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Shaping the Nation: Estimating the Impact of Fourth of July Using a Natural Experiment*

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Preliminary

Abstract

Do childhood events shape adult political views and behavior? This paper investigates the impact of Fourth of July celebrations in the US during childhood on partisanship and participation later in life. Using daily precipitation data to proxy for exogenous variation in participation on Fourth of July as a child, we examine the role of the celebrations for people born in 1920-1990. We find that days without rain on Fourth of July in childhood have lifelong effects. In particular, they shift adult views and behavior in favor of the Republicans and increase later-life political participation. Our estimates are significant: one Fourth of July without rain before age 18 raises the likelihood of identifying as a Republican by 2 percent and voting for the Republican candidate by 4 percent. It also increases voter turnout by 0.9 percent and boosts political campaign contributions by 3 percent. Taken together, the evidence suggests that important childhood events can have persistent effects on political beliefs and participation and that Fourth of July celebrations in the US affect the nation's political landscape.

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1 Introduction

Many countries have a national day commemorating a key historical event. France celebrates the storming of the Bastille on 14 July. South Africa celebrates Freedom Day to commemorate the first post-apartheid elections held on 27 April 1994, and the United States celebrates Independence Day or the Fourth of July in memory of declaring independence from Great Britain in 1776. In 2010, an estimated 144 million Americans age 18 or older celebrated Fourth of July by attending a barbecue. Another 98 million watched the fireworks or went to a community festivity, while more than 28 million saw a parade (National Retail Federation, 2010).

Beyond the immediate fervor of the festivity, however, do national day celebrations matter? Does participation in national ceremonies and parades have a deeper impact by affecting peoples' political beliefs, identity, and behavior? Fourth of July celebrations in the United States are a case in point. The celebration is traditionally considered a patriotic event that divides along political lines. A majority of people report displaying American flags, and over 30 percent say they sing patriotic songs. Republicans attend Fourth of July to a greater extent and also view the holiday as more important compared to Democrats (Gallup, 2002; AARP, 2006; Rasmussen Reports, 2009, 2010). Children are a particular focus, and adults with children at home are more likely to participate in Fourth of July celebrations than those without (Gallup, 2002; Rasmussen Reports, 2010).

Motivated by the emphasis placed on children during the festivities, our main objective in this paper is to analyze the impact of Fourth of July celebrations during childhood on political preferences and behavior later in life. Estimating the effect of public events, such as Fourth of July, presents two main challenges, however. First, it is difficult to observe participation in Fourth of July festivities. For example, it is hard to measure how many parades an individual attended during childhood, or how many fireworks she watched. Second, even if such measures are correlated with political preferences, they may not reflect a causal effect of Fourth of July. For instance, patriotic families might both attend celebrations and have preferences in favor of the Republicans. A correlation between participation in Fourth of July festivities and partisanship, thus, simply reflects that some families are more inherently patriotic.

In this paper, we address these issues by exploiting a natural experiment induced by random daily variation in precipitation. The basic idea is the following: fireworks, parades, political speeches, and barbecues are typically held outdoors. Parents and children are less likely to participate if it is raining, and events are often cancelled due to bad weather. Some children growing up experience nice weather and are more likely to celebrate, while others are hit by bad weather making it less likely that they join the festivities. We thus use the absence of rain as a proxy for participation in holiday celebrations on Fourth of July.[1] By using within-county variation across

[1]Because we cannot observe participation in specific Fourth of July activities, we are agnostic about which type of

cohorts, we exploit arguably exogenous shocks in rainfall that are uncorrelated with other determinants of political preferences and behavior. Any estimated difference in outcomes should therefore capture a causal effect of weather-induced Fourth of July celebrations.[2]

To analyze whether participation in Fourth of July celebrations affects preferences and behavior, we compile individual-level outcome data from 27 American National Election Studies (ANES) conducted between 1952-2008 and match it with county-level information on rainfall taken from the National Oceanic and Atmospheric Administration (NOAA) during the period 1920-2008. The reduced-form impact of rain is estimated in two ways. We first compare the contemporaneous change in preferences and behavior for adults, who experience a rain-free Fourth of July, with those that do not. This establishes whether Fourth of July affects individuals contemporaneously as adults. We then extend the main analysis by measuring the effect of the number of rain-free Fourth of Julys experienced during *childhood* on preferences and behavior as an *adult*.

We document a set of striking relationships linked to Fourth of July. We first show that Fourth of July celebrations have a significant impact on people's political preferences. A rain-free Fourth of July makes it 1.3 percentage points more likely that an individual contemporaneously identify as a Republican. Turning to the effect on children, we show that the likelihood that an adult at age 40 identifies as a Republican increases by 0.76 percentage points for each rain-free Fourth of July during childhood, where childhood is defined as the ages of 3-18. There is no evidence of an increased likelihood of identifying as a Democrat, indicating that Fourth of July shifts preferences to the right rather than increasing political polarization.[3]

Fourth of July weather also has a significant impact on political behavior and political participation in presidential elections. One rain-free Fourth of July increases the likelihood of voting for the Republican candidate at age 40 by 1 percentage point, with no effect on the likelihood of voting for the Democratic candidate. This is not only due to a shift in political preferences, as Fourth of July increases political participation in general. We show that voter turnout later in life increases by 0.62 percentage points per rain-free day. The likelihood that individuals attend political rallies, make campaign donations, and work for political parties as adults also rises.[4]

We further investigate whether rain-free Fourth of Julys at certain key ages matter more than others during childhood and if the effects are *permanent*. Surprisingly, the estimates show that the impact on political preferences is permanent, with no evidence of the effects depreciating as indi-

celebratory activities during Fourth of July that matter.

[2]We investigate the plausibility of this assumption by showing that rainfall on Fourth of July during childhood and later in life is uncorrelated with other important individual covariates of preferences and behavior.

[3]To check whether the effects are truly driven by Fourth of July celebrations we run placebo regressions for all the outcome variables. In particular, we show that contemporaneous and childhood rainfall on 2nd, 3rd, 5th, and 6th of July has no effect on preferences and participation.

[4]We do not find evidence that adults celebrating Fourth of July in the election year are affected in terms of voting behavior or other forms of political participation.

viduals become older. We also document an inverted-U relationship between age in childhood and the Fourth of July impact on pro-Republicanism. In particular, there are no statistically significant effects early or late in childhood, and the effects peak for rain-free days at ages 7-10. Examining voter turnout, we find evidence suggesting that the critical period occurs later, as the effects peak for rain-free days at ages 15-18. Contrary to the finding on political preferences, the impact on turnout depreciate as individuals become older.

Finally, we consider if the effects of Fourth of July varies across political orientation at the community level and across time. We show that the impact on preferences and voting behavior are driven by Republican-dominated counties, with no effect in Democratic counties. To understand how the celebrations have evolved over the 20th century, we examine the impact across the different cohorts and find that the Republican bias is weaker for younger cohorts. Meanwhile, the effect on voter turnout is constant across political domain and across time.

Taken together, the results indicate that Fourth of July celebrations in the United States shape the nation's political landscape by forming beliefs and increasing participation, primarily in favor of the Republican party. To quantify the overall effects during the sample period, one rain-free Fourth of July in childhood raises the nationwide share of people identifying as Republicans by 2.1 percent, the share of people voting for the Republicans by 4.0 percent, and the share of people turning out to vote by 0.95 percent.

Our results are consistent with three interpretations. First, evidence from development psychology and neurobiology shows that the early years are foundational for a full range of human competencies (Knudsen et al., 2006). Children are particularly responsive toward change, with the consequence that later experience requires relatively more intensity and tends to be less efficacious in shaping emotions and behavior. Also, specific interactions during childhood display nonlinearities as different types of abilities appear to be manipulable at different ages (Heckman, 2007). This may explain why we find permanent effects on political preferences, where the critical period occurs relatively early, while the key ages for turnout occur later with the effects fading over time. The explanation also supports the inverted-U relationship between age and rain-free Fourth of Julys if the influences shaping political preferences and the choice to vote are manipulable at certain key ages. This is something that warrants further investigation.

A second interpretation is based on congruence. To the extent that there is a political congruence between the patriotism promoted on Fourth of July and Republican beliefs, celebrations in Republican dominated counties may be more politically biased occasions that socialize children into Republicans. Evidence on historical Fourth of July practices shows that the holiday was a political community event in the first half of 20th century, but became increasingly commercialized and more private in character in the 1950's and the 1960's (Appelbaum, 1989; Nemanic, 2007). Hence, strong political connotations to Fourth of July celebrations in Republican communities

yield a Republican bias that should diminish if the festivities become depoliticized.

A third interpretation is that Fourth of July celebrations build a national identity and a shared belief in the underlying principles supporting society, one such principle being the civic duty to vote. The constant impact on voter turnout across time and space is consistent with the idea that the holiday transmits a general and nonpartisan national identity that fosters political participation per se.

The latter two interpretations relate to work by economists and sociologists that view national holidays as public rituals that reconfirm societal commitments, national identity, and political norms (Durkheim, 1912; Turner, 1985; Etzioni, 2000; Chwe, 2001).[5] According to this literature, Fourth of July is a day that provides a context for the celebration of an American civil religion organized around flags, parades, and the Constitution (Warner, 1962; Verba, 1965; Bellah 1967; Kertzer, 1988). While it is unclear whether public rituals primarily promote value integration or mobilize in favor of certain political interests (Lukes, 1975), there is evidence that the political right has been more successful in appropriating American patriotism and its symbols during the 20th century (Thomas and Flippen, 1972; Mathisen, 1989; Leege et al., 2002; Parker, 2009).

By examining determinants of political behavior our paper contributes to empirical research explaining political participation and voter turnout. A large body of work has investigated the impact of personal characteristics such as age, education, gender, and race (see for example, Ashenfelter and Kelley, 1975 and Wolfinger and Rosenstone, 1980 and Blais, 2000 for a review).[6] However, most of the existing studies are based on simple correlations (for an exception related to education, see Sondheimer and Green, 2010). We add to this literature by exploiting a natural experiment to study the causal determinants of political participation.

In addition, political theorists have rationalized why people vote by appealing to the voting act's consumption benefits or civic duty (Downs, 1957; Riker and Ordeshook, 1968). More recent efforts highlight group-based models where group members want to "do their part" to help the group win (Coate and Conlin, 2004; Feddersen and Sandroni, 2006). The challenge to this approach is understanding why people join groups to begin with and act as group rule-utilitarians in elections. We connect to these papers by examining a possible determinant of civic duty. Also, by investigating Fourth of July as a source of group identity formation, we provide an explanation for how people align or identify with their groups in the first place.

Our focus on party identification as a measure of people's political preferences is motivated by recent research showing how partisan identity causally affects political attitudes and behavior (Gerber et al., 2010). Related to this, while most work takes political preferences as given,

[5]Chwe (2001) argues that Fourth of July and similar public rituals can be rationalized as a common knowledge-generating coordination mechanism that allows people to submit to a social or political authority.

