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Complementary Role of Web Experiment

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1. Introduction

When the CASI project started, we intended to test a causal hypothesis by experiment, which makes full use of the CASI technology. We name this experiment "Computer Administrated-Self Experiment (CASE)". Given that CASE is normally conducted as a part of social opinion survey using CASI technology, CASE is directed to randomly selected sample and in this experimental environment, experimenters are usually absent. Characteristics of CASE due to its technology, its sample and its environment produce not only advantages but also shortcomings as an experimental tool.

In 2007 we have realized a CASE by "visualization" of experimental instruction, which aim is to promote its advantages and reduce its shortcomings. It was the first time the new technologies were introduced to Japanese experimental field. From this first experience, we have obtained several meaningful suggestions to improve CASE, especially a crucial role of web experiment as a pilot experiment of CASE.

To explain how and why we have achieved this idea, we look back upon as concretely as possible the process through which we conducted the first CASE, revised it and prepared for a

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next CASE.

2. Characteristics of Experiment in General and a Feature of Experiment with Human being

Principal objective of experiment both in natural sciences and in social sciences is to test a causal hypothesis which is supposition or theory about on whether one thing causes another. For this objective, generally speaking, it is necessary for experimenters to create two distinct groups: experimental group and control group[6]. While the experimental group is the group of individuals subjected to the supposed cause being studied by experimenters, the control group is a group of those that have not been exposed to the supposed cause. Then if statistically significant difference of the frequencies of predicted effect between the experimental group and the control group is found, experimenters think that their causal hypothesis is confirmed for the moment because they can attribute difference of predicted effect to difference of groups.

Any experiment needs to assign *randomly* to subjects experimental and control treatments (conditions) in order to eliminate or cancel out potential causes (confounding variables) other than the supposed cause. This technique is more important in experiment which is intended for living things than in experiment which is directed to material substances, because variance of living things including human beings is much larger than materials. With this technique, the individual attributes in the different groups will be roughly equivalent and therefore any effect observed between groups can be linked to the supposed cause and is not a characteristic of the individuals in the group. "Random assignment" ensures confidence that we can place in the cause and effect relation in a study, "internal validity" of experimental research.

Objective of experiment and its technique do not differ essentially among branches of positive sciences. However regarding experimental research which subjects are human beings, whether this research requires human subjects to understand experimental/control conditions seems to provide a *practical* difference in experimental procedure.

On the one hand, there are experimental researchers which require their subjects to understand experimental/control conditions imposed by experimenter. We often come across such a research in social sciences. This kind of research tends to discover a cause of human decision making and/or human behavior in social environment in which she/he behaves and decides. For example, experimental economist, who thinks payoff structure with which people are confronted can affect their behavior, prepare different payoff structures to subjects and examine if they behave differently in different payoff structures as experimenter has expected.

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[6] Here we focus on between subjects design alone. Alternatively a hypothesis can be examined using within subject design, in which each individual experiences two distinct conditions: experimental and control condition.

Suppose that an experimental economist assigns different payoff structures— prisoner's dilemma type and coordination game type for example— to subjects and predicts that they cooperate more in the latter than in the former. In this experiment, experimenter consciously or unconsciously expects that subjects *understand* different payoff structures differently. Without their understanding, experiment cannot be realized in proper way. More generally speaking, in such an experiment it is (almost) always necessary that human subjects understand experimental/control conditions as experimenters have expected.

As a result, experiment of this type requires experimenters to do "manipulation check", that is, verification of whether their subjects can really understand conditions that are assigned to them. As these conditions are set up intentionally by experimenters to justify their supposed cause as valid, "manipulation check" is inevitable to test their causal hypothesis appropriately. Manipulation check is usually done either in post-questionnaire form or by interview after experiment.

On the other hand, there are experimental researches in which this requirement -human subjects must understand conditions imposed by experimenters to them- is usually unnecessary or lowered. Medical clinical research and physiological psychology are a typical example. These researches manipulate a physiological domains or materials. Therefore subject in such experiment actually need not to recognize the meaning of experimental/control conditions that experimenter have implemented. Necessity of "manipulation check" is also small.

3. Characteristics of "Computer Administrated-Self Experiment (CASE)

In this section, we explain first advantages and problems of CASE principally compared with laboratory experiment and lastly show one of the way to overcome these problems.

Advantages of CASE

Experiment in social sciences, which possess the feature discussed above, has been mainly conducted in laboratory. As subjects of laboratory experiment are usually university student not for theoretical reason but for practical reason, criticisms directed repeatedly against experimental research have been that neither the findings nor the inferences drawn from this limited sample can be generalized to general sample: lack of "external validity". The lack of external validity is more problematic, particularly when the hypothesis being tested in the experiment has something to do with phenomena that an interaction between experimental condition and subject's features may cause.

Suppose that we want to know an effect of medicine for cold. We organize an experimental group which is prescribed this medicine and control group which is not. And a significant difference of healing rate between two groups is observed. Can we conclude that this medicine

is useful? If this experiment were conducted only with young people, we could not conclude as such, because it is possible that this medicine is not efficacious for infants or elder people. In such a case, if we obtain an effect that we had predicted, it is not plausible to generalize this effect. This difficulty is due to the fact that effect is caused not only by experimental condition but by "interaction" between this condition and sample specificity. So it can be called "interaction problem".

As typical example in social phenomena, for which we have to care about this interaction problem, we can refer to political change, such as elections, demonstrations and revolutions, because in these phenomena subject's behavior and/or decision making can be strongly affected by her/his experience in their real life and her/his own characteristic[7].

CASE can overcome the lack of "external validity" because its subjects are randomly selected people. It is probable that with enormous pecuniary and human cost, we could realize a laboratory experiment with much wider range sample than university students. However even this kind of laboratory experiment can hardly make participate in experiment people who are difficult to come to laboratory, like physically handicapped people or parents of small children. CASE can do it, because we can bring an experimental environment implemented in mobile computer to the place where this kind of people is available. Hence it is natural to think that CASE is better than laboratory experiment in the matter of resolution of lack of "external validity".

In addition to the lack of "external validity", following two criticisms are also directed to laboratory experiment: "experimenter effect" and "Hawthorne effect." "Experimenter effect (Rosenthal effect)" means that experimenter's behavior, personality traits, or expectancies on the results of his/her own research can affect the performance or response of subjects in the experiment[8]. "Hawthorne effect" describes a phenomenon that in experiments with human subjects, the mere fact that the subjects are in laboratory setting makes them effortful and can change their behavior or response. CASE can also reduce these two effects because subjects in CASE setting can participate in experiment at their home without experimenter, because CASE is normally conducted as a part of social opinion survey using CASI technology[9].

We have so far pointed out advantages of CASE principally in comparison with laboratory

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[7] Given that CASE is normally conducted as a part of social opinion survey, we can also expect to examine which experience and characteristic may affect our interested social phenomenon by referring to this survey's data.

[8] In laboratory experiment, in which experimenter need not know instantly what is going on this place, it is not unusual that experimenter leave laboratory during experiment to deal with this effect.

[9] In CASE survey environment, the interviewers hand over the notebook computers at the beginning of the survey and the respondents are asked to type-in their answers directly. Experimenters are generally absent.

experiment. For the moment, let us look closely at its difficulties as an experimental tool.

Problems with CASE

On the one hand, because CASE is normally conducted as a part of social opinion survey using CASI technology, experimental subjects are at the same time respondents of this survey. Thus they should have spent time and energy to answer questionnaire before entering into experimental part[10]. Considering their time and physical constraint and keeping their concentration during experiment, experimenters need to make experimental instruction as short and uncomplicated as possible to reduce cognitive or physical burdens imposed on the subjects. It demands experimenters "simplification" of experimental procedures and instruction. On the other hand, variance of CASE subjects (randomly selected people) can be much larger than that of laboratory experiment subjects, because subjects in laboratory experiment are usually university students. This large sample variance in CASE asks experimenters not only to adjust their instruction level to people who have the biggest difficulty to understand instruction, but also to check in detail whether they sufficiently follow instruction without uneasiness("instruction check"). It is because subjects' sufficient comprehension of conditions assigned by experimenter is necessary to realize a proper experiment, as we have discussed before. These requirements should make experimental instruction long and detailed, that is, "sophistication". A *trade-off* between "simplification" and "sophistication" must be noted[11].

Compared with CASE, laboratory experiment does not suffer heavily from above trade-off. As subjects in laboratory experiment, younger than those in CASE, are usually *only* asked to participate in experiment, experimenters do not have to consider their tiredness and time constraint as seriously as in the case of CASE. Hence the requirement of "simplification" is comparatively light. Relatively high cognitive ability of university students lowers the requirement of "sophistication" also, because it is reasonable to expect that university students can understand experimental/control conditions better than randomly selected sample. We also consider two following points as a merit of laboratory experiment in comparison with CASE: in laboratory experiment we can conduct group type experiment and set up monetary incentive for subjects without much difficulty.

Considering strong and weak points of CASE together, we have decided to test our causal hypothesis in CASE setting, because this hypothesis is regarding voter's behavior about which we should take into account an interaction *possibly* caused by experimental conditions and

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[10] The reason why people have to answer a lot of opinion survey questions prior to experiment seems to be *conventional.*

[11] It is also noteworthy that large sample variance can be a serious obstacle to realize an experiment which has a complex game structure. More complex is experimental design, more difficult are subjects to understand it.

subject's features. It is, hence, reasonable to use randomly selected sample rather than university student sample. In this experiment conducted as a part of CASI2007, named CASE2007, we tried to apply a lot of flash animation and some photos in experimental instruction. We thought that this "visualization" could resolve above trade-off; on the one hand as it reduces the cognitive burdens imposed on the subjects, we can expect the same effect as "simplification" can provide; on the other hand as it makes an experimental instruction more comprehensive intuitively, it gives the same effect as "sophistication" is expected to give.

Before we attempt to explain a concrete case of "visualization" realized in CASE2007, we show a general reason why we mainly used flash animation rather than other audiovisual devices like video clip for our experiment.

Visualization of Instruction: Introducing Flash Animation

We usually make experimental instructions for university student participants with text and a small number of figures. The explanation is relatively abstract and depends more on text than figures. It has been working well in laboratory experiment, but it does not seem to be the case for CASE. In the CASE, we should introduce more intuitively understandable communication devices that help explanation by simple text. For example, such devices can be figures, pictures, movies, and sounds. These devices can make it easy to understand what text-based explanations mention. Upon implementing these devices, we got a cue from technology of internet. Nowadays there are enormous amount of internet users around the world, whose attributes –age, profession, education background, etc.- are really various. Two decades ago, before the age of internet, most of our online communication is text-based. Internet technology had huge impact for people because it makes it possible for people to communicate not only with text, but also figures, pictures, voice, movies etc. These innovations of communication devices helped a lot to obtain a vast amount of users from all over the world. This rapid diffusion of internet seems to be due to the fact that combination of several communication devices (for example text, voice and video) can create user friendly interface on the computer screen.

