Widowhood Effects in Voter Participation

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Past research suggests that spouses influence one another to vote, but it relies almost exclusively on correlation in turnout. It is therefore difficult to establish whether spouses mobilize each other or tend to marry similar others. Here, we test the dependency hypothesis by examining voting behavior before and after the death of a spouse. We link nearly six million California voter records to Social Security death records and use both coarsened exact matching and multiple cohort comparison to estimate the effects of spousal loss. The results show that after turnout rates stabilize, widowed individuals vote nine percentage points fewer than they would had their spouse still been living; the results also suggest that this change may persist indefinitely. Variations in this "widowhood effect" on voting support a social-isolation explanation for the drop in turnout.

Recent experimental studies highlight the importance of social mobilization and demonstrate that efforts to increase turnout may not only convince those directly contacted to vote but also their political partners, friends, and family members. For example, Nickerson (2008) conducted a get-out-the-vote (GOTV) field experiment with two-person households and showed that 60% of the increased propensity to turn out resulting from the treatment was passed from one household member to the other. Gerber, Green, and Larimer (2008) also conducted a GOTV experiment in which they promised to show neighbors whether or not a person voted. This raised turnout by 8%—one of the largest effects ever observed for a by-mail treatment. Bond et al. (2012) conducted a 61-million-person experiment on Facebook and showed that a GOTV message not only increased turnout among the recipients but among the recipients' friends as well. Observational work by Cutts and Fieldhouse (2009) provides evidence that the occupants in two-person households have substantially larger effects on each other's turnout propensity than other geographically proximate electors.

The basis of many of these studies is a theory of social dependency. That is, forms of political participation that are strongly motivated by interpersonal influences may in turn be strongly dependent on them. This dependency, and a lack of (community-based) social connectedness and mobilization in recent decades, may account for variation in political participation rates (Gerber, Green, and Larimer 2008; McPherson, Smith-Lovin, and Brashears 2006; Putnam 2001). Importantly, however, these studies do not directly test whether increased social isolation will have large and long-lasting (negative) effects on political participation.

Here, we study political interpersonal dependency directly—specifically, dependency within a spousal relationship. This is a natural starting place for research on social isolation/connection and turnout. Spouses have long been identified as an important source of mobilization and influence (Campbell et al. 1960; Glaser 1959).

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This research uses three publicly available data sources: the Social Security Death Master File (distributed through the National Technical Information Service), the California Voter Record (distributed through the California Secretary of State's office), and the U.S. Census zip-code data. The Social Security Death Master File, relatively complete at the time we obtained the data, no longer includes many state records. More complete death-record information can be obtained by application to the California Department of Public Health.

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To better understand spousal dependency, we examine turnout before and after a spouse's death. This is an analysis of voting behavior when a person finds him- or herself alone, cut off from a relationship that for many people is the strongest they experience. Turnout before the death is important because many deaths result from chronic illness and will take their toll before the event (e.g., caregiver burden, during which the terminally ill spouse may have limited interaction capacity and/or be unable to return social support). Turnout after the death is also important because it will help us to see whether people return to their predeath levels of participation. In particular, we study the one-year anniversary of the death to see whether changes in personal health or the grieving process itself may be contributing to turnout decline. To identify the effect of interspousal mobilization, we compare changes among widowed voters by spouses' past voting histories and observe whether differences vary with age.

Existing Theories on the Marital Turnout Boost

It is well established that married individuals vote more than never married, divorced, or widowed people (Campbell et al. 1960; Stoker and Jennings 1995; Wolfinger and Rosenstone 1980; Wolfinger and Wolfinger 2008) and that the beneficial effects of marriage, in terms of political participation at least, appear to increase with time (Wolfinger and Rosenstone 1980). These observations are among the most fundamental in the political-participation literature. However, it is less clear whether spouses might indeed be significant mobilizing influences. More consistent voters may be more likely to marry, and the similarly voting spouses may have been politically similar prior to their wedding (Eaves and Hatemi 2011; Jennings and Stoker 2005).

Rather than focusing on the absence of a spouse, the current literature focuses on the presence of a spouse, and there are a number of existing theories that attempt to explain the phenomenon of higher turnout among married people. Three of these dominate contemporary conceptualizations of marriage and voting.

First, a number of researchers have applied life-cycle explanations to the marital turnout boost. Participation in politics, and formal organizations in general, might change over time through new and lost familial attachments (Stoker and Jennings 1995; Wilensky 2002; Wolfinger and Wolfinger 2008). This conceptualization is supported by observed changes in turnout by age and family structure. Recent analyses support this hypothesis by showing that major marital transitions, entry into marriage, separation, and divorce decrease political participation (Stoker and Jennings 1995). Past research also observes lower rates of participation among widows and widowers than among married individuals (Wilensky 1961; Wolfinger and Wolfinger 2008), but it has not found a statistically significant effect in the transition to widowhood (Stoker and Jennings 1995). Notably, and of relevance to this research, there is little survey evidence that electors disengage from passive forms of political participation (such as voting) as they reach old age (Jennings and Markus 1988).

Second, a number of social scientists hypothesize that discussion of political topics among spouses induces greater political interest and political participation. This theory is supported by survey evidence which indicates that spouses and family members are the most cited political discussion partners (Beck 1991; in addition to being the most cited discussion partners more generally [Marsden 1987]). Further, spouses are the most likely recipients of efforts to persuade another person to vote (Stoker and Jennings 1995; University of Michigan 1968). This theory posits not only that spouses influence each other but also that the primary mechanism of increased political participation, increased political interest, accumulates over time.

Third, scholars emphasize the importance of interpersonal mobilization around polling time. In *The American Voter* (1960), Campbell et al. note that people with "very low motivation who have gone to the polls" cite interpersonal influence as their primary motivator. Wolfinger (1980) hypothesized that marriage would be the most important source of such interpersonal influence. This hypothesis was founded in the work of Glaser (1959). Glaser argued that marriage could increase turnout by 20 percentage points, specifically for those who, if alone, might be less personally motivated to vote. Wolfinger (2008) posits that recently divorced or widowed persons might have grown accustomed to the assistance of a spouse and suffer from the lack of such assistance at voting time.

Somewhat surprisingly, given these encompassing approaches to marriage and turnout, we know relatively little about the degree of interpersonal influence (and dependency) within couples. It is difficult to disentangle the reasons for the observed differences in political behaviors of married and single voters. To pose the question succinctly: is the fundamental cause of the turnout discrepancy between married, divorced, and widowed voters that many unmarried, "unpaired" potential voters are alone at polling time? Evidence supporting this social-isolation

hypothesis could have large implications for changing patterns of voting behavior in the American electorate. Recent work on social isolation in the United States suggests that Americans find themselves increasingly alone (McPherson, Smith-Lovin, and Brashears 2006; O'Malley et al. 2012).

Several factors could be at play within this lonely nonvoter perspective. For example, are spouses influencing each other to become more politically involved, or do they possess identical voting records because they coordinated their voting behavior? Could attendance at political events or turning out to vote be social ("moral") support from one less political spouse to the other (analagous to an individual who very much wants to visit a certain restaurant but is unwilling to go alone or a less religious spouse indulging a more religious one)? At old ages, could some voters be (or, nearly equivalently, feel) entirely dependent on a healthier spouse? Regardless of the (possibly unique) mobilizing factor, the unifying, necessary condition for these influences is a voting partner. Should these partnerships exist at varying prevalence within the electorate, this will have fundamental implications for democratic representation.

For most Americans, a spouse is the most likely source for such a political pairing. This is well supported by findings in the political discussion and interpersonal influence literature noted above (Beck 1991; Glaser 1959; Marsden 1987). Also, many people consider voting to be a duty (Blais 2000), and political scientists have incorporated this assumption into theories of political participation (Campbell, Gurin, and Miller 1954; Downs 1957; Gerber, Green, and Larimer 2008; Riker and Ordeshook 2008). Given this, and if such a duty might alternatively be considered a chore to be checked off the "to-do list," it might be unusual to invite a friend to go vote with you unless you are both highly political. With this logic, whether spouses (or any couple living together) serve as voting partners might be less dependent on their levels of political interest.

Grieving, Health, and Behavior after the Death of a Spouse

It is well established that the death of a spouse has profound consequences. The recently widowed are at a much greater risk of death following the loss of a spouse (Christakis and Allison 2006; Lillard and Waite 1995; Martikainen and Valkonen 1996). Survival after the hospitalization of a spouse and spousal death varies by disease (Christakis and Allison 2006; Elwert and Christakis 2008), and men are more adversely affected by spousal death than women (Lillard and Waite 1995; Martikainen and Valkonen 1996; Moon et al. 2011), though men and women respond similarly to the hospitalization of a spouse (Christakis and Allison 2006). Some works find greater mortality risk among younger widows and widowers (Christakis and Allison 2006; Martikainen and Valkonen 1996), whereas others find no significant difference by age (Moon et al. 2011). This phenomenon is conventionally termed the widower effect, or, more colloquially, "dying of a broken heart."

Nonetheless, mortality risk is highest in the *first three months* following the death of a spouse and stabilizes (at a higher mortality risk than before) after *one year* (Elwert and Christakis 2006). Rates of depression also stabilize one year into widow(er)hood (Zisook and Shuchter 1993). Moreover, some changes in actions related to widowhood might be expected to precede the actual death of the spouse and to reflect the burden of caring for the spouse (Christakis and Allison 2006), especially since the terminal period can be significant (Christakis and Escarce 1996). For this reason, we expect turnout to be lower not only after the death of a spouse but also for some period beforehand. People caring for a chronically ill spouse should be less likely to vote.

Research Design

Past research has established that widowed and divorced voters, even after suitable controls, are significantly less likely to vote than their married counterparts (Wilensky 1961; Wolfinger and Wolfinger 2008). However, these analyses are unable to determine the time frame of this behavioral change. In contrast, our research design is intended to measure behavioral change throughout the transition from being married to widowed. We also seek to determine to what extent reduced turnout during this transition may be attributed to the loss of a partner (and social isolation), rather than disengagement, emotional trauma, disability, or some other factor. We first establish a baseline turnout rate in the years preceding a spouse's death via exact matching of widowed voters to married voters on relevant criteria, including past voting history, age, and gender. We then measure the difference in widows' turnout and baseline turnout before and after the death of their spouse.

A gradual decline prior to the death may be caused by coping with a chronically ill spouse or one's own poor health. However, if it is one's own poor health, then we expect this decline to continue after the spouse's death. A gradual recovery toward previous political behavior

suggests an emotional explanation for behavioral changes. Meanwhile, an indefinite change would be best explained by spousal dependency.

Methods

Our analysis is a combination of 78 case-control trials, one for each week in the six months prior to, and 12 months after, the death of a spouse. We also use three longitudinal observations for each trial to compare voting behavior between and within cohorts and further analyze turnout immediately before and after the anniversary of the death of a spouse.

For each of the 78 weeks surrounding the California Special Statewide 2009, Gubernatorial Primary 2010, and Gubernatorial General 2010 elections, we exact match likely widowed voters to pairs of likely married voters by past voting history, party identification, gender, age discrepancy between spouses, and age group. Age and age discrepancy are "coarsened," as described by Iacus, King, and Porro (2011), to avoid preferentially dropping older and/or less consistent voters. This exact matching is possible due to the size of the utilized dataset. In the next section, we describe the means through which we identify 60,000 cases (spousal deaths) and 5,800,000 controls. Through this, we examine the effect of the death of a spouse on the propensity to turn out in the year and a half before and after the death of a spouse.

The analysis of the overall patterns in turnout over the 78 weeks surrounding the death of a spouse deploys both a between-cohort and within-cohort analysis of these individual case-control trials for each of the three elections. Week 52 (by time from spousal death—negative numbers denote time preceding a death) cohorts experience the anniversary of a spouse's death on the week of an election. The week 0 cohorts include voters whose spouses died the week of an election. The anniversary discontinuity, at 52 weeks, is important because it may mark a turning point in grieving and behavioral adaptation, as suggested by widowhood-effect health research including Jin and Christakis (2009), and by prior (mixed) work on anniversary-related and other date-related health effects (Phillips and Smith 1990; Young and Hade 2004). Also, the emotional effect of the anniversary of a death is something of a truism in the psychiatry literature (though it has been studied in one empirical work on spousal death: Bornstein and Clayton 1972). Most studies of emotional health conduct surveys in the thirteenth month of grieving rather than the twelfth to avoid this effect (see, for example, Zisook and Shuchter 1991, 1993). Because this effect (to our knowledge) has never been shown in quantitative work, point displacement at this time point (52 weeks) permits preliminary confirmation of the anniversary as a major psychological event. We set discontinuities at weeks 0 and 52 to account for expected sudden and substantial behavioral shifts at these two time points. We also examine the suddenness of behavioral changes to determine whether observed turnout rates among widowed voters may be primarily due to the loss of social support rather than the onset of personal illness.

To isolate the effect of the loss of a political partner, we compare turnout rates among widowed voters who in 2004 through 2006 voted more, the same amount, or less than their spouses. Next, we consider the influence of the grieving process on voting widowhood effects by determining whether widows return to previous voting behavior of the observed year-and-a-half period. We argue that the difference among turnout rates for these groups is a useful approximation of mobilizing influence, once we establish variation by age and that independent participation among couples five years before a death cannot be attributed to the chronic illness of one spouse. The treatment groups (widowed voters) are compared to a matched baseline turnout in control groups (electors with similar ages, voting histories, and other covariates, weighted by their representation in the widowed population).

