

Patience, Turnout, and Political Opportunity Structure

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Abstract

Why do people vote? A rational voter must overcome her immediate cost of voting, while the expected policy outcome will not be realized in the near future. Indeed, recent studies find a positive correlation between turnout and patience, an important personality trait which is pivotal to a wide range of behaviors. However, I argue that the effect of patience on turnout should be contingent on the political opportunity structure. Patience would increase turnout only if the voter perceived that the future policy outcome would be different depending on the election result. This hypothesis is supported by the cross-sectional 2014 Comparative Congressional Election Survey. Furthermore, a survey experiment through Amazon MTurk including a newly-proposed treatment was implemented to manipulate the level of patience and examine the causal relationship between patience and turnout. The experimental result shows that a voter who was treated to increase her patience will instead decrease the voting intention if she sees no difference between the two major parties, but increase if the perceived ideological difference is large enough. Hence, patience is a political virtue not simply because it increases turnout, but because it increases people's responsiveness to the political opportunity structure.

Keywords. Patience; Discount Factor; Turnout, Spatial Voting, Survey Experiment

Word count: 7634

Introduction

Why do people vote (or not)?¹ Starting from De Tocqueville in his *Democracy in America* (De Tocqueville, 1972), it is assumed by many democratic theorists that an individual's level of patience plays a crucial role in political participation and engagement (e.g. Mill, 1861; Diamond, 1999). Since the voting behavior itself is a costly behavior on the Election Day, an economic rational individual must put more weights on the potential future policy outcome after the election - either positive or negative - than the immediate cost of voting. De Tocqueville believes that it is those farsighted people that stabilize the function of democracy in America.

The assumption linking patience and turnout, albeit being widely believed, has not been empirically examined until recent years. Based on the development in psychology and economics (Frederick, Loewenstein and O'donoghue, 2002; Loewenstein, Read and Baumeister, 2003), Fowler and his colleagues provide a decision-theoretic model suggesting a positive relationship between patience and turnout (Fowler and Smirnov, 2007), which the patience is formalized as the individual's discount factor. They then provide some empirical evidence based on ANES data (1976-1988) and a survey on undergraduate students (Fowler and Kam, 2006). In a follow-up study using the data from National Longitudinal Study of Adolescent Health, Dawes and Loewen (2009) also provide preliminary evidence linking the gene, patience, and turnout. Two subsequent studies with representative 2014 Cooperative Congressional Election Study (CCES2014) revealed similar positive correlation (Schafer, 2016; Hill, 2016).

The theoretical mechanism behind these positive correlations is that an individual must put more weight on the future policy outcome in the far future after the election so that the utility in the future decides his or her willingness to invest in the voting now. By using

¹A former version of this article was presented at Midwest Political Science Association 2017 annual conference. I appreciate the helpful comments from Hanna Wass, Tolga Sinmazdemir, and Andrew Menger.

Fowler’s words: “...no one has yet noted that the costs of voting are paid on or before Election Day, while policy benefits may not materialize until several days.” In democracies, it takes weeks and even years for a policy statement to be a signed law: the legislator needs to draft the policy proposal, send it to the Congress, discuss it and negotiate in the committee, pass it, and oversee the administrative branch to implement it. Fowler then summarizes the patience as a *political virtue*, indicating its importance to the function of democracy.²

Given the empirical evidence, two theoretical weaknesses have not been adequately addressed. First, the political opportunity structure matters and should interact with patience on explaining the decision to vote. In formal models, the discounting rate is usually used as an *instrumental variable* rather than the outcome itself. Even though a voter is farsighted and cares policy outcome a lot after the Election Day, if she sees no ideological difference between the available options on the ballot, voting is still a waste of time – the policy outcome had been decided even before the campaign. On the contrary, if the voter found a huge difference between the two leading candidates, her future will be severely influenced by the election outcome; in this scenario, her patience will emphasize more on the potential future policy change and therefore motivate her to vote.³ In short, how much patience can influence the turnout should be contingent on voter’s perception of the (competitive) candidates and parties.

Second, *correlation is not causation*. As Cohen, Vigoda and Samorly (2001) noticed, an individual’s level of patience is widely correlated with the sociodemographic background, some of which may indirectly impact on the decision to vote. One study also finds negative or null effect between patience (measured by impulsive and aggressive personality) and turnout (Denny and Doyle, 2008). Unlike the relation between genes and behavior (See Fowler and

²Recent philosophical discussion on how patience can be a worth-pursuing virtue can see Bommarito (2014).

³Indeed, two recent studies both touched this issue. Schafer (2016) runs the interaction between swing state and discount rate but gets mixed result, while Hill (2016) interacts civil duty and discount rate but gets null finding.

Dawes (2008) for discussion), an individual's level of patience can be manipulated, and can also be properly trained (e.g. Dignath, Buettner and Langfeldt, 2008; Muraven, 2010; Mullainathan and Shafir, 2014). Therefore, it is theoretically and empirically feasible to estimate how the temporarily change of patience influences one's willingness to vote. The exploration of the causality can provide insight into policy design to rescue the declining turnout rate globally (e.g. Holbein, 2016).

In this article, an analysis of a representative cross-sectional survey and a new survey experiment are provided to tackle these two weaknesses. For the former one, I will investigate the 2014 Comparative Congressional Election Survey (CCES 2014 hereafter) to estimate the correlation between the respondent's patience, perceived ideological difference between candidates, and the respondent's turnout. CCES 2014 is the first representative survey in the U.S. that includes the precise measure of the respondent's discounting factor, which was also used by recent studies linking patience and turnout (e.g. Schafer, 2016; Hill, 2016). For the later one, following the future-self connectedness mechanism behind an individual's patience (Parfit, 1984; Bartels and Rips, 2010) and study on perceived life expectancy (Payne et al., 2013), this article proposes a new treatment which can temporarily manipulate a respondent's level of patience *in both directions*. The survey experiment was then conducted right before the U.S. 2016 Presidential election to investigate how the change of patience may influence an individual's willingness to vote; meanwhile, respondent's perception of the two main presidential candidates was also recorded. The highly-heated and competitive political context in the 2016 presidential campaign provides a unique environment for testing our hypothesis since voter's perception of the two candidates can be extremely different.