We thus decided to use multiple communication devices for CASE in addition to text and figures. At first a video clip with voice explanation –short movie- seemed to be very effective to make very understandable instruction such as the evacuation instruction before taking off on aircraft. However it has two problems for using movie file. One is a technical problem that some of interviewers of CASI survey have difficulty to operate sound system of mobile computer used in CASE. It is also possible that some respondents have difficulty to hear sound because of their age or handicap. The other problem is due to the fact that individuals in a video clip are real persons. Participants in experiment may pay attention to how much they like the way of their speaking or participants may recall someone who looks like individuals in the

video. These effects must be noisy because in experiment respondents are strongly recommended to pay attention only to necessary information.

We gave up using a video clip with voice explanation for these reasons. Instead, we mainly used flash animation, which is one of the most popular internet technologies. We have two major reasons for using the flash animation. First, most of Japanese participants are familiar with Japanese cartoon and animation ("Manga")[12].We expected that using simple animation made it possible to give intuitively understandable instructions for all the participants. Second, we can easily change the impressions of characters in the animation so that we can relatively reduce noises mentioned above.

To give the details of these animations used in CASE2007, we should begin to mention our original research interest, experimental design and hypothesis, as role of animations is closely related to them.

4. How to implement CASE? : Case of CASE2007

Main aim of this section is to explain which effect we count on our flash animation and why we can expect it from flash animation. Thus it suffices us here to summarize content of CASE2007 as long as it is related to this aim[13].

Research Interest

Although reform is a popular buzzword in politics, not all politicians who tout reform win elections. Suppose you wish a political reform and want to vote for a candidate who insists such a reform at the next election. However, what would you do if you know that all the other people are not motivated to go to vote for this reform? You certainly feel that your political action at the next election will not work out and you may decrease the will to vote in spite of your individual motivation. In contrast, if you expect that the other people share with your thought, you feel that you can obtain a favorable result by voting and are more likely to vote. Thus, from a point of reformer, she/he should persuade each voter not only that her/his agenda is good for voters but also that many other voters agree with his agenda. One of the best ways to do this is to present the reform information in simple and clear phrases. Following this argument, we think that reformers win elections when they present their message in a way that voters easily come to understand the merits of reform themselves (direct effect) and expect others to do so as well (indirect effect). In real life, since direct effect through individual motivation and indirect effect through expectation of others' behavior work simultaneously, it is very difficult to

[12] As shown in Figure 3-1, there are several persons appear on the display and give explanations in CASE2007. These characters give instructions with colloquial text not with actual voice. This is Japanese "manga" style with which most people are familiar.

[13] About detail of CASE2007, see Shimizu et al., (2008).

distinguish them. Thus, in order to precise each effect, it is necessary to control the other in experimental setting.

Experimental Design and Prediction

In CASE2007, we first describe to subjects in experiment a hypothetical situation that a bid-rigging problem occurs in subject's living area. We then tell subjects that a new ordinance is proposed to prevent the problem. The ordinance will be effective if the half or more of the people in that area vote for it[14]. It is also supposed that the new ordinance can solve this bid-rigging problem for sure. One major reason that we featured the bid-rigging problem is that this problem can be considered as a "valence issue": an issue that is uniformly agreed or disagreed among people, as opposed to a position issue on which opinion is divided. If so, we can expect that potential causes like their political position other than our supposed cause do not affect their voting for this rule. After the explanation of new ordinance content, subjects are also instructed that they can choose either "vote" or "not vote" at a ballot box near their living place on a certain day and certain rage of time. We manipulate *way* of this explanation about new ordinance as experimental conditions[15]. We make clear how to manipulate it.

First of all, following a conventional notion of words (easy and hard), we define Easy/Hard information as follows: while "Easy" information, consisting of short and plain phrases, does not requires much cognitive costs for people to understand, "Hard" information, consisting of long and difficult expressions (jargons), requires much time and cognitive costs to understand. For example, Easy information of a feature of new ordinance is like "It can effectively cut the costs for construction". It is transformed in Hard information as follows: "It enhances a substantial reduction in budgets for constructions by introducing the regulation prohibiting selective tendering and private contract and by strict enhancement of general and open bidding regulation."

Based on this definition of Easy/Hard information, we think that quality of information about new ordinance affects voter's choice through two canals. For example, on the one hand, if people receive Easy information, this information can motivate people to go to vote for new ordinance, because they can easily understand the merit of ordinance; on the other hand, if people know that others also receive Easy information, this knowledge can also motivate them (people who know that others also receive Easy information) to go to vote, because they can

[14] The structure of experiments is the threshold public goods provision game. The public goods in the experiments were provided if and only if the half of the population cooperates. There are two kinds of Nash equilibria in this game that have representative characteristics; all noncooperation and half of people cooperation.

[15] Almost of people can consider "bid-rigging problem" as a matter to resolve (valence issue) support a rule which can resolve it. If so, we can expect that potential causes like their political position other than our supposed cause do not affect their voting for this rule.

reasonably expect that others are also likely to go to vote (because others receive Easy information). As former effect influences *directly* people's motivation to vote through their *own* understanding of new ordinance, it can be called "direct effect" of information on voter's behavior. As latter effect influences *indirectly* people's motivation to vote through expectation for others' voting, it can be called "indirect effect" of information on voter's behavior. The figure below illustrates these two effects of information on voter's behavior.

[figure4-1 around here]

According to the argument about these two effects, if a participant in this experiment suppose "Not only me but also the others in my local area receive Easy information", we can suppose that she/he is most likely to go to vote. It is because this situation would produce highest levels of her/his own understanding of new ordinance and her/his expectation for the others' voting (it is useful to remember again that the bid-rigging problem can be considered as a "valence issue"). On the contrary if a participant in this experiment suppose "Not only me but also the others in my local area receive Hard information", we can assume that she/he is least likely to go to vote. It is because this situation would produce lowest levels of her/his own understanding of new ordinance and her/his expectation for the others' voting. One interesting question is what happens if a participant supposes "I receive Easy information but the others in my local area receive Hard information" or "I receive Hard information but the others in my local area receive Easy information". It is a situation in which a participant in this experiment supposes that she/he and others have different kinds of information.

Finally we can assume four possible experimental conditions. In each condition participants in experiment are expected to suppose "Not only me but also the others in my local area receive Easy information" or "Not only me but also the others receive in my local area Hard information" or "I receive Easy information but the others in my local area receive Hard information" or "I receive Hard information but the others in my local area receive Easy information". We name each information condition EE, HH, EH and HE (while the first letter signifies the quality of information given to self, the second letter the quality of information given to the others). In the former two cases, we need to make participants THINK that they *share* the same information with the others in their local area. In the latter two cases, we need to make participants THINK that they receive *different* information from that of the others in their local area.

Direct and indirect effects, mentioned above, are confounded in EE and HH, but to introduce EH and HE makes us possible to isolate each effect. For example, if we compare effect of EE condition and that of EH condition, we can precise indirect effect of Easy

information. However, HE condition is actually impossible. In this case, although participants are to receive *only* Hard information, they cannot help knowing the others' Easy information as well. As a result, it makes a difference between EH and EE conditions insignificant. Thus, the experimental design should be EE, EH, and HH.

In this experiment, participants were randomly assigned to one of three conditions. If our argument is correct, we should observe that vote for a new ordinance is most likely to occur among people in EE condition, least likely among people in HH condition, with people in EH condition in between. In the next part, before move on to experimental result, we explain concretely how to use flash animations not only to make respondents understand these information conditions but also to follow experiment without problem.

Flash Animation: Three Characters and TV Screen

As explained in the part of "Visualization of Instruction", the first merit of the explanation by animation character is that people are more likely to pay attention to what visualized character says than what only text explains. So we can expect participants are more motivated to recognize the instruction and guidance. The second merit is that instruction by animation character, not in a formally written expression but in more colloquial way, makes people easy to understand what animation character says. Considering these merits, we introduced three different characters and TV screen. However first character and the other three animations (the other two characters and TV screen) play a different role.

First character is a navigator of the experimental procedure, a young female, who not only instructs general frame of experiment (bid-rigging problem, date and time of vote, for example) but also guides experiment itself: she notices to participants, who were replying to questions of social opinion survey so far, that a scene changes (see figure 4-2). In addition, this character plays a role of interactive interface in CASE (see figure 4-3). At some points in the course of instruction, she asks a question to check if participants are sure of their understanding of instruction (see figure 4-4). If they feel apprehensive about their understanding, they can return to a corresponding part of instruction and follow it again. So participants can make sure if they understand the instruction by themselves *without* experimenters. This navigator type character seems to be usually necessary in CASE type experiment. Since experimenter is physically absent in CASE, we are required to do something to substitute the role of experimenter in laboratory experiment.

The other two animation characters and TV screen are made up for manipulating experimental conditions, not only to make participants clearly understand contents of Easy and Hard information, but also to make them distinguish information (supposedly) given to

themselves from that (supposedly) given to others. We introduce two different characters; "Anchorman of a news program" and "Professor as an expertise." As shown in figure 4-5, "Anchorman of a news program" appears on TV screen and gives information as well as in the real world. By this device -Anchorman on TV screen-, we expect that participants can easily imagine that the information given by the anchorman is publicly shared. On the other hand, "Professor as an expertise" gives information personally with TV screen faded out (see figure 4-6). After the instruction of TV news display, professor appears on the display, saying "Now I give detailed information about the topic in the TV show. I give it only to you, not to the others". By doing this, we expect that participants can imagine professor gives information to themselves, which is not known by others. These two characters and TV screen were created *particularly* for our experiment. It is clear that different experimental design needs different type of flash animation devices.

Experimental Results

As a result, only 20 participants among 780 answered "do not know" or "do not want to answer". In this respect, we can appreciate effect of our "visualization". However with results appeared in Table4-1, statistical analysis showed that our experimental conditions – explanation of the proposed ordinances in a different way- do not affect participant's behavior as we have expected. In the next section, we examine minutely reasons why information conditions do not influence participant's behavior and try to draw a lesson to implement a better CASE.

5. Web Experiment as Pilot Experiment: Examination and Revision of Parts in Experiment

In general, we can suppose several reasons when predicted effect could not be observed. Two main reasons are as follows: cause (experimental condition) supposed by experimenter is not originally valid; cause (experimental condition) supposed by experimenter is not sufficiently understood by subjects.

