Participate with Uncertainty?

– What "Don't Know" Responses and a Response Time Reveal
About Political Awareness and Political Participation –

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Abstract

Political awareness is considered to be a critical variable in the study of democracy, largely because of its positive impact on democratic behavior, participation. However, the conventional measures of political awareness, which focus on respondents' information on different dimensions of government, politics and policy, have come under criticism. Critics suggest that the informational measures fail to capture respondents' abilities to gather and utilize information to form opinions. In order to capture the missing dimension of political awareness, this thesis constructs the measures of "opinion uncertainty," utilizing two long-neglected elements in political survey research: "don't know" (DK) responses and a response time (RT). It will be shown that the DK scale based on the proportion of DK answers to a set of political attitudinal questions has a comparable power in predicting the willingness to participate in political activities as the informational scale. Turning to RT, it will be shown that longer RT weakens the predictive power of the informational scale on their willingness to participate. In addition, the significance of RT changes along different levels of DK frequency and information. These findings yield two major contributions. First, they deepen multifaceted understandings towards the ways in which people (do not) participate in politics, adding new insights to the previous studies of the information-oriented concept of "political awareness." Second, they contribute to the methodological advancement in terms of utilizing DK and RT as meaningful indicators in survey analysis.

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1 Introduction

Political awareness has long been considered as essential for democratic citizenship. Many researchers treat political information as the core measure of political awareness and test its impact of enhancing democratic behaviors (e.g., Luskin 1987, Zaller 1992, Althaus 2003). The most fundamental of all is the relationship with political participation. As Delli Carpini and Keeter (1996) conclude, "[a] central resource for democratic participation is political information," different studies find that the amount of information possessed is an important predictor of political participation (e.g., Delli Carpini and Keeter 1996, Cho and McLeod 2007, Yamazaki 2008). The more informed a person is, the more that this person is motivated to get involved in politics.

However, information is neither the only nor unique element of political awareness in the explanation of political participation. Some informed people may not be motivated enough to participate in politics, while other uninformed people may have high motivation for political participation. One line of researchers criticizes the conventional measurement of political awareness to explain the above discrepancy (e.g., Lupia and McCubbins 1998). They contend that information-focused measures fail to capture another critical element of political awareness: that is the cognitive resources to gather and utilize information to form opinions.

In light of these criticisms, this thesis introduces the idea of "opinion uncertainty," so as to complement the traditional concept of political awareness. The purpose of so doing is to capture the dimension of political awareness that cannot be captured by simple informational scales. More specifically, this study offers two indicators of "opinion uncertainty," "don't know" responses and a response time, and considers their implications for the relationship between political information and political participation.

Firstly, I propose a proportion of "don't know (DK)" responses to survey items of political attitude, referred to as the "DK rate", as a scale to include elements of both information insufficiency and opinion uncertainty. This measurement assumes that those who answer "don't know" to attitudinal questions lack either information or cognitive

resources or both and "give up" before forming and expressing their opinions. I contend that, while a sporadic DK response may reflect measurement errors generated by researchers (i.e., confusing, complex, sensitive or poorly articulated questions), greater reliance on the DK response across the entire questionnaire is more likely to be a manifestation of the respondent's cognitive limitations, and that the DK rate scale can produce an unbiased and inclusive indicator of political awareness.

Secondly, I posit that a response time (RT) for political opinion items can be considered as a pure measure of opinion uncertainty. Even when a person could give opinions, "cases where the attitude is slow to come to mind [...] are often thought to involve nonattitudes" (Bassili 2008, 253) : a long RT is thus expected to be the indication of inadequate cognitive resources. This measure is known not to correlate strongly with an informational scale (e.g., Sellke and Mayerl 2004); RT can be considered as a concept independent of information. I suggest therefore that, when a person takes long time to give opinions, a high score in an informational scale does not necessarily mean that this person has the high political awareness, which motivates one to be willing to participate in politics.

This thesis is structured as follows. The next section reviews the previous studies on theoretical links between information, DK responses and RT as the political awareness measures, and discusses the expected relationship between political awareness and political participation. Section 3 presents theory and hypotheses for the analysis. Section 4 offers the designs and the results of my analyses using three survey datasets: two surveys of field interview and a web survey. The results indicate that the DK rate scale is comparable in its power to explain participation as an informational scale (section 4.1), and the longer RT functions as a conditional factor to weaken the predictive power of an informational scale on a willingness to participate (section 4.2). In addition, the significance of RT changes along different levels of DK frequency and information (section 4.3). Section 5 summarizes the findings and discusses their implications. Finally, section 6 concludes with suggestions for the future research.

2 Literature Review

In this thesis, I highlight "uncertainty" in the person's opinion on political topics. Traditionally, the general level of political awareness is solely measured by the amount of correct information possessed by a person, but this study extends the concept of political awareness by including the general level of "opinion uncertainty." As the information level is measured by information tests, I claim that an "uncertainty" level can be measured by using DK responses and RT. This section reviews the past studies on information, DK and RT, and discusses their implications as the measurements of political awareness. Regarding the dependent variable of the analysis, it also overviews the studies on political participation and its relationship with political awareness.

Following subsections are designed as follows. Section 2.1 reviews the studies on political information as a measurement of political awareness and discusses potential problems of the measurement. Section 2.2 reviews studies on the nature of DK responses to political attitudinal items, and discusses its utility as an inclusive and unbiased indicator of political awareness. Section 2.3 surveys studies on the meaning of RT, discusses its nature as a measure of uncertainty. Finally, section 2.4 summarizes the findings on political participation, and confirms the logic of the relationship between political awareness and participation.

2.1 The Informational Measurement of Political Awareness

In the classic theories of participatory democracy, political awareness has been considered to be the critical requirement for citizens. To keep a democratic government in good shape, people have to have the resources to make sophisticated decisions about politics. To understand the citizens' competence in democratic society, many studies struggle to measure, and find antecedents of, political awareness. Particularly, they focus on the measurement of political information to study political awareness. This subsection overviews those struggles, and discusses potential problems in informational measurement of polit-

ical awareness.

To capture political awareness, researchers have mostly used the amount of political information as its measurement. This measurement is based on the assumption that people need information to make sense of the political world. The information score is often calculated by simply aggregating correct responses to factual test questions (see early suggestions for the scale construction for Luskin 1987 and Delli Carpini and Keeter 1993). To measure the general amount of information possessed, Delli Carpini and Keeter (1996) recommend the inclusion of factual test questions from three categories: "*rules of the game, the substance of politics, and people and parties*" (65). First category indicates the knowledge on the structure of political institutions, rules and the construction of parliament, court systems, or constitution. This constitutes the basic idea of "what the government is" (Barber 1973, 44). Second category asks about the policies implemented or discussed in the government. This is what the government "does" (Barber 1973, 44). The last category, people and parties, is the knowledge about "the face" of the government. It includes names and positions of current political leaders. Some researchers utilize related but different ways to measure information, such as interviewer's assessment of the amount of information possessed by respondents (Zaller 1992). (See the detailed review of informational measures for Price 1999.)

Accordingly, using factual test as the scale, many studies pursue to find distributions and determinants of political information. The findings are discouraging, however, as Converse (1990) summarizes: "[t]he two simplest truths I know about the distribution of political information in modern electorates are that the mean is low and the variance high" (372). For the determinants, researchers point to sociological factors such as age, marital status, urban residence or gender, structural factors such as education, social network or occupation, and attitudinal factors such as political interests or party identification explain the information level of respondents (e.g., Delli Carpini and Keeter 1996, Gronlund and Milner 2006, Collet and Kato 2014). Many suggest that those antecedents of information are relatively stable, creating "gaps" in the citizens' level of information (e.g., Tichenor,

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Donohue and Olien 1970, Jennings 1996 but Mondak and Anderson 2004). They indicate that citizens with particular characteristics are always more informed than others without these characteristics.

However, there are some criticisms in measuring political awareness solely by information. Critics suggest that the current informational measure fails to capture the critical part of what "political awareness" should represent. The attack has been on two fronts.

First, some criticize the method to construct the conventional measure of political information: the factual test score from limited number of questions arbitrarily selected by researchers. They point out that the scale often fails to test the precise information necessary for a person to be democratically competent. For example, in analyzing opinions on complex insurance reforms in California in 1988, Lupia (1994) finds that voters with inadequate information about the issue, when they know efficient information cues, can still form their opinion as if they are well-informed voters.[1] The current informational measurement may miss a critical element that differentiates whether a person participates in the political activities or not.

The second line of criticism points to the inability of informational measures to capture resources to gather and utilize information to form political opinions. It suggests that scores from on-site quick tests of information recall do not represent the political awareness level of the respondents at the actual moment of political attitude formation. For example, Prior and Lupia (2008) find that the information recall of respondents improves by just giving extra time or monetary incentives. The finding indicates that on-site information recall does not necessarily reflect the cognitive resources to gather and utilize necessary information. In another context, Lee and Matsuo (2014) suggest that accuracy of information recall does not always correlate with the self-assessed confidence in the correctness of recall: possessing accurate information does not always mean that a person is confident enough to utilize that information.

The above discussion implies that there is another dimension of political awareness than information, which I call "opinion uncertainty." *Opinion uncertainty* here is defined

as *the lack of cognitive resources to fully utilize information possessed to form opinions.* With this dimension, we can capture whether a person has non-informational resources to form precise opinions. Measuring this dimension, we can examine how this another source of political awareness interacts with information. I claim that both opinion uncertainty and information are crucial in the concept of political awareness. *Political awareness*, as such, is defined as *resources for individuals to make sense of politics and form considered opinions about politics.*

In the following subsections, I introduce two potential indicators of "opinion uncertainty," and discuss their utilities in coping with the inability of informational measurement of political awareness.

2.2   DK Responses and the Measurement of Political Awareness

DK responses, along with no answers (NA), are considered to be kinds of "item non-response" (Tourangeau, Rips and Rasinski 2000). It is the issue of not answering specific questions in a survey, in contrast to the issue of abstention from a whole survey, which is called "unit nonresponse." This review focuses on the studies of "item nonresponse" to understand the nature of DK responses, and discusses its utility as a political awareness measure.

In understanding item nonresponse, Krosnick et al. (2002) confirm that the occurrence of nonresponse is systematic. They find that respondents who choose the non-attitude options do not answer randomly when these options are not offered (385): there are systematic characteristics behind those who are not giving answers to the political attitudinal items. Other studies consistently find that low levels of factual information and education are the major predictors of frequent nonresponse (e.g., Faulkenberry and Mason 1978, Francis and Busch 1975, Krosnick and Milburn 1990). The characteristics of questions also influence the likelihood of nonresponse. Researchers find that questions with issues of complex or remote from everyday concern, such as political or governmental issues, produce higher nonresponse rates (e.g., Converse 1976, Sugiyama 1983). As Grichting (1994)

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concludes, nonresponse should be "interpreted as expressions of ignorance," (75) and the findings from the previous studies strongly suggest that nonresponse to an attitudinal item is a representation of a lack of cognitive resources. More specifically, the tendency to give up expressing meaningful opinions and give DK responses can be understood as the combination of information insufficiency and cognitive uncertainty that prevents the efficient use of available information when forming opinions.

It should be noted that factors other than political awareness might determine nonresponse. Several studies find that relatively sensitive questions about respondents' personal affiliations yield more nonresponse (Tourangeau, Rips and Rasinski 2000) especially when a respondent has socially undesirable opinions (Berinsky 1999). Here, the distinction between "don't know (DK)" answers and "no answers (NA)" is important. Shoemaker, Eichholz and Skewes (2002) find that the high sensitivity of the question may raise NA, but not DK responses. Thus, NA may mean neither information insufficiency nor a lack of cognitive resources; rather, it is likely to be an indicator of the respondent's desire to self-censor (Hayes, Glynn and Shanahan 2005). If NA picks up the major part of nonresponse caused by an active censorship to answer questions, DK responses are more genuine representations of cognitive limitation. In addition, in a major political survey, sensitive questions consist only a few of many. Thus, the question specific sensitivities would not affect the general tendency to give nonresponse. The above discussion suggests that the general tendency to use DK options across the entire survey is more likely to be a reflection of a respondent's lack of political awareness.

2.3   RT and the Measurement of Opinion Uncertainty

A response time (RT) is the length of time that a respondent takes to answer a question. In this subsection, it is claimed that RT represents uncertainty in the opinion of a respondent. The following paragraphs survey the studies regarding causes and consequences of RT, and discuss RT's utility as an opinion uncertainty measure.

RT has long been used in experimental psychology to measure attitude accessibility,

defined as "the speed and ease with which the attitude can be accessed from memory" (Fazio et al. 1982, 340). According to Fazio, respondents take a shorter RT if they are asked the same question repeatedly. (See the review of his experiments in Fazio 1995) This concept of attitude accessibility implies that respondents with more certainty in attitudes should form them in less time. Several experimental studies support this implication, finding that faster responses connect with higher certainty in answering factual quizzes (Kimble and Seidel 1991) and eyewitness accounts of crime (Smith, Kassin and Ellsworth 1989).

In understanding the determinants of RT in a survey context, there are two major perspectives. One perspective sees RT as a personal trait. Here, age and education are the stable predictors of a response time; older and less educated people tend to respond slowly (Mimura and Arai 2013, Yan and Tourangeau 2008). The second perspective views RT as an indicator of question characteristics; different questions have different tendencies in their distributions of RT. For example, complicated questions with long wordings put a higher cognitive burden on respondents; thus, their RT tend to become longer than those for other less complex questions (Yan and Tourangeau 2008). In general, both personal traits and the questions' requirements of cognitive loads determine RT.[2]

Based on the idea that RT represents uncertainty - internal ambiguity or conflict - several studies examine consequences of RT as an intervening variable to attitude-behavior consistency. Bassili (1993), using the Computer Assisted Telephone Interview (CATI) survey during the 1990 Ontario provincial election in Canada, finds that respondents with shorter RT are less likely to switch their voting intention when actually voting. RT explains the switching better than self-assessed certainty in voting intention. Similarly, Fazio and Williams (1986) conduct a panel survey experiment during the 1984 US presidential election, albeit with non-representative sample. They find that respondents with shorter RT in evaluating presidential candidates have a higher tendency to vote and evaluate the presidential debate consistently with their beliefs than respondents with longer RT. Meyer and Schoen (2014) get a mixed result when examining Germany subnational

referendum. They asked respondents for two kinds of intentions; whether to turnout in the referendum, and whether to vote in favor of the proposal. They find that a short response time does contribute to the attitude-behavior consistency for turnout intention, but not for vote intention.

It should be noted that, however, in special occasions, RT might represent deliberation rather than uncertainty. It is suggested that deliberation may occur when the occasion provides both the motivation and the opportunity (e.g., Fazio 1990, Olson and Fazio 2009). Here, the motivation is to carefully consider opinions and the opportunity means adequate time to form opinions. If the occasion meets both criteria, long RT might mean that a respondent is deliberating. With high motivation and adequate opportunity, the function of RT as an opinion uncertainty measure is expected to be weakened.