Foreseeing the Political Opportunity Structure

Why do people put more weight on the immediate outcome while discounts the distant one? This question was firstly asked by political economists over one hundred and fifty years ago. Cited in Loewenstein and Elster (1992), both Senior (1836) and Jevons (1871) argued that people should view the equal treatment of the present and future as a behavioral norm. If the goal of a rational man is to maximize the accumulated utility within the lifespan, it then seems irrational to consider the utility of a future event as less important relative to the myopic alternative.

One possible explanation for (im)patience come from the philosophical debate. According to Loewenstein, Read and Baumeister (2003), there are two views of personal identity: simple and complex. The simple view is that there is an irreducible entity of "I" that remains unchanged over time; an individual has no reason to discount the future self. The complex view argues that the personal identity across time is based on reducible characteristics (Parfit, 1984). One may forget previous experiences while the cells on one's body are continuously renewed; therefore, people discount the future event because the future-self and the current-self are partially different. The value of the discount factor is therefore decided by an individual's subjective future-self connectedness. Bartels and Rips (2010) conduct five different surveys to show that an individual's future-self connectedness positively correlates to his personal discounting factor. A famous survey experiment carried out by Hershfield et al. (2011) also indicates that respondents tend to choose a long-term insurance plan and increase saving behavior when there was a photo shown on the screen; the photo is the respondent's face, but it was edited to look older. The experiment provides powerful evidence that future-self connectedness can change one's intertemporal choice on important life issues.

In the classic rational voting model, an individual's decision to vote is formalized as $V = P \times B - C$, while V is the decision to vote, P is the probability of being pivotal, B

is the benefit received from the election outcome, while C is the cost of voting. Previous studies linking patience and turnout is to investigate the component inside B further. Since the policy outcome will not be realized right after the Election Day, people with higher level of patience are much likely to vote because they care more about the future policy reward. In another word, $B = \delta_i \times K_i$, while δ_i is an individual's level of patience modeled as the discounting factor, and K_i is the net policy outcome for the voter when the policies are carried out. Hence, previous studies find supportive evidence for $V \propto \delta$ (Fowler and Kam, 2006).

However, if δ matters, why shouldn't K_i ? In psychology, goal-setting is one of the most important mechanisms linking the trait self-control and behavior. If the policy outcome is the goal that voters are looking for, what voters perceived should interact with patience on influencing their willingness to vote. To be specific, $K_i = |K_{1i} - K_{2i}|$, the perceived difference between the two candidates (K_1 and K_2) in the specific election by the voter, which I defined as the political opportunity structure. In this model, when there is no ideological or policy difference between the two candidates, $K_i = 0$; if the ideological difference is significant, K_i will also increase. By taking the abstract value of the difference, I take into account both the net benefit and regret minimization. Indeed, previous studies on both presidential elections and midterm elections found that political opportunity structure plays an important role on turnout (Plane and Gershtenson, 2004).

There are two major theoretical advantages to decompose B into $\delta_i \times |K_{1i} - K_{2i}|$. First of all, it predicts *when* the individual's level of patience did not help promote turnout. If an individual suddenly became farsighted, but she found no difference between the candidates, then why should she vote? If we further take into consideration that voting usually as a habitual behavior (Plutzer, 2002; Aldrich, Montgomery and Wood, 2011) and that habit is a goal-oriented behavior (Aarts and Dijksterhuis, 2000) (not shown in the model above), it is even possible to predict that people with higher level of patience would *decrease* their voting

intention when they see no difference on the future policy outcomes after the election carried by different candidates. In this scenario, turnout is a habit and a default tendency, but a higher level of patience is then used to inhibit this habit owing to goal conflict in the specific election with fewer political opportunity (see Wood and Neal, 2007).

Second, the decomposition predicts *who* are more responsive to the change of the political opportunity structure. In the model, people with higher level of patience are much likely to change their decision to vote according to the given political opportunity structure in each election ($1 \times |K_{1i} - K_{2i}|$), while the impatient voters would be indifferent to structure ($0 \times |K_{1i} - K_{2i}|$). One of the weaknesses in Fowler and Kam (2006) is that their subjects are from the same area (one university in California), which excludes the possibility to test the interaction between political opportunity structure and patience.

Following the discussion above, four testable hypotheses can be derived from the complex model:

H₁: Patient people have higher turnout.

H₂: People perceived larger difference between the candidates have higher turnout.

H₃: Interaction between patience and perceived difference between the candidates positively influences the turnout.

H₄: When people are treated to be more patient, they become much responsive to the perceived difference between the candidates on the decision to vote.

Among the four hypotheses, *H₁* and *H₂* are consistent with the previous studies, while *H₃* is the main contribution of this article. The former three hypotheses can be falsified through the cross-sectional surveys including related items. *H₄* further aims at establishing the causal mechanism behind patience and turnout. A survey experiment is required to

manipulate respondents' level of patience.

CCES 2014 for Testing H_1 , H_2 , and H_3

Measures

In the 2014 CCES, 1000 respondents were asked about their level of patience (discussed later), perceived ideological difference between the candidates and parties, voting behavior, and socio-demographic background. The analysis is done by R 3.1.3, and the logit models are estimated by the *glm* function.

The main dependent variable, *Turnout*, takes the value of 1 if the respondent voted in the 2014 midterm election (including early voting) and 0 if not. In the dataset, 708 of them (70.8%) self-reported voting in the election, which is, unfortunately, higher than the real value (36.4% officially).