[6]There is also a literature studying how turnout is affected by media access (Strömberg, 2004; Gentzkow, 2006; Oberholzer-Gee and Waldfogel, 2009).

there is a small empirical literature in economics and political science that investigates how adults' preferences may be affected, notably DellaVigna and Kaplan (2007) who study media persuasion, Green and Gerber (2008) who focus on get-out-the-vote experiments, Washington (2008) who documents congressional decision making, and Mullainathan and Washington (2009) who examine voting behavior and cognitive dissonance.[7] Unlike in these contributions, we consider how childhood experience can affect preferences and subsequent adult behavior.

The paper also relates to research on how political culture is sustained or changed as people acquire their attitudes or values (Almond and Verba, 1963). Theories of political socialization claim that political ideas, identity, and preferences in childhood are created by way of the family, the education system, peers, and media (Hyman, 1959; Easton and Dennis, 1969; Jennings and Niemi, 1974). The notion that the family is an important agent of socialization ties in with a recent theoretical economics literature emphasizing parents' role in value transmission (Bisin and Verdier, 2000, 2001; Tabellini, 2008). Empirical work in political science and psychology also show that what is learned during childhood predicts political behavior and opinions later in life (Gimpel et al., 2003). However, there are few quantitative studies using causal inference methods that investigate these determinants and their long-run effects. Our paper contributes to this literature by examining how a natural experiment in the United States, Fourth of July weather, forms political preferences in childhood, which then transmits into adult political behavior.[8]

Finally, despite extensive sociological research on rituals there are no empirical studies using causal inference to investigate the transitory and lasting importance of national days in general, and Fourth of July in particular. We add to this work by examining how one of the largest public rituals and festivities in the United States, Fourth of July, affects short- and long-term political preferences and political behavior.

The next section gives some background on Fourth of July celebrations to contextualize our findings. Section 3 discusses the methodology. In Section 4 we present our main results and Section 5 concludes.

2 A Brief History of Fourth of July

On July 3, 1776, John Adams, the second president of the United States wrote "[Fourth of July] ought to be commemorated as the day of deliverance...It ought to be solemnized with pomp and parade, with shows, games, sports, guns, bells, bonfires, and illuminations, from one end of this

[7] See also Clingingsmith et al. (2009), documenting the impact of the Hajj pilgrimage on adult pilgrims' attitudes, beliefs, and practices.

[8] By causally investigating the importance of early childhood influences on later life outcomes, we connect to a growing literature examining early determinants of human capital formation (see, for example, Cunha and Heckman, 2008 and Cunha et al., 2010 and Almond and Currie, 2010 for a review).

continent to the other, from this time forward, forevermore" (Adams, 1776, p. 3).[9] In the years that followed, Fourth of July was the only national holiday, marking the date of the nation's existence and serving as a display of national unity. The latter function of Independence Day was particularly important in helping the scattered citizens of 13 states view themselves as part of a single nation (Waldstreicher, 1995; Travers, 1997; Heintze, 2007). Celebrations in the early republic included militia drills, processions, readings of the Declaration, dinners, and fireworks.[10]

Present-day festivities took form in the late 19th and early 20th century, being part of the Progressive Movement's effort to revive civic ceremonies on Fourth of July. Appelbaum (1989) describes how the tastes of the progressive reformers ran towards "patriotic pageants, patriotic music, parades with patriotic floats, marching units patriotically costumed in period dress, and tableaux vivants depicting patriotic scenes in American history" (Appelbaum, 1989, p. 141). Through campaigns such as "Safe and Sane July Fourth", the reformers sought to convince local civic officials to make the public holiday resemble a playground festival, in which children performed dramatic skits and dances (Smilor, 1980; Glassberg, 1987). In documenting Fourth of July celebrations in Minnesota in the early and mid 20th century, Nemanic (2007) writes "Independence Day programs featured events for the entire family, with particular emphasis placed on children...festivities would begin with a noisy wakeup ritual followed by a patriotic parade. Afterwards, a formal ceremony might be held that included orations and readings from the Declaration of Independence. The afternoon offered an array of contests, concerts, and sporting events. In the evening,...a torch light parade might be held...Fireworks ended most celebrations" (Nemanic, 2007, p. 121).

Celebrations in the first half of the 20th century were political events. Local politicians were involved in planning for the occasion, as well as providing financial support to the Fourth of July festivities. They also participated actively in the parades and presented orations during the formal ceremonies. Many used the holiday to campaign or to gain visibility between campaigns by giving political speeches. In the cities, civic groups and political parties organized separate events to further their particular cause (Appelbaum, 1989; Nemanic, 2007).

Fourth of July in the 1950's and the 1960's included beauty contests, auto races, regattas, dog shows, and parachute-jumping contests, as well as traditional parades and orations (Appelbaum, 1989). The holiday became increasingly commercialized as businesses took over the Fourth of July program sponsorship from town volunteer committees and the political parties (Nemanic, 2007). Also, the backyard barbecue was institutionalized during this period, making Fourth of July a more private tradition among friends as opposed to a community festival. As a consequence of the

[9] John Adams' letter to his wife, Abigail, actually spoke of July 2, the date the resolution of independence was approved, but from the outset, Americans celebrated independence on Fourth of July, the date shown on the Declaration of Independence (Appelbaum, 1989).

[10] Historic accounts further document how newspapers played a vital role in spreading common Fourth of July practices across the country (Waldstreicher, 1995; Newman, 1999).

holiday's changed character, the event became depoliticized. While Fourth of July celebrations in the last 40 years have kept much of the private features introduced in the 1950's and 1960's, some of the patriotic practices from the beginning of the 20th century were reintroduced. Contemporary festivities can be full-day affairs, with parades and speeches in the morning followed by afternoon barbecues, tailgating, and evening fireworks (Heintze, 2007).

3 Methodology

The ideal experiment to estimate the effects of Fourth of July would be to allocate participation in the event randomly to some individuals and not to others, and then compare preferences and behavior across the two groups. In the absence of such evidence, and because we cannot audit actual participation nor control for unobserved factors likely to motivate those who join the festivities, it is difficult to measure the impact of celebrating Fourth of July.

The key innovation of this study is to exploit random day-to-day variation in precipitation to estimate the effect of Fourth of July celebrations. Using daily rainfall data has two advantages. First, rain deters people from participating in the celebrations. While there is no systematic evidence on attendance rates on Fourth of July, several newspaper accounts from Fourth of July festivities across the United States report that rainfall reduces the number of people who participate. In recounting the event in 2004, the *Washington Times* wrote "Rain keeps crowds thin, ends some festivities...Metro reported a drop of more than 100,000 riders from last July Fourth, likely the result of the weather" (Washington Times, July 10, 2004). Similarly, in describing the celebrations in 2003, the *Houston Chronicle* reports "...weather dampens turnout for Red, Hot & Blue bash...crowd estimates put attendance at a little more than half of the 100,000 people who normally pack the event" (Houston Chronicle, July 10, 2003). In what follows, absence of rain thus serves as a proxy for participation in holiday celebrations on Fourth of July. Second, since weather is stochastic, conditional on the probability of rain, rainfall on a specific Fourth of July is a random event. Similarly, given the likelihood of rain, the number of days during childhood in which a child experiences rain on Fourth of July is also random. Random rainfall therefore provides plausibly exogenous variation in participation in Fourth of July celebrations. In the next sections, we discuss the data and lay out the details of our identification strategy.

3.1 Data

We rely on information from two sets of data. The data on rainfall comes from NOOA National Data Centers (NNDC). The data on political preferences and political behavior is taken from the ANES. The NOOA data set contains daily rainfall from approximately 18,000 weather stations for

each July between 1920 and 2008.[11] Figure 1 displays the distribution of weather stations across the U.S. We proceed in several steps to match the rainfall and the survey data. For each day, we first aggregate the weather station data to the county level by extracting the average rainfall (in inches) in the county. Figure 2 graphically shows the probability of rain during Fourth of July in U.S. counties for the sample period. To minimize measurement error problems due to missing data, we only include counties for which there is at least fifty years of data. The ANES contains survey data for every national election between 1952 and 2008. To measure rainfall during childhood and later in life, we match the 1920-2008 county-level rainfall data with individuals born 1920 and later surveyed in the ANES.

There are some issues with matching and measurement of rainfall for individuals during childhood. Because the measurement error problem is less problematic when investigating the contemporanous effects of Fourth of July as an adult, we build one panel (Panel A) used for studying long-term effects from childhood and one panel (Panel B) for contemporaneous effects as an adult.

In a majority of the surveys, the data contains information on the county of residence. A limitation is that we lack information of the county of birth or county of residence in childhood. When investigating the long-term effect of Fourth of July, we would like to measure rainfall for an individual during childhood. Since we only observe the county of residence at the time of the survey, we match at the county of residence, leading to a measurement error problem. However, in most surveys, data is available on the region of birth. To mitigate some of the measurement error problem we only include individuals living in the region of birth in Panel A.[12] In addition, the county-level rainfall data in childhood is incomplete for some individuals. Hence, Panel A only contains individuals for which there is no more than one missing Fourth of July childhood rainfall observation.[13] Since the measurement error is likely to be classical, attenuation bias will lead us to underestimate the long-term effects of Fourth of July celebrations.[14]

Table 1 presents the summary statistics.

3.2 Empirical Strategy and Specification

The empirical strategy builds on two assumptions. First, conditional on the likelihood of rain, rainfall on a specific Fourth of July, or the number of days during childhood in which a child

[11] The NOOA data has information for some weather stations going further back in time. However, according to a NOOA contact person the data quality before the 1920's is very low. Consequently, we do not use earlier data.

[12] Since weather systems are typically much larger than counties, the spatial correlation of daily rainfall across counties within a given region will be high, thereby mitigating some of the measurement error.

[13] In addition to the above issues, in the years when the Fourth of July is on a Sunday, the official federal holiday is on July 5 and many events also move to July 5. Therefore, for the years when Fourth of July is on a Sunday we use the rainfall on July 5.

[14] For this reason, the estimated effects can be viewed as lower bounds.

experiences rain on Fourth of July is random. Second, individuals are less likely to participate in the festivities when it rains. Together, the assumptions imply that rainfall induces random variation in Fourth of July celebrations.

The challenge faced when implementing this idea in a regression framework concerns estimating the likelihood of rain on a specific Fourth of July for each cohort born between 1920 and 1990. If the probability of rain would be constant across years at a given geographic location, the problem could be solved by simply using fixed effects for the proper geographic identifier, such as the county. This is insufficient, however, as the likelihood of Fourth of July rain has decreased over time (results not shown). Hence, even conditional on county, climate change has lead to earlier cohorts experiencing more rainy Fourth of Julys on average than later cohort. To address the possibility that heterogeneous rainfall trends across different U.S. regions could be correlated with other determinants of political preferences and behavior, we include a set of fixed effects, time trends, and individual covariates.[15] Specifically, to investigate whether Fourth of July affects preferences and behavior, we use OLS to estimate the following specification

$$y_{i,b,c,t} = \beta RainfreeJuly4_{i,b,c,t} + \lambda_c + \tau_b + \theta_t + \delta_s \times t + \gamma X_i + \varepsilon_{c,i}, \tag{1}$$

where $y_{i,b,c,t}$ is the outcome of interest (political party identification, voting behavior, and political participation) for individual i, born in year b, living in county c, and surveyed in election year t. In Panel B, $RainfreeJuly4_{i,b,c,t}$ (hereafter $RainfreeJuly4$) is a dummy variable equal to one if there was no rain in county c in election year t. In Panel A, $RainfreeJuly4$ is a continuous variable measuring the number of days without rain on Fourth of July during childhood, for individual i, born in year b, and living in county c. We define childhood to include ages 3 to 18. We exclude the first two years of life, as the child is unlikely to be aware of Fourth of July celebrations due to cognitive development.[16] Figure 3 shows the distribution of $RainfreeJuly4$ in panel A. In the main specification, we include county (λ_c), birth-cohort (τ_b), and survey-year fixed effects (θ_t), as well as state-specific time trends (δ_s) and a vector of covariates X_i for individual i. The county fixed effects control for any time-invariant county-level determinant of preferences and behavior. The birth-cohort fixed effects control for any time-variant determinant of preferences and behavior across birth cohorts. The survey-year fixed effects control for any time-variant determinant across different survey years (that is, elections). The state-specific trends control for any linear time trend in preferences and behavior that is specific to each state in the sample.

