Voting Fast and Voting Slow: A dynamic dual processes account of voter decision-making

by

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Abstract

This thesis builds on previous work in dual process theory. Dual process theory argues that decisions are made based on two systems: one that is fast and one that is automatic. Based on evidence from psychological research, I argue that contextual cues such as the way voting is framed and the information available to voters should affect the way these two systems are used. When voters have more developed affective feelings or are manipulated to feel as if vote choice is an affective decision, they should be less likely to engage in cognitive reasoning.

Using experimental and observational data from an experimental dataset, I demonstrate that the nature of online tallies (as proposed by Lodge, Stroh, and McGraw 1989) has a strong effect on how rational strategies are employed and that the framing of a decision as affective causes voters to make their vote choice more quickly.

This work contributes two main pieces to the literature. First, using a novel design to demonstrate the two processes acting concurrently adds weight to the generalizability of dual process theory as previous research has been criticized for its lack of realism. Second, it demonstrates that the dual processes are dynamic and their role in vote choice depends on contextual clues.
Lay Summary

This work provides a step towards understanding how voters make decisions. Previous work has found that voters know very little about politics and so much time has been devoted to understanding how they can still make good decisions. This thesis shows that unconscious factors can contribute to what strategies voters use to make decisions. In some cases, contextual clues and the information available to participants can cause them to either engage in more rational strategies or to prevent them from activating this effortful process. This is an important step towards understanding how votes should be understood in modern elections.
Preface

This work makes use of data collected by the UBC Public Opinion lab prior to my involvement with the work. I was responsible only for cleaning up the dataset and preparing a codebook. All analysis within this thesis is my own unpublished and original work.
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This thesis is dedicated to my brother Angus, for being there from day 1.
Chapter 1: Introduction

Research in voting behaviour has become increasingly consistent with psychological research. While early research tended to build on work in economics that assumed rational behaviour, the trend in the literature has shifted towards psychological principles. This has resulted in a shift in focus from early work that looked closely at what information voters use to decide, with the goal of predicting voting behaviour, towards work that looks at how decisions and opinions are formed. Part of the reason for this shift is the consensus that voters are generally poorly informed on most issues. In the United States, while many voters know the presidential candidates, few will be able to do more than recognize the names of the candidates running in House and Senate elections and even fewer will be able to describe their policies and positions (Jacobson 2013, Stokes and Miller 1962). This is to say nothing of voters’ ability to make judgements about candidates or parties in accordance with some consistent rubric (see Converse 1962 and Fiorina 1981).

Researchers initially developed two broad types of theory of voter decision making: memory based models (MBMs) and the online tally model (OTM). These models do not deal with what types of information voters use but rather how they use that information. A memory based model assumes that voters make a choice based on the information they have available to them at the time of decision making. The online tally model posits that voters have impressions of political objects that are constantly updated as they are exposed to new information and then this impression is used in decision making, while the original information is discarded (Kelley and Mirer 1974, Lodge, Stroh, and McGraw 1989). More recently researchers have developed a dual processes model that combines both MBMs and the OTM to allow for conscious and unconscious aspects of voter decision making (cf. Erisen, Lodge, Taber 2014).
These different decision-making processes have important implications for democratic governance. Many researchers have looked at how voting strategies operate for voters with low levels of information (cf. Popkin 1991, Page and Shapiro 1992, Iyengar 1994, and Cutler 2002). The exact nature of the decision-making strategy employed has been shown to have important effects on the quality of decisions, which is critical for the understanding of elections more broadly.

This paper seeks to build on the work of dual process theory in two ways. First, using a novel experimental data set it will show that both processes are operating in a setting that is more externally valid than settings used in previous experimental research. Previous research has been criticized, as voting is often viewed as a decision that is hard to replicate in a laboratory; this research will seek to demonstrate that even in a very realistic lab ‘election’ the dual processes are evident. Second, it will show that the two processes are dynamic; external factors can influence the balance between the two decision-making processes.

The rest of the paper will proceed as follows. The next section will provide an overview of dual processes literature and how it has been applied in political science. It will show where the gaps in the literature are and provide a framework through which to fill them. The following section will give a brief overview of the study’s methods, including the participants, the experimental protocol, notable aspects of the study design, and the measures used. The fourth section will include the results of a number of analyses to test the propositions earlier developed. The section that follows will then describe the significance of these results and compare them to a dual processes account of voting. Finally, the conclusion will look at how future research can build on these findings.
Chapter 2: Literature Review

2.1 Background

Dual process theory has a long history within academic literature, often arising in seemingly unrelated literature apparently ignorant of work in other fields that suggests similar processes (Evans and Frankish 2009). The study of dual processes is most developed in the psychological literature on the subject, originating in the 1970s and the 1980s and focusing on reasoning and decision making (e.g. Wason & Evans 1975). Since then, other forms of dual processing theory have merged across fields such as social cognition (e.g. Epstein 1994, Kruglanski & Orehek 2007) and learning (e.g. Sun, Slusarz, & Terry 2005).

While these versions of the theory have often proved difficult to reconcile due to their different purposes and frameworks, they all share a broad underlying concept (Evans & Stanovich 2013). The basis of dual processes accounts is that there is a conscious and an unconscious aspect to the process in question. The unconscious component is usually considered to be automatic and constantly active, interpreting information about the world at a very basic level. Heuristics, for example, are usually included in the unconscious component of a dual processes account as they are fast, automatic, and unconscious processes used in decision making. The conscious aspect is closer to what political scientists and economists envision when they discuss bounded rational decision making; the processes involved are limited by cognitive ability but generally involve the conscious and effortful thinking that is under the control of the person thinking.

