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Are People More Likely to Vote with “easy” Information than with “hard” Information?
-Resource Sharing Illusion-

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-Resource Sharing Illusion-[1]

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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

[1] This study has been made by considering results of our previous research (Shimizu et al., 2008), which shares the same research interest.

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

Basic Idea of Experiment

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[7]. 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.

As "our supposed cause", we manipulate *content* of the information about new ordinance as experimental conditions: Easy *content* and Hard *content*. We make clear a difference of these two contents. First of all, to define Easy/Hard information, we rely on an 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 define Easy/Hard concept. From the second requisite, related to substance of issue rather than to its way of explanation, we can immediately derive two types of information: information containing only "ends", information including only "means". 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". A more concrete explanation about the implementation of "easy" and "hard" information in our experiment will be given

[7] 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.

later.

Based on this definition of Easy/Hard information, we think that different contents 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 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.

[figure1 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 living 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.

Independent Variables and Prediction

As independent variables, we introduced ENDS, MEANS, MEANS/ENDS information and self vs. the others as the information receiver. ENDS manipulation means that participants get information only explaining ends of new ordinance, MEANS manipulation means that they get information only containing its means, whereas MEANS/ENDS manipulation includes both. It must be noted that ENDS and MEANS/ENDS are considered as "easy" whereas MEANS as "hard".

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)[8].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[9].

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. In other words, we can only construct experimental condition in which participant's information is as same as the others' or her/his information include the others'. Thus, 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" argued previously, 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.

[8] 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.

[9] Direct and indirect effects are confounded in EE, MM and ME_ME but to introduce ME_E and ME_M makes us possible to isolate each effect, even if it is partially.

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.

Experimental Procedure: Manipulation of Public Information and Private Information

For this study, we consigned a web experiment to a private research company and used the members pooled by the company as subjects. These members voluntarily apply for membership to the company, and it is up to them to answer the survey questions diffused over the internet. They can participate in experiments alone in their homes, as experimental instruction is given on their computer screen by using a digital tool. After the experiment, the company randomly extracts the data of the respondents and pays them a fee[10].

In this web experiment, we introduced three different animation characters because we thought the explanation by animation character had two merits. The first merit of them 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. 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 that the experiment starts (see figure 2). In addition, this character plays a role of interactive interface in this experiment. 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 3). 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* real experimenters. This navigator type character seems to be usually necessary in this type of experiment. Since experimenter is physically absent, we are required to do something to substitute the role of experimenter in laboratory experiment.

[10] One drawback of such a web experiment, as has been often noted, is a sample bias. Although the company shuffles its members every year and we tried to use as widely distributed a sample as possible, the problem of sample bias may not be negligible when the results are generalized.

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, "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 5). 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.

The anchorman 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, "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.

Instruction/Manipulation Check and Its Results

To verify our manipulation validity and instruction plainness, we prepared a number of

questions to check following three points;

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.

As for the results of questions to check in detail whether participants sufficiently follow instruction without uneasiness (see the first and second points above), we have quite positive results. Table1 shows that across five conditions almost more than 80% participants take anchorman's information as "completely reliable", "mostly reliable" or "quite reliable" and table2 reveals the similar reliability of participants with regard to professor's information. Table3 and 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, it seems that participants do not understand sufficiently the difference of information. Table5 shows that around 70% of people in ME_E and ME_M 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 five conditions the number of DK is non negligible.

Do these results suggest that our web experiment does not work? *Actually* analysis with independent variables based on the concept of Easy/Hard information provides us a reason how participants distinguish 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 Table6 and 7, their statistical analysis shows that our experimental conditions do *not* affect participant's behavior *exactly* as we have expected.

[table 6 around here]

[table 7 around here]

[table 8 around here]

[table 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 8). With participants who are relatively less confident in their "political efficacy" [11], not only E_E manipulation but also ME_M manipulation could give some impact on their vote choice(see table 9). As long as a comment element of both E_E and ME_M manipulations is "easy" information to self, this 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[12]:

$$\text{Logit}\,(p_i) = \log\,(p_i/1\text{-}p_i) = \beta_0 + \beta_1\ \text{Self\_E} + \beta_2\ \text{Self\_ME}\ ^{13}$$

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

[11] In addition to instruction/manipulation check questions, we introduced questions to investigate participant's consideration for others and to measure participant's "political efficacy" (about questions of "political efficacy" and its results, see appendix 1). 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. 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.