[15] Even if rainfall is uncorrelated with other determinants of political preferences, and as long as the covariates are not endogenous to Fourth of July celebrations, including individual control has the benefit of improving precision. We investigate how sensitive the results are to the inclusion of different fixed effects and individual controls. In general, the main results do not change.

[16] We later investigate whether rain-free Fourth of Julys at certain key ages matter more than others during childhood. The results confirm the assumption of no effect in the first two years of life.

We include the following covariates: race (African American and other non-white), education (high school degree with some college education and college degree), gender, marriage status, and family income (middle and top tertile).[17] In Panel B, we also control for average daily July rainfall in county *c*, in election year *t*, excluding Fourth of July. In Panel A, we instead control for the average daily July rainfall for individual *i*, during childhood, excluding Fourth of July.

If Fourth of July celebrations *as an adult* affects preferences and behavior contemporanously, then $\beta \neq 0$ in Panel B. If Fourth of July celebrations *during childhood* affects preferences and behavior as an adult, then $\beta \neq 0$ in Panel A.

The identifying assumption in the regression specification is that, conditional on the fixed effects and the state trends, rainfall on Fourth of July is a random variable. That is, since weather is a stochastic event, some cohorts growing up in a given county will have few Fourth of Julys without rain (and are thus less likely to celebrate), whereas other cohorts growing up in the same county will have many rain-free Fourth of Julys (making them more likely to celebrate). Similarly, in Panel A whether adults experience a rainy or rain-free Fourth of July in the year of the survey is as good as randomly assigned.

The assumption implies that any other determinant of political preferences and behavior is uncorrelated with $Rainfree July4$. To assess the validity of this assumption, we first examine whether pre-determined individual covariates are correlated with $Rainfree July4$. In columns 1 and 3 of Table 2, we examine the estimated coefficient of equation (1), excluding $Rainfree July4$. We find that the set of individual covariates (race, gender, marriage status, education, and income) in Panels A and B are strong predictors of identifying with the Republicans. In column 4, we estimate the same equation using $Rainfree July4$ of Panel B as the dependent variable. If the identifying assumption is correct, there should be no correlation between the individual covariates and the likelihood of having a rain-free Fourth of July. Column 4 shows that the coefficients are small and no one is individually significant. Also, the F-test also indicates that they are jointly insignificant. In fact, they explain almost none of the variation in rainfall, with a p-value of 0.99. Similarly, column 2 runs the same regression on Panel A using the number of rain-free Fourth of July days in childhood as the dependent variable. Again, none of the coefficients are individually significant and the p-value is very high.[18] Together, this lends credibility to the identification strategy.

[17] Note that we indirectly control for age since age is collinear with the cohort- and survey-year fixed effects.

[18] Since we are measuring rainfall during childhood, only race and gender are truly pre-determined variables for the individual. Nevertheless, none of the covariates are correlated with the rainfall variable. While we include the covariates in the main regressions, we show that the main results are insensitive to the exclusion of the covariates.

4 Main Results

This section presents our main results on the impact of Fourth of July. We examine political preferences, political behavior, political participation, critical periods in childhood when rain-free Fourth of Julys may matter more, and life-long persistence, respectively. In the Appendix we include additional robustness tests.

4.1 Political Preferences

Table 3 reports the main results on political preferences as measured by party identification. Panel A examines the long-term impact of rain-free Fourth of Julys in childhood, whereas Panel B estimates the contemporanous impact of a rain-free Fourth of July in the survey year. Starting with the latter, in column 1 of Panel B, we report the estimated coefficient without the individual controls and the state-specific time trend. The point estimate of 0.0103 is (marginally) insignificant. In columns 2 and 3 we add the controls and the trend. The coefficient 0.0131 is significant at the five percent level. It implies that a rain-free Fourth of July increases the likelihood of identifying with the Republicans by 3.6 percent (1.3 percentage points from a sample mean of 35.7 percent Republicans). To understand whether Fourth of July shifts the political preferences to the right, rather than increasing political polarization, columns 5 and 6 estimate the likelihood of identifying as an Independent and Democrat, respectively. The point estimate in column 5 is negative (-0.0098) and significant at the five percent level. Importantly, the results in column 6 show a negative coefficient (-0.0033 and insignificant) which is inconsistent with Fourth of July celebrations increasing political polarization.[19] Overall, the results in columns 1-3 and 5-6 show that Fourth of July causes individuals to identify more with the Republicans, consistent with Fourth of July celebrations shifting preferences toward the political right.

To investigate whether the effects are truly driven by weather conditions affecting Fourth of July celebrations, rather than weather conditions in early July affecting political preferences for other reasons, unrelated to the celebrations, column 4 presents placebo results. In particular, the placebo variables measure whether July 2nd, 3rd, 5th, and 6th were rain free. If the effects are driven by Fourth of July weather affecting the celebrations, having good weather during the other days should have no impact.[20] Indeed, the results in column 4 indicate no evidence in support of the hypothesis that weather during the other days has an effect on identifying as a Republican.[21]

[19] In the data, respondents identify as Republicans (including "leaners"), Independents, or Democrats (including "leaners"). Therefore, the point estimate in column 1 is equal to the sum of the point estimates in columns 2 and 3.

[20] Note that even if Fourth of July celebrations truly has an impact, weather in the days preceding July Fourth could still affect expectations about July Fourth weather, and therefore cause cancellations of events, in addition to affecting planning decisions. However, as the results in column 4 show, we find no evidence of such anticipation effects.

[21] There are also no effects on identifying as an Independent or a Democrat for the placebos (results not shown).

The coefficients are all close to zero and the p-value from the F-test that all the placebo coefficients are zero is also high. Reassuringly, the point estimate for Fourth of July is similar to the one in column 3, and significant at the ten percent level.[22] Together, the results support the notion that celebrating Fourth of July *as an adult* induces a contemporaneous preference shift to the right.

Panel A of Table 3 examines the main question of whether Fourth of July celebrations *during childhood* permanently shapes an individual's political preferences. We first run the specification without the controls and the state trend (column 1) and then add the covariates and the trend. The coefficients are similar across the three columns and show that Fourth of July celebrations during childhood affect the likelihood of identifying with the Republicans at age 40 (the sample mean). The point estimate in column 3, 0.0076, is significant at the one percent level and implies that one more rain-free Fourth of July increases the likelihood of identifying with the Republicans by 2.1 percent (35.7 percent in the sample identify as Republicans). Columns 5 and 6 investigate whether there is a shift of preferences to the right, or an increase in political polarization. There is no evidence of an increase in political polarization. Instead, columns 1-3 and 5-6 indicate that Fourth of July shifts political preferences to the right, consistent with Fourth of July celebrations during childhood affecting an individual's political views later in life.

Column 4 presents results on identifying with the Republicans when we include the placebos. If the effects are truly driven by Fourth of July weather, having good weather during other days should have no effect.[23] The results in column 4 indicate that there is little evidence that the weather during the other days has an effect. The coefficients are all close to zero and the p-value from the F-test that all the placebo coefficients are zero is very high (0.9). Examining column 4, we also see that the point estimate for Fourth of July is similar to column 3 and significant at the one percent level. Figure 4 graphically displays the estimated coefficients of column 4 with 95 percent confidence intervals. In sum, the fact that there there is only a significant effect of weather on Fourth of July supports the idea that political preferences change because good weather increases the likelihood that children participate in the celebrations.

4.2 Voting Behavior

The results above show that Fourth of July celebrations in childhood cause individuals' political preferences to permanently shift toward the Republicans. In this section, we examine whether the change in preferences translate into altered political behavior. We do this by exploiting the ANES survey data to investigate the impact of childhood celebrations on voting behavior in presidential

[22] Since weather on Fourth of July is highly correlated with weather during nearby days, the standard error naturally goes up.

[23] However, this is not necessarily the case. For example, rainfall in the days leading up to Fourth of July could change expectations about Fourth of July weather, thereby changing one's plans to participate in the festivities.

elections later in life. Columns 1 and 2 of Table 4 shows the point estimate with and without the controls and the trend, and indicates that a rain-free Fourth of July increases the likelihood of voting for the Republicans by 1.0 percentage point (column 2).[24] The coefficient is significant at the one percent level.[25] In columns 3 and 4, we examine whether there is an increase in the likelihood of voting for the Democratic candidate. The point estimates are negative, close to zero, and insignificant. Hence, we find no evidence of Fourth of July celebrations increasing the likelihood of voting for the Democratic candidate, in line with Fourth of July shifting preferences to the right.[26] In the final column, we restrict the analysis to those respondents who reported having voted. Conditional on voting, an individual is .96 percentage points more likely to vote for the Republicans, a result which is significant at the five percent level.[27] In the Appendix we also investigate whether there is any effect of rain free adjacent days and find that the coefficient on the placebo days are individually and jointly insignificant (the p-value from the F-test of the joint hypothesis that all the placebo coefficients are zero is 0.95).

Overall, the results imply that the festivities cause an increase in the likelihood of voting for the Republicans, consistent with the notion that Fourth of July celebrations during childhood affect not only political preferences but also voting behavior later in life. From a baseline of 25 percent in the sample voting for the Republicans (including non voters), the point estimate from column 1 implies that one rain-free Fourth of July increases the Republican candidate's vote share by approximately 4.0 percent. Based on the mean of the (presidential) voting age population in the period 1940-1988, 124 million voters, this is equivalent of 1,240,000 votes.

4.3 Voter Turnout and Participation in Presidential Elections

Next we examine whether Fourth of July affects political and civic engagement during presidential elections. We begin by studying the effect on voter turnout. Columns 1-3 of Table 5 derive our findings with and without individual controls and state trends. We find a similar and significant impact of Fourth of July on turnout across all three specifications. The estimated coefficient in column 3 is significant at the five percent level and implies that a rain-free Fourth of July during childhood increases the likelihood of voting in presidential elections as an adult by 0.62 percentage points. This translates into a 0.95 percent increase (0.0062 from an average of 0.65) overall. The

[24]The outcome variable is a dummy equal to one if the respondent voted for the Republican party, and zero if the respondent did not vote or voted for another party. Note that we do not restrict the sample to only those that voted in the election, since this would create a bias when Fourth of July has a true impact on turnout.

