# Does Voting Context Lead You to Deeper and More Balanced Information Search?

– Candidate Selection Experiment with Eye-tracking and Mouse-tracking Methods –

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## 1 Introduction

Voter's information processing during candidate selection process in election has been one of the substantial interests in the study of political behavior. To understand the competence of ordinal people's votes in election, it is important to understand how ordinal people acquire information while they are making decisions. In particular, several studies start to utilize the research design to track the information seeking behavior through mock-election experiment (e.g., Lau and Redlawsk 2006). Here, experimental design makes it possible for researchers to make direct observation of decision-making process of voters.

On the other hand, the critical weakness of experimental design is its low external validity. Even when one finds something significant in the experiments, it is often difficult to generalize the findings to real world. Here, the question is that how we can design experiments that produce more generalizable results. Motivated from the above external validity issue, we design simple candidate selection experiments to track information search process of participants. In the experiment, we exogenously assign two contextual treatment on the purpose of selection (i.e., voting and preference) and two different methods to capture information search (i.e., eye-tracking, and mouse-tracking) to ask following questions: a)How selection context and partisanship influence information search process for candidate selection? b) Does information search process differ across different methods to capture information search?

Following sections proceed as follows. In the next section, the relevant literatures to the research question of this study are reviewed. Then, in Section 3, the procedure of experiment is explained in detail.

*This is a collaborative project with Liu Ling at Waseda University, Japan.

The substantive analyses on the impact of selection context and partisanship on information search are conducted in Section 4 and 5. Section 6 explore further the potential difference between eye-tracking and mouse-tracking method to trace information search behavior. Section 7 concludes with the suggestions for future research.

## 2 Campaign Information Processing and Experiment: History and Theory

The substantial interest in this study is to introduce and assess the new approach to capture the strategy of voting decision making process. In this section, first, previous experimental approaches to examine voting decision-making are briefly reviewed. Then, relevant theories to the hypotheses in this study are discussed. In particular, I review studies on electoral cycle of knowledge and selective exposure to the information. Lastly, it discusses the recent development in methodology to capture information processing, namely mouse-tracking and eye-tracking.

### 2.a Experimental Approach to Electoral Decision Making

"How people make voting decisions ? " is a classic question in the field of political behavior. Most of the past literature use the data from public opinion survey to give answers the question. Here, in the influential study of *The American Voter* 1960,Campbell et al. find that voting preference can be explained by three major psychological factors: party identity, candidate image, and issue preference. In Japan, similar model of voting preference is suggested (Miyake 1989, Miyake and Nishizawa 1992) and it is argued that the voting preference is explained by party support, candidate preference, and policy issue preference.

On the other hand, the above public opinion survey based study cannot examine the process of voting decision making. In other words, while they can reveal the correlational relationship between potential individual level explanatory variable and voting preference, they cannot examine how these factors are dynamically interacted during the process of election. Several studies tackle this problem by utilizing what is called "information board" experiment to trace the process of decision-making. Information board technology is initially invented in the context of consumer choice of products. In this experiment, researchers present information to participants in the form of two-dimensional table; one dimension represents the choice of products and another dimension represents the attribute of products. In the initial experiment on apartment selection (Payne 1976), information board is physically constructed as the set of envelops attached to a board, with information card in each envelop. Participants can choose to read whatever information card they want during the information search process (they can only open and read the information card one at a time) and make the decision after they finished with the search; researchers record the time and location of the search.

There are several attempts to apply information board technology to the experiment of political context. First, Herstein (1981) present the participants in his experiment 45 information items about two candidates in simulated presidential elections. He finds that participants access more information when two candidates are ideologically close to each other (i.e. two centrist candidates) than when two candidates are ideologically distant (i.e. strong liberal and strong conservative candidates). He also finds that participants conduct more intra-item search than intra-candidate search. Second, Lau and Redlawsk (2006) made significant advancement to the initial design. Given the recent technological advancement, they construct the computer-based information board of mock-presidential election, where participants in the experiment can search for information by clicking on the information cell on computer screen[1]. They find the systematic variation in information search strategies taken by participants, depending on socio-economic status, the level of political sophistication, and election environment (i.e., number of candidates, ideological difference of candidates).

Given the above recent advancement in process-tracing experiment during mock-elections, there are issues remained to be resolved. In this study, I focus on two of them. First, the above studies assume the context of voting, and do not consider the other context of candidate evaluation. Here, election is not the only time people form evaluation to the politicians, and the context may matter. Second, previous studies measure information search in un-realistic way. Here, capturing information search by information card or mouse-clicking imposes un-realistic extra procedure for individuals to access information. In reality, for example, voters may look thorough the campaign pamphlet without paying extra cost to put out card from the envelop or click to open new window. In the following two sections, I briefly discuss how these issues are approached in my research, and overview the relevant literature.

## 2.b Context and Information Process

The context of selection may change the strategy of decision-making. For example, using survey experiment in Japan, Shimizu and Endo (2013) finds that the characteristics of selection in Stag-Hunt Game changes across economic context (neutral money transaction) and political context (money transaction through pension system). Given this simple motivation, this study gives two decision-making contexts to the selection of politician: preference and voting. The following part describes the theoretical reasons why and how information search processes differ across selection contexts.

First, I expect that *voting context leads to deeper information search than preference context* (H1a), because voting is more serious context of selection than being just asked for the preference. Here, Baumeister and Newman (1994) suggests that, under accuracy induced condition, people are expected to conduct extensive information search and attempts to avoid adjust the bias in their decision making. On the other hand, under the context without accuracy inducement, people may selectively pay attention to the given information and adjust their decisions along with their pre-formed preference (Table 1, 6). Similarly, in observational study, researchers find *the electoral cycle of knowledge*; people tend to possess higher level of political knowledge immediately following election than other times (Andersen, Tilley and Heath 2005).