Data

Because marital status is confidential information in publicly available data, and the theories we wish to test posit that it is a spousal partner rather than the institution of marriage that will most influence observed differences in turnout among married and previously married voters, we use a validated algorithm to infer likely spousal relationships from voter residency data.

At the ages persons are most likely to experience a death, cohabiting couples of similar ages are likely to be spouses, partners, or, in some cases, siblings.[1] Within the theoretical framework of political partnerships (whether from a political discussion or interpersonal perspectives), all of these relationships can resemble a spousal connection, though possibly to differing degrees. We limit the analysis to couples sharing the same last name to decrease

[1] In 2003, respectively only 2% and 3% percent of women and men over the age of 65 lived with non-relatives, 17% and 7% lived with non-spouse relatives, and 41% and 71% lived with their spouses (U.S. Census Bureau 1996). Many more women than men lived alone, 40% compared to 19% due to greater rates of widowhood (U.S. Census Bureau (1996). We first accept these rates as given, and then we observe the incidence of same-sex couples with the same last name to infer the prevalence of non-spouses in our analysis.

the possibility that observed pairs are unrelated voters who list the same address. While this removes many people who are common-law spousal partners, it ensures that the remaining sample is less likely to contain non-spouses.

The analysis utilizes four data sources: the California Voter Records for 2009 and 2010, the Social Security Death Master File, and the 2000 Census zip-code-level geographic data.

The California Voter Records contain individual-level registered voter information, including full name, date of birth, complete address, gender, party affiliation, and voting history from the 2004 Presidential General Election through the 2010 Gubernatorial General Election.[2] The Social Security Death Master File (SSDMF) is a record of all deaths reported to the Social Security Administration (SSA), close to 90 million total deaths in the file used for this research. The individual-level records include full name, date of birth, date of death, social security number, zip code of last residence, and the source of the death notice received by the SSA. The file used for the research is the version last updated in March 2011. As of 1997, following the introduction of policies to enforce death reporting, the SSDMF included over 95% of deaths occurring after the age of 65, around 80% for ages 55 to 64, and around 75% for ages 25 to 54 (Hill and Rosenwaike 2001). It is less likely to include death records for women and foreign-born naturalized citizens than for men born in the United States (Schisterman 2004).[3]

Algorithm to Infer Spousal Relationships

To implement the algorithm, we first create a dataset of all households in California by grouping voters with the same listed address, excluding addresses with more than six household members (to exclude group homes). Next, we link household members whose ages are within 15 years and who share the same last name. The dyadic linking duplicates the voter records, with each individual in a spouse pair classified in one observation as a "subject" (the person whose turnout we will measure) and in another as a "spouse" (the person whose death may affect the subject's behavior). Lastly, we remove observations where the deceased voter is designated the subject.

We link registered voters in the two California Voter Records by exact full name and date of birth and deceased voters to the Social Security Death Master File in the same way. To ensure that deceased voters are identified accurately, this dataset excludes households with at least one occupant whose full name and date of birth are duplicated in the California Voter Records or in the Social Security Death Master File. This also avoids overcounting of the many duplicate records present in the file (up to 100,000 if we compare the incidence of persons sharing the same name and birth date in the Death Master File to that in the California Voter Record).

We remove records in which there are more than three household members of age within 15 years who share the same last name. We also remove subject-spouse pairs who experience a within-household death from another generation (another subject-spouse pair in the same household). We exclude pairs included in a three-person generation because we are unable to infer probable spousal relationships. Pairs which experience a death in the household, but not within the subject-spouse pair, are excluded to prevent these voters from being included in the controls. Income and population-density variables from the 2000 Census are by zip code.

This process leaves us with around 5.8 million controls (half as many households) with a living spouse and 60,000 cases with a deceased spouse. These remaining dyads are the examined "spouses." We impute gender when voter records include a gender-specific title (like "Mr."). A total of 1.5% of the female deceased "spouses" are the same sex as the cohabiting voter corresponding to the profile of a spouse, while 4.8% of the male deceased spouses are of the same gender as the identified subject. We assume that these numbers are upper bounds (that siblings are more likely to live together if they are the same sex).

Matching

Once we have identified probable spouses in the California Voter Record, we match voters who have lost a spouse in the past year to voters who have not. The purpose of this process is to balance treatment and control groups

[2]Not all of these data are complete, much like the Los Angeles County records used by Brady and McNulty (2011). For example, out of the over 17 million voters in the file, over 100,000 do not list a full date of birth (the majority of those who do, omit the year), around one-third do not include gender (partly because this is no longer included on voter registrations), and around 1.46 million voters were expunged between 2009 and 2010, in compliance with California voter record policy. The implications of the removal of voters from the registry are explained in the discussion section. Voters who experience long, debilitating illness are more likely to be absent from our analysis.

[3]The Social Security Death Master File cannot be fully relied upon to identify whether a voter is living. However, the California Registrar of Voters uses the Department of Public Health records to remove deceased voters from the voter registry. Comparing the rates of removal for voters identified by the Social Security Death Master File as deceased, we find that California counties remove 80% to 90% of deceased voters from the voter record prior to an election. Only Los Angeles County varies significantly from this. It has a 30% removal rate.

TABLE 1 Match Criteria

	Subject Variables	Spouse Variables	Subject-Spouse Variables
Age	-	Age[1]	Age Discrepancy[1]
Gender	Male/Female/Unknown	Male/Female/Unknown	-
Household Occ.	-	-	Nmbr. Reg. Voters
Party Affiliation	Democrat/Republican/Other	Democrat/Republican/Other	-
Voting History	GG06, GP06, SS05, PG04[2]	GG06, GP06, SS05, PG04[2]	More/Same/Fewer

[1]Coarsened - groups:
Age: (18:24), (25:29), (30:34), (35:39), (40:44) ... (75:79), (80:84), (85:89), (90:94), (95:115)
Age discrepancy: (−15:−6), (−5:−2), (−1:1), (2:5), (6:15)
Household occupancy: (2), (3:6)
[2]California statewide elections 2004–2006:
GG06 - Gubernatorial General 2006 GP06 - Gubernatorial Primary 2006
SS05 - Special Statewide 2005 PG04 - Presidential General 2004

on covariates that predict spousal deaths and restrict our analysis to only the voting population likely to experience spousal deaths. This matching is partitioned by weeks since the death of a spouse at election time to enable multiple between- and within-cohort comparisons. Because the count of days between California elections is in multiples of seven, cases belong in the same weekly cohorts for each analyzed election, Gubernatorial General 2010, Gubernatorial Primary 2010, and Special Statewide 2009. The criteria for this matching are shown in Table 1. The couples are matched exactly, in some cases within groupings, on a many-to-many basis. This implementation utilizes the methods described in Iacus, King, and Porro (2011). Matched cases (m_T)and controls (m_C) used in the analysis receive weights described in Equation (1). The control weights are the ratio of cases to controls in the matched stratum S ($\frac{m_T^S}{m_C^S}$), multiplied by the ratio of matched controls to matched cases in the trial ($\frac{m_c}{m_t}$) (which is constant among in-trial strata). Unmatched cases and controls receive a weight of zero.

$$w_i = \begin{cases} 1, & i \in T^S \\ \frac{m_T^S}{m_C^S}, & i \in C^S, \left(\times constant = \frac{m_c}{m_t}\right) \end{cases} \quad (1)$$

The matching criteria directly and indirectly account for a number of important factors which affect the comparability of these two populations (widowed and married voters). The first and most obvious of these is the age of a spouse. Also, women are much more likely to survive their spouses than men. Fifty-one percent of ever-married (ever-married excludes never-married) women over 70 have been widowed while 23% of men over the age of 70 have been widowed (Kreider and Ellis 2011). Party affiliation helps account for variation by political cycle.

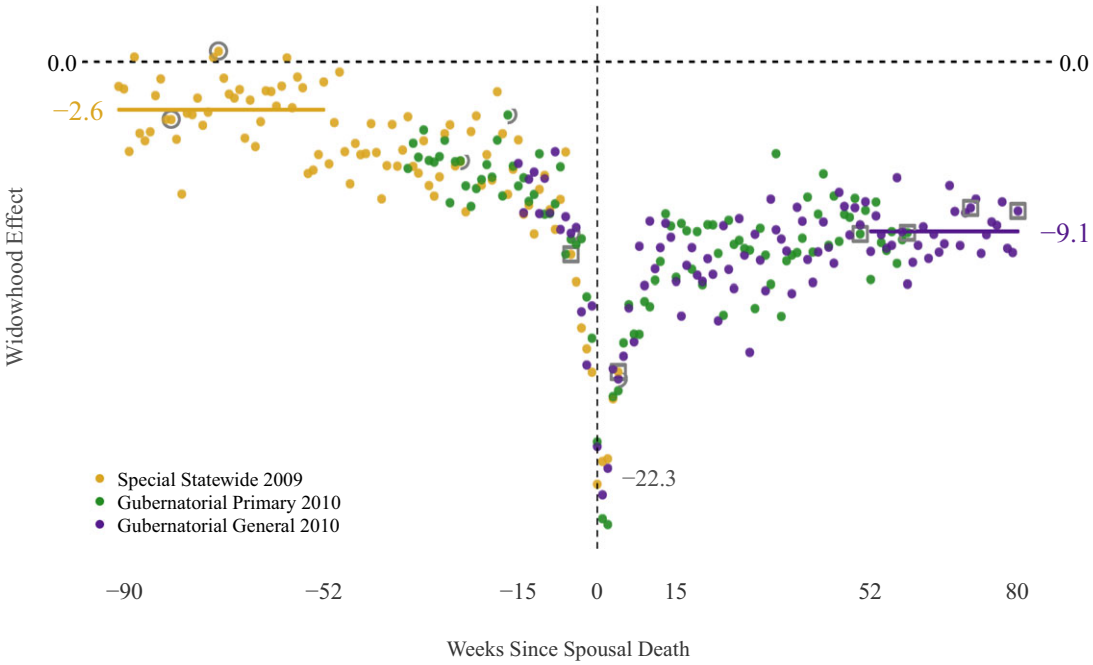
The past voting-history boolean variables are catch-all matching terms. Because voting behavior is determined by a number of factors, including habit (Gerber, Green, and Shachar 2003), persistence (Denny and Doyle 2009), socioeconomic status, and natural predisposition (Fowler, Baker, and Dawes 2008), matching on past voting history partially controls for these variables (between cases and controls).

Calculation of Treatment Effect

Given the exact matching process and the size of the dataset (60,000 cases and 5,800,000 controls), calculation of treatment effects is nonparametric and makes few assumptions. We use "average treatment effect on the treated" (ATET) to calculate the widowhood effect for voting. The calculation is the turnout rate of married voters minus the turnout rate of widowed voters, weighted according to their proportional representation in the widowed population (matched cases receive a weight of one; matched controls receive a weight of the number of cases within the matched strata over the number of controls within the matched strata as described in Equation (1); unmatched cases and controls receive a weight of zero). Point estimates, standard errors, and 95% confidence intervals are calculated using the standard bivariate regression formulas. In Equation (2), V_{1e} is the turnout of cases, and V_{0e} is the turnout of controls. D_a represents the distribution of treatment covariates ($D_a = 1$, meaning that observed treatment covariates of controls are distributed identically, within the coarsened matching bounds, to covariates in the treatment group; this controls for the probability of experiencing the death of a spouse), and w_i is the weights assigned to cases and controls.

$$ATET = E[V_{1e} - V_{0e}|D_a = 1] = E[V_{1e}] - E[V_{0e}|w_i]. \quad (2)$$

FIGURE 1 Overall Widowhood Effects, Aligned by Weeks Since Spousal Death at Election Time



Note: This plot shows the turnout changes for 60,856 widowed voters. The line at 0.0 is the base turnout of matched and weighted controls, and each point displacement is the average difference in turnout between matched subjects and weighted controls for a weekly cohort (the average treatment effect on the treated). Groups of widows and widowers who would lose a spouse in the weeks following an election are the −90 through −1 week cohorts on the left of the vertical line at 0 (election week), and groups who lost a spouse prior to an election are the 1 through 80 week cohorts on the right. Each subject, and his or her weekly cohort, appears three times in the figure—once for each election. To illustrate the three observations, we circle two cohorts of caregiving/soon-to-be-widowed voters and draw squares around two cohorts of recently widowed voters.

Next, we divide this estimate by the weighted mean of control turnout rates to obtain the proportional treatment effect. (See Equation 3.) This estimates the proportion of widowed voters who did not vote but would have voted had their spouse been alive at election time

$$PATET = E[V_{1e} - V_{0e}|D_a = 1]/E[V_{0e}|w_i]. \quad (3)$$

We calculate these estimates for each cohort and their three longitudinal observations. This partitioning allows us to view progressive behavioral changes in the year and a half surrounding spousal death. We add loess smooth (discontinuity at week 0) and least squares (discontinuity at week 52) regressions to better visualize behavioral changes over the course of the observed period. The least-squares regressions begin at week 15. This excludes both the acute mourning period (this is a separate, highly nonlinear recovery process) and early mail-in ballots (this removes subject votes cast while a spouse was still living, but who died before the election).

Results and Analysis

After we have matched voters and calculated the average treatment effect for voters who experience a spouse's death in a given week (and treatment effects for age, gender, and voting subgroups), we first align the results by the weeks since spousal death at election time. The overall results appear in Figure 1.