In the case of decision making, researchers have described two distinct systems at work, fittingly titled system 1 and system 2 (Stanovich 1999). While there is no universally accepted theory of what constitutes each system, a general picture in line with dual processes can be
described. System 1 is the unconscious component earlier described; it operates constantly and is usually considered evolutionarily older (Evans 2003). Heuristic processes are included here, such as the representative heuristic, because they operate without conscious effort; people don’t choose to employ these nor do they necessarily know that they are employing heuristics, but they are constantly at work (Evans & Frankish 2003). Similarly, processes like affective judgements and the use of visual cues are considered part of system 1 (Evans 2009). All of these aspects share the fact that they are automatic and that people employing them are often unaware that this processing is occurring.

System 2, in contrast, is considered to be the more rational system. Unlike system 1, system 2 is characterized by its conscious nature; it is an effortful system that requires a person to choose to make use of it and is considered newer evolutionarily (Evans 2003). While heuristics are operating constantly to process vast amounts of information, the rational system is limited to a much smaller amount of processing due to the low number of items human conscious working memory can handle (Lodge & Taber 2013). This system can be thought of as the actual decision making experience people often experience when they consider different benefits of different options; it is very much bounded rationality.

System 1 is sometimes considered the ‘fast’ system as it is constantly operating – before people are consciously aware of a decision they are making, system 1 has been operating. Thus much work has considered system 1 to be ‘thinking fast’ (Kahneman 2012). System 2 is much slower and only operates some of the time; much information is exclusively processed by system 1. Many decisions are thus made primarily by system 1; unless a person consciously chooses to engage system 2, it is not active (Evans 2011).
Before dual process theory entered into the political science literature, most work on vote choice essentially assumed only system 2 was active. Consider economic voting, for instance. Sociotropic models of economic voting suggest voters vote based on how they view the economic well-being of others. This requires them to make a conscious judgement based on how they perceive the economy to be and so their decision influenced heavily by their conscious thoughts about the state of the economy (Kinder and Kiewiet 1981). Gelman and King’s (1993) enlightenment theory suggests that the campaign plays an important role in vote choice by providing information for voters to use in their judgements; elections are predictable because voters tend towards full knowledge of factors like the economy. At the end of the campaign, voters weigh this information and use it in their decisions, resulting in vote choices that are largely predictable before the election has even started.

Policy based models also emphasize the rational system. Brody and Page (1972) suggest that voting is related to policy preference and voters’ analysis of alternative policies. Voters must use their knowledge to evaluate alternatives at the voting booth. Kelley and Mirer (1974) take a similar approach as they show that policy positions are related to vote choice. They also show that the reasons provided by voters for voting the way they did is predictive of vote choice; voters who reported more positive associations with one party tended to vote for that party.

Common in both these approaches was a focus on rational decision making. Models of vote choice in political science have assumed that the choice itself is a rational one; the information used might be biased by partisan loyalties, but when it comes to making a choice that information is used in a rational way (e.g. Campbell et al 1960, Fiorina 1981, Lazerfeld et al 1944). This rational approach wasn’t without criticism, however, as research has demonstrated that a number of non-rational factors contribute to vote choice. Vote choice has been shown to be
linked to a number of factors that voters aren’t aware of, including campaign events that voters don’t know occurred and subliminal aspects of vote choice.

Coronel et al. (2012), for example, demonstrated that a patient with anterograde amnesia who was unable to form new memories was still affected by information presented to him; despite not learning new information, his vote choice changed to reflect what was presented to him. Other research has shown that effects like subliminal messages (Weinberger & Westen 2008), emotional state (Erisen, Lodge, & Taber 2014), attractiveness (Todorov et al. 2005), and social characteristics (Cutler 2002) all play a role in vote choice, despite voters being unaware of the effects.

To accommodate this, political scientists have developed models that engage with system 1 processing. One such model, put forward by Lodge, Stroh, and McGraw (1989), suggests that voting is driven by effective judgements. Their online tally model was based on a more developed model of interpersonal evaluations prominent in psychology (Anderson and Hubert 1963) where it has been demonstrated that the specific traits people report as affecting their evaluations of others are not necessarily linked to the nature of their evaluations. Participants are biased towards reporting traits they are exposed to more recently but their judgements are more strongly affected by traits they are initially exposed to. Hastie and Park (1986) further suggest that this effect should be prominent in contexts like voting where people (voters) expect to need an opinion about another person (candidate) for some later task (voting).

Based on this, LSM suggest that voters keep running tallies that represent their overall impressions about candidates. When voters are exposed to information they find appealing the tally becomes more positive and when they are exposed to negative information the tally moves in the opposite direction. Without even remembering information about a candidate, voters can
report candidate evaluations that match how they would feel if they had access to full information and could thus make an informed vote choice. This model explicitly accounted for the unconscious and automatic nature of system 1, suggesting that it was at the heart of decision making.