Experimenters usually conduct pilot experiment prior to actual experiment firstly to verify if the above two points are cleared in experimental procedures. Then if they do not obtain predicted effect although subjects understand experimental condition, they move on to create new hypothesis or amend their original experimental design. Prior to CASE2007, we have done a laboratory experiment with university students for this purpose. At that time results of experiment have supported quite positively our hypothesis; data of manipulation check and results of interview after experiment have showed that university students understood well our different conditions. We also checked impression on animation characters: as a result, participants did not have a strange impression. However these results did not ensure a success of

CASE2007.

This experience seems to suggest us a very important matter to organize CASE: pilot experiment for CASE *should be* directed to more variant sample than university student. Although university student can easily understand instructions explaining experimental/control conditions, it is very probable that such instructions can be incomprehensible for more various subjects like CASE subjects. This is the reason why we had better to verify both validity of our supposed cause and subjects' understanding of experiment with sample as similar as possible to that of CASE. In this pilot experiment, we have to *examine* and *revise* each part of experimental procedures for the preparation of upcoming CASE. If we conducted another CASE as pilot experiment regardless of pecuniary and human cost, it would not be the best pilot, for we could not prepare the sufficient number of questions for the verification in the experimental part. Thus we think web experiment can be the most adequate and realizable pilot experiment for CASE under existing circumstances[16].

There are three reasons why we can consider web experiment as an appropriate pilot experiment for CASE. First, sample of web experiment is more various than student sample usually used in laboratory experiment[17]. Secondly, we can prepare a sufficient number of questions to know if people understand experimental/control conditions and what impressions they get from instruction without too much consideration for their time and physical constraint, because in web experiment people can participate according to their own availability. First and second points enable us to verify our manipulation validity and instruction plainness with wider range of sample. Thirdly, its experimental environment is similar to CASE in the sense that experimenter is physically absent and experimental instruction is given only on computer screen by using the same digital tool like flash animation or photos as in CASE.

Based on the reasons given above, we have conducted successively two web experiments in spring 2009 to prepare for next CASE. In the first experiment done in February 2009, we intended to recognize reasons why information conditions do not influence participant's behavior in CASE2007. For this purpose, we prepared a number of questions to check following

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[16] In web experiment, subjects take part in an experiment through internet. Experimenters consign to a private research company to diffuse their experimental instruction through internet and use the members pooled by this company as subjects. These members voluntarily apply for membership, and it is up to them to participate in an experiment. In Japan, the company randomly usually extracts the data of the respondents and pays them some monetary reward.

[17] Compared with CASE, web experiment has to face digital divide bias of sample. Thus CASE can be superior to web experiment as for "external validity". In addition, when we analyze experimental results, CASE can easily refer to social opinion survey's data, if necessary, because CASE is usually conducted with social opinion survey. It is not the case with web experiment.

three points by using the same instruction screen as in CASE2007;

1. Whether participants feel reliable with information given by each animation character –especially anchorman and professor- ;
2. Whether participants think that they understand well content of information given to self and given to the others;
3. How well participants understand difference of information given to self and that given to the others .

The number of subjects was 161, 86 female (53.4%), 85 male (46.6%) and 1 DK/NA. Population ratio of thirties is 33.5%, forties 16.1%, fifties 19.3%, sixties 30.4% and seventies 0.6%. As table 5-1 reveals that in this experiment our prepared conditions do not affect participant's behavior either, it is worth checking above three points.

As for first and second points, we have quite positive results. Table5-2 shows that across three conditions more than 80% participants take anchorman's information as "completely reliable", "mostly reliable" or "quite reliable" and table5-3 reveals almost 80% participants consider professor's information as "reliable" or "quite reliable". Table5-4 and 5-5 indicate that across three conditions almost 80% participants answer "I completely (or mostly) understand what anchorman and professor have explained".

In contrast, as for the third point, it seems that participants don't understand sufficiently the difference of information. Table5-6 shows that in EH (Easy information for self and Hard information for others) condition, in which information for self and that for the others should be different, almost 80% of people answer "information for me and for the others are exactly (or mostly) same". It is also noted that across three conditions the number of DK is non negligible.

These results suggest that our "visualization" of experimental instruction in CASE2007 is *not totally* sufficient to overcome trade-off between "simplification" and "sophistication": while participants seemed to feel at ease with each animation character, they seemed not to understand information conditions as we had expected. It asks us to do something to make participants understand better difference of information. Hence *generally speaking*, our second step is to conduct a pilot experiment by following foregoing suggestion, without reconsidering our original hypothesis itself. However we have *actually* changed an important element of the original hypothesis in the second web experiment organized in March 2009, because we thought this element could directly influence participant's understanding of information conditions. Before moving on to its explanation in the next section, let us lead a general guidance for CASE from our experience examined so far.

CASE has a trade-off between "simplification" and "sophistication" as *de facto* problem. Any attempt to enable subjects to understand *better* contents of experiment with *less* cognitive

burden, such as "visualization" of experimental instruction in CASE2007, is the first step to resolve this problem[18]. In addition, subject in CASE, randomly selected people, is so various that it is inevitable to conduct pilot experiment with sample as similar as possible to that of CASE in order to know if such attempt as "visualization" works well. For the present, we consider web experiment as the most suitable pilot experiment. In this experiment using internet technology, we have to

1. use subject sample which variance is larger than university student sample;
2. set up identical experimental environments (e.g. way of instruction, experimental and control conditions, animation characters, etc.) with those in future CASE;
3. check not only effect of supposed cause but also participant's understanding level of experimental/control conditions and their general impression over experimental instruction .

Based on its results and data, we have to examine experimental components and to revise them, if necessary. It is in order to decide minimum but necessary components for upcoming CASE.

6. Second Web Experiment 2009 as Necessary Step to new CASE: Resource Sharing Illusion?

Our research interest is always to recognize how information affects people's voting behavior through their own motivation and their expectation for others. For this aim, we have conducted the second web experiment in March 2009. In this experiment, we constructed the same hypothetical situation as CASE2007: a bid-rigging problem occurs in subject's living area and the new ordinance to prevent this problem will be effective if the half or more of the people in that area vote for it.

Since CASE2007 did not give us a result as we had predicted, by *examining* the results obtained from web experiment in February 2009 we have decided to *revise* a content of hard/easy information in our original hypothesis and to keep basic way of visualization of experimental instruction. In addition, we have introduced new questions especially to measure subject's political sense and their consideration for others. In this section we will show you a reason for this revision, a revised hypothesis and its prediction, revised experimental design, newly prepared questions, experimental results and suggestions for upcoming CASE.

[18] It may be useful to combine voice and visualized items in the instruction.

Reason to Revise Original Hypothesis

On the one hand from the results of first and second questions shown in the previous section, it seems that participants do not feel uneasy with animation characters – anchorman and professor- and participants think that understand content of information given by both of them. On the other hand, manipulation check (third question shown in the previous section) reveals us that they do not well understand the difference of information given to self and that given to others. As reason for this phenomenon, we take seriously the possibility that our previous concept of hard/easy information, relying on difficulty and prolixity of its way of expression, could not be considered by subjects as we had expected. We supposed that people might consider short and simple explanation as *easy* issue and they might consider long and difficult explanation as *hard* issue. However if people pay attention to information *content* rather than its *way* of explanation, it is natural that people are hard to recognize the difference of information given to self and of that given to the others, because easy and hard information actually has the same content.

Revised Concept of Easy/Hard Issue

To revise our original concept of easy/hard, we rely on idea developed by Carmines and Stimson (1980). Carmines and Stimson insist that easy issue possesses following three requisites;

1. The easy issue would be symbolic rather than technical;
2. It would more likely deal with policy ends than means;
3. It would be an issue long on the political agenda.

In this experiment, we focused on the second requisite to revise original easy/hard concept. From the second requisite, related to substance of issue rather than to its way of explanation, we can derive three types of information: information containing only "ends", information including only "means" and information containing both "means" and "ends". According to above definition, the first type information is Easy and the second type is Hard. In addition to these two kinds of information, We may consider information including both "means" and "ends" as *easiest*: we can suppose that it can raise both expectation for others and subjects' own understanding level more highly than (or at least, as highly as) information explaining only "ends", because information containing both "means" and "ends" seems more reliable than that containing only "ends".

Compared with original hypothesis, we have actually changed *only* composites of easy/hard information. The general frame of experiment always untouched, revision of independent variables and experimental design is derived from this change.

Revised Independent Variables

As independent variables, we introduced ENDS, MEANS, MEANS/ENDS information and self vs. the others as the information receiver. ENDS manipulation means that participants got information only explaining ends of new ordinance, MEANS manipulation means that they got information only containing its means, whereas MEANS/ENDS manipulation includes both.

There are nine experimental conditions logically possible (3 by 3) but only 5 conditions are actually realizable: ENDS information given to both self and the others (E_E), MEANS information given to both self and the others (M_M), MEANS/ENDS information given to both self and the others (ME_ME), MEANS/ENDS information given to self whereas ENDS information given to the others (ME_E) and MEANS/ENDS information given to self whereas MEANS information given to the others (ME_M) [19].To be more precise, in the latter two cases, it is necessary to make participants THINK that the others are given different kind of information from theirs in the actual manipulation.

However, it is impossible to construct an information condition like E_M. In this case, although participants are to receive *only* ENDS information, they cannot help knowing the others' MEANS information as well. As a result, it makes a difference between E_M and ME_E conditions insignificant. Hence, we can only construct experimental condition in which participant's information is as same as the others' or her/his information include the others'. The experimental design should be E_E, M_M, ME_ME, ME_E and ME_M. In this experiment, participants were randomly assigned to one of the five conditions.

Admitting our "direct effect and indirect effect" argument in the section 4, we have two hypotheses to test. Both hypotheses are different only about composite of easy information.

H1: Only "ends" matter: participants in E_E or ME_ME or ME_E manipulation are most likely to go to vote, those in M_M manipulation are least likely to go to vote, and those in ME_M manipulation in between.

H2: Not only "ends" but also "means" matter: participants in ME_ME manipulation are most likely to go to vote, those in M_M manipulation are least likely to go to vote, and those in E_E or ME_M or ME_E manipulation in between.

Actually these two hypotheses are not opposite. While H1 focus on the "direct effect and indirect effect", H2 intends to examine not only these effects but also to verify if ME (MEANS/ENDS information) is *easier* than E (ENDS) information.

