Revisiting the Political Life-Cycle Model: Later Maturation and Turnout Decline Among Young Adults

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Abstract

Turnout among young adults has declined steadily in various advanced industrial democracies in recent decades. At the same time, as a consequence of delayed transitions to adulthood, many life-cycle events considered important for the development of electoral participation are experienced later in life. These combined trends call for a revaluation of the political life-cycle model and the way in which it explains voter turnout among young adults. More specifically, in this paper it is argued that variation in the timing of life events has been overlooked as an explanatory factor of generational differences in young adults' propensity to turn out to vote. With accumulating evidence that the decision to vote is to some extent habitual, a lack of life experiences may cause young adults to form the habit to abstain rather than to vote. If the mechanisms of the life-cycle model are indeed correct, later maturation should at least partially explain why young adults these days are less inclined to vote than their parents or grandparents in their younger years. Based on the British Election Studies from 1964 to 2010 the findings of this study confirm generally observed patterns of a delayed assumption of adult roles by young citizens. This trend toward later maturation negatively affects turnout levels of young citizens. If maturation levels had remained at pre-war levels, the average turnout among Britain's post-seventies generation would have been no less than 12 percentage points higher.

Keywords: Turnout; young adults; political life-cycle; generational differences; later maturation.

Introduction

Although young adults have long been identified as a group of the electorate less likely to vote, recent research suggests that turnout levels among young cohorts are declining rapidly. This implies that today's young adults turn out at lower levels than their parents and grandparents did when they were young. Trends of declining young adult turnout levels have been particularly well documented in Canada (Gidengil et al., 2003; Pammett and LeDuc, 2003; Johnston et al., 2007), the United States (Levine and Lopez, 2002; Lopez et al., 2005) and Great Britain (Phelps, 2004, 2006).[1]

Young voters grow into older voters. Unless turnout losses are made up as young people age, the recently witnessed decline in turnout levels among young adults predicts lower general turnout levels in the future. According to the political life-cycle argument young adults vote less than older citizens because they are faced with 'start-up' problems: pre-occupations outside the political sphere that lead to low attachment to civic life. In terms of the life-cycle theory, declining turnout patterns among young adults suggest that today's young people face more or extended start-up problems than previous generations (Kimberlee, 2002; Flanagan et al., 2012). Indeed, delayed transitions to adulthood are witnessed in almost all advanced industrial democracies (Vogel, 2001; Iacovou, 2002; Nico, 2014).

This paper seeks to understand whether, and if so to which extent, delayed transitions to adulthood play a role in the observed patterns of declining turnout among young adults. Combining elements of the life-cycle and the cohort/generation approaches to age differences in voter turnout, the later maturation hypothesis examines

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[1]See Smets (2012, 2013) for an overview of trends in young adult turnout and the age gap in voter turnout in ten advanced industrial democracies.

the idea that the timing of life events that are considered important for the development of electoral participation varies between generations. Since key events such as leaving school, starting a first job, getting married and forming a family are gradually taking place at a higher average age, the trend towards later maturation should be able to explain part of the turnout decline among young voters. More sharply put: if the movement of life-cycle events to a higher average age does *not* translate into changes in turnout patterns of young people, we have serious reasons to doubt the over-time validity of the life-cycle model.

The relationship between (later) maturation and young adult voter turnout is assessed in two ways. First a maturation index based on six basic socio-demographic indicators that mark the transition to adulthood is used. Analyses with the separate life-cycle events, secondly, allow a peek into the black box of the effect of age on voter turnout. Empirical research of individual-level voter turnout often uses age as a proxy for the respondent's life-cycle stage and it is on the whole a significant explanatory factor of voter turnout (see Smets and van Ham, 2013). Yet, from an empirical point of view, we know relatively little about *why* turnout increases as citizens age and even less about how the relationship between age and turnout changes with time.

Empirical analyses based on the British Election Studies from 1964 to 2010 support the general observation that the proportion of young adults that has experienced consequential life-cycle events has decreased over-time. As expected, maturation is a strong, stable, and significant predictor of individual level turnout among young voters. Combining these two insights, later maturation can be linked to declining turnout levels among younger voters. Had there been no delays in the transition to adulthood since the pre-war generation experienced its young adulthood years, turnout among Britain's post-seventies generation would have been 53% instead of 41%: a 12 percentage point

difference. These findings are particularly relevant in light of the present-day economic crisis, which causes additional hurdles in the transition to adulthood for the current generation of young adults.

Focussing on separate life-cycle events instead of an index of maturation, moreover, brings to light the differential impact of various life-cycle events on young adult turnout. As expected the maturation index explains away the effect of age on voter turnout; however, not all life-cycle indicators perform as expected. Home ownership, marriage and cohabitation are found to have a consistent positive effect on turnout. Contrary to theoretical expectations of the life-cycle model, leaving education negatively influences turnout of young adults. The same is true for childbearing; however, the variable does not reach statistical significance in a plurality of the models. Having a job and residential stability, while positively related to young adult voter turnout, also do not reach statistical significance.

Later maturation and turnout decline among young adults

The impressionable or formative years between childhood and adulthood are generally believed to be a crucial period during which citizens form the basis of political attitudes and behaviours (see e.g. Jennings, 1979; Strate et al., 1989; Highton and Wolfinger, 2001; Kinder, 2006). Young citizens have not yet developed political habits and are, therefore, more easily influenced by external factors (Alwin and Krosnick, 1991; Flanagan and Sherod, 1998; Sears and Levy, 2003). Social, cultural, political and historical changes affect young citizens disproportionally thus creating generational differences in turnout patterns.

One way in which today's young adults differ decisively from young adults of the past seems to have been systematically overlooked in the empirical literature.[2] Young citizens nowadays grow into their adult roles – defined in terms of a set of social qualifiers rather than in terms of psychological development (see Mary, 2014 on this distinction) – at a different pace than their parents or grandparents did when they were young. To understand how such later maturation is tied to declining levels of young adult voter turnout we need to consider the life-cycle approach of political participation.

According to the life-cycle argument of political behaviour, young people participate less in politics given their low attachment to civic life: a characteristic that is fuelled by young people still going through education, being occupied with finding a partner, establishing a career, having higher mobility, dealing with the psychological transformation into adulthood, etc. These characteristics lead young people to be politically inexperienced and to have little interest in politics, low levels of knowledge and fewer skills (i.e. to have few political resources). This, in turn, makes electoral participation both more difficult and less meaningful in this first stage of the life-cycle (Strate et al., 1989; Jankowski and Strate, 1995).

In middle life, turnout rates are thought to stabilise at a higher level as people experience life-cycle events that mark the transition to adulthood. Such events include leaving the parental home, starting a full-time job, cohabiting or getting married, buying a house, starting a family, settling down in a community, etc. Even though many of these processes put a demand on time, they are associated with activities (involvement in organizations, associations, the community, etc.) that tend to enhance turnout due to increased mobilisation, skills, and pressure (Strate et al., 1989, 444, Lane, 1959, 218, Kinder, 2006). As stakeholders, home owners are more likely to be interested in

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[2]For a theoretical discussion see Kimberlee (2002) and Flanagan et al. (2012)

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property tax and mortgages. To those with (full time) jobs issues such as pensions and income tax become relevant (Flanagan et al., 2012). As a result the transition to adulthood increases attention to and familiarity with parties' and candidates positions, which in turn fosters party attachment and other forms of political engagement. All in all, the middle-aged seem to have the best cards to understand politics and their part in it (Jankowski and Strate, 1995, 91), which is most likely the reason why this stage of the political life-cycle is often used as a base against which to compare the political participation levels of younger and older citizens (Braungart and Braungart, 1986, 210).