In the dataset, two items are used to measure the respondent's level of patience *Patience*, one of the two major independent variables in my model. The description and option of the two items are as followed: "Imagining you will receive a certain amount of money. Which of the following way do you prefer? (A) To gain \$10 today (B) To gain \$20 six months year later" and "(A) To gain \$1000 today (B) To gain \$2000 a year later." The design of the items is similar to the discounting rate choice battery (DR hereafter) in economics (Frederick, Loewenstein and O'donoghue, 2002; Hardisty et al., 2013). Those who prefer delayed and larger rewards are assumed to have more patience and higher self-control, and those who choose immediate but smaller rewards are believed to be myopic and emotional (Berns, Laibson and Loewenstein, 2007; Metcalfe and Mischel, 1999). The more items are asked, the more precisely the researcher is able to estimate the discounting rate for an individual participant. Recent studies show that the measure of patience based on this design has been found with good test-retest stability (Kirby, 2009), and the measurement positively correlates

with other scales measuring self-regulation and future-orientation created by psychologists (Daly, Harmon and Delaney, 2009; Vischer et al., 2013). In political science, 20 items are designed in DR battery used by Fowler and Kam (2006), which fixes the immediate payment to be \$100 in 30 days, and delayed payment in 60 days from \$ 100.17 to \$123.07. In comparison, only two items are allowed to put in the 2014 CCES. As a result, it would be imprecise to calculate the exact discounting rate for each respondent.

In the first part of the analysis, I simply assume those who choose the immediate but smaller reward on both items to be impatient (*Patience* = 0), and those who choose both delayed and larger rewards are patient (*Patience* = 1). In the 2014 CCES, 393 (39.3%) are coded as impatient while 375 (37.5 %) are patient. This distribution suggests enough variance for further analysis, and people are not choose at random.⁴ Besides, measuring patience by using two or less DR item is not uncommon, albeit not perfect (e.g. Klochko and Ordeshook, 2005; Wang, Rieger and Hens, 2009). Moreover, to suggest the credibility of the two-item DR measure, I can examine whether the measure has similar properties with previous studies. In the 2014 CCES, consistent with previous studies, being patient positively correlates with educational level (Duckworth and Seligman, 2005) ($r = 0.28, p < 0.01$), family income (Harrison, Lau and Williams, 2002) ($r = 0.28, p < 0.01$), regulating CO2 emission ($r = 0.07, p = 0.05$), and not correlates with age (Chao et al., 2009) ($r = 0.02, p = 0.51$). Therefore, in this article, I will use the binary coding on individual patience derived from the two items in the 2014 CCES.

Apart from patience, another independent variable in my model is the political opportunity structure *Oppo*. To be specific, the perceived political opportunity structure is measured by the abstract value of the ideological difference (in a 1=Very liberal to 7 = very conser-

⁴It is also possible to calculate the range of discounting rate basing on the two items. There are 54 (5.4%) respondents who chose delayed reward in the first item (with smaller reward) but immediate one in the later item (with larger reward), and 178 (17.8%) with opposite choice. The main result and conclusion are not changed with different coding.

vative scale) between the two major candidate *in the House election in the respondent's district*. I choose the House election for the following reasons: First, the Senate election is less preferred since only half of the Senate district had election; therefore, only 450 respondents were available for the Senate election in CCES 2014. Second, measuring voters' perception of the two district candidates to calculate the *Oppo* can be a better measure compared with their perception of the two national parties. Previous studies on candidate positioning (e.g. Ansolabehere, Snyder Jr and Stewart III, 2001; Burden, 2004) suggest that House candidates usually follow the position of their national party, but meanwhile, they still need to accommodate themselves to the need of local voters. Moreover, the incumbent and the challenger has different strategies on nudging their policy stance in their district so as to increase the likelihood of winning. Thus, measuring *Oppo* through the House election can not only enhance the variance of the measurement, but also clarify the linkage between *Oppo* (goal), *Patience* (mechanism), and *Turnout* (goal-pursuit behavior) all in the local and individual level.

One potential limitation of measuring *Oppo* in House election is that many voters did not know the policy stance of their candidates. In the CCES 2014, 436 respondents (43.6 %) said they are "not sure" about the ideological location of one of the House candidates in their district. To deal with this issue, I will run two models, one for dropping all subjects who are not sure, and the other for assuming the "not sure" answer to be 4 in the 1 to 7 scale. If the respondents did not know the policy position of the two candidates, the perceived policy difference would be $|4 - 4| = 0$, indicating that the respondents did not expect any policy outcome from the election.

Result

Table 1 shows the result of the seven logit regression models. Model 1 indicates that a voter's level of patience positively correlates with her turnout, which is consistent with

H_1 and recent studies (Fowler and Kam, 2006; Schafer, 2016; Hill, 2016). Model 2 and 5 indicates that the voter’s perceived ideological difference between the two House candidates in her district is also a strong predictor for turnout, which is unsurprisingly consistent with H_2 , regardless the ”not sure” response is counted or not.

Table 1: Patience, Political Opportunity Structure, and Turnout in CCES2014

	<i>Dependent variable:</i>						
	Turnout in 2014 Midterm Election						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Patience</i>	0.515*** (0.164)		0.838 (0.531)	0.757 (0.572)		0.448** (0.226)	0.244 (0.244)
<i>Oppo</i>		0.378*** (0.106)	0.119 (0.159)	-0.063 (0.176)			
<i>Oppo</i> × <i>Patience</i>			0.586** (0.275)	0.583** (0.286)			
<i>Oppo_{All}</i>					0.697*** (0.071)	0.570*** (0.108)	0.392*** (0.115)
<i>Oppo_{All}</i> × <i>Patience</i>						0.295* (0.170)	0.306* (0.175)
Age, Gender, Edu, Race, Party ID				Yes			Yes
Observations	768	336	262	262	895	691	691
Log Likelihood	-447.5	-109.4	-75.1	-65.2	-468.9	-349.6	-314.0
Akaike Inf. Crit.	899.0	222.9	158.3	150.5	941.7	707.2	647.9
VIF_{MAX}			2.145	2.208		2.160	2.133

Note: *p<0.1; **p<0.05; ***p<0.01

Model 3 and 6 in Table 1 both shows that the interaction between patience and perceived ideological difference will positively influence turnout, which is consistent with H_3 . The correlations remain positive after controlling for a series of socio-demographic variables in Model 4 and 7, including the respondent’s age, gender, the level of education, race, and dummies for party identification. After putting the interaction term, *Patience* itself is no longer predictive to turnout. In other words, it implies that the positive effect of *Patience*

on turnout is passed through the perceived ideological difference.

