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Voting Characteristics of Individuals With Traumatic Brain Injury

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Voting is the foundation of democracy. Limited data exist about voting characteristics of individuals with neurologic impairment including those living with a traumatic brain injury (TBI). To statistically examine voting characteristics using a convenience sample of registered voters with TBI during elections held in Mecklenburg County, North Carolina—2007, 2008. Data were collected on 51 participants with TBI during May 2007, 2008 general, and 2008 Presidential Election. (i) There was a significant difference between the Competence Assessment Tool for Voting (CAT-V) total score of participants with TBI who voted and the CAT-V total score of participants with TBI who did not vote and the CAT-V total score predicted voting; (ii) the age of the participants with TBI was predictive of voting; and (iii) being married was inversely related to voting. We find that there is variation in voting even among this small sample interviewed for the present study, and that the variation is predictable. Those with the highest CAT-Vs are most likely to vote. In addition, we find that traditional predictors of voting simply are not predictors among this TBI group, and even one, whether the person is married, has a negative effect on voting.

KEY WORDS: traumatic brain injury, political participation, voting

Introduction

Voting is a fundamental aspect of any democracy and one of the most basic forms of political participation. Although it is known that relative to other chronic health conditions, neurodegenerative brain diseases have among the strongest of negative association with voter turnout (Sund, Lahtinen, Wass, Mattila, & Martikainen, 2017), only four studies that we know of have examined voting among individuals with cognitive impairment, and no data exist concerning the voting characteristics of individuals with traumatic brain injury (TBI). Research suggests that those with self-reported "cognitive impairments" were less likely to vote in recent elections (2008 and 2010) than those without disabilities (Schur & Adya, 2012; Schur, Adya, & Kruse, 2013). The Schur et al. study (2013) analyzed the Census Bureau's Current Population Survey, where "cognitive impairments"

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was operationalized with the question, "Because of a physical, mental, or emotional condition, does anyone have serious difficulty concentrating, remembering, or making decisions?" Schur et al. (2013) give us a broad picture of the voting life of people with cognitive impairments, and Sund et al. (2017) conclude that individuals with neurodegenerative conditions are among the least likely to vote, when compared with individuals with any other chronic health conditions. Scholars are in the initial phases of defining voter participation characteristics within each neurodegenerative condition subgroup such as people living with Alzheimer's disease/cognitive impairment (Appelbaum, Bonnie, & Karlawish, 2005; De Cauwer, 2005; Karlawish, 2008; Karlawish, Casarett, James, Propert, & Asch, 2002; Karlawish et al., 2008), mental illness/schizophrenia (Agran, MacLean, & Kitchen, 2016; Doron, Kurs, Stolovy, Secker-Einbinder, & Raba, 2014; Lawn, McMillan, Comley, Smith, & Brayley, 2014; Melamed et al., 2007; Raad, Karlawish, & Appelbaum, 2009; Rees & Reed, 2016; Yates, 2016), and stroke (Hammel, Jones, Gossett, & Morgan, 2006); but information on the voting participation characteristics of other neurodegenerative condition subgroups such as epilepsy, Huntington disease, Parkinson's disease, amyotrophic lateral sclerosis, and (the focus of the current study) TBI, remains less robust. While the chances of a race being decided by tossing a coin is very small,[1] federal, state, and local elections are often decided by narrow margins (Hayes, 2017; Mulligan & Hunter, 2003; Teixiera, 2001). Additional justification for this particular paper lies in the theory of inclusive democracy (Young, 2002) and political equality: who votes matters in terms of who gets elected and which group become represented in the decision-making processes. This, ultimately, makes a difference in terms of whose preferences are accommodated in outputs of legislation. Thus, understanding who votes and who does not is increasingly important, but especially in populations experiencing disenfranchisement—either legally imposed or self-imposed. Thus, the research question we consider herein is: "how do voters with TBI differ from individuals with TBI who do not vote?"

Voting Among Those With Cognitive Decline

Scholarship on disenfranchisement among U.S. citizens with neurological and neurodegenerative conditions is both sparse and narrowly focused. Empirical research on voting among the neurological/neurodegenerative subgroup of dementia has focused primarily upon the elderly and progressive dementia disorders such as Alzheimer's disease. Work by Appelbaum (2000) has examined cognitive capacity to vote in this population, and Karlawish et al. (2002) show that those mildly affected by dementia can and did independently cast a vote in the 2000 election. More recent work by Karlawish et al. (2008) shows that long-term care facility staff assessed the capacity to vote of patients across facilities in different ways (independent of government authorization or direction, and without any standardized assessment tool), and used those informal observational assessments in deciding whether to assist residents in registering and voting. Such a nonstandardized process could be subject to raising the threshold