[25]We find no effect on voting behavior in midterm elections (results not shown).

[26]Note that even if Fourth of July shifts political preferences to the right, if there is an impact on general turnout we could still see an impact on the likelihood of voting for the democratic candidate.

[27]Note that in columns 1-4 we do not restrict the sample to only those that voted in the election, since it is difficult to interpret the effects when Fourth of July has a true impact on turnout. Nevertheless, in column 5 we condition the sample on individuals who turned out. This estimate should therefore be interpreted with caution.

Appendix shows that we cannot reject the null hypothesis of the adjacent placebo days being jointly equal to zero. As our previous result in Table 4 show, the boost in turnout primarily benefits the Republican party.

Columns 4-6 of Table 5 investigate if weather-induced Fourth of July celebrations have an effect on a broader range of participatory outcomes. We find that Fourth of July increases the likelihood of donating money to political campaigns during the presidential elections by 3.2 percent (0.0029/0.09).[28] Column 5 shows that the celebration also increases attendance at political campaign meetings and rallies. The likelihood that an individual attend meetings during the campaign increases by 4.4 percent (0.0035 from an average of 0.08). Finally, column 6 shows that Fourth of July festivities during childhood increases the likelihood of working for a political party as an adult by 0.02 percentage points. Unfortunately, the broader participation variables do not distinguish between the Republicans and the Democrats, so we cannot estimate which political party that benefits most from this. However, given that the Fourth of July effects increase voting for the Republicans, it seems likely that the increase in campaign contributions primarily go toward the Republican party.

4.4 Age-specific Effects and Persistence

This section explores whether rain-free Fourth of Julys at certain key ages matter more than others during childhood and if the effects are permanent or depreciate over time. In a standard Bayesian framework, individuals update their political beliefs as they become older and receive new information. As a result, the impact of Fourth of July should be temporary. However, lasting effects are consistent with recent work in development psychology and neurobiology showing that the early years are foundational for a full range of human competencies (Knudsen et al., 2006). Also, if individuals are subject to cognitive dissonance (Mullainathan and Washington, 2009; Gerber et al., 2010) the effects on partisanship could be permanent.

Columns 1 and 5 of Table 6 examine if there are critical periods during childhood when rain-free Fourth of Julys matter more in shaping adult outcomes. Instead of using the $Rainfree July4$ that counts the number of rain-free Fourth of July days from ages 3-18, we add the number of days within five intervals: from ages 3-6, 7-10, 11-14, and 15-18. We also include a dummy measuring the number of rain-free days in the ages 0-2.[29] This latter interval should be viewed as a placebo variable, since if the effects are truly driven by children with sufficient cognitive development taking part in the celebrations, there should be no effect at toddler age. We begin

[28] Since the outcome variables in the ANES data are self-reported, the results should be interpreted with caution. It is worth noting, however, that we would only get an upward bias in the estimates if the measurement error is positively correlated with rainfall on Fourth of July during childhood. The likelihood of such a correlation is arguably low.

[29] In principle, one could estimate the effect at every age. However, doing so leads to noisy estimates and we do not show the results. They are available on request.

by investigating whether there are any differential effects on adult political preferences. Figure 5 plots the coefficients of column 1 and their 95 percent confidence intervals, and shows an inverted-U relationship between the impact of Fourth of July and age. There is no evidence of effects before age 2, the point estimates increase and peak at ages 7-10, and are almost zero at ages 15-18. Figure 6 and column 5 repeat the same exercise on voter turnout. Unlike political preferences, the impact is concentrated in adolescence, and peaks at ages 15-18. In order to understand whether the effects continue into adulthood, we include ages 19-24 in the model. Columns 2 and 6 show that this is not the case.

To investigate whether the impact of Fourth of July during childhood is lifelong, we add an interaction term between $RainfreeJuly4$ and the survey respondent's age in columns 3-4 and 7-8. Column 3 reports the outcome on political preferences. The interaction term is positive, close to zero, and insignificant. In column 4, we interact $RainfreeJuly4$ with birth year to address that older respondents tend to belong to earlier birth cohorts, thereby confounding the relation between RainfreeJuly4 and age. Interacting with birth year does not change the sign of the interaction term with age. It is still positive, close to zero, and insignificant. Columns 7 and 8 show, however, that the effect on voter turnout depreciates over time as the interaction between $RainfreeJuly4$ and age is negative and significant.

In short, the effects of Fourth of July on political preferences are permanent and occur at a relatively early age while the impact of the celebrations on voter turnout occurs later and fade out over time.

5 Interpretations

Our main results indicate that Fourth of July shifts preferences and behavior to the right and increases voter turnout. We also find that certain key ages during childhood matter more and that some of the effects are permanent. This section sheds light on potential mechanisms for why this may be the case. We begin by interpreting the evidence on critical periods and persistence and then consider heterogeneous effects across political orientation at the county level and across time.

5.1 Critical Periods

There are two sets of results. First, the effect of Fourth of July celebrations during childhood on adult political preferences are permanent and occur at a relatively early age. Second, the impact on voter turnout depreciates over time and occurs in adolescence.

The findings are in line with evidence from development psychology and neurobiology. Research in development psychology demonstrates that the early environment exerts a strong influ-

ence on social behavior and cognitive skills later in life. Also, work in neurobiology shows that the neural circuits are particularly responsive toward change in early childhood, changes that are influential as the structures created do not interfere with already-established patterns (see Knudsen et al., 2006 for an overview of the two literatures). As a consequence, later experience requires relatively more intensity and tends to be less efficacious in shaping emotions and behavior. Also, specific interactions during childhood display nonlinearities as different types of abilities appear to be manipulable at different ages (see Heckman, 2007 for a review). Together, this evidence predicts that celebrating Fourth of July as a child can have an impact that is less susceptible to later-life political influences. Moreover, while earlier experience in childhood may have stronger effects, they need not be linear in age. This rationalizes why we find permanent effects on political preferences, where the critical period occurs relatively early, while the key ages for turnout occur later with the effects fading over time. Consistent with the idea that exposure to Fourth of July later in life has less of an impact, we also show that the contemporaneous adult effects on political preferences are temporary (see Table A2 in the Appendix). Finally, the explanation further supports the inverted-U relationship between age and rain-free Fourth of Julys if the influences shaping political preferences and the choice to vote are manipulable at certain key ages.

A complementary explanation is that people are motivated to maintain congruence between emotions, beliefs, and actions (Mullainathan and Washington, 2009; Gerber et al., 2010). In this case, exposure to Fourth of July at an early age systematically alters the political preferences as the celebration potentially affects both voting behavior and political beliefs in favor of the Republicans. Although we cannot definitely determine what accounts for the persistence, the results are consistent with research in political science showing that early childhood experience has strong long-term effects on political behavior and opinions later in life (Gimpel et al., 2003).

5.2 Republican vs. Democratic Counties

We now examine the differential impact of Fourth of July depending on the political orientation of the local community. Does it make a difference if you grow up in an area dominated by Republican or Democratic partisanship? Specifically, we interact $Rainfree July4$ with a dummy variable indicating whether the fraction of people identifying as Republicans is above or below the median county in our sample.

Columns 1-3 of Table 7 show that the effects on political preferences are driven by individuals living in counties dominated by the Republicans. There is no evidence of significant effects in Democratic counties. The results in Table 7 suggest some plausible mechanisms behind our findings. The first set of explanations draws on work by economists and sociologists that see national holidays as an occasion to reconfirm societal commitments, national identity, and political norms

(Durkheim, 1912; Turner, 1985; Etzioni, 2000; Chwe, 2001).

One hypothesis that can be distilled from this literature is that Fourth of July transmits the dominating social or political norm, irrespective of any patriotic values, symbols, or historical importance associated with the day. The function of Fourth of July, or any federal holiday that brings people together, is to induce socialization with other adults and children within a given community. The celebration thus leads to *peer effects* in local political beliefs and preferences.[30] However, if this was the case, we would expect there to be a shift in preferences and behavior toward the Democratic party in communities dominated by Democrats. As Table 7 shows, we find no evidence of such effects. The simple socialization explanation alone cannot therefore fully account for the results.

Alternatively, Fourth of July is a day that provides a context for the celebration of an American civil religion organized around flags, parades, and the Constitution (Warner, 1962; Verba, 1965; Bellah 1967; Kertzer, 1988; Angrosino, 2002). While these values need not be partisan, there is a literature showing that the political right has been more successful in appropriating American patriotism and its symbols during the 20th century (Thomas and Flippen, 1972; Mathisen, 1989; Leege et al., 2002; Parker, 2009). Survey evidence also confirms that Republicans consider themselves more patriotic than Democrats (Gallup, 2010). According to this interpretation, there is a *political congruence* between the patriotism promoted on Fourth of July and the values associated with the Republican party. Fourth of July celebrations in Republican dominated counties may thus be more politically biased events that socialize children into Republicans.[31]

A final interpretation departs from the sociological literature and rationalizes the findings in terms of the *intensity* of the celebration being different in Republican and Democratic counties. If Republicans participate more because they enjoy the festivities or view them as important, then children are exposed to more intense celebrations in Republican areas. In this case, transmission of political preferences occurs when there are sufficiently many adults celebrating Fourth of July, which only happens in Republican communities. From Table 7, it is impossible disentangle *intensity* from *political congruence*, as congruence may explain why Republican adults celebrate Fourth of July more intensively in the first place.

Turning attention to voter turnout, we demonstrate in columns 4 and 5 of Table 7 that the impact of Fourth of July is homogeneous across Republican and Democratic counties. Column 4 shows the effect for ages 3-18 and column 5 for ages 7-18.[32] The coefficients in column 5 are

[30] In this case, qualitatively we would see similar effects of public holidays that also induce socialization within the community, such as Memorial Day and Labor Day. Investigating the effects of other holidays is an avenue for future research.

[31] This can manifest itself in many ways. The Republican party could be better at exploiting the festivities in a partisan manner. Also, children may be exposed to different type of events that induce values attributed to the Republican party later in life.

[32] In the remaining analysis we focus on ages 7-18 given the absence of any effects before age 7, as displayed in

of similar magnitude and statistically significant at the five percent level. The estimates suggest that the *intensity* explanation for the Republican bias discussed above is incorrect. If more people celebrate Fourth of July in Republican dominated counties, we would expect the effect on turnout to be driven by the Republican communities. However, the impact is the same across counties of different political color.

The result on voter turnout is consistent with the *political congruence* explanation if celebrating Fourth of July also induces non-partisan sentiments related to turnout. This is likely to be the case if the holiday promotes national identity and a shared belief in the underlying principles that supports society. In this sense, voting is one of the symbols of American democracy with Fourth of July transmitting an apolitical *civic duty* to vote. In the next section, we examine whether both effects are at work.