Participation rates among older age groups, finally, tend to drop under the influence of, for example, health problems, the loss of a politically active spouse, retirement, and declining family income. Summarizing, it is the more general disengagement from social life that leads to a lower attachment to political life (Cutler and Bengtson, 1974, 163).

So far, the political life-cycle has mostly been conceived a static curvilinear relationship between age and voter turnout. However, we do not know whether *the* life-cycle of political participation really exists, or whether its shape differs across time and space.[3] With accumulating evidence that the decision to vote is to some extent habitual (Green and Shachar, 2000; Kanazawa, 2000; Plutzer, 2002; Bendor et al., 2003; Gerber et al., 2003; Cutts et al., 2009; Aldrich et al., 2011; Dinas, 2012), a lack of life experiences may cause young adults to form the habit to abstain rather than to vote.

Based on findings in the sociological and demographic literature as well as circumstantial evidence, it seems plausible to reason that the political life-cycle of today's

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[3]What we do know is that the curvilinear relationship with age does not seem to hold for all modes of political participation (see e.g. Stolle and Hooghe, 2011).

young adults is not similar to the initial stage of the life-cycle of their parents or grandparents. Higher educational levels have resulted in young adults staying in school longer, having extended co-habitation with – as well as longer financial dependence on – their parents, and postponed full entry onto the labour market. Moreover, the average age of marriage has risen and childbearing is increasingly postponed (see Pirie and Worcester, 1998; Billari and Wilson, 2001; European Commission, 2001; Billari and Kohler, 2002; Furstenberg, Jr. et al., 2003; Kennedy, 2004; OECD, 2007). Seemingly facing more and/or extended start-up problems than young people of previous generations, turnout patterns of today's young adults are expected to have been negatively affected. Variation in the timing of life events has thus far been overlooked as an explanatory factor of generational differences in young adults' propensity to turn out to vote. The later maturation hypothesis, moreover, provides an explanation as to why contemporary young people are often found to be less interested, more alienated and more disengaged from the political system.

Life-cycle events and their impact on young adult voter turnout

Notwithstanding decennia of references to the life-cycle model in the literature, relatively little is known about the influence that each possible life event has on individuals' levels of turnout. The acquisition of an 'adult role' is what ties together the life events that mark the transition from the first to the middle life-cycle stage. *Leaving education* is one of the first steps towards entering the adult world. Being in education, from a theoretical perspective, thus, is seen as a first stage life-cycle characteristic: a start-up problem that causes these citizens to be too pre-occupied with externalities to become involved in political affairs (Wolfinger and Rosenstone, 1980; Strate et al.,

1989; Jankowski and Strate, 1995; Highton and Wolfinger, 2001). Empirical research paints a different picture, however. Studies that have researched the effect of 'being in education' on individual level turnout, find a positive and significant relationship between the two variables (Wolfinger and Rosenstone, 1980; Highton and Wolfinger, 2001; Sandell Pacheco and Plutzer, 2007; Tenn, 2007). An explanation for this finding is that young people who are still in school find themselves in a much more stimulating environment than their non school-going peers. Since theory and empirical findings are contradicting, the direction of the hypothesized effect of leaving education on turnout can be twofold.

At some point after leaving education most people *leave the parental home* (Elder, 1985). Some take up temporary residence in the city where they study, others settle down more permanently. Not many studies have focussed on the effect of leaving the parental home on turnout. From an adult role perspective, leaving the parental home should foster turnout. Highton and Wolfinger (2001), nonetheless, find turnout among young people who left the parental home to be lower than among those who had not taken the adult step of moving out. Controlling for confounding factors such as residential stability (discussed in more detail below), the relationship between leaving the parental home and turnout was, however, found positive.

Settling down in a community goes hand in hand with *residential stability*. Students in particular are not tied to one place (see Squire et al., 1987 for a breakdown of the characteristics of movers and stayers).This is especially problematic in countries where electoral registration is the responsibility of the voter (Highton, 2000; Highton and Wolfinger, 2001). The need to constantly re-register is a burden that often leads citizens to abstain from voting. *Home ownership*, just like residential stability, is considered to strengthen community ties (Lane, 1959; Jankowski and Strate, 1995).

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After leaving school *getting a job* is often the next step toward assuming adult roles (Lane, 1959; Elder, 1985; Jankowski and Strate, 1995). The work environment is considered a place of political socialization in various ways – both direct and indirect (Sigel, 1989; Brady et al., 1995). Certain jobs bring citizens directly in touch with socio-political issues. Having a job, secondly, puts certain demands on citizens (e.g. time-consciousness, punctuality, ability to follow written instructions, etc.). Moreover, certain occupations come with a certain status. This status brings with it a diversity of resources, skills, knowledge and prestige that are also useful for electoral participation. The work environment is also considered to influence political interest because workers are often organised in unions which inform their members and mobilise them to protest against unpopular measures. These mobilization efforts can trigger interest in socio-political issues. On the whole, having a job is therefore expected to boost turnout.

Marriage and starting a family are also positively related to turnout in the long run (Elder, 1975, 1985). While Stoker and Jennings (1995) find that the transition to married life initially has a disruptive effect on political participation levels, in the mid to long term being married is generally found to be positively correlated to participation. Partners can learn from and influence each other, and a politically active spouse is likely to motivate and mobilise his or her partner. Denver (2008) argues that married citizens adhere to more traditional values. This may lead married people to be more likely to conform to the idea of 'good citizenship' and to consider voting and political engagement a civic duty. In this paper marriage and cohabitation are treated as one. Both social and legal boundaries between cohabitation and marriage are fuzzy (Thornton et al., 2007). Moreover, the practical and beneficial consequences of living with a partner are present in a similar fashion among cohabiting and married couples. *Childbearing*, lastly, increases the awareness of social needs, such as education, health

care, and playgrounds, as well as the responsibility to perform as a citizen model (Lane, 1959). Parents of school-going children are likely to become part of social networks that mobilize them into collective action (Flanagan et al., 2012). While those with young children can be expected to have little time on their hands, parenthood is often interpreted as a sign of stability, and therefore, stronger links to the community (see Anderson, 2009 for an empirical study of the relation between being part of a community and voter turnout).

Data

The aim of this paper is to assess the extent to which later maturation affects generational differences in voter turnout. First, we need to establish whether generational differences in the transition to adulthood can indeed be observed. Second, we have to assess to which extent generational differences in patterns of political maturation influence generational turnout patterns of young adults. Panel data following the same respondents over time are best suited to study the effect of transitions to adulthood on voter turnout (Hooghe, 2004; Glenn, 2005; Hobbs et al., 2014). However, to study generational differences a long time span is essential. To my knowledge there are no panel data available that contain the relevant indicators and are composed of sufficient waves to allow for a large time dimension. I, therefore, rely on the best alternative to assess my hypotheses: repeated cross-sectional election surveys. Compared to election surveys in other advanced industrial democracies the British Election Studies from 1964 to 2010 are much more inclusive when it comes to the over-time measurement of life-cycle events that mark the transition to adulthood. For the purpose of this study ideally we would like to know whether respondents are in education, whether they have

a partner, have a full-time job, live away from their parents, have stable residence, and own their own home. Only an indicator keeping track of whether a respondent left the parental home or not is missing from the British Election Studies.

The dependent variable in the analyses presented below is reported turnout in the last general election. The key independent variables in all models are events marking the transition to adulthood. They are measured as dichotomous variables where a '1' indicates that the respondent has made the transition.

A question asking after the respondent's marital status was used to create a dummy variable identifying those respondents who were either married or cohabiting with their partner. A measurement of the respondent's job status was used to identify the respondents with a (full-time) job.