of competence beyond that of the general population—resulting in illegal and systematic disenfranchisement, and/or to voter participation suppression secondary to partisan motivation. While interesting parallels may be drawn between the experiences of individuals with Alzheimer's disease and those with TBI, caution must be taken in generalization of these results to those with TBI. One population is in a state of cognitive decline, while the other is in a constant state of recovery. Despite the differences among these differing populations, we draw two parallels. First, the decisions of caregivers to encourage or resist voting in individuals with TBI may be similar, as those with cognitive impairments may present similar challenges to caregivers in terms of activities of daily living. Second, we apply cognitive assessment tools designed for cognitive impairment across populations to examine levels of understanding of voting. Appelbaum et al. (2005) use a standardized competency assessment tool specifically designed to test ability to vote among individuals—the "Competency Assessment Tool for Voting" or CAT-V (see the Appendix in Supporting Information), developed out of criteria laid out in a 2001 federal district court decision, *Doe v. Rowe*. The so-called "Doe Standard" comprises the first three questions in the CAT-V, addressing whether the individual understands the nature and effect of voting, and whether the respondent can make a choice between two candidates (Appelbaum et al., 2005). The remaining questions are extra-Doe questions which include two questions measuring "reasoning" (can one state why one of the two candidates chosen is "better" and how this decision would affect one's future?) and one question measuring "appreciation" for voting (will the respondent vote in the next election?). The scoring criteria show good inter-rater reliability as measured by the kappa statistic: understanding the nature of voting (0.91), understanding the effect of voting (0.91), being able to make a choice (1.0), comparative reasoning (0.77), consequential reasoning (0.74), and appreciation (0.87). Appelbaum et al. (2005) find the scores on the CAT-V demonstrate a strong correlation with the potential voters' cognitive impairment, measured objectively by the widely used Mini-Mental State Examination (MMSE), a brief 30-question questionnaire used to screen for cognitive impairment overall.

Traumatic Brain Injury: Definition, Incidence, and Prevalence

Traumatic brain injury is defined as "an alteration in brain function, or other evidence of brain pathology, caused by an external force" (Menon, Schwab, Wright, & Maas, 2010, p. 1637). TBI may result from motor vehicle accidents, falls, explosions, assaults, and sports injuries (Langlois, Rutland-Brown, & Thomas, 2006). Increasingly, TBI is not just viewed as a single event issue, but rather through the lens of a chronic disease paradigm with long-term impairment in physical, cognitive, behavioral, and social function domains that impact the patient for decades (Dikmen et al., 2009; Dikmen, Machamer, & Temkin, 2017). Football players (Clark, Asken, Marshall, & Guskiewicz, 2017; Coughlin et al., 2017; Farmer, 2010; Martin, 2012; Merz, van Patten, & Lace, 2017; Neale, 2009; Storrs, 2009) and returning soldiers dominate the popular media when it comes to

discussion of TBI. According to a Veterans Health Initiative Independent Study Course sponsored by the Department of Veterans Affairs, 24,559 (37 percent) of veterans presenting to the VA Healthcare System from operation Iraqi Freedom (OIF)/Enduring Freedom (OEF), were confirmed to have sustained a TBI (Vanderploeg et al., 2010). A 2017 follow-up study found that 17.3 percent of a random sample of 1,388 post-9/11 veterans met criteria for TBI (Lindquist, Love, & Elbogen, 2017). There is an estimated 2.8 million Americans who sustain a TBI each year (Faul, Xu, Wald, & Coronado, 2010; Taylor, Bell, Breiding, & Xu, 2017). It is estimated that 3.2 million Americans are living with some sort of disability related to prior TBI (Corrigan, Selassie, & Orman, 2010). In 2016, The Centers for Disease Control and Prevention reported the results of a nearly 10-year study of the incidence rates of combined TBI-related emergency department visits, hospitalizations, and deaths, finding a slow and steady increase in the United States from 0.8 percent (82.7 per 100,000) of the U.S. population to 0.9% (91.7 per 100,000) (Centers for Disease Control and Prevention, 2016). Lifetime prevalence data suggest that TBI is most prevalent in men, older African Americans, and younger Whites in poverty (Kisser, Waldstein, Evans, & Zonderman, 2017).

Barriers to Political Participation

Traditional political behavior theories concerning voting emphasize resources available to vote (time, income, civic skills as in Brady, Verba, & Schlozman, 1995). Education and age positively correlate with voting (e.g., Ansolabehere & Hersh, 2013; Strate, Parrish, Elder, & Ford, 1989; Verba, Schlozman, & Brady, 1995). Research also examines social connections that matter to voting (e.g., Knack, 1992), including marriage. For example, scholars have consistently found that "married people are *substantially* more likely to vote than single people" (Leighley & Nagler, 2014, p. 77; see also Jennings, 1979). Legal/institutional structures are also widely studied including voter registration laws (as in Squire, Wolfinger, & Glass, 1987), modes of voting (e.g., Leighley & Nagler, 2014) and whether or not government-issued photo identification is required to vote (e.g., Alvarez, Bailey, & Katz, 2008). Most obviously, however, scholars know that individuals are more likely to participate in a presidential election than a midterm or local election.