5.3 Fourth of July During the 20th Century

To investigate whether the Fourth of July effects have been stable over time, we estimate the impact depending on birth cohort. Specifically, we construct dummy variables dividing the birth cohorts in our sample into 7 separate groups: 1920-29, 1930-39,..., and 1980-89.[33]

Table 8 presents results on party identification, voting, and political participation, with corresponding Figures displaying the estimated coefficients and their 95 percent confidence intervals.[34] Figure 7 shows the results on Republican party identification equivalent to column 1 of Table 8. We see that the impact has been steadily decreasing over time, with no evidence of effects for the cohorts born 1980 and later. Figure 8 and columns 2 and 3 display the impact on voting for the Republicans or the Democrats in the presidential elections. We detect a similar pattern as the impact of Fourth of July on voting favors the Republicans less for younger cohorts. For those cohorts born in 1970 and later, there is no Republican Fourth of July "bias". Figure 9 and column 4 of Table 8 investigate the impact on voter turnout. Unlike the previous two findings, there is no decline in the impact on turning out to vote. If anything, the effect on the youngest cohorts born 1980 and later, is larger than for older cohorts.

At first sight, the decreasing pro-Republican effect appears consistent with the *intensity* explanation if participation in Fourth of July celebrations has declined over time. It also fits with the work documenting a reduction in political and organized community life more generally that has taken place since the mid-1960's (Putnam, 2000). However, an alternative explanation drawing on the historical studies of Fourth of July is that the celebrations become more apolitical in the

Table 6 above.

[33]Since the youngest cohort in our sample is born in 1990, we only have one cohort from the 1990's. For simplicity, we include those individuals in the 1980-1989 group.

[34]To facilitate the interpretation, we drop the cohort-fixed effects and include age and birth year as additional controls.

latter half of the 20th century (Appelbaum, 1989; Nemanic, 2007). In light of this evidence, the decreasing effects over time could be driven by a weaker connection between political values and Fourth of July, perhaps in favor of more private celebrations focusing on the family and apolitical barbeques.

The constant impact on voter turnout across time further invalidates the *intensity* interpretation of the Republican bias, as turnout should arguably have declined as well. Instead the results suggest that the importance of Fourth of July celebrations has been relatively stable over time and political boundaries, but that the event has become more apolitical in character.

Taken together, we hypothesize that the effects behind Fourth of July are consistent with three complementary interpretations: *foundational impact of childhood*, *political congruence*, and *civic duty*. The long-lasting effects can be rationalized based evidence that exposure in early years are important to later human development. Strong political connotations to Fourth of July celebrations in Republican communities yield a Republican bias that should diminish if the festivities become depoliticized. Finally, the constant impact on voter turnout across time and space implies that the holiday also helps build a general and apolitical national identity that fosters political participation per se.[35]

6 Concluding Remarks

We show that Fourth of July influences people's political preferences and their political behavior. In particular, participating in the festivities during childhood shifts later-life preferences and behavior toward the Republicans and increases adult voter turnout.

Three plausible mechanisms help interpret our findings. First, the long-lasting impact of Fourth of July fits the notion that experiences during early childhood have effects that are less susceptible to adult political persuasion—either because later-life influences require relatively more intensity or because of cognitive dissonance. Second, the republican bias is consistent with the idea that there is a political congruence between the patriotism promoted on Fourth of July and Republican beliefs. Third, the increase in voter turnout further suggests that Fourth of July transmits a non-partisan civic duty to vote.

To our knowledge, this is the first study to use a natural experiment approach to quantify the

[35]The interpretations above assume that weather affects the likelihood of participating in the celebrations similarly across different age groups in childhood, across time, and across space. Since we cannot directly measure attendance, this leaves the possibility that weather conditions increase the likelihood of participation in Fourth of July celebrations only for certain age groups, or in certain counties, or during certain periods over the 20th century. In an IV/2SLS framework where participation was observable, this would be equivalent to saying that the first-stage estimates are different. However, we find this explanation incomplete as there is an impact of Fourth of July weather in early childhood (ages 7-10) and adolescence (ages 15-18), across Republican and Democratic counties, and across early and late birth cohorts.

effect of both childhood experience *and* a nation's national day celebration on political identity and political behavior later in life. An important caveat is that we estimate the impact of rain on the outcomes of interest. While it is reasonable to assume that our findings are driven by variation in participation as captured by rainfall, this is something we cannot establish empirically given our methodological design.

The facts identified leaves a number of open questions. First, more research is needed to investigate the effect of celebrating other holidays and celebrations in other countries. This would help to further rationalize our current findings and shed light on the importance of public rituals. Second, additional evidence on other outcomes driven by national day celebrations such as military enlistment and religious beliefs would complement the evidence in this paper. Finally, we have not directly examined the impact on policy making. We believe that future studies should investigate how policy making is affected by preference-generating public rituals, such as Fourth of July.

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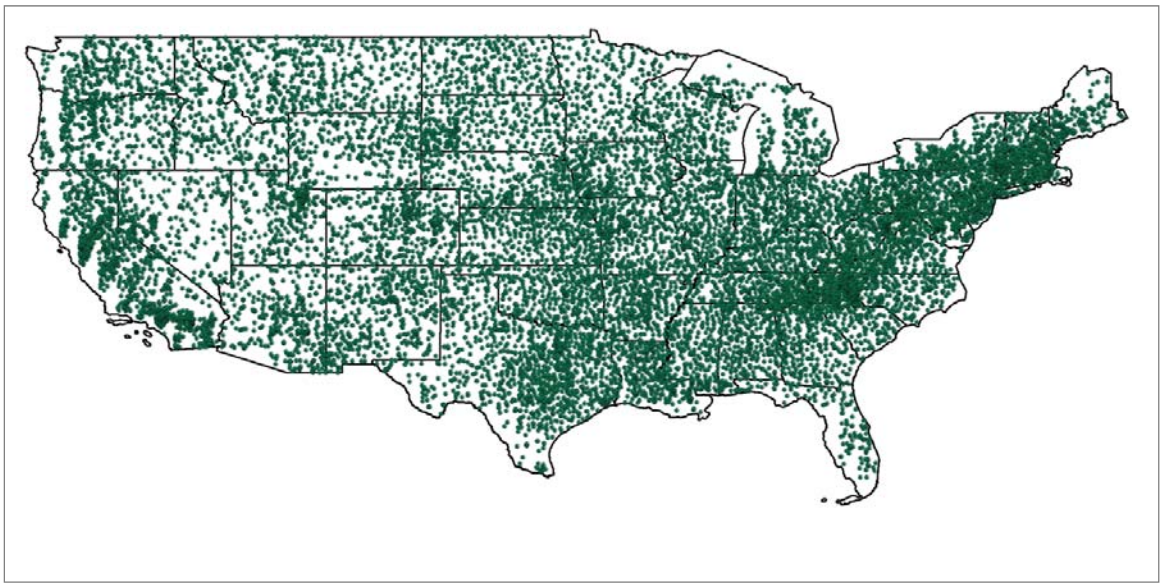
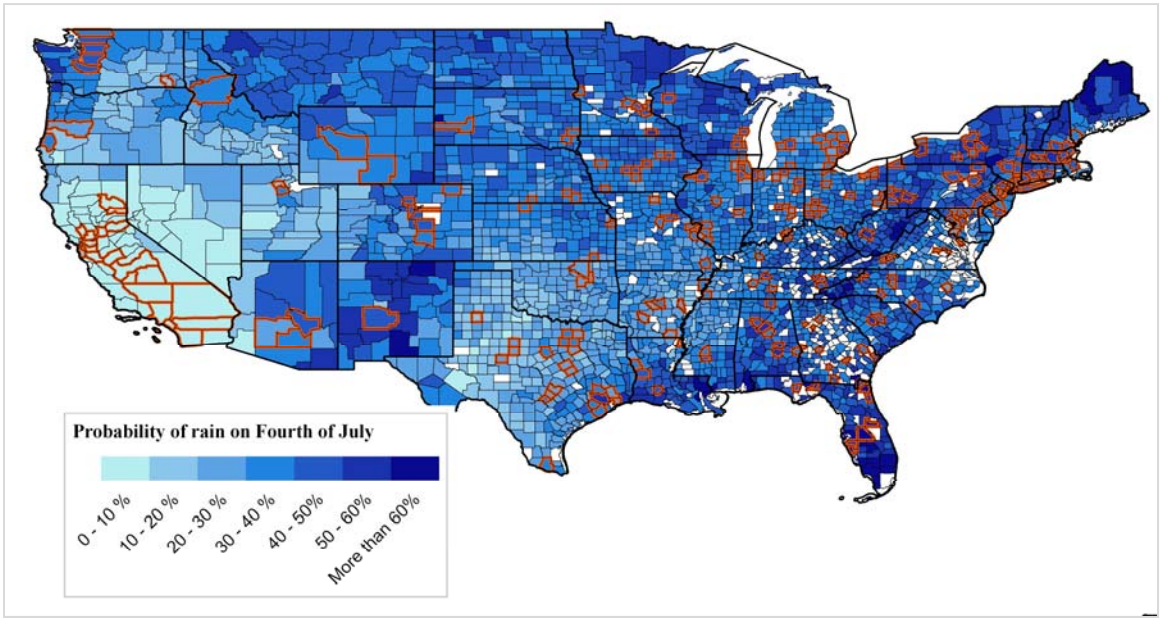
Figure 1. Weather stations.



Note: Each green dot is a weather station. Source: NOOA.

Figure 2. Probability of rain on Fourth of July, 1920-2008 mean.



Note: NES sample counties in red.

Figure 3. Distribution of childhood days without rain on Fourth of July.

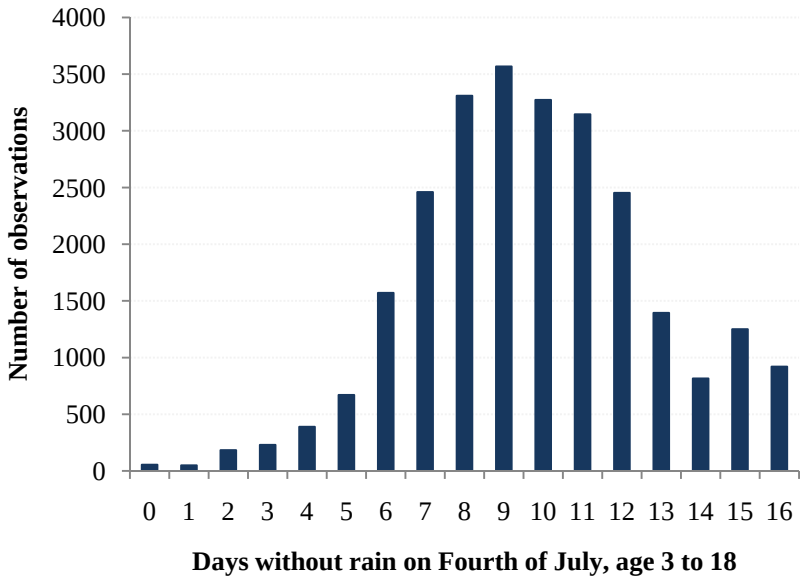


Figure 4. Effects of rain-free childhood days on Republican Party identification.