As reviewed above, in both experiments and surveys based studies, although with some notes, RT has been understood as it represents uncertainty or cognitive load in answering questions. There is also an important finding that the amount of information only weakly correlate with RT. Possessing a large amount of information does not always mean a person takes short time to answer questions (e.g., Sellke and Mayerl 2004). This indicates that the uncertainty measured by RT can be considered as an independent dimension in political awareness, which complements the information dimension.

2.4   Political Participation and Political Awareness

Political participation is, obviously, the most fundamental element in "participatory" democracy. Verba, Nie and Kim (1978) suggest that it is divided into four categories based on the results of factor analysis: voting, campaign activity, communal activity, and contacting officials on personal matters. The prototype of each participation is summarized in Table 1. First is voting, the most notable and the most studied dimension. The voting is generally an individual act, so it does not require a cooperation with others. The involvement with campaign activities, on the other hand, requires cooperation, but self-initiatives are limited. Especially in Japan, due to strong mobilization force through

Table 1: Four Categories of Political Participation

Mode of Activity	Type of influence	Scope of Outcome	Conflict	Initiative required	Cooperate with others
Voting	High pressure/ low info.	Collective	Yes	Little	Little
Campaign activity	High pressure/ low-high info.	Collective	Yes	Some or little	Some or much
Communal activity	Low-high pres./ high info.	Collective	Yes/No	Some or much	Some or much
Contacting officials on personal matters	Low pressure/ high info.	Particular	No	Much	Little

This table is the author revison of the table in Verba, Nie and Kim (1978), p.56

social networks, campaign participation acts are expected to be more of social obligation than self-motivation (Flanagan 1991). The third category, communal activity, includes such activities as involvement in community organization, volunteering, signing petitions, or joining demonstrations. All these are cooperative activities, but communal activities are expected to be initiated by self-motivation. The last category indicates more personal and direct communications between citizens and politicians. This does not require cooperation and is initiated mainly by self-motivation.

In determining participation, voting has been the main focus in the literature. Researchers find that socio-economic and psychological factors explain participation: a person who has high socio-economic status, high political interest, strong partisanship, high sense of civic duty and high political efficacy are more likely to turn out to vote (See the detailed review in Milbrath and Goel 1977). Other researchers focus on the mechanism of the voting participation from the rational choice perspective. The classic model by Downs (1957) suggests that a person turns out to vote when the expected utility from voting in the election is larger than zero. Here, the utility is determined by several factors: the size of benefit when the preferred party wins, the probability that one's vote is influential in changing the election result, and the cost to cast a vote. Beyond voting, some studies explore the determinants of general participation by aggregating different types of participation. The findings are generally similar to that of voting (e.g., Verba, Schlozman and

Brady 1995). Other studies compare the determinants across different types of participations. In Japan, Kabashima (1988) shows that, if participation is divided into campaign activities and communal activities, the predictive power of partisanship is much weaker for the latter. This confirms the point that self-motivation rather than mobilization matters for the communal participation. Going more specific, some researchers find that determinants changes partially across each type of participation, but there are little evidences that those differences are systematic (e.g., Yamada 2004, Nishizawa and Kuriyama 2008).

In addition to the above determinants, political awareness is one of the most important factors to enhance a willingness to participate. Without awareness, a person has no resources to be self-motivated to represent one's own opinion in politics. The rationalistic model confirms this logic, that the lack of awareness leads to the lower motivation to turnout to vote (Feddersen and Pesendorfer 1996). Several studies test the relationship between political information and political participation, and all find the significant effect of political information on voter turnout (e.g., Delli Carpini and Keeter 1996, Yamazaki 2008); the effect somewhat varies but stays significant for other types of political participation (Cho and McLeod 2007).

Other than information, for DK and RT, almost no studies discuss or test their relationships with political participation. This is the main focus of my thesis. The next section introduces the theory of the relationships between "opinion uncertainty" measures and political participation, and constructs hypotheses for the analysis.

3   Theory

Based on the discussion in the preceding section, this section introduces the theory of the relationships between information, DK, RT and participation. It shows that the extension of the concept of political awareness has significant theoretical implications regarding how political awareness motivates people to participate in politics. The following part is divided into three subsections. First, section 3.1 theorize the relationships between

DK responses and participation. Second, section 3.2 presents the utility of RT as the conditional factor in informed participation. The theoretical picture of the implications from these two subsections are summarized in Figure 1. The content of section 3.3 is more technical than its preceding subsections. It argues for the possible change in the meaning of RT across different levels of DK frequency and information. The theoretical picture of this subsection is summarized in Figure 2.

3.1   DK Responses and Political Participation

In section 2.4, previous studies show that high level of information enhances a willingness to participate in political activities. The logic of the relationship between DK responses and political participation is parallel to that of informed participation, while the expected direction of the relationship is opposite. Frequent DK responses means that a respondent possesses only a small amount of information: one has no resources to construct an opinion. In addition, DK responses include "opinion uncertainty" dimension: it means that a person has no resources to utilize information possessed to construct an opinion. Logics from both dimensions indicate that the high frequency of DK responses to be correlated with the low willingness to participate.

While some studies in Japan utilize DK responses as a substitution for informational scales (e.g., Yamada 2006, Yokoyama 2014), almost no study utilizes it as a predictor of political participation. Thus, the initial hypothesis for the analysis is presented as follows:

> *H1. The tendency to give DK responses has a negative impact on a willingness to participate in political activities.*

The only study to test the above expectation is Kanbayashi (2005) – utilizes it as a predictor of voting participation – and he confirms the negative relationship between DK responses and participation. However, his study does not compare the impact of a DK response scale and an informational scale directly.

Here, in comparing an informational scale with DK responses as political awareness

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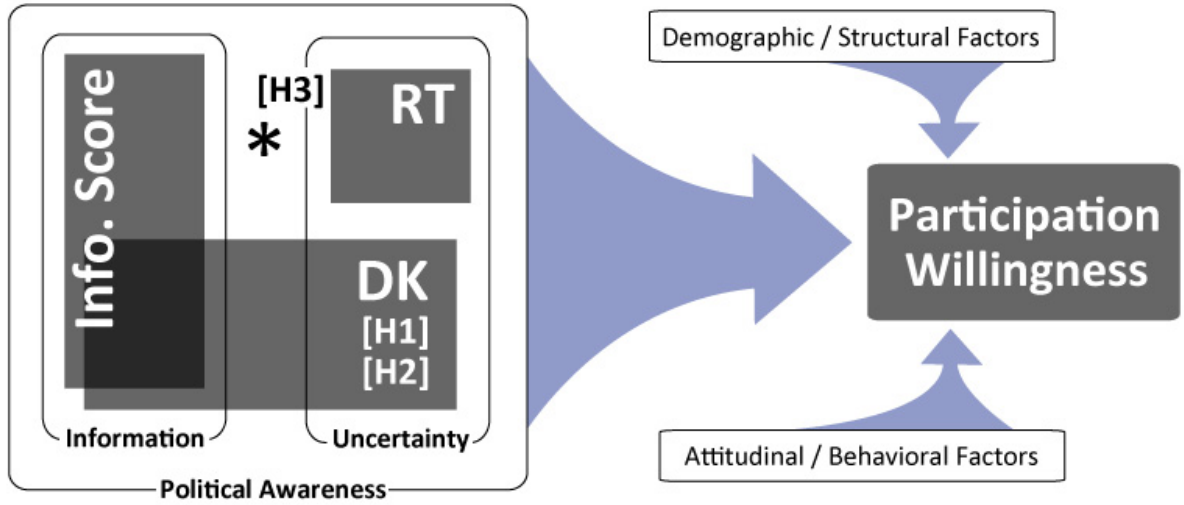
Figure 1: Theoretical Picture of the Relationship between Political Awareness and Participation Willingness

scales, there are two possible advantages to utilize the latter. First, DK responses are supposed to capture both informational and uncertainty elements in political awareness. The inclusion of the uncertainty concept may enhance the ability to explain the possible link between political awareness and a willingness, (especially, to participate in politics) because, without certainty, information alone can confuse a person and lessen his or her willingness. Second, measurements by DK responses can cover a wide range of issues without adding any new questions. In creating an informational scale, the possible amount of factual test items in one survey is limited. This limitation leads to the elitist selection of testing items by a researcher. By contrast, the use of the DK measure can minimize the possible bias generated from the arbitrary selection of the measurement items. These advantages make the DK scale more inclusive and unbiased as an indicator of political awareness. Therefore, we should expect that:

H2. DK responses better predict a willingness to participate in political activities than an informational scale.

3.2 RT and Informed Political Participation

In section 2.3, previous studies on the consequence of RT imply that RT is expected to have a conditional rather than a direct impact on the consistency between political attitude and behavior. Parallel to the idea of conditioning attitude-behavior consistency, this thesis proposes that RT moderates the consistency of the relationship between information and a willingness to participate. Specifically, the logic goes as follows: even when a person possesses a fair amount of information about politics, if one is not certain enough and cannot utilize information fully to form precise opinions of whether to participate, thus takes long time to disclose them, information would not help this person to become motivated to get involved in political activities. On the other hand, if one has no information on politics, high uncertainty may not matter since one already has no resources to utilize. In accordance with these expectations, the hypothesis is constructed as follows:

> *H3. For a respondent with longer RT to give opinion on a willingness to participate in political activities, the power of an informational scale to predict a willingness to participate in political activities becomes weaker.*

The similar conditional relationship as in H3 not necessarily be observed between DK and RT. If one gives DK responses frequently and responds with long RT, it amplifies uncertainty, thus one is expected to be less willing to participate in politics than the DK scale indicates. However, the expectation becomes more complex for a respondent who rarely gives DK responses; the meaning of RT may change. The following subsection theorizes the systematic change in the meaning of RT along different levels of DK frequency and information, and discusses their implications on the relationship between political awareness and a willingness to participate in politics.

3.3 DK, Information and the Meaning of RT

In section 2.3, there is one note regarding the meaning of RT, that RT represents *deliberation* rather than *uncertainty* in particular occasions. This is important; if RT represents

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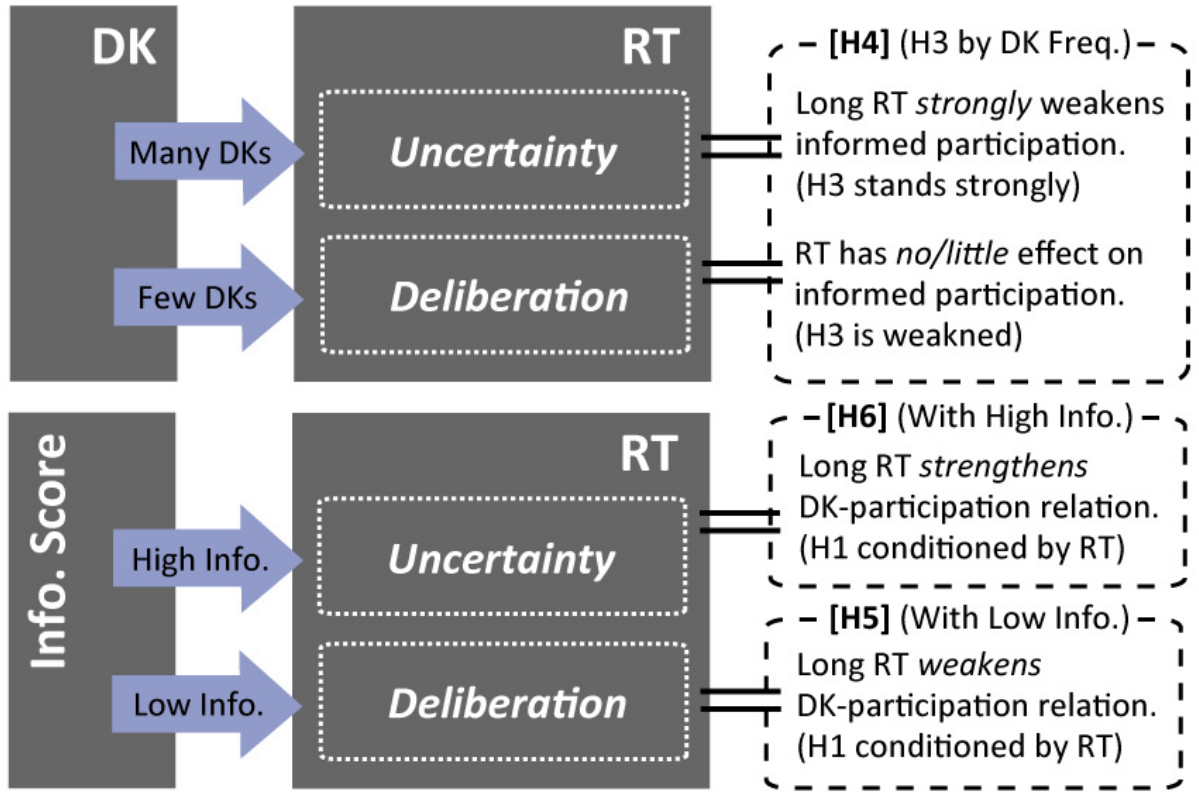
Figure 2: Theoretical Picture of the Change in the Meaning of RT

deliberation, the logic in the preceding subsection may subject to change. Researchers claim that deliberation may occur when the occasion provides both the motivation and the opportunity to consider the opinion carefully (e.g., Fazio 1990, Olson and Fazio 2009). Here, the opportunity – adequate time to form opinions – is often fulfilled under survey occasions. Thus, the issue is whether a respondent has a strong motivation to consider the opinion carefully; if the motivation is strong enough, long RT might mean that a respondent is deliberating. I contend that this motivation may change along different levels of DK frequency and information. Figure 2 summarizes the argument in this subsection.

First of all, I propose that, for a respondent with few DK responses, long RT represent more deliberation than uncertainty, while for a respondent with many DK responses, long RT represent more uncertainty than deliberation. The reasoning goes as follows. To begin with, those who consistently give out opinions through a survey (with few DKs) are expected to be motivated to consider their opinions seriously on wide range

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of issues; their long RT might represent deliberation. But, as Krosnick et al. (2002) argue, when questions involve "no opinion" response options (i.e., DK, NA or undecided), less motivated respondents choose these options to shortcut and avoid these questions. This suggests that respondents who tend to give up meaningful responses and give DKs are, in fact, less motivated to carefully consider responses: their RTs should represent uncertainty.

From another viewpoint, I propose that, for a respondent possessing only a small amount of information, long RT represent more deliberation than uncertainty, while, for a respondent possessing a large amount of information, long RT represent more uncertainty than deliberation. The reasoning goes as follows. When respondents are motivated to consider their opinions carefully, as Zaller (1992) suggests that those who have inadequate pool of information have difficulties in accessing the considerations in their head, those who possess only a small amount of information naturally take long RT to come out with meaningful opinions. Those who possess low information but take short RT to answer the question, in the mean time, take short RT probably because they are weakly motivated and give up a careful consideration of the question contents. The above logic indicates that for respondents with a small amount of information, those with long RT might be more motivated to consider a question carefully than those with short RT: long RT may represent more of a deliberation. On the other hand, respondents with a large amount of information are expected to have less difficulties in accessing the considerations in their head to form serious opinion. Long RT for those with a large amount of information is, therefore, not necessarily a indication of the struggle – deliberation – to reach considered opinion. Thus, RT for those with a large amount of information should represent more of uncertainty.