Second, I expect that *voting context leads to more balanced (less selective) information search than preference context* (H1b). As in previous paragraph, Baumeister and Newman (1994) claims that people conduct deeper information search under accuracy goal, because they want to avoid biased choice. Here, The selective information process, including selective attention, is widely discussed in the political communication literature. In particular, Klapper (1960) argues that people selectively expose, perceive and retain information according to their pre-dispositions. He suggests that, by this selective information process, people protect and strengthen their previous pre-dispositions. Severin and Tankard (1992) develop the concept by calling it as "four rings of defences" (64). They argue that there are four selective processes – selective exposure, selective attention, selection perception and selective retention – which function in this order as to defend one's pre-dispositions from new information. Selective exposure is the first selective process at work, and when each outer ring fails, it is argued that the next ring starts to function (e.g. when selective attention fails, selective perception starts to work) (65). The above selective processes are expected to function more strongly under preference context, since people are not provided with accuracy goals.

On the other hand, I expect that contextual impact will be conditioned by the partisanship status of people. Here, *partisans are expected to conduct no-deeper and no-more-balanced information search in voting context than in preference context* (H2a, H2b). Given that they have strong predispositions in the preference of party, partisans do not need to search more information reach their decisions under the voting context. This expectation is supported by many empirical studies which show that partisanship is the single most effective factor to explain voting decisions (e.g., Campbell et al. 1960, Converse 2006, Miyake and

Nishizawa 1992).

From the above, on contextual treatment, I expect deeper and less selective information processes to be at function for voting context, compare to preference context, but context only matters among non-partisans, and not among partisans.

### 2.c Methodology to Capture Information Search: Mouse-Tracking and Eye-Tracking

Considering potentially un-realistic setting of information search in the previous studies, this study utilizes two types of information search method – mouse-tracking and eye-tracking – for otherwise identical information board. In the previous experiments of mock-election, participants physically open an envelop one by one or click and open windows in computer to search for the information Lau and Redlawsk (2006). Our mouse-tracking experiment utilize the similar method as those studies, as each information are hidden and participants can only search information one by one. In eye-tracking setting, however, all the information windows are kept open, and instead of mouse-clicking, the special device is used to track the eye-ball movement of participants to capture information behavior. Here, eye-tracking eliminates "clicking" from the information search, provides more "realistic" setting of information search compare to mouse-tracking setting.

There are very few studies that compare the difference between eye-tracking and mouse-tracking method to capture information search behavior. In one from behavioral economics, Kang, Imai and Camerer (2015) conduct choice experiment to test whether information search measure (attention measured by mouse-tracking and eye-tracking) improve the prediction of buying the product or not. They find the improvement in mouse-tracking setting, while the improvement is not evident in eye-tracking setting. They assess the results by saying "[w]e speculate that mouse movement is more effortful and deliberative than eye saccades" (27). It implies that, given the high cost of search[2], participants may be committed to more intentional information search in mouse-tracking setting than in eye-tracking setting.

The difference between eye-tracking and mouse-tracking setting is still unclear, but given the recent rise in the use of eye-tracking in experiments, it is important to understand the difference between methods. Thus the analysis in this study provide exploratory and preliminary results for the search method difference.

## 3 Candidate Selection Experiment Design

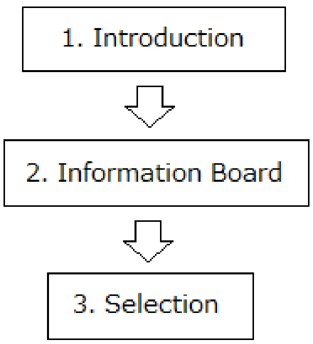


Figure 1: Experiment Structure

To answer our research questions, we design the simple three-slides candidate selection experiment. Two web-survey experiments in computer lab are conducted in March and July 2015. March experiments involve 47 participants[3] and July experiment involves 78 participants, both recruited from students at Waseda University, Japan. The main part of the experiment is consisted from three pages of web-survey screen[4]. The general procedure is described in Figure 1. In first page, we provide participants with the general instruction of the experiment. In second page, participants are provided with information board of two politicians, which imitates the design of an election bulletin, and given the opportunity to search for the information of each politician. Then, in the third page, participants choose one of the politicians.

In the main treatment in our experiment, we randomly assign one of the two contexts of politician selection. In one context, participants are asked to choose the politician to vote for in elections, and in another context, they are asked to select the politician that they prefer. Specifically, we have two different instructions in the first page, as follows (English translation of original Japanese text. Bold and underline are applied in the real experiment too):

> *Preference Context*: From now, we show information about two politicians. (If you click on the headline, you can read the specific contents of information.[5]) After looking at the information, we will ask you to select **the person that you prefer**. When you finished to read the necessary information, click "next page" button and proceed to the next page.

> *Voting Context*: From now, we show information about two politicians. Two are intending to run for House of Representative election from Tokyo. (If you click on the headline, you can read the specific contents of information.[6]) After looking at the information, we will ask you to select **the person that you want to vote for**. When you finished to read the necessary information, click "next page" button and proceed to the next page.