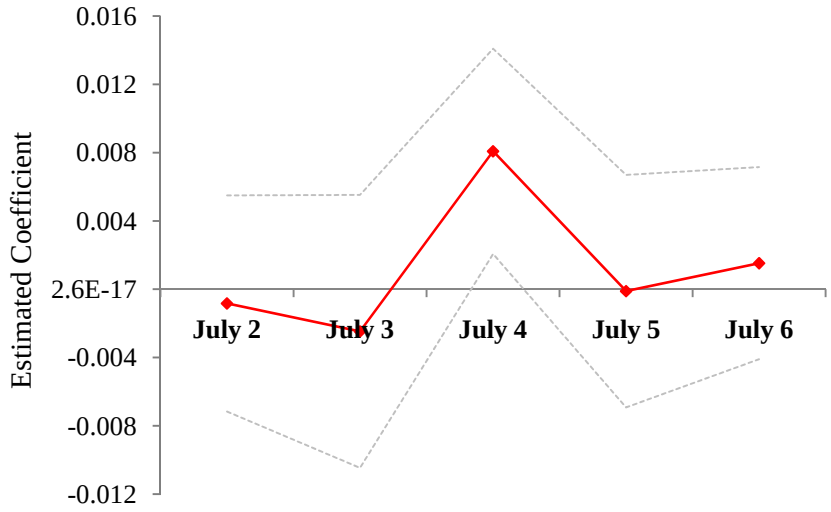


Figure 5. Fourth of July effects on Republican Party identification, by childhood age.

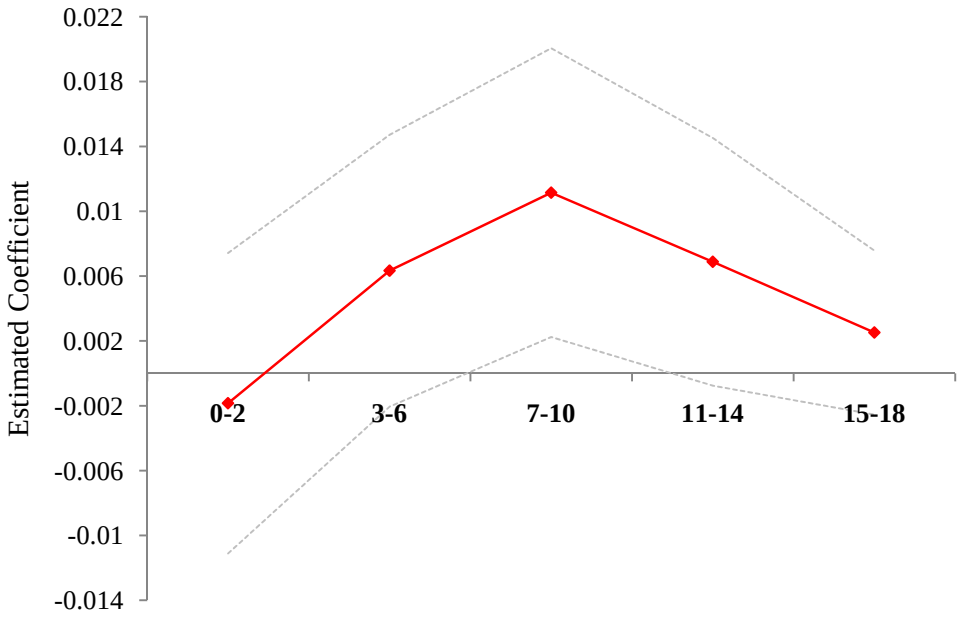


Figure 6. Fourth of July effects on Turnout, by childhood age.

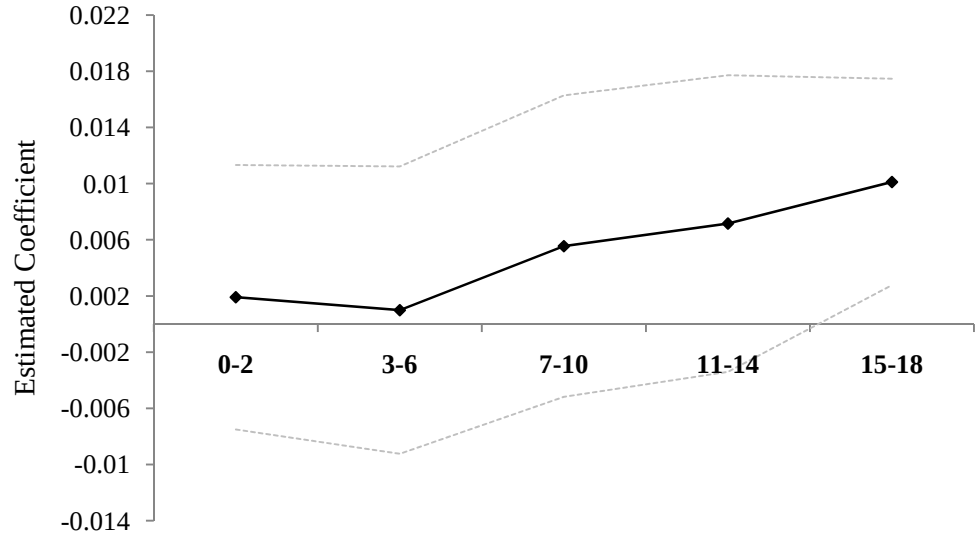


Figure 7. Fourth of July effects on Republican Party identification, by birth cohorts.

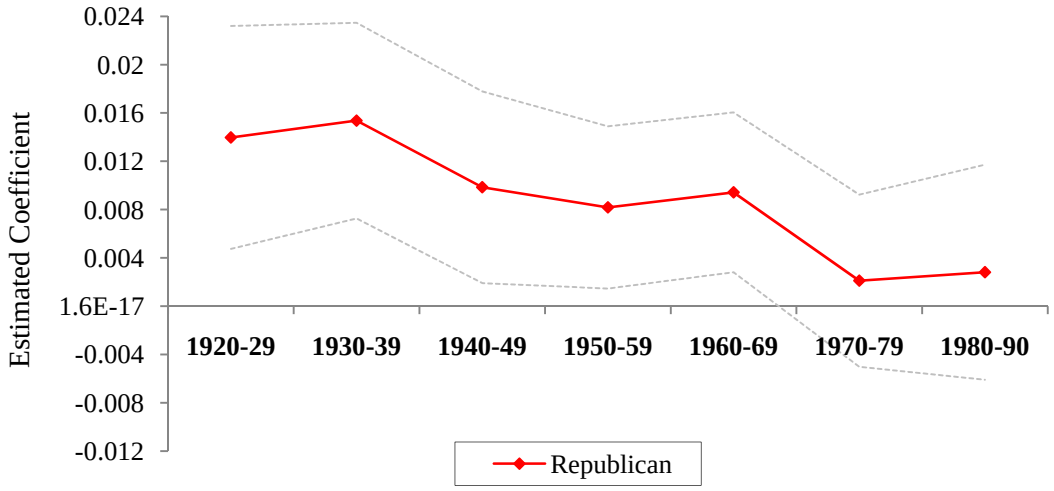


Figure 8. Fourth of July effects on voting behavior in Presidential elections, by birth cohorts.

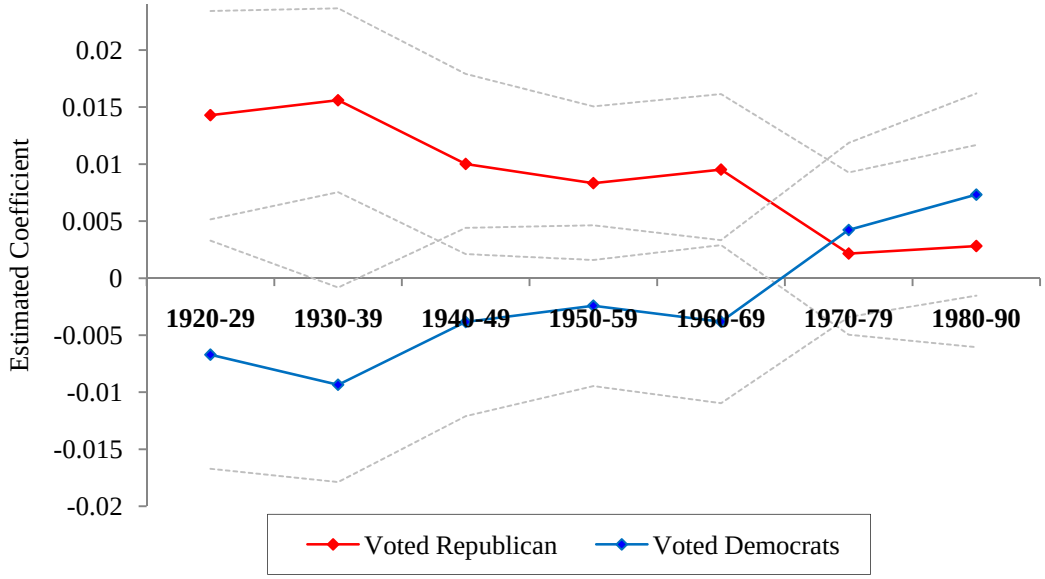


Figure 9. Fourth of July effects on turnout, by birth cohorts.

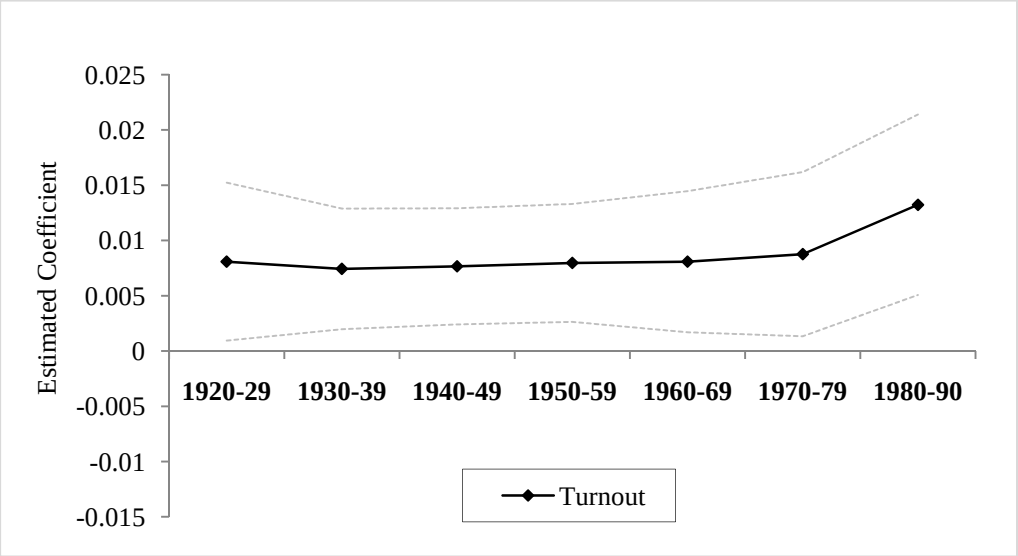


Table 1. Summary Statistics

	Panel A: Fourth of July during childhood					Panel B: Fourth of July as an adult				
	Obs	Mean	S.D.	Min	Max	Obs	Mean	S.D.	Min	Max
Precipitation										
Rain-free July 4, days	25723	9.75	2.97	0	16					
Rain-free July 4, dummy						33788	0.63	0.48	0	1
Political Preferences										
Republican	25393	0.36	0.48	0	1	33347	0.35	0.48	0	1
Independent	25393	0.13	0.34	0	1	33347	0.13	0.33	0	1
Democrat	25393	0.51	0.50	0	1	33347	0.52	0.50	0	1
Voted for the Republican Candidate	17437	0.25	0.43	0	1	22698	0.25	0.43	0	1
Voted for the Democratic Candidate	17437	0.28	0.45	0	1	22698	0.27	0.44	0	1
Political Participation										
Turnout	23808	0.65	0.48	0	1	31422	0.65	0.48	0	1
Campaign Donation	22904	0.09	0.29	0	1	29885	0.09	0.29	0	1
Worked for a Political Party	23045	0.04	0.20	0	1	30102	0.04	0.20	0	1
Attended Campaign Rally	23053	0.08	0.27	0	1	30116	0.08	0.27	0	1
Individual Covariates										
Race, African American	25419	0.12	0.33	0	1	33308	0.13	0.33	0	1
Race, other non-white	25419	0.11	0.31	0	1	33308	0.09	0.29	0	1
Gender, female	25723	0.55	0.50	0	1	33788	0.55	0.50	0	1
Married	25618	0.61	0.49	0	1	33647	0.63	0.48	0	1
Income, middle tertile	24304	0.34	0.47	0	1	32329	0.33	0.47	0	1
Income, top tertile	24304	0.32	0.47	0	1	32329	0.34	0.47	0	1
Education, HS degree with some college	25537	0.26	0.44	0	1	33545	0.24	0.43	0	1
Education, college degree	25537	0.21	0.41	0	1	33545	0.21	0.41	0	1
Age	25723	39.3	14.2	18	88	33788	39.5	14.0	18	88
Birth year	25723	1948.3	15.7	192	199	33788	1945.5	15.8	1920	1990