The variable 'left education' is based on a question asking the respondent's age when leaving (full-time) education. In some instances, a separate category was included for those still in education. For the earlier election years the question concerning the age at which the respondent left education referred to primary or secondary education only. In these instances, a proxy was calculated based on the age and educational level of the respondent. For all respondents with a post-secondary educational level, three years were added to the age the respondent left secondary education. Three is the minimum number of years it takes to complete a bachelor degree in Great Britain and the measure, although not optimal, is a conservative estimate of the period a respondent was in post-secondary education. If a respondent was younger than the computed school leaving age or had an age equal to it, he or she was considered to still be in education.[4]

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[4]No respondents were identified as being in education in 1964 and 1966. This is not as peculiar as it may seem at first sight. In the 1964 and 1966 elections the minimum voting age in Great Britain

Whether a respondent has children was only asked in the earlier election studies. In subsequent years, instead, the number of young people in the household was enquired after. Usually, the threshold was put at the age of 18 years, but in two instances the question referred to young people aged less than 16 (1987) or less than 15 (1983) years. When dealing with young respondents, it is impossible to distinguish between siblings and own children with a question phrased this way. To avoid this mix-up, only children in the household of married, cohabiting, divorced, widowed, or separated respondents where counted as being the respondent's own. No references to children are available for the February 1974 and 1992 elections.

A variable tapping home ownership was derived from a question asking the respondent whether their home was owned or rented. The home ownership variable was not included in the election survey of 1966. A measure of residential stability of respondents, lastly, is based on a question asking the respondent after the number of years he or she lived in the neighbourhood or area. This question was missing from the 1983 and 1992 election studies and was only posed to two-thirds of the respondents in 2001. A respondent is considered to have residential stability when he or she has lived in the same place for three or more years.[5] However, there is one problem with these last two measures. An 18-year old who has lived with her/his parents since birth is likely to live in an owned home and have residential stability. Neither scenario has much to do with maturation. As a filter, respondents who are in education and indicate to live in an owned home or to live in their neighbourhood for a long time are set to zero on

was still 21 years. This age threshold is most likely what accounts for the lack of respondents in education in these two election years.

[5]Since the variable measuring residential stability was categorical in 1964, 1966 and 1970 the cut-off was placed at 2 years in these election years.

the home ownership and residential stability variables. This filter should at the very least improve the measurement of home ownership and residential stability.

The six dichotomous life-cycle indicators available in the British Election Studies from 1964 to 2010 – having left education, being married or cohabiting, having children, owning a home, long residential stability and having a job – are combined in an additive 'maturation index'.[6] As such, the maturation index is a seven-point scale ranging from 0 to 6 where a higher score indicates a higher level of maturation.

Some of the models presented below also include control variables: gender, educational level, union membership, strength of partisanship, the perceived difference between political parties, turnout in the previous elections and the margin of the victory. The first four variables are expected to boost turnout as they are linked to the socio-economic, mobilization and psychological models of turnout. The rationale for including perceived differences between parties is linked to the rational choice model. If differences are small, turnout is expected to be lower. The margin of the victory is the simple difference in the vote share between the first and second placed parties at the national level. The smaller the difference, the more competitive the election. High stake elections generally attract more voters. Turnout in previous elections, lastly, is a measure of the habitual nature of voter turnout whereby previous behaviour is a predictor of current behaviour. Descriptive statistics and value labels for all variables are presented in Appendix A.

As indicated above not all indicators of interest are available in all election years. Because this missing data problem affects the robustness of the results, missing values have been replaced through a multiple imputation method. Multiple imputation meth-

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[6]Different indexes were constructed. The choice for a six-item index is prompted by theoretical arguments discussed above. Moreover, a maturation index consisting of the six items proposed yields the largest Cronbach's α (.499).

ods replace missing values by a list of $m>1$ simulated values and produces m plausible alternative versions of the data set. Each of the m data sets is estimated in the same fashion by a complete data method. The estimates of parameters of interest in the m data sets are averaged to give a single estimate. The main advantage of multiple imputation is that it yields a constant sample size over all models. The imputation process is described in detail in online appendix C. All analyses presented in the next two sections are based on the imputed data sets. The data have, moreover, been adjusted for sampling errors and over-reporting of turnout.[7] Lastly, in order facilitate comparison all variables were standardized to vary between 0 and 1.

A comparison of the political life-cycle of different generations

As a first step we need to establish whether generational differences in levels of maturation can indeed be observed. There are various suggestions to this in the literature; however, most empirical research focuses on one or two life-cycle indicators at a time. In this section a broader overview of over-time changes in life-cycle indicators will be presented. All analyses focus on a young subset of the electorate aged 35 years or less. The crucial 'impressionable years' are often situated between the ages of seventeen and twenty-five (Jennings and Niemi, 1981). Nonetheless, both a clear definition and operationalisation are lacking and political learning is certainly not confined to these

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[7]Self-reported turnout is affected by problems such as recall bias and social desirability (Bernstein et al., 2001; Karp and Brockington, 2005). For this reason reported turnout tends to have an upward bias when compared to data on actual turnout. The weights used for the analysis are computed by dividing the official turnout rate in a given year by the BES reported turnout for that year with design weights applied. This procedure adjusts the overall levels of turnout in each year and allows calculation of generation-specific turnout rates under the assumption that response and reporting bias is evenly distributed among all generations. For an identical approach see e.g. Franklin (2004) and Fieldhouse et al. (2007).

early adulthood years. Recent research by Bhatti and Hansen (2012b) suggests that turnout drops after the first voting experience at the age of 18 and that only by the age of 35 citizens return to their first-time turnout levels. Moreover, the theoretical expectation is that life-cycle events experienced during early adulthood influence the development of political interest and political participation. Delays in the transition to adulthood imply that defining the group of young adults too narrowly entails to miss out on a number of important life-cycle changes (Iacovou, 2002; Council of Europe, 2005).

To investigate generational differences in the assumption of adult roles, the average scores (in percentages) on the maturation index were plotted by decade for young adults of five generations. Following Blais et al. (2004), Wass (2007), and Bhatti and Hansen (2012a) I have used the distinction between the pre-war generation (born before 1944), the baby boomers (1945–1959), the 1960s generation (1960–1969), the 1970s generation (1970–1979) and the post-1970s generation (born in 1980 or later). Figure 1 tracks the average scores on the maturation index for those aged 18 to 20, 21 to 25, 26 to 30 and those aged 31 to 35 whereby each line represents a different generation.

Figure 1 looks at the generational differences in the transition to adulthood for different age groups. (Note that the earliest election surveys did not include respondents under the age of 21 as they were not allowed to vote.) As expected, the older the respondent, the higher the score on the maturation index. Generational differences are largest for the youngest age group with a 20 percentage point gap between the maturation scores of 18 to 20 year olds of the sixties generation compared to the post-seventies generation. Generational differences are smaller in the oldest two age groups (26-30 and 31-35 years), which implies that while maturation levels of the youngest

citizens these days are much lower than those of previous generations, these generational differences do seem to even out to some extent by the time citizens arrive in their mid-thirties.

<FIGURE 1 ABOUT HERE >

<FIGURE 2 ABOUT HERE >

The lines in Figure 2, on the other hand, track the average scores on the six life-cycle indicators from one generation to the next. It shows that the percentage of young adults who have left education, are married and have children has declined steadily and drastically between the pre-war generation and the post-seventies generation. The 1960s generation scores highest for having a job, residential stability and home ownership by the age of 35. Young adults of the post-seventies generation score lower than the pre-war generation on these three items, however.

Based on the findings in this section we can conclude that the political life-cycle has indeed changed over-time and it has done so in the expected direction. Overall, young adults nowadays mature at a different pace than their parents and grandparents did. Today's young adults have lower starting levels of maturation. Even though some of the losses are made up as citizens age over-time differences remain apparent and young adults are found to experience ever fewer life events with each election year that passes. The next step is to assess the extent to which the delayed assumption of adult roles is linked to generational differences in voter turnout.