To further illustrate the conditioning effect of *Oppo* on patience and turnout, Figure 1 shows the simulated distribution on respondents' probability of turnout from Model 4 in Table 1. The two lines indicate the predicted probabilities to vote given the specific number of *Patience* and *Oppo*, controlling all other variables at the mean, while the shadowed area is the plus and minus one standard error.

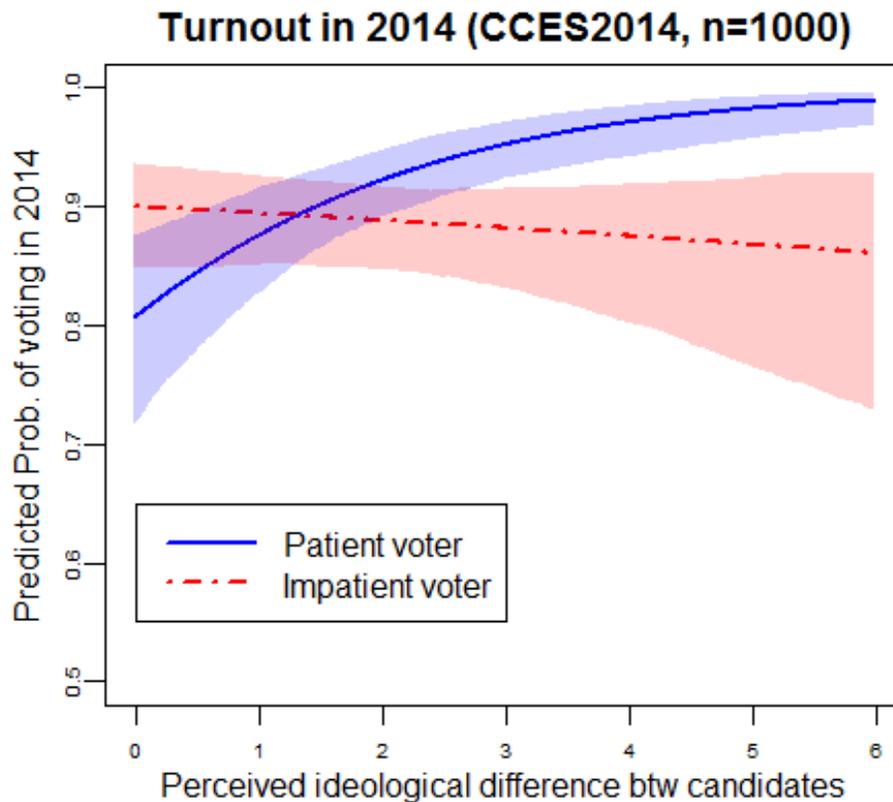


Figure 1: Patience, Political Opportunity Structure, and Turnout - A simulation

In this figure, it is clear that the political opportunity structure works oppositely for patient and impatient voters. Patient people are much likely to vote only if they perceive that the outcome will bring dramatic policy change in the future; when the patient people are indifferent between the candidate, their turnout rate is not distinguishable with the impatient ones. Among the impatient voters, perceived ideological difference did not influence their

tendency to vote; in other words, they vote just because they did not care the future policy outcome of the election but for other reasons, such as punishing the incumbent for poor performance or scandal. By comparing the two trends in Figure 1, it is clear that patient voters are much susceptible to the change of political opportunity structure on their decision to vote. The simulation result in Figure 1 provides supportive evidence to H_3 .

Discussion

Results in Table 1 and Figure 1 make two insights on explaining turnout. First of all, patience helps increase the turnout only if the political opportunity structure is large enough. This pre-condition generally true in the context of the highly-polarized U.S. politics, but my analysis further investigate the cognitive mechanism linking patience and turnout. It also provides the evidence that turnout itself is still a goal-oriented behavior. When people care the future policy outcome and set it as the goal, they can self-control themselves to spend their time in the voting booth so as to approach the goal.

Second, it is the patient people that are responsive to the political opportunity structure. Because patient voters care much about the change of the future policy outcome, they decided to invest their time and resource to stand in the voting booth on the Election Day. In our dataset, impatient voters also have a very high self-reported turnout rate. However, their behavior cannot be explained by the political opportunity structure; they decided to vote for other reasons. This result implies that patient and impatient voters may be mobilized through different campaigning strategies.

Survey Experiment for H_4

In the previous analysis of CCES 2014, one major weakness is that correlation is not causation. If there is a causal story behind the Figure 1, it is possible to change an indi-

vidual’s willingness to vote by merely manipulating her level of patience.⁵ To be specific, manipulation on patience can help us distinguish the direct and indirect influence of patience on turnout: (1) If previous studies suggesting the direct impact of patience on turnout is correct, we should expect to find that people are much likely to vote when they are treated to increase their patience, and vice versa; (2) If the moderation story implying the indirect patience is correct, subjects who are treated to increase their patience will enhance their turnout only if they had perceived enough difference between the candidates; the patience-enhancing treatment would instead work in the opposite direction if the subjects failed to see the difference between the candidates.

Future-self Connectedness for Manipulating Patience

Following the theory of future-self connectedness discussed above, I propose Payne et al. (2013)’s life expectancy treatments to manipulate the respondent’s level of patience. In Payne and colleague’s survey experiment, respondents are asked to estimate how likely they will ”live to 65/85/105 years old or order” or ”die at 65/85/105 or younger” (also see the next section ”Research Design”). Estimated and transformed through Weibull function, they found that the respondent’s average life expectancy in the ”live-to” group is about 85 years in average, while in the ”die-at” group is around 75 years. The different is statistically different, and the result holds under several robustness checks.

Admittedly, Payne and colleague’s treatments are not originally designed for the manipulation of patience but life expectancy. However, the future-self connectedness theory implies such possibility that patience can be influenced by the items. First, their items ask respondents to imagine what would happen to herself in the (far) future, which temporar-

⁵Indeed, it is also feasible to manipulate an individual’s perceived political opportunity structure. However, the aim of this article is to extend the previous findings linking patience and turnout. Moreover, the 2016 presidential election provides a highly intense political context so that voters must have acquired enough knowledge and information about the political opportunity structure, which makes it harder to be manipulated.

ily builds and strengthens the connection to her future-self. Thus, an individual's level of patience may be influenced through the future-self connectedness mechanism. Second, their two treatments provide different levels of manipulation on patience. Especially, I hypothesize that the "live-to" frame can increase one's patience because their previous study shows that respondents tend to have longer life expectancy. Meanwhile, people in the "die-at" frame would have lower patience since people expected themselves to live shorter. The hypotheses come from the seminal works on framing effect (McNeil et al., 1982; Tversky and Kahneman, 1986). In the studies, subjects care more about the overall future outcome when being framed by survival rate in choosing between therapies, but focus more on the immediate risk when being framed by death rate.