[19] To avoid a confusion, it is useful to note; E_E, ME_E and ME_ME are considered as Easy_Easy condition; M_M as Hard_Hard condition; ME_E as Easy_Hard condition.

Revised Experimental Design: Manipulation of Public Information and Private Information

The same female navigator as in CASE2007 and the web experiment in February 2009 started this experiment. She instructs general frame of experiment, guides experiment itself and plays a role of interactive interface.

The same anchorman as in CASE2007 and the first web experiment appears in a TV screen, and he explains three features of a new ordinance. In E_E and ME_E versions he explains the information only about "ends", in ME_M and M_M versions he explains only "means" and in ME_ME version he explains both "ends" and "means".

More precisely, in the ENDS version the explanation on the three features was described in the following way: first "**It can effectively cut the costs for construction**," second "**It punishes unfair bidders**," and finally "**It excludes unqualified bidders**."

In other version of animation, we had "means" explanation. The first feature was explained as "**It enhances a general and open bidding regulation**." The second was explained as "**It constructs a monitoring system of general bidding process operated by third parties**" Finally, the third was explained as "**It records the list of unqualified bidders.**"

The ENDS and MEANS version combine both ENDS and MEANS versions. One example is enough to understand this information condition: "**By introducing a general and open bidding regulation**, **it can effectively cut the costs for construction**."

Subsequently, as well as in CASE2007 and the web experiment in February 2009, "professor" came up on the display and summarized the given information of the hypothetical TV news. This information was given only to the participant personally. In E_E, M_M, and ME_ME conditions, he only repeated the information that anchorman explained, whereas in ME_E and ME_M conditions he tried to give an additional information to that given by anchorman.

We have already discussed important role of animation devices in section 5, and so we need briefly review it here. By "anchorman on TV screen", we expect that participants can imagine with ease that the information is publicly shared. On the other hand, "professor" gives information personally with TV screen faded out. We expect that participants can imagine that professor gives information to self, which is not known by others.

Newly Prepared Questions

In keeping questions for instruction and manipulation check as well as in the first Web Experiment2009, we also introduced, for the first time, questions to investigate participant's consideration for others and to measure participant's "political efficacy"[20]. Let us start with an

[20] About questions of "political efficacy" and its results, see appendix 1.

explanation about our intent to introduce the first question.

Results of manipulations check in both CSASE2007 and previous web experiment suggest that participants have difficulty to distinguish information given to self and given to the others. Firstly we think it is due to our insufficient manipulation for participants. But it is also possible that they are *really* indifferent to others when they do a decision making. If so, we have to change drastically our hypothesis about voter's behavior, because our hypothesis supposes not only "direct effect" but also "indirect effect" on people's vote choice. In order to clarify whether "indirect effect" matters, in other words, whether participants' expectation for others affects their own decision making, we asked participants the next question: "Do you think how many percents of the others in your local go to vote?" (answers range from 0 to 9)[21]. If participants are indifferent to the others, it is reasonable to suppose that their voting behavior and their answer to this question should not be related each other.

Idea of insertion of questions about "political efficacy" is as follows: as people's voting choice can be influenced by their personal political sense, it may be interesting to analyze how differently our (revised) independent variables affect (or do not affect) their decision making in proportion to their "political efficacy" sense[22]. In this experimental context, we expect that participants who are relatively less confident in their "political efficacy" become more sensitive to information condition about new ordinance. Because they think it is difficult for them to influence political affairs, they make political action as long as they expect the others also participate in it and/or they are strongly motivated to do it.

Instruction and Manipulation Check

As for the results of questions to check in detail whether participants sufficiently follow instruction without uneasiness (see the first and second questions in section 5), we have quite positive results. Table6-1 shows that across five conditions almost more than 80% participants take anchorman's information as "completely reliable", "mostly reliable" or "quite reliable" and table6-2 reveals the same reliability of participants with regard to professor's information. Table6-3 and 6-4 indicate that across all conditions more than 80% participants answer "I completely (or mostly) understand what anchorman and professor have explained".

In contrast, as for the third point(also shown in the previous section), it seems that participants do not understand sufficiently the difference of information. Table6-5 shows that

[21] 0 corresponds to "I think 0 to 10% people go to vote", 1 corresponds to "I think 10 to 20% people go to vote". From 2 to 9, people's expectation rises up at interval of 10%.

[22] As we have argued in the part of "advantages of CASE" (section 3), when the hypothesis being tested in the experiment concerns phenomena that an interaction between experimental condition and participant's features may cause, it is useful to prepare questions which can precise participant's features. By analyzing both effect of experimental condition and answer to these questions, we can examine interaction between them.

around 70% of people in ENDS_MEANS/ ENDS and ENDS_MEANS/ MEANS condition, in which information for self and that for the others should be different, answer "information for me and for the others are exactly (or mostly) same". This tendency is identical in the other information conditions. It is also noted that across three conditions the number of DK is non negligible.

Do these results suggest that our new web experiment does not work as well as CASE2007? *Actually* analysis with new independent variables based on revised concept of easy/hard information provides us a reason why participants have difficulty to separate information given to self from that given to the others. As for this point, we will explain in detail lately in the part of "resource sharing illusion". Now let us follow the thread of argument which achieves "resource sharing illusion" by explaining results of this web experiment.

Experimental Results

The survey was realized from 27/02/2009 to 03/03/2009 and the number of subjects was 4107, 1775 female (56.3%), 2312 male (43.2%) and 20 DK/NA(0.5%). Population ratio of twenties is 0.1%, thirties 28.5%, forties 25.4%, fifties 20.0%, sixties 25.3%, seventies 0.2%.

With results appeared in table 6-6 and 6-7, their statistical analysis shows that our experimental conditions do *not* affect participant's behavior *exactly* as we have expected.

[Table 6-6 around here]
[Table 6-7 around here]
[Table 6-8 around here]
[Table 6-9 around here]

Roughly speaking, participants who are in E_E manipulation are more driven to vote than those in M_M manipulation (see table 6-8). With participants who are relatively less confident in their "political efficacy", not only E_E manipulation but also ME_M manipulation could give some impact on their vote choice (see table 6-9). These results seem to suggest that only information for self does matter. Following analysis also seems to support this idea.

Les us examine five experimental conditions (E_E, M_M, ME_ME, ME_E and ME_M) from the point of "which information is given to self or the others". We can take subjects in ME_ME, ME_E and ME_M condition as same group if we focus on the information given to self. On the same reasoning, we can take subjects in M_M and ME_M condition as same group if we focus on the information given to the others. As a result, we can consider previous experimental conditions as follows: In Self_ME manipulation, "means and ends" information is given to self and, in Self_M manipulation "means" information to self and in Self_E

manipulation "ends" information to self. On the other hand, in Others_ME manipulation, "means and ends" information is given to the others, in Ohers_M manipulation "means" information to the others and in Others_E manipulation "ends" information to the others.

With these newly reconstructed variables, we analyzed again participant's voting behavior by the following model[23]:

$$\text{Logit}\,(p_i) = \log\,(p_i/1\text{-}p_i) = \beta_0 + \beta_1\ \text{Self\_E} + \beta_2\ \text{Self\_ME}$$ [24]

$$\text{Logit}\,(p_i) = \log\,(p_i/1\text{-}p_i) = \beta_0 + \beta_1\ \text{Others\_E} + \beta_2\ \text{Others\_ME}$$

[Table 6-10 around here]
[Table 6-11 around here]
[Table 6-12around here]
[Table 6-13 around here]

It appears that this result reveals participant's sensitiveness to their self-information and indifference to the others' information. They are more likely to go to vote when they receive "easy" information (ENDS information or ENDS and MEANS information). With limited sample (subjects relatively less confident in their "political efficacy"), we can obtain more clear results in terms of significance level. This self-information's effect on participant's vote choice can be illustrated as following figure:

[Figure 6-1 around here]

By contrast, a similar analysis of the results of CASE2007 shows participant's indifference to both their self-information and the others' information. A more likely explanation of this difference between two experiments is that definition of easy/hard issue based on its substance (examined in this web experiment) is more valid than that relying on its way of explanation (in CASE2007).

[Table 6-14 around here]

[23] It is noteworthy that our newly reconstructed variables are not randomly assigned to participants. Hence our findings based on these variables are to be accepted with reservation.

[24] If the probability of the i^{th} respondent's vote is written by p_i, the dependent variable is defined as Logit (p_i), that is, log (p_i/1- p_i). β is a standardized binomial logit regression coefficient. Self_E dummy is coded 1 if participant i is in the Self_E manipulation and otherwise, 0. Self_ME dummy is coded 1 if participant in the Self_ME manipulation and otherwise, 0. Ohters_E dummy is coded 1 if participant i is in the Ohters_E manipulation and otherwise, 0. Ohters_ME dummy is coded 1 if participant in the Ohters_ME manipulation and otherwise 0.

[Table 6-15 around here]

Let us return to results of this web experiment. It seems to reveal that it is the information to "self" that matters for participants and they do not take seriously what kind of information the others received. So "direct effect" of presenting new ordinance does matter. However our further analysis suggests that participant's decision can be more complicated and interesting than this result shows superficially.

Vote Choice and Consideration about the Others

In this part, we show that participants decide their vote choice by giving a care to others.

-Participant's Decision and their "Expectation for Others' Behavior (EOB)"

As we have mentioned before, we inserted a question after subject's decision making, which asked participants how many percents of the others in their local would go to vote. This question confirms participants' "expectation for others' voting behavior" (EOB). If participants are indifferent to the others' information, it is reasonable to suppose that their voting behavior is not affected by the others' behavior. However the result was contrary. With this new variable, we analyzed participant's voting behavior by the following model:

$$\text{Logit}\,(p_i) = \log\,(p_i/1-p_i) = \beta_0 + \beta_1\,\text{EOB}$$

[Table 6-16 around here]

[Table 6-17 around here]

It reveals that with both total sample and limited sample (participants who are relatively less confident in their "political efficacy"), participants who expected the others' higher voting rate are more driven to vote.