However, both models relying on system 1 and those that relied on system 2 faced issues they could not explain. System 2 models lacked an explanation for the effects of unconscious processes but system 1 models could not account for changes that occurred as the result of conscious deliberation. Thus political scientists borrowed yet again from psychology, taking the idea of a dual processes account of decision making (Erisen 2009, Lodge & Taber 2013, Ecker et al 2010, Erisen, Lodge, Taber 2014). By combining both types of models, the dual processes account explained voting much more effectively. Information is used by voters in multiple ways. Information encountered is encoded and stored automatically in the form of an evaluation. Some information is also stored as information and becomes available for future retrieval. When a voter is asked to make a choice, they thus have two sources of information on which to call.

The dual processes account also allows for the systems to affect one another. Thorson (2016) showed that a voter’s affective state affects what information is retrieved; the retrieval process itself is affected by unconscious factors. Other research suggests that the emotional strength of information might also be related to whether it is recalled and how much weight is given to it if a voter does remember it. Information that is more emotionally charged is significantly more likely to be used in judgements, even if that information is known to be incorrect (Thorson 2016).

One area that has yet to be developed in the dual processes account of vote choice is how contextual factors affect the use of systems 1 and 2 in vote choice. Research in psychology has
shown that since system 2 requires conscious and deliberate activation, context can determine how strongly it engages with a given decision. Suggesting that system 2 should be active or not active can cause people to activate the system. Through this, their actual decision can be affected.

For example, heuristic processing can lead to incorrect judgements that can be overwritten but are not always. Participants in a classic study by Kahneman, Slovic, and Tversky (1982) were given a description of a woman named Linda that suggested she was a feminist but did not say so explicitly. They were then asked which of two options was more likely: that Linda was a feminist and a bank teller or that she was a bank teller (with no reference to her social views). Overwhelmingly, participants thought the first option was more likely, despite the fact that necessarily the second option was more likely (unless all bank tellers are feminists). However, in similar studies participants who are told that there is a trick can more accurately identify the correct response; the suggestion that system 2 processing should be used increases the use of system 2 (Ecker et al. 2010).

The vote choice process, similarly, should be subject to contextual cues that affect the use of system 2 reasoning. While voting might be seen as an inherently complex choice that should engage system 2, this doesn’t have to be the case. Lodge, Stroh, and McGraw (1989), for example, show that candidate evaluations are almost entirely driven by system 1 processing; they found no evidence that evaluations are marked by any intervention from system 2. Similarly, research has consistently shown at least some voters who cannot provide any reason for their decision (see Campbell et al. 1960 or Holbrook 1996 for examples).
2.2 Contributions of this work

This analysis will seek to fill two holes within the literature. It will make use of a study in which participants experienced a mock election campaign in a laboratory setting and were allowed to record their vote choice. First, it will try to demonstrate both processes in a setting that seeks to maximize external validity, although still being a lab setting. This will add weight to the idea that voters, even in the real world, are engaged in unconscious processing that affects voting decisions such as the formation of an online tally. While some researchers might consider the laboratory inadequate, as the setting might not provide a situation with enough weight to fully engage system 2, this analysis will use a more realistic setting to increase the external validity of the findings. This leads to my first proposition:

Proposition 1: Participants’ decisions will be influenced by both their memories through system 2 processing and by their unconscious tallies through system 1 processing.

Based on the above discussion, this analysis will also show that the use of system 1 and 2 in decision making is dynamic. This will first be demonstrated using a new measure of online tallies. The state of an online tally itself is, of course, impossible to observe, so researchers typically look for proxies or infer the tallies from associations of measurable concepts. My approach is to assume that the updating of running tallies is constant during exposure to relevant stimuli. So, specifically, voters who engage more deeply with an election campaign should produce tallies that are more well developed. Based on this, they should feel more comfortable relying on their tallies as opposed to effortful, conscious, system 2 processing. All else equal, the more processing time as information comes in, the more developed are the online tallies, and the more confident voters will be in the veracity of their tallies, thus they will give them more weight in decision making. The increased engagement will lead to less reliance on the content of
memories as participants will instead be able to use their affective tally judgements. In this case, system 2 should be less active and so there should be an observed trade off; the strength of system 1’s effect on the outcome is inversely proportional to the strength of system 2’s effect on the outcome. This is captured by the following proposition:

**Proposition 2:** Participants who spend more time reading the campaign articles will be more influenced by their online tallies.

I further propose that voters’ engagement with system 2 is mediated by their view of voting as a decision. Voters’ who have different understandings of the vote choice process will engage with it differently and thus have differing uses of system 2. Voters who believe voting to be a rationally driven and highly important decision should be more inclined to actively seek to engage system 2, just as people are more likely to overcome heuristic bias if they believe a question to be logic based. Conversely, voters who view voting as an affective choice based on their feelings or otherwise disengage with the rational aspect of voting should be less influenced by system 2 processing. These voters should not engage system 2 and will be more likely to ‘go with their guts’ when arriving at decisions. This view of voting isn't necessarily stable; while some voters might maintain lifelong views of voting as a rational choice, others will be strongly influenced by the context of the election. For these voters, the way that the election is framed should have a strong influence on how they make their decision. Thus voters who are primed to think of the election in affective and emotional terms will be more likely to rely on system 1 processing and not engage system 2. Based on this, I propose the following proposition:

**Proposition 3:** Participants who are asked to provide their affective reactions to campaign articles will make their vote choice more quickly than those who are in the control group and not asked for their opinions.
To test this proposition, the analysis will proceed in two major parts. The first part will aim to deal with potential confounds. Despite the experimental control and randomization, the manipulation may have had two different effects and thus the apparent effect might not have been due to the priming of system 1. To avoid this, two potential control variables might be included in the model: learning and the difficulty of the vote choice. To avoid the inclusion of irrelevant variables in the final model, I will first look at whether these are relevant.