One additional advantage to apply Payne and colleague's treatment is that its simplicity and cost-saving. Even though Hershfield et al. (2011)'s morphing procedure is highly preferred in theoretical perspective, respondents in their research need to show up in the laboratory, or provided their own photos and then wait for several weeks. The procedure may restrain the number of respondents as well as the external validity of the result.

Research Design and Data

Overall 471 subjects are recruited from Amazon Mturk web service during October 17-24, 2016, three weeks before the 2016 U.S. Presidential Election Day. They were offered \$1.25 to complete a 30 item questionnaire named "How people make decisions in everyday life." All subjects are at least 18 years old, with IP address located in the U.S., and with 95% approval rating or higher for previous tasks on the Amazon Mturk. The study is fully sponsored by the Program for the Study of Democracy, Institutions, and Political Economy (DIPE) at Duke University.

Subjects were first asked to report their routine political behaviors including news consumption, political interest, and political discussion. They were then be asked to locate their

ideology on a 0 to 100 liberal-conservative scale. Similarly, they then located the Democratic and Republican Partys ideological position on the same scale.

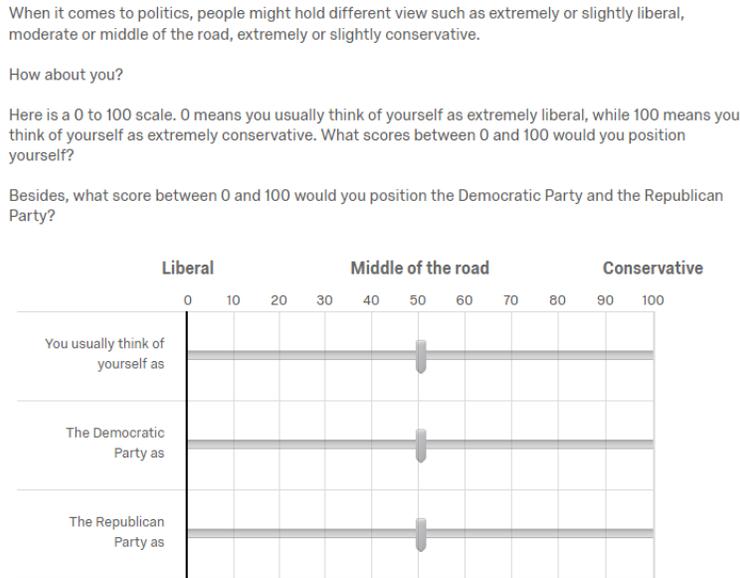


Figure 2: Measuring self-reported ideology and perceived ideological stance

Subjects were then be randomly assigned to three different groups. In Treatment Group A, subjects were asked three questions about how likely they think they will live to be 65/85/105 years old (See the figure below). In Treatment Group B, subjects were asked three questions about how likely they think they will die at 65/85/105 years old or younger. Respondents in the Control Group answered nothing. After the treatments, all subjects were asked about their likelihood to vote (from Extremely likely to Not likely at all, five-point scale).

After that, all subjects were asked about their level of patience through a six-item choice battery edited from Karoly (1993); Fowler and Kam (2006). The design of the items used here is similar to the discounting rate choice battery in economics (Frederick, Loewenstein and O'donoghue, 2002; Hardisty et al., 2013). This design includes more items than that in the 2014 CCES because the available space in the representative survey is much limited.

In the end, all subjects were then asked about their gender, age, race, and level of

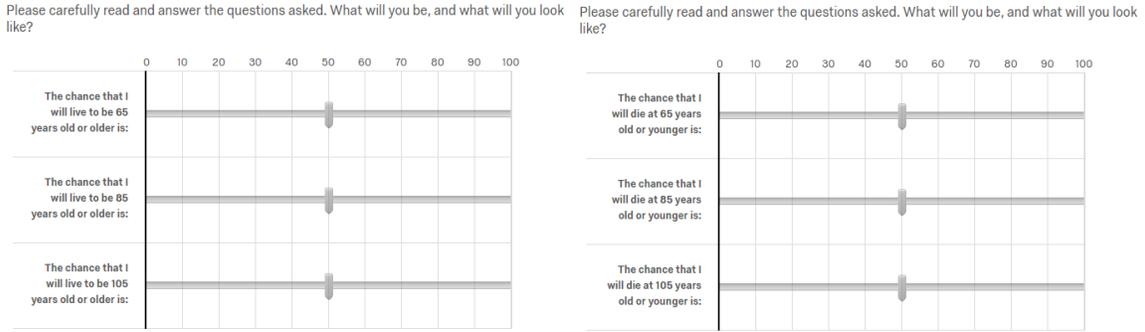


Figure 3: The "Live-to" and "Die-at" treatment

In the following questions, you will be asked to choose the payment option that you would prefer in each of 5 different conditions. Note that each of the 5 conditions will pay \$100 in 30 days (option A) or \$100+\$x in 60 days (option B), where x differs under each condition. For each question you will select the payment option (A or B) that you would prefer if you are chosen to receive the amount of money.

You are asked to choose between:

	A	B	
To gain \$100 now	<input type="radio"/>	<input type="radio"/>	To gain \$105 in 30 days
To gain \$100 now	<input type="radio"/>	<input type="radio"/>	To gain \$120 in 30 days
To gain \$100 now	<input type="radio"/>	<input type="radio"/>	To gain \$150 in 30 days
To gain \$100 in 30 days	<input type="radio"/>	<input type="radio"/>	To gain \$105 in 60 days
To gain \$100 in 30 days	<input type="radio"/>	<input type="radio"/>	To gain \$120 in 60 days
To gain \$100 in 30 days	<input type="radio"/>	<input type="radio"/>	To gain \$150 in 60 days

Figure 4: Six-item discounting factor measurement

education. All subjects were debriefed about the manipulation of patience at the end of the survey.