-Participant's Decision and their "Consideration about Information Sharing (CIS)"

A question for manipulation check asks participants "in terms of the contents, do you think the explanation given to you regarding the proposed ordinance is different from that given to other people in your local area?" This question is to confirm participants' consideration about information sharing with the others. Answers for this "consideration about information sharing (CIS)" question range from 1 to 3 and DK/NA[25]. If participants are indifferent to the others'

[25] In this analysis we included respondents who replied "I do not know (DK)" at CIS question, because it seems to be plausible to think people's "do not know" attitude about information sharing with others can affect their decision making. If we exclude this kind of participants from analysis, the result does not change essentially.

information, it is plausible to think that their voting behavior is not affected by degree of information sharing with others. However the result is contrary. With this new variable, we analyzed participant's voting behavior by the following model:

$$\text{Logit}\,(p_i) = \log\,(p_i/1\text{-}p_i) = \beta_0 + \beta_1\,\text{CIS}$$

[Table 6-18 around here]

[Table 6-19 around here]

It suggests that with both total sample and limited sample (participants who are relatively less confident in their "political efficacy"), participants who consider that they share the information with the others tend to vote. We illustrate both effects –effect of EOB and that of CIS- on people's vote choice as following figure:

[Figure 6-2 around here]

-"Expectation for Others' Behavior (EOB)" and "Consideration about Information Sharing (CIS)"

We show lastly that there is a significant correlation between "Expectation for Others' Behavior (EOB)" and "Consideration about Information Sharing (CIS)". A positive correlation between EOB and CIS exists. Spearman's correlation coefficient is 0.126 ($p < 0.00$). With participants who are relatively less confident in their "political efficacy", this correlation coefficient between EOB and CIS rises to 0.526 ($p < 0.00$).

It is reasonable to insist that people are not totally indifferent to others when they decide whether to vote. With above three statistical relations, we can transform figure6-2 as follows:

[Figure 6-3 around here]

Let us then go on to examine a role of information given to "self" (Self_E, Self_ME and Self_M) on participant's consideration of others.

-Information Given to "Self" and "Consideration about Information Sharing (CIS)"

Earlier we had said "it is the information to "self" that matters for participants and they do not take seriously what kind of information the others received." This idea is right in the sense

that participant's choice is not affected by the information given to the others. However the next analysis suggests that the information given to "self" may affect participant's supposition about "what kind of information the others received."

As for the effect of information given to "self" (Self_E, Self_ME and Self_M) on CIS (Consideration about Information Sharing), see following two tables.

[Table 6-20 around here]
[Table 6-21 around here]

From these results, it follows that subjects receiving "easy" information, consisting of "ends" or "ends and means", are more likely to think that they share information with the others in comparison with those receiving "hard" information (MEANS information). And this tendency is more evident with people who are less confident in their "political efficacy".

As a result, with observations in this part, we can infer a (causal) process of participant's vote choice as follows: under "easy" manipulation, on the one hand, participants tend to vote, because they can understand clearly positive results of new ordinances: "direct effect". On the other hand, participants who receive "easy" information suppose that they share "easy" information with others even if they actually do not. It gives rise to their expectation that the others go to vote, because they consider the others also get "easy" information: "indirect effect". The figure below illustrates this causal process.

[Figure 6-4 around here]

To make this inference persuasive, it is necessary to explain the reason why and how information given to "self" is able to affect not only participant's self-understanding level of new ordinances but also her/his consideration of the others. Let us now attempt to extend this argument into the idea of "Resource Sharing Illusion".

Resource Sharing Illusion?

To achieve to this idea, we start with introducing psychologically-based findings on how we understand, or estimate, other people's internal state.

-"Theory of Mind

In the psychology of understanding others' mind, considerable attention has been paid to the "Theory of Mind (Premack & Woodruff, 1978; hereafter ToM)." ToM refers to the ability

with which human beings and other apes understand or estimate others' minds –that is, their knowledge, belief, intention, desire and feeling[26]. In general, human beings acquire a sophisticated ToM when they are between the ages of 3 and 6 (for a review, see Frith and Frith, 2003).

Then, what developmental process enables us to understand what others' knowledge is like? Intuitively plausible process would be as follows: at first, children have no idea what others know and do not know, and then they gradually learn how to estimate what and how others know –yet such process is now regarded as implausible. Instead, developmental psychologists have found that a child at first cannot distinguish their own knowledge from others –in other words, they feel that others have the same knowledge as their own. Suppose a child sorely has certain knowledge, for instance, about the place where her favorite doll exists, she thinks that other people also know the place even when she is shown that others never have any chance to know it. As growing, children become able to distinguish between their own knowledge and those of others.

-Difficulty of Distinction between One's Own Internal State and Others'

Recently, psychologists have reported that even adults have difficulty distinguishing their own knowledge from others'. Keysar, Lin, and Barr (2003) demonstrated that adults sometimes tend to impute their own knowledge to others even when they know exactly what others know and do not know and have no difficulty keeping the two apart.

To be more specific, Keysar et al. (2003) recruited adult participants, each participant was paired to the "director," who was a well-trained confederate, and played a "communication game" with the director. The experimenter showed four items to a participant and the confederate before each trial: an item hidden in a bag and three visible items. Before starting the trial, only participants were informed what the item hidden in the bag was. In the game, the director was to instruct participants to move one of the three visible items. In experimental condition, the director told to move an item which was similar to the hidden item. For instance, the director instructed participants to move a "large" cup when there was a visible middle-sized cup which could be regarded as "large" although the hidden item was a larger cup than the visible one. When a "large" cup was mentioned, it means a hidden large cup for participants while it means a visible middle-sized cup for the director. Since participants knew that the director did not know what the hidden item was, they should move the middle-sized cup as the

[26] Internal state consists of many elements. Even infants are considered to be able to grasp others' *intention* or *desire* (e.g. Csibra, Gergely, Biro, Koos, & Brockbank, 1999; Gergely, Nadasdy, Csibra, & Biro, 1995; Woodward, 1998), yet the understanding of intention and desire is not sufficient for a sophisticated ToM –correctly understanding others' beliefs, feelings and knowledge. We here introduce literatures about Theory of *Knowledge*, because our hypothesis regards what respondents *know* or suppose to *know* as important.

intended item. On the other hand, in control condition, the item hidden in the bag was not similar to the item which the director told to move. Keysar et al. found that, in experimental condition, the great majority of participants (71%) attempted to move the bag (a hidden larger cup) instead of the correct item (a visible middle-sized cup) at least one out of the four trials, and 46% attempted to move it for half or more the items. In short, participants behaved as if they did not know that the director was ignorant of the item in the bag. Contrary, in control condition, participants never attempted to move the bag. These results indicate that it is difficult for participants to ignore their own knowledge, and even adult participants often confound their own knowledge with those of others.

Gilovich, Savitsky, and Medvec (1998) discovered a similar phenomenon: adult participants showed a tendency to feel that their minds are peeped through by others. Through experiment 1a to 1c, Gilovich et al. had groups of participants play a lie detection game in which each of them told lies or truths to the rest of the group as instructed. After participants were asked to lie, they tended to overestimate the number of participants, besides themselves, who guessed correctly that they had lied. In experiment 2a and 2b, participants in dinner-guest experiment believed that they failed to hide their reactions to an unpleasant taste, although, in reality, they are remarkably successful at concealing their distaste. These findings of Gilovich et al. also indicate the difficulty distinguishing one's own knowledge from those of others. We now attempt to apply these findings to the idea of "Resource Sharing Illusion."

- "Resource Sharing Illusion."

Our last statistical analysis suggests that information provided to "self" affects subjects' consideration of "others." Certainly the belief that the information provided only to subjects are shared with others is incorrect, or just an illusion, but we have to recognize the possibility that our participants indeed had the illusion[27]. We name this incorrect consideration "Resource Sharing Illusion (hereafter RSI)." As described above part, it is difficult for even adults to separate their own knowledge from others' (c.f., Keysar et al., 2003; Gilovich et al., 1998). Given this, it is not implausible that the participants in our experiment had RSI, in other words, they can hardly distinguish what they knew and what others knew.

Participants who have RSI would show higher CIS although experimental instruction

[27] What an advantage of having RSI could be? It seems that having RSI –that is, misunderstanding others' knowledge –is *not* adaptive. Apparently, a complete, sophisticated ToM –estimating others' knowledge correctly –would be better. In order to answer this question, we should recognize not only benefit of sophisticated ToM but also its cost. Psychologists have repeatedly insisted that cognitive ability of human beings is seriously limited, and logical or analytical thinking bears a heavy load. Recent neuroimaging research has demonstrated specific brain regions consistently activated during theory of mind tasks, which means achieving ToM is costly (see Gallagher and Frith, 2003). From the cost-benefit viewpoint, it is reasonable to consider that RSI is *not less* adaptive than ToM in some cases.

empathizes a difference between information given to self and that to others. As mentioned earlier, higher CIS provides higher EOB. Therefore, it seems to be reasonable to think that RSI brings out higher EOB, mediated by the higher CIS, indirectly enhanced voting behavior.

Summary of the Experiment Results and Suggestions for upcoming CASE

Let us summarize the current experimental results. Participants were sensitive only to their private information: those who received "easy" information (ENDS information or ENDS and MEANS information) are more likely to go to vote, yet what kind of information the others received did not make a difference. In brief, "direct effect" appears to matter whereas "indirect effect" does not. However, statistical analyses on our data revealed the significant statistical correlations among three variables: voting behavior, EOB (Expectation of Others' Behavior) and CIS (Consideration about Information Sharing). Because EOB and CIS were indices of others' behavior and knowledge estimated by participants, the idea that the direct effect alone affects the voting behavior seems to be inappropriate. To bridge participant's sensitiveness to the private information and her/his consideration for others, we have proposed "Resource Sharing Illusion" hypothesis: participants who privately received "easy" information (ENDS information or ENDS and MEANS information) tended to think that they shared information with others (higher CIS).

As a consequence, while the information given to self can *directly* affect voting behavior, this private information can also *indirectly* affect voting behavior by the expectation for others voting behavior (EOB) which is mediated by the consideration about information sharing with others (CIS).

Considering these results and findings, we are asked to create a re-revised experimental design to analyze voting behavior in future CASE, in which;

- we define a concept of Easy/Hard with reference to contents of information; "ends" and/or "means";
- we assign randomly new information conditions to participants to verify precisely statistical relations observed in this web experiment (relation between information given to self and EOB/CIS);
- we add an experimental component to examine "Resource Sharing Illusion;
- we make a new flash animation if a re-revised experimental design requires it.

7. Conclusion

CASE has not only advantages but also shortcomings as an experimental tool; on the one hand, CASE can overcome the lack of "external validity" and reduce "experimenter effect"; on the other hand, CASE suffers from a trade-off between "simplification" and "sophistication".

In the first CASE conducted as a part of CASI2007 (named CASE2007), we tried to resolve the trade-off by the "visualization" and aimed to test a hypothesis about people's voting behavior to the best advantage of CASE.

This experience, CASE2007, gives us a general lesson to improve CASE. Any attempt to enable subjects to understand *better* contents of experiment with *less* cognitive burden, such as "visualization" in CASE2007, must be necessary. In addition, participants in CASE is so various that it is inevitable to conduct pilot experiment with sample as similar as possible to that of CASE in order to *examine* experimental components and to *revise* them, if necessary. For the present, we consider web experiment as the most suitable pilot experiment.