[12] It is noteworthy that our experiment was not originally design to examine effects of these newly reconstructed variables. Hence our findings based on these variables are to be accepted with reservation.

[13] 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, $\log\,(p_i/1\text{-}\,p_i\,)$. 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. 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 10 around here]
[table 11 around here]
[table 12around here]
[table 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 around here]

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)"

To confirm participants' "expectation for others' voting behavior" (EOB), 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[14]. 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

[14] This question was introduced to clarify whether people were *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"? The answers range from 0 to 9: 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%. 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.

participant's voting behavior by the following model:

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

[table 14 around here]

[table 15 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 If participants are indifferent to the others' 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[15].:

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

[table 16 around here]

[table 17 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 7 around here]

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

[15] 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.

(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 figure7 as follows:

[Figure8 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 18 around here]
[Table 19 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 9 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 an 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[16]. 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.

[16] 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.

-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 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[17]. 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 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 experiment

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).

[17] 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.

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 revised experimental design to analyze voting behavior in future research, 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 revised experimental design requires it.

Acknowledgement

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Table 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 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 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?"

Table 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 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 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 8: Logit Analysis of Vote Choice with Total Sample

Independent Variables	Exp(ß)		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 9: Logit Analysis of Vote Choice with Selected Sample

Independent Variables	Exp(ß)		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 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 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 12: Logit Analysis of Vote Choice with Selected Sample

Independent Variables	Exp(ß)		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 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 14: 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 15: 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 16: 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 17: 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 18: 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 19: Information Conditions and Information Sharing with Limited 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

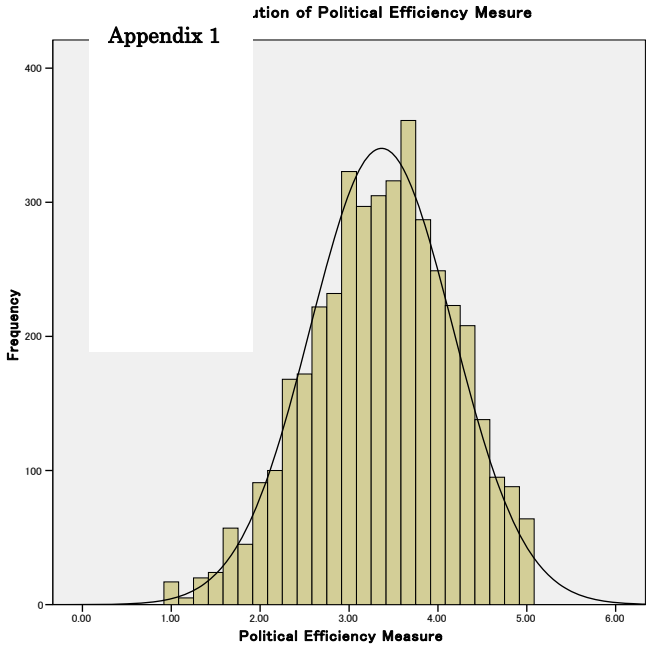
Pearson's Independence Test: χ^2 (1)=12.534, p value=.000

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.

Appendix 1



Mean = 3.36

Standard Deviation = 0.803

Number of Obs = 4107

Questions are as follows;

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.