Demographics and Randomization check

Overall, 455 in 471 completed the survey (96.6 %). Table 2 shows the socio-demographic background of the respondents to be analyzed. Among the respondents, 154 were assigned to the Control Group, 150 to the "Die-at" Group, and 151 to the "Live-to" Group. ANOVA test shows that there is no difference among subjects in the three groups on their age ($p = 0.976$), gender ($p = 0.675$), educational level ($p = 0.069$), race ($p = 0.178$), self-reported ideology

position ($p = 0.809$), political interest ($p = 0.525$), political knowledge ($p = 0.766$), and news consumption ($p = 0.564$).

Table 2: Socio-Demographic Background of the MTurker Subjects

Variable	N	Mean	St. Dev.	Min	Max
Age	454	38.81	11.38	19	79
Male	452	0.53	0.50	0	1
Edu (1=High school, 7=PhD)	455	4.22	1.22	1	7
Black	455	0.07	0.50	0	1
Self-Reported Lib.-Con. Position (0-100)	452	40.12	27.91	0	100

Treatment Check

I firstly try to replicate the result of Payne et al. (2013) to check if respondents in the two treatment groups have a different level of life expectancies. Following the same Weibull transformation procedure (which assumes that the likelihood for everyone to live to 122 is zero), the average life expectancy in my "Live-to" Group is 83.06 with variance 11.17 (median is 82.66), while in my "Die-at" Group is 72.78 with variance 12.29 (median is 71.96). Two-tail t-test shows that the difference is statistically significant ($t = 7.582, df = 294.5, p < 0.001$). This result perfectly replicates Payne's seminal work which also based on MTurk samples (85 and 75 in their original research).

Besides, it is possible that the treatment effect is heterogeneous by different generations. To verify this possibility, I run a simple regression model by using the life expectancy as dependent variable, and adding the interaction between the treatment and the respondent's age (mean-centered) as the independent variable. However, regression shows that the estimated coefficient of the interaction term is insignificant ($p = 0.314$). It indicates that the treatment effect is quite stable for different generations. Moreover, the randomization check also shows that the distribution of age is the same among the three groups. Therefore, the

treatment effect may not come from the uneven distribution of respondents' age.

Manipulation Check

Next, I test whether the both frames may influence respondent's level of patience toward different directions. All subjects answered six items in the patience battery as is shown in Figure 3. Following the hyperbolic discounting model (Frederick, Loewenstein and O'donoghue, 2002), participant's subjective time preference can be estimated by two parameters, α and β : α is the level of present-bias measured by the first three items since the first three items ask the respondent to compare two outcomes happening now and after 30 days. Moreover, β is the traditional long-term discount factor captured by the latter three items, asking respondents to compare what happens in 30 days and in 60 days. There are numerous ways to transform an individual's answers into a specific number of discounting factor (or at least a range). However, since the number of the items used in this research is small, I simply assumed that respondents who chose straight B as 1 (always preferred later and larger reward, no discounting) for both α and β , ABB as $\frac{100}{105}$, AAB as $\frac{100}{120}$, and AAA as $\frac{100}{150}$. If a respondent gave the same pattern of answer on the first and later three items, her value of α and β would be the same. Among all respondents, the correlation between α and β is high ($r = 0.767$).

After the transformation, we can compare respondents' level of patience among the three groups. Figure 4 shows the distribution of the respondents' present-bias and long-term discounting factor in the Control Group and Treatment Group A and B. The dot is the mean value, while the errorbars indicate plus or minus one standard error. Compared to those in the Control Group, respondents who were framed with the "live-to" items are slightly much patient, and those who were framed with the "die-at" items are slightly less patient. The difference between the "live-to" and "die-at" group are significant in both α and β measures based on two-tail t-test: $p = 0.07$ for α and $p = 0.10$ for β .

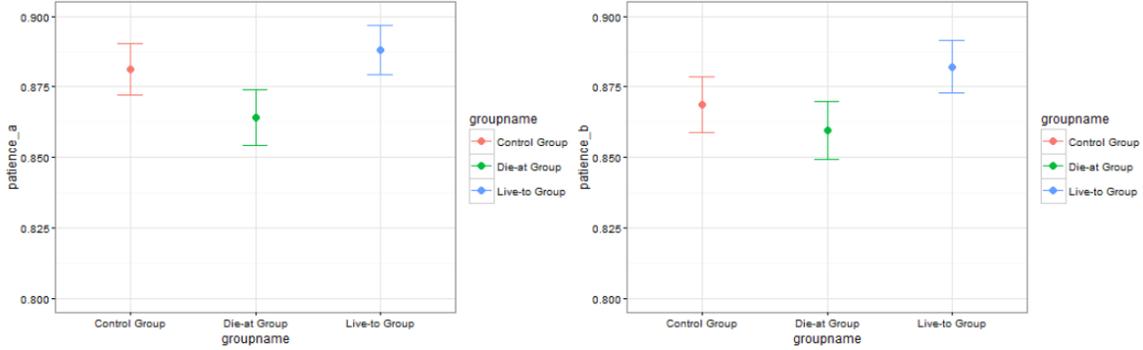


Figure 5: Distribution of the respondents' discounting factor in different groups

To sum up, Payne et al. (2013)'s two treatments on life expectancy are successfully replicated in this study. Besides, the "live-to" and "die-at" treatments indeed make people to temporarily increase and decrease their level of patience, respectively, which are verified through the widely-used discounting factor measurements. Since the respondents' patience is manipulated by the treatments, the next step is to examine if people will change their voting intention after the treatments.

Testing the Direct Linkage between Patience and Turnout

In the above three subsections, the random assignment process is confirmed, and the two treatments can successfully change people's level of patience in both directions. The "Live-to" and "Die-at" treatments are then used to examine the causal relationship between patience and turnout.