Taking into account of this lesson, we conducted a web experiment in 2009 to revise CASE2007 and to prepare for an upcoming CASE. Results and findings of this web experiment showed minimum but necessary components to test our new hypothesis: "Resource Sharing Illusion."

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Reference

Bowles, Samuel. 2004 *Micoroeconomics: Behavior, Institutions, and Evolution*, Princeton University Press.

Carmines, Edward G., and James A. Stimson. 1980. The Two Faces of Issue Voting, *American Political Science Review* 74: 78-91.

Cadsby, Bram C. et al., 2007, Cross-National Gender Differences in Behavior in a Threshhold Public Goods Game, *Journal of Economic Psychology* 28: 242-60.

Csibra, G., Gergely, G., Biro, S., Koos, O., & Brockbank, M. 1999. Goal attribution without agency cues: the perception of 'pure reason' in infancy. *Cognition*, 72: 237–267.

Frith, U. and Frith, C.D. 2003. Development and neurophysiology of mentalizing, *Philosophical Transactions of the Royal Society of London. Series B* 358: 459-473.

Gallagher and Frith, (2003) "Functional imaging of 'theory of mind'," *Trends in Cognitive Sciences* Vol. 7, No. 2, 77-83

Gergely, G., Nadasdy, Z., Csibra, G., & Biro, S. (1995). Taking the intentional stance at 12

months of age. *Cognition*, 56: 165–193.

Gilovich, T., Savitsky, K., & Medvec, V. H. 1998. The illusion of transparency: biased assessments of others' ability to read one's emotional states. *Journal of Personality and Social Psychology* 75: 332–346.

Gintis, H. 2000 Strong reciprocity and human society, *Journal of Theoretical Biology*, 206, 169-179.

Henrich, J., & Boyd, R. 2001 Why people punish defectors: weak conformist transmission can stabilize costly enforcement of norms in cooperative dilemmas, *Journal*

Keysar, B., Lin, S. H., & Barr, D. J. 2003. Limits on theory of mind use in adults, *Cognition* 89: 25–41.

Kinder, Donald R. and Thomas R. Palfrey. eds. 1993. *Experimental Foundations of Political Science*. Ann Arbor: University of Michigan Press.

Marcus, George E., W. Russel Neuman and Michael MacKuen. 2000. *Affective Intelligence and Political Judgment*. Chicago, IL: University of Chicago Press.

McDermott, Rose. 2002. Experimental Methods in Political Science. *Annual Review of Political Science* 5: 31-61.

Olson, Mancur. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard University Press.

Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, England: Cambridge University Press.

Premack, D. and Woodruff, G. 1978. Does the chimpanzee have a theory of mind? *Behavioral Brain Science* 1: 515-526.

Shimizu, K., Fukumoto, K., Watabe, M., & *Morimoto, Y. (2008),Easy Issue for Me, Hard Issue for Them:Field Experiment in Large Social Survey, *Discussion Paper in Global COE of Waseda University (GLOPE II).*

Woodward, A. L. (1998). Infants selectively encode the goal object of an actor's reach. *Cognition*, 69: 1–34.

Table 4-1: Voters' Behavior and Information Conditions in CASE2007

Information Conditions	Vote		Don't Vote		DK/NA		Sum	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
EE	198	77.0	51	19.8	8	3.1	257	100.0
EH	203	82.9	37	15.1	5	2.0	156	100.0
HH	218	78.4	53	19.1	7	2.5	172	100.0
Number of obs	619		141		20		780	

Pearson's Independence Test: χ^2 (2)=3.549, p value=.737

Note: DK/NA is excluded from the analysis.

Table 5-1 : Voters' Behavior and Information Conditions at the First Web Experiment2009

	Vote		**Don't Vote**		**Sum**	
Information Conditions	Frequency	%	Frequency	%	Frequency	%
EE	39	79.6%	10	20.4%	49	100.0%
EH	40	76.9%	12	23.1%	52	100.0%
HH	50	83.3%	10	16.7%	60	100.0%
Number of obs	129		32		161	

Pearson's Independence Test: χ^2 (2)=.731, p value =.694

Note: DK/NA is excluded from the analysis.

Table 5-2: Information Conditions and Self-Reported Reliability Level of Anchorman's Information at the First Web Experiment in 2009

	Completely reliable (1)	**Mostly reliable (2)**	**Quite reliable (3)**	**A little bit reliable (4)**	**Completely unreliable (5)**	**DK/NA (6,7)**	**Sum**
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
EE	3 6.1%	26 53.1%	13 26.5%	3 6.1%	1 2.0%	3 6.1%	49 100.0%
EH	4 7.7%	21 40.4%	17 32.7%	4 7.7%	0 0.0%	6 11.5%	52 100.0%
HH	2 3.3%	33 55.0%	14 23.3%	7 11.7%	2 3.3%	2 3.3%	60 100.0%
Number of obs	9	80	44	14	3	11	161

Note: Question is "How well did you understand what the anchorman explained about the proposed rule?"

Table 5-3: Information Conditions and Self-Reported Reliability Level of Professor's Information at the First Web Experiment in 2009

	Completely reliable (1)	**Mostly reliable (2)**	**Quite reliable (3)**	**A little bit reliable (4)**	**Completely unreliable (5)**	**DK/NA (6,7)**	**Sum**
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
EE	4 8.2%	26 53.1%	9 18.4%	2 4.1%	1 2.0%	7 14.3%	49 100.0%
EH	3 5.8%	29 55.8%	8 15.4%	6 11.5%	0 .0%	6 11.5%	52 100.0%
HH	4 6.7%	38 63.3%	8 13.3%	4 6.7%	2 3.3%	4 6.7%	60 100.0%
Number of obs	11	93	25	12	3	17	161

Note: Question is "How well did you understand what the professor explained about the proposed rule?"

Table 5-4: Information Conditions and "Self-Reported Comprehension Levels" of Anchorman's Information at the First Web Experiment in 2009

	Understood all of it (1)	**Understood most of it (2)**	**Understood about half of it (3)**	**Understood a little of it (4)**	**Did not understand at all (5)**	**DK/NA (6,7)**	**Sum**
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
EE	16 32.7%	27 55.1%	5 10.2%	1 2.0%	0 0%	0 0	49 100.0%
EH	6 11.5%	32 61.5%	9 17.3%	3 5.8%	0 0%	2 3.8%	52 100.0%
HH	10 16.7%	40 66.7%	7 11.7%	3 5.0%	0 0%	0 0	60 100.0%
Number of obs	32	99	21	7	0	2	161

Note: Question is "How well did you understand what the anchorman explained about the proposed rule?"

Table 5-5: Information Conditions and Self-Reported Comprehension Levels of Professor's Information at the First Web Experiment in 2009

	Understood all of it (1)	**Understood most of it (2)**	**Understood about half of it (3)**	**Understood a little of it (4)**	**Did not understand at all (5)**	**DK/NA (6,7)**	**Sum**
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
EE	11 22.4%	29 59.2%	7 14.3%	1 2.0%	0 0%	1 2.0%	49 100.0%
EH	6 11.5%	34 65.4%	6 11.5%	4 7.7%	0 0%	2 3.8%	52 100.0%
HH	8 13.3%	43 71.7%	5 8.3%	2 3.3%	0 0%	2 3.3%	60 100.0%
Number of obs	25	106	18	7	0	5	161

Note: Question is "How well did you understand what the professor an explained about the proposed rule?"

Table 5-6: Information Conditions and "Clarity Difference of Information" at the First Web Experiment in 2009

	exactly same (1)	**mostly same (2)**	**quite different (3)**	**completely different (4)**	**DK/NA (5,6)**	**Sum**
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
EE	9 18.4%	21 53.1%	0 5.8%	0 0%	14 28.6%	49 49
EH	3 35.8%	21 40.4%	2 3.8%	1 1.9%	25 48.0%	52 100%
HH	13 21.7%	22 36.7%	4 6.7%	1 1.7%	20 33.3%	60 100%
Number of obs	25	69	6	2	59	161

Note: Question is "In terms of the levels of clarity, do you think the explanation given to you regarding the proposed rule is different from that given to other people in your local area?"

Table 6-1: Information Conditions and Self-Reported Reliability Level of Anchorman's Information at the Second Web Experiment in 2009

	Completely reliable (1)	**Mostly reliable (2)**	**Quite reliable (3)**	**A little bit reliable (4)**	**Completely unreliable (5)**	**DK/NA (6,7)**	**Sum**
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
E_E	92 10.4%	391 44.3%	233 26.4%	60 6.8%	32 3.6%	74 8.4%	882 100.0%
ME_M	68 8.5%	349 43.5%	223 27.8%	80 10.0%	29 3.6%	53 6.6%	802 100.0%
ME_ME	92 11.8%	404 51.7%	185 23.7%	37 4.7%	13 1.7%	50 6.4%	781 100.0%
ME_M	77 9.5%	398 49.1%	206 25.4%	61 7.5%	13 1.6%	55 6.8%	810 100.0%
M_M	116 13.9%	402 48.3%	184 22.1%	46 5.5%	19 2.3%	65 7.8%	832 100.0%
Number of obs	445	1944	1031	284	106	297	4107

Note: Question is "How well did you understand what the anchorman explained about the proposed rule?"

Table 6-2: Information Conditions and Self-Reported Reliability Level of Professor's Information at the Second Web Experiment in 2009

	Completely reliable (1)	**Mostly reliable (2)**	**Quite reliable (3)**	**A little bit reliable (4)**	**Completely unreliable (5)**	**DK/NA (6,7)**	**Sum**
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
E_E	95 10.8%	405 45.9%	194 22.0%	46 5.2%	23 2.6%	119 13.5%	882 100.0%
ME_M	92 11.5%	398 49.6%	175 21.8%	34 4.2%	21 2.6%	82 10.2%	802 100.0%
ME_ME	109 14.0%	405 51.9%	149 19.1%	35 4.5%	9 1.2%	74 9.5%	781 100.0%
ME_M	106 13.1%	424 52.3%	157 19.4%	36 4.4%	6 .7%	81 10.0%	810 100.0%
M_M	124 14.9%	400 48.1%	145 17.4%	48 5.8%	12 1.4%	103 12.4%	832 100.0%
Number of obs	526	2032	820	199	71	459	4107

Note: Question is "How well did you understand what the professor explained about the proposed rule?"