In Figure 1, each point represents the estimated widowhood effect (average treatment effect on the treated) for those voters who lost a spouse in a specific week (week 0 is the week of an election). For illustrative purposes only, we highlight four cohorts through the one-and-a-half-year observation period (two circled on the left-hand side and two outlined with squares on the right). The average number of cases per week was 644, and the rate of successful matches for cases was 98%. Unmatched cases receive a weight of zero and are not included in the estimate (according to the procedure described above from Iacus, King, and Porro 2011). The x-axis is the weeks

since the death of a spouse, and the y-axis is the widowhood effect on voting, i.e., the difference in turnout rates between cases and matched controls. The observed time period—the time between the first available California Voter Record (voters deceased before this time had already been removed from the record) and the version of the available Social Security Death Master File—spans three elections.

There are three main results. First, turnout rates of cases decrease precipitously in the weeks immediately preceding a spouse's death and reach a nadir when the death occurs near Election Day. Second, after turnout rates increase and then stabilize around three months following spousal death, about 11% of widowed voters no longer turn out to vote (ATET percentage point estimate: −.091, ordinary least squares [OLS] standard error: .003; control turnout estimate: .830, OLS standard error: .00026). Third, the turnout of widowed voters increases greatly only in the acute mourning period, and increases are statistically significant only in the first year (weeks 15 through 52 OLS slope: .00092, standard error: .00025, p-value: .00068 – weeks 52 through 80 OLS slope: .00032, standard error: .00029, p-value: .283). Given that most behaviors and rates of depression following the death of a spouse stabilize after one year (Jin and Christakis 2009; Zisook and Shuchter 1993), this suggests that many widowed voters may discontinue voting indefinitely. This is further analyzed in the final results section on recovery to previous voting behavior, where we show variation by household occupancy. Table 2 in the online supporting information (SI) shows aggregated widowhood-effect estimates by partition and time period before and after spousal death.

Figure 5 in the supporting information aligns the results by cohort, meaning that the points vertically aligned in this figure are identical groups of voters. This graphic shows turnout of both cases and controls and displays a proportional widowhood effect (the proportion of widowed individuals who did not vote but would have voted had their spouse been living), as opposed to the mean difference in case and control turnout shown in Figure 1.[4]

[4]It is relevant to note that the voters appearing on the more recent end (the left side of the figures) of the observation period are, on average, one year older than the voters on the earlier end (the right side). This is evident in the slightly lower base turnout rates. However, the turnout rates of the matched controls differ by only .25 percentage points. Also, there are around 12% more cases in the winter season (noticeable in the smaller variance for the winter season), and there are 8% fewer cases in summer 2010 than in summer 2009. This discrepancy is likely due to both out-of-state changes of address among widow(er)s and the deaths of surviving spouses.

Changes in Turnout by Age and Gender

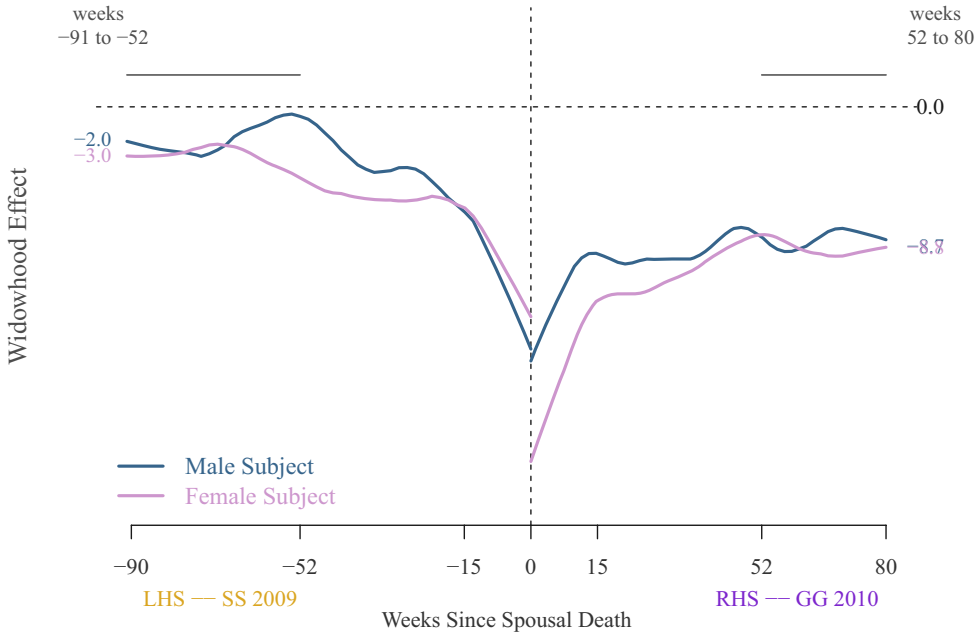
A gender difference in widowhood effects is one of the most established findings in widowhood-effect health research. Men are more adversely affected than women, especially in the period surrounding spousal death (Lillard and Waite 1995; Martikainen and Valkonen 1996; Moon et al. 2011). This is commonly attributed to differences in the salutatory effects of marriage for men and women and differing emotional and practical responses.

Figure 2 compares widowhood effects among men and women. The left-hand side of this graph shows differences in turnout between cases and matched controls for the Special Statewide 2009, and the right-hand side shows the Gubernatorial General 2010. We observe spousal deaths for only one month prior to the Special Statewide 2009 and for three months following the Gubernatorial General 2010. We are able to compare the different election turnout rates because the absolute difference between cases and controls over weeks since the death of a spouse is constant between low- and high-salience elections (as shown in the previous figure). The Gubernatorial Primary 2010 is excluded because the additional points reduce graphical clarity and are substantively equivalent to those from the Special Statewide and Gubernatorial 2010. The x-axis is the weeks since the death of a spouse, and the y-axis is the time since spousal death. The numbers on the left-hand side note mean widowhood effects for weeks −91 through −52, and the numbers on the right-hand side are mean widowhood effects for weeks 52 through 80.

Next, we calculate aggregated effects (taking the mean across time would assign different weights because there are more cases in winter and more cases on the left side of the graph). These numbers are as follows: weeks −91:−52 men −.020 (95% CI: −.014, −.026), women −.030 (95% CI: −.026, −.035); weeks 52:80 men −.087 (95% CI: −.081, −.093), women −.088 (95% CI: −.084, −.092). The complete aggregated results are shown in Table 2 in the supporting information.

In the year surrounding spousal death, men are slightly less adversely affected than women. Using a simple differences-in-means test for widowhood effects at weeks 52 before spousal death through 52 after spousal death, this difference is statistically significant at $\alpha = .05$. However, the aggregate widowhood effects in the Gubernatorial General 2010 in weeks 52 through 80 after spousal death, the period for which turnout rates are stable, are not substantively different between genders. As noted above, they are −.087 ATET for men and −.088 ATET for women. This difference is not statistically significant.

FIGURE 2 Gender Comparison



Note: This figure shows the separate changes in turnout levels for widows and widowers. The line at 0.0 is the base turnout of matched and weighted controls, and the loess curve (span = .3) shows the smoothed average difference in turnout levels between matched subjects and weighed controls for weekly cohorts (the smoothed average treatment effect on the treated by week). As in the figure above, the widows and widowers on the left of the vertical line at 0 (election week) would lose a spouse in the weeks following an election, and those on the right lost a spouse prior to an election. The left-hand side of this graph shows differences for the Special Statewide 2009, and the right-hand side shows the Gubernatorial General 2010. Figure 1 and Table 2 in the supporting information show that absolute differences between cases and controls over weeks since the death of a spouse are constant between low- and high-salience elections.

Figure 8 in the supporting information compares progressive differences in widowhood effects by age. Voters under the age of 65 are more adversely affected than older voters, and the effect decreases up to age 75 (a finding that parallels prior work showing a larger widowhood effect with respect to health when the decedent or surviving spouses are younger). The increase in the adverse effect at old ages is conceivably due to a decreased ability to travel to a polling station or obtain and complete a mail-in ballot. We exclude pairs who possess different voting histories because matching drops many cases in the "more votes than spouse" and "fewer votes than spouse" partitions at advanced ages. This aids the analysis of interpersonal mobilization, since it likely removes pairs with unusual voting records that may be attributable to illness but misrepresents an analysis of widowhood effects by age.

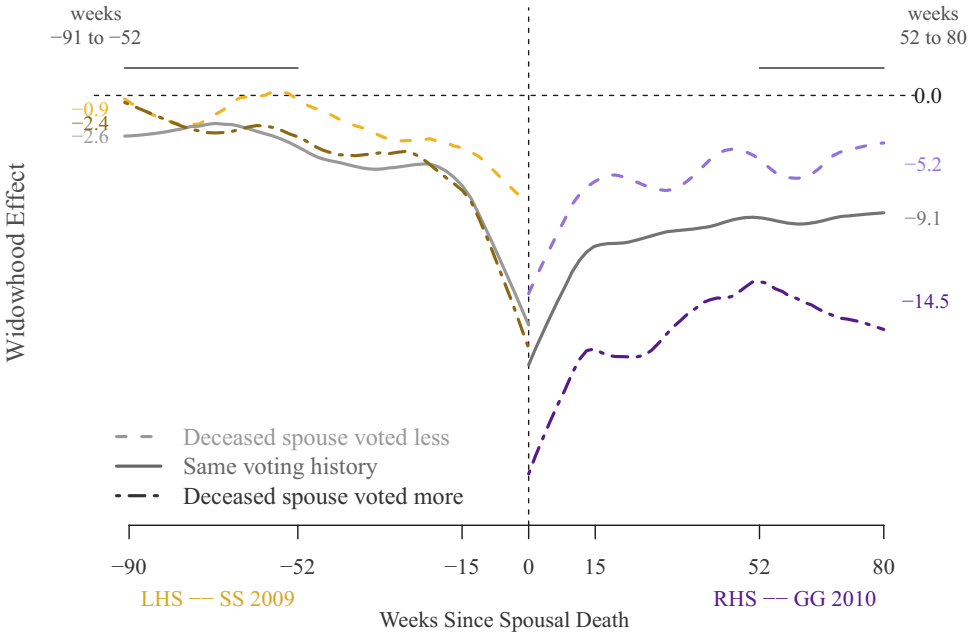
The greater effects at young ages may be attributed to greater emotional trauma for deaths at young ages (when deaths are more sudden and unexpected), a greater dependency on a political partner, or a combination of both of these two factors. Subramanian, Elwert, and Christakis (2008) find that a high concentration of widowed individuals moderates the adverse health effects of widowhood. In the context of voting, this suggests the possibility that greater social isolation resulting from widowhood at relatively young ages is further plausible explanation.

The supporting information also contains Figures 6 and 7, showing turnout by age for the test elections and baseline elections (note that baseline elections are matched and not directly calculated in the widowhood-effect estimates) for both widowed individuals and matched controls. Of most relevance to the current analysis, they show (1) that turnout rates in the age groups most likely to experience a spousal death are comparable between low- and high-salience elections, and (2) the pruning effects of the matching process restrict most of our control sample to the 45-to-90 age range.

The Effect of the Loss of a Political Partner

While the analysis so far suggests that people are less likely to vote once their spouse dies, it does not investigate the

FIGURE 3 Voting History Comparison



Note: This figure shows the separate changes in turnout levels for widows and widowers who in the past vote more than, the same as, or less than their spouses. The voting relationships proxy for interspousal mobilization. Figure 9 in the supporting information shows that these relationships are not proxies for health. As in the previous figures, the line at 0.0 is the base turnout of matched and weighted controls and the loess curve (span = .3) shows the smoothed average differences in turnout levels between matched subjects and weighted controls for weekly cohorts (the smoothed average treatment effect on the treated by week). The widows and widowers on the left of the vertical line at 0 (election week) would lose a spouse in the weeks following an election, and those on the right lost a spouse prior to an election.

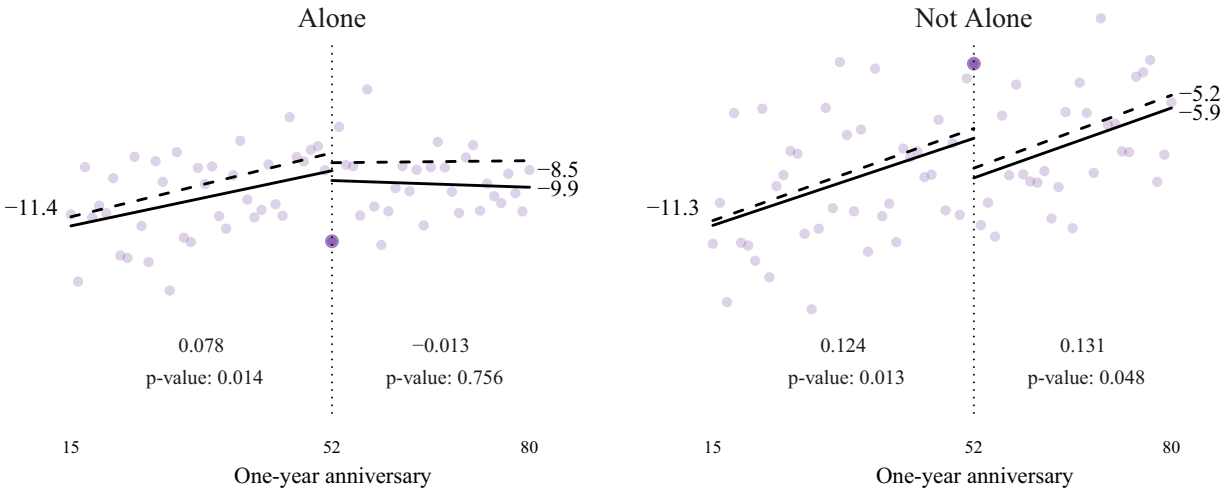
potential causal mechanism. Next, we test whether or not the political behavior of the deceased spouse influences the size of the widowhood effect. If it does and if the variation in the effect does not substantively change with age in the matched sample, then the result suggests that the loss of a mobilizing partner is driving the effect. If variation in past behavior does not influence the widowhood effect or if the results change substantively with age, then the loss of social support, physical disability, and/or depression may be the most important causal mechanisms.