For individuals with TBI, as Belio et al. (2014) show using the Grid for Measurement of Activity and Participation (G-MAP), within the TBI population, voting is more difficult than other activities such as personal hygiene, looking after one's health, dressing/laundry, housework, managing a family budget, shopping (e.g., groceries and home goods), interpersonal relationships (with family, friends, or acquaintances), and leisure activity. Research has indicated that there are state laws that could bar those with TBI from voting, explicit in Constitutional language, statute, or precedence from court decisions (Hurme & Appelbaum, 2007). Certainly, some individuals with TBI may be under guardianship, which disqualifies them from voting in about four states (Link et al., 2012) but because physical behaviors may resemble a person who is intoxicated (slurred

speech, poor balance, etc.), individuals with TBI may expect or experience more problems at the polls than people without disabilities (Schur & Kruse, 2000, 2009). Furthermore, those with TBI tend to lose their employment and relocate more often than the general population because of financial hardship (Penna et al., 2010). Political behavior scholars have found that mobility is a key barrier to registering to vote (e.g., Squire et al., 1987) resulting in a lower likelihood of voting for those with lower mobility. Given that many may have impaired working memory and information-processing skills (McAllister et al., 2001; McDowell, Whyte, & D'Esposito, 1997), "stating one's name and address," which is required identification as of this writing in North Carolina, is a challenge.[2] Some individuals with TBI are unable to drive after their injury (Rapport, Bryer, & Hanks, 2008), and as a result photo identification, in the form of a driver's license or age of majority card, is not nearly as easy to obtain as may be true for the general population.

Research Aims

The present research is part of a larger agenda to understand the experience (e.g., thoughts and feelings) associated with a simple form of political participation (voting) from the perspective of individuals living with TBI. This line of research has revealed several insights about adults with TBI and their political participation. Using a qualitative research approach consisting of interviews of individuals with moderate to severe TBI during the presidential election, Davis and colleagues (Davis et al., 2010; Hirsch, Ball, Davis, & Hammond, 2010) find that individuals with TBI expressed the view that cognitive capacity to vote should not be a factor in voting but that some people with high levels of cognitive impairment should not vote if they do not understand what is going on. One other study (Link et al., 2012) shows that those with TBI scored similarly to healthy controls on competence to vote and election-specific knowledge.

The aim of the present study is to discover and delineate characteristics of voters or non-voters with TBI. Understanding the characteristics of those who are franchised versus those who are disenfranchised may give us insights into what sorts of programs could be developed to assist those individuals with TBI, legally entitled to vote, greater access to the exercising of their political voice.

Method

Participants

The participant characteristics are listed in Table 1. Potential participants with TBI were identified through the Carolinas Rehabilitation TBI Model Systems registry (Hammond & Malec, 2010). Individuals with a diagnosis of TBI who consent to participate in the Model Systems study are entered into the TBI registry at Carolinas Rehabilitation. The registry, which at the time of subject recruitment held 782 names of individuals with TBI, dates back to January 5th,

Table 1. Participant Characteristics

Variable	Description
Voted (in election under consideration at time of study enrollment)	62.5%
Male	73.21%
Age (SD)	40.85 years (16.70)
Percent white	64.29%
Percent married (or living with an adult)	32.14%
Percent with high school diploma	85.71%
Interviewed during November 2007 election	33.93%
Interviewed during May 2008 election	33.93%
Interviewed during November 2008 election	32.14%

1999 when Carolinas Rehabilitation began enrolling TBI patients into the Model Systems database. Our convenience sample of persons with TBI was drawn from this population of individuals through referrals made by the research and clinical staff at Carolinas Rehabilitation in 2007. To be eligible, the individual with TBI had to be a U.S. citizen, 18 years or older, who had sustained his/her TBI more than 6 months prior to election day in May 2007.

Data were collected during three different election cycles in Mecklenburg County, North Carolina: a primary held in May 2007, a general election held for mayor and other such offices in November 2007, and the general election held in November 2008; one-third of our sample was interviewed in each election cycle. All participants gave voluntary informed consent and the study was approved by the Institutional Review Board of Carolinas Medical Center.

Procedure

Testing Procedure

The Mini-Mental State Exam (MMSE) and CAT-V (the first three questions of the CAT-V are the Doe voting capacity score) were administered by reading all questions aloud and providing the questions in writing to each participant during seated face-to-face interviews following a standardized protocol (Link et al., 2012). Questions for the voting efficacy test (see Appendix in Supporting Information) were taken from the survey of National Election Studies (NES), and options "f" and "g" were created by Douglas Kruse (Link et al., 2012). All measures were administered individually in 2007 and 2008 by a trained researcher (on average, tests were administered 119 days after the election).

Results

Table 1 presents the participant characteristics. In total, 51 adults with TBI participated in the study. The majority are male. The average age of the sample is 41 years old (the Census Bureau reports that the median age in Mecklenburg County, NC is 34; 37 is the median age in the United States). Of that sample, 64 percent reported having voted in the election cycle.