The above propositions on the change in the meaning of RT have significant implications on the relationships between information, DK responses, and a willingness to participate in politics. If RT represents deliberation, those with long RT are not necessarily uncertain about their opinions. As for the relationship between information and

participation, it is expected that, for those with a few DK responses, RT might represent deliberation. This expectation leads to the following hypothesis.[3]

> *H4. Among those who give many DK responses, longer RT strongly conditions to weaken the positive relationship between information and a willingness to participate in political activities, while, among those who give only a few DK responses, the power of RT as a conditional factor is significantly weakened.*

As for the relationship between DK responses and a willingness to participate in politics, it is expected that, for those with a small amount of information, long RT might represent deliberation. Considering the above expectation, the logic of RT in conditioning the relationship between DK responses and participation changes along the amount of information possessed. First, for those with a small amount of information and long RT, giving DK responses might be a result of considerable amount of deliberation: the more DK responses does not necessarily mean less willingness to participate in politics. Those with a small amount of information and short RT, in the mean time, frequent DK giving should be interpreted as the cognitive limitation to quickly give up answering questions: the more DK responses does mean less willingness to participate in political activities. It leads to the following hypothesis:

> *H5. Among those with a small amount of information, longer RT weakens the negative relationship between DK responses and a willingness to participate in political activities.*

Second, for those with a large amount of information and long RT, same as for those with a small amount of information and short RT, DK should be interpreted as the cognitive limitation: the more DK responses indicates less willingness to participate in political activities. For those with a large amount of information and short RT, it is expected that their political awareness is already high. Thus, for these respondents, as *Socrates*, frequent DK responses may be a representation of "I know nothing except the

fact of my ignorance" for a person with a great wisdom; the more DK responses may not mean less willingness to participate. It leads to the following hypothesis.

H6. Among those with a large amount of information, longer RT strengthens the negative relationship between DK responses and a willingness to participate in political activities.

Hypotheses in this subsection do not intend to fundamentally change the theoretical structure among information, uncertainty, and participation; it rather aims to provide methodological tips to utilize RT as a meaningful measure.

All the hypotheses introduced in this section indicates that "opinion uncertainty" is a meaningful and crucial dimension in political awareness to explain participation. The following section finally starts the analyses to test the hypotheses.

4   Analysis

The analysis section is divided into three separate subsections. Section 4.1 compares the power of the DK responses scale and the information score in explaining respondents' willingness to participate in political activities. Section 4.2 turns to the examination of RT, discusses its significance as a conditional factor to the relationship between information and respondents' willingness to participate in politics. Finally, section 4.3 examines the relationships between information, DK, RT and participation all together, and confirms the change in the meaning of RT along different levels of DK frequency and information. Each subsection utilizes independent dataset, so I attached the introductions of the datasets and the descriptions of the constructions of variables at the beginning of each subsection.

4.1 *DK Responses* versus *Information*

This subsection of analysis focuses on the power of DK responses scale in explaining respondents' willingness to participate in politics, and compares its explanatory power with that of an informational scale.

4.1.1 Data: GLOPE2005

The dataset utilized for this subsection of analysis is GLOPE2005[4], which was conducted in November of 2005, two months after the House of Representatives (HoR) of the Diet election in Japan. It targets randomly selected Japanese adults, uses the face-to-face interview by directly visiting respondents' houses. The mode of data collection is Paper and Pencil Interviewing (PAPI), and they offer explicit DK and NA response options for each question. Due to this data collection format, GLOPE2005 accepts DK responses generously; an average respondent choose to answer DK in 7.4% of all the questions.[5]

4.1.2 Construction of Variables

Participation Willingness Variables. GLOPE2005 asks respondents whether they are "willing to participate," "neither," or "not willing to participate," in variety of political activities. Almost identical questions are included in Waseda-CASI2010 dataset utilized in the next section, 4.2, so they are explained together here. The specific activities asked in the two surveys are (see details of distributions in Appendix A):

- Vote in Elections
- Attend Party/Politician's Meetings (not asked in GLOPE2005)
- Contact Local/National Politicians
- Consult Local Offices
- Sign Petitions (not asked in GLOPE2005)
- Join Demonstrations or Rallies
- Vote in Referendums (not asked in GLOPE2005)
- Work as Volunteers

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- Join Actively in a Residential Association

- Submit Public Comments (not asked in GLOPE2005)

In the following analyses, three category scores of participation willingness (2 = "willing to participate"; 1 ="neither" ; 0 = "not willing to participate") are used for each type of political activities.[6] DK[7] and NA to those questions are considered as missing.[8] In the willingness to participate in individual activities, voting has a particularly high proportion of willing to participate (80 to 90%), while the rates for other types of political activities are much less (scoring around 5% to 40%).[9] There are fairly wide variations along the levels of political participation.[10] I have constructed factor scores of all ten (or six) variables and I will utilize them as main dependent variables.[11]

Information Score. GLOPE2005 includes factual test questions which follow the recommendations by Delli Carpini and Keeter (1996), including the questions from three fields – institution, party politics, and political leader – of political information.[12] To create the information score, correct responses are aggregated by balancing each of three fields.[13] The lowest score is 0 and the highest score is 3 for the created variables.[14]

DK Rate. The "DK rate" is the simple count of DK responses to attitudinal items divided by the total number[15] of attitudinal items in a survey. Therefore, the possible scores for the DK rate range from 0 to 1.

Control Variables. Nine control variables are included in each analytic model: gender, age, education, city size, political interest, party identity strength, frequency of newspaper reading, Internet use, and societal trust[16] (same controls are utilized in section 4.2). For gender, the recent studies find that the structure of gender effect is more complex than simply saying which gender participates more than the other (Ondercin and Jones-White 2011). For age and education, older and more educated people are expected to be more willing to participate. For city size, living in a larger city indicates lower level of
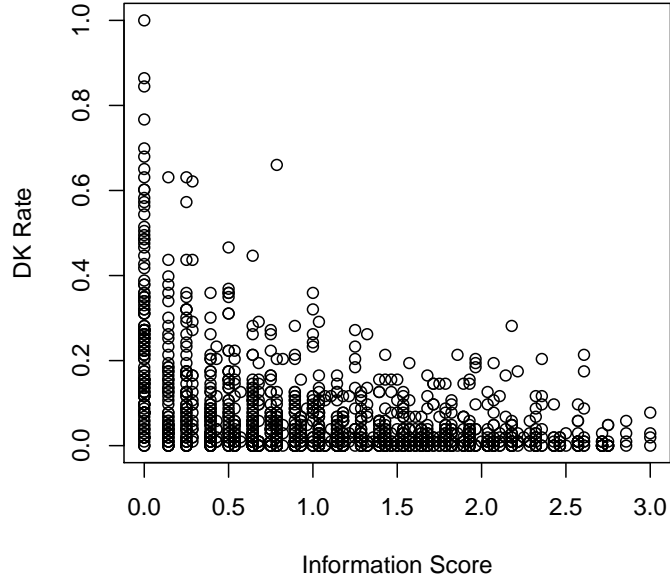
Figure 3: Relationships between the DK rate and the Information Score (GLOPE2005)

participation, because in a more urbanized area a resident is expected to become more distant from politics. Positive relationships between the control variables' score and the political participation score is expected for other attitudinal and behavioral variables.[17]

4.1.3 Results

Before starting the main analysis, the scatter-plots of the relationship between the DK rate and the information score is shown in Figure 3. As expected, the DK rate is negatively correlated with the information score, with Pearson's correlation coefficients of -0.418. Considering this correlated nature of the two variables, the main analysis first includes each variable interchangeably into an identical equation to compares the size of the impacts, and then include them together in the model to test the comparative strength of the variables.

I will start the main analysis by comparing the power of the "DK rate" and the "information score" in explaining participation willingness. The analysis deals with the factor score of six participation willingnesses (ones that are included in GLOPE2005) as

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a dependent variable.[18] The general participation willingness score ranges from -1.37 to 1.90, with the median of -0.02. I estimate the results by ordinary least square (OLS) regression, and the models are specified as follows:

$$(ParticipationWillingness) = \beta_0 +$$
$$\boldsymbol{\beta_{1a}(DK\ Rate)\ \underline{or}/+\ \beta_{1b}(Information\ Score)} +$$
$$\beta_2(Gender)+\beta_3(Age)+\beta_4(Education)+\beta_5(PartyIDStr.)+\beta_6(PoliticalInterest)+$$
$$\beta_7(CitySize)+\beta_8(Newsp.ReadingFr.)+\beta_9(InternetUse)+\beta_{10}(Soc.Trust)+\epsilon$$

Here, the DK rate (model 1) and the information score (model 2) are included in the equation interchangeably.

Table 2 presents the results. Model 1 and 2 indicate that both the DK rate and the information score have statistically significant powers to explain participation willingness in expected directions; willingness decreases as the DK rate increases, and it increases as the information score increases.[19] It can be said that H1 is confirmed. Moreover, comparing the impacts of the DK rate and the information score, the standard error of residual for model 1 is 0.761 and it is smaller than 0.766 of model 2. According to fit statistics, the model with the DK rate has slightly better explanatory power than the model with the information score.

To further compare the size of impacts of two independent variables, Figure 4 plots the simulated increase in participation willingness, using the numbers from model 1 and model 2.[20] The x-axis shows each of the political awareness scores moves from the lower 10th percentile to the higher 10th percentile. It can be seen that the shape and the range of impacts of the two scales are almost identical, while the size of impact is slightly larger for the DK rate. For the DK rate, when it increases from 0.000 (10th percentile) to 0.214 (90th percentile), the participation score decreases by 0.243. For the information score, when it increases from 0.143 (10th percentile) to 2.143 (90th percentile), the participation score increases by 0.171.

The two variables are entered together in model 3 of Table 2. Here, the coefficients of both variables becomes smaller possibly because of the correlated nature, while the

Table 2: Comparing the Powers of the DK rate and the Information Score in Explaining Participation Willingness (OLS / GLOPE2005)

	Model1	Model2	Model3
DK Rate	$-1.136\ (0.256)^*$		$-1.057\ (0.262)^*$
Information Score		$0.086\ (0.037)^*$	$0.053\ (0.038)$
Gender (Female)	$0.120\ (0.046)^*$	$0.115\ (0.048)^*$	$0.135\ (0.047)^*$
Age	$-0.002\ (0.002)$	$-0.004\ (0.002)^*$	$-0.002\ (0.002)$
Education	$0.084\ (0.026)^*$	$0.081\ (0.027)^*$	$0.075\ (0.027)^*$
Party ID Strength	$0.089\ (0.024)^*$	$0.105\ (0.024)^*$	$0.088\ (0.024)^*$
Political Interest	$0.152\ (0.030)^*$	$0.165\ (0.030)^*$	$0.142\ (0.030)^*$
City Size	$-0.065\ (0.016)^*$	$-0.067\ (0.017)^*$	$-0.067\ (0.016)^*$
Newspap. Reading Freq.	$0.051\ (0.018)^*$	$0.054\ (0.018)^*$	$0.048\ (0.018)^*$
Internet Use	$0.104\ (0.057)^\dagger$	$0.099\ (0.058)^\dagger$	$0.097\ (0.058)^\dagger$
Societal Trust	$0.054\ (0.024)^*$	$0.054\ (0.024)^*$	$0.051\ (0.024)^*$
(Intercetpt)	$-0.830\ (0.166)^*$	$-0.977\ (0.162)^*$	$-0.814\ (0.166)^*$
R^2	0.149	0.139	0.150
Adj. R^2	0.142	0.131	0.142
SE of Residual	0.761	0.766	0.761
Num. obs.	1204	1204	1204

Standard Errors in Parentheses $^*p < 0.05$, $^\dagger p < 0.1$
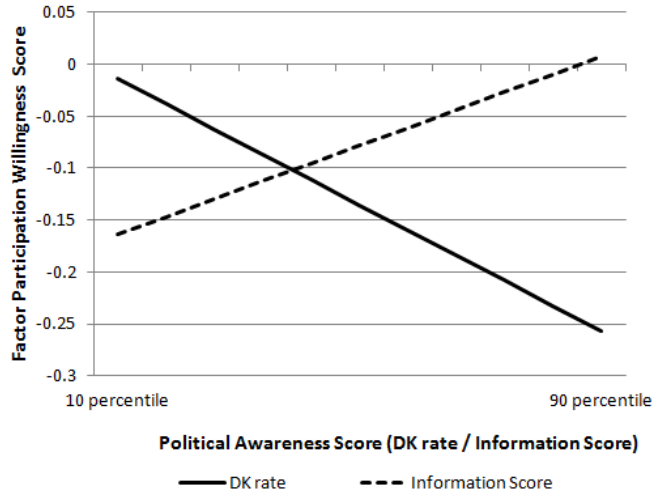
Figure 4: The Simulated Effect Sizes of Political Awareness Scales in Explaining Participation Willingness (GLOPE2005)

DK rate stays statistically significant but the information score no longer has a statistically significant effect.[21] It indicates that the DK rate still has some explanatory power

even after the information score is controlled, while the information score's impact on participation willingness is largely explained by the DK rate. In addition, the standard error of residual for model 3 is the same as model 1; it means that entering two variables together does not improve the model's overall explanatory power. These results imply that the DK rate's inclusion of the uncertainty dimension does have an advantages over the information score. H2 is confirmed here.

In sum, the DK rate has a comparable explanatory power as the information score. The comparison of explanatory powers in separate models illustrates that the range and the size of the effects are almost identical for both political awareness variables. When directly compares the explanatory powers of the two variables in the same model, the DK rate explains participation willingness better than the information score, and inclusion of two variables in the same models does not contribute to the improvement of the original models. Therefore, the DK rate alone is sufficient to be included in the models to explain participation willingness as an alternative to the information score. Simply recording the tendency of those who give up on providing opinions is possibly more useful to explain their willingness to participate in political activities than constructing costly and error prone informational items. H1 and H2 are confirmed.

4.2 Conditional Effect of *RT* on Informed Participation

This subsection focuses on the RT as an opinion uncertainty scale, and tests its conditional role in the relationship between the information score and respondents' willingness to participate in politics.

4.2.1 Data: Waseda-CASI2010

The dataset in use is Waseda-CASI2010[22], which was conducted in 2010 in two waves, before and after the 2010 the House of Councilor (HoC) of the Diet election in Japan. As GLOPE2005, it targets randomly selected Japanese adults and interviewers visit respondents' houses directly. On the other hand, the mode of data collection is Computer

Assisted Self-Administered Interviewing (CASI). While PAPI in GLOPE2005 accepts DK and NA answers generously, CASI records RT for every question in a survey while suppressing easy DK answers; thus, an average respondent in this survey provides DKs for only 1.7% of all the questions.[23] The exclusion of DK options, on the other hand, makes it possible to measure RT with less errors.[24] From the above characteristics, CASI format surveys in 2010 offer a rare opportunity to test the genuine effect of RT as a conditional factor to the relationship between the information score and participation willingness.[25]

4.2.2 Construction of Variables

The critical variable in this analysis, RT, is constructed in two ways. Both scales utilize a response time to answer the questions of participation willingness. Thus, long RT means that respondents take a long time to express an opinion on whether they are willing to participate or not. The construction of other variables are identical to section 4.1.