Another critical treatment in the experiment is the method of information search. In the second page, we utilize two methods to capture the information seeking behavior of participants: mouse-tracking (March

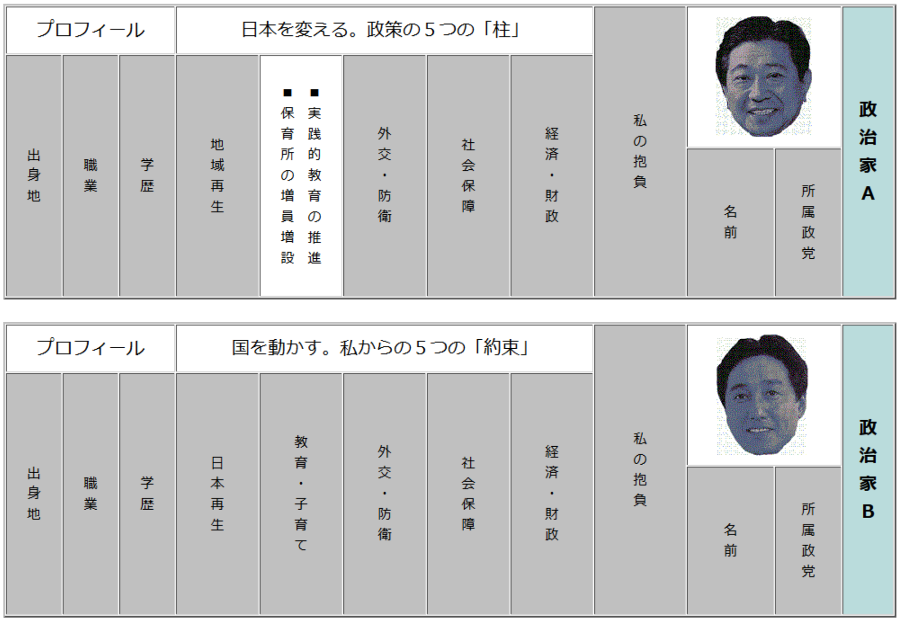


Figure 2: Mouse-Tracking Information Board

2015 experiment) and eye-tracking (July 2015 experiment). Here, the example screen for mouse-tracking is shown in Figure 2. Each gray area (total of 11 for each politician) involves headline that provides the general category of the contents, including party affiliation, name, policy preferences, educational background, occupational status, and home town. Participants can only click one area at a time to open and read the information, and we record the time they open each window to capture the information search (the window closes after one moves on to the next information, therefore one can only look at information one at a time). The example screen of eye-tracking is shown in Figure 3. The layout here is identical to the one in mouse-tracking, but now all information areas are already opened. Instead of click, we use eye-tracking device[7] to record the time participants are looking at each information category.

At the end of all experiments – after the main politician selection experiment, participants continue to answer unrelated set of different experiments – participants are asked two questions about the politician selection that they made (approximately 10 minutes ago). First, they are asked if they remember any information about the politicians. Second, they are asked to evaluate the preference toward each information category by 1-100 scale, 100 means they completely like it and 1 means they do not like it at all. (Those two measures are not used in the current analysis, but may be utilized for the later purpose.) Participants are also asked with whether they have a supporting party or not, and whether they have a party that they never


Figure 3: Eye-Tracking Information Board

support, in post-experiment questionnaire.

In the following two sections, I conduct analyses. Each section corresponds to hypotheses regarding *depth* and *balance* of information search.

## 4 Analysis 1: Search Depth

### 4.a Data and Method

In this section, I will test hypothesis H1a and H2a. It expects that participants of the experiment search information deeper in voting context than in preference context, but the contextual impact is only significant among non-partisans, not among partisans.

To test the hypothesis, I measure the search depth in *information category* level. The data is constructed as the pooled dataset of information category[8], so the case number is (22 information categories * number of participants) for each of mouse-tracking and eye-tracking experiment.

There are two measurements of search depth. First, *search time depth* indicates the total amount of time one devotes (by opening or looking) to each information category. It ranges from 0 seconds (not searching at all) to 45 seconds. Figure 4 shows the Kaplan-Meier plot of the average search time depth for each information category[9]. It shows that participants generally search for longer time (in each information category) in mouse tracking than in eye-tracking. Also, it can be seen that most of information categories are stopped to be looked (dead) before 15 seconds. Given the time nature of this variable, the analysis with this variable is conducted by Cox proportional hazard method.

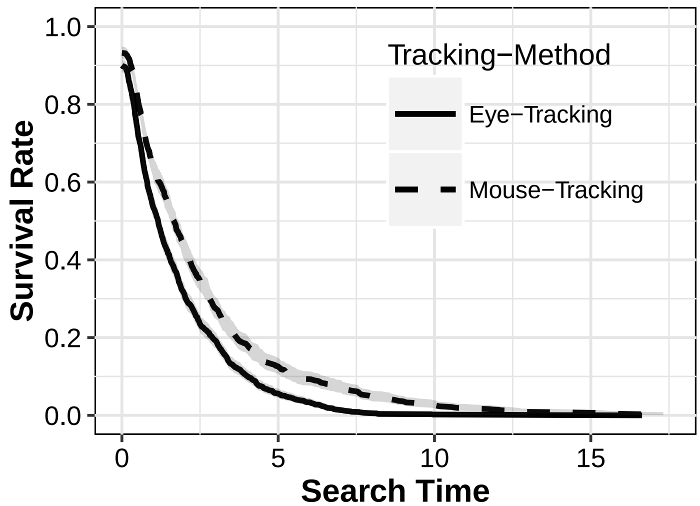


Figure 4: Kaplan-Meier Plot of Searth Time Depth by Searching Method (The Gray Area Indicates 95% Confidence Interval)

The second measure of search depth is *repeated search*. It originally comes from the search count depth of each category, which indicates how many time one search for each category. Givent the this distribution is not exactly looks like a count distribution (there are not much large N visit to any of the information category), I decide to use the dichotomous variable to capture search count depth. In repeated search measurement, all those information categories searched more than two times are coded as 1, and those categories searched only once are coded as 0[10]. The distribution of repeated search is presented in Figure 5. It can be seen that one is more likely to search each information category repeatedly in eye-tracking search than in mouse-tracking search. Given the dichotomous nature of the variable, the analysis with this variable is conducted as logistic regression.

