomes although this is not required.

The estimates are presented in Table 3. First note that the significant correlation coefficient reported at the bottom of the table suggests that the decision to estimate turnout and interest simultaneously is correct. The large and well determined correlation coefficient suggests that, conditional on observables, people who are likely to have an interest in politics are more likely to vote, and visa-versa. The turnout equation is very similar to the last column in Table 2, which implies that despite the cross-equation correlation, estimating the model as a "stand alone" does not make a

huge difference. While the determinants of both outcomes are similar, there are also some notable differences. First, comprehension is the only ability measure which has a significant impact on turnout. However, interest in politics is affected by both comprehension ability, such that a one standard deviation increase in ability increases the probability of being increased in politics by about 7%, and non-verbal ability, which has a negative and significant, albeit modest (at the 10% level), impact on political interest. Higher comprehension ability makes it easier to process political information, understand the complexities of the political system and engage in political discourse, all of which lead to a higher interest in politics.

Regarding the personality measures, we find that aggressive individuals are more likely to have an interest in politics and turnout to vote. As stated above, aggressive people are not afraid to express their views, even if their opinions deviate from others. Such factors should therefore encourage them to seek out political information and to express their preferences at election time. On the other hand, being hardworking, as opposed to lazy, only increases the probability of voting and has no impact on being interested in politics. As voting requires a certain degree of physical effort, which one could argue that the costs of civic participation for lazy individuals is greater. We also find that being even-tempered as opposed to moody, has a modest impact on voter turnout, while having no statistical impact on interest. In addition, being rigid, as opposed to flexible, decreases the probability of being interested in politics, while having no impact on turnout.

Civic duty also has an impact on both turnout and political interest; its effect however, is greater on political interest - members to political/voluntary organisations are 16% more likely have an interest in politics than those that are not, while such individuals are only 7% more likely to vote. Engaging in social activities with other socially orientated people may lead to group discussions concerning society, the environment and also politics, thereby further enhancing political interest. In addition, being members of such groups may encourage electoral participation through peer effects<sup>14</sup>.

Several of the socio-economic factors also play a role in determining political interest and turnout. More specifically, males have a greater interest in politics than

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<sup>14</sup> See Knack (1992) or Knack and Kropf (1998).



females (being male increases interest by 18%). The education results are largely unchanged for turnout (while neither of the variables are individually significant, they are jointly significant). Such results show that education is not just a proxy for underlying cognitive ability, but it also has an independent effect on turnout.

Table 3 also reports that being married increases the probability of voting, while having no impact on political interest. Being self-employed decreases the probability of voting, while increases the probability of being interested in politics. Hence confirming the opportunity cost of time argument discussed early. Finally, being a member of a trade union both increases the probability of voting and being interested in politics. While coming from a high socio-economic background induces participation, it has no impact in political interest.

Overall the bivariate model shows that the factors which influence the decision to vote and the decision to acquire political information are quite similar. Most of the coefficients in the Interest in Politics equation are larger than the corresponding coefficients in the Turnout equation suggesting that a characteristic, say union membership, may be sufficient to make one interested in politics (which is costless by itself) but not to vote (which requires effort). So these results point to the existence of a class of individuals who are interested *but that interested* in politics.

## 5. Conclusion

This paper contributes to the voter turnout literature in several novel ways. Following recent literature which discusses the potential endogeneity of both education and turnout, on the one hand, and political interest and turnout on the other, we attempt to contribute to this debate by utilising a rich longitudinal dataset which allows us to include a number of key psychological and ability factors that were previously absent in the literature. It is argued that the standard turnout model, which typically includes a measure of political interest as a primary regressor, may present a misleading picture of the determinants of voter turnout. We propose that both political interest and turnout are driven by common characteristics, both observable and unobservable, which generate a spurious correlation between the two and this vitiates the common practice of modelling the latter as depending on the former. The NCDS dataset allows us to investigate some previously unobserved characteristics, by including a number of childhood factors which, we argue, may influence the intrinsic

motivation for voting. We propose that personality and cognitive ability may capture some of these characteristics.

