Real-Time Information and Group Litigation Decisions*

by

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Abstract

An experimental choice environment is created that requires a decision on whether to litigate and how much to spend if a decision is made to go forward with a lawsuit. These decisions are made individually and by a group. The group contexts have real-time information in which people can observe others' decisions and revise their risky investment decisions within a predetermined time limit. Simply observing others' choices has a significant impact on individual decisions that is not reversed after leaving the group. Real-time information influences choices even though there is full information because preferences are noisy. Coupling real-time information with majority rule establishes the median spending choice as the focal point, as people with low values increase spending and those with high values decrease spending. Unanimity has more asymmetric effects.

Key Words: litigate, real-time information, group decisions, majority rule, unanimity, herding

JEL Classification: D03, D80, D70

1. Introduction

Risky investments often are made in a group environment. For example, incorporated and government entities decide through a committee to undertake capital investment projects; pension and other saving funds are managed by investor groups; parents choose how to save for their families. The decision to go forward with litigation is an investment with unknown returns that is often made in a group setting. The group could be a board of directors or a family. The group could be very large in class action suits. While the difference in decision-making behavior between groups and individuals has recently been the subject of much academic research, very little is known about group behavior in risky situations. Individuals may act differently because of the separate and related effects of (1) being embedded in a group and (2) the group decision rule. Most theoretical and empirical models of risky financial decision-making assume that the decision-making group acts as a rational economic agent, without taking group informational dynamics and decision-making rules into account.

This article seeks to fill this void by presenting experimental evidence that illuminates how the group environment affects risky financial decisions. Individual choice behavior is compared to that made in three different group environments in which the group faces the same range of risky choices as the individual. In each group context, participants have real-time information (RTI) that enables them to observe the desired investment amounts of others, and they can revise their investment recommendations based on these observations. Both RTI alone and the group decision rule—deciding how much to spend either by majority rule or unanimous rule—may influence individual choices. The experimental design allows us to distinguish the separate effects of simply observing what others want to do and the group decision rule, track how people change, and test for significance.

Our experiment involves the choice of an investment amount, where higher investment levels at first increase the chance of obtaining a higher payoff, but after a point greater investment levels reduce the net expected payoff. To operationalize the investment decision in both an individual and group setting, we construct a decision context that makes people contemplate filing a lawsuit. In our scenarios, up-front payments must be made to earn an uncertain return. Such decisions are often faced by an individual who must act alone or is part of a group.

Spending more on the lawsuit increases the probability of winning the case, but the expected payoff net of litigation costs will eventually decline as the investment increases. Although subjects in our experiments are presented with this concrete decision problem, its general form is one that has a concave expected payoff schedule. Hence too much can be spent to achieve a desired outcome. The temptation to throw money at an endeavor can easily be extended to other situations where emotions run high because of a strong desire to prevail -- paying for a child's rearing and education, health care of a loved one, or perhaps the financing of a professional sports team.

Whether alone or in a group, the subject must settle on an expenditure amount that will later yield an unknown return. In the group settings, people are not only told that they are part of a group, but they also have RTI and can observe the amounts recommended by other members of the group; people can change their commitment to the endeavor as they see how others are committing. In two of the three group situations there is a common group decision based on either majority rule or unanimous rule that eventually determines an identical payoff for each member of the group. Because two treatment effects essentially take place in these group sessions, one being the decision rule and the other being able to observe what all group members want to spend in real time, we isolate the effect of RTI based on an RTI only treatment, in which individuals are in a group that is strictly informational; they can observe what others do, but their payoffs depend only on their own decision and are unaffected by others' choices.

A priori one would not expect there to be strongly different effects on an individual's behavior from these group contexts, particularly for the RTI case in which the individual's own investment determines the individual's payoff. All experimental participants have full information regarding probabilities and payoffs, and they can presumably make decisions based on their own willingness to bear risk. Thus, providing information on other people's decisions should have no effect if the individual's payoff is governed solely by one's individual choice. However, risky decisions pose well-known difficulties for individual decision-making. If individuals have noisy preferences and are uncertain about whether they have made their expected utility-maximizing choice, observing others' choices may provide information on possible errors in their private decision.