Figure 3 compares widowed individuals partitioned by whether, in 2004 through 2006, they voted while their spouse abstained, possessed the same voting history, or abstained while their spouse voted. This figure is identical to the gender comparison graphic. The left-hand side shows differences in turnout between cases and matched controls for the 2009 Special Statewide Election, and the right-hand side shows the 2010 Gubernatorial General Election. As in Figure 2, Gubernatorial Primary 2010 is excluded because the additional points reduce graphical clarity and are substantively equivalent to those from the Special Statewide and Gubernatorial 2010.

Notice that the discrepancies between cases and controls and their progression leading up to spousal death are approximately equivalent in all three partitions. In contrast, the differences among these relative voting-history subgroups after spousal death are substantial and greater than any others we observe in this research. These findings strongly support a social-mobilization explanation for widowhood effects in voter participation. Spouses motivate each other to vote, even up to the weeks just before death.

Since past voting histories may be a proxy for health, we analyze how the widowhood effect for pairs with different voting histories varies with age. The results of this analysis are shown in Figure 9 of the supporting information. The differences in widowhood effects between subjects whose "spouse votes more" and subjects whose "spouse votes less" are constant over the age range. In contrast, if poor health among people who vote less than their spouse were driving the result, then we would expect this difference to be smaller in younger people for whom the incidence of debilitating illness is much lower.

FIGURE 4 "Recovery" by Number of Registered Voters in Household



Note: This figure shows widows' and widowers' return to previous turnout levels in weeks 15 through 80 after the death of a spouse. We draw a discontinuity at week 52 to account for anniversary effects and highlight turnout during the week of the anniversary. The solid line is a linear regression on observed changes in turnout rates, and the dotted lines are the changes in turnout rates possibly unobserved due to movement out of California.

Recovery Past 52 Weeks

In most of our results, we see the turnout of widows and widowers increase up to 52 weeks before it flattens or again declines. This is similar to results in most widowhood-effect research that finds health behaviors and outcomes *stabilize* after one year (Elwert and Christakis 2006; Zisook and Shuchter 1993). Accordingly, the characteristics of any groups that are able to return to predeath levels of turnout may suggest factors which, over the long term, ameliorate the adverse effect of widowhood and personal loss on voting.

In Figure 4 (and Figure 10 in the supporting information), the x-axis spans weeks 15 through 80 after the death of a spouse. The y-axis is the widowhood effect. We draw a discontinuity at week 52, the anniversary of spousal death, where we see most turnout rates stabilize, and highlight turnout during this week (as an indicator of whether the anniversary is a significant displacement in turnout rates and a verified anniversary effect). The means on the left- and right-hand side of the figure are for weeks 15 through 25 and 70 through 80, respectively.

Figure 4 shows recovery past the anniversary of spousal death by the number of registered voters in the household. Voters in households of three or more voters are less likely to be living alone after a spouse's death. In this dataset, "living with others," or "not alone," means that the widowed individual was living with another registered voter, in addition to the spouse, in 2009 (prior to the spouse's death). Because the spouse-identification algorithm excludes voters with two possible spouses, meaning two cohabitants with an age within 15 years of the voter and a shared last name, along with address listed by more than six individuals (regardless of last name or age), the additional household members who are registered to vote are likely to be adult children or family members from another generation, such as cousins, nieces, or uncles. Widowed individuals who may have moved to be closer to family are included in the "alone" category because we observe their movement only when they re-register to vote. The solid line is the observed recovery, while the dotted line is an estimate of the recovery that is unobserved due to widowed individuals moving out of state.[5]

[5]We utilize two estimates of this unobserved recovery. The 2010–2011 Current Population Survey by the U.S. Census Bureau (2011) estimates that 16% of American widow(er)s who move, move between states. This is higher than out-of-state movements from California, but we use it as a conservative estimate. We multiply 16% by the proportion of widows who re-register at new addresses before the anniversary of spousal death in our sample and multiply by 20% for re-registrations at new addresses after the anniversary (because out-of-state relocation might occur slightly later). We then multiply this by the turnout of controls (a widowhood effect of zero because re-registration is correlated with voting) and add this "unobserved recovery" estimate to the fitted values of the observed data. This first estimate is the dotted line in Figure 4. The second estimate uses 16% before and after the anniversary and the case turnout (which takes an unobserved widowhood effect equal to the observed effect). The second estimate is the lower bound in our estimate of the recovery rate, and the first estimate is the upper bound. We do not include this unobserved recovery in the

This comparison of widowed individuals who are alone against those who are not alone shows that close to half of widowed individuals return to previous voting behavior in the year and a half after the loss of a spouse. Recovery in widowed individuals living alone is limited. In the supporting information, we show that voters over 80 recover substantially in the first year before their turnout rates plateau, and that voters under 65 also experience continual recovery. However, the continual recovery among voters under 65 is less substantial than that for those living with others (and not statistically significant), suggesting that social support is a greater ameliorating factor than young age.

This result suggests concrete means through which widowed individuals may maintain civic engagement. Widowed voters living with others are less socially isolated and may be able to receive assistance when needed (including a ride to a polling place). Living with others may increase the motivation to vote (and it is noteworthy, if unsurprising, that living alone may lead to depression; Pulkki-Raback et al. 2012).

Discussion

Here, we estimate that approximately 70% of the change from married to widowed turnout may occur during the year immediately surrounding the death of a spouse. Moreover, spouses who voted more than the decedent experienced a substantially smaller widowhood effect with respect to voting than spouses who voted less than their deceased partner. This difference is not explained by the possibility of differences in personal health and disability between these two groups. Overall, we see that around 11% of voters who otherwise would have voted no longer vote even a year and a half after the death of a spouse.

Social connection, either by increasing the motivation to vote or decreasing the obstacles to voting, may greatly attenuate the adverse effects of spousal loss on voter participation. We observe substantially less recovery past the acute grieving period among widowed individuals who likely live alone than among widowed individuals living with another registered voter (who in our sample are very likely to be children or other different-generation family members). After stabilizing around four months after spousal death, observed turnout rates among solitary widowed individuals increase up to the anniversary of spousal death before flattening or again declining. Turnout rates among those living with others rise continually. We estimate that around 20–30% of voters living alone after a spouse's death return to previous voting behavior within a year and a half of the death, while 50% of voters still living with others return to previous rates of voting in the same time period. This variation is not explained by differences in age or residential mobility between the two groups.

The findings that the loss of a mobilizing partner and relative social isolation likely drive the sudden, varied, and persistent changes in voter participation beyond that attributable to emotional trauma from spousal death also have significant implications for observations on the turnout discrepancies between married and divorced voters. Somewhat counterintuitively, works that compare the effects of widowhood and divorce suggest that divorce is at least as, and perhaps more, detrimental than widowhood in the long term. The similarity of divorce and widowhood is a consistent finding for turnout discrepancies (Stoker and Jennings 1995; Wolfinger and Wolfinger 2008), loneliness (Peters and Liefbroer 1997), levels of subjective well-being (Mastekaasa 1994), and morality risk (Lillard and Waite 1995).

A conservative estimate of the net electoral losses from spousal death and divorce, assuming persistent changes with some recovery, accounts for 1.1 million lost votes in nonpresidential elections (6% of 9.8 million widowed and 3% of 17.6 million divorced/separated registered voters; Kreider and Ellis 2011). Strong effects for the divorced and never married would increase this estimate by up to 3 million votes.

To place this sample and the findings on spousal mobilization in perspective, 61% of spouses in our study possess identical turnout histories for all four observed low-salience elections (gubernatorial primary and special statewide elections between 2005 and 2010). The estimated "contagion" effect for two-person households in Nickerson (2008), using experiments conducted during low-salience elections, was 60%. Gerber, Green, and Lariman (2008) calculated a treatment effect of 8 percentage points in a low-salience election for their GOTV experiment on social pressure. Here, the estimated overall widowhood effect for the low-salience Gubernatorial Primary 2010 was −9.6 percentage points (weeks 15 through 52 after spousal death—the estimated effect was −10.3 percentage points in the Gubernatorial

overall estimates of the widowhood effect because of the likelihood of an unobserved effect from illnesses sufficiently debilitating and chronic to result in the de-registration of the dying and their caregivers before the observation period. This exclusion assumes the effect of long-term, debilitating illness is at least the size of the unobserved recovery (greater than 1–2% of the sample size).

General 2010 for the same time period and 1 percentage point smaller after week 52). We observe around 10 percentage points' difference between the "more political" and "less political" spouse partitions for the Gubernatorial General 2010 and 8 percentage points' difference in the primary.

There are several limitations of this study. First, we do not know the specific reasons that widows and widowers stop voting. Though spousal mobilization and social isolation explain aggregate variation, and social support seems to either increase the motivation to vote or decrease obstacles to voting, these factors tell us little about the individual experiences of widowed individuals. Also, those couples who discontinue voting long before the death of one spouse may be excluded from our sample. This selection may lead to underestimation of the effects of social isolation, health, and emotional trauma.

Second, our study is limited to nonpresidential elections. Levels of (potentially compensatory) social mobilization are presumably higher during very high-salience presidential elections, and whether or not the widowhood effect observed here extends to these contests remains open to speculation and further empirical work. We note, however, that turnout rates and effects of spousal death in our study population (many of whom are senior citizens) are comparable between special, midterm primary, and midterm general elections.

Next, while our results vary less substantially by geography than by differences in spousal voting histories and household occupancies (consistent with predominantly "small spatial scale," or household, effects on turnout observed by Cutts and Fieldhouse 2009), we note that California-specific contextual effects may limit the exact external validity of our findings. For example, California permits mail-in ballots, and some areas have vote-by-mail-only precincts. Assignment to vote-by-mail decreases participation in high-salience elections and may increase participation in low-salience elections (Kousser and Mullin 2007). In preliminary work, we have observed no statistically significant differences in areas with very low population density (areas more likely to have vote-by-mail-only precincts) in the 2010 general election. However, we cannot yet rule out state-by-state variation or variation contingent on specific voting rules.

With respect to the possible return of individuals to previous voting behavior, though our results suggest somewhat limited recovery past one year, there is still likely to be unobserved recovery in the long term, especially as widowed individuals reestablish close relationships. It is also important to note that the possibly indefinite drop in turnout does not imply a lack of recovery in a broader sense (emotional or physical health, for example).

Finally, while we find that voters living with others return to previous voting behavior, we note that family social support (and perhaps income) may determine the probability that elderly voters live with their children. We cannot distinguish between the presumed support (either emotional or practical) which determined living arrangements and support that might be provided by default in a shared living environment. Conversely, the poor health of the elderly parents may determine living arrangements. We do not see evidence of this in our sample, but, if this is the case, it could lead to an underestimation of the positive effect of living with others.

Conclusion

The death of a spouse greatly decreases one's propensity to vote. Though the large effect of emotional trauma on voter participation (both around spousal death and for the week of the anniversary of the death) is an important finding, our main contribution is perhaps our exploration of substantial variation and persistency in voter-participation changes after the death of a spouse. Moreover, the proposed explanatory variables—the loss of a mobilizing partner and an increase in social isolation—are not exclusive to widowhood, and hence more broadly relevant.

Our work departs from previous research on social mobilization by directly measuring the effects of induced social isolation on turnout. The approach improves on previous aggregate and/or cross-sectional studies of social isolation and civic participation by using longitudinal and matched between-cohort analyses to provide plausibly causal evidence for isolation effects. Of theoretical interest, our analysis shows that there exist both highly independent and dependent voters in spousal relationships and that the magnitude of interpersonal dependency effects on turnout can be substantial. We further show that the presence of other registered voters in a household may, over time, compensate for the loss of a voting partner, suggesting that turnout lost with the absence of a social connection can be, but is not always, recovered through others.

We hope that the findings here, and our proposed explanations, serve as a foundation for further direct assessments of social isolation and civic engagement. Identifying forms of social isolation that are involuntary and reversible, along with additional means to compensate for lost social mobilization and/or connection to

society (including whether existing social-mobilization techniques do exactly this), may be especially fruitful research.

It is relevant to note three additional areas that merit future study: the prevalence and impact of social isolation by socioeconomic status, the influence of divorce and widowhood on the estimated effect of mobility on turnout, and advocacy for the seriously ill.

Poor health and vulnerability to stressful events, including divorce and widowhood, are correlated with low socioeconomic status. Though we are unable to study effects by socioeconomic status at an individual level, a socioeconomic status gradient appears probable. In our sample, there is a greater effect in zip codes with per capita income below $35,000.

We further note that our findings bear on studies which find that residential mobility appears to decrease turnout, such as Squire, Wolfinger, and Glass (1987), but that do not control for changes in marital status. Newly widowed and divorced individuals often move in the year immediately following spousal death or separation. For example, Speare and Goldscheider (1987) found that around 50% of divorced individuals moved during the year of their divorce, compared with 7% of the currently married and 14% of those not divorced during the year (the highest rates of mobility, close to 70%, were for newlyweds, who have also been shown to exhibit low turnout rates during marital transition; Stoker and Jennings 1995). In the same study, 11% of widowed individuals moved during the year their spouse died, compared with 7% of non-widowed individuals. These numbers are not especially surprising. For example, separated individuals who exhibit the lowest turnout rates by family structure (Wolfinger and Wolfinger 2008) do not live with each other by definition. This should be taken into consideration when calculating the effect of residential mobility on turnout. In our results, the period of greatest recovery (week 15 through one year) is also the period of greatest residential mobility after spousal loss or separation.