Some people are more likely to vote than others as the costs and benefits of voting differ for different groups in society. Therefore the determinants of voter turnout must be placed in the context of how they affect the costs and benefits of voting. Education is believed to reduce the costs of voting by providing the necessary skills to deal with political information and understand the political system, and increase the benefits of voting by instilling students with the desire to participate in society. In this paper we show that cognitive ability, and comprehension ability in particular, taken at age 11, has a significant impact on voter turnout. This suggests that individuals with higher ability have lower costs of voting, compared to those with lower ability, as independent of education (which may also further increase such skills), high ability individuals already possess the skills which enable them to engage in civic participation. While several studies have investigated the link between turnout and ability, their reliance on contemporaneous measures of ability makes it difficult to disentangle this independent ability effect, in addition, they run the risk of including measures of skills which are collinear. In this paper we argue that using earlier ability measures is more desirable. We find that ability influences voter turnout. In particular, we find that it is comprehension ability i.e. the ability to read, interpret and understand information, which drives the relationship. This confounds previous studies which find that verbal ability is the primary determinant, however as such studies do not include alternative ability measures and rely on current measures, it is likely that verbal ability was a proxy for the acquired skills.

This paper also contributes to the political psychology literature by presenting the first study of voter turnout and personality traits. In addition, unlike previous studies of personality traits and political outcomes we use measures of personality which were recorded over 20 years before the outcome of interest, i.e. voter turnout. Given we find that such early personality measures influence outcomes later in life provides strong evidence that psychological factors can have a major impact on political behaviour. We also show have some personality types have a greater impact on turnout than others. For example, hardworking individuals are more likely to vote compared to lazy individuals, this is perhaps motivated by the fact that obtaining information about the election and physically engaging in the act of voting, both

requires substantial effort. Therefore the costs of voting are greater for lazy individuals. We also find that even-tempered individuals have a greater probability of voting than moody individuals. Similarly one could argue that the costs of voting are greater for moody individuals as they may have other issues to deal with, which reduces the tendency to engage in socially orientated activities. The opposite may be the case for individuals with an aggressive personality. Aggressive people are more likely to vote as they wish to have their views and opinions expressed, therefore, they derive greater benefits from voting compared to timid people. Finally, while it is true that individuals who report a greater interest in politics are also more likely to vote, we argue that it is better to include the original factors that drive both outcomes, rather than using one to explain the other. Using such exogenous measures offers us insights into the intrinsic motivations of voting and helps explain variations in voter turnout at an individual level.

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## Tables

**Table 1 Descriptive Statistics**

	Mean	St. Dev
Turnout in 1997 British General Election	0.796	0.403
Cognitive Ability (age 11)	0.350	1.690
Maths Ability (age 11)	0.178	0.972
Comprehension Ability (age 11)	0.153	0.946
Verbal Ability (age 11)	0.191	0.940
Non-Verbal Ability (age 11)	0.178	0.938
Impulsive (age 16)	2.734	0.869
Even-Tempered (age 16)	3.633	1.176
Aggressive (age 16)	2.916	0.707
Rigid (age 16)	2.732	0.786
Withdrawn (age 16)	2.324	1.028
Hardworking (age 16)	3.382	1.195
Interest in Politics	0.430	0.495
Civic Duty	0.194	0.396
Male	0.474	0.499
Age Left Education	17.186	1.898
Stayed in Education after 16	0.408	0.491
Married	0.735	0.441
Self-Employed	0.132	0.338
Union Member	0.294	0.456
Parental Social Class at birth	3.094	1.326
Observations	4668	