The final model of is formally presented as follows. First, the independent variables $\beta$ are defined as *selection context* (voting = 1, preference=0), *partisanship* (partisan=1, non-partisan=0)[11], and interaction variable of selection context and partisanship, and fixed effect of each information categories. The Cox

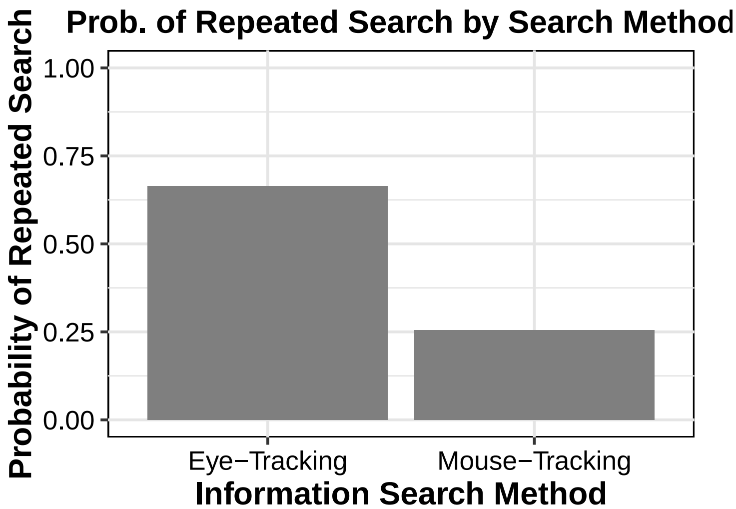


Figure 5: Probability of Repeated Search by Searching Method

Model is defined as follows:

$$Pr(t_j = T_i | R(t_i)) = \frac{e^{\beta' x_i}}{\Sigma_{j \in R(t_i)} e^{\beta' x_j}} \tag{1}$$

It shows the probability of stop searching at time $T_i$ for information category (of particular one participant) $j$, given that $R(t_i)$ is the number of cases at risk of experiencing search stop at time $i$. Simply stated, the equation calculates the *survival rate* of information search for each given time.

Logistic regression model is similarly defined as follows.

$$Pr(\text{Repeated Search}_j) = \Lambda(X_j \beta) \tag{2}$$

It calculates the predicted probability of repeated search of information category (of particular participant) $j$.

Table 1: Selection Context and Partisanship Influence on Search Time Depth (Cox PH Model)

| | Eye-Track | Mouse-Track |
|---|---|---|
| Context (Voting) | $-0.471$ $(0.272)^{\dagger}$ | $-0.166$ $(0.268)$ |
| Partisan | $-0.127$ $(0.260)$ | $0.029$ $(0.251)$ |
| Voting * Partisan | $0.335$ $(0.331)$ | $0.567$ $(0.340)^{\dagger}$ |
| AIC | 17273.655 | 11391.375 |
| $R^2$ | 0.238 | 0.293 |
| Max. $R^2$ | 1.000 | 1.000 |
| Num. events | 1408 | 990 |
| Num. obs. | 1408 | 990 |

$^{*}p < 0.05$, $^{\dagger}p < 0.1$. Clustered Standard Error in Parentheses.

Information Category Fixed Effects Omitted from the table.

## 4.b Result

***Search Time Depth***. The result for the search time depth analysis is presented in Table 1. Here, the positive coefficient means to increase the rate of death (search stop) at each time point, thus it means shorter search time. The negative coefficient means to decrease the rate of death (search stop) at each time point, thus it means longer search time. First, the context variable shows the coefficients of expected directions. Especially in eye-tracking setting, the negative direction of coefficients is marginally significant ($.05 < p < .10$). Given that the variable is interacted with partisanship, the base term coefficient of context variable shows the contextual impact among non-partisans. Thus, the coefficients mean that, for non-partisans, voting context leads to deeper search (longer search time) than preference context (especially in eye-tracking setting).

Second, the interaction variable of context and partisan show positive coefficients. This means that for partisans, the negative contextual impact cancels out and disappears. In eye-tracking context, it functions as to cancels out the contextual impact (-0.471+0.335=-0.136) and context plays no role among partisans ($p > .10$). In mouse tracking context, the direction of coefficient is the same, but the interaction impact is so large that it actually reverse the relationship (-0.166+0.567=0.401). Here, among partisans, voting context leads to *shorter* search time than preference context ($p < .10$).

The graphic representation of the result is shown in Figure 6. It shows the predicted averaged survival rate of each information category given each time points, with corresponding 95% confidence intervals. First, the upper half of the figure shows that, for non-partisans, voting context leads to slightly longer search