Average RT. The first scale is the average RT for all participation willingness items. The average RT is calculated by dividing the total response time by total numbers of participation items.[26,27] This "average RT" is then included as an interaction term for the analysis with the factor score of participation willingness as a dependent variable.

RT (Median Split). Second set of measurements of RT is dichotomous variables based on the response time of a participation willingness towards individual political activity. Particularly, this subsection uses the ones on voting in elections and signing petitions. The dummy variables are created by the median splits of a response time. There are two reasons for this design of the measurement. First, using RT for only one question is prone to errors (e.g., unexpected interruptions) and sensitive to outliers. In this sense, dichotomous design is more appropriate since using a row response time may amplify possible errors and outliers. Second, the distribution of RT is known to be positively skewed. Thus, using median instead of mean is more appropriate as a central tendency.
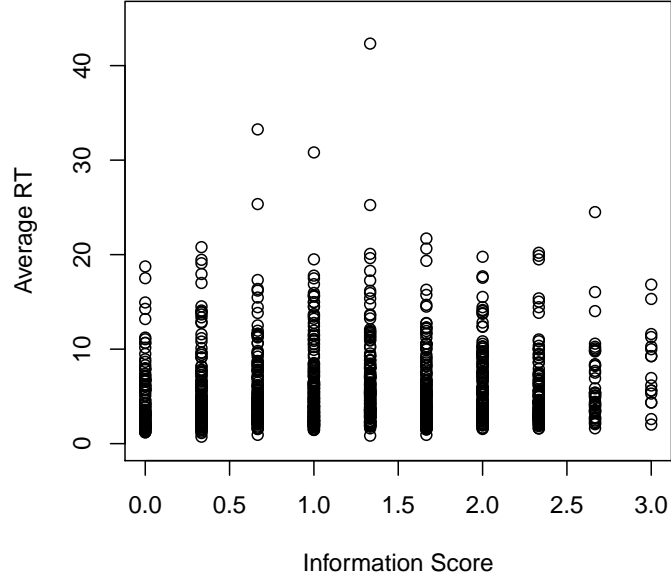
Figure 5: Relationships between the Average RT and the Information Score
(Waseda-CASI2010)

The usage of the median split RT variable is the same as the average RT variable, just in different models.

4.2.3 Results

Before starting the analysis, Figure 5 shows that the average RT only has a very weak correlation with the information score (Pearson's correlations of -0.066). It confirms the expectation that RT is a independent dimension from the information score.

I will start the analysis by using the factor score of participation willingness toward ten political activities as dependent variable[28], the information score as independent variable, and the average RT as a conditional factor. Using the same control variables as in the preceding subsection, the OLS regression model is specified as follows.

$$(Participation Willingness) = \beta_0 +$$
$$\boldsymbol{\beta_{1a}(Info.\ Score) + \beta_{1b}(Average\ RT) + \beta_{1ab}(Info.*Average\ RT)} +$$
$$\beta_2(Gender) + \beta_3(Age) + \beta_4(Education) + \beta_5(PartyIDStr.) + \beta_6(PoliticalInterest) +$$

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Table 3: Conditional Effect of RT on Informed Participation (OLS / Waseda-CASI2010)

	Model4	Model5
Information Score	0.184 (0.041)*	0.273 (0.063)*
Average RT		0.041 (0.012)*
Information*Average RT		-0.015 (0.008)†
Gender (Female)	0.011 (0.053)	0.017 (0.053)
Age	-0.011 (0.002)*	-0.013 (0.002)*
Education	0.135 (0.029)*	0.142 (0.029)*
Party ID Strength	0.131 (0.033)*	0.123 (0.032)*
Political Interest	0.201 (0.037)*	0.189 (0.038)*
City Size	-0.033 (0.020)†	-0.036 (0.020)†
Newspap. Reading Freq.	0.034 (0.020)†	0.028 (0.020)
Internet Use	0.134 (0.065)*	0.159 (0.066)*
Societal Trust	0.097 (0.035)*	0.098 (0.034)*
(Intercetpt)	-1.169 (0.195)*	-1.265 (0.201)*
R^2	0.219	0.228
Adj. R^2	0.211	0.219
SE of Residual	0.817	0.813
Num. obs.	1081	1080

Standard Errors in Parentheses $^*p < 0.05$, $^\dagger p < 0.1$

$$\beta_7(CitySize) + \beta_8(Newsp.ReadingFr.) + \beta_9(InternetUse) + \beta_{10}(Soc.Trust) + \epsilon$$

Here, if the interaction term of the information score and the average RT becomes negative, the average RT conditions to weaken the relationship between the information score and participation willingness.

Table 3 presents the initial result. The interaction term has a marginal statistical significance (0.05<p<0.1), and the longer average RT does weaken the explanatory power of the information score on participation willingness. Figure 6 graphically show the marginal effect. It simulates the size of the overall explanatory power of the information score on participation willingness along different lengths of the average RT, moves it from the shortest 10 percentile (2.0 seconds) to the longest 10 percentile (11.5 seconds). The lines show the estimated size and the 95% confidence interval of the information score coeffi-
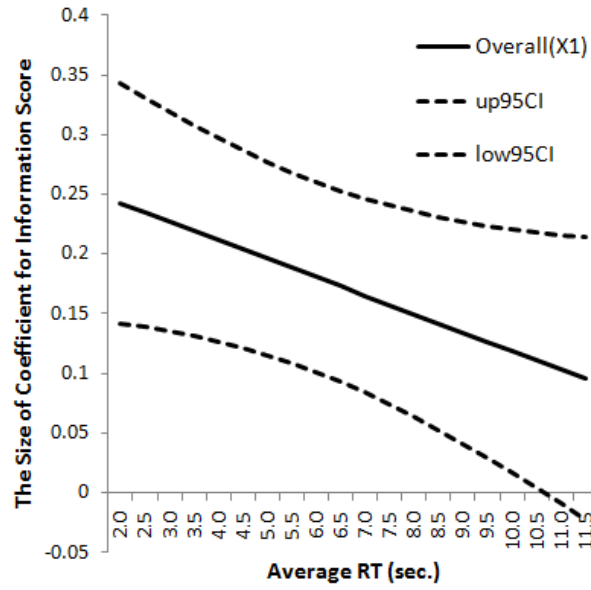
Figure 6: Overall Explanatory Power of the Info. Score on Participation Willingness Decreases as the Av. RT Increases (Waseda-CASI2010)

cient. It indicates that, for respondents who reach the average RT of above 10.7 seconds, consist about 10 percent of respondents, the information score has no significant power (p>0.05) to explain participation willingness. Using the factor score of participation willingness as a dependent variable, the average RT does condition the explanatory power of the information score. The standard error of residual is also improved from 0.817 in model 4 to 0.813 in model 5, indicates that the inclusion of the average RT and the interaction term improves the overall explanatory power of the predictive model.

To further specify the conditional effect of RT on the relationship between the information score and respondents' willingness to participate in politics, ordinal probit analysis is conducted on two individual participation willingness variables in Waseda-2010CASI – voting in elections and signing petitions. As explained in section 4.1.2, each participation variable has three response categories: 2 = "willing to participate," 1 ="neither" and 0 = "not willing to participate." Here, voting is a representative example of popular activity which almost everyone willing to participate, and signing petitions is a representative example of unpopular activity which only the minority of the people willing to participate. While the overall "willing to participate" rate for voting is high (82.9%), that for signing

petitions is only 25%. For RT variables, the following models use median split RT for the each participation willingness question (i.e., voting in elections or signing petitions) instead of the average RT variable. The ordinal probit model for this analysis is specified as follows.

$$Pr(Voting/Signing = j) = \Phi(\tau_j - X_i\beta) - \Phi(\tau_{j-1} - X_i\beta)$$

$$X_i\beta = \boldsymbol{\beta_{1a}(Info.\ Score) + \beta_{1b}(Median\ Split\ RT) + \beta_{1ab}(Info.\text{*}RT) +}$$
$$\beta_2(Gender) + \beta_3(Age) + \beta_4(Education) + \beta_5(PartyIDStr.) + \beta_6(PoliticalInterest) +$$
$$\beta_7(CitySize) + \beta_8(Newsp.ReadingFr.) + \beta_9(InternetUse) + \beta_{10}(Soc.Trust) + \epsilon$$

Here, the model estimates the probabilities for a respondent to choose each response category j in voting in elections and signing petitions willingness variables, assuming that the response categories are ordered. The immediate result is shown in Table 4. It shows that, for each of the activities, RT does have conditional effects to weaken the explanatory power of the information score on participation willingness.

The sizes of conditional effects are simulated in Figure 7 and 8. The result for voting is shown in Figure 7. Two graphs show the cumulative simulated probability of each response category by short and long RT; the left graph is for short RT, and the right graph is for long RT.[29] The pale gray area indicates the simulated proportion of "willing to vote," gray area represents "neither" proportion, and black area shows "not willing to vote" proportion. Looking at the left graph with short RT, the information score clearly explains the willingness to vote: from minimum score (0) to the maximum score (3), the simulated proportion of "willing to vote" increases by 27.7%, from 70.6% to 98.4%. Almost all respondents with the maximum information score are willing to participate. On the other hand, in the right graph with long RT, "willing to vote" proportion only increases by 15.2% (from 73.4% to 88.6%) when the information score moves from the minimum to the maximum. Compare to those with short RT, those with long RT for the voting participation willingness question are less likely to increase their participation willingness as the information score goes up. The tendency is similar for the willingness

Table 4: Conditional Effect of RT on the Relationship Between the Information Score and Voting and Signing Petitions Willingnesses (Ordinal Probit / Waseda-CASI2010)

	Model6 Voting	Model7 Petition
Information Score	$0.533 \ (0.115)^*$	$0.303 \ (0.072)^*$
RT (Median Split)	$0.080 \ (0.165)$	$0.419 \ (0.137)^*$
Info*RT	$-0.340 \ (0.132)^*$	$-0.210 \ (0.090)^*$
Gender (Female)	$0.257 \ (0.098)^*$	$0.109 \ (0.072)$
Age	$-0.006 \ (0.004)$	$-0.007 \ (0.003)^*$
Education	$0.033 \ (0.055)$	$0.068 \ (0.039)^\dagger$
Party ID Strength	$0.050 \ (0.058)$	$0.095 \ (0.044)^*$
Political Interest	$0.207 \ (0.065)^*$	$0.124 \ (0.052)^*$
City Size	$-0.036 \ (0.036)$	$-0.001 \ (0.027)$
Newspap. Reading Freq.	$0.061 \ (0.033)^\dagger$	$0.058 \ (0.027)^*$
Internet Use	$0.198 \ (0.120)^\dagger$	$0.197 \ (0.089)^*$
Societal Trust	$0.124 \ (0.062)^*$	$0.079 \ (0.047)^\dagger$
Cutpoint (Unwilling||Neither)	$0.081 \ (0.352)$	$1.408 \ (0.288)$
Cutpoint (Neither||Willing)	$0.597 \ (0.352)$	$2.536 \ (0.294)$
AIC	1179.335	2333.885
Log Likelihood	-575.668	-1152.943
Num. obs.	1114	1116

Standard Errors in Parentheses $^*p < 0.05$, $^\dagger p < 0.1$

to sign petitions. The result is shown in Figure 8. For short RT respondents, "willing to sign" proportion increases by 27.9% when information moves from the minimum to the maximum, while, for long RT respondent, the size of increase is limited to 9.3%.

It should be noted that, though, especially under the low information score, those respondents who take long time to give opinions are actually more willing to participate in political activities than those who give opinions in short time. It rather strengthens the power of RT as a conditional factor than weakening it, but it should be note that the change in the meaning of RT might be occurring here: long RT with a small amount of information might represent more of deliberation than uncertainty.
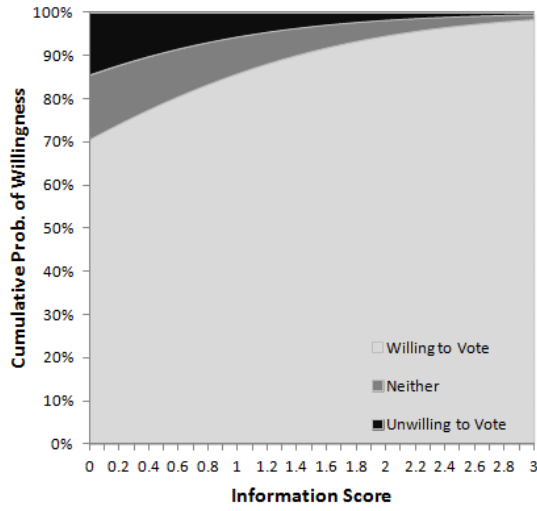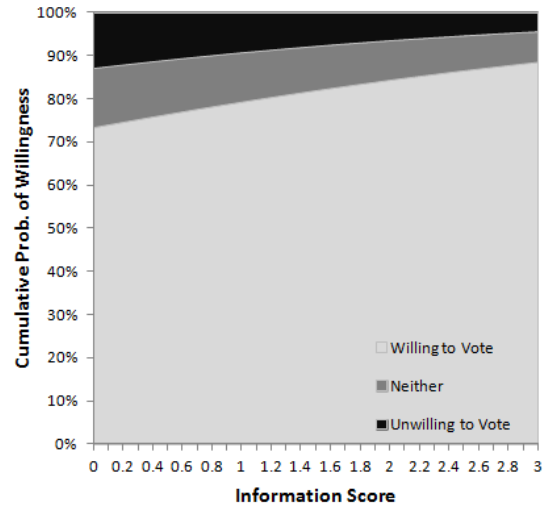
(a) Short RT   (b) Long RT

Figure 7: Simulated Conditional Effect of RT on Informed Participation
(Waseda-2010CASI: Voting in Elections)
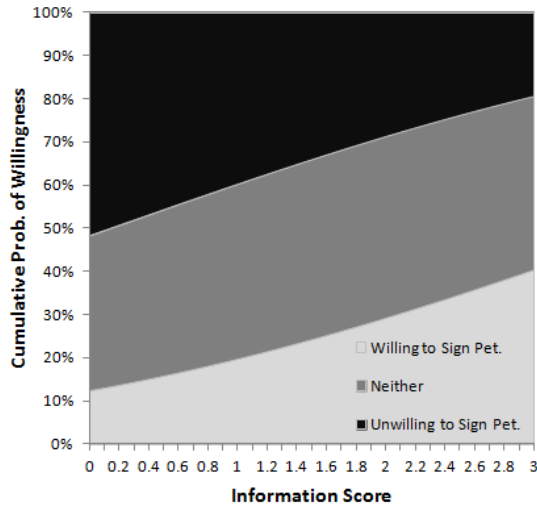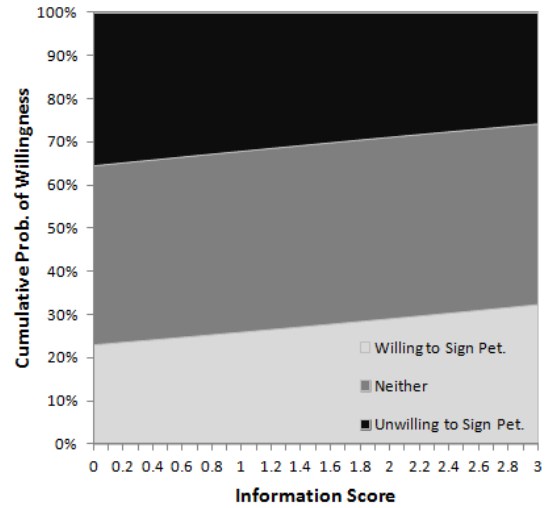
(a) Short RT   (b) Long RT

Figure 8: Simulated Conditional Effect of RT on Informed Participation
(Waseda-2010CASI: Signing Petitions)

Both OLS and ordinal probit results clearly show that when a person take long time to answer participation willingness questions, the power of the information score to explain participation willingness gets weaker. The effect persists for willingnesses toward different type of political activities, for a popular activity like voting to a minor activity like signing petitions. H3 is consistently supported. Whether a respondent take long or short time to

answer participation willingness questions does condition the relationship between information and participation willingness. The inclusion of "opinion uncertainty" dimensions in informed participation model helps to understand when and how information motivate a person to participate in politics. From the methodological perspective, the findings generally confirm the initial expectation on the meaning of RT – the lack of cognitive resources to process information possessed – except for the RT for those with the low information score. The further analyses on this point are made in the next subsection.