Table 2 provides bivariate correlations of voting (in the election indicated) and the various scores which we hypothesized as surrogates for the "ability" to participate of the respondents. In running the regression, operationalizing the "election" variable as a general election (November 2007 and 2008) versus a primary election (May 2007) yielded similar results. A higher score on the MMSE does not significantly correlate with voting, and three other measures of competence, the court-accepted Doe Standard and the two "extra Doe" measures are not significant at conventional levels ($p < 0.05$).

Table 3 indicates that traditional individual-level predictors of voting (education) have no effect on the probability of voting in this group. One of the most important predictors of voting, whether or not the contest is a presidential contest, was not a predictor of the vote among our sample of individuals with TBI. Those with TBI who vote, tend to vote no matter what the type of election is; they are as likely to vote in a contentious presidential election (November 2008) as they are a local mayor's race or a party primary.

Table 3 also shows us that in general terms, those with higher age, CAT-V, MMSE, Doe Scores, and Reasoning Scores are more likely to vote than those who have lower scores. The Appreciation Score (will you vote again and why?) is not significantly related to the probability of voting, controlling for other important factors.

The final notable point is that those individuals with TBI who were married, or were not living alone, were significantly less likely to vote; this is notable because it is contrary to what one expects in studies of general population turnout (Jennings, 1979; Knack, 1992; Leighley & Nagler, 2014; Wolfinger & Wolfinger, 2008).

Discussion

This is the first known study on voting characteristics in people with TBI who voted and in people with TBI who did not vote. This study demonstrates three

Table 2. Bivariate Comparisons of Comprehension and Voting

Variable Name	Voters With TBI $N = 31$	Non-Voters With TBI $N = 20$	Difference
CAT-V Score (out of 12 points total), mean (SD)	10.97 (0.35)	9.80 (0.59)	1.17 (0.64)**
Doe Standard Score (out of six points total), mean (SD)	5.70 (0.15)	5.24 (0.27)	0.46 (0.28)*
Reasoning (Extra Doe) (out of 4 points), mean (SD)	3.48 (0.17)	3.05 (0.32)	0.43(0.33)*
Appreciation (Extra Doe) (out of 2 points), mean (SD)	1.73 (0.11)	1.47 (0.16)	0.26 (0.19)*
MMSE Score, mean (SD)	26.23 (0.59)	25.05 (1.12)	1.18 (1.15) n.s.

**$p < 0.05$; *$p < 0.10$; n.s. not statistically significant for a one-tailed test; MMSE, Mini-Mental State Exam scores range from 0 to 30; TBI, traumatic brain injury; SD, standard deviation

Table 3. Determinants of Voting in the Election (May 2007, November 2007 & November 2008)

	Model	Model	Model	Model	Model
VARIABLES	1	2	3	4	5
Interviewed for November 2008 Election	0.997 (0.813)	0.787 (0.912)	0.657 (0.847)	0.721 (0.861)	0.993 (0.873)
Married	−2.604** (1.200)	−3.057** (1.358)	−2.338** (1.161)	−2.482** (1.160)	−2.751** (1.238)
Age	0.0694* (0.0363)	0.0726* (0.0402)	0.0592* (0.0355)	0.0618* (0.0357)	0.0760** (0.0379)
Has a High School Diploma	1.058 (1.168)	1.638 (1.224)	1.578 (1.126)	1.870* (1.137)	1.161 (1.205)
Internal Efficacy	0.228* (0.138)	0.229 (0.143)	0.205 (0.135)	0.228 (0.139)	0.102 (0.131)
MMSE	0.161* (0.0901)				
CAT-V		0.356** (0.181)			
Doe Standard Score			0.553* (0.328)		
Extra-Doe:					
Reasoning Score				0.556*(0.288)	
Appreciation Score					0.801 (0.545)
Constant	−8.219** (3.390)	−8.220** (3.245)	−7.006** (2.891)	−6.171** (2.456)	−4.932** (2.223)
Observations	53	48	51	50	48

Standard errors in parentheses; ***p < 0.01, **p < 0.05, *p < 0.1.

key results: (i) there was a significant difference between the CAT-V total score of participants with TBI who voted and the CAT-V total score of participants with TBI who did not vote and the CAT-V total score predicted voting, (ii) the age of the participants with TBI was predictive of voting ($p < 0.1$), and (iii) being married was inversely related to voting.