Later maturation and young adult turnout: an empirical test

Although national election surveys are designed to include a representative sample of the electorate as a whole, subsequent analyses will be performed on a young subset of the electorate only (aged 35 years or less). There are several reasons for doing so. First, the aim of this research is to understand what makes the turnout patterns of today's young adults different from young adults of the past. Second, the later maturation hypothesis central to this study applies to young voters and abstainers only. Although the hypothesis assumes that certain life-cycle events are experienced later in life, which may suggest increasing the upper age bound, the more important assumption is that the proportion of young citizens that has matured by a certain age has decreased with time because of more or extended 'start-up' problems: a finding that was corroborated in the previous section.

The analyses of young adult turnout presented in Table 1 consist of five steps. In the first step, a model is estimated including only age and the dichotomous variables for the different generations (see Model 1). The pre-war generation is the reference category and is therefore not included in the model. As expected, the age variable is positive and significant at the $p<.05$ level. The coefficients for the seventies and post-seventies are negative and significant implying that the propensity to vote for young adults of these generations is significantly smaller than for the pre-war generation.

<TABLE 1 ABOUT HERE >

In a second step the maturation index is added to the model. The relationship between the index variable and turnout is expected to be positive: the higher the

level of maturation, the higher the probability that a respondent will turn out to vote. This is indeed the case as is evidenced by the positive and significant coefficient for the maturation index in Model 2 of Table 1. The coefficient for the age variable should become smaller once the life-cycle indicators are included in the model. The life-cycle model predicts that turnout increases with age as age increases the likelihood of experiencing certain life-cycle events that are important for the development of turnout patterns. Controlling for such events should therefore reduce the impact of the variable age itself. Upon the inclusion of the maturation index in Model 2, we find that the effect of age disappears completely. The magnitude of the generation effects for the seventies and post-seventies generation appears, moreover, somewhat reduced compared to Model 1.

The third model involves the inclusion of interactions between the generational dummy variables and the maturation index. The inclusion of these interaction effects assesses the extent to which maturation has the same impact on voter turnout for young adults belonging to different generations. As can been seen in Model 3 of Table 1 the impact of maturation is equal for young voters of all generations except for those belonging to the post-seventies generation. The impact of political maturation on voter turnout is smaller for today's young adults than for young adults of the pre-war generation in a model that does not include control variables.

In Model 4 these control variables are added to the model. Gender does not reach statistical significance, but the other variables are statistically significant and in the expected direction with the exception of perceived differences between parties. Larger perceived differences appear to confuse the voter and lead to lower turnout levels. More interesting, the impact of maturation on voter turnout does not disappear in a better specified model even if the magnitude of the coefficient does decrease slightly. The

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interaction effect between the post-seventies generation and maturation is no longer significant after the inclusion of the control variables.

In the final model of Table 1 a variable that measures the average turnout of older voters (aged 36 years or more) is added to the model. This variable is a constant for a given election year. Through the inclusion of the average turnout of older voters, we can take account of the differences between younger and older voters (see Fieldhouse et al., 2007 for a similar approach). If significant, this variable shows us that young citizen's turnout is partly a function of processes that are going on in the electorate at large. Including the average turnout of older voters, moreover, makes it possible to establish whether life-cycle changes influence turnout among young voters regardless of other factors that influence turnout levels in the electorate at large. The average turnout of older voters is significant and positive, implying that the turnout levels of younger and older voters move in conjunction in Great Britain. The standardized coefficients, moreover, show that the impact of unmeasured societal processes have the most substantial impact on young adult voter turnout. This notwithstanding maturation remains a positive and significant explanatory factor of young adult voter turnout in a fully specified model.

In terms of model fit the maturation index in itself does not do a good job a explaining variation in young adult voter turnout. The pseudo R^2 of Model 2 in which the index was first included is a meagre .03. This result is not in the least surprising. In their meta-analysis of individual-level voter turnout Smets and van Ham (2013) found that no less than 177 different explanatory had empirically been linked to turnout in journal articles published in the last decade. In other words, if there is a single determinant of voter turnout it seems like we have not yet found it. This is also reflected when looking at the model fit of Model 5 which includes most explanatory

factors. Here the pseudo R^2 reaches .16, which is decent for an individual level model but still leaves a lot of room for improvement.

One of the questions that remains unanswered is what would have happened to young adult voter turnout had maturation levels remained stable through time. Figure 3 shows the reported and predicted probabilities of turnout by generation had maturation levels remained constant at the pre-war level (68%), while holding all other variables at their (generational) mean. The difference between observed and predicted levels of turnout is +2% for the baby boom generation, +3% for the sixties generation, a difference of +4% for the seventies generation, and a difference of +12% for the post-seventies generation. Delayed transitions to adulthood thus certainly play a role in the low attraction that elections have on young adults these days.[8]

<FIGURE 3 ABOUT HERE >

As a last step, it is worth looking into the black box of the maturation index. Until now we have assumed that all life-cycle events have an equal impact on young adult voter turnout. Table 2 shows models similar to those in Table 1 this time including the separate life-cycle events rather than the maturation index. There is one problem, however. Since respondents belonging to the post-seventies generation have hardly experienced any life-cycle events, there are too few observations taking a '1'

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[8]Figure 3 reports the predicted probabilities of turnout for all five generations based on pre-war maturation levels while holding all other variables at their generational average. The smaller differences between the reported and predicted turnout for the pre-war, baby boom, sixties and seventies generation could theoretically be based on the fact that the average age for these generations is higher (21.9 years for the post-seventies generation versus an average of 27.3 years for the other generations). To assess whether the findings for the post-seventies generation in Figure 3 are related to the life-cycle stage in which these respondents find themselves (i.e. the fact that they are younger), the predicted probabilities were also calculated while keeping maturation at the pre-war level and age at the post-seventies level. The results are almost identical to those reported in Figure 3. The robustness check yields the following differences between observed and predicted turnout levels: post-war generation +4%, baby boom generation +2%, sixties generation +3%, seventies generation +4%, post-seventies generation +12%.

for the interaction effects between the life-cycle events and this particular generation. Interactions with the post-seventies generation are therefore not modelled.[9]

<TABLE 2 ABOUT HERE >

Starting with the impact of the life-cycle events, being married, cohabiting or being a home owner are consistently linked to higher turnout levels. Having left education is also a significant predictor of turnout, but not in the expected way. The coefficient is negative in all models, indicating that those in education are actually more likely to vote than those who left their formative years behind them. Although contradictory to the life-cycle hypothesis, these results are in line with the research of other scholars who find a similar positive relationship between being in education and turnout (see e.g. Wolfinger and Rosenstone 1980; Highton and Wolfinger 2001; Sandell Pacheco and Plutzer 2007 and Tenn 2007). Those in school find themselves in a much more stimulating environment, are more likely to discuss politics with peers and in some instances are also engaged through the formal curriculum (e.g. social science students). Hence the positive relationship between being in education and voter turnout. While not statistically significant at the $p<.05$ level, having children is likewise found to negatively impact turnout among young adults in the more fully specified models. It is, of course, not a far stretch to assume that having small children leaves little room for political engagement. Residential stability and having a job are positively correlated with voter turnout but lose statistical significance once control variables are added to the model.

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[9]As a robustness check the models were also ran with the separate life-cycle events and interactions with the maturation index (which is after all composed of all six life-cycle events). The results are presented in Appendix B. None of the interaction effects with generation reaches statistical significance.

In comparison with the maturation index models, more significant differences in generational turnout patterns can be observed in Table 2. However, in terms of the interactions between life-cycle events and generations we find very few significant effects. Due to space reasons only significant interactions are shown in the table. We see that the coefficients for having children, being married and having left education are significant for the baby boom generation. However, in all cases the sign is opposite from that for the pre-war generation which is the reference category. The two effects thus almost cancel each another out. This implies that on the whole the effect of life-cycle events on voter turnout is the same for young adults of all generations.