To simply illustrate the average treatment effect, Figure 6 shows the distribution of subjects' voting intention in the Control and the two treatment groups, respectively. The dot is the average in each group, while the errorbars show a range of the plus or minus one standard error.

Surprisingly, the two treatments *both have negative impact* on the MTurk subjects' voting intention. In this figure, the difference between the Control Group and "Live-to" is signifi-

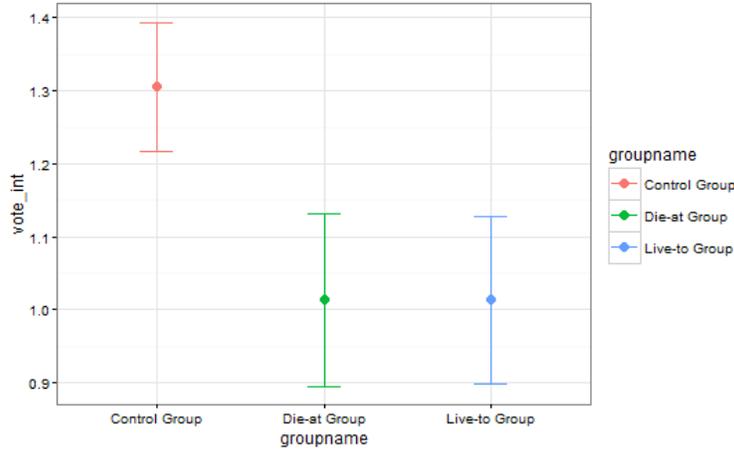


Figure 6: MTurk subjects' voting intention in the control and two treatment groups

cantly negative ($p = 0.044$), and the Control Group and "Die-at" is also significantly negative ($p = 0.049$). In other words, no matter when a subject temporarily *increases or decreases* her level of patience, she will be less likely to vote in average. This result is inconsistent with H_1 , and fails to establish a direct causal story linking patience and turnout.

Patience is Moderated by the Political Opportunity Structure

Why did subjects in the "Live-to" group also decreased their willingness to vote? The political opportunity structure story suggested by the analysis of CCES 2014 implies that many subjects in the "Live-to" group may fail to see the difference between the two major parties, or the difference between them is not large enough. In other words, the effect of manipulating patience is *heterogeneous* among different kind of voters owing to the perceived ideological difference among options on the ballot.⁶

In Table 3, four regression models are applied to further examine the impact of the two patience treatments on voting intention and to explore the potential heterogeneous effect, controlling for other confounding variables. In this table, the first, second, and third

⁶A recent study also uses experiments to explore the heterogeneous effect of self-control for people with diverse backgrounds. See Hoel, Schwab and Hoddinott (2016).

model suggests that the two treatments, which increases and decreases subject’s patience respectively, in average, both *have a negative impact on the voting intention*. The negative impact remains significant after the perceived ideological difference and a series of personal background variables are taken into account. If the influence of the ”Die-at” treatment fits the theoretical prediction between patience and turnout, the impact of the ”Live-to” treatment is abysmal.

Table 3: Patience manipulation, Perceived Ideological Difference, and Voting Intention

	<i>Dependent variable: Likely to vote -2 to +2</i>			
	vote_int			
	(1)	(2)	(3)	(4)
”Die-at” Group	-0.292*	-0.319**	-0.317**	-0.307**
	(0.152)	(0.145)	(0.144)	(0.144)
”Live-to” Group	-0.292*	-0.290**	-0.312**	-0.299**
	(0.152)	(0.145)	(0.144)	(0.144)
Pcvd. Diff.		0.014***	0.013***	0.009**
		(0.002)	(0.002)	(0.004)
”Die-at” × Pcvd. Diff.				0.003
				(0.005)
”Live-to” × Pcvd. Diff.				0.009*
				(0.005)
Age, Gender, Education, Race, Party ID			YES	YES
Observations	455	450	446	446
R ²	0.011	0.089	0.137	0.143
Adjusted R ²	0.006	0.083	0.121	0.124
F Statistic	2.475*	14.611***	8.653***	7.279***

Note:

*p<0.1; **p<0.05; ***p<0.01

In the second and third model, the subject’s perceived ideological difference between the two major parties play an independent and strong impact on the voting intention. The comparison between the first and the second model indicates that the perceived ideological difference itself can account for a big proportion of variance on explaining the voting

intention. In short, the political opportunity structure matters.

In the fourth model, we further examine the heterogeneous effect of the two treatments on the subjects with various perceived political opportunity structures. Indeed, model 4 in Table 3 provides some evidence for supporting the heterogeneous effect hypothesis. In the last column, the interaction between the "Live-to" treatment and perceived ideological difference significantly increases the subject's willingness to vote. In the most extreme scenario, if a voter perceived the ideological difference between the two parties is the maximum value 100, the effect of the "Live-to" treatment to that voter would be $-0.299 + 0.009 \times 100 = +0.6$ then the same voter in the Control Group, which the voting intention is *increased*. However, opposite effect does not exist in the interaction between "Die-at" treatment and perceived difference.

Besides, it is worth noticing that the patience and perceived ideological difference are not correlated with each other. Based on the responses in the Control Group, the correlation between present bias α and perceive difference is -0.09 ($p = 0.265, n = 152$), and with long-term discounting factor β is -0.12 ($p = 0.138$). The zero correlation rules out the possibility that the interaction effect between the two patience treatments and perceived ideology comes from the higher order confounding effects (for example, the belief that people with higher level of patience are much likely to see the difference between the parties.)

To illustrate the relation among the patience, political opportunity structure, and voting intention, Figure 7 shows the simulation result generated from the model 4 in Table 3. The x-axis is voter's perceived ideological difference between the two parties, while the y-axis is the simulated level of voting intention. The solid and dash lines are the predicted value of voting intention, while the shaded area is a plus and minus one standard error. The variance-covariance matrix of model 4 is used to generate 500 sets of the regression coefficient randomly. The 500 sets are then used to simulate the predicted voting intention given different level of perceived ideological difference and experimental group assignment,

controlling all other variables as the mean value.