Thus choices in a group environment may be different than an individual's choice behavior because of the information exchanged in group contexts. Models of group polarization, such as Glaeser and Sunstein (2009), recognize herding effects or information cascades generated by observing others' choices, as this information may alter the assessed probabilities and consequently affect decisions in the group environment.[1] However, unlike these analyses, in our experiment participants alter their choices even though there is no uncertainty regarding the probabilities or the lottery payoffs, as all participants have full information. For our RTI

[1] The information cascades analyzed by Bikhchandani, Hirshleifer, and Welch (1992, 1998) and the herding effects analyzed by Banerjee (1992) are defined similarly. In each case, individuals find it optimal to follow the actions of others rather than relying on their private information. Anderson and Holt (1997) present experimental evidence on these effects, while Daughety and Reinganum (1999) examine herding effects for judicial decisions. Rook (2006) provides a general review.

environments, we suggest that the shift is attributable to noisy individual preferences coupled with information about welfare-maximizing choices provided by RTI.

The changes in decisions once the individual is operating in a group context often involve a systematic shift in the riskiness of decisions. Risk shifts associated with greater risk are known as a risky shift; risk shifts associated with less risk are known as conservative shifts or cautious shifts.[2] While most studies have found evidence of a risky shift, Ambrus, Greiner, and Pathak (2009) conduct experimental tests demonstrating that evidence of risky shifts in mean group decisions may provide a misleading perspective on the shifts in individual decisions. Their analysis of experimental lottery choices did not indicate any risky shift for individuals relative to the median. Our study differs from this literature in that for the experimental treatment that couples RTI with individual choice there is no actual group interaction or group decision rule, only an exchange of information on choices. We compare the pure RTI results for individual decisions to the decisions individuals make when there is a group decision rule in order to analyze the nature of the risky shift across our different experimental treatments.

For RTI group contexts in which the investment amount is guided by unanimity or a majority choice decision rule, one would not expect the group context alone to alter individual choices. When preferences are single-peaked, simple majority rule outcomes will be guided by the preferences of the median voter. When unanimity is required, the lowest individual contribution in the group guides the group decision. The lowest bidder for the unanimous choice

[2] For analyses of risky shift and cautious shift (also called conservative shift) behavior, see Wallach, Kogan, and Bem (1962), Brown (1986), and Aronson, Wilson, and Akert (2005). Analogous group polarization effects have been found for mock jury behavior in Schkade, Sunstein, and Kahneman (2000).

treatment has no incentive to raise the investment amount, and the higher bidders have no incentive to lower their investment amount when placed in this group setting.[3]

When the group RTI environment is coupled with a group decision rule, there will be framing effects and group norms at work even when group members interact in a relatively sterile environment that allows them to only register their spending "votes" on a computer screen. Majority rule and unanimous rule not only define the payoff structure of the experiment but also have a framing effect in highlighting the pivotal values in the group context. Framing effects are well established in the psychology literature, but the major task always has been to predict *ex ante* how the frame will affect the decisions.[4] The majority rule and unanimous rule have well-defined, predictable focal points that are described in the experiments as being the instrumental value that will govern group decisions. By comparing the amounts spent as individuals alone and as individuals in a group, it is possible to quantify the effect of RTI and the framing and social norm effects of the group contexts on expenditures.[5]

The litigation decision that we examine is preceded by two sets of lottery choices. One set estimates a measure of risk aversion following the Holt and Laury (2002) procedure. The results of this series of choices can be used to control for the influence of individual risk aversion on decisions. The second set of lotteries introduces subjects to the main experimental task by

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[3] While one might not expect the group decision rule to alter individual choices, in an experiment with a very different structure than ours, Guarnaschelli, McKelvey, and Palfrey (2000) found experimental evidence of strategic, insincere behavior with both majority rule and a unanimity group decision rule.
[4] Fischhoff (1983) discusses the importance of decision frames and the difficulties that arise in predicting the effect of the frames *ex ante* rather than offering *ex post* rationalizations of framing effects that take advantage of hindsight.
[5] The potential influence on group contexts as well as the salience of the group environment has been examined in experimental studies by Blinder and Morgan (2005), Cooper and Kagel (2005), Goette, Huffman, and Meier (2006), Charness, Rigotti, and Rustichini (2007), Tan and Bolle (2007), Sutter (2007, 2009) and Hargreaves-Heap and Zizzo (2009). Reviews of the related psychology literature appear in Brown (1986), Kerr, MacCoun, and Kramer (1996), and Aronson, Wilson, and Akert (2005).

creating a setting that is very much like the litigation decision, but without the context of a possible lawsuit.