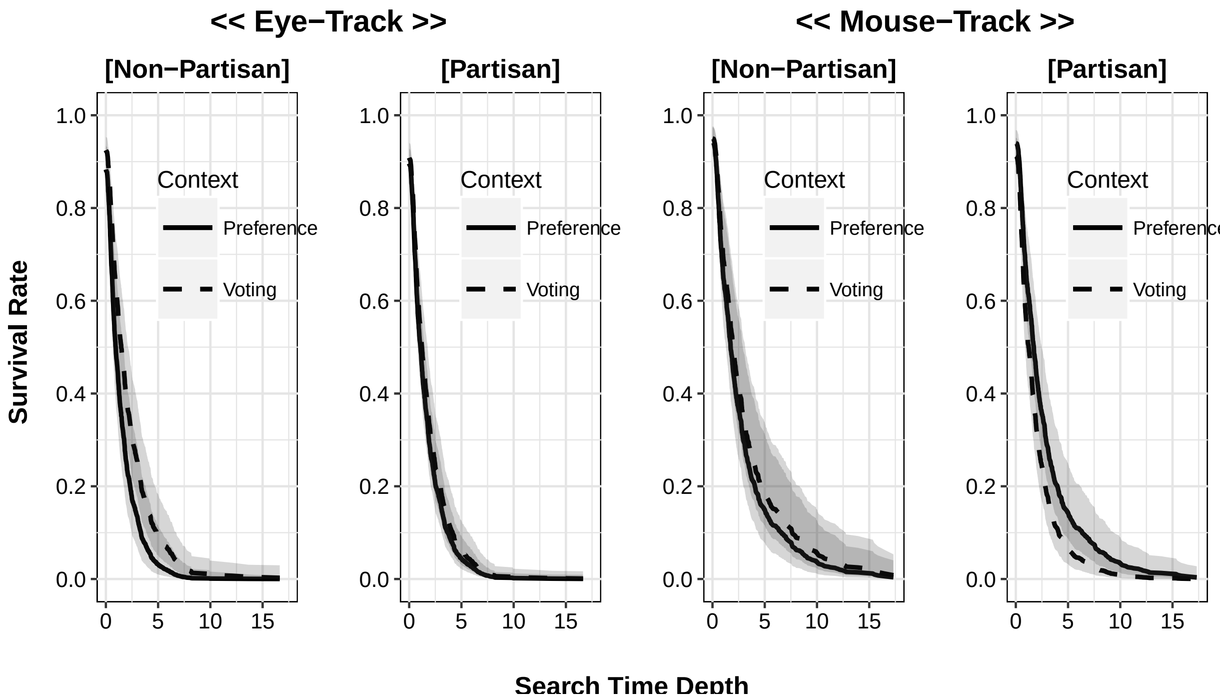


Figure 6: Simulated Average Survival Rate of Information Category Search Time by Selection Context and Partisanship (Gray Areas Indicate 95% Confidence Interval)

time (less steeper curve) than preference context. The tendency is particularly prevalent under eye-tracking setting, and lesser extent in mouse-tracking setting. The lower half of the figure shows that for partisans, the contextual impact disappears (eye-tracking) or even reverse (mouse-tracking).

***Repeated Search***. The result from logistic regression is shown in Table 2. It shows the expected direction of coefficients: Voting context increases the likelihood of repeated search, and interaction with partisanship function as to cancel out the contextual impact. The tendency is the same across eye- and mouse-tracking, but the impact is statistically significant ($p < .05$) only under eye-tracking setting.

The simulated probabilities of repeated search are presented in Figure 7. It clearly shows that, among non-partisans, there are higher likelihood of repeated search under voting context compare to preference context. But among partisans, the contextual impact disappears.

In sum, H1a and H2a are confirmed. Non-partisans do search deeper in voting context than in preference context, but partisans search no deeper or even shorter in voting context than in preference context.

Table 2: Selection Context and Partisanship Influence on Repeated Search (Logit)

| | Eye-Track | Mouse-Track |
|---|---|---|
| (Intercept) | 0.345 (0.365) | $-1.250$ (0.509)$^{*}$ |
| Context (Voting) | 0.929 (0.464)$^{*}$ | 0.316 (0.511) |
| Partisan | 0.278 (0.321) | $-0.323$ (0.450) |
| Voting * Partisan | $-1.151$ (0.537)$^{*}$ | $-0.671$ (0.621) |
| AIC | 1535.354 | 1035.091 |
| Log Likelihood | $-742.677$ | $-492.546$ |
| Num. obs. | 1268 | 923 |

$^{*}p < 0.05$, $^{\dagger}p < 0.1$. Clustered Standard Error in Parentheses.

Information Category Fixed Effects Omitted from the table.

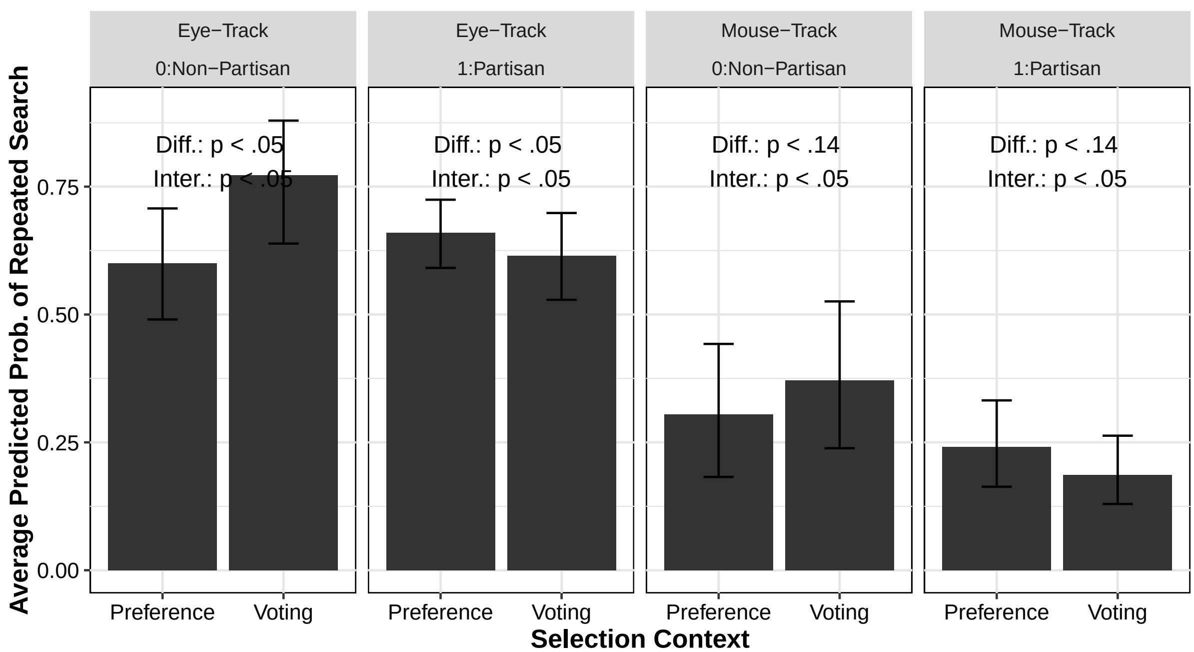


Figure 7: Simulated Average Predicted Probability of Information Category Repeated Search by Selection Context and Partisanship (Error Bars Indicate 95% Confidence Interval)

## 5 Analysis 2: Search Balance

### 5.a Data and Method

In this section, I will test hypothesis H1b and H2b. It expects that participants of the experiment search information more balanced in voting context than in preference context, but the contextual impact is only significant among non-partisans, not among partisans.