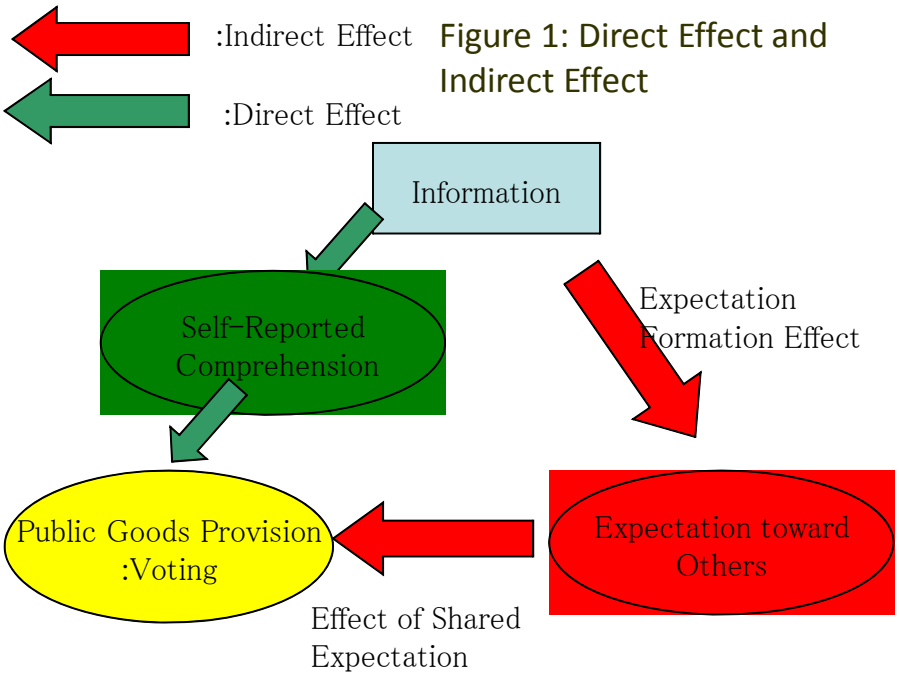
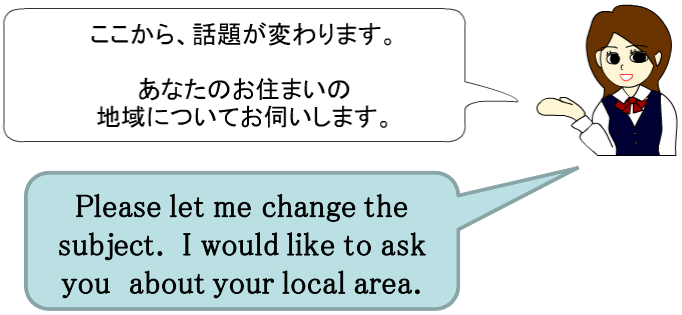


Figure 1: Direct Effect and Indirect Effect

Figure 2


ここから、話題が変わります。
あなたのお住まいの
地域についてお伺いします。
Please let me change the subject. I would like to ask you about your local area.
次へ