4.3 Change in the Meaning of *RT* and *DK Responses* and *Information*

In this subsection, using the dataset that involves all three political awareness measures, I examine trilateral relationships among information, DK and RT and their relationships with participation. Through the analysis, I explore the change in the meaning of RT along different levels of the DK rate and the information score.

4.3.1 Data: Survey on the Images of Foreign Countries and Current Topics (Waseda-Foreign)

The last dataset in use is the Survey on the Images of Foreign Countries and Current Topics[30] (Waseda-Foreign), which was conducted from October 2011 through September 2013, in 24 monthly waves of panel and fresh sample web surveys. This study utilizes the fresh sample for the November 2012 wave, which was conducted just before the HoR election in December 2012.

There are several caveats to utilize this survey. First, it is a web-survey, thus the respondent is not a representative sample of the population. This is probably not a serious issue when examines the relationships between variables, but just to note that the absolute values from this survey does not necessarily represent the reality. Second, its main focus on foreign affairs have some disadvantages to GLOPE2005 and Waseda-2010CASI; it does not include a wide range of information or political attitudinal questions as in other

two surveys. Moreover, it includes just one participation variable: voting willingness to the election in following month. The details of above limitations will be discussed later, but just note here that the relationships between political awareness variables and participation willingness might be underestimated in this survey: the real relationship is expected to be stronger.

Even with the above limitations, this survey has several features which makes it particularly appropriate for the analysis in this section. First, as an web survey, it records the RT for every question displays. Second, it includes DK and NA for each question. Third, it includes factual test questions to construct information measure. Fourth, in November 2012 wave includes the voting willingness question for the following December 2012 election. In short, this survey makes it possible to examine the trilateral relationships among DK, RT and information, and their relationship with voting participation. This is not possible in GLOPE2005 or in Waseda-2010CASI, since they do not include proper measures of DK and RT at the same time.

4.3.2 Construction of Variables

Voting Turnout Willingness. November 2012 wave of the survey includes the following question: "Do you vote in the next House of Representative election?" There are four response categories: "will vote," "will abstain," "undecided" and NA.[31] The analysis use first three categories, and recode them as a ordered variable – 2="will vote," 1="undecided" and 0="will abstain." NA is excluded from the analysis.

This variable has one major difference from the participation variables utilized in the preceding analyses. While participation variables in the preceding sections asks about the "general" willingness to participate in different political activities, this variable asks about the voting turnout intention to the specific election conducted in the following month of the survey. Thus, the variable is vulnerable to the event-specific elements from 2012 HoR election. Considering this potential problem, the analysis begins from the validity check of this dependent variable.

Information Score. The information score is constructed by using six factual test questions. It does not contain the three dimensions suggested by Delli Carpini and Keeter (1996), but since the questions tests the facts over wide range of foreign policy related issues, it is the best possible proxy of the general information score.[32] The score aggregates the correct responses to six factual test questions, divided by six thus it becomes a proportion of correct responses, ranges from 0 to 1.

DK Rate. The DK rate is constructed by DK responses to 37 attitudinal items.[33] It is calculated as the proportion of DK responses in all attitudinal items in a survey. The possible scores for the DK rate, thus, range from 0 to 1. As expected, the DK rate is negatively correlated with the information score, with Pearson's correlation coefficients of -0.401.

RT (Median Split). As in Waseda-CASI2010, RT is constructed as the dichotomous variable, divided by median. It uses RT for teh question of a willingness to turnout to vote in the election of the following month of the survey.[34]

Control Variables. Seven controls are included in analysis: gender, age, education, party ID strength, political interest, newspaper reading frequency, and Internet use. In the controls included in GLOPE2005 and Waseda-CASI2010 analysis, city size and societal trust are not included, since appropriate questions are not included in the Waseda-Foreign dataset.[35]

4.3.3 Results

To confirm the validity of the voting turnout willingness variable for Waseda-Foreign dataset, I use 2010 election-specific voting turnout willingness variable from GLOPE2010[36]

Table 5: Checking the Validity of Event-Specific Voting Willingness (Ordinal Probit)

	Waseda-CASI2010		Waseda-Foreign
	Model6 (Reproduced) General	Model8 2010 Election	Model9 2012 Election
Information Score	0.533 (0.115)*	0.337 (0.146)*	0.565 (0.144)*
RT (Median Split)	0.080 (0.165)	−0.369 (0.205)†	−0.630 (0.133)*
Info*RT	−0.340 (0.132)*	−0.206 (0.169)	−0.312 (0.230)
Gender (Female)	0.257 (0.098)*	0.012 (0.123)	0.286 (0.078)*
Age	−0.006 (0.004)	0.014 (0.005)*	0.016 (0.003)*
Education	0.033 (0.055)	0.002 (0.073)	0.093 (0.043)*
Party ID Strength	0.050 (0.058)	0.359 (0.065)*	0.584 (0.077)*
Political Interest	0.207 (0.065)*	0.324 (0.080)*	0.664 (0.047)*
City Size	−0.036 (0.036)	0.007 (0.045)	
Newspap. Reading Freq.	0.061 (0.033)†	0.116 (0.039)*	0.049 (0.022)*
Internet Use	0.198 (0.120)†	−0.116 (0.161)	−0.029 (0.022)
Societal Trust	0.124 (0.062)*	0.028 (0.078)	
Cutpoint (0‖1)	0.081 (0.352)	0.185 (0.466)	1.373 (0.254)
Cutpoint (1‖2)	0.597 (0.353)	1.471 (0.461)	2.592 (0.259)
AIC	1179.335	656.697	1899.179
Log Likelihood	−575.668	−314.348	−937.590
Num. obs.	1114	1118	1973

Standard Errors in Parentheses *$p < 0.05$, †$p < 0.1$

and conduct ordinal probit analysis parallel to model 6 and 7. Table 5 shows the result. For comparison, I reproduce the result from model 6 – the model with the dependent variable of "general" voting willingness.

Comparing model 6 with model 8 and model 9, the determinants in the three models are similar: there are some differences in the variation of statistically significant variables and the directions of the relationship, no variable are statistically significant *in* opposite directions. The information scores consistently have positive relationship with voting willingness, and the interaction terms show negative directions, although not statistically significant in model 8 and 9. Overall, event-specific voting willingness variables function fairly well, if not good as "general" willingness variable. One important difference, how-

ever, is in stand-alone RT variable. Looking at model 8 and 9, the coefficients for RT variables are negative and statistically significant, and the size of the effect is quite large. This implies one thing: in the analysis with event-specific voting willingness variable, RT may also represent whether a respondent already thought about the specific election or not. Regardless of their political awareness level, those who haven't thought about whether to participate in the following election takes time to answer the questions, and often times, choose "undecided." So, for part of those who have answered "undecided" with long RT, they may be willing to vote in elections "generally," but they haven't decided yet to vote for the specific election. Therefore, please note that the observed negative relationship of RT with participation willingness in the following analysis is possibly generated from the event-specific design of the dependent variable. When using the "general" willingness variable, this negative relationship may disappear.

The main result for this subsection is estimated by ordinal probit analysis, including three-way interaction terms to capture the relationships among three political awareness variables. Here, I assume that the explanatory power of each political awareness variable – the information score, the DK rate, and the median split RT – is conditioned by other two variables. The model is specified as follows:

$$Pr(Voting\ in\ 2012\ Election = j) = \Phi(\tau_j - X_i\beta) - \Phi(\tau_{j-1} - X_i\beta)$$

$$X_i\beta = \boldsymbol{\beta_{1a}(DK\ Rate) + \beta_{1b}(Info.\ Score) + \beta_{1c}(Median\ Split\ RT)) +}$$
$$\boldsymbol{\beta_{1ac}(DK*RT) + \beta_{1bc}(Info.*RT) +}$$
$$\boldsymbol{\beta_{1ab}(DK*Info.) + \beta_{1abc}(DK*Info.*RT) +}$$
$$\beta_2(Gender) + \beta_3(Age) + \beta_4(Education) + \beta_5(PartyIDStr.) + \beta_6(PoliticalInterest) +$$
$$\beta_7(Newsp.ReadingFr.) + \beta_8(InternetUse) + \epsilon$$

Table 6 shows the result for the main analysis. All control variables except for Internet use have statistically significant effect on participation. While gender variable shows that female is more likely to vote, coefficients for other control variables have theoretically expected directions.

Table 6: Three Way Interaction Model of Information, DK and RT on Voting Willingness (Ordinal Probit / Waseda Foreign)

	Model10
DK Rate	$-0.941\ (0.298)^{*}$
Information Score	$0.221\ (0.178)$
RT (Median Split)	$-0.944\ (0.181)^{*}$
DK*RT	$1.433\ (0.597)^{*}$
Info.*RT	$0.171\ (0.288)$
DK*Info.	$1.999\ (0.850)^{*}$
DK*Info.*RT	$-2.923\ (1.441)^{*}$
Gender (Female)	$0.275\ (0.079)^{*}$
Age	$0.017\ (0.003)^{*}$
Education	$0.088\ (0.043)^{*}$
Party ID Strength	$0.564\ (0.078)^{*}$
Political Interest	$0.659\ (0.048)^{*}$
Newspap. Reading Freq.	$0.047\ (0.023)^{*}$
Internet Use	$-0.031\ (0.022)$
Cutpoint (Will Abstain || Undecided)	$1.099\ (0.274)$
Cutpoint (Undecided || Will Vote)	$2.330\ (0.279)$
AIC	1895.662
Log Likelihood	-931.831
Num. obs.	1973

Standard Errors in Parentheses $^{*}p < 0.05$, $^{\dagger}p < 0.1$

While majority of the interaction terms in Table 6 are significant, it is hard to extract direct implications from the table. Therefore, to visually understand sizes and directions of conditional effect, I conduct two sets of simulations of cumulative probabilities (The way of interpretation is the same as in Figure 7 and 8). First, Figure 9 simulates the conditional effect of RT on the relationship between the information score and voting willingness, in conditions to different DK rate levels. Two graphs at the left hand side simulate the relationship between the information score and the voting willingness for short and long RT, both with the low DK rate (0%, lower 10 percentile). The graphs indicate that, for those who give no DK responses, longer RT does not condition to weaken

the explanatory power of the information score on voting willingness; Regardless of RT, the higher information score promotes the higher willingness to vote. Next, two graphs at the right hand side simulate the conditional effect of RT on the relationship between the information score and the voting willingness for the high DK rate respondents (32%, 90 percentile). In contrast to the left hand side graphs, those two graphs at the right hand side show that, for those who give DK responses frequently, longer RT does condition to weaken the explanatory power of the information score on participation. For short RT respondents, the simulated proportion of "will vote" increases by 23.2% (from 63.0% to 90.3%) as the information score moves from 0 (the minimum) to 1 (the maximum); for long RT respondents, the proportion of "will vote" increases by only 3.9% (from 48.3% to 52.1%) as the information score moves from the minimum to the maximum. To summarize the findings from Figure 9, the conditional effect of RT to weaken the explanatory power of the information score persists among those who give DK response frequently, while this conditional effect is significantly weakened among those with few DKs. H4 is confirmed.

The second set of simulations is shown in Figure 10. It simulates the conditional effect of RT on the relationship between the DK rate and voting willingness along different information scores. Two graphs at the left hand side show simulations for those with the low information score (the score is 0, the minimum), and other two graphs at the right hand side show simulations for those with the high information score (the score is 1, the maximum). Overall, H5 and H6 are confirmed; For those with the low information score, RT has a conditional effect to weaken the negative relationship of the DK rate with voting willingness, while, for those with the high information score, RT has a conditional effect to strengthen the negative relationship of the DK rate with participation. By changing its meanings, RT conditions the relationship between the DK rate and the voting willingness differently in different contexts.

The graphs in Figure 10, however, involve some unexpected findings. For H5, long RT for poorly informed respondents does more than weakening the DK's negative relationship with participation willingness; it goes further to reverse the direction of the coefficient,
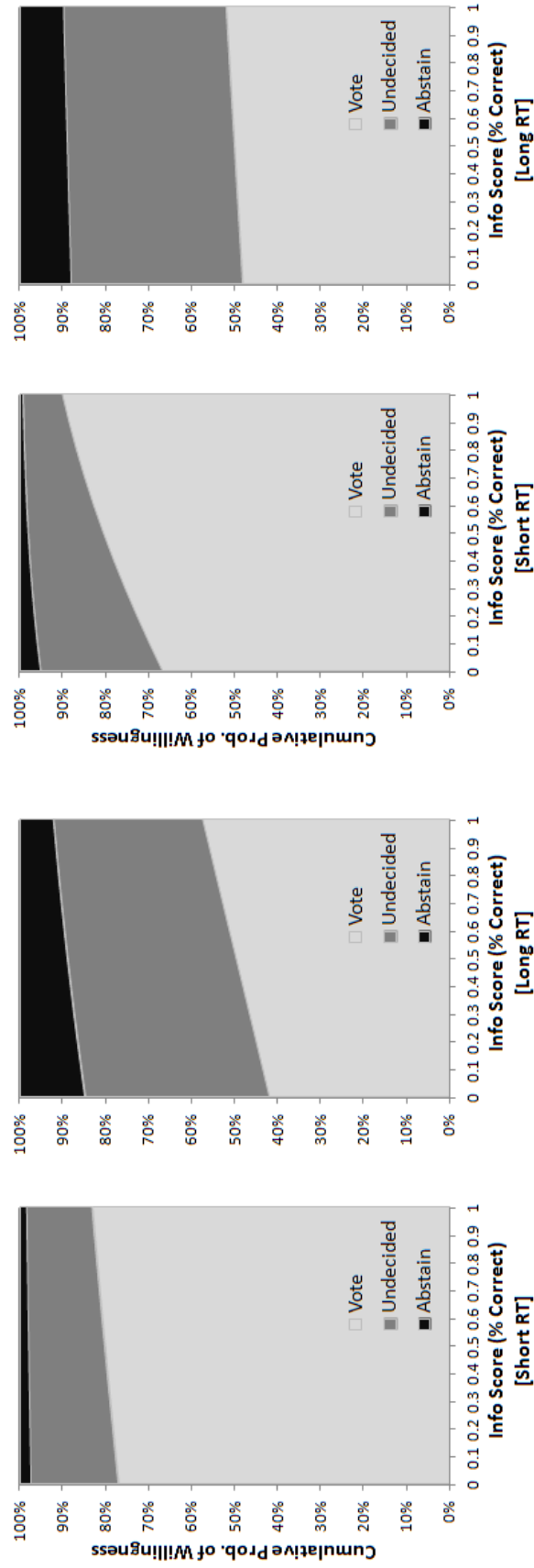
(a) Low DK Rate (0%)