To test the hypothesis, I measure the search balance in *individual* level. In contrast to the previous section, the data is constructed as rows representing each participant[12], so the case number is equal to the number of participants in each of mouse-tracking and eye-tracking experiment.

There are two measurements of search balance. First, *search time balance* is calculated by the following equation: (Search time for more searched candidate) - (Search time for less searched candidate). This is an non-directional measure. It just indicates that how many seconds more a participant search for one candidate more than other candidate. For example, if the score is 5, then it means the one is search one candidate 5 seconds more than the other candidate. Higher the score, more unbalanced the search is. The score ranges from 0.062 to 66.8, with the median of 4.83. Giving the time nature of the variable, the analysis with this variable is again estimated by the Cox PH model.

Second, *search count balance* is calculated by the identical equation as the search time balance. It indicates that how many times more one visited the information of one candidate compare to another candidate, and the score ranges from 0 through 24, with the median of 4. With the count nature of the variable, and given the over-dispersion, I use negative binomial regression model to estimate the result.

For the estimation, I use the identical variables as in the previous section, but given that the dataset i no longer pooled, it is without information category fixed effects.

### 5.b Result

***Search Time Balance***. The result for the search time balance analysis is presented in Table 3. Here, the positive coefficient means to increase the rate of death (search no longer) at each time point, thus it means less unbalanced search time. The negative coefficient means to decrease the rate of death (search no longer) at each time point, thus it means more unbalanced search time. To explain the result, the context variable shows significance only under eye-tracking setting, and has the coefficient that is opposite of expected direction: Search time is more unbalanced under the context of voting than preference ($p < .05$). The interaction variable coefficient shows that this reversed contextual impact is slightly cancelled out among partisans, but the interaction variable is not statistically significant ($p > .10$).

The visual representation of the result is shown in Figure 8. It shows that, under eye-tracking setting, non-partisans search information more unbalanced in voting context than in preference context. This contex-

Table 3: Selection Context and Partisanship Influence on Search Time Balance (Cox PH Model)

| | Eye-Track | Mouse-Track |
|---|---|---|
| voting | $-1.002\ (0.440)^{*}$ | $-0.104\ (0.525)$ |
| psup | $-0.342\ (0.363)$ | $0.088\ (0.476)$ |
| voting:psup | $0.442\ (0.539)$ | $-0.143\ (0.654)$ |
| AIC | 408.683 | 256.183 |
| $R^2$ | 0.113 | 0.010 |
| Max. $R^2$ | 0.998 | 0.997 |
| Num. events | 64 | 44 |
| Num. obs. | 64 | 44 |

$^{*}p < 0.05$, $^{\dagger}p < 0.1$ Standard errors in parentheses.

tual impact is slightly weakened but still persists among partisans. On the other hand, under mouse tracking setting, context and partisanship play no role to influence search time balance.

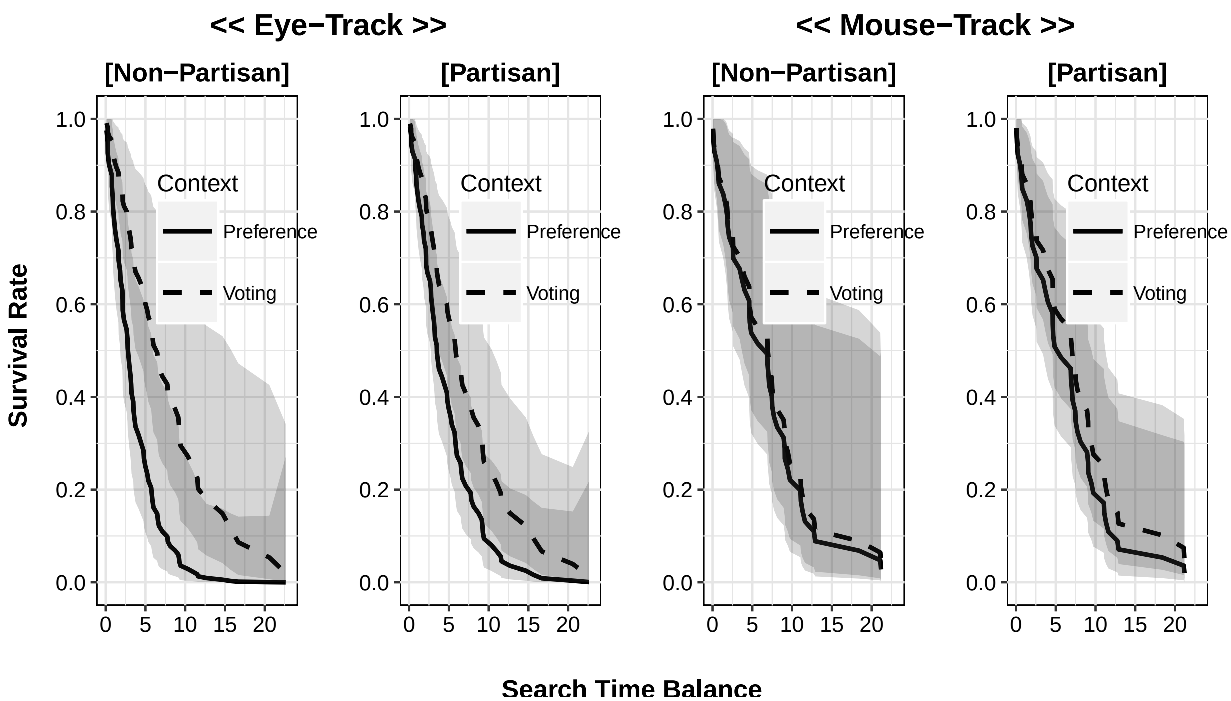


Figure 8: Simulated Average Survival Rate of Information Category Search Time Balance by Selection Context and Partisanship (Gray Areas Indicate 95% Confidence Interval)