The last important area of future study is the ability of the seriously ill, their caregivers, and their loved ones (along with others going through a similar crisis) to advocate for their political concerns. For example, disability alone may decrease turnout by up to 20 percentage points (Schur et al. 2002). Induced social isolation from certain disabilities or illnesses may negatively affect political participation well beyond the impact of physical health on voting. More broadly, social isolation may be a major form of disenfranchisement. Isolated individuals and families may be most in need of government assistance during crisis and the least likely to request it.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Notes verifying data quality
Figure A1: Overall widowhood effects, aligned by cohort
Figure A2: In-sample turnout, by age (identical voting histories only)
Figure A3: In-sample turnout in matched elections, by age (identical voting histories only)
Figure A4: Widowhood effects, by age
Figure A5: Voting history comparison, by age
Figure A6: Recovery, by age
Figure A7: Recovery, by population density
Figure A8: Recovery, by per capita income in zip code
Table A1: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

Online Supporting Information

Overview

This paper measures turnout rates before and after a spousal death to estimate the effects of spousal loss on turnout, and analyzes variations in turnout changes to evaluate social explanations for the observed widowhood effects.

The social explanation analysis is based on three assumptions: 1) persistent changes in turnout (changes not accompanied by a substantial gradual recovery for the year half of a spouse's death) are directly attributable to the absence of a spouse, and not the loss and grieving process; 2) relative voting histories of spouses (whether one spouse votes more, the same amount, or less than the other) are indicators of political engagement, and observed variations in turnout changes by relative spousal voting histories are attributable to differences in political engagement; and 3) changes in turnout caused by the absence of a mobilizing spouse can be moderated (over time) by the presence of other electors in the same household (e.g. as they assume new household and social support roles).

The tests of social explanations for drops in turnout following the death of a spouse are presented in the body of the article. We observe limited aggregate return to previous voting behavior in the year and a half following the death of a spouse and no aggregate return to previous voting behavior past the one year anniversary of spousal death, electors who voted less than the decedent spouse are substantially more affected by the spouse's absence than electors who voted more, and widowed individuals who lived with other electors (likely family members) at the time of their spouse's death gradually return to previous voting behavior past the one year mark.

In this supporting information, we detail the structure of the dataset used in the above analysis, and test alternative explanations for observed turnout patterns.

Data Structure

Our longitudinal and between cohort analyses are constructed from three elections – the Special Statewide 2009, the Gubernatorial Primary 2010, and the Gubernatorial General 2010. In the main

article (Figure 1), we arrange cohorts by weeks since spousal death and show that the average treatment effect on the treated (ATET) estimates for each of the three elections are comparable when arranged this way. Given this and that we do not observe turnout rates for one and half years before and after spousal deaths for each of the three elections, we treat turnout rates in each election as representative.

Specifically, for graphical clarity and because the results are substantively equivalent, we do not display the Gubernatorial Primary 2010 results in the gender and voting history comparisons (Figures 2 and 3). Also, the analysis of recovery over the study period (in Figure 10) is restricted to the Gubernatorial General 2010 because we do not observe widowed individuals for a sufficiently long period following the special and primary elections. This approach is further supported in Figures 6 and 7 where we show that turnout patterns in the study population (most of which is over the age of 45) are similar for each election.

In Figure 5, we show the original data structure for our analysis. The x-axis in each plot is still the weeks since spousal death, but each plot shows cohorts/calendar weeks vertically aligned – each widowed cohort at the same chronological/horizontal position on across rows is the same group of individuals. We also note calendar date by season and year at the top of each plot in the middle column of this figure – while weeks since spousal death increases from left to right, calendar time is more recent on the left side of the plots. The rows plots are also arranged vertically (top to bottom) by chronological date of the election, and the election dates (at x-axis 0) move from right to left across rows.

The plots are otherwise very similar to those in the main text. The left column of plots shows the weighted (using match weights), average turnout rates (y-axis) for both cases (crosses) and controls (circles). In each remaining plots for the paper, the control turnout rate is the baseline '0.0'. In the middle and right columns of plots, the y-axis is the proportional treatment effect on the treated. The middle column of plots is the data setup used in the overall, gender, and voting history analyses in the main text. The right column of plots shows the data setup for the recovery analyses (focused on weeks 15 through 52, and the post one year anniversary period).

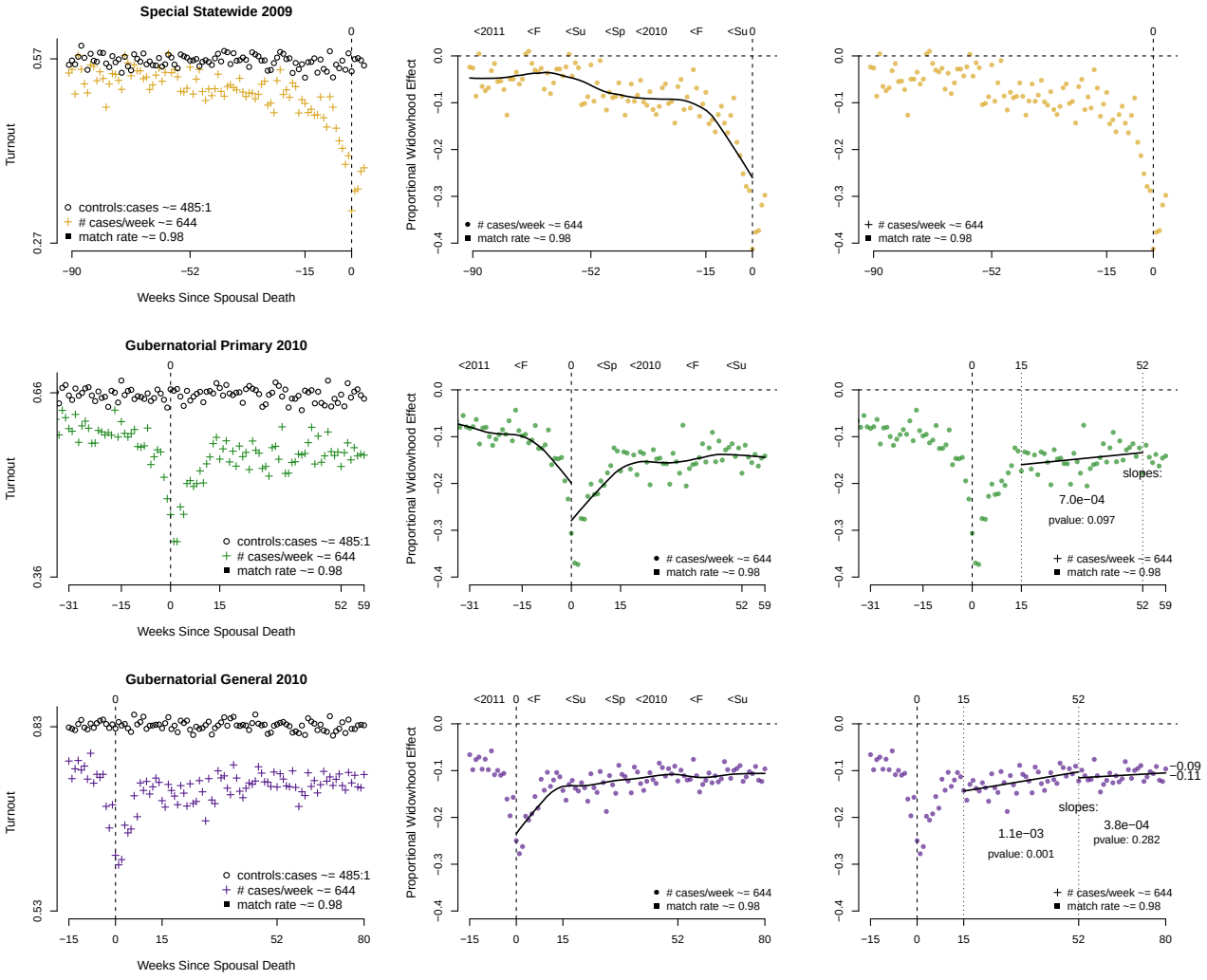

FIGURE 5: *Overall widowhood effects, aligned by cohort.* This figure shows the turnout rates for 60,856 widows and widowers and over 5 million matched controls, aligned by the calendar week of spousal death. The weeks since spousal death are noted on the bottom axis and the chronological season on the top axis. The top row shows turnout for the Special Statewide 2009, the middle the Gubernatorial Primary 2010, and the bottom the Gubernatorial General 2010. The left column of plots shows the unadjusted turnout rates for cases and controls, while the middle and right columns show the average treatment effects divided by the turnout rates of the controls (for a proportional "widowhood effect").

Age Analysis and Tests of Alternate Explanations

Study Population and Comparability of Elections

We match electors by age and other covariates because not all individuals are equally likely to experience the death of a spouse. Individuals who are nearly equivalent in these covariates are weighted according to their reperesentation in the widowed population, and those individuals for

whom we observe either no corresponding cases or controls are dropped from the analysis entirely. Figures 6 and 7 shows the effects of this matching and pruning process on the representativeness of our sample. Our analysis is most representative for the forty-five to ninety age range. Figures 6 and 7 further show that turnout patterns in this age group are comparable in low and high salience elections.

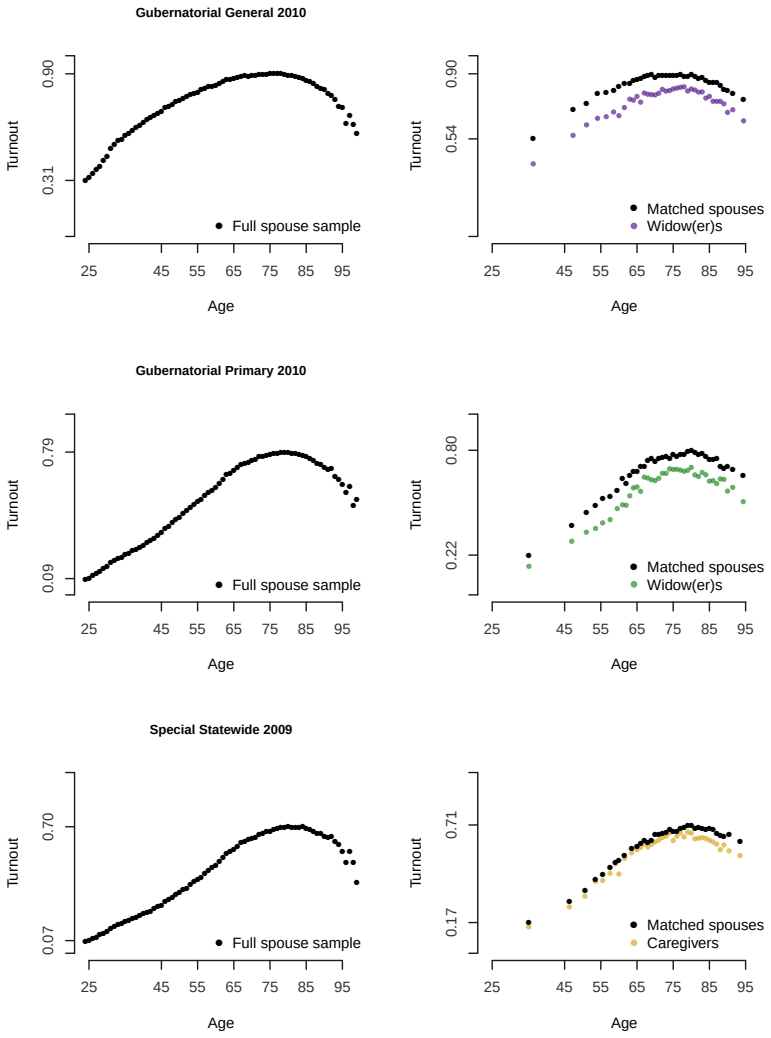

FIGURE 6: In-sample turnout, by age (identical voting histories only)

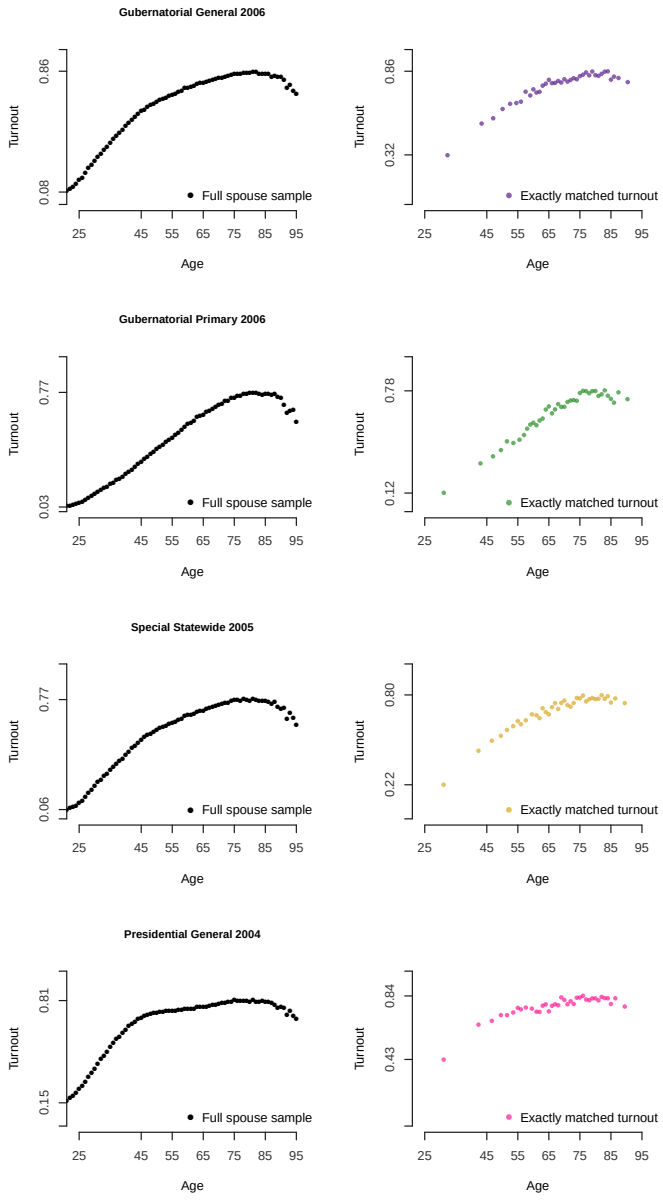

FIGURE 7: In-sample turnout in matched elections, by age (identical voting histories only)

Age-related disability and magnitude of widowhood effects

An alternative explanation for turnout discrepancies between spouses with different voting histories is the relative health of each spouse. If this is the case, that differences in past voting history are determined by disability, then we should observe smaller discrepancies in turnout among surviving, younger spouses for whom rates of long-term, debilitating illness are very low. That is,

though it is perhaps likely that the deceased spouses, both old and young, were chronically ill, it is much less likely that two young spouses have terminal or prohibitively debilitating illnesses than two older spouses.