In terms of model fit, lastly, there are not many differences with the maturation index models. The most fully specified model explains 16% of the variation in young adult turnout.

Conclusion and discussion

According to the life-cycle theory, turnout increases as citizens age and experience life-cycle events that coincide with the transition to adulthood. These life-cycle events are thought to facilitate voter turnout. Findings in the sociological and demographic literature, as well as circumstantial evidence, suggest that in the past decades many life-cycle events have moved to a higher average age. In other words, young adults these days experience fewer life-cycle events than their parents and grandparents did when they were young. If the mechanisms of the life-cycle model are correct, these generational differences in the transition to adulthood should be able to explain – at least in part – why turnout in advanced industrial democracies has declined steadily among young adults in recent decades.

Based on the British Elections Studies from 1964 to 2010 this research shows how levels of political maturation have declined from one generation to the next. An index of six life-cycle events (having left education, being married or cohabiting, having children, owning a home, long residential stability and having a job) is found to have a positive and significant effect on young citizens' turnout even when modelled with other covariates of turnout. Had average levels of maturation remained constant since the pre-war generation faced young adulthood, turnout levels of the post-seventies generations would have been 12 percentage points higher.

While these results boost our confidence in the mechanisms of the political life-cycle model, not all life-cycle indicators were found to have an equal impact on young adult turnout. Home ownership and being married or cohabiting were found to have the expected impact on turnout. Leaving education, on the other hand, had an unexpected impact on turnout among young adults. While the life-cycle model considers leaving education to be a sign of maturation it actually leads to lower instead of higher turnout levels. This finding is in line with previous research. Students are most likely more easily mobilized to participate in politics than their non-school going peers. Residential stability, having a job, and childbearing were not found to pass the test of statistical significance in a more fully specified model.

Concluding, there does not seem to be any reason to doubt the over-time validity of the life-cycle model. Generational differences in the transition to adulthood explain part of the generational differences in turnout among young adults. Previous research has overlooked to link this societal trend to patterns of declining young adult turnout in advanced industrial democracies. This study can be seen as a follow-up on earlier work in which the link between later maturation and turnout was assessed at the aggregate level (Smets, 2012).

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The later maturation hypothesis provides an intuitive explanation as to why young adults are often found to be less interested, more disengaged and more alienated from the political system. Not having made the transition to adulthood, turnout seems more difficult and less meaningful for the current generation of young adults. While the results of this study can only speak for the impact of later maturation on voter turnout, it would be interesting to see whether a link with declining participation in other forms of political action can be established as well. Depending on data availability it would, moreover, be interesting to see whether a link between later maturation and declining turnout among young adults can be found beyond Great Britain. From a theoretical perspective there are no reasons why this would not be the case. Young adult turnout has declined in almost all advanced industrial democracies and diversified life-trajectories and delayed transitions to adulthood are observed in these countries as well.

While later maturation is found to negatively impact turnout among young voters, the models with the separate life-cycle events do show that more research is necessary to understand the exact mechanisms of the life-cycle models. The negative impact of some indicators suggests that their relationship with young adult turnout may be curvilinear rather than linear. In other words, transitions may have an initial disruptive effect on voter turnout before becoming a positive influence in the mid to long term. Also, while not all variables behave as expected, taken together they do have a positive impact on turnout. It seems that political maturation entails more than just a collection of life-cycle events. Their collective strength seems to outnumber the performance of the individual components.

The findings of this research also have potential policy implications. While it is difficult for governments to influence the pace of maturation in broad terms, assisting

young citizens to become stable and independent earlier in life would have a positive impact on young adults' turnout levels. Tackling youth unemployment, assistance for first-time home buyers, and sufficient childcare facilities are examples of measures that would facilitate the transition to adulthood for young citizens and increase their levels of political engagement. In this sense, the current economic crisis, which puts young Europeans in an exceptionally precarious situation, does not bode well for future levels of voter turnout.

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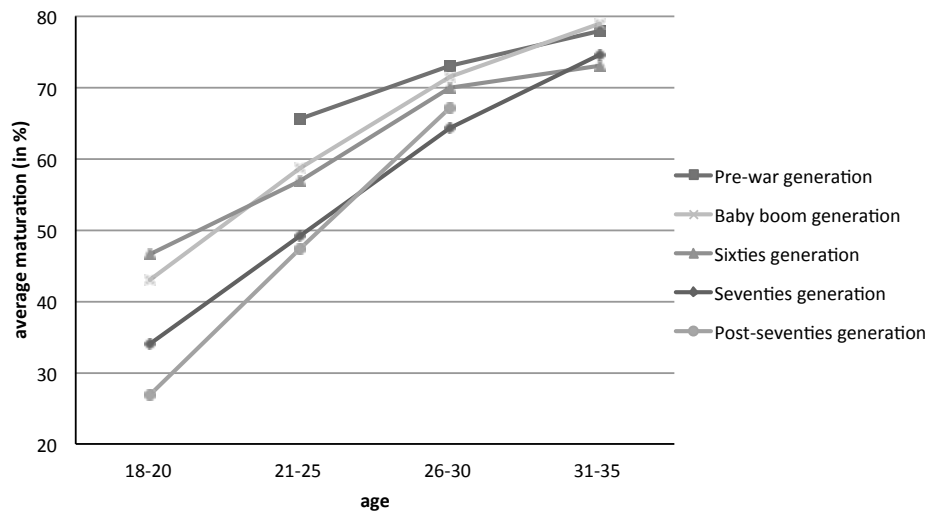
Tables and figures

Figure 1: Average maturation score by age for young adults of different generations, BES 1964–2010
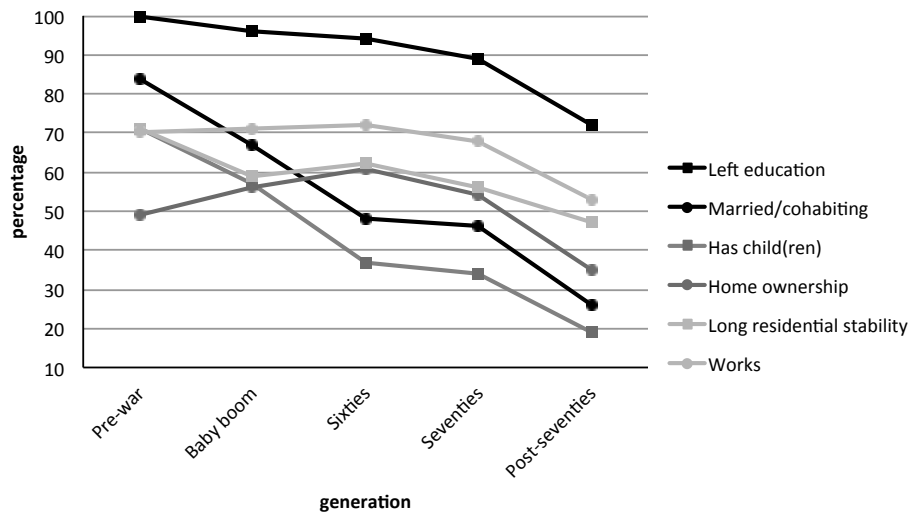
Figure 2: Average scores on life-cycle events of young adults of different generations, BES 1964-2010
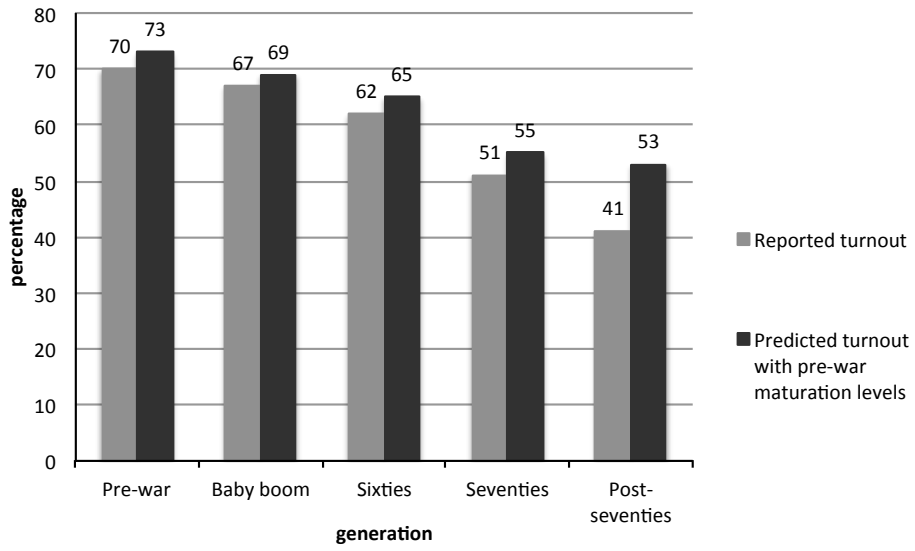
Figure 3: Reported young adult turnout and predicted turnout based on pre-war maturation levels, BES 1964-2010