(b) High DK Rate(32%)

Figure 9: Conditional Effect of the DK Rate on
Conditional Effect of RT on Informed Participation
(Waseda-Foreign)
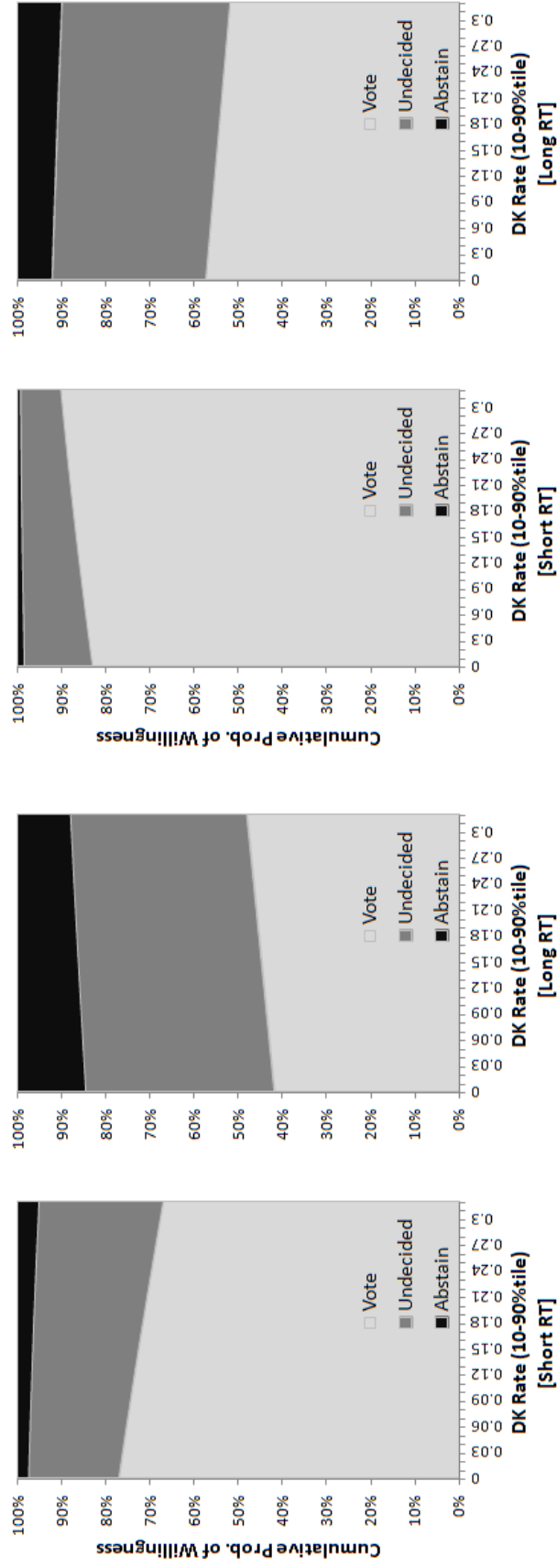
(a) Low Information (0)

(b) High Information (1)

Figure 10: Conditional Effect of the Information Score on Conditional Effect of RT on the DK Rate-Participation (Waseda-Foreign)

40

and, for respondents with the low information score and long RT, those with frequent DKsare now more willing to vote than those with few DK responses. For H6, those the high information score and short RT are more likely to be willing to vote as they give more DK responses. This might mean that, for those with the high information score and short RT to respond the willingness questions, "knowing what you don't know" may even promote participation. The above unexpected findings may be a result of error-prone event-specific voting willingness variable, but if it is true, the information score has an unexpectedly strong power to condition the conditional effect of RT on the relationship between the DK rate and voting willingness.

The above analysis reveals the complex but predictable change in the meaning of RT along different levels of the DK rate and the information score. Even with some limitations in the dependent variable, hypotheses are generally confirmed in the analysis. The results contribute to the discussions on the meanings of RT. By utilizing conditional variables as the DK rate or the information score, researchers can extract more genuine representation of uncertainty (or deliberation) through RT. The findings also indicate that two dimensions in political awareness are deeply connected together. The further exploration of relationships among political awareness measurements are waited to be done.

5 Discussion
– *Participate with Information but Uncertainty?*

In summary, the initial hypotheses were generally supported in the analysis. Firstly, the DK rate explains participation willingness as good as the information score does, even when the sizes of the relationship do not far exceed those from the information score. The ranges of effect are also identical between two scales as well. This indicates that a simple scale of the DK rate – just to give out opinions or not – can alternate the information scores as the scale for political awareness. Researchers looking for a sufficient proxy measure for

political information and cognitive resources may be able to do so easily without adding additional costs to survey administration. Secondly, the average RT (time to respond to the participation willingness question) weakens the positive relationship between the information score and participation willingness. Even when the respondent possesses a rich information, if they take long time to come up with their own opinions, the amount of information does not coincide with a willingness to participate in politics. The third analysis gives cues to understand the complex reality in examining the meaning of RT, finding that change in the meaning of RT occurs systematically along different levels of the DK rate and the information score. Utilizing two newly introduced variables, analyses in this thesis disclose the importance of "opinion uncertainty" dimension to get comprehensive understandings toward the relationship between political awareness and a willingness to participate in politics.

Then, what are the implications of the findings on citizens' democratic competence? The previous studies on democratic competence approach the issue mainly from two perspectives. First, studies on the role of political information tend to focus on the implications *after* the participation in politics. For example, Bartels (1996) imputed hypothetical "fully informed" vote choices using survey data, and explored its discrepancy from real-world voting preferences. Second, those discuss the role of heuristics focus on the sophistication of citizens *without* information. Almost all of those studies emphasize the role of information cue or shortcut among those with a limited amount of information (e.g., Lupia 1994, Lau and Redlawsk 2006). Both traditions assume that the highly informed people participate in political decisions automatically, making sophisticated choices. The findings from this study pose a question to this assumption; if their uncertainty level is high, even informed people may not be motivated enough to participate in politics. The findings from this study imply that information alone is not enough; even when one is "informed," we don't know whether the one can reach representative political "choices." In that, "opinion uncertainty" variables as DK and RT helps to differentiate citizens who are informed *and* certain thus really competent in making political decisions.

Finally, what are the possible policy implications from this study for political elites? Recently, in Japan, information on politics are increasingly available through variety of channels including newspaper, TV, radio, Internet, and twitter. It can probably be said that people have a better chance to absorb different types of information than before. On the other hand, the diversity in the information sources do not necessarily reduce the uncertainty. In 2014 HoR election, Prime Minister Abe contended that the central issue in the election is the extension of the starting date of the consumption tax hike, while no opposition parties went against this proposition; the election started with no major conflicted issue. This might be one of the reason why it recorded one of the lowest voting turnout in HoR election history, since the unconfrontational election environment should make voters uncertain about their preferences. As implied from findings in this study, if people cannot form political opinions with certainty due to unclear options provided by political elites, being informed does not necessarily motivate them to participate. In short, the above arguments suggests that, to raise the democratic competence of citizens, political elites should provide not only information but also clear choices.

6   Conclusion

The analyses in this thesis provide two major contributions to the literature. Firstly, it has substantial implications for multifaceted understanding regarding the relationship between political awareness and political participation. It shows that opinion uncertainty, the newly introduced dimension of political awareness, plays a critical role in explaining when the amount of political information possessed motivates a person to be willing to participate in political activities. Political awareness, as a predictor of participation willingness, is a collaboration of political information and opinion certainty. The second contribution is methodological. For DK, many studies do discuss its use as a dependent variable, finding non-randomness of DK, whereas almost none go as far as utilizing DK as an independent variable. For RT, only few survey studies discuss its use due to data

unavailability, although, with the rise of web and computer assisted surveys, recording of RT are increasingly available in recent survey data. Treating DK and RT as the indicators of opinion uncertainty, this thesis proposes a new perspective in survey research to utilize the rich data of DK and RT as meaningful predictors of political behavior.

Several caveats remain. One is the direction of causal relationships. For example, there is a possibility that the past participation experience may influence the current political awareness and participation willingness of respondents. An analysis using panel data or a more sophisticated statistical model may be required. Another is that the findings may be idiosyncratic to Japanese respondents. Since the DK rate and RT measures are simple to compute, their explanatory abilities in other survey contexts deserve exploration.

The next steps for this study can go in at least three directions. First, it can compare and explain the differences among different types of political activities. If different dimensions in political awareness have different relationships with different types of participation, it is interesting to examine the systematic elements in those differences. Second, the antecedent of the relationship between information and RT is worth exploring. For example, it is important to know the characteristics of the respondents with high participation willingness but with long RT and a lack of information. Third, the implications from DK and RT could go beyond the participation context. As Kuklinski et al. (2000) suggest, there are a significant amount of citizens who are quite certain about their opinions, but which are based on incorrect information. (See also Lee and Matsuo 2014) Those misinformed people may be eager to participate in politics, but they may make different decisions than informed people. If the level of opinion uncertainty and possession of information do not coincide with each other, there is a significance in examining the decision making process of those respondents. The above next steps would contribute to the further understandings of the competence of citizens in democratic environments.

Acknowledgements

Notes

[1]Also, some studies suggest that the scale underestimates the information level by excluding almost-correct responses in free answer questions (e.g., Gibson and Caldeira 2009, DeBell 2013).

[2]Some researches show that there are other factors to explain RT. For example, Bassili (2003) finds that those who perceive that their opinion is in a minority tend to take a longer response time than others. However, this "minority slowness effect" is supposed to be limited to sensitive questions. Others are the environmental factors: the speed of PC or the condition (e.g. weather) of the survey site can also be considered as the factors for a response time. (For the detailed review of potential RT determinants, see Arai and Mimura forthcoming.)

[3]In addition, the second proposition indicates that, for those with a small amount of information, RT may mean deliberation. This suggests that, for low information holders, longer RT may mean higher motivation to participate, further strengthening the conditional relationship. This expectation is confirmed in the analysis in Table 4.

[4]The GLOPE2005 Study, which is based on the paper and pencil method, was conducted by Masaru Kohno and Nishizawa Yoshitaka. The GLOPE2005 Study was made financially possible by the Open-Research-Center Enhancement Program (2004-2008, headed by Koichi Suga of Waseda University) of the Academic Research Advancement Promotion Programs for Private Universities, the Japanese Ministry of Education, Culture, Sports, Science and Technology, Japan. These datasets will be available in the near future from ICPSR, the University of Michigan (http://www.icpsr.umich.edu/) and/or the Social Science Japan Data Archive, the Institute of Social Science, the University of Tokyo (https://ssjda.iss.u-tokyo.ac.jp/en/). The author is given the data directly from the research project member. All the analyses in this study is conducted under the responsibility of the author; the research project members who have collected the data are not responsible.

[5]To confirm the results from this section, I replicate the analysis of this subsection by using another dataset, Waseda-2009CASI&PAPI, and got a similar result. If interested, check appendix E for this replication.

[6]Only six of them are asked in GLOPE2005. Also, there are other types of political activities asked in a survey, such as "party membership" or "support party activities (e.g., donation or reading party newspaper)." Participation in these activities possibly be considered as a result of party mobilization rather than self-motivation. This thesis's intent is to measure the impact of political awareness on democratic behaviors, not to find the characteristics of those who are easy to be mobilized. Therefore, they are excluded from the analysis.

[7]The exception is GLOPE2005, which does not provide "neither" option, so that the number of DK answers are inflated. Therefore, DK is recoded as "neither" and NA is defined as missing only for GLOPE2005.

[8]This may sound confusing since this study emphasizes the utility of DK responses, but the artificial recoding of DK/NA into "never participated" may lead to the overestimation of the DK rate scale's predictive power. Those who answered DK/NA to the other questions are expected to answer DK/NA to the political involvement questions. Thus the exclusion of DK/NA respondent to the political involvement questions can be justified as a strict test of the DK rate scale.

[9]Appendix Table A.1 and A.2 present the frequency distribution of participation willingness for each activity.

[10]Also, as Nishizawa and Kuriyama (2008) find, there are significant differences between participation levels in CASI and PAPI survey, due to supposed reduction of social desirability effect in CASI survey.

[11]See Appendix B for the detail of factor analysis.

[12]For a more detailed analysis on the constructions of political information items in GLOPE2005, please see Imai (2008) and Collet and Kato (2014).

[13]For each field, the aggregated score is divided by the number of questions in the field, so that the highest score for the each of the three fields is standardized into 1.

[14]The constructions are almost identical though using slightly different questions in Waseda-CASI2010. see further details in Appendix C.1.

[15]The dataset is in two-waves panel, questions in both waves are considered at the same time.

[16]This control variable utilizes the question which ask for agree or disagree towards the statement "Most people are trustworthy." Four point scale with "agree" getting the highest score. This variable is

intended to control the effect that DK is sometimes considered as a representation of "I don't want to be get involved."

[17]See detailed constructions of control variables in Appendix D.

[18]Detailed results for factor loadings are shown in appendix Table B.1.

[19]I also tested the models including NA rate, which has the same construction as the DK rate, but got statistically insignificant results. This confirms the expectation that NA is not necessarily a representation of cognitive inability or uncertainty.

[20]Gender is fixed to male, Internet use is fixed to not using, and other variables are fixed to mean.

[21]Variance Inflation Factor (VIF) for the political awareness variables are 1.41 for the DK rate and 1.61 for the information score. Thus there is no serious statistical problem in estimating the result with two variables in the same model.

[22]The study of the 2010 House of Councilors Election (Waseda-CASI) was collected by Computer Assisted Self-Administered Interview (CASI). The study was conducted by Aiji Tanaka (Principal Investigator), and by the members of this research project team, Yoshitaka Nishizawa, Airo Hino, Takeshi Iida, Ryosuke Imai with the help from Yomiuri Shimbun Public Opinion Poll Department. It also appreciated help of Masahisa Endo, Ryo Hosogai, Kiichiro Arai, Norihiro Mimura, and Arata Yamazaki. Waseda-CASI2010 was made financially possible by the Grant-in-Aid for Scientific Research (A) (#18203008), the Japanese Ministry of Education, Culture, Sports, Science and Technology. These datasets will be available in the near future from ICPSR, the University of Michigan (http://www.icpsr.umich.edu/) and the Social Science Japan Data Archive, the Institute of Social Science, the University of Tokyo (https://ssjda.iss.u-tokyo.ac.jp/en/). The author is given the data directly from the research project member. All the analyses in this study is conducted under the responsibility of the author; the research project members who have collected the data are not responsible.