Given this, we analyze changes in turnout by age. Consistent with disability-related dependency affecting the ability to vote, figure 8 shows that widowhood effects increase past age seventy-five. However, disability does not appear to be a determinant of turnout discrepancies between relative voting history subgroups (those who voted more or less than the deceased spouse). Figure 9 shows that the differences in widowhood effects between subjects whose spouse votes more and subjects whose spouse votes less are the same across age groups.

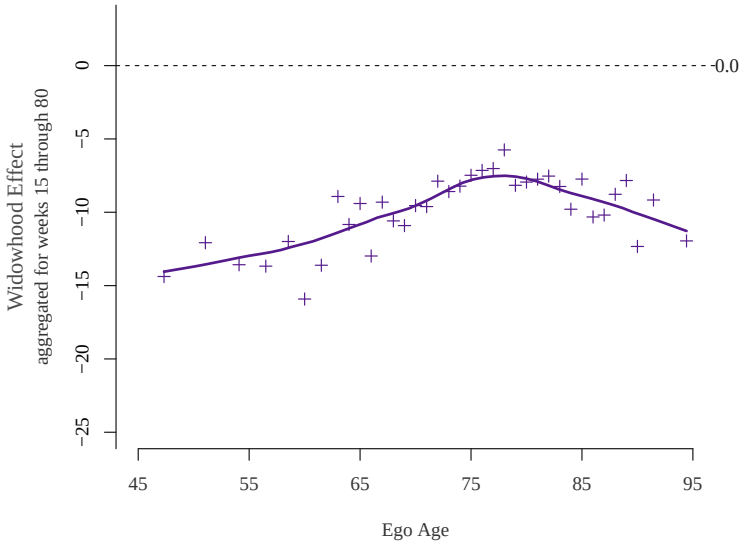

FIGURE 8: *Widowhood effects, by age.* This figure shows the loess smooth (span = .4) of the average treatment effect on the treated by age in the 2010 California Gubernatorial General election. It shows subjects whose spouses possessed identical voting histories. Cohorts include widows and widowers who lost a spouse 15 to 80 weeks prior to the election.

Recovery Analysis and Tests of Alternate Explanations

We show in the main text that returns to previous turnout rates past the one year anniversary of a spouse's death are significant only among those living with others at the time of the death (and presumably living with others in the time after the death). However, living with others or the ability to return to previous voting behavior is perhaps determined by other factors. For example,

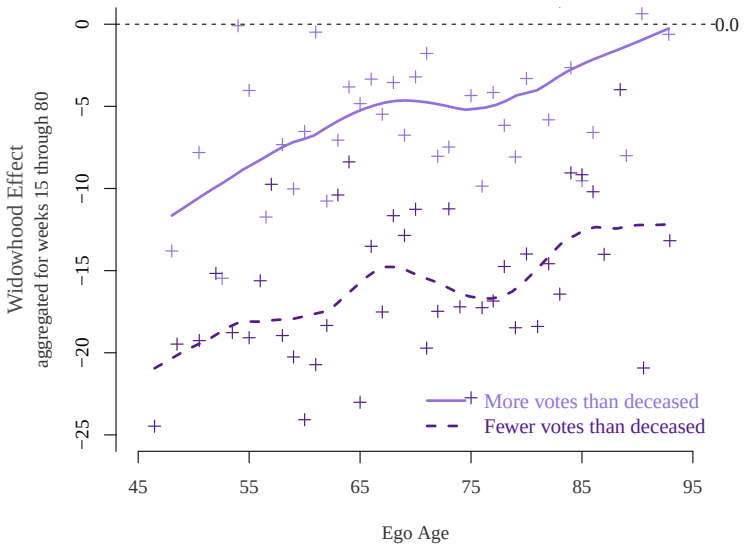

FIGURE 9: *Voting history comparison, by age.* This figure shows the loess smooth (span = .4) of the average treatment effect on the treated by age in the 2010 California Gubernatorial General election. It separates subjects whose deceased spouses vote more and those whose spouses voted less to show that past voting history is not a proxy for health. Cohorts include widows and widowers who lost a spouse 15 to 80 weeks prior to the election.

younger widows may be less likely to have functional limitations and therefore more able to return to previous behavior. Further, the ability to vote may be determined by community support and the accessibility of polling places. In Figures 10, 11, and 12, we show that the age, population density, and area per capita income are less strong predictors of recovery rates in the post-anniversary period than household occupancy.

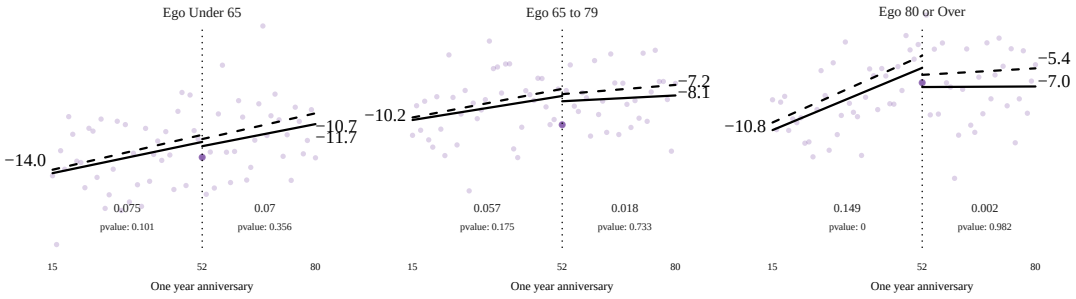

FIGURE 10: Recovery, by age

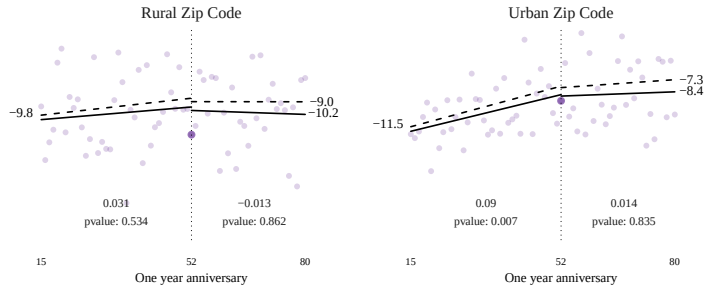

FIGURE 11: Recovery, by population density

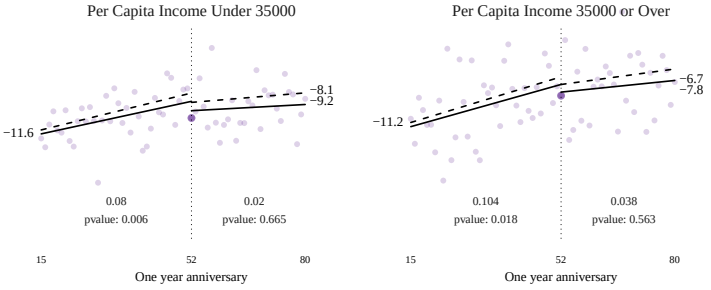

FIGURE 12: Recovery, by per capita income in zip code

Tests of Additional Alternative Explanations

To allow readers to easily assess significance levels, proportional treatment effects, and possible alternative explanations for observed patterns, we include below a number of aggregate results not displayed in the main article. In particular, we highlight that low past turnout rates are less strong predictors of widowhood effects than social, relative voting history comparisons.

TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
All Registered Voters						
Special Statewide 2009	-0.026 (-4.5%)	-0.049 (-8.7%)	-0.098 (-17.6%)			
	(-0.023, -0.029)	(-0.046, -0.052)	(-0.093, -0.104)			
	n = 26150, m = 0.98	n = 23484, m = 0.98	n = 8530, m = 0.98			
Gubernatorial Primary 2010			-0.089 (-13.6%)	-0.149 (-22.6%)	-0.096 (-14.6%)	
			(-0.084, -0.094)	(-0.144, -0.154)	(-0.092, -0.099)	
			n = 9402, m = 0.99	n = 9763, m = 0.98	n = 22459, m = 0.98	
Gubernatorial General 2010			-0.091 (-11%)	-0.14 (-16.7%)	-0.103 (-12.3%)	-0.091 (-11%)
			(-0.088, -0.095)	(-0.136, -0.143)	(-0.1, -0.105)	(-0.088, -0.094)
			n = 10779, m = 0.98	n = 9513, m = 0.99	n = 23820, m = 0.98	n = 16223, m = 0.98
Female Subject						
Special Statewide 2009	-0.03 (-5.3%)	-0.055 (-9.7%)	-0.098 (-17.3%)			
	(-0.026, -0.035)	(-0.05, -0.059)	(-0.09, -0.105)			
	n = 12468, m = 0.99	n = 11174, m = 0.99	n = 4036, m = 0.99			
Gubernatorial Primary 2010			-0.101 (-15.5%)	-0.153 (-23.3%)	-0.099 (-15.2%)	
			(-0.094, -0.108)	(-0.146, -0.16)	(-0.095, -0.104)	
			n = 4603, m = 0.99	n = 4615, m = 0.99	n = 10660, m = 0.99	
Gubernatorial General 2010			-0.101 (-12.1%)	-0.151 (-18.1%)	-0.103 (-12.4%)	-0.088 (-10.6%)
			(-0.096, -0.106)	(-0.146, -0.157)	(-0.1, -0.107)	(-0.084, -0.092)
			n = 5109, m = 0.99	n = 4522, m = 0.99	n = 11425, m = 0.99	n = 7660, m = 0.99
Male Subject						
Special Statewide 2009	-0.02 (-3.5%)	-0.036 (-6.3%)	-0.088 (-15.7%)			
	(-0.014, -0.026)	(-0.029, -0.043)	(-0.077, -0.1)			
	n = 6172, m = 0.98	n = 5561, m = 0.98	n = 1924, m = 0.98			
Gubernatorial Primary 2010			-0.079 (-11.8%)	-0.127 (-19.1%)	-0.09 (-13.5%)	
			(-0.068, -0.089)	(-0.117, -0.137)	(-0.083, -0.096)	
			n = 2161, m = 0.98	n = 2275, m = 0.98	n = 5308, m = 0.98	
Gubernatorial General 2010			-0.079 (-9.5%)	-0.106 (-12.6%)	-0.091 (-10.9%)	-0.087 (-10.5%)
			(-0.072, -0.087)	(-0.098, -0.114)	(-0.087, -0.096)	(-0.081, -0.093)
			n = 2552, m = 0.98	n = 2256, m = 0.99	n = 5622, m = 0.98	n = 3731, m = 0.98

Continued on next page

TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
Subject Under 65						
Special Statewide 2009	-0.016 (-4.2%)	-0.034 (-8.9%)	-0.074 (-19.3%)			
	(-0.01, -0.022)	(-0.028, -0.04)	(-0.064, -0.084)			
	n = 6766, m = 1	n = 6097, m = 0.99	n = 2394, m = 1			
Gubernatorial Primary 2010			-0.071 (-14.8%)	-0.135 (-28.2%)	-0.104 (-21.9%)	
			(-0.061, -0.081)	(-0.125, -0.145)	(-0.098, -0.111)	
			n = 2506, m = 0.99	n = 2493, m = 1	n = 5997, m = 0.99	
Gubernatorial General 2010			-0.087 (-11.5%)	-0.183 (-23.6%)	-0.137 (-17.9%)	-0.117 (-15.2%)
			(-0.079, -0.096)	(-0.174, -0.191)	(-0.132, -0.143)	(-0.11, -0.123)
			n = 2704, m = 1	n = 2528, m = 0.99	n = 6156, m = 0.99	n = 4422, m = 1
Subject 65 to 79						
Special Statewide 2009	-0.021 (-3.4%)	-0.041 (-6.6%)	-0.095 (-15.5%)			
	(-0.016, -0.026)	(-0.035, -0.046)	(-0.087, -0.104)			
	n = 10481, m = 0.99	n = 9321, m = 0.99	n = 3369, m = 0.99			
Gubernatorial Primary 2010			-0.092 (-12.8%)	-0.155 (-21.5%)	-0.089 (-12.3%)	
			(-0.085, -0.1)	(-0.148, -0.162)	(-0.084, -0.094)	
			n = 3819, m = 0.99	n = 3853, m = 0.99	n = 8943, m = 0.99	
Gubernatorial General 2010			-0.083 (-9.5%)	-0.116 (-13.2%)	-0.094 (-10.7%)	-0.085 (-9.7%)
			(-0.078, -0.088)	(-0.11, -0.121)	(-0.09, -0.097)	(-0.08, -0.089)
			n = 4323, m = 0.99	n = 3795, m = 0.99	n = 9475, m = 0.99	n = 6445, m = 0.99
Subject 80 or Over						
Special Statewide 2009	-0.038 (-5.8%)	-0.07 (-10.7%)	-0.125 (-19.3%)			
	(-0.033, -0.043)	(-0.065, -0.075)	(-0.116, -0.134)			
	n = 8803, m = 0.96	n = 7958, m = 0.96	n = 2738, m = 0.95			
Gubernatorial Primary 2010			-0.1 (-13.9%)	-0.154 (-21.4%)	-0.097 (-13.4%)	
			(-0.092, -0.108)	(-0.146, -0.162)	(-0.092, -0.102)	
			n = 3043, m = 0.96	n = 3368, m = 0.96	n = 7434, m = 0.96	
Gubernatorial General 2010			-0.105 (-12.5%)	-0.133 (-15.9%)	-0.087 (-10.4%)	-0.076 (-9.2%)
			(-0.098, -0.111)	(-0.126, -0.14)	(-0.082, -0.091)	(-0.071, -0.082)
			n = 3705, m = 0.96	n = 3159, m = 0.97	n = 8080, m = 0.96	n = 5299, m = 0.96
Female Subject Under 65						