Competence Assessment Tool for Voting (CAT-V)

The Doe Standard, Reasoning, or Appreciation scores were not predictive of voting, whereas the CAT-V summary score was predictive of voting ($p < 0.05$). This may be because there was less variation in the overall CAT-V summary score than in the subitems. Only a few studies have examined CAT-V scores among populations with cognitive conditions. Appelbaum et al. (2005) administered the CAT-V to 33 community-dwelling persons with very mild to severe Alzheimer's disease (AD). They found a strong correlation between dementia severity and the capacity to vote. Irastorza, Corujo, and Banuelos (2011) administered the CAT-V to 68 adults with dementia (AD) and 25 healthy elderly controls living in a senior residence. They found significant differences on all CAT-V items between the two groups. Tiraboschi et al. (2011) administered the CAT-V to 38 subjects with mild to moderate AD in a day-patient facility in Bergamo, Italy 30 to 60 days before the 2006 Italian general elections. Only a small

minority of AD subjects (3/38), at mild disease severity, achieved the maximum score on the CAT-V. Raad et al. (2009) administered the CAT-V to a sample of 52 community-dwelling adults with serious mental illness. Most (>80 percent) of the participants achieved high scores on the CAT-V summary score.

Age

Most studies of the relationship between age and voter turnout in the general population suggest that voting activity increases "from young adulthood through middle age and then decreases for those past middle age" (Curtis & Lambert, 1976) in a nonlinear fashion (Ansolabehere & Hersh, 2013; Ansolabehere, Hersh, & Shepsle, 2012). Although there is a paucity of literature examining the effect of age upon voter turnout among individuals with neurologic impairment, research shows that in the spinal cord injured (SCI) population voting rates increase with chronological age—just not as with nearly as robust of an effect as in the general population (Schur & Kruse, 2000). We find that the age of the subject with TBI is predictive of voting (see Table 3). However, in the general population, research indicates that age-related changes in community attachment, strength of partisanship, church attendance, government responsiveness, family income, employment status, and civic competence are all known to account for about 50 percent of age-related increases in voting (Strate et al., 1989). Each of these factors are variables that may deviate from the natural history of family development status post injury—influencing voter participation as a result. Differences in community support, and/or introduction of the aforementioned impact factors at different points in the life span of the participants with TBI relative to the general population may result in some subtle differences (e.g., non-linear versus possibility of linear relationship) in the impact of age upon voting participation between groups and may be an interesting area for future research.

There is a growing amount of research that does consider age as a control; these incidental findings show the effect of chronological age upon capacity to vote and voter turnout among individuals with mental illness and neurodegenerative conditions. Yet the mixed findings highlight the need for more work specifically about those with TBI. In a 2009 study examining the capacity to vote of persons with serious mental illness Raad et al. (2009) found no statistical impact of age of 52 subjects 23 to 69 years of age upon capacity to vote. A 2005 study of 33 subjects that examined the capacity to vote among a slightly older group of community-dwelling subjects (59 to 97 years of age) living with Alzheimer's disease similarly found no impact of age upon capacity to vote (Appelbaum et al., 2005). A 2011 Spanish study examined capacity to vote in persons with dementia, finding that capacity to vote decreases as a function of age. Closer examination reveals that similar to the aforementioned studies, no correlation existed between capacity to vote and age among 61-year-old to 89-year-old subjects. It was only when a 90- to 99-year-old group (not examined in earlier studies) was included, that a nonlinear inverse relationship emerged between age and capacity to vote (Irastorza et al., 2011). It is unclear,

therefore, if this finding is more a function of age (e.g., would be seen in all neurologically impaired subpopulations that included subjects 90 years of age and older in their datasets) or is unique to the voters with neurodegenerative conditions.

Marital Status

In sharp contrast to the general population, where marriage *increases* the likelihood that an individual will vote (Leighley & Nagler, 2014; Wolfinger & Wolfinger, 2008) married individuals with TBI were *less* likely to participate in the voting process. Stoker and Jennings (1995) offer a potential reason—marital transitions tend to depress turnout, especially transitions in marriages among younger individuals. While the transitions Stoker and Jennings consider are new marriages, new divorces, and deaths—these are situations where individuals must "undergo a period of substantial adjustment in their personal lives, both in emotional terms and in terms of their day-to-day life-style" (430). Consider the potential effects of an unexpected TBI; it might be considered a constant transition from the planned family dynamics pre-injury.

Yet prior research suggests that patients perceived to have successfully graduated from inpatient hospital rehabilitation are encouraged by their families to engage in patient advocacy (Schur, 1998). The results of this study raise the possibility that families of individuals with moderate to severe TBI do not view their family member as having been truly successful in rehabilitation —or that the definition of a successful clinical outcome is incongruent with the family's views of a successful outcome. An alternative possibility is that families of individuals with moderate to severe TBI encourage their loved ones to engage in advocacy and political engagement—activities up to the point of actually voting. A recent catchphrase among the disability community has been "Nothing about me without me." We think understanding the nature of the barriers faced by a diversity of individuals with TBI, both conscious/intentional and unconscious/unintentional can help us understand how to develop programs to help those who wish to vote, to vote in the future. With that participation, it makes the electorate more representative of everyone, but also makes it more likely that this group will be represented when policy is made. More research is needed to clarify the association between TBI, voting, and marriage.