**Table 2 Determinants of Turnout in the 1997 British General Election**

Turnout	(1)	(2)	(3)	(4)
Cognitive Ability (age 11)	~	0.012*	0.021***	~
	~	[0.007]	[0.007]	~
Maths Ability (age 11)	~	~	~	0.009
	~	~	~	[0.011]
Comprehension Ability (age 11)	~	~	~	0.024**
	~	~	~	[0.010]
Verbal Ability (age 11)	~	~	~	-0.005
	~	~	~	[0.012]
Non-Verbal Ability (age 11)	~	~	~	-0.002
	~	~	~	[0.010]
Impulsive (age 16)	~	-0.007	-0.008	-0.007
	~	[0.008]	[0.008]	[0.008]
Even-Tempered (age 16)	~	0.011**	0.012*	0.012*
	~	[0.006]	[0.006]	[0.006]
Aggressive (age 16)	~	0.014	0.020**	0.019**
	~	[0.009]	[0.009]	[0.009]
Rigid (age 16)	~	-0.006	-0.009	-0.009
	~	[0.008]	[0.008]	[0.008]
Withdrawn (age 16)	~	0.005	0.004	0.004
	~	[0.007]	[0.007]	[0.007]
Hardworking (age 16)	~	0.016***	0.018***	0.017***
	~	[0.006]	[0.006]	[0.006]
Interest in Politics	0.181***	0.177***	~	~
	[0.011]	[0.011]	~	~
Civic Duty	0.055***	0.048***	0.071***	0.070***
	[0.015]	[0.015]	[0.014]	[0.014]
Male	-0.043***	-0.041***	-0.009	-0.013
	[0.012]	[0.012]	[0.012]	[0.013]
Age Left Education	0.013**	0.007	0.009	0.008
	[0.005]	[0.005]	[0.006]	[0.006]
Stayed in Education after 16	0.031*	0.018	0.031*	0.029
	[0.018]	[0.019]	[0.019]	[0.019]
Married	0.061***	0.056***	0.055***	0.055***
	[0.014]	[0.014]	[0.014]	[0.014]
Self-Employed	-0.047**	-0.047**	-0.034*	-0.035*
	[0.019]	[0.019]	[0.019]	[0.019]
Union Member	0.046***	0.045***	0.055***	0.055***
	[0.012]	[0.012]	[0.013]	[0.013]
Parental Social Class at birth	0.009**	0.009*	0.009**	0.009*
	[0.004]	[0.005]	[0.005]	[0.005]
Regions	YES	YES	YES	YES
Pseudo R <sup>2</sup>	0.094	0.099	0.053	0.054
Observations	4668	4668	4668	4668

**Note:** Marginal effects and standard errors (in parenthesis) reported. Significance levels: \*\*\* 1%, \*\* 5%, \* 10%



**Table 3 Bivariate Probit Determinants of Turnout and Political Interest**

	Turnout	Interest in Politics
Maths Ability (age 11)	0.010 [0.011]	0.006 [0.013]
Comprehension Ability (age 11)	0.023** [0.010]	0.071*** [0.012]
Verbal Ability (age 11)	-0.007 [0.011]	0.011 [0.015]
Non-Verbal Ability (age 11)	-0.002 [0.010]	-0.025* [0.013]
Impulsive (age 16)	-0.007 [0.008]	-0.004 [0.010]
Even-Tempered (age 16)	0.011* [0.006]	0.000 [0.008]
Aggressive (age 16)	0.019** [0.009]	0.035*** [0.013]
Rigid (age 16)	-0.009 [0.008]	-0.018* [0.011]
Withdrawn (age 16)	0.005 [0.007]	0.001 [0.009]
Hardworking (age 16)	0.017*** [0.006]	0.013 [0.008]
Civic Duty	0.071*** [0.014]	0.156*** [0.020]
Male	-0.015 [0.013]	0.176*** [0.016]
Age Left Education	0.009 [0.006]	0.008 [0.006]
Stayed in education after 16	0.028 [0.019]	0.072*** [0.024]
Married	0.054*** [0.014]	-0.012 [0.017]
Self-Employed	-0.035* [0.019]	0.066*** [0.023]
Union Member	0.057*** [0.013]	0.079*** [0.017]
Parental Social Class at birth	0.009** [0.005]	0.007 [0.006]
Regions	YES	YES
$\rho$		0.415***
Standard error		0.025
Observations		4668

**Note:** Marginal effects and standard errors (in parenthesis) reported. Significance levels: \*\*\* 1%, \*\* 5%, \* 10%