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TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
Special Statewide 2009	-0.019 (-5%)	-0.032 (-8.4%)	-0.075 (-19.3%)			
	(-0.011, -0.028)	(-0.023, -0.041)	(-0.061, -0.09)			
	n = 3284, m = 1	n = 2940, m = 1	n = 1119, m = 1			
Gubernatorial Primary 2010			-0.074 (-15.2%)	-0.143 (-29.8%)	-0.112 (-23.5%)	
			(-0.06, -0.088)	(-0.129, -0.157)	(-0.103, -0.121)	
			n = 1247, m = 1	n = 1233, m = 1	n = 2837, m = 1	
Gubernatorial General 2010			-0.091 (-11.7%)	-0.195 (-24.8%)	-0.141 (-18.2%)	-0.117 (-15%)
			(-0.079, -0.103)	(-0.183, -0.206)	(-0.134, -0.149)	(-0.108, -0.126)
			n = 1264, m = 1	n = 1243, m = 1	n = 3022, m = 1	n = 2087, m = 1
Male Subject Under 65						
Special Statewide 2009	-0.002 (-0.6%)	-0.02 (-5.2%)	-0.06 (-16.5%)			
	(0.01, -0.014)	(-0.007, -0.032)	(-0.04, -0.081)			
	n = 1608, m = 0.99	n = 1485, m = 0.99	n = 549, m = 1			
Gubernatorial Primary 2010			-0.078 (-16.6%)	-0.103 (-21.4%)	-0.084 (-17.9%)	
			(-0.057, -0.099)	(-0.083, -0.124)	(-0.071, -0.097)	
			n = 572, m = 0.99	n = 597, m = 1	n = 1437, m = 0.99	
Gubernatorial General 2010			-0.062 (-8.3%)	-0.136 (-17.9%)	-0.115 (-15%)	-0.094 (-12.5%)
			(-0.045, -0.079)	(-0.119, -0.154)	(-0.104, -0.126)	(-0.08, -0.107)
			n = 658, m = 0.99	n = 598, m = 0.99	n = 1483, m = 0.99	n = 1033, m = 1
Female Subject 65 to 79						
Special Statewide 2009	-0.024 (-3.9%)	-0.05 (-8%)	-0.088 (-14.2%)			
	(-0.017, -0.031)	(-0.042, -0.057)	(-0.076, -0.1)			
	n = 5211, m = 0.99	n = 4476, m = 0.99	n = 1648, m = 0.99			
Gubernatorial Primary 2010			-0.11 (-15.1%)	-0.161 (-22%)	-0.09 (-12.4%)	
			(-0.099, -0.12)	(-0.15, -0.171)	(-0.083, -0.097)	
			n = 1945, m = 0.99	n = 1804, m = 0.99	n = 4337, m = 0.99	
Gubernatorial General 2010			-0.086 (-9.8%)	-0.132 (-15.1%)	-0.093 (-10.6%)	-0.085 (-9.6%)
			(-0.079, -0.093)	(-0.124, -0.139)	(-0.089, -0.098)	(-0.079, -0.091)
			n = 2148, m = 0.99	n = 1892, m = 0.99	n = 4596, m = 0.99	n = 3113, m = 0.99
Male Subject 65 to 79						
Special Statewide 2009	-0.022 (-3.6%)	-0.034 (-5.3%)	-0.085 (-13.7%)			

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TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
	(-0.012, -0.033)	(-0.023, -0.044)	(-0.066, -0.103)			
	n = 2206, m = 0.98	n = 2034, m = 0.99	n = 697, m = 0.98			
Gubernatorial Primary 2010			-0.072 (-10.1%)	-0.147 (-20.4%)	-0.092 (-12.6%)	
			(-0.056, -0.088)	(-0.132, -0.163)	(-0.082, -0.102)	
			n = 787, m = 0.99	n = 845, m = 0.99	n = 1942, m = 0.98	
Gubernatorial General 2010			-0.092 (-10.4%)	-0.091 (-10.3%)	-0.095 (-10.7%)	-0.082 (-9.3%)
			(-0.081, -0.103)	(-0.079, -0.102)	(-0.087, -0.102)	(-0.073, -0.09)
			n = 918, m = 0.98	n = 788, m = 0.99	n = 2065, m = 0.99	n = 1362, m = 0.98
Female Subject 80 or Over						
Special Statewide 2009	-0.049 (-7.4%)	-0.079 (-12.2%)	-0.134 (-20.7%)			
	(-0.041, -0.056)	(-0.071, -0.087)	(-0.121, -0.148)			
	n = 3932, m = 0.97	n = 3706, m = 0.96	n = 1255, m = 0.96			
Gubernatorial Primary 2010			-0.113 (-16%)	-0.153 (-21.6%)	-0.103 (-14.4%)	
			(-0.1, -0.125)	(-0.141, -0.165)	(-0.095, -0.111)	
			n = 1399, m = 0.97	n = 1551, m = 0.96	n = 3447, m = 0.96	
Gubernatorial General 2010			-0.129 (-15.4%)	-0.138 (-16.7%)	-0.084 (-10.2%)	-0.067 (-8.2%)
			(-0.12, -0.139)	(-0.128, -0.149)	(-0.077, -0.09)	(-0.059, -0.075)
			n = 1677, m = 0.96	n = 1373, m = 0.97	n = 3757, m = 0.96	n = 2432, m = 0.96
Male Subject 80 or Over						
Special Statewide 2009	-0.029 (-4.4%)	-0.049 (-7.4%)	-0.113 (-16.8%)			
	(-0.019, -0.039)	(-0.039, -0.06)	(-0.095, -0.131)			
	n = 2334, m = 0.96	n = 2019, m = 0.96	n = 669, m = 0.95			
Gubernatorial Primary 2010			-0.084 (-11.1%)	-0.127 (-17.1%)	-0.09 (-12.2%)	
			(-0.068, -0.099)	(-0.111, -0.142)	(-0.08, -0.101)	
			n = 795, m = 0.97	n = 825, m = 0.96	n = 1908, m = 0.96	
Gubernatorial General 2010			-0.082 (-9.7%)	-0.097 (-11.4%)	-0.074 (-8.7%)	-0.087 (-10.2%)
			(-0.07, -0.093)	(-0.085, -0.109)	(-0.066, -0.082)	(-0.077, -0.097)
			n = 964, m = 0.95	n = 863, m = 0.98	n = 2051, m = 0.96	n = 1323, m = 0.96
Female Subject - Opposite Sex Only						
Special Statewide 2009	-0.031 (-5.5%)	-0.051 (-9.1%)	-0.103 (-18%)			
	(-0.026, -0.036)	(-0.046, -0.056)	(-0.094, -0.111)			

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TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
	n = 10444, m = 0.99	n = 9382, m = 0.99	n = 3374, m = 0.99			
Gubernatorial Primary 2010			-0.101 (-15.5%)	-0.156 (-23.7%)	-0.104 (-15.8%)	
			(-0.094, -0.109)	(-0.148, -0.163)	(-0.098, -0.109)	
			n = 3852, m = 0.99	n = 3820, m = 0.99	n = 8979, m = 0.99	
Gubernatorial General 2010			-0.103 (-12.3%)	-0.153 (-18.2%)	-0.105 (-12.6%)	-0.088 (-10.5%)
			(-0.097, -0.109)	(-0.146, -0.159)	(-0.101, -0.109)	(-0.083, -0.093)
			n = 4289, m = 0.99	n = 3780, m = 0.99	n = 9543, m = 0.99	n = 6451, m = 0.99
Male Subject - Opposite Sex Only						
Special Statewide 2009	-0.021 (-3.7%)	-0.032 (-5.5%)	-0.095 (-16.2%)			
	(-0.015, -0.028)	(-0.025, -0.04)	(-0.083, -0.107)			
	n = 5245, m = 0.99	n = 4741, m = 0.99	n = 1622, m = 0.99			
Gubernatorial Primary 2010			-0.079 (-11.6%)	-0.137 (-20.2%)	-0.091 (-13.4%)	
			(-0.068, -0.09)	(-0.126, -0.148)	(-0.084, -0.098)	
			n = 1832, m = 0.99	n = 1944, m = 0.99	n = 4494, m = 0.99	
Gubernatorial General 2010			-0.081 (-9.6%)	-0.102 (-12%)	-0.096 (-11.2%)	-0.09 (-10.7%)
			(-0.073, -0.088)	(-0.094, -0.11)	(-0.09, -0.101)	(-0.084, -0.097)
			n = 2176, m = 0.99	n = 1917, m = 1	n = 4795, m = 0.99	n = 3140, m = 0.99
More Votes than Spouse						
Special Statewide 2009	-0.009 (-1.8%)	-0.026 (-5.3%)	-0.053 (-10.8%)			
	(-0.001, -0.017)	(-0.018, -0.035)	(-0.039, -0.067)			
	n = 3735, m = 0.92	n = 3472, m = 0.92	n = 1269, m = 0.93			
Gubernatorial Primary 2010			-0.076 (-12.3%)	-0.091 (-15%)	-0.04 (-6.6%)	
			(-0.063, -0.089)	(-0.078, -0.104)	(-0.032, -0.049)	
			n = 1334, m = 0.93	n = 1397, m = 0.92	n = 3376, m = 0.93	
Gubernatorial General 2010			-0.07 (-8.3%)	-0.09 (-10.8%)	-0.057 (-6.8%)	-0.052 (-6.2%)
			(-0.06, -0.079)	(-0.08, -0.101)	(-0.05, -0.063)	(-0.044, -0.059)
			n = 1539, m = 0.93	n = 1309, m = 0.93	n = 3517, m = 0.92	n = 2406, m = 0.92
Fewer Votes than Spouse						
Special Statewide 2009	-0.024 (-6.3%)	-0.042 (-11%)	-0.102 (-27.2%)			
	(-0.015, -0.033)	(-0.032, -0.051)	(-0.087, -0.118)			
	n = 3088, m = 0.92	n = 2726, m = 0.93	n = 998, m = 0.91			

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TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
Gubernatorial Primary 2010			-0.091 (-19.8%)	-0.171 (-36.1%)	-0.122 (-26.6%)	
			(-0.075, -0.106)	(-0.156, -0.186)	(-0.112, -0.131)	
			n = 1091, m = 0.91	n = 1113, m = 0.92	n = 2657, m = 0.92	
Gubernatorial General 2010			-0.123 (-17.2%)	-0.209 (-28.8%)	-0.167 (-23.2%)	-0.145 (-20.3%)
			(-0.11, -0.136)	(-0.196, -0.223)	(-0.158, -0.175)	(-0.135, -0.156)
			n = 1283, m = 0.92	n = 1105, m = 0.92	n = 2764, m = 0.93	n = 1870, m = 0.92
Same Voting History						
Special Statewide 2009	-0.026 (-4.2%)	-0.051 (-8.2%)	-0.106 (-17.3%)			
	(-0.022, -0.03)	(-0.047, -0.054)	(-0.099, -0.112)			
	n = 18595, m = 0.98	n = 16650, m = 0.98	n = 6009, m = 0.98			
Gubernatorial Primary 2010			-0.089 (-12.8%)	-0.156 (-22.2%)	-0.101 (-14.4%)	
			(-0.084, -0.095)	(-0.151, -0.162)	(-0.098, -0.105)	
			n = 6700, m = 0.98	n = 6978, m = 0.98	n = 15815, m = 0.98	
Gubernatorial General 2010			-0.087 (-10.3%)	-0.138 (-16.1%)	-0.099 (-11.6%)	-0.091 (-10.7%)
			(-0.083, -0.091)	(-0.133, -0.142)	(-0.096, -0.101)	(-0.088, -0.094)
			n = 7677, m = 0.98	n = 6820, m = 0.98	n = 16880, m = 0.98	n = 11473, m = 0.98
Same Voting History - No Abstains						
Special Statewide 2009	-0.03 (-3.8%)	-0.055 (-7.1%)	-0.117 (-15.1%)			
	(-0.025, -0.034)	(-0.051, -0.06)	(-0.109, -0.124)			
	n = 9436, m = 1	n = 8562, m = 1	n = 3106, m = 1			
Gubernatorial Primary 2010			-0.091 (-10.4%)	-0.166 (-19%)	-0.115 (-13.1%)	
			(-0.085, -0.097)	(-0.16, -0.171)	(-0.111, -0.118)	
			n = 3356, m = 1	n = 3559, m = 1	n = 8194, m = 1	
Gubernatorial General 2010			-0.069 (-7.3%)	-0.119 (-12.5%)	-0.079 (-8.4%)	-0.074 (-7.8%)
			(-0.065, -0.072)	(-0.115, -0.122)	(-0.077, -0.082)	(-0.071, -0.077)
			n = 3945, m = 1	n = 3440, m = 1	n = 8610, m = 1	n = 5935, m = 1
Same Voting History - One Abstain						
Special Statewide 2009	-0.022 (-3.8%)	-0.049 (-8.5%)	-0.116 (-20.2%)			
	(-0.013, -0.03)	(-0.04, -0.058)	(-0.101, -0.131)			
	n = 3431, m = 0.97	n = 2953, m = 0.97	n = 1083, m = 0.97			
Gubernatorial Primary 2010			-0.116 (-17.1%)	-0.177 (-26.2%)	-0.112 (-16.7%)	