Rain-free July 4 in panel A is a dummy variable indicating whether there was no rain recorded in the respondent's county on July 4th preceding the survey. *Rain-free July 4* in panel B is the number of July 4th's without rain during the respondent's childhood. *Republican* is a dummy variable equal to one if the respondent thinks of himself/herself as a Republican, and zero otherwise. The dependent variables *Independent* and *Democrat* similarly indicate whether the respondent thinks of himself/herself as an Independent or a Democrat, respectively. *Voted for the Republican Candidate* is a dummy variable equal to one if the respondent voted for the Republican party in the latest presidential election, and zero otherwise. *Voted for the Democratic Candidate* is a dummy variable equal to one if the respondent voted for the Democratic party in the presidential election, and zero otherwise. *Turnout* is a dummy variable indicating whether the respondent voted in the latest presidential election. *Campaign Donation* is a dummy variable indicating whether the respondent reports that he/she gave money to a campaign. *Attended Campaign Rally* is a dummy indicating whether the respondent attended a political meeting or rally during the campaign. *Worked for a Political Party* is a dummy indicating whether the respondent worked for a political party during the campaign. The survey data is from 27 American National Election Studies conducted in 1952-2008. The precipitation data covers 1920-2008 and comes from NOOA.

Table 2. Exogeneity Check

	Panel A: Fourth of July during childhood		Panel B: Fourth of July as an adult	
	Republican Party Identification	Rain-free July 4, number of days	Republican Party Identification	Rain-free July 4, dummy
	(1)	(2)	(3)	(4)
Race, African American	-0.232***	0.029	-0.233***	-0.001
	(0.016)	(0.064)	(0.015)	(0.013)
Race, other non-white	-0.105***	-0.043	-0.106***	-0.004
	(0.020)	(0.060)	(0.019)	(0.011)
Gender, female	-0.029***	-0.008	-0.023***	0.003
	(0.007)	(0.024)	(0.006)	(0.005)
Married	0.041***	-0.028	0.042***	0.001
	(0.007)	(0.026)	(0.006)	(0.007)
Income, middle tertile	0.006	-0.017	0.008	-0.001
	(0.009)	(0.036)	(0.008)	(0.007)
Income, top tertile	0.064***	-0.005	0.066***	-0.000
	(0.009)	(0.039)	(0.009)	(0.006)
Education, HS degree with some college	0.080***	0.013	0.085***	-0.000
	(0.010)	(0.025)	(0.008)	(0.006)
Education, college degree	0.115***	-0.000	0.117***	-0.004
	(0.012)	(0.030)	(0.009)	(0.007)
Observations	23,516	23,516	31,168	31,168
R-squared	0.129	0.753	0.130	0.371
F-test	50.29	0.545	67.84	0.207
p-value	.0000	0.817	.0000	0.988

The regressions in panel A and B include county-, birth cohort- and survey year fixed effects, and linear state trends. Regressions in panel A control for average daily rainfall in July in the survey year, and average daily July rainfall during childhood in panel B. Rain-free July 4 in panel A is a dummy variable indicating whether there was no rain recorded in the respondent's county on July 4th preceding the survey. Rain-free July 4 in panel B is the number of July 4th's without rain during the respondent's childhood. The other independent variables indicate it for other dates. The outcome variable Republican is a dummy variable equal to one if the respondent thinks of himself/herself as a Republican, and zero otherwise. The outcome data is from 27 American National Election Studies conducted in 1952-2008. The p-value corresponds to the F-test of the null hypothesis that the race, gender, marriage status, income and education variables are jointly zero. Robust standard errors in parentheses, clustered at the state level. There are 50 states in the sample. *** 1% , ** 5% , * 10% significance level.

Table 3. Political Party Identification

	Republican				Independent	Democrat
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Fourth of July during childhood						
Rain-free July 4, days	0.0070***	0.0073***	0.0076***	0.0084***	-0.0033*	-0.0043
	(0.0026)	(0.0023)	(0.0023)	(0.0029)	(0.0018)	(0.0026)
Rain-free July 2, days				-0.0004		
				(0.0031)		
Rain-free July 3, days				-0.0026		
				(0.0040)		
Rain-free July 5, days				-0.0003		
				(0.0034)		
Rain-free July 6, days				0.0018		
				(0.0028)		
Individual controls	No	Yes	Yes	Yes	Yes	Yes
State-specific time trend	No	No	Yes	Yes	Yes	Yes
Observations	25,393	23,516	23,516	23,516	23,516	23,516
R-squared	0.0866	0.1277	0.1321	0.1321	0.0668	0.1182
F-test				0.260		
p-value				0.902		
Panel B: Fourth of July as an adult , contemporaneous						
Rain-free July 4, dummy	0.0103	0.0124*	0.0131**	0.0129*	-0.0098**	-0.0032
	(0.0068)	(0.0066)	(0.0060)	(0.0066)	(0.0042)	(0.0070)
Rain-free July 2, dummy				0.0040		
				(0.0090)		
Rain-free July 3, dummy				-0.0065		
				(0.0078)		
Rain-free July 5, dummy				0.0075		
				(0.0083)		
Rain-free July 6, dummy				-0.0027		
				(0.0082)		
Individual controls	No	Yes	Yes	Yes	Yes	Yes
State-specific time trend	No	No	Yes	Yes	Yes	Yes
Observations	33,353	31,174	31,174	31,174	31,174	31,174
R-squared	0.0882	0.1296	0.1323	0.1324	0.0608	0.1195
F-test				0.402		
p-value				0.806		

The regressions in panel A and B include county-, birth year and survey year fixed effects. Regressions in panel B control for average daily rainfall in July in the survey year, and average daily July rainfall during childhood in panel A. *Rain-free July 4* in panel A is the number of July 4th's without rain during the respondent's childhood. *Rain-free July 4* in panel B is a dummy variable indicating whether there was no rain recorded in the respondent's county on July 4th preceding the survey. The other independent variables indicate it for other dates. The dependent variable *Republican* is a dummy variable equal to one if the respondent thinks of himself/herself as a Republican, and zero otherwise. The dependent variables *Independent* and *Democrat* similarly indicate whether the respondent thinks of himself/herself as an Independent or a Democrat, respectively. The outcome data is from 27 American National Election Studies conducted in 1952-2008. The p-value corresponds to the F-test of the null hypothesis that Rain-free July 2, 3, 5 and 6 are jointly zero. Robust standard errors in parentheses, clustered at the state level. There are 50 states in the sample. *** 1% , ** 5% , * 10% significance.

Table 4. Voting Behavior, Presidential Elections

	Voted for the Republican Candidate		Voted for the Democratic Candidate		Voted for the Republican Candidate
	(1)	(2)	(3)	(4)	(5)
Panel A: Fourth of July during childhood					
Rain-free July 4, days	0.0092**	0.0101***	-0.0028	-0.0038	0.0096**
	(0.0036)	(0.0033)	(0.0037)	(0.0035)	(0.0041)
Sample	Full	Full	Full	Full	Turned out to vote
State-specific time trend	No	Yes	No	Yes	Yes
Individual controls	No	Yes	No	Yes	Yes
Observations	12,690	12,503	12,690	12,503	8,997
R-squared	0.0835	0.1931	0.0827	0.1541	0.2270

The regressions include county-, birth cohort- and survey year fixed effects, and average daily July rainfall during childhood. *Rain-free July 4* is the number of July 4th's without rain during the respondent's childhood. *Voted for the Republican Candidate* is a dummy variable equal to one if the respondent voted for the Republican party in the latest presidential election, and zero otherwise. *Voted for the Democratic Candidate* is a dummy variable equal to one if the respondent voted for the Democratic party in the presidential election, and zero otherwise. Column 5 restricts the sample to individuals that voted, so that the dummy variable is equal to zero if the individual voted for a non-Republican Candidate. The outcome data is from 15 American National Election Studies conducted in 1952-2008. Robust standard errors in parentheses, clustered at the state level. There are 50 states in the sample. *** 1% , ** 5% , * 10% significance level.

Table 5. Political Participation, Presidential Elections

	Turnout			Campaign Donation	Attended Campaign Rally	Worked for a Political Party
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Fourth of July during childhood						
Rain-free July 4, days	0.0062**	0.0057**	0.0062**	0.0029**	0.0035**	0.0020*
	(0.0027)	(0.0026)	(0.0026)	(0.0014)	(0.0017)	(0.0010)
Individual controls	No	Yes	Yes	Yes	Yes	Yes
State-specific time trend	No	No	Yes	Yes	Yes	Yes
Observations	13,437	13,437	13,233	13,144	13,153	13,148
R-squared	0.0962	0.1073	0.1940	0.1166	0.0669	0.0465

The regressions include county-, birth cohort- and survey year fixed effects, and average daily July rainfall during childhood. *Rain-free July 4* is the number of July 4th's without rain during the respondent's childhood. *Turnout* is a dummy variable indicating whether the respondent voted in the latest presidential election. *Campaign Donation* is a dummy variable indicating whether the respondent reports that he/she gave money to a campaign. *Attended Campaign Rally* is a dummy indicating whether the respondent attended a political meeting or rally during the campaign. *Worked for a Political Party* is a dummy indicating whether the respondent worked for a political party or candidate during the campaign. The outcome data is from 15 American National Election Studies conducted in 1952-2008. Robust standard errors in parentheses, clustered at the state level. There are 50 states in the sample. *** 1% , ** 5% , * 10% significance level.