***Search Count Balance.*** The result for search count balance analysis is presented in Table 4. In the initial assessment using Poisson analysis, the over-dispersion parameter for both models for eye- (5.180) and

Table 4: Selection Context and Partisanship Influence on Search Count Balance (Negative Binomial Model)

| | Eye-Track | Mouse-Track |
|---|---|---|
| (Intercept) | 1.969 (0.249)$^{*}$ | 1.012 (0.278)$^{*}$ |
| voting | 0.099 (0.358) | 0.205 (0.382) |
| psup | −0.094 (0.308) | −0.432 (0.368) |
| voting:psup | 0.126 (0.449) | −0.056 (0.506) |
| AIC | 395.899 | 180.309 |
| Log Likelihood | −192.949 | −85.154 |
| Dispersion | 0.964 | 0.973 |
| Num. obs. | 64 | 44 |

$^{*}p < 0.05$, $^{\dagger}p < 0.1$

mouse-tracking (1.560) was significantly exceeding 1. Given this preliminary result, I decided to use negative binomial regression to estimate the final result. The result shows that the over-dispersion issue is resolved, with the dispersion parameters of 0.964 and 0.973. Looking at the coefficients, however, no variables come out to be statistically significant at $p < .10$ level. Context and partisanship has no significant impact on the search count balance.

In sum, H1b and H2b are not supported. One has a tendency to conduct more unbalanced search time in voting context than in preference context, and partisanship plays weak or no role. Also it should be noted that the impact is only observed among eye-tracked sample, and not in mouse-tracked sample. Search count balance is not affected by selection context or partisanship status.

## 6 Eye and Mouse Movement: Exploring Further Difference

Throughout the analysis, one interesting thing is observed: eye-tracking experiment produces more contextual difference than mouse-tracking experiment. It is at least clear that there are some qualitative difference between two methods. This section briefly discuss further the potential difference between two information search methods.

Alternative way of looking at the information search during voting decision making is from information contents. In our experiment, there are four types of information included in the information board: policy information (foreign policy, education policy, economic policy, welfare policy, local policy), summary goal, personal profile (prefecture of origin, education, previous occupation), party affiliation and candidate's name. Here it is important to assess which type of information is searched when and how much. Here, Figure 9 summarizes the information contents search patterns in experiments. In the figure, vertical axis shows a cumulative density of searched information contents, and x axis shows different stages of information search formulated as percentage. This means that it is a relative measure of search timing: At 0% each individual starts their search, and at 100% all individuals finish their search. Bottom half shows the density from eye-tracking setting, separated by selection context; the top half shows the parallels results from mouse-tracking setting.

By the closer look of the graph, two things are evident. First, there is a striking difference in the order of information content search between eye- and mouse-tracking. In eye-tracking setting, most of the participants first look at party identity or the name, then move on to other content of information. On the other hand in mouse-tracking setting, overwhelming majority of participants look at party affiliation and name at the very last stage of their information search. This is probably because, under mouse-tracking setting, information windows of party affiliation and name is located at the bottom left of the each candidate's information board, there fore participants may not bother clicking it at the early stage. Second, under both setting, participants do more likely to be exposed to party affiliation at the early stage in voting context than in preference context. This may shows the importance of selection context, but still, in mouse tracking setting, many participants check party affiliation at the last stage of their search.

The difference here may have significant implications toward the information search behavior in different search method setting. Mouse-tracking result shows that people may not short cut to the easy information when it is costly and complicated to acquire information. This would pose some concerns to the previous studies using mouse-tracking experiment. Because, by requiring click to acquire information, the search method itself may have systematic influence on the search patterns – thus different decision making process – of participants.

## 7 Conclusion

In summary, this study has two important implications. First, selection context and partisanship plays a significant role in the information search process during candidate selection. This result may imply that people – especially non-partisans – are conducting different types of information search during election and between-election time. In election context, people may search information more deeply, but potentially more