First, by asking participants to react to articles, the manipulation might cause participants to encode the information they are exposed to more deeply. If this is the case, it might actually result in a decrease in decision making speed because participants have more considerations available to them. The manipulation might, on the other hand, encourage participants to engage more deeply with the campaign and in doing so make a decision before they are explicitly asked to do so, which would cause them to appear to decide more quickly. If this is the case, they should also feel as if the decision is easier as they had already made it before being asked to do so. To ensure that the effect of interest isn’t being obscured by either of these effects, I will first seek to establish if they are relevant and, if either variable – learning or feeling about the difficulty of the decision -- is being affected by the manipulation, include those variables as controls in the second analysis.

Because this analysis makes use of an experimental manipulation in the study, the second stage is simple. Controlling for whichever of learning or difficulty of vote choice is important, the relationship between the manipulation – asking subjects to respond – and decision speed must be due to the manipulation. The analysis itself will make use of a manipulation that primes participants to view the vote choice as affective or at least not rational.
The rest of this paper will seek to test these propositions to show dual processes in operation and demonstrate the dynamic relationship that connects the two processes. The next section will detail the experimental procedure that was employed to assess this effect as well as the measures that were used to assess the variables of interest discussed above.
Chapter 3: Methods

The data used in this analysis were initially obtained by researchers as part of the broader Making Electoral Democracy Work project. The project examined the interplay between electoral systems, party systems, and voters. This section aims to document first the procedure used and subsequently how that procedure should be understood in the context of an analysis of voter decision making strategies.

The study was run over three years and in 7 waves of experiments that involved a variety of different experimental manipulations and set ups. For the first part of this study, all the waves are used as they all follow similar procedures in the relevant areas. The experimental manipulation relevant to the second part of this study was only included in the second and third waves. Because participants not in these waves were automatically “assigned” to the control condition, the analysis that follows will be restricted to only these two waves. While this drastically reduces the sample size, it appears not to be obscuring any potential effects of interest.

3.1 Participants

The overall pool of participants was recruited from political science courses at the University of British Columbia between December 2009 and December 2012. They were recruited through a process that allows students to participate in research in exchange for bonus marks in courses; they participated in the experiment near the end of the academic term. The age of participants was much younger than the population as a whole due to the recruitment process; the average age was just over 20. The income of participants was also much higher than in the general population as over a third of participants had household incomes over $100,000. Finally,
participants were not nearly as religious as the population as a whole with only about 40% considering religion at least somewhat important to themselves.

Participants were also unusually engaged in politics. Because of the recruitment process, all of the sample had graduated high school (or achieved an equivalent standard) and had some university education. Over 20% of the sample claimed to spend over an hour every day engaged with political news and less than 10% didn’t consistently engage with political news daily. A majority of the sample spent between 10 minutes and an hour every day engaged with political news. Finally, only 12% of the sample rated themselves as below a 7 on a 10-point scale of political interest in which 10 is a great deal of engagement. The subset used for the second part of the analysis is broadly similar to the overall sample. Because the study featured a mock Manitoban election, participants who had lived in Manitoba were excluded from analysis.

3.2 Procedure

Participants completed the experiment on computers at the UBC Public Opinion Lab. Subjects first completed a pre-treatment questionnaire that included questions on demographics and political awareness. Some participants were then randomly assigned to be given specific policy questions that would relate to the mock campaign they were about to experience while others were assigned to receive these questions after the campaign. Participants were also asked about their general political attitudes at this point. Before beginning the campaign, participants were told they would read a number of news articles on a recent provincial election campaign in Manitoba and would be asked to answer some questions about it and vote for a preferred party. Participants were randomly assigned to either be told they would be able to give their reactions to articles after reading each article or they were told nothing.
The mock campaign proceeded by presenting the participants with the articles in order. They were shown, in random order, 10 different articles that were created by a doctoral student of political science who was also a former journalist. The articles were short and designed to resemble real news stories; they were created based on real campaign activity. Participants were randomly assigned to receive campaigns with either two centrist parties, two extreme parties, or four parties. Participants were allowed to spend as much or as little time as they wished viewing each article and could continue on to the next article as soon as they wished, even if they had not finished reading the current article. The time they spent reading was recorded.

The participants who were told they would have the opportunity to react were given the chance to react to the article by providing positive or negative feedback. The prompt was aimed at encouraging participants to think about the campaign in terms of overall reactions and not specific details; the goal was not to improve learning but rather to promote the formation of online tallies.

After the 10 campaign articles, participants were given the chance to record their vote and how hard they felt the decision was to make before being presented with another article that randomly presented one of the two major parties winning. The time they spent making these decisions was also recorded.

After experiencing the full campaign and result, participants were asked a set of post-treatment questions. The group of participants who were not asked about their specific policy beliefs in the pre-treatment questionnaire were asked those questions in the post-treatment survey. Participants were also asked about how they experienced the campaign, their satisfaction with the process, and questions assessing their recall of campaign information. Participants were then debriefed about the purpose of the study before leaving the lab.
3.3 Study design

As is the case with much work in political science, this study involved a trade-off between experimental control and external validity. In general, it leaned towards experimental control by making use of a carefully crafted experimental design that was administered in an academic laboratory to a non-representative sample. This controlled nature makes causal influence relatively easy as true randomization was possible; participants who reacted to the articles are in no way systematically different than those who did not. The control also means that there was not much room for confounds to affect participants’ experience with the study (such as bringing outside information about the parties and candidates into the campaign). While the use of real party names serves to somewhat counteract this benefit, participants can only bring in general knowledge while specific details of the campaign that were measured could only be learned in the controlled setting.