Table 6-3: Information Conditions and "Self-Reported Comprehension Levels" of Anchorman's Information at the Second Web Experiment in 2009

	Understood all of it (1)	Understood most of it (2)	Understood about half of it (3)	Understood a little of it (4)	Did not understand at all (5)	DK/NA (6,7)	Sum
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
E_E	235 26.6%	508 57.6%	80 9.1%	44 5.0%	6 .7%	9 1.0%	882 100.0%
ME_M	193 24.1%	449 56.0%	100 12.5%	38 4.7%	8 1.0%	14 1.7%	802 100.0%
ME_ME	267 34.2%	439 56.2%	48 6.1%	12 1.5%	4 .5%	11 1.4%	781 100.0%
ME_M	219 27.0%	477 58.9%	70 8.6%	29 3.6%	4 .5%	11 1.4%	810 100.0%
M_M	261 31.4%	464 55.8%	66 7.9%	18 2.2%	5 .6%	18 2.2%	832 100.0%
Number of obs	1175	2337	364	141	27	63	4107

Note: Question is "How well did you understand what the anchorman explained about the proposed rule?"

Table6-4: Information Conditions and Self-Reported Comprehension Levels of Professor's Information at the Second Web Experiment in 2009

	Understood all of it (1)	Understood most of it (2)	Understood about half of it (3)	Understood a little of it (4)	Did not understand at all (5)	DK/NA (6,7)	Sum
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
E_E	195 22.1%	502 56.9%	110 12.5%	40 4.5%	7 .8%	28 3.2%	882 100.0%
ME_M	185 23.1%	474 59.1%	95 11.8%	28 3.5%	4 .5%	16 2.0%	802 100.0%
ME_ME	211 27.0%	463 59.3%	72 9.2%	13 1.7%	3 .4%	19 2.4%	781 100.0%
ME_M	215 26.5%	474 58.5%	79 9.8%	17 2.1%	2 .2%	23 2.8%	810 100.0%
M_M	222 26.7%	475 57.1%	83 10.0%	24 2.9%	5 .6%	23 2.8%	832 100.0%
Number of obs	1028	2388	439	122	21	109	4107

Note: Question is "How well did you understand what the professor explained about the proposed rule?"

Table 6-5: Information Conditions and "Difference of Information Contents" at the Second Web Experiment in 2009

	exactly same (1)	**mostly same (2)**	**quite different (3)**	**completely different (4)**	**DK/NA (5,6)**	**Sum**
Information Conditions	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
E_E	183 20.7%	447 50.7%	32 3.6%	7 .8%	213 24.1%	882 100.0%
ME_M	101 12.6%	450 56.1%	100 12.5%	22 2.7%	129 16.1%	802 100.0%
ME_ME	175 22.4%	352 45.1%	23 2.9%	10 1.3%	221 28.3%	781 100.0%
ME_M	157 19.4%	451 55.7%	71 8.8%	8 1.0%	123 15.2%	810 100.0%
M_M	188 22.6%	379 45.6%	32 3.8%	3 .4%	230 27.6%	832 100.0%
Number of obs	804	2079	258	50	916	4107

Note: Question is "In terms of the contents, do you think the explanation given to you regarding the proposed rule is different from that given to other people in your local area?".

Table 6-6: Voters' Behavior and Information Conditions with Total Sample

Information Conditions	Vote		Don't Vote		DK/NA		Sum	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
E_E	739	83.8	141	16.0	2	0.2	882	100.0
ME_E	656	81.8	145	18.1	1	0.1	802	100.0
ME_ME	638	81.7	142	18.2	1	0.1	781	100.0
ME_M	667	82.3	142	17.5	1	0.1	810	100.0
M_M	663	79.7	168	20.2	1	0.1	832	100.0
Number of obs	3363	81.9	738	18.0	66	0.6	780	4107

Pearson's Independence Test: χ^2 (4)= 5.236, p value=.264

Note: DK/NA is excluded from the analysis.

Table 6-7: Voters' Behavior and Information Conditions with Selected Sample

Information Conditions	Vote		Don't Vote		DK/NA		Sum	
	Frequency	(%)	Frequency	%	Frequency	%	Frequency	%
E_E	338	77.3	98	22.4	1	0.2	437	100.0
E_ME	301	74.9	100	24.9	1	0.2	402	100.0
ME_ME	293	74.4	101	25.6	0	0	394	100.0
E_ME	327	75.7	105	24.3	0	0	432	100.0
M_M	291	70.5	122	29.5	0	0	413	100.0
Number of obs	1550	74.6	526	25.3	2	0.1	2078	

Pearson's Independence Test: χ^2 (4)=6.037, p value=.196

Note: DK/NA is excluded from the analysis.

Table 6-8: Logit Analysis of Vote Choice with Total Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	3.946	***	252.606	.000
E_E dummy	1.328	*	5.061	.024
E_ME dummy	1.146		1.175	.278
ME_ME dummy	1.138		1.047	.306
E_ME dummy	1.190		1.895	.169
Number of obs			4101	
AIC			3870.6	

* $p < .05$ ** $p < .01$ *** $p < .001$(one-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is $\log(p_i/1- p_i)$

; From all respondents, we exclude those who answered DK/NA at vote choice

; As time cost is not influential at all on the vote choice, this element is not inserted in any model.

Table 6-9: Logit Analysis of Vote Choice with Selected Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	2.385	***	64.960	.000
E_E dummy	1.446	*	5.485	.019
E_ME dummy	1.262		2.169	.141
ME_ME dummy	1.216		1.536	.215
E_ME dummy	1.306	+	2.937	.087
Number of obs			2076	
AIC			2354.11	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is $\log(p_i/1- p_i)$

; From all respondents, we exclude those who answered DK/NA at vote choice

; As time cost is not influential at all on the vote choice, this element is not inserted in any model.

; In this case, we use sample which "political efficacy" measure is less than its mean (3.36). This Selected Sample contains about half of respondents.

Table 6-10: Logit Analysis of Vote Choice with Total Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	3.946	***	252.606	.000
Self_E dummy	1.328	*	5.061	.024
Self_ME dummy	1.158		2.096	.148
Number of obs			4101	
AIC			3866.735	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is log(p_i/1- p_i)

; From all respondents, we exclude those who answered DK/NA at vote choice. As time cost is not influential at all on the vote choice, this element is not inserted in any model

;There is no significant difference between Self_E dummy group and Self_ME dummy group.

Table 6-11: Logit Analysis of Vote Choice with Total Sample

Independent Variables	Exp(β)	Wald Value	P value
Intercept	4.290	533.22	.000
Others_E dummy	1.137	2.009	.156
Others_ME dummy	1.047	.169	.681
Number of obs		4101	
AIC		3869.784	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is log(p_i/1- p_i)

; From all respondents, we exclude those who answered DK/NA at vote choice

; As time cost is not influential at all on the vote choice, this element is not inserted in any model.

Table 6-12: Logit Analysis of Vote Choice with Selected Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	2.385	***	64.960	.000
Self_E dummy	1.446	*	5.485	.019
Self_ME dummy	1.262	+	3.383	.066
Number of obs			2076	
AIC			2350.304	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is log(p_i/1- p_i)

; From all respondents, we exclude those who answered DK/NA at vote choice

; As time cost is not influential at all on the vote choice, this element is not inserted in any model

; There is no significant difference between Self_E dummy group and Self_ME dummy group

; In this case, we use sample which "political efficacy" measure is less than its mean (3.36). This limited sample contains about half of respondents.

Table 6-13: Logit Analysis of Vote Choice with Selected Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	2.722	***	166.530	.000
Others_E dummy	1.185		2.289	.130
Others_ME dummy	1.066		.209	.648
Number of obs			2076	
AIC			3870.6	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is log(p_i/1- p_i)

; From all respondents, we exclude those who answered DK/NA at vote choice

; As time cost is not influential at all on the vote choice, this element is not inserted in any model.

; In this case, we use sample which "political efficacy" measure is less than its mean (3.36). This limited sample contains about half of respondents.

Table 6-14: Voters' Behavior and Information Conditions in CASE2007

	Vote		Don't Vote		Sum	
Information Conditions	Frequency	%	Frequency	%	Frequency	%
Hard Information for Me	218	80.4%	53	19.6%	271	100.0
Easy Information for Me	401	82.0%	88	18.0%	489	100.0
Number of obs	619		141		760	100.0

Pearson's Independence Test: χ^2 (1)= .281, p value=.596

Note: Colum variable is voters' behavior

; Row variable is information condition. In this analysis, while participants in "Easy Information for Me" are those assigned to Easy_Easy condition or Easy_Hard condition in the experiment, participants in "Hard Information for Me" are those assigned to Hard_Hard condition in the experiment

;DK/NA is excluded from the analysis.

Table 6-15: Voters' Behavior and Information Conditions in CASE2007

	Vote		Don't Vote		Sum	
Information Conditions	Frequency	%	Frequency	%	Frequency	%
Hard Information for Others	421	82.4%	90	17.6%	511	100.0
Easy Information for Others	198	79.5%	51	20.5%	249	100.0
Number of obs	619		141		760	100.0

Pearson's Independence Test: χ^2 (1)= .912, p value=.340

Note: Colum variable is voters' behavior

; Row variable is information condition. In this analysis, while participants in "Easy Information for Others" are those assigned to Easy_Easy condition in the experiment, participants in "Hard Information for Others" are those assigned to Hard_Hard condition or Easy_Hard condition in the experiment

;DK/NA is excluded from the analysis.

Table 6-16: Logit Analysis of Vote Choice by EOB with Total Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	.702	**	8.687	.003
EOB	1.584	***	235.990	.000
Number of obs			4101	
AIC			3597.172	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is $\log(p_i/1- p_i)$

; From all respondents, we exclude those who answered DK/NA at vote choice

; As time cost is not influential at all on the vote choice, this element is not inserted in any model.

Table 6-17: Logit Analysis of Vote Choice by EOB with Selected Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	.480	**	23.723	. 003
EOB	1.558	***	146.143	.000
Number of obs			2076	
AIC			2184.7	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is log(p_i/1- p_i)

; From all respondents, we exclude those who answered DK/NA at vote choice

; As time cost is not influential at all on the vote choice, this element is not inserted in any model.

; In this case, we use sample which "political efficacy" measure is less than its mean (3.36). This limited sample contains about half of respondents.

Table 6-18: Logit Analysis of Vote Choice by CIS with Total Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	1.733	*	5.259	.022
CIS	1.436	***	22.081	.000
Number of obs			3191	
AIC			2773	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is $\log(p_i/1- p_i)$

; From all respondents, we exclude those who answered DK/NA at vote choice and those who answered DK/NA at CIS question (q_02)

; As time cost is not influential at all on the vote choice, this element is not inserted in any model.