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TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
			(-0.102, -0.129)	(-0.163, -0.19)	(-0.103, -0.121)	
			n = 1250, m = 0.98	n = 1251, m = 0.97	n = 2812, m = 0.97	
Gubernatorial General 2010			-0.103 (-11.7%)	-0.169 (-19.1%)	-0.117 (-13.3%)	-0.108 (-12.3%)
			(-0.094, -0.112)	(-0.161, -0.178)	(-0.111, -0.123)	(-0.101, -0.116)
			n = 1366, m = 0.97	n = 1284, m = 0.98	n = 3083, m = 0.97	n = 2037, m = 0.97
Same Voting History - Two Abstains						
Special Statewide 2009	-0.028 (-5.5%)	-0.043 (-8.7%)	-0.11 (-23%)			
	(-0.017, -0.038)	(-0.032, -0.054)	(-0.091, -0.129)			
	n = 2244, m = 0.95	n = 2047, m = 0.95	n = 714, m = 0.95			
Gubernatorial Primary 2010			-0.093 (-16.2%)	-0.161 (-28.7%)	-0.077 (-13.7%)	
			(-0.076, -0.11)	(-0.144, -0.178)	(-0.066, -0.089)	
			n = 834, m = 0.95	n = 854, m = 0.95	n = 1895, m = 0.95	
Gubernatorial General 2010			-0.113 (-13.8%)	-0.166 (-20.2%)	-0.105 (-13%)	-0.128 (-15.6%)
			(-0.1, -0.125)	(-0.153, -0.179)	(-0.097, -0.114)	(-0.118, -0.139)
			n = 925, m = 0.95	n = 833, m = 0.95	n = 2074, m = 0.95	n = 1355, m = 0.95
Same Voting History - Three Abstains						
Special Statewide 2009	0.002 (0.7%)	-0.021 (-9.1%)	-0.036 (-16.5%)			
	(0.013, -0.01)	(-0.009, -0.034)	(-0.016, -0.056)			
	n = 1383, m = 0.95	n = 1215, m = 0.94	n = 424, m = 0.95			
Gubernatorial Primary 2010			-0.03 (-10.7%)	-0.075 (-25.2%)	-0.055 (-19.1%)	
			(-0.01, -0.051)	(-0.054, -0.095)	(-0.042, -0.069)	
			n = 486, m = 0.94	n = 504, m = 0.94	n = 1149, m = 0.95	
Gubernatorial General 2010			-0.108 (-18%)	-0.15 (-24.5%)	-0.113 (-19.1%)	-0.072 (-12.3%)
			(-0.088, -0.128)	(-0.128, -0.171)	(-0.098, -0.127)	(-0.055, -0.089)
			n = 595, m = 0.95	n = 504, m = 0.95	n = 1207, m = 0.94	n = 836, m = 0.94
Alone						
Special Statewide 2009	-0.03 (-4.8%)	-0.053 (-8.5%)	-0.11 (-18.2%)			
	(-0.026, -0.033)	(-0.049, -0.057)	(-0.104, -0.117)			
	n = 18656, m = 0.99	n = 16781, m = 0.99	n = 6094, m = 0.99			
Gubernatorial Primary 2010			-0.094 (-13.5%)	-0.16 (-22.8%)	-0.1 (-14.3%)	
			(-0.089, -0.1)	(-0.155, -0.166)	(-0.097, -0.104)	

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TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
			n = 6687, m = 0.99	n = 7003, m = 0.98	n = 16017, m = 0.99	
Gubernatorial General 2010			-0.098 (-11.4%)	-0.141 (-16.5%)	-0.105 (-12.3%)	-0.097 (-11.3%)
			(-0.094, -0.102)	(-0.137, -0.145)	(-0.102, -0.108)	(-0.093, -0.1)
			n = 7621, m = 0.99	n = 6839, m = 0.99	n = 17055, m = 0.99	n = 11538, m = 0.99
Not Alone						
Special Statewide 2009	-0.016 (-3.5%)	-0.04 (-9.1%)	-0.068 (-15.5%)			
	(-0.01, -0.022)	(-0.034, -0.047)	(-0.058, -0.078)			
	n = 7494, m = 0.98	n = 6703, m = 0.98	n = 2436, m = 0.98			
Gubernatorial Primary 2010			-0.077 (-14.2%)	-0.12 (-22%)	-0.084 (-15.5%)	
			(-0.068, -0.087)	(-0.111, -0.13)	(-0.077, -0.09)	
			n = 2715, m = 0.98	n = 2760, m = 0.98	n = 6442, m = 0.98	
Gubernatorial General 2010			-0.076 (-9.8%)	-0.136 (-17.5%)	-0.096 (-12.4%)	-0.078 (-10.1%)
			(-0.069, -0.084)	(-0.128, -0.144)	(-0.091, -0.101)	(-0.072, -0.084)
			n = 3158, m = 0.97	n = 2674, m = 0.98	n = 6765, m = 0.98	n = 4685, m = 0.98
Rural Zip Code						
Special Statewide 2009	-0.033 (-5.3%)	-0.06 (-9.6%)	-0.115 (-18.7%)			
	(-0.028, -0.038)	(-0.054, -0.065)	(-0.106, -0.123)			
	n = 9159, m = 0.96	n = 8296, m = 0.96	n = 3003, m = 0.97			
Gubernatorial Primary 2010			-0.084 (-11.9%)	-0.16 (-22.7%)	-0.107 (-15.2%)	
			(-0.076, -0.092)	(-0.152, -0.167)	(-0.102, -0.112)	
			n = 3316, m = 0.97	n = 3514, m = 0.97	n = 7890, m = 0.96	
Gubernatorial General 2010			-0.091 (-10.6%)	-0.139 (-16.1%)	-0.111 (-12.9%)	-0.094 (-11%)
			(-0.085, -0.097)	(-0.134, -0.145)	(-0.107, -0.115)	(-0.089, -0.099)
			n = 3743, m = 0.96	n = 3339, m = 0.97	n = 8457, m = 0.96	n = 5720, m = 0.97
Urban Zip Code						
Special Statewide 2009	-0.025 (-4.6%)	-0.043 (-7.9%)	-0.089 (-16.8%)			
	(-0.021, -0.029)	(-0.039, -0.047)	(-0.082, -0.096)			
	n = 16085, m = 0.98	n = 14352, m = 0.98	n = 5254, m = 0.98			
Gubernatorial Primary 2010			-0.094 (-14.9%)	-0.144 (-22.6%)	-0.089 (-14.1%)	
			(-0.088, -0.1)	(-0.138, -0.15)	(-0.085, -0.093)	
			n = 5781, m = 0.98	n = 5933, m = 0.98	n = 13775, m = 0.98	

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TABLE 2: Aggregated widowhood effects with 95% confidence intervals, sample sizes, and match rates

	weeks -91 to 52	weeks -52 to -15	weeks -15 to 0	weeks 0 to 15	weeks 15 to 52	weeks 52 to 80
Gubernatorial General 2010			-0.093 (-11.4%)	-0.143 (-17.4%)	-0.098 (-12%)	-0.088 (-10.8%)
			(-0.088, -0.098)	(-0.138, -0.148)	(-0.095, -0.102)	(-0.084, -0.092)
			n = 6644, m = 0.97	n = 5856, m = 0.98	n = 14541, m = 0.98	n = 9960, m = 0.98
Per Capita Income Under 35000						
Special Statewide 2009	-0.025 (-4.5%)	-0.05 (-8.9%)	-0.103 (-18.6%)			
	(-0.021, -0.029)	(-0.046, -0.054)	(-0.096, -0.11)			
	n = 16945, m = 0.98	n = 15242, m = 0.98	n = 5554, m = 0.98			
Gubernatorial Primary 2010			-0.084 (-13.2%)	-0.153 (-24.1%)	-0.097 (-15.4%)	
			(-0.078, -0.09)	(-0.147, -0.159)	(-0.093, -0.101)	
			n = 6117, m = 0.98	n = 6296, m = 0.98	n = 14642, m = 0.98	
Gubernatorial General 2010			-0.09 (-11.1%)	-0.143 (-17.4%)	-0.106 (-13%)	-0.097 (-11.9%)
			(-0.086, -0.095)	(-0.138, -0.148)	(-0.103, -0.109)	(-0.093, -0.1)
			n = 6968, m = 0.97	n = 6171, m = 0.98	n = 15467, m = 0.98	n = 10511, m = 0.98
Per Capita Income 35000 or Over						
Special Statewide 2009	-0.032 (-5.4%)	-0.05 (-8.4%)	-0.093 (-16.1%)			
	(-0.026, -0.037)	(-0.044, -0.056)	(-0.084, -0.103)			
	n = 8346, m = 0.97	n = 7390, m = 0.96	n = 2706, m = 0.96			
Gubernatorial Primary 2010			-0.097 (-13.8%)	-0.14 (-19.7%)	-0.092 (-13%)	
			(-0.089, -0.106)	(-0.132, -0.149)	(-0.087, -0.097)	
			n = 2988, m = 0.97	n = 3130, m = 0.96	n = 7028, m = 0.96	
Gubernatorial General 2010			-0.093 (-10.7%)	-0.135 (-15.6%)	-0.095 (-11%)	-0.077 (-8.9%)
			(-0.087, -0.099)	(-0.129, -0.141)	(-0.092, -0.099)	(-0.073, -0.082)
			n = 3452, m = 0.97	n = 3024, m = 0.96	n = 7516, m = 0.96	n = 5169, m = 0.96

Data Notes

[1]In 2003, respectively only two and three percent of women and men over the age of sixty-five lived with non-relatives, seventeen and seven percent lived with non-spouse relatives, and forty-one and seventy-one percent lived with their spouses US Census Bureau (2006). Many more women than men lived alone, forty to nineteen percent, due to greater rates of widowhood US Census Bureau (2006). We first accept these rates as given, and then we observe the incidence of same-sex couples with the same last name to infer the prevalence of non-spouses in our analysis.

[2]Not all of this data is complete, much like the Los Angeles County records used by Brady and McNulty 2011. For example, out of the over 17 million voters in the file, over 100,000 do not list a full date of birth (the majority of those who do, omit the year), around one-third do not include gender (partly because this is no longer included on voter registrations), and around 1.46 million voters were expunged between 2009 and 2010, in compliance with California voter record policy. The implications of the removal of voters from the registry are explained in the discussion section. Voters who experience long, debilitating illness are more likely to be absent from our analysis.

[3]The Social Security Death Master File cannot be fully relied upon to identify whether a voter is living. However, the California Registrar of Voters uses the Department of Public Health records to remove deceased voters from the voter registry. Comparing the rates of removal for voters identified by the Social Security Death Master File as deceased, we find that California counties remove eighty to ninety percent of deceased voters from the Voter Record prior to an election. Only Los Angeles County varies significantly from this. It has a thirty percent removal rate.

[4]It is relevant to note that the voters appearing on the more recent end (the left side of the figures) of the observation period are, on average, one year older than the voters on the earlier end (the right side). This is evident in the slightly lower base turnout rates. However, the turnout rates of the matched controls differ by only .25 percentage points. Also, there are around twelve percent more cases in the winter season (noticeable in the smaller variance for the winter season), and there are eight percent fewer cases in summer 2010 than in summer 2009. This discrepancy is likely due to both out-of-state changes of address among widow(er)s and the deaths of surviving spouses.

[5]We utilize two estimates of this unobserved recovery. The 2010-2011 Current Population Survey (CPS) US Census Bureau (2011a) estimates that 16% of American widow(er)s who move, move between states. This is higher than out-of-state movements from California, but we use it as a conservative estimate. We multiply 16% by the proportion of widows who re-register at new addresses before the anniversary of spousal death in our sample and multiply by 20% for re-registrations at new addresses after the anniversary (because out-of-state relocation might occur slightly later). We then multiply this by the turnout of controls (a widowhood effect of zero because re-registration is correlated with voting) and add this "unobserved recovery" estimate to the fitted values of the observed data. This first

estimate is the dotted line in Figure 4. The second estimate uses 16% before and after the anniversary and the case turnout (which takes an unobserved widowhood effect equal to the observed effect). The second estimate is the lower bound in our estimate of the recovery rate and the first estimate is the upper bound. We do not include this unobserved recovery in the overall estimates of the widowhood effect because of the likelihood of an unobserved effect from illnesses sufficiently debilitating and chronic to result in the de-registration of the dying and their caregivers before the observation period. This exclusion assumes the effect of long-term, debilitating illness is at least the size of the unobserved recovery (greater than one to two percent of the sample size).