However, where possible the design sought to replicate the real world as faithfully as possible. The campaign articles were formatted to look like real news articles and were written to mirror the tone of real election coverage. The setting was ideal, as subnational elections in Canada are a unique opportunity to manipulate the nature of campaigns. Each province has a similar but different party system such that it would be recognizable to participants but also possible for them to believe that a Liberal party might be centrist or fairly extreme. Participants were thus exposed to a situation in which they had some pre-existing expectations but no detailed knowledge of the election. This mirrors how voters would feel in elections before the campaign has begun if they are as uninformed as past research appears to suggest.

However, because the study was designed for a purpose other than the one I undertake in this paper, a number of experimental manipulations were incorporated that are not used in this
analysis. These are likely not an issue to the analysis that will follow as the key effect of interest was generated through random assignment. None of the other experimental manipulations were related and so there should be no confounding effect.

3.4 Measures

While many of the measures employed in this study are intuitive, some require further explanation. First is the measure of learning. This measure was for two purposes: to measure the effect of system 2 processing on vote choice and to control for the possibility that the experimental manipulation increased the amount of information available to participants. To measure learning in a neutral way, the measure uses 5 questions that asked the participants to select which party put forward certain policies in the mock campaign. Higher scores indicate more learning while lower scores indicate less learning. This provides a measure that cannot be affected by motivated reasoning in which participants try to justify their decision by reporting considerations in a biased way – it is a pure measure of information acquisition.

Habitual political awareness, or political sophistication, was measured similarly using a neutral measure of real-world political information in line with Zaller (1992). Participants were asked to identify whether prominent figures were politicians, journalists, or something else. A scale was constructed by looking at how many politicians and journalists participants could recognize; the other public figures were excluded from this measure. Higher scores thus indicate more politically aware individuals. To make sure the figures were equally relevant across time, the waves were compared; there appeared to be no significant difference in the average level of recognition. This measure of awareness thus provides a way to control for prior interest in politics.
To measure the difficulty of a vote choice, participants were asked how hard they considered the choice to be. The options presented to them ranged from “Easy” to “Extremely difficult” and were converted to an ordinal scale with values between 1 and 4.

The measurement of online tallies presents a considerable departure from previous work. This measure makes use of reading time as a proxy for depth of processing, assuming that increased reading times are associated with more deep processing and that online tallies should be reflective of how deeply information is processed. Participants who engage deeply with the campaign should have significantly more developed online tallies than those who are less engaged. Previous research has used memory as a proxy for depth of processing, particularly within psychology, however for obvious reasons this could not be used here. This study aimed to separate the two concepts and so reading time was selected as a more appropriate measure. The controlled setting means that all the information that could be used in an online tally was incorporated during the reading and so this measure captures the entire online process. Because this measure is aimed at capturing the online tally formation, it should be reflective of system 1 processing.

Unfortunately, article timers were not available for the 5th through 7th waves. To work around this, the time participants took to react to the statements pulled from the article was used. Assuming that those who engaged more with the articles would also be more engaged with the statements, this would be a good proxy for reading time. All the waves had timers for the 9th and 10th articles meaning this assumption could be checked. The correlation coefficient (Pearson’s r) between the first 8 article reading times and the last two article reading times for waves 1 through 3 was 0.65, suggesting that the two variables are measuring the same underlying concept. To allow for cross-wave comparison, I standardized the reading time scores.
Ideology was measured by constructing a scale based on respondents’ answers to 10 policy questions. Respondents were asked to score, on a scale from 1-10, how much they agreed with the policies. The first dimension extracted by a factor analysis had an eigenvalue of 2.3 and explained 91% of the common variance; no other dimension had an eigenvalue higher than 1.0. The combined scale has a reliability coefficient (Cronbach’s $\alpha$) of 0.739 (a coefficient greater than 0.7 is usually considered adequate). Higher scores on the scale correspond to more typical “right-wing” ideologies while lower scores represent “left-wing” positions.

The parties’ ideological positions were measured with averages of subjects’ perceptions of party positions on a scale ranging from 1-10 with 1 being the most left position and 10 being the most right. Participants gave estimates of each party’s position. These positions were compared to those assigned in the neutral calibration exercise (wave 4) where other research subjects were given the same policies but without existing party names and asked to judge them. The results confirm the validity of the aggregate scores (analysis omitted). Again, higher scores indicate more right-wing parties and low scores indicate left-wing parties. Correctness of vote choice was then computed by calculating the difference between a participant’s ideology score and that of their chosen party. High scores in this case indicated more incorrect votes as they represented the different between a participant’s ideal point and that of their party.¹

¹ Analyses using correctness of vote choice was repeated using a binary measure of correct vote choice (whether a participant voted for the closest party or not). This did not change the results and so is omitted from this paper.
Chapter 4: Results