	model 1 b/(se)	model 2 b/(se)	model 3 b/(se)	model 4 b/(se)	model 5 b/(se)
Age	0.399**	0.088	0.057	-0.339*	-0.097
	(0.184)	(0.184)	(0.195)	(0.186)	(0.171)
Baby boom generation	-0.104	-0.094	-0.091	-0.274	-0.174
	(0.109)	(0.114)	(0.246)	(0.218)	(0.220)
Sixties generation	-0.253	-0.226	0.062	-0.175	-0.031
	(0.185)	(0.179)	(0.403)	(0.416)	(0.396)
Seventies generation	-0.738***	-0.673***	-0.279	-0.169	0.085
	(0.213)	(0.222)	(0.361)	(0.369)	(0.299)
Post-seventies generation	-1.024***	-0.917***	-0.235	-0.239	0.428
	(0.226)	(0.223)	(0.379)	(0.417)	(0.523)
Maturation index		0.803***	1.229***	0.793**	0.742**
		(0.164)	(0.420)	(0.387)	(0.369)
Maturation * Baby boom			0.034	0.192	0.105
			(0.458)	(0.373)	(0.354)
Maturation * Sixties			-0.399	0.093	0.129
			(0.653)	(0.611)	(0.578)
Maturation * Seventies			-0.580	-0.308	-0.031
			(0.505)	(0.459)	(0.418)
Maturation * Postseventies			-1.329***	-0.632	-0.703
			(0.478)	(0.513)	(0.518)
Gender				-0.129*	-0.125*
				(0.074)	(0.075)
Educational level				0.676***	0.664***
				(0.150)	(0.147)
Union membership				0.185**	0.182**
				(0.091)	(0.090)
Strength of party id				1.495***	1.513***
				(0.093)	(0.095)
Perceived party differences				-0.601***	-0.577***
				(0.108)	(0.110)
Vote t-1				1.125***	1.103***
				(0.115)	(0.115)
Margin of the victory				-0.318	-0.304*
				(0.228)	(0.163)
Average turnout older voters					6.148***
					(1.099)
Constant	0.571***	0.193	-0.097	-0.935***	-5.976***
	(0.144)	(0.167)	(0.275)	(0.329)	(1.156)
Log-likelihood	-7137.508	-7100.769	-7087.017	-6237.298	-6204.970
R^2	0.025	0.031	0.033	0.150	0.155
N	10043	10043	10043	10043	10043

note: b coefficients from logit analyses with robust s.e.'s clustered by election in parentheses; reference category is pre-war generation; * $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table 1: Young adult turnout by maturation, BES 1964-2010

	model 1 b/(se)	model 2 b/(se)	model 3 b/(se)	model 4 b/(se)	model 5 b/(se)
Age	0.399**	0.170	0.146	-0.249	0.008
	(0.184)	(0.178)	(0.179)	(0.184)	(0.156)
Baby boom generation	-0.104	-0.140	-0.992***	-0.860**	-0.797*
	(0.109)	(0.110)	(0.270)	(0.427)	(0.431)
Sixties generation	-0.253	-0.330*	-0.662***	-0.648*	-0.538*
	(0.185)	(0.185)	(0.257)	(0.357)	(0.320)
Seventies generation	-0.738***	-0.798***	-1.014***	-0.485	-0.283
	(0.213)	(0.216)	(0.346)	(0.415)	(0.307)
Post-seventies generation	-1.024***	-1.107***	-1.191***	-0.718***	-0.082
	(0.226)	(0.260)	(0.207)	(0.272)	(0.304)
Left education		-0.835***	-1.214***	-1.044***	-1.075***
		(0.159)	(0.193)	(0.250)	(0.259)
Married/cohabiting		0.246***	0.468***	0.426**	0.380**
		(0.090)	(0.166)	(0.188)	(0.183)
Has child(ren)		-0.024	-0.203*	-0.218*	-0.238*
		(0.075)	(0.116)	(0.117)	(0.123)
Home owner		0.520***	0.428***	0.367***	0.371***
		(0.084)	(0.119)	(0.124)	(0.124)
Residential stability		0.229***	0.244	0.294	0.293
		(0.075)	(0.192)	(0.218)	(0.219)
Works		0.166**	0.256*	0.230	0.212
		(0.065)	(0.139)	(0.152)	(0.152)
Left education * baby boom			1.063***	1.029**	1.017**
			(0.337)	(0.449)	(0.462)
Married * baby boom			-0.432**	-0.487*	-0.457*
			(0.200)	(0.249)	(0.243)
Child(ren) * baby boom			0.341**	0.331**	0.283*
			(0.145)	(0.161)	(0.164)
Gender				-0.150**	-0.149**
				(0.075)	(0.074)
Educational level				0.581***	0.566***
				(0.136)	(0.135)
Union membership				0.181*	0.174*
				(0.095)	(0.092)
Strength of party id				1.508***	1.529***
				(0.092)	(0.096)
Perceived party differences				-0.589***	-0.563***
				(0.106)	(0.109)
Vote t-1				1.114***	1.093***
				(0.115)	(0.116)
Margin of the victory				-0.363	-0.350**
				(0.222)	(0.152)
Average turnout >35 years					6.394***
					(1.000)
Constant	0.571***	0.861***	1.171***	-0.061	-5.251***
	(0.144)	(0.154)	(0.211)	(0.311)	(0.921)
Log-likelihood	-7137.508	-7009.394	-6982.965	-6173.429	-6139.803
Pseudo R^2	0.025	0.043	0.047	0.159	0.164
N	10043	10043	10043	10043	10043

note: b coefficients from logit analyses with robust s.e.'s clustered by election in parentheses;
* $p<0.10$, ** $p<0.05$, *** $p<0.0$; reference category is pre-war generation; models include
all interactions between life-cycle events and the baby boom, sixties and seventies generations;
only interaction terms significant at the $p<.05$ level are shown because of space limitations.