Limitations

Our study is not without limitations. We used a relatively small convenience sample of ambulatory, literate, community-dwelling individuals with moderate to severe TBI, majority male, who were not randomly drawn from the population and who therefore may not be fully representative of the entire population of individuals with TBI. Additional research should examine CAT-V among individuals with lesser degrees of education and literacy, and with

greater enrollment of females and injury severity of mild, moderate, and severe grades; residents in nursing homes; and people with mobility impairments. This could assist in identifying groups at higher risk for not voting and thus permit more targeted assessments of such persons (Appelbaum et al., 2005). The sample represents individuals who voted in a single city in the Southern United States. Characteristics of voters vary by U.S. geographic region and by country. In addition, although our study finds that age is a significant predictor of voting, we did not, however, account for what Ansolabehere et al. (2012, p. 334) call the Stayer-Mover model of registration: "Even with a constant rate of registering across the life-span, the model highlights that the longer a person lives and does not move, the greater is the probability that the person is in the [registration] system" (334). Once someone is registered, they are more likely to vote. Put another way, we do not account for residential stability when considering that age increases the probability of voting.

A shift in state policies has expanded a singular Election Day to a multi-week voting period. Partisans and older voters disproportionately take advantage of early voting, and younger individuals (i.e., newly wounded veterans) who take advantage of early voting tend to do so later in the early-voting period (Vivekinan, Feder, McGrath, & Hersh, 2016). It is not known how CAT-V scores affect behavior when it comes to early voting, nor does our data shed light on how early voting or convenience methods affect the negative relationship we find concerning marriage. We believe these are important topics for future research. Nevertheless, this study represents the largest study to date on voting empowerment in this population.

Conclusion and Policy Implications

We find that there is variation in voting even among this small sample interviewed for the present study, and that the variation is predictable. Those with the highest CAT-Vs are the most likely to vote. In addition, we find that traditional predictors of voting simply are not predictors among this TBI group, and even one, whether the person is married, has a negative effect on voting.

One of the central questions in democratic government is who should have the right to vote? Although scholars have argued it is unconstitutional to prevent people with mental incapacity from voting, states still exclude from voting people with mental impairments (Schriner & Batavia, 2002; Schriner, Ochs, & Schields, 1997; 2000; Schur, Schields, & Schriner, 2003). Schriner and Ochs (2000) state that

> prohibiting participation can have negative effects at the societal level . . . By ignoring the constitutional guarantees to equal treatment under the law, the fabric of the political society is weakened. By refusing to face the mythology of incapacity that surrounds the disability distinction in electoral qualifications, we lose the opportunity to take another step toward ensuring [equal] representation in democratic governance. In hindsight, we may one day decide that in limiting the citizenship rights

> of people with cognitive and emotional impairments, we have disabled democracy itself. (p. 183)

Yet, all too often, those with mental incapacity of various types have been a group denied suffrage (Hurme & Appelbaum, 2007). In terms of public policy, consistent with other scholarship, we argue that the implication of this work is that suffrage restrictions are likely "over-exclusive" (e.g., Beckman, 2014; Hurme & Appelbaum, 2007). We argue that at a minimum, these results suggest that lawmakers should not make blanket policies concerning the voting rights of those with mental incapacities. For example, until recently, California had such a blanket law. However, according to the Secretary of State's website, "California recently amended its laws regarding the limitation of a person's right to vote based on his or her mental incompetence and conservatorship status. Specifically, Senate Bill (SB) 589 (Block, Chapter 736 of the Statutes of 2015) amended several sections of the Elections Code and the Probate Code related to the voting rights of persons subject to a conservatorship (conservatees)."[3] We argue that other states should follow the lead of California, particularly since there is such a wide variation among individuals with TBI, especially in terms of their cognitive capacity. Clearly, there are individuals who want to vote.

Another central question in democratic government is whether participation in voting affects the health of the public. Research suggests an interrelationship between voting and health issues. Two studies on voting and health conducted in the UK and the United States by Denny and Doyle (2007) and Blakely, Kennedy, and Kawachi (2001) found that citizens experiencing poor mental or physical health were more likely to abstain from voting than citizens reporting excellent or good health. Arah (2008) used data from the National Child Development Study of a cohort born in a single week in Britain in March of 1958 and found that abstaining from voting in the election of 1979 increased the odds of reporting poor health in 1981, 1991, 2000, and 2004, after controlling for socioeconomic factors (including age, gender, location, chronic illness, smoking, and alcohol use). These studies suggest poor political participation harms health, and poor health, in turn, hampers political participation. Future research ought to investigate whether political participation (specifically voting, but also other forms of political participation including participation in demonstrations/peaceful protests) improves cognitive health of those with cognitive impairment. Until further research is conducted, the association between voting and changes in health status of those living with TBI remains speculative.