To find evidence of dual processes, I began by analyzing how they might affect vote choice. Based on the theory discussed earlier, I constructed a model that would allow for both the processes to be observed simultaneously. The model is presented below:

\[
Cor = \alpha DoP + \beta DoP \times IdeoF + \gamma Learn + \delta Learn \times IdeoF + \theta Learn \times IdeoF^2 \\
+ \mu Awareness + \rho DoP \times Learn + \tau IdeoF + Constant + \epsilon
\]

In this model, \( Cor \) refers to the correctness of the vote (reverse scored), \( DoP \) refers to the depth of processing as measured by reading times, \( IdeoF \) refers to the participant’s folded ideological position (their distance from the midpoint ideological score), \( Learn \) refers to the number of promises they recalled correctly, and \( Awareness \) refers to their overall political awareness. Recall that dual processes theory suggests that both the content of a voter’s memory and their online tally (captured by depth of processing) should affect vote choice. Based on proposition 1 and 2, I built the following hypotheses:

\[H1: \alpha \neq 0; \gamma \neq 0\]

\[H2: \rho \neq 0\]

The results of this model are displayed in Table 1. They indicate a clear and separate role for both memory and depth of processing in the correctness of the vote. For both processes, the results indicate that an increase in the amount of information available to system 2 processing or used in system 1 processing resulted in a more correct vote. Participants that spent longer engaging with the articles chose parties that were significantly closer to their own ideal points than those who were less engaged (\( p<0.05 \)). Similarly, participants who could correctly identify more promises were significantly better at choosing a party that was close to them ideologically (\( p<0.05 \)). This latter effect was strongly moderated by ideological position, but the effect is the
same; since all coefficients for the interaction between learning and folded ideology scores were positive the interaction indicates that for all participants, an increase in learning resulted in more correct vote choices. These results confirm a dual processes account of vote choice.

The interaction effect between learning and depth of processing was also found to be significant ($p<0.05$). Because the interaction effect is positive and the individual effects are negative, the results show that the effect of increasing either reading time or recall on correct voting was smaller when the other variable was higher. This result is demonstrated in Figure 1 as participants scoring above the mean level on learning were much less affected by increased reading times. The graph makes it clear that system 1's effect was limited to participants that scored in the lower half of system 2.

The first part of the second analysis aimed to discover which potential confounds need to be controlled for. To look at learning as a possible confound, I ran a regression of the learning on treatment, the results of which are displayed in Table 2. If participants who were in the react condition were also learning more about the campaign, this could serve to counteract the priming of system 1 by introducing considerations that might increase system 2’s role. However, the mean number of correct answers for both the treatment and control groups was 3.10; participants in both groups correctly identified 3.10 promises on average. Unsurprisingly, this result proved to be not significantly different ($p=0.98$) – there was no difference in the number of promises recalled for the treatment and control group, demonstrating that the experimental manipulation was not affecting learning.

The second potential confound was time of decision; there was a chance that participants who were given the opportunity to react also thought more critically about their vote choice before being explicitly asked after the campaign. If this was the case, their final decision would
be quicker despite the fact that system 2 was still engaged. If this is the case, we would expect them to find the final act of decision making easier as it had already been done. Table 2 also reports the results of a regression that looks at the effect of the manipulation on the subject’s own estimate of the difficulty of making up their mind. The results show that there is a clear difference – on a 4-point scale, participants in the treatment (reaction) group reported their decision as being 0.19 points easier than those in the control group. This result is statistically significant (p<0.05), thus showing that the manipulation did make the vote choice easier. Because of this, the reported difficulty of the vote decision is included in the next analysis to control for the effect that deciding earlier has on decision speed.

Based on the above findings, I constructed a final model to demonstrate the effect of the priming affective reactions on decision speed. The model is presented below:

\[ RT = \beta React + aDifficulty + C + \epsilon \]

In this model, \( RT \) refers to the time it took a participant to respond to the vote choice question. It is modelled as a function of their experimental condition (a dummy variable, React, for whether they reacted to the articles or not), the difficulty of their vote choice, a constant, and an individual error term. Recall that according to the theory earlier developed, participants who reacted to the articles should have a lower reaction time for the vote choice question; their decisions should be faster than those who did not react to the articles. Based on this, I developed a final hypothesis:

\[ H3: \beta < 0 \]

The results of the model are displayed in Table 3. These results show a clear effect – participants in the reaction condition responded with their vote choice over 3.6 seconds faster than those who were in the control condition. Given that the mean amount of time it took
participants to record their vote was only around 10 seconds, this represents a substantial
difference between the groups; the control group were responding over 40% slower than the
treatment group.

This effect was also demonstrated to be significant (p<0.05). This is despite the fact that
some of the variability associated with the manipulation was controlled for through the inclusion
of a control variable for the difficulty of the vote choice. Further, the within group variance in
both conditions was very high (in the control group the standard deviation was double the
average reaction time). The finding of a significant effect despite these two elements thus
demonstrates that it is a fairly robust effect.

Figure 2 also demonstrates this different effect size. Based on the above regression, the
predicted reaction time for someone in the control group who was not exposed to the reactions
was substantially higher than for the control group. The graph demonstrates clearly that this
effect was not just statistically significant but also substantively important, especially given the
overall speed of recording vote choice.
Chapter 5: Discussion

The results provide strong empirical support for the dual processes model as well as the hypothesis that the relationship between the two processes can be manipulated. $H1$ sought to demonstrate dual processes in a lab setting. To do this, system 1 needed to be demonstrated alongside system 2; decisions based on either system would be based on the same information and so both need to be demonstrated concurrently to show the full dual process.