Table 2: Young adult turnout by life-cycle events, BES 1964-2010

Appendix A

Variable	Obs	Mean	Std. Dev.	Min	Max
Self-reported turnout (1 = yes)	10043	0,61	0,49	0	1
Age	10043	26,84	5,12	18	35
Maturation index (6 = mature)	10043	3,82	1,50	0	6
Left education (1 = yes)	10043	0,93	0,26	0	1
Married/cohabiting (1 = yes)	10043	0,58	0,49	0	1
Has child(ren) (1 = yes)	10043	0,48	0,50	0	1
Homeowner (1 = yes)	10043	0,54	0,50	0	1
Residential stability (1 = yes)	10043	0,60	0,49	0	1
Works (1 = yes)	10043	0,69	0,46	0	1
Gender (1 = male)	10043	0,50	0,50	0	1
Educational level (3 = high)	10043	2,10	0,60	1	3
Union membership (1 = yes)	10043	0,25	0,43	0	1
Strength of party id (3 = very strong)	10043	1,48	0,93	0	3
Perceived party differences (3 = not much)	10043	1,83	0,71	1	3
Voted previous election (1 = yes)	10043	0,59	0,49	0	1
Margin of the victory	10043	8,01	4,60	1	15
Average turnout older voters	10043	77,53	4,21	68	82

Table 3: Descriptive statistics all respondents

Variable	Obs	Mean	Std. Dev.	Min	Max
Self-reported turnout (1 = yes)	1756	0,70	0,46	0	1
Age	1756	29,82	3,92	21	35
Maturation index (6 = mature)	1756	4,45	1,03	1	6
Left education (1 = yes)	1756	1,00	0,01	0	1
Married/cohabiting (1 = yes)	1756	0,84	0,37	0	1
Has child(ren) (1 = yes)	1756	0,71	0,45	0	1
Homeowner (1 = yes)	1756	0,49	0,50	0	1
Residential stability (1 = yes)	1756	0,71	0,45	0	1
Works (1 = yes)	1756	0,70	0,46	0	1
Gender (1 = male)	1756	0,49	0,50	0	1
Educational level (3 = high)	1756	1,69	0,72	1	3
Union membership (1 = yes)	1756	0,28	0,45	0	1
Strength of party id (3 = very strong)	1756	1,87	0,93	0	3
Perceived party differences (3 = not much)	1756	1,94	0,83	1	3
Voted previous election (1 = yes)	1756	0,67	0,47	0	1
Margin of the victory	1756	3,25	2,12	1	7
Average turnout older voters	1756	79,81	1,34	78	82

Table 4: Descriptive statistics pre-war generation (born <1945)

Variable	Obs	Mean	Std. Dev.	Min	Max
Self-reported turnout (1 = yes)	3618	0,67	0,47	0	1
Age	3618	27,43	4,83	18	35
Maturation index (6 = mature)	3618	4,06	1,33	0	6
Left education (1 = yes)	3618	0,96	0,19	0	1
Married/cohabiting (1 = yes)	3618	0,67	0,47	0	1
Has child(ren) (1 = yes)	3618	0,57	0,50	0	1
Homeowner (1 = yes)	3618	0,56	0,50	0	1
Residential stability (1 = yes)	3618	0,59	0,49	0	1
Works (1 = yes)	3618	0,71	0,45	0	1
Gender (1 = male)	3618	0,49	0,50	0	1
Educational level (3 = high)	3618	2,26	0,56	1	3
Union membership (1 = yes)	3618	0,30	0,46	0	1
Strength of party id (3 = very strong)	3618	1,58	0,92	0	3
Perceived party differences (3 = not much)	3618	1,82	0,69	1	3
Voted previous election (1 = yes)	3618	0,65	0,48	0	1
Margin of the victory	3618	8,11	5,14	1	15
Average turnout older voters	3618	79,65	1,69	78	82

Table 5: Descriptive statistics baby boom generation (born 1945-1959)

Variable	Obs	Mean	Std. Dev.	Min	Max
Self-reported turnout (1 = yes)	2748	0,62	0,48	0	1
Age	2748	26,11	5,36	18	35
Maturation index (6 = mature)	2748	3,75	1,44	0	6
Left education (1 = yes)	2748	0,94	0,24	0	1
Married/cohabiting (1 = yes)	2748	0,48	0,50	0	1
Has child(ren) (1 = yes)	2748	0,37	0,48	0	1
Homeowner (1 = yes)	2748	0,61	0,49	0	1
Residential stability (1 = yes)	2748	0,62	0,49	0	1
Works (1 = yes)	2748	0,72	0,45	0	1
Gender (1 = male)	2748	0,51	0,50	0	1
Educational level (3 = high)	2748	2,16	0,52	1	3
Union membership (1 = yes)	2748	0,25	0,43	0	1
Strength of party id (3 = very strong)	2748	1,38	0,88	0	3
Perceived party differences (3 = not much)	2748	1,68	0,63	1	3
Voted previous election (1 = yes)	2748	0,63	0,48	0	1
Margin of the victory	2748	11,54	2,53	7	15
Average turnout older voters	2748	77,95	3,82	68	82

Table 6: Descriptive statistics sixties generation (born 1960-1969)

Variable	Obs	Mean	Std. Dev.	Min	Max
Self-reported turnout (1 = yes)	1513	0,51	0,50	0	1
Age	1513	26,24	4,88	18	35
Maturation index (6 = mature)	1513	3,46	1,67	0	6
Left education (1 = yes)	1513	0,89	0,31	0	1
Married/cohabiting (1 = yes)	1513	0,46	0,50	0	1
Has child(ren) (1 = yes)	1513	0,34	0,47	0	1
Homeowner (1 = yes)	1513	0,54	0,50	0	1
Residential stability (1 = yes)	1513	0,56	0,50	0	1
Works (1 = yes)	1513	0,68	0,47	0	1
Gender (1 = male)	1513	0,50	0,50	0	1
Educational level (3 = high)	1513	2,12	0,50	1	3
Union membership (1 = yes)	1513	0,17	0,38	0	1
Strength of party id (3 = very strong)	1513	1,23	0,90	0	3
Perceived party differences (3 = not much)	1513	1,96	0,68	1	3
Voted previous election (1 = yes)	1513	0,47	0,50	0	1
Margin of the victory	1513	8,35	3,60	3	13
Average turnout older voters	1513	73,64	4,98	68	81

Table 7: Descriptive statistics seventies generation (born 1970-1979)

Variable	Obs	Mean	Std. Dev.	Min	Max
Self-reported turnout (1 = yes)	408	0,41	0,49	0	1
Age	408	21,92	3,28	18	30
Maturation index (6 = mature)	408	2,52	1,77	0	6
Left education (1 = yes)	408	0,72	0,45	0	1
Married/cohabiting (1 = yes)	408	0,26	0,44	0	1
Has child(ren) (1 = yes)	408	0,19	0,40	0	1
Homeowner (1 = yes)	408	0,35	0,48	0	1
Residential stability (1 = yes)	408	0,47	0,50	0	1
Works (1 = yes)	408	0,53	0,50	0	1
Gender (1 = male)	408	0,51	0,50	0	1
Educational level (3 = high)	408	2,06	0,43	1	3
Union membership (1 = yes)	408	0,10	0,30	0	1
Strength of party id (3 = very strong)	408	1,07	0,85	0	3
Perceived party differences (3 = not much)	408	1,94	0,70	1	3
Voted previous election (1 = yes)	408	0,30	0,46	0	1
Margin of the victory	408	5,85	2,43	3	9
Average turnout older voters	408	70,88	1,48	68	72

Table 8: Descriptive statistics post-seventies generation (born ≥ 1980)