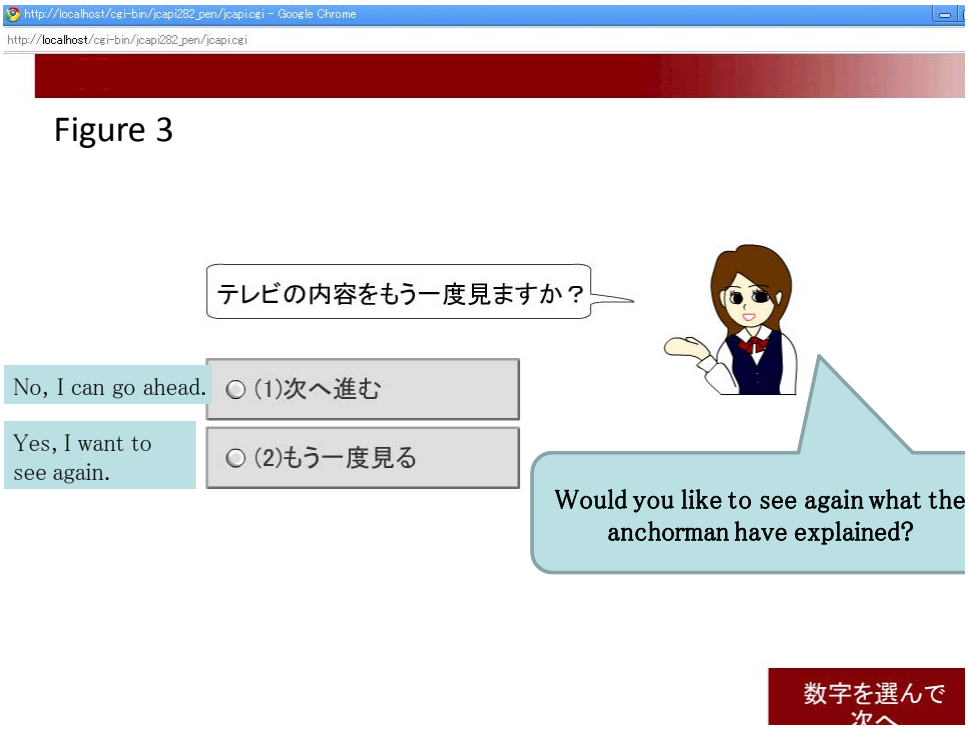

http://localhost/cgi-bin/jcapi282_pen/jcapi.cgi - Google Chrome
http://localhost/cgi-bin/jcapi282_pen/jcapi.cgi
テレビの内容をもう一度見ますか？
No, I can go ahead.
(1)次へ進む
Yes, I want to see again.
(2)もう一度見る
Would you like to see again what the anchorman have explained?
数字を選んで

Figure 3

Figure 4: TV screen and Anchorman

“It enhances a general and open bidding regulation.”

Figure 5: Professor and His Explanation

Notice: This information is available for you only.
Others in your area do not know it.

Hi!
Let me explain this information for you.

By introducing a general and open bidding regulation, it can effectively cut the costs for construction,

Figure 6: Information and Voting Behavior

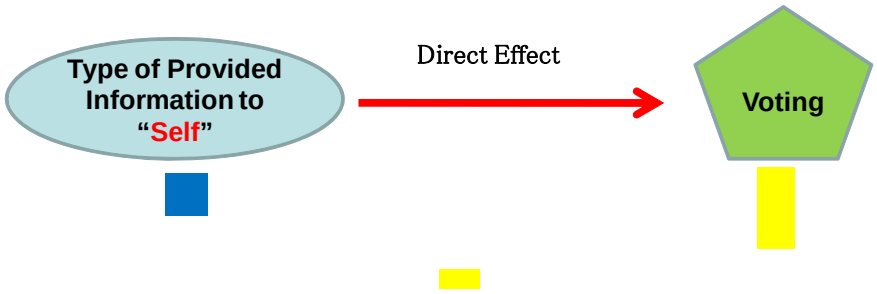


Figure 7: Information and Voting Behavior

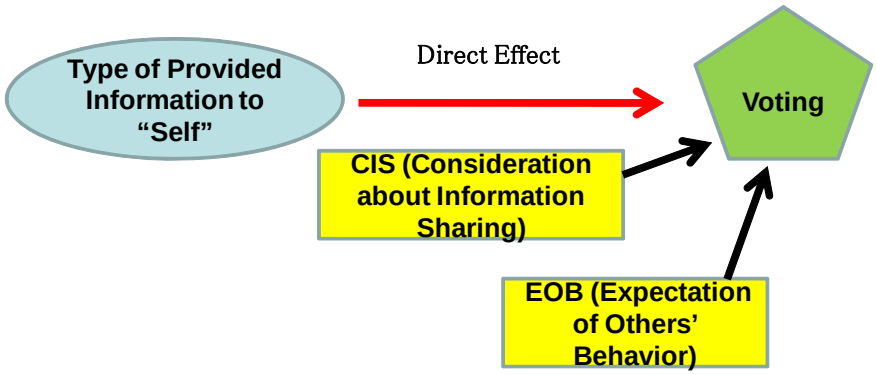


Figure 8: Information and Voting Behavior

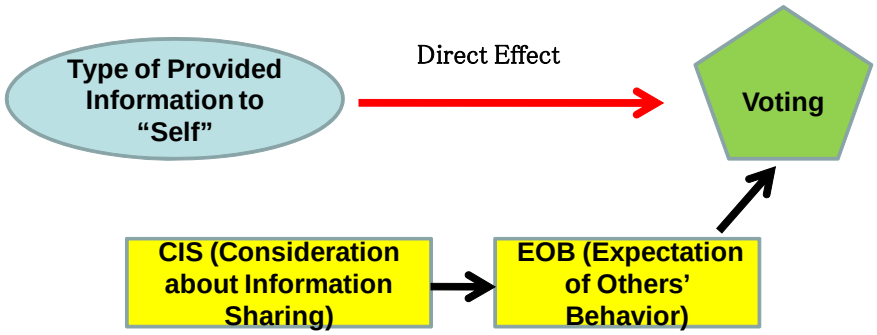


Figure 9: Information and Voting Behavior