This was accomplished by using a novel measure of online tallies in the form of reading time. The first analysis shows clear evidence that separate from memory, reading time itself has an effect on the correctness of vote choice. Participants who spent longer reading the articles were better at selecting parties that were ideologically consistent with themselves. This effect can be attributed solely to system 1 because memory was controlled for. If system 2 were not being controlled for, we could not be sure that the reading time measure was capturing a faster and automatic process. However, because both are present the effect of reading time cannot be caused by what is in a participant’s memory. As system 2 requires conscious and effortful processing, it is inherently limited to items that are present in a participant’s memory. It follows then that reading time must be affecting vote choice through another process – specifically system 2.

At the same time, the role for memory and system 2 in decision making was reaffirmed. Regardless of how long participants spent reading the campaign articles, those who remembered the most about the parties were best able to select the party closest to their own ideal point. This demonstrates that there was an effect of system 2 that is separate from system 1.

The joint evidence for both processes confirms $H1$ and fits with prior expectations about the role of dual processes. Recall that system 1 is continuously in operation while system 2 is
only engaged in some types of decisions. This suggests that the result of a decision that logically
should engage system 2 should also be affected by system 1, even if the degree of engagement is
high, so that the slower system is strongly engaged. System 1 is clearly continuously affecting
voting outcomes, as is system 2.

My analysis then turns to demonstrating that the dual processes operate in a dynamic way
that has important influences on vote choice. The key gap identified in the literature earlier was a
failure to look at how voters might vary in the extent to which they engage in system 2
processing. H2 and H3 both offered potential tests for this as they look at how affecting system 1
can affect the vote choice.

Turning first to H2, the analysis wanted to show that participants who produced more
entrenched online tallies were more affected by these when making a decision. By using reading
times to measure online tallies, the analysis was able to show this. Reading times present a
dynamic measurement of online tallies that can vary; instead of assuming tallies are the same,
this allows some to be more developed than others.

The interaction term between depth of processing and learning in Table 1 captures this
dynamic effect. When the value of either learning or depth of processing is particularly high, the
marginal effect of the other is smaller. Thus for participants who learned a lot and were
successfully able to recall most party promises, the effect of reading for longer is less than it
would be for someone who learned less. Conversely, participants who carefully read the
campaign articles were less strongly influenced by their vote choice. This interaction effect
captures the interplay between system 1 and system 2; when either system is particularly
developed, participants were significantly more likely to base their choice on the information that
system provided. Thus H2 is confirmed; the roles of system 1 and system 2 are not constant.
The analysis suggests that this has a significant positive benefit on the actual quality of the choice. Because the ultimate measure being used is the quality of the vote choice, this data shows that participants’ use of the two processing strategies produces the best outcomes; when they have more developed online tallies they rely heavily on those while when they have more complete memories, they rely on their conscious decision making process. This paints a picture of an advantageous decision making strategy that relies on the best information it has, be that unconsciously collected feelings or consciously recalled information.

The final hypothesis, H3, suggests that this process might not be quite as advantageous or at least it isn’t in every situation. The experimental evidence presented above shows a significant effect of priming affective evaluations on the decision speed. In line with theoretic expectations, participants who were primed to see the vote choice process as affective made decisions faster. The increased speed represented both a statistically significant and substantively important effect size.

Following previous research, this suggests that the way in which voters interpret a decision affects the strategy they use in the decision-making process. Previous research showed that people who encountered decisions in which they expected to employ system 2 generally made better use of it than those who where not explicitly prepared to engage the slower system. While vote choice might seem like a decision in which system 2 is to be relied upon, this evidence shows that this isn’t always the case. In some situations, voters can be manipulated into attending less to system 2 processing and reaching a faster decision.

This has important real world implications. Past research on agenda setting has demonstrated conclusively that media attention can affect issue salience and even issue attribute salience (McCombs and Shaw 1972, Soroka 2002). This research suggests that above and
beyond telling voters what information to use in a decision, the media might have an effect on how they incorporate that information. Assuming that media cues and discussions can cause similar thinking to the reactions participants were giving, these findings suggest that a media that focuses on affective qualities of campaigns might actually cause voters to rely more heavily on their automatic judgements about candidates and parties such as opinions based on their attractiveness or likability.

Similar to how participants who spent more time engaged with the campaign developed and subsequently relied on their online tallies more, those who were manipulated to think about the campaign in affective terms also produced decisions that were more based on affective judgements. This suggests that the balance between system 1 and system 2 might not always be based on which is more accurate but rather on which is seen as more salient. Both the manipulation and the depth of processing measure were related to increased use of online tallies and both caused participants to develop more deeply held online tallies. Whether those tallies always led to better judgements isn’t definitive.

The picture that has developed is one of two dynamic and related processes that simultaneously affect vote choice. Both the conscious and unconscious elements of the vote are key determinants, but the relative importance of the two depends on at least two factors. The nature of the online tally formed and the apparent nature of the decision have both been shown to play an important role in the decision-making process. The final section will discuss how future research should build on these findings to further improve our understanding of voting.
Chapter 6: Conclusion

This paper has argued two things. First, dual processes theory can be seen in a more realistic setting than previous research has used. Evidence was presented that showed a clear role for both conscious decision making and unconscious elements. Second, a dual process account of vote choice needs to incorporate a dynamic element as the roles of system 1 and 2 depend on the context of the vote choice. Evidence was presented that suggested the nature of an online tally and the framing of an electoral decision both affect the decision-making process itself. This demonstrates that the dual processes model of vote choice needs to be seen in dynamic terms that accept individual differences and differences between elections.