Although we did not assess specific mental health issues, health literacy, loss of work, financial hardship (Sabella, Andrzejewski, & Wallgren, 2018), or incarceration (Schofield et al., 2006) in relation to voting, some of these events, such as poor mental health and incarceration, may affect voting among people with TBI. Internationally, 25 percent to 87 percent of incarcerated male and female prisoners report a history of mild to severe TBI and TBI associated mental health problems and impaired cognitive performance (Ferguson, Pickelsimer, Corrigan, Bogner, & Wald, 2012; Pitman, Haddlesey, Ramos, Oddy, & Fortescue,

2015; Schofield et al., 2006; Slaughter, Fann, & Ehde, 2003), compared to 8.5 percent in a general population with a history of TBI and associated mental health problems (Silver, Kramer, Greenwald, & Weissman, 2001). It is plausible that TBI-related problems after release from jails or prisons and lingering mental health and cognitive issues could trigger disenfranchisement among people with TBI leading them to be less likely to be registered to vote, and less likely to vote during elections than individuals with other disabilities (Keeley, Redley, Holland, & Clare, 2008; Ott, Heindel, & Papandonatos, 2003).

How could accessibility and participation (including issues of independence and privacy) during the electoral process be assured for individuals with impairments that affect communication; perception; attention; memory; reasoning; the ability to read, interpret written language, understand directions, navigate the (computerized) ballot or polling place, or choose between two or more candidates or political platforms—behaviors that citizens with TBI might reasonably have difficulty with. Such a person might require rehabilitation supports in the community and modifications of polling place practices to allow an individual of the voters' choice to assist the voter in casting the ballot by reading the ballot and providing unbiased explanation of ballot measures or allowing an election worker to provide assistance in use of new computerized technologies (Schur, Adya, & Ameri, 2015). Election officials receive manualized training on assisting citizens with disabilities at the polls. We are not aware of any data on the effect of election official training on participation of voters with TBI/cognitive limitations. Greater provision of basic training to increase knowledge about mental incapacity or TBI among election officials could potentially facilitate participation of voters with cognitive limitations.

Finally, there is a paucity of research on voting of persons who need assistance at the polls, many of whom have TBI, but some who are simply old, or cognitively impaired, and how to solicit whether someone needs assistance and how to provide that assistance. Similarly, research on political participation or voting among people with neurologic conditions has yet to examine why disenfranchisement might be self-imposed. Perhaps self-imposed disenfranchisement is due to factors including low self-efficacy or lack of motivation, or simply because people with disabilities are less likely to go and vote if they expect problems at the polls (Schur & Kruse, 2009), or perhaps self-imposed disenfranchisement is the brain's way of conserving energy for daily activities that matter for survival (work, sleep, eating) at the expense of voting (Verba et al., 1995). Future research is needed to study/analyze those with TBI to understand why people with TBI do not vote and why voting matters. Research could lead to new insights into obstacles to voting participation faced by citizens with mental incapacity or TBI so that these citizens are able to vote in a manner that provides the same opportunity for access and participation as for other voters and provides specific recommendations to the United States Election Assistance Commission to facilitate participation of voters with cognitive limitations (Lampel, 2011).

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Notes

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1. Coin tosses or other random selection methods literally decide tied election contests. A 2017 tied Virginia House of Delegates race was decided by "placing both names in old film canisters and shuffling them in a clear bowl" (see Hayes, 2017).
2. Stating one's name and address is the current identification requirement for voting in North Carolina as of this writing, but states do differ. For current identification requirements across the United States, see http://www.ncsl.org/research/elections-and-campaigns/voter-id.aspx (accessed March 27, 2018).
3. California Secretary of State. 2018. "Voting Rights: Persons Subject to Conservatorship." http://www.sos.ca.gov/elections/voting-info/conservatorship/ (Accessed June 15, 2018).

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web-site.

Appendix

Competency Assessment Tool for Voting (CAT-V)

"I'm going to ask you some questions about elections. This should take about five minutes. If you don't understand something I say or ask, please tell me and I will repeat it. Some of the questions may seem very simple to you, but don't worry about that. We are just looking for straightforward answers. Do you have any questions before we begin?"

Understanding

Imagine that two candidates are running for Governor of [fill in name: *your state*], and that today is Election Day in [fill in name: *your state*].

Understands the nature of voting:

What will the people of [fill in name: *your state*] do today to pick the next Governor?

Note to interviewer: If subject describes how he/she or people in general would choose between the two choices for governor (i.e. watch TV ads, listen to their campaign issues, etc.), ask:

Well that's how you might decide who you think should be governor. But how would you actually indicate your choice?

[Score of 2: Completely correct response, e.g., "They will go to the polls and vote." "Each person will cast his/her vote for one or the other." Score of 1: Ambiguous or partially correct response, e.g., "That's why we have Election Day." Score of 0: Incorrect or irrelevant response, e.g., "There's nothing you can do; the TV guy decides."]

Understands the effect of voting:

When the election for governor is over, how will it be decided who the winner is?