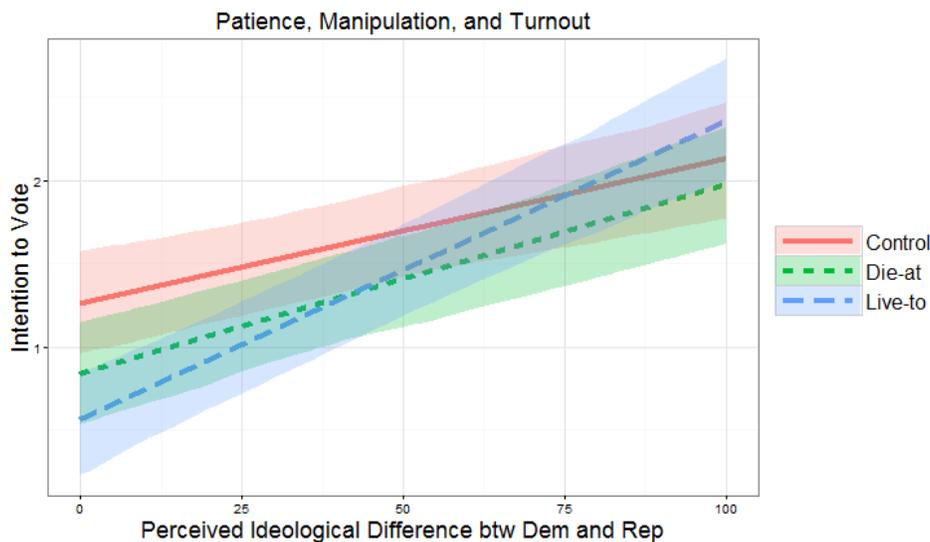


Figure 7: Both treatments reduce the intention to vote among the indifference voters

In Figure 7, for the "Live-to" group, subjects who are indifferent between the parties, increasing their patience will significantly lower their willingness to vote. Meanwhile, subjects who perceived the huge difference between different election outcomes, increasing patience will also enhance their voting intention. Thus, the moderating effect of political opportunity structure on linking patience to turnout is supported by the subjects in the "Live-to" group, which is consistent with H_4 . Among the MTurk subjects used in this study, the median of perceived ideological difference is 42, while the 75% percentile is 64. The distribution may be the reason why the average treatment effect of the "Live-to" group is negative: their perceived ideological difference between the two major parties is not large enough, so they decrease their voting intention. However, the opposite pattern is not found in the "Die-at" group. Subjects who are treated to be impatient are less likely to vote, regardless of the perceived ideological difference. The survey experiment provides more nuances to be studied in the future.

Additional Evidence

In the simulation of Figure 1, the self-report turnout rate among the impatient voters is about 80% regardless of the perceived ideological structure. If patience makes people to see the future policy change and motivates people to vote now, what is the motivation for impatient voters to go to the booth?

Following the rational calculation, one possible explanation is that the cost of voting might be smaller among those impatient voters; therefore, the immediate cost is endurable. To test this hypothesis, I again exploit the CCES 2014 dataset. All respondents are categorized into four groups based on the binary-coded patience/impatience \times voters/non-voters. In CCES 2014, there are two items that ask respondents about the cost of voting: the length of waiting in line and the same-day registration. Result shows that "impatient-voters" are much likely to register on the Election Day (23.5%) compared with those "patient-voters" (7.14%). However, there is no evidence that impatient-voters spent less time on waiting in line than the patient ones. To sum up, the argument on the cost side of calculus of voting is partially supported.

Another possible explanation for the impatient-voters is that they wanted to punish the incumbent by their votes. Hence, their expected outcome will be announced right after the Election Day and need not waiting longer. To test this hypothesis, I use the respondent's job approval attitude toward their House representative in the district as well as the President Obama in 2014. However, there is no evidence that impatient-voters viewed their House representative much negatively than the patient-voters (59.8% and 58.0%, respectively), nor was there difference on the attitude toward the President (with approval rate 41.9% for impatient-voters and 41.2% for patient-voters). Unfortunately, CCES 2014 dataset may not be enough to examine the relationship between punishing incumbents and impatient voting. Future work may focus on why impatient voters also have a certain level of turnout.

Conclusion

Based on the analysis of representative survey and newly-designed survey experiment, this article extends previous understanding linking patience and turnout. In CCES 2014, I provide evidence that patient voters are much likely to vote only if they perceived enough ideological difference between the candidates in the 2014 House Election. In the survey experiment, increasing a subject's level of patience would instead decrease her willingness to vote if she sees no difference between the two major parties in the 2016 Presidential Election. Additional evidence also shows that impatient voters are much likely to register on the Election Day, an indicator of lowering the cost of voting. In short, patience is a political virtue not simply because it increases turnout as is described by previous studies (Fowler and Kam, 2006), but because it increases people's responsiveness to the changing political opportunity structure.

If the effect of patience on the turnout is contingent, should we still regard patience as a political virtue and try to increase the level of patience among the citizens? The results shown in Figure 1 and 7 would give a positive answer. In the two figures, a voter may decrease her voting intention when she became impatient, while whether she increases voting intention after being much patient depends on the perceived ideological difference. In other words, if we can successfully increase the level of patience among all citizens, they will be more responsive to the given political context. This responsiveness would motivate parties and politicians to strategically position themselves and provide distinguishable policy manifesto, which would benefit the overall function of democracy.

Besides, the experimental result revokes the argument considering patience as an instrumental variable. Existing studies linking patience and personal behaviors (e.g. Chabris et al., 2008; de Ridder et al., 2012; Hardisty et al., 2013) usually make a strong assumption of what life goal people ought to achieve, such as safe driving, quitting smoking, and good academic

performance. However, this article questions whether people indeed perceived improved outcome in the future if they changed their immediate decisions. After all, self-control is a goal-oriented exercise (Latham and Locke, 1991).

In the end, this article proposes an easy-to-implement treatment on manipulating patience in both directions. Even though the magnitude of the manipulation is not big, the two treatments still bring out unignorable effect on the MTurk subjects' voting intention before the 2016 Presidential Election. A similar procedure can be implemented to explore the relationship between patience and other decisions and behaviors. Future work may focus on the strength and robustness of this treatment.

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