Table 6. Age and Persistence of Effects

	Party Identification: Republican				Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Fourth of July during childhood								
Rain-free July 4, age 0-2	-0.0019	-0.0030			0.0021	-0.0006		
	(0.0046)	(0.0051)			(0.0047)	(0.0053)		
Rain-free July 4, age 3-6	0.0068	0.0087*			0.0009	0.0022		
	(0.0042)	(0.0044)			(0.0051)	(0.0049)		
Rain-free July 4, age 7-10	0.0116**	0.0104**			0.0053	0.0036		
	(0.0043)	(0.0046)			(0.0053)	(0.0052)		
Rain-free July 4, age 11-14	0.0070*	0.0087**			0.0069	0.0071		
	(0.0039)	(0.0042)			(0.0052)	(0.0058)		
Rain-free July 4, age 15-18	0.0028	0.0025			0.0099***	0.0083*		
	(0.0025)	(0.0027)			(0.0037)	(0.0042)		
Rain-free July 4, age 19-24		-0.0028				0.0022		
		(0.0034)				(0.0050)		
Rain-free July 4, days			0.0077***	0.0080***			0.0074***	0.0078***
			(0.0024)	(0.0025)			(0.0025)	(0.0025)
Rain-free July 4 x age			0.0001	0.0000			-0.0002*	-0.0003**
			(0.0001)	(0.0001)			(0.0001)	(0.0001)
Rain-free July 4 x birth year				-0.0001				-0.0002
				(0.0001)				(0.0001)
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NES Sample	Full	Full	Full	Full	Presidential Elections	Presidential Elections	Presidential Elections	Presidential Elections
Observations	23,277	19,749	23,516	23,516	13,111	10,915	13,233	13,233
R-squared	0.1320	0.1408	0.1322	0.1322	0.1939	0.1811	0.1943	0.1945

The regressions include county-, birth cohort- and survey year fixed effects, and average daily July rainfall during childhood. Rain-free July 4 is the number of July 4th's without rain during the respondent's childhood. The dependent variable in columns 1-4 is a dummy variable equal to one if the respondent thinks of himself/herself as a Republican, and zero otherwise. The dependent variable in columns 5-8 is a dummy variable indicating whether the respondent voted in the latest presidential election. The interaction term with age and birth year are demeaned. Rain-free July 4 in columns 3 and 4 use rainfall days during age 3 to 18, while columns 7 and 9 use rainfall days during age 7 to 18. The outcome data is from American National Election Studies conducted in 1952-2008. Robust standard errors in parentheses, clustered at the state level. There are 50 states in the sample. *** 1% , ** 5% , * 10% significance level.

Table 7. Heterogeneous Effects: Republican vs. Democratic Counties

	Political Preferences			Political Participation	
	Party Identification: Republican	Voted for the Republican Candidate	Voted for the Democratic Candidate	Turnout	
	(1)	(2)	(3)	(4)	(5)
Panel A: Fourth of July during childhood					
Rain-free July 4, Republican county	0.0137***	0.0180***	-0.0105**	0.0069*	0.0083**
	(0.0047)	(0.0040)	(0.0049)	(0.0039)	(0.0034)
Rain-free July 4, Democratic county	0.0011	0.0009	0.0039	0.0054*	0.0069**
	(0.0029)	(0.0041)	(0.0038)	(0.0028)	(0.0032)
Individual controls	Yes	Yes	Yes	Yes	Yes
State-specific time trend	Yes	Yes	Yes	Yes	Yes
NES Sample	Full	Presidential Elections	Presidential Elections	Presidential Elections	Presidential Elections
Observations	23,516	12,503	12,503	13,233	13,233
R-squared	0.1325	0.1939	0.1546	0.1940	0.1941

The regressions include county-, birth cohort- and survey year fixed effects, and average daily July rainfall during childhood. Rain-free July 4 is the number of July 4th's without rain during the respondent's childhood. The Republican county dummy is equal to one if the fraction of Republicans (identifies as) is above the median county in the sample. The Democratic county dummy is collinear with the Republican county dummy. Rain-free July 4 in columns 4 uses rainfall days during age 3 to 18, while column 5 uses rainfall days during age 7 to 18. The outcome data is from American National Election Studies conducted in 1952-2008. Robust standard errors in parentheses, clustered at the state level. There are 50 states in the sample.
*** 1% , ** 5% , * 10% significance level.

Table 8. Heterogeneous Effects: Birth Cohorts

	Political Preferences			Political Participation
	Party Identification: Republican	Voted for the Republican Candidate	Voted for the Democratic Candidate	Turnout
	(1)	(2)	(3)	(4)
Panel A: Fourth of July during childhood				
Rain-free July 4, 1920-29 cohorts	0.0113***	0.0140***	-0.0068	0.0076**
	(0.0039)	(0.0046)	(0.0049)	(0.0035)
Rain-free July 4, 1930-39 cohorts	0.0110***	0.0153***	-0.0093**	0.0071**
	(0.0032)	(0.0040)	(0.0042)	(0.0027)
Rain-free July 4, 1940-49 cohorts	0.0072**	0.0098**	-0.0039	0.0074***
	(0.0030)	(0.0039)	(0.0041)	(0.0026)
Rain-free July 4, 1950-59 cohorts	0.0056**	0.0081**	-0.0024	0.0077***
	(0.0028)	(0.0033)	(0.0035)	(0.0026)
Rain-free July 4, 1960-69 cohorts	0.0061**	0.0094***	-0.0038	0.0080**
	(0.0025)	(0.0033)	(0.0035)	(0.0031)
Rain-free July 4, 1970-79 cohorts	0.0048	0.0020	0.0043	0.0087**
	(0.0030)	(0.0035)	(0.0038)	(0.0037)
Rain-free July 4, 1980-90 cohorts	-0.0022	0.0027	0.0074*	0.0132***
	(0.0034)	(0.0044)	(0.0044)	(0.0041)
Individual controls	Yes	Yes	Yes	Yes
State-specific time trend	Yes	Yes	Yes	Yes
NES sample	Full	Presidential Elections	Presidential Elections	Presidential Elections
Observations	23,516	12,503	12,503	13,233
R-squared	0.1234	0.1803	0.1339	0.1828

The regressions include county- and survey year fixed effects, individual controls including age and birth year, and average daily July rainfall during childhood. Rain-free July 4 is the number of Fourth of July's without rain during the respondent's childhood. The independent variables are interaction variables between Rain-free July 4 and cohort dummies, where each cohorts dummy covers one decade. Since the earliest cohort in the sample is born 1990, individuals born in 1990 are included in the 1980-90 dummy. Rain-free July 4 in columns 1 to 3 use rainfall days during age 3 to 18, while column 4 uses rainfall days during age 7 to 18. The outcome data is from American National Election Studies conducted in 1952-2008. Robust standard errors in parentheses, clustered at the state level. There are 50 states in the sample.
*** 1% , ** 5% , * 10% significance level.

Table A1. Falsification Checks: Placebo Days

	Voted for the Republican Candidate	Voted for the Democratic Candidate	Turnout	Campaign Donation	Attended Campaign Rally	Worked for a Political Party
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Fourth of July during childhood						
Rain-free July 4, days	0.0109***	-0.0062	0.0055*	0.0065***	0.0037**	0.0040**
	(0.0030)	(0.0040)	(0.0031)	(0.0022)	(0.0015)	(0.0018)
Rain-free July 2, days	-0.0014	0.0032	-0.0030	-0.0025	-0.0006	0.0020
	(0.0027)	(0.0039)	(0.0036)	(0.0027)	(0.0013)	(0.0018)
Rain-free July 3, days	-0.0018	0.0017	0.0032	-0.0003	-0.0014	-0.0016
	(0.0039)	(0.0034)	(0.0032)	(0.0024)	(0.0015)	(0.0022)
Rain-free July 5, days	-0.0004	0.0040	0.0039	-0.0008	0.0001	0.0003
	(0.0037)	(0.0051)	(0.0048)	(0.0020)	(0.0015)	(0.0023)
Rain-free July 6, days	0.0018	-0.0045	0.0011	-0.0026	0.0016	0.0019
	(0.0035)	(0.0039)	(0.0026)	(0.0018)	(0.0013)	(0.0025)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trend	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,503	12,503	13,233	13,144	13,148	13,153
R-squared	0.1932	0.1545	0.1944	0.1172	0.0470	0.0672
F-test	0.176	0.836	0.692	1.166	0.740	0.953
p-value	0.950	0.509	0.601	0.337	0.569	0.442

The regressions include county-, birth cohort- and survey year fixed effects, and average daily July rainfall during childhood. Robust standard errors in parentheses, clustered at the state level. The ANES data is from presidential elections in 1952-2008. There are 50 states in the sample.
*** 1% , ** 5% , * 10% significance level.

Table A2. Fourth of July effects as an adult, Contemporaneous and lagged effects

	Political Preferences			Political Participation			
	Party Identification: Republican (1)	Voted for the Republican Candidate (2)	Voted for the Democratic Candidate (3)	Turnout (4)	Attended Meeting (5)	Campaign Donation (6)	Worked for a Political Party (7)
Panel B: July 4th as an adult							
Rain-free July 4	0.0151**	0.0094	-0.0131	-0.0034	0.0036	0.0096*	-0.0029
	(0.0060)	(0.0115)	(0.0095)	(0.0111)	(0.0071)	(0.0057)	(0.0042)
Rain-free July 4, days in previous 1-5 years	0.0065*	-0.0009	-0.0017	-0.0034	0.0022	-0.0034	-0.0009
	(0.0036)	(0.0046)	(0.0049)	(0.0038)	(0.0035)	(0.0034)	(0.0030)
Rain-free July 4, days in previous 6-10 years	0.0003	0.0050	-0.0074	-0.0018	0.0004	0.0001	0.0007
	(0.0041)	(0.0058)	(0.0050)	(0.0042)	(0.0036)	(0.0029)	(0.0023)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NES sample	Full	Presidential Elections	Presidential Elections	Presidential Elections	Presidential Elections	Presidential Elections	Presidential Elections
Observations	28,858	14,434	14,434	15,288	15,149	15,166	15,159
R-squared	0.1319	0.1863	0.1378	0.1802	0.1098	0.0672	0.0572

The regressions include county-, birth cohort- and survey year fixed effects, linear state trends, individual controls, and average daily July rainfall during July in the election year. Rain-free July 4 in panel B is a dummy variable indicating whether there was no rain recorded in the respondent's county on July 4th preceding the election (i.e., the same year as the survey). Rain-free July 4, days in the previous 1-5 years is counting the number of rain-free Fourth of July's in the preceding five years. Rain-free July 4, days in the previous 6-10 years measures the same in the preceding 6-10 years. Voted Republican is a dummy variable equal to one if the respondent voted for the Republican party in the latest presidential election, and zero otherwise. Voted Democrats is a dummy variable equal to one if the respondent voted for the Democratic party in the presidential election, and zero otherwise. Turnout is a dummy variable indicating whether the respondent voted in the presidential election. Attended Meeting is a dummy indicating whether the respondent attended a political meeting or rally during the campaign. Campaign Donation is a dummy variable indicating whether the respondent reports that he/she gave money to a campaign. Worked for a Political Party is a dummy indicating whether the respondent worked for a party or candidate during the campaign. The outcome data is from American National Election Studies conducted in 1952-2008. Robust standard errors in parentheses, clustered at the state level. There are 50 states in the sample. *** 1% , ** 5% , * 10% significance level.