Appendix B

	model 1 b/(se)	model 2 b/(se)	model 3 b/(se)	model 4 b/(se)	model 5 b/(se)
Age	0.399**	0.170	0.154	-0.229	0.036
	(0.184)	(0.178)	(0.182)	(0.188)	(0.157)
Baby boom generation	-0.104	-0.140	-0.496*	-0.508**	-0.395*
	(0.109)	(0.110)	(0.273)	(0.214)	(0.208)
Sixties generation	-0.253	-0.330*	-0.468	-0.477	-0.319
	(0.185)	(0.185)	(0.402)	(0.453)	(0.445)
Seventies generation	-0.738***	-0.798***	-0.950***	-0.632*	-0.355
	(0.213)	(0.216)	(0.330)	(0.353)	(0.353)
Post-seventies generation	-1.024***	-1.107***	-1.138**	-0.897*	-0.185
	(0.226)	(0.260)	(0.446)	(0.492)	(0.595)
Left education		-0.835***	-0.833***	-0.709***	-0.719***
		(0.159)	(0.235)	(0.262)	(0.275)
Married/cohabiting		0.246***	0.202**	0.125	0.129
		(0.090)	(0.090)	(0.091)	(0.089)
Has child(ren)		-0.024	-0.065	-0.087	-0.126
		(0.075)	(0.097)	(0.108)	(0.109)
Home owner		0.520***	0.478***	0.328***	0.323***
		(0.084)	(0.099)	(0.093)	(0.092)
Residential stability		0.229***	0.187*	0.208**	0.219**
		(0.075)	(0.097)	(0.093)	(0.091)
Works		0.166**	0.132	0.046	0.037
		(0.065)	(0.096)	(0.100)	(0.100)
Maturation * Baby boom			0.513	0.549	0.451
			(0.489)	(0.402)	(0.378)
Maturation * Sixties			0.176	0.486	0.513
			(0.685)	(0.678)	(0.647)
Maturation * Seventies			0.200	0.297	0.573
			(0.567)	(0.540)	(0.550)
Maturation * Postseventies			-0.094	0.346	0.253
			(0.600)	(0.652)	(0.672)
Gender				-0.149*	-0.148*
				(0.077)	(0.076)
Educational level				0.544***	0.533***
				(0.140)	(0.137)
Union membership				0.176*	0.171*
				(0.092)	(0.089)
Strength of party id				1.518***	1.539***
				(0.090)	(0.093)
Perceived party differences				-0.577***	-0.552***
				(0.103)	(0.106)
Vote t-1				1.113***	1.090***
				(0.113)	(0.114)
Margin of the victory				-0.357	-0.347**
				(0.225)	(0.155)
Average turnout >35 years					6.481***
					(1.022)
Constant	0.571***	0.861***	1.006***	-0.050	-5.372***
	(0.144)	(0.154)	(0.366)	(0.409)	(1.129)
Log-likelihood	-7137.508	-7009.394	-7006.383	-6195.254	-6159.942
Pseudo R^2	0.025	0.043	0.044	0.156	0.161
N	10043	10043	10043	10043	10043

note: b coefficients from logit analyses with robust s.e.'s clustered by election in parentheses; reference category is pre-war generation; * $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table 9: Young adult turnout by life-cycle events with maturation index interactions, BES 1964–2010

Appendix C - Intended for online publication

Handling missing data raises both conceptual difficulties and computational challenges. The default way in which most statistical packages approach the missing values problem – through listwise deletion or complete case analyses – can yield bias, is inefficient, and is therefore considered unreliable. In general, two approaches to handling missing data are recommended in the literature: maximum likelihood (ML) and multiple imputation (MI) (Schafer and Graham, 2002; Raghunathan, 2004).

There are different types of missing data. Unit non-response occurs when the entire data collection procedure fails because respondents e.g. refuse to participate. Item non-response occurs when data are partially missing because a respondent e.g. did not answer all questions in the survey. Although part of the missing data problem in this paper is due to item non-response, the more pressing problem is that certain variables were not included in certain waves of the British Election Studies. Using listwise deletion would cause the sample size to vary considerably in the analyses presented. This renders comparison of results between the models difficult.

Table 10 below lists all the variables used in the analyses of this paper, the ratio of missing to valid answers, the percentage of missing values[10],and the main reason for the lack of data. If no reason is given, data are missing due to item non-response. The variable with the largest percentage of missing values is residential stability, which was missing in 27.5% of the cases.

variable name	missing/valid value ratio	percentage of missing values	reason for missingness
turnout	0/33737	0%	
age	0/33737	0%	
left education	203/33737	0.6%	
married	29/33737	0%	
has child(ren)	6915/33737	20.5%	Not included in 1974 (feb), 1992
home ownership	2000/33737	5.9%	Not included in 1966
residential stability	9264/33737	27.5%	Not included in 1983, 1992; 1/2 sample in 2001
works	57/33737	0%	
gender	0/33737	0%	
educational level	897/33737	2.7%	
union membership	3014/33737	8.9%	Not included in 1966
pid strength	1656/33737	4.9%	
voted in previous elections	4690/33737	13.9%	Only posed to 1/6 of the sample in 2001
average turnout older voters	0/33737	0%	

Table 10: Missing values of modelled variables

The percentage of missing values in the sample used is quite high for certain variables. This calls for an imputation method with a high level of efficiency. Suppose x is a real value

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[10]Ratio's and percentages are calculated based on the whole sample rather than the subset of young adults aged 35 years or less. The reason for this is that the average turnout of older citizens is part of the model and missing values thus need to be imputed for all respondents.

and $\hat{x}$ an estimated value. While treating missing data in a sample we want to make sure that the bias between estimated and the true values is small. Moreover, we want the variance and standard deviation of the estimated values to be small. Bias and variance are often combined into one measure called mean square error, which is the squared distance between the estimated and the real values over repeated samples: $(\hat{x}\text{-}x)^2$. The mean square error is equal to the squared bias plus the variance. Bias, variance, and the mean error describe the behaviour of an estimate. However, we also want to be confident about the measures of uncertainty that we report and estimate the true x with a probability of a certain predefined rate (Schafer and Graham, 2002, p. 149).

Multiple imputation (MI) is a method for handling missing data that solves the problem of uncertainty that many single imputation methods face. MI replaces each missing value by a list of $m > 1$ simulated values and as such produces m plausible alternative versions of the complete data set. Each of the m data sets is estimated in the same fashion by a complete data method. Estimates of parameters of interest are subsequently averaged to give a single estimate. Standard errors are computed according to the 'Rubin rules' (see below), allowing for between- and within-imputation components of variation in the parameter estimates.

MI does not need many rounds of estimation to reach a high level of efficiency. Rubin (1987) developed with the following way to calculate the efficiency of an estimate based on an m number of imputation (see equation 1):

$$eff = (1 + \lambda/m)^{-1} \qquad (1)$$

where the efficiency is a function of the rate of the missing information (λ) and the number of imputations (m). For example, with 27.5% of missing information (as is the case with residential stability), $m = 5$ imputations will yield results that are $100/(1 + .055) = 94.8\%$ efficient. A rule of thumb for selection of the number of imputation rounds is that the confidence coefficient for the worst-case parameter (in this case residential stability) should be at least 95% (Royston, 2004, p. 239). This means that in this particular case more than five rounds of imputation are desirable. Six rounds of imputation yield an efficiency of 95.6% for the residential stability variable. Therefore, m is set to six for the imputation procedure used to handle missing data for the analyses in this paper. The `ice` command in Stata is used to execute the multiple imputation process (see Royston, 2004, 2005a,b).

As mentioned above, multiple imputation creates a small number of data sets (in this case six), each of which has the missing values suitably imputed. The next step is to analyze each complete data set independently and summarize the results of these independent estimations. Coefficients are simply averaged. Summarizing the standard errors requires a bit more work (see equation 2 taken from Rubin (1987)):

$$s = \sqrt{\bar{u}_m + \frac{m+1}{m} b_m} \qquad (2)$$

where $\bar{u}_m$ is the mean of the standard error's, and b_m is the variance of the estimates across the imputations. The `micombine` command in Stata combines the estimates from the m analyses using Rubin's rules (Royston, 2004, 2005a,b).

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