The experimental design requires subjects to make an actual payment in contrast to a survey questionnaire. The group litigation decision is made by the subjects revealing how much they are willing to spend in going forward, rather than for example simply asking members for a vote on whether to go forward. These features of the experiment create a rich data set on how people and groups make decisions in a context that has risk, and for which net gains are concave. The findings provide evidence of a strong influence of RTI both when choices are governed by a group decision rule as well as when individuals make their own decision after being exposed to RTI from other members of the group. These effects on decisions arise even though subjects have full information about the risks and lottery payoffs. However, given the cognitive difficulties posed by having to choose among a set of lottery options, they may not be certain of the expected utility-maximizing choice. Thus, noisy preferences may account for these effects in the RTI individual choice case, while for group decisions the framing and social norm effects of majority rule and unanimity also come into play.

2. Experimental Design

The experimental design compares an individual's decision to litigate with the decision of a group of six. Each treatment consists of four parts—two lotteries (Part I and Part II), one individual investment decision (Part III), and one group investment decision (Part IV). These parts are sequenced or staged differently in experimental sessions. The Part I and II lotteries were always stages 1 and 2 of an experimental session and were identical across all treatments. Part III, the individual investment decision, was also identical across all treatments, but in three treatments this part was conducted in stage 3 before the group decisions, which we refer to as original order, while in the other three treatments it was in stage 4 after the group decisions, which we refer to as reversed order. Finally, as we explain in more detail below, there were three variations of Part IV, the group investment decision. Table 1 provides an overview of the order of all parts in all six treatments and the acronyms we use to reference each treatment. The treatments are different based on the order of the parts and the group environment in Part IV.

We recruited 144 subjects from college undergraduate and graduate classes. Each treatment consisted of two sessions with groups of 12, which were later divided into groups of six for the group treatments. Subjects reported to a computer lab, where each person was seated at a terminal. The experiment was programmed and conducted with the software z-Tree (Fischbacher, 2007). At the beginning of each stage of the experiment, instructions were read aloud as subjects followed along on their written copies. Instructions to a subsequent stage of the experiment were not given to subjects until they completed all of their choices in the current stage of the experiment. Sessions ran for about 45 minutes from start to finish when subjects where paid in cash. Average earnings were about $18.00.

Part I: Measuring Risk Aversion

To develop a risk aversion variable to be used in the analysis of the risky investment decisions, in Part I of the experiment subjects considered the Holt and Laury (2002) lottery choices used to measure an individual's risk aversion. Individuals were asked to choose between two lottery options in ten different cases. The choices presented to subjects are in Table 2.

The ten choices have two options labeled Option A and Option B. These options keep the same dollar and cents values as the choices change. The options are different over the ten choices because the probabilities in the choice change. Option A has progressively higher probabilities for winning $2.00 and progressively lower probabilities for winning $1.60. In

Option B there are progressively higher probabilities of winning \$3.85 and progressively lower probabilities of winning \$0.10. The tenth decision is a choice between taking either \$2.00 or \$3.85 with certainty. The expected value of Option A in the first decision is \$1.64 and the expected value of Option B is \$0.475. Both expected values increase, but a different rate: In choice five the expected value of Option B (\$1.975) becomes larger than Option A (\$1.80), and a risk-neutral subject should switch from Option A to Option B. Risk-loving subjects will switch sooner, and risk-averse subjects will switch later. Option A is considered a safe choice relative to Option B. One measure of risk aversion is the number of safe choices made before switching to Option B.

After all subjects have chosen either Option A or Option B in each of the ten scenarios, the computer randomly chooses one of the ten scenarios for payment and determines for each subjects whether they win or lose their chosen lottery. Before moving to Part II of the experiment subjects are informed of their earnings, and their screen begins to tabulate an earning balance.

Based on their responses to Part I of the experiment and assuming a utility function of the form $v(x) = \frac{x^{1-r}}{1-r}$, where r is the measure of constant relative risk aversion (CRRA), Table 3 provides the CRRA measure implied by the choice of Option B in the lottery and the fraction of respondents in each risk aversion group. There is a preference for risk if $r<0$, and there is risk aversion if $r>0$. Using the same intervals as Holt and Laury (2002) for measures of preference, subjects are risk-neutral if they have r such that $-0.15<r<0.15$. Overall, 83% of the respondents are consistent in that they switch from Option A to Option B only once; of those, 17% of the respondents display risk-loving preferences, 28