[23]Specifically, it accepts DK and NA only when a respondents forces to proceed to next question without answering a question by pressing "next page" button on a computer screen. In other words, a respondent may never notice that there are nonresponse option until they find out the above system; this characteristic makes the number of DK and NA responses in CASI format not only exceptionally small but also unreliable.

[24]As several studies suggest (e.g., Krosnick et al. 2002), the existence of exit options like DK or NA makes an uncertain respondent to shortcut and quickly choose this options, thus bias the RT downwards.

[25]Again, to confirm the results from this section, I also replicate the analysis of this subsection by using Waseda-2009CASI&PAPI dataset, and got a similar result. If interested, check appendix E for the replication.

[26]Some previous studies transform RT by controlling for individual "baseline" RT ((see detailed discussion in Mayerl 2005)), but this study would not take this direction for two reasons. Firstly, this study focuses on respondent's "general" tendency in RT, so controlling for baseline RT may take away the critical information that this study is interested in. Secondly, the analysis models consider the impact computer literacy by controlling for age and Internet use; thus, the external causes of baseline RTs are (at least partially) filtered away.

[27]Those respondents who took more than 10 minutes (or 600 seconds) to answer at least one of the items are excluded from the analysis due to supposed bias on the individual average response time, and also as outliers.

[28]See appendix Table B.1 for the details of factor analysis.

[29]For other variables, gender is fixed to male, Internet use is fixed to using, and all else are fixed to mean.

[30]Data of the Survey on the Images of Foreign Countries and Current Topics (data depositor: Waseda University Research Institute of Contemporary Japanese Systems), will be available in the near future from the Social Science Japan Data Archive, the Institute of Social Science, the University of Tokyo (https://ssjda.iss.u-tokyo.ac.jp/en/). The author is given the data directly from the research project member. All the analyses in this study is conducted under the responsibility of the author; the research project members who have collected the data are not responsible.

[31]This question is also included in October 2012 wave, two months before the election. So, the confirmatory analyses were made by October 2012 dataset, and I found the similar tendency as in November 2012 wave.

[32]See details of original questions in Appendix C.1.

[33]See details of used questions in Appendix C.2.

[34]Outliers which exceeds 200 seconds are excluded from the analysis.

[35]See Appendix D for the detailed constructions of the variables.

[36]The question is asked in pre-election wave for the willingness of a respondent to participate in 2010 HoC election. The response categories are "will vote," "will abstain," "will vote by absentee ballot or early voting, " "did vote by absentee ballot or early voting," "undecided," DK and NA. For the analysis, "will abstain" is recoded to 0, "undecided" is recoded to 1, DK and NA are excluded, and all other categories are recoded to 2.

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Appendices

A Distributions of Participation Willingness Variables

Table A.1: Frequencies for Participation Willingness

		Willing to Participate (%)	Neither (%)	Not Willing to Participate (%)	N
Vote in Elections	2005-PAPI	87.75	2.95	9.30	1355
	2010-CASI	82.93	9.45	7.63	1154
	2009-PAPI	93.9	4.06	2.03	689
	2009-CASI	84.95	9.03	6.02	598
Attend Party/ Politician's Meetings	2005-PAPI	-	-	-	-
	2010-CASI	15.29	35.10	49.61	1151
	2009-PAPI	13.13	22.09	64.78	670
	2009-CASI	17.28	35.74	46.98	596
Contact Local/ National Politicians	2005-PAPI	6.82	11.24	81.95	1335
	2010-CASI	7.54	34.84	57.63	1154
	2009-PAPI	2.83	12.5	84.67	672
	2009-CASI	9.24	33.78	90.76	595
Consult Local Offices	2005-PAPI	33.98	21.86	44.16	1345
	2010-CASI	37.83	33.74	28.43	1150
	2009-PAPI	10.83	25.56	63.61	665
	2009-CASI	42.79	33.05	24.16	596
Sign Petitions	2005-PAPI	-	-	-	-
	2010-CASI	25.00	39.32	35.68	1152
	2009-PAPI	18.8	31.38	49.32	665
	2009-CASI	27.44	44.11	28.45	594

Table A.2: Frequencies for Participation Willingness (Continues)

		Willing to Participate (%)	Neither (%)	Not Willing to Participate (%)	N
Join Demonstration/	2005-PAPI	9.06	10.74	80.20	1313
Rallies	2010-CASI	6.00	25.57	68.43	1150
	2009-PAPI	4.65	16.34	79.01	667
	2009-CASI	6.04	27.52	66.44	596
Vote	2005-PAPI	-	-	-	-
in Referendums	2010-CASI	30.19	36.04	33.77	1146
	2009-PAPI	20.72	23.68	55.61	642
	2009-CASI	36.49	36.82	26.69	592
Work as Volunteers	2005-PAPI	42.13	14.84	43.03	1341
	2010-CASI	39.01	36.06	24.93	1151
	2009-PAPI	32.38	28.19	39.43	667
	2009-CASI	41.78	38.76	19.46	596
Join Actively in	2005-PAPI	44.14	12.75	43.11	1357
a Residential Assoc.	2010-CASI	28.76	39.88	31.36	1151
	2009-PAPI	27.61	32.54	39.85	670
	2009-CASI	26.59	42.98	30.43	598
Submit	2005-PAPI	-	-	-	-
Public Comments	2010-CASI	9.98	35.29	54.73	1142
	2009-PAPI	6.97	21.06	71.97	603
	2009-CASI	9.48	42.64	47.88	591

B Factor Analysis to Create General Participation Willingness Score

Table B.1: Factor Loadings for Participation Willingness Scores

| | Factor Loadings | |
	GLOPE2005	Waseda-2010CASI
Vote in Elections	0.350	0.382
Attend Party/Politician's Meetings	-	0.565
Contact Local/National Politicians	0.349	0.594
Consult Local Offices	0.570	0.548
Sighn Petitions	-	0.630
Join Demonstrations/Rallies	0.474	0.588
Vote in Referendums	-	0.576
Work as Volunteers	0.642	0.595
Join Actively in a Residential Assoc.	0.603	0.592
Submit Public Comments	-	0.657

Table B.2: Summary Statistics for Participation Scales

	Mean	Std. Dev.	Median	Min.	Max.	N
GLOPE2005	0.000	0.778	-0.218	-1.209	2.537	1303
Waseda-2010CASI	0.000	0.918	-0.011	-1.644	2.076	1113
Waseda-2009CASI&PAPI(PAPI)	-0.168	0.706	-0.213	-1.374	1.902	655
Waseda-2009CASI&PAPI(CASI)	0.251	0.750	0.264	-1.374	1.902	591

Waseda-2009CASI&PAPI(PAPI) uses factor weights for GLOPE2005 (activities not in GLOPE2005 are not used)

Waseda-2009CASI&PAPI(CASI) uses factor weights for Waseda-2010CASI

C   Constructions of Political Awareness Variables

C.1   Information Scores

Institutional Knowledge

    GLOPE2005(4): War renunciation in the Japanese Constitution is article nine / Possible number of appeals in the Japanese court system is three / Cabinet is responsible for executing policies towards Diet / Know the name of "citizen judge system"

    Waseda-2010CASI(3): Possible number of appeals in the Japanese court system is three / Cabinet is responsible for executing policies towards Diet / The term for the members of House of Councilors is six years

    Waseda-2009CASI&PAPI(3): Same as in Waseda-2010CASI

Party Policy Knowledge

    GLOPE2005(7): LDP is more active than DPJ toward postal privatization / DPJ is more active towards the unification reform of pension system than LDP / Know electoral campaign catch phrases for LDP / DPJ / CGP(Komei) / JCP / and SDP

    Waseda-2010CASI(3): LDP is more active about strengthening Japan-US alliance than DPJ / LDP is more active about raising tax than DPJ / DPJ is more active about giving voting rights to foreigners than LDP

    Waseda-2009CASI&PAPI(3): DPJ is more active about limiting heredity of politicians than LDP / LDP is more active about raising tax than DPJ / DPJ is more active about banning corporate contribution than LDP

Political Leader Knowledge

    GLOPE2005(2): Know the title of Kohno, Yohei / and Tony Blair in 2005

    Waseda-2010CASI(3): Know the titles of Nagatsuma, Akira / Okada, Katsuya / Ozawa, Sakihito in 2010

    Waseda-2009CASI&PAPI(3): Know the titles of Masuzoe, Yoichi / Yosano, Kaoru / and Hamada, Yasukazu in 2009

Foreign Policy Knowledge (Only in Waseda-Foreign, November 2012 Wave)

    Waseda-Foreign (6): The nationality of UN Secretary-General is South Korea / NATO is a military alliance of US, Canada, and major European countries / IMF is International Monetary Fund / The int'l agreement in 1985 to regurate exchange rates is Plaza Accord / The int'l orgnaization with Japanese chief is IAEA / The country with the largest Islamic population is Indonesia.

Table C.1: Summary Statistics for the Information Scores

	Mean	Std. Dev.	Median	Min.	Max.	N
GLOPE2005	1.055	0.748	0.964	0	3	1397
Waseda-2010CASI	1.200	0.763	1.333	0	3	1433
Waseda-Foreign	0.546	0.321	0.500	0	1	2137
Waseda-2009CASI&PAPI(PAPI)	1.304	0.719	1.333	0	3	840
Waseda-2009CASI&PAPI(CASI)	1.377	0.754	1.333	0	3	763

C.2 DK Rates

The DK rate utilizes the following set of questions in GLOPE2005, Waseda-Foreign and Waseda-CASI&PAPI2009. The question contents are omitted in here due to space limitation. Please check http://www.cinaic.jp/survey and http://www.cjs-waseda.jp/surveys/surveys.html for wording details.

GLOPE2005 (103 items): A2, A4LDP, A4DPJ, A4CGP, A4JCP, A4SDP, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, A16, A17, A18A1, A18A2, A18A3, A18A4, A18A5, A18A6, A18A7, A18A8, A18B1, A18B2, A18B3, A18B4, A19A, A19B, A19C, A19D, A19E, A19F, A19G, A19H, A20, A21A1, A21A2, A22A, A22B, A22C, A22D, A22E, A22F, A24, A26A, A26B, A26C, A26D, A27, A31A, A31B, A31C, A31D, A31E, A31F, A34, A36ALDP, A36ADPJ, A36ACGP, A36AJCP, A36ASDP, A36AIDP, A36BLDP, A36BDPJ, A36BCGP, A36BJCP, A36BSDP, A36BIDP, A37, A38, A39, A40A, A40B, A40C, A40D, A41A, A41B, A41C, A41D, A42, A44, A47, A48, A50, A54A, A54B, A54C, A54D, A54E, A55, A56, A57, A58A, A58B, A58C, A58D, A58E, A58F

Waseda-Foreign (37 items / November 2012 Wave): q03, q04, q05, q06_1, q06_2, q06_3, q06_4, q06_5, q06_6, q06_7, q06_8, q11_1_1, q11_1_2, q11_1_3, q11_2, q11_3, q11_5_1, q11_5_2, q11_5_3_1, q11_5_3_2, q11_5_3_3, A2, q12_01, q12_02, q12_03, q12_04, q12_05, q12_06, q12_12, q12_13, q12_14, q12_15, q12_16, q13, q16, q20, q21, q24a

Waseda-2009CASI&PAPI (114 items): a3, a4s1LDP, a4s1DPJ, a4s1CGP, a4s1JCP, a4s1SDP, a4s1PNP, a5, a6, a7, a9, a10, a11, a12, a13, a14, a15, a16, a17, a18, a23a, a23b, a23c, a24, a25a, a25b, a25c, a26a1, a26a2, a26a3, a26a4, a26a5, a26a6, a26a7, a26a8, a26b1, a26b2, a26b3, a26b4, a26b5, a26b6, a26b7, a26b8, a27, a28, a29a, a29b, a29c, a30a1, a30b1, a30c1, a31s1, a31s2, a31s3, a31s4, a31s5, a31s6, a31s7, a31s8, a32s1, a32s2, a33a, a33b, a33c, a33d, a33e, a33f, a33g, a33h, a34a, a34b, a34c, a34d, a34e, a34f, a35, b5a, b5b, b5c, b6a, b7a, b7b, b7c, b7d, b7e, b7f, b7g, b7h, b7i, b7j, b7k, b7l, b7m, b8a, b8b, b8c, b8d, b8e, b8f, b9a, b14a, b14b, b14c, b14d, b15, b16, b17a, b17b, b17c, b17d, b17e, b17f, b17g, b17h

Table C.2: Summary Statistics for the DK Rates

	Mean	Std. Dev.	Median	Min.	Max.	N
GLOPE2005	0.074	0.115	0.029	0	1	1397
Waseda-Foreign	0.109	0.175	0.027	0	0.973	2197
Waseda-2009CASI&PAPI(PAPI)	0.042	0.082	0.009	0	0.719	694

D   Constructions of Control Variables

Demographic / Structural Variables (DK and NA are missing)

Gender (All Datasets): [Male=0; Female=1]

Age (All Datasets): [Row Age]

Education (GLOPE2005): How many years you attended a school. [(Less than 9 years)= 1; (9-12 years) = 2; (13-15 years) = 3; (16 years or over) = 4]

Education (Waseda-CASI2010, Waseda-CASI&PAPI2009): Tell me the last school you attended (or the school that you are attending now). [(Elementary school / common elementary school / upper elementary school for a person educated before WWII) = 1; (Old system-middle school, women's school for a person educated before WWII) = 2; (Old system-upper specialty school / old system-high school for a person educated before WWII) = 3; (Old system-technical school / prep. school old system-college / university) = 4; (Elementary school / junior high school for a person educated after WWII) = 1; (Senior high school for a person educated after WWII) = 2; (Technical / vocational school / two-year junior college, higher technical school for a person educated after WWII) = 3; (Four-year collage / university / graduate school for a person educated after WWII) = 4]

Education (Waseda-Foreign): Which of these is the school that you last attended (or are now attending)? [(Primary school / junior high school)= 1; (High school) = 2; (Junior college / technical college / technical school) = 3; (University / graduate school) = 4]

City Size (GLOPE2005, Waseda-CASI2010, Waseda-CASI&PAPI2009): [(Fifteen major cities) = 5; (Over 200,000) = 4; (Over 100,000) = 3; (Other Cities) = 2; (Towns and Villages) = 1]

Attitudinal / Behavioral Variables (DK and NA are missing)

Party ID Strength (GLOPE2005, Waseda-CASI2010, Waseda-CASI&PAPI2009): Putting elections aside for a moment, which party do you normally support? [(Have supporting party + strong support)= 3; (Have supporting party + not strong support) = 2; (No supporting party + have preferred party) = 1; (No supporting party + no preferred party) = 0]

Party ID Strength (Waseda-Foreign): Not speaking about elections, which party do you usually support? [(Have supporting party)=1; (Have no supporting party)=0]

Political Interest (All Datasets): Are you interested in politics? [Interested = 4; Somewhat interested = 3; Not very interested = 2; Not interested at all = 1]

Newspaper Reading Frequencies (All Datasets): How often do you read newspapers? [Never = 1; Once a week = 2; 2-3 days a week = 3; 4-5 days a week = 4; (Almost) everyday = 5]

Internet Use (GLOPE2005, Waseda-CASI2010, Waseda-CASI&PAPI2009): Do you use the Internet on your computers or cellular phones? [Yes = 1; No = 0]

Internet Use (Waseda-Foreign): On average how much do you use Internet every day? [Less than 30 minutes = 1; 30 minutes - less than 1 hour = 2; 1 hour - less than 2 hours = 3; 2 hours - 3 hours = 4]

Societal Trust (GLOPE2005, Waseda-CASI2010, Waseda-CASI&PAPI2009): Most people are trustworthy. [Agree = 1; Somewhat agree = 2; Somewhat disagree = 3; Disagree = 4]

E   Analysis using Waseda-2009CASI&PAPI

The study of the 2009 House of Representatives Election (Waseda-CASI&PAPI2009) is composed of two surveys. One is the Waseda Study of Computer Assisted Self-Administered Interview 2009 (Waseda-CASI2009), and the other is Waseda Study of Paper-and-Pencil Interview (Waseda-PAPI2009). Waseda-CASI2009 was made financially possible by the Grant-in-Aid for Scientific Research (A) (#18203008), the Japanese Ministry of Education, Culture, Sports, Science and Technology. Waseda-PAPI2009 was made financially possible by the Open-Research-Center Enhancement Program (2004-2008, headed by Koichi Suga of Waseda University) of the Academic Research Advancement Promotion Programs for Private Universities, the Ministry of Education, Culture, Sports, Science and Technology, Japan. These datasets are available from the Social Science Japan Data Archive, the Institute of Social Science, the University of Tokyo (https://ssjda.iss.u-tokyo.ac.jp/en/). The author is given the data directly from the research project member. All the analyses in this study is conducted under the responsibility of the author; the research project members who have collected the data are not responsible.