This work provides a number of avenues for future research. One such area would be to look further at how the use of system 2 contributes to the quality of decision making. Research has shown that both system 1 and system 2 can contribute to either improved (Lodge, Stroh, & McGraw 1989, Lau & Redlawsk 2006) or worsened (Thorson 2016, Converse 1962, Cutler 2002) voter decision making. By looking at how other factors influence the use of these two systems, research might provide clues as to what conditions produce the best vote choices.

Research might also seek to search for further evidence of dual processes in increasingly externally valid settings. Survey research should be able to demonstrate similar effects as those demonstrated here; the first analysis is not dissimilar to research that is often conducted in survey settings. However, it will require a careful consideration of how the two processes are measured; without control over what participants are exposed to, it will be more challenging to demonstrate both processes.

Finally, research might look at whether real election campaigns produce the sort of effects demonstrated in the second part of this paper. The finding that participants could be
primed to rely less on system 2 processing is interesting, but the question remains if such priming can occur in the real world. It seems possible that the tone of media coverage could produce a similar effect. When the focus is heavily on emotional questions such as gut feelings and emotional responses to candidates instead of policy questions and careful analyses of competing alternatives, it would seem that the decision might be more based on system 1 processes and system 2 would be less active.

Whatever the answers to these questions might be, it is clear that dual process theory provides considerable benefits to political scientists seeking to understand the voting process. Moving beyond the view that voting is a solely rational endeavour allows for greater understanding of how actual voters make decisions and highlights the importance of understanding how unconscious aspects of elections affect vote choice.
# Tables

## Table 1. OLS estimates of the model of correctness of vote choice.

<table>
<thead>
<tr>
<th></th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading Time (standardized)</strong></td>
<td>-0.328**</td>
</tr>
<tr>
<td></td>
<td>(0.107)</td>
</tr>
<tr>
<td><strong>Reading Time X Folded Ideology</strong></td>
<td>0.0131</td>
</tr>
<tr>
<td></td>
<td>(0.0443)</td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td>-0.0792*</td>
</tr>
<tr>
<td></td>
<td>(0.0315)</td>
</tr>
<tr>
<td><strong>Learning X Folded Ideology</strong></td>
<td>0.0476***</td>
</tr>
<tr>
<td></td>
<td>(0.0113)</td>
</tr>
<tr>
<td><strong>Learning X Folded Ideology</strong>(^2)</td>
<td>0.0617***</td>
</tr>
<tr>
<td></td>
<td>(0.00869)</td>
</tr>
<tr>
<td><strong>Awareness</strong></td>
<td>-0.0731*</td>
</tr>
<tr>
<td></td>
<td>(0.0295)</td>
</tr>
<tr>
<td><strong>Learning X Reading Time</strong></td>
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<tr>
<td></td>
<td>(0.0264)</td>
</tr>
<tr>
<td><strong>Folded Ideology</strong></td>
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</tr>
<tr>
<td></td>
<td>(0.0920)</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td>1.434***</td>
</tr>
<tr>
<td></td>
<td>(0.166)</td>
</tr>
</tbody>
</table>

| \(N\) | 852 |
| adj. \(R^2\) | 0.085 |

Standard errors in parentheses

* \(p < 0.05\), ** \(p < 0.01\), *** \(p < 0.001\)
### Table 2. OLS estimates of the effects of the treatment on learning and vote choice difficulty.

<table>
<thead>
<tr>
<th></th>
<th>Learning</th>
<th>Vote Choice Difficulty</th>
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</thead>
<tbody>
<tr>
<td>Treatment Condition</td>
<td>-0.00535</td>
<td>-0.189</td>
</tr>
<tr>
<td></td>
<td>(0.183)</td>
<td>(0.0898)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.102***</td>
<td>2.686***</td>
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<tr>
<td></td>
<td>(0.129)</td>
<td>(0.0635)</td>
</tr>
<tr>
<td>N</td>
<td>374</td>
<td>350</td>
</tr>
<tr>
<td>adj. $R^2$</td>
<td>-0.003</td>
<td>0.010</td>
</tr>
</tbody>
</table>

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

### Table 3. OLS estimates of the effect of the treatment on decision time in vote making.

<table>
<thead>
<tr>
<th></th>
<th>Timer – Vote Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Condition</td>
<td>-3.662*</td>
</tr>
<tr>
<td></td>
<td>(1.808)</td>
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<tr>
<td>Vote Choice Difficulty</td>
<td>3.457**</td>
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<tr>
<td></td>
<td>(1.073)</td>
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<tr>
<td>Constant</td>
<td>3.633</td>
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<tr>
<td></td>
<td>(3.149)</td>
</tr>
<tr>
<td>N</td>
<td>350</td>
</tr>
<tr>
<td>adj. $R^2$</td>
<td>0.039</td>
</tr>
</tbody>
</table>

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Figures

Figure 1. Predicted correctness of vote choice based on standardized reading times by amount learned.

![Predicted Vote Quality by learning scores](image1)

Figure 2. Mean predicted decision times by experimental group, controlling for difficulty of vote choice.

![Predicted Decision Speed by experimental group](image2)
Bibliography