[Score of 2: Completely correct response, e.g., "The votes will be counted and the person with more votes will be the winner." Score of 1: Ambiguous or partially correct response, e.g., "By the numbers." Score of 0: Incorrect or irrelevant response, e.g., "It all depends on which sign they were born under."]

[Note that it is likely that some subjects will answer both of these questions in response to the first question. If so, they should be given a full score for each, and the second question may be omitted.]

Choice

[Hand subject a card with the information in the following paragraph in large print; allow subject to retain and consult this card for the remainder of the interview.]

Let me ask you to imagine the following about the two candidates who are running. Candidate A thinks the state should be doing more to provide health insurance to people who don't have it, and should be spending more money on schools. He is willing to raise taxes to get the money to do these things. Candidate B says the government should not provide health insurance but should make it easier for employers to offer it. He

believes that the schools have enough money already but need tighter controls to make sure they use it properly. He is against raising taxes.

Based on what I just told you, which candidate do you think you are more likely to vote for: A or B?

Note to interviewer: If subject can not choose a candidate or is vacillating, ask:

If you had to make a choice based on the information you have before you, who would you pick?

[Score of 2: Clearly indicates choice. Score of 1: Choice is ambiguous or vacillating, e.g., "I think I might go for the guy who doesn't like taxes, but I'm not sure because schools are important too." Score of 0: No choice is stated, e.g., "I don't know. I can never make up my mind."]

The following measures of reasoning and appreciation are not part of the Doe standard.

Reasoning

Comparative reasoning:

If subject identifies a choice, ask: How is voting for [*subject's choice*] better than voting for [*name of other candidate*]? [*Or if subject had no choice, ask*: How might voting for Candidate A be better or worse than voting for Candidate B?]

[Score of 2: Identifies at least one comparative attribute in relation to the views of the two candidates, e.g., "Someone who really cares about health care would be a better governor." Score of 1: Ambiguous response, e.g., "Health care." Score of 0: Fails to mention a comparative attribute of the respective candidates, e.g., "I just think he's good." or "I can't see any difference"]

Generating Consequences:

If [*subject's choice or Candidate A if subject had no choice*] were elected governor in your state, how could that affect your life?

Note to interviewer: Probe for a reason if subject says it will not affect them.

[Score of 2: Identifies a consequence for his or her life, e.g., "I'd have more money to spend" or "I'd have better access to health care"; if sees no personal consequences, subject gives a coherent reason ("I'll be moving to another state soon." "I'll be dead in a year anyway.") Score of 1: Gives a vague consequence for his or her life, e.g., "Health." Score of 0: Does not give a consequence for his or her life or a reason for saying that there are no personally relevant consequences.]

Appreciation

Would you want to vote in the next election for governor of your state? If yes, why? If no, why not?

[Score of 2: Response based on reason that reflects reality of voting situation. E.g., if yes: "My doing that makes it more likely that the candidate I like will win." If no, "I don't care who wins"; "My one vote is

unlikely to make much of a difference." Score of 1: Ambiguous response that partially reflects reality of voting situation. E.g., if yes: "It helps to run the country." If no, "They might not let me." Score of 0: Responses that fail to reflect reality of voting situation; confused or delusional responses. E.g., if yes: "The person I pick will win." If no, "They never count my vote anyway."]

Appendix
Voting Efficacy Test
Participant ID:_____

Date:_____/_____/20____

Please indicate how much you agree or disagree with these statements by checking the corresponding box:

	Agree Strongly	Agree Somewhat	Neither Agree Nor Disagree	Disagree Somewhat	Disagree Strongly	Don't Know
a. Public officials don't care much what people like me think.						
b. people like me don't have any say about what the government does.						
c. sometimes politics and government seem so complicated that a person like me can't really understand what's going on.						
d. I consider myself well-qualified to participate in politics.						
e. I think that I am better informed about politics than most people						
f. people with disabilities have as much influence as other groups in government and public affairs.						
g. Government officials treat people with disabilities with as much						

respect and dignity as they treat members of other groups.						

Appendix

Participant Characteristics

Participant ID:_____

Date:_____/_____/20____

1. What is your gender?

____ Female____Male

2.Do you consider yourself to be Hispanic or Latino?

____ ____ ____Yes____Yes

3. What race or ethnicity do you consider yourself?

____ White____Asian /pacific islander____Other (please provide):

____ ____Native American ____Native American_____

4. What is your marital status?

____Single (never married) ____Divorced ____Widowed

____ Married or Cohab. >7yrs ____Separated____Other_____

5. What is the highest level of education **you** have completed?

____ Some High ____ ____ ____High____High ____High School Diploma School Diploma

____Some College ____2-yr Assoc. degree ____4-yr BA/BS degree

____Some post- grad____MA degree____PhD degree

6. What is the highest level of education anyone in your **immediate family** (parents and siblings) has completed?

____ Some High ____ ____ ____High____High ____High School Diploma School Diploma

____Some College ____2-yr Assoc. degree ____4-yr BA/BS degree

____Some post- grad____MA degree____PhD degree