Waseda-CASI&PAPI2009 was conducted in two waves, before and after the 2009 HoR election in Japan. This survey is particularly appropriate in validating the results in the main analysis. It splits the identical questionnaire into two data collection formats of PAPI and CASI. Both PAPI and CASI suppress DK and NA by not offering DK and NA options openly, while PAPI get more DKs (4.2% in average) than CASI (0.8% in average). Interviewers in PAPI survey were specifically instructed to pick up DK and NA answers by observing the reaction of respondents, so PAPI can record more DKs than CASI. This means that Waseda-CASI&PAPI2009 can confirm the both of main results in section 4.1 and 4.2 by using the same set of questions.

At the same time, this survey has several notable limitations. First, the circumstances in 2009 HoR election was unusual. In 2009, Democratic Party of Japan won the election for the first time, and Liberal Democratic Party lost the cabinet positions for the second time ever in postwar history. In this election, voter's political interests may be inflated, and the respondents are generally expected to express higher participation willingness than usual. Thus, the genuine relationship between political awareness and participation willingness might be weakened. Second limitation is technical. As it is already noted, Waseda-CASI&PAPI2009 does not offer explicit DK/NA options in a survey. Considering that, potential DK givers may turn out to give some opinions, and it may weaken the DK rate's relationship with participation willingness. With above limitations, the results from Waseda-CASI&PAPI2009 may come out weaker, but there is no reason to expect different relationships. The construction of variables are detailed in appendix B and C.

Table E.1 shows the result parallels to Table 2. The direction and relative size of coefficients for the DK rate and the information score are same as in GLOPE2005, while the absolute size of the relationships are weaker in Waseda-CASI&PAPI2009. Table E.2 and Figure E.2 shows the result parallels to Table 3 and Figure 6. Again, the size of coefficients are slightly smaller, but the overall directions of the effect are the same. Table E.3, Figure E.3 and Figure E.4 shows the result parallels to Table 4, Figure 7 and Figure 8. These results also confirm the ones from the main analysis.

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Table E.1: Comparing the Powers of the DK rate and the Information Score in Explaining Participation Willingness (OLS / Waseda-CASI&PAPI2009(PAPI))

	Model E1	Model E2	Model E3
DK Rate	$-0.747\ (0.421)^{\dagger}$		$-0.659\ (0.437)$
Information Score		$0.052\ (0.043)$	$0.034\ (0.045)$
Gender (Female)	$-0.042\ (0.054)$	$-0.040\ (0.055)$	$-0.034\ (0.055)$
Age	$-0.007\ (0.002)^{*}$	$-0.008\ (0.002)^{*}$	$-0.007\ (0.002)^{*}$
Education	$0.061\ (0.030)^{*}$	$0.059\ (0.030)^{*}$	$0.056\ (0.030)^{\dagger}$
Party ID Strength	$0.081\ (0.029)^{*}$	$0.085\ (0.029)^{*}$	$0.082\ (0.029)^{*}$
Political Interest	$0.186\ (0.035)^{*}$	$0.189\ (0.036)^{*}$	$0.180\ (0.036)^{*}$
City Size	$-0.026\ (0.020)$	$-0.022\ (0.020)$	$-0.025\ (0.020)$
Newspap. Reading Freq.	$0.051\ (0.020)^{*}$	$0.051\ (0.020)^{*}$	$0.049\ (0.020)^{*}$
Internet Use	$0.138\ (0.067)^{*}$	$0.133\ (0.067)^{*}$	$0.135\ (0.067)^{*}$
Societal Trust	$0.109\ (0.033)^{*}$	$0.111\ (0.033)^{*}$	$0.108\ (0.033)^{*}$
(Intercetpt)	$-1.063\ (0.199)^{*}$	$-1.133\ (0.194)^{*}$	$-1.066\ (0.199)^{*}$
R^2	0.190	0.187	0.190
Adj. R^2	0.176	0.174	0.176
SE of Residual	0.643	0.644	0.643
Num. obs.	622	622	622

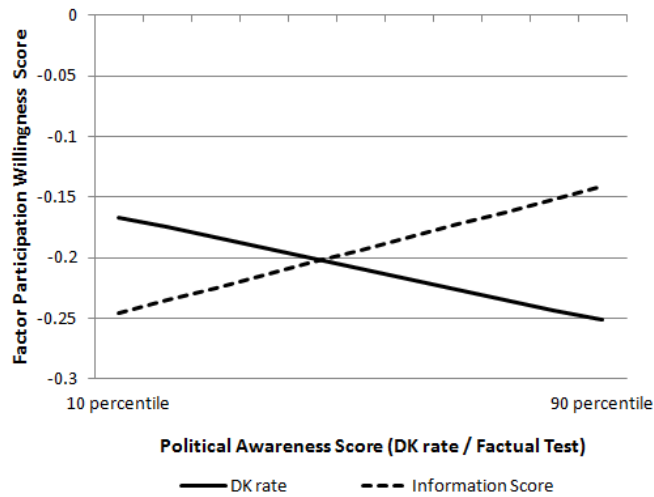Standard Errors in Parentheses $^{*}p < 0.05$, $^{\dagger}p < 0.1$

Figure E.1: The Simulated Effect Sizes of Political Awareness Scales in Explaining Participation Willingness (Waseda-CASAI&PAPI2009(PAPI))

Table E.2: Conditional Effect of RT on Informed Participation
(OLS / Waseda-CASI& PAPI2009(CASI))

	Model E4	Model E5
Information Score	$0.203\ (0.053)^{*}$	$0.279\ (0.077)^{*}$
Average RT		$0.049\ (0.015)^{*}$
Information*Average RT		$-0.012\ (0.009)$
Gender (Female)	$-0.008\ (0.072)$	$-0.004\ (0.072)$
Age	$-0.006\ (0.003)^{*}$	$-0.010\ (0.003)^{*}$
Education	$0.181\ (0.039)^{*}$	$0.191\ (0.039)^{*}$
Party ID Strength	$0.034\ (0.041)$	$0.026\ (0.041)$
Political Interest	$0.231\ (0.052)^{*}$	$0.206\ (0.052)^{*}$
City Size	$-0.046\ (0.026)^{\dagger}$	$-0.050\ (0.026)^{\dagger}$
Newspap. Reading Freq.	$0.005\ (0.025)$	$0.012\ (0.024)$
Internet Use	$0.198\ (0.087)^{*}$	$0.235\ (0.087)^{*}$
Societal Trust	$0.128\ (0.048)^{*}$	$0.130\ (0.048)^{*}$
(Intercetpt)	$-1.392\ (0.254)^{*}$	$-1.483\ (0.258)^{*}$
R^2	0.243	0.263
Adj. R^2	0.229	0.247
SE of Residual	0.778	0.769
Num. obs.	557	557

Standard Errors in Parentheses $^{*}p < 0.05$, $^{\dagger}p < 0.1$
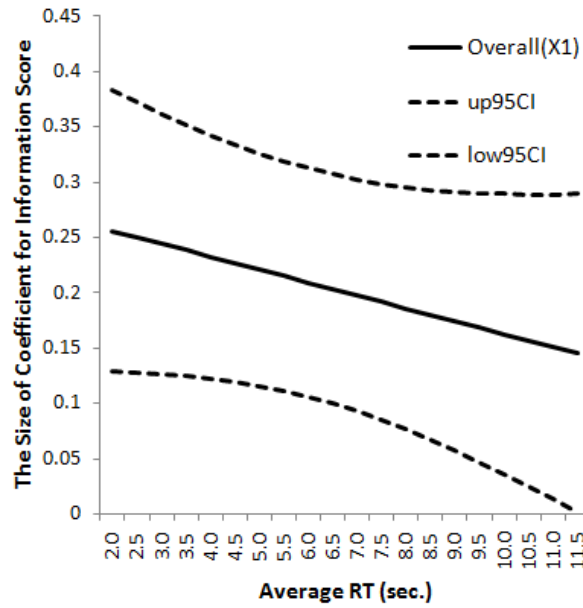

Figure E.2: Overall Impact of the Info. Score on Participations Decrease as an Av. RT
Increases (Waseda-CASI&PAPI2009(CASI))

Table E.3: Conditional Effect of RT on the Relationship Between the Information Score and Voting and Signing Petitions Willingnesses (Ordinal Probit / Waseda-CASI&PAPI2009(CASI))

	Model E6 Voting	Model E7 Petition
Information Score	0.554 (0.184)*	0.410 (0.167)*
RT (Median Split)	0.018 (0.279)	−0.173 (0.281)
Info.*RT	−0.462 (0.210)*	−0.241 (0.203)
Gender (Female)	−0.087 (0.148)	−0.107 (0.146)
Age	0.004 (0.006)	0.002 (0.006)
Education	0.163 (0.085)†	0.203 (0.085)*
Party ID Strength	0.035 (0.079)	0.043 (0.079)
Political Interest	0.224 (0.097)*	0.240 (0.097)*
City Size	−0.015 (0.055)	−0.019 (0.054)
Newspap. Reading Freq.	−0.038 (0.052)	−0.036 (0.051)
Internet Use	0.163 (0.174)	0.116 (0.174)
Societal Trust	0.124 (0.098)	0.112 (0.097)
Cutpoint (Unwilling||Neither)	0.151 (0.523)	0.043 (0.513)
Cutpoint (Neither||Willing)	0.754 (0.522)	0.646 (0.512)
AIC	547.685	552.979
BIC	608.573	613.867
Log Likelihood	−259.843	−262.490
Deviance	519.685	524.979
Num. obs.	572	572

Standard Errors in Parentheses $^*p < 0.05$, $^†p < 0.1$
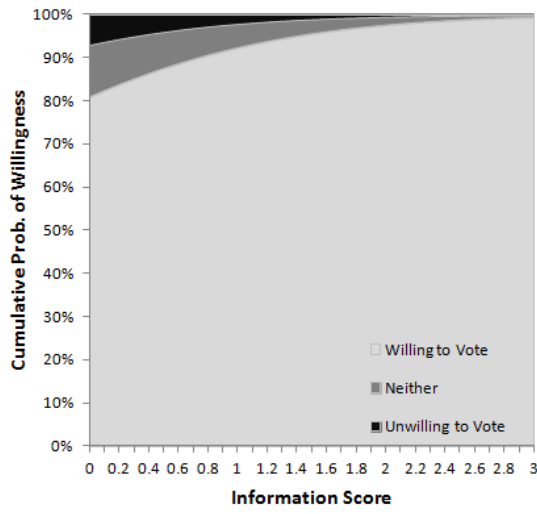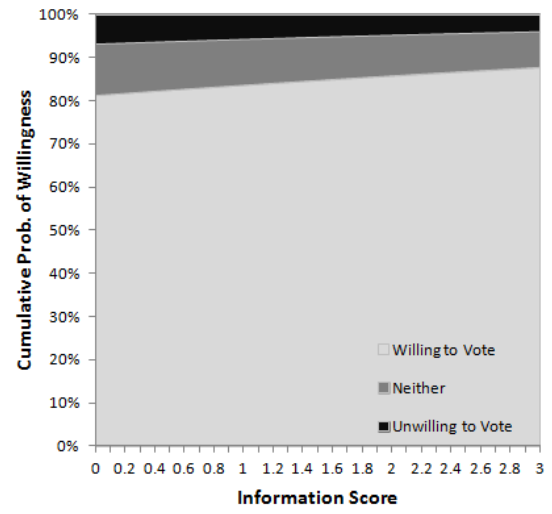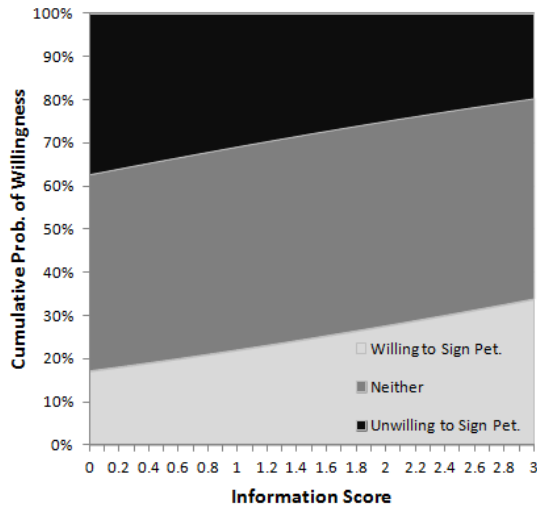
(a) Short RT   (b) Long RT
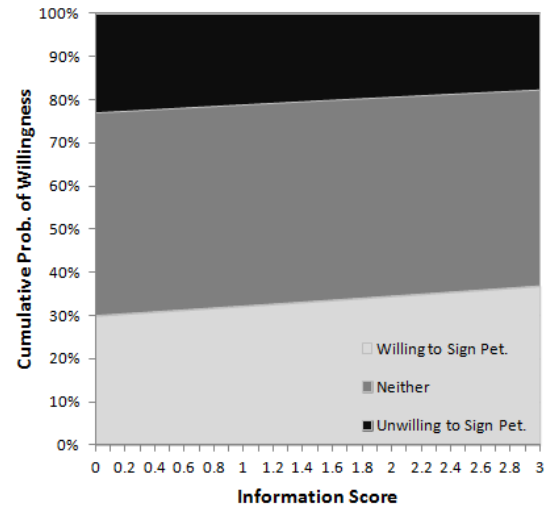
Figure E.3: Simulated Conditional Effect of RT on Informed Participation
(Waseda-CASI&PAPI2009: Voting in Elections)

(a) Short RT   (b) Long RT

Figure E.4: Simulated Conditional Effect of RT on Informed Participation
(Waseda-CASI&PAPI2009: Signing Petitions)