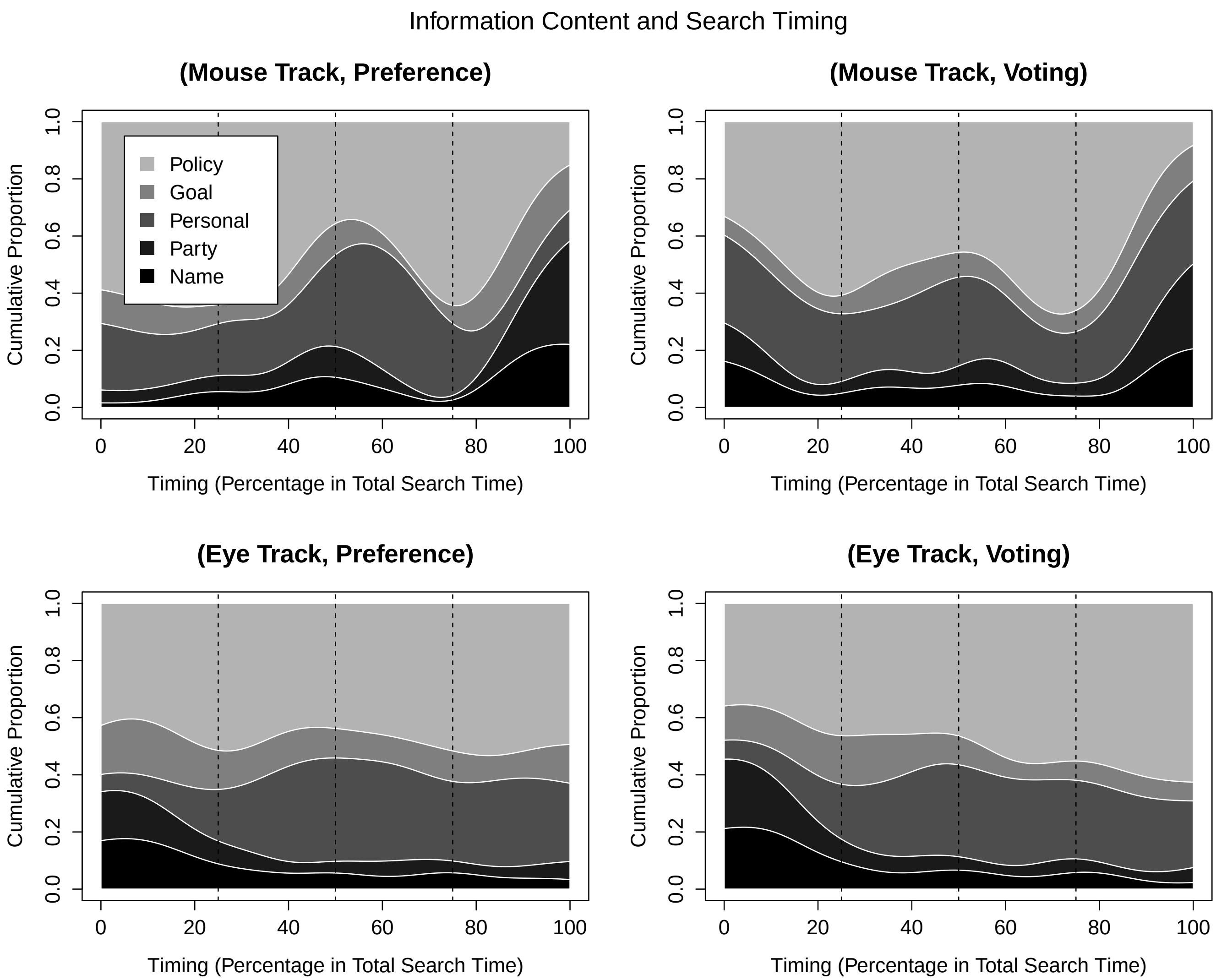


Figure 9: Information Content Search Pattern by Selection Context and Information Search Method

selectively than in between-election context of candidate preference. Second, there is a significant difference between the information search behavior under eye-tracking and mouse-tracking method of search. This implies that previous experimental studies which utilize mouse-tracking method, may involves systematic bias caused by the search method design itself. Use of eye-tracking may resolve these bias by avoiding extra cost of information acquisition and make information search one step closer to the reality.

We are planning to extend the analysis and revise the experiment in the future, and thinking about three possible directions. First, one can include selection result into the analysis. The substantive interest of information search in behavioral literature is that whether the searched information is going to influence the final selection decision or not. Bringing selection into the equation, the results may have more important implications to the voting decisions in real-world election. Second, one can explore different aspects of the information search (i.e., information content search pattern and order). It should enhance the understanding from the different perspective than the focus of this study (depth and balance). Third, one can revise the experimental design to manipulate the selection context within the context of election (i.e., number of candidates, ideological position) and focus more on the difference between eye- and mouse-tracking method of information search. This may provide a significant methodological contributions to the study of decision making process during election.

## Notes

[1]They also made the information board "dynamic," which means that available information on the computer screen changes over time.

[2]and due to the nature that participants are already paid to participate in experiment

[3]The original participants number is 94, but it cuts down to half because I included another treatment than selection context (i.e., whether to impose time-limit or not), this treatment does not occur in eye-tracking setting, so I only use no-time limit samples for the purpose of comparison.

[4]This experiment is conducted in combination with several other experiments. In terms of the order, it is conducted all other experiments that are conducted at the same time.

[5]this sentence is only included in the mouse tracking experiment.

[6]this sentence is only included in the mouse tracking experiment.

[7]We use "Tobii T60" from Tobii Technology as our tracking device.

[8]Following participants are excluded from analysis: For mouse track two participants with no record time at all (either by machine error or they never looked at any information) and one participants who had completely contradictory memory after (he remembers something that he never looked at). For eye-track, 13 participants who have less than 60% of eye movement catch rate (the machine could not reliable catch the eye movement) and one participants who fails to adjust the eye movement position at the beginning of the experiment. Therefore, the last participants cases for experiment became 44 for mouse-track and 64 for eye-track.

[9]I calculate Kaplan-Meier survival rate for each information category with 95% confidence interval and averaged them

[10]To simplify the understandings, those categories that are never searched are excluded from the analysis. The inclusion of this is one of the future task

[11]Partisan is defined as those who have either having supporting party as LDP or DPJ (which is the party for the candidates presented in the experiment) or having LDP or DPJ as the party they never voter for (unti-party).

[12]Following participants are excluded from analysis: For mouse track two participants with no record time at all (either by machine error or they never looked at any information) and one participants who had completely contradictory memory after (he remembers something that he never looked at). For eye-track, 13 participants who have less than 60% of eye movement catch rate

(the machine could not reliable catch the eye movement) and one participants who fails to adjust the eye movement position at the beginning of the experiment. Therefore, the last participants cases for experiment became 44 for mouse-track and 64 for eye-track.

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