Table 6-19: Logit Analysis of Vote Choice by CIS with Selected Sample

Independent Variables	Exp(β)		Wald Value	P value
Intercept	1.240	+	3.285	.070
CIS	1.751	*	4.746	.029
Number of obs			1546	
AIC			1674.652	

+p<0.1 * p < .05 ** p < .01 *** p < .001 (two-tailed test)

Note: If probability of i^{th} respondent's vote choice is written by p_i, dependent variable is defined as logit(p_i), that is $\log(p_i/1- p_i)$

; From all respondents, we exclude those who answered DK/NA at vote choice and those who answered DK/NA at CIS question (q_02)

; As time cost is not influential at all on the vote choice, this element is not inserted in any model.

; In this case, we use sample which "political efficacy" measure is less than its mean (3.36). This limited sample contains about half of respondents.

Table 6-20: Information Conditions and Information Sharing with Total Sample

Information Conditions	"exactly same" or "mostly same"		"quite different" or "completely different"		Sum	
	Frequency	%	Frequency	%	Frequency	%
HARD	35	5.8	567	94.2	602	100.0
EASY	273	10.5	2316	89.5	2589	100.0
Number of obs	308	9.7	2883	90.3	3191	100.0

Pearson's Independence Test: χ^2 (1)=12.534, p value=.000

Note: Colum variable is CIS measure. In this analysis, we divide sample into two groups. Participants who answered "exactly same" or "mostly same" make one group, those who answered "quite different" or "completely different" another group

; Row variable is information condition. In this analysis, we divide three self-information conditions into two groups. While both Means/Ends information for self and Ends information for self are regrouped as Easy information, Means information for self is considered as Had information.

Table 6-21: Information Conditions and Information Sharing with Total Sample

Information Conditions	"exactly same" or "mostly same"		"quite different" or "completely different"		Sum	
	Frequency	%	Frequency	%	Frequency	%
HARD	17	5.9	269	94.1	286	100.0
EASY	137	10.7	1141	89.3	1278	100.0
Number of obs	154	9.8	1278	90.2	1546	100.0

Pearson's Independence Test: χ^2 (1)=12.534, p value=.000

Note: Colum variable is CIS measure. In this analysis, we divide sample into two groups. Participants who answered "exactly same" or "mostly same" make one group, those who answered "quite different" or "completely different" another group

; Row variable is information condition. In this analysis, we divide three self-information conditions into two groups. While both Means/Ends information for self and Ends information for self are regrouped as Easy information, Means information for self is considered as Hard information

; In this case, we use sample which "political efficacy" measure is less than its mean (3.36). This limited sample contains about half of respondents.

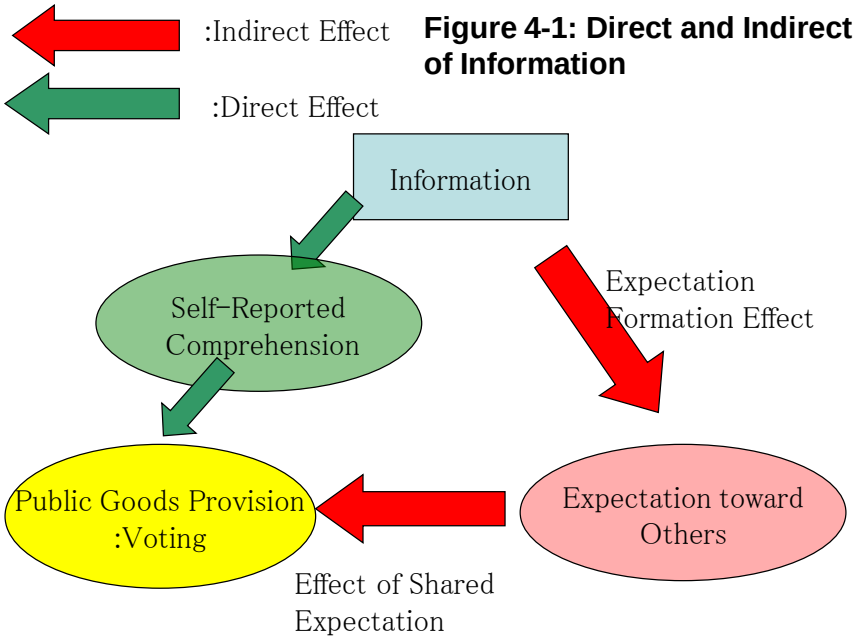
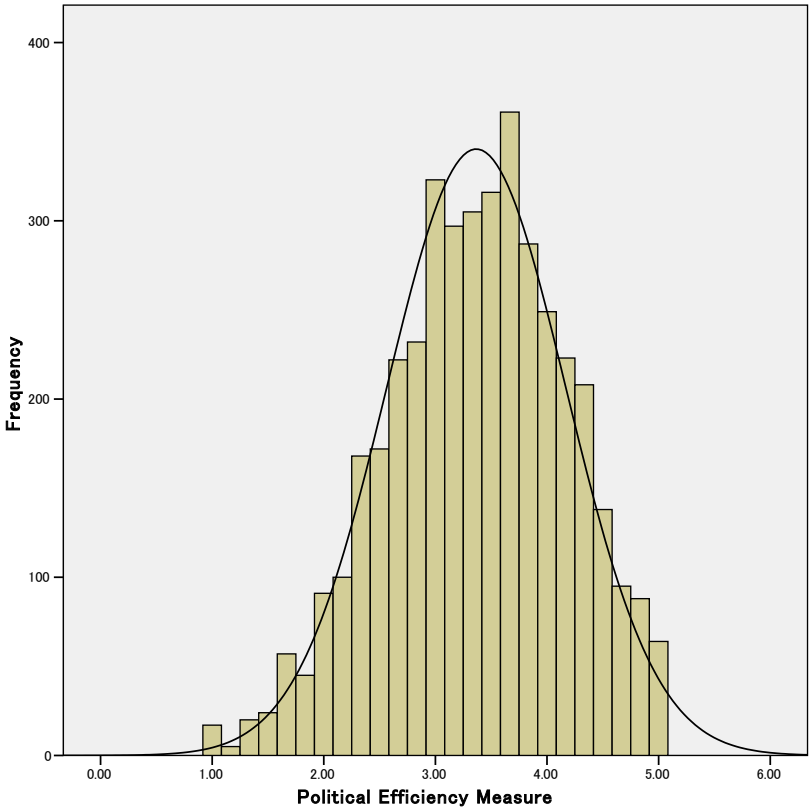


Figure 4-1: Direct and Indirect of Information

Figure5-1: Distribution of Political Efficiency Mesure



Mean = 3.36

Standard Deviation = 0.803

Number of Obs = 4107

Questions are as follows; What do you think about each of the opinions listed here about people, election and politics. Please answer by choosing one.

a) it is no use going to vote, when a party or a candidate you support for has no chance to win an election.

b) because many people vote in elections, it does not matter if I myself would vote or not.

c) it is a duty as an eligible voter to vote.

d) I have no power over what the government does.

e) there are some occasions where things like politics and government are too complex for me to understand what they are all about.

f) When a bill that is potentially very harmful to you is introduced to the Parliament, you can stop the bill through various campaigns against it, without just being passively letting the Parliament decide it for you.

Answers are (1) I think so, (2)I'd rather think so, (3)It depends, (4) I would not rather think so, (5) I don't think so.

Figure 6-1: Information and Voting Behavior

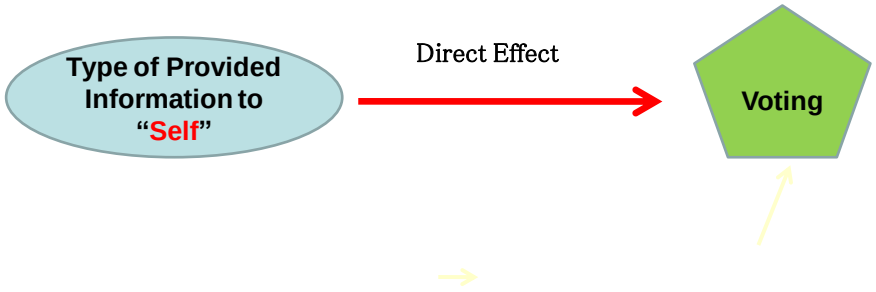


Figure 6-2: Information and Voting Behavior

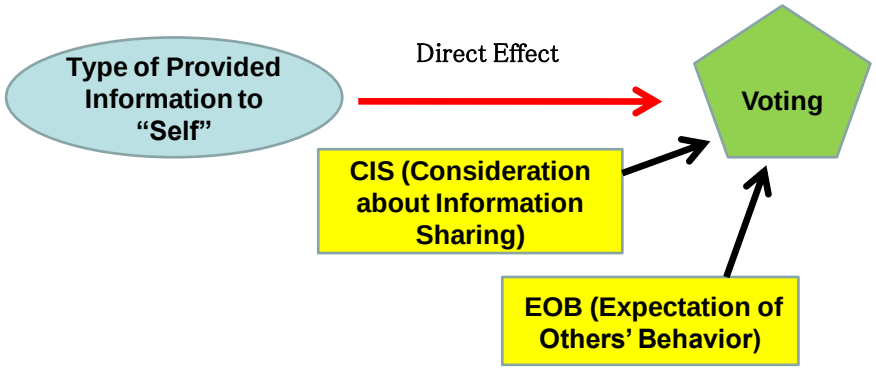


Figure 6-3: Information and Voting Behavior

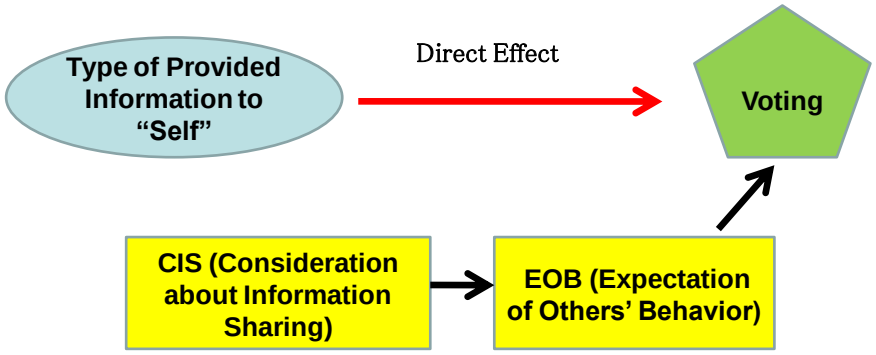


Figure 6-4: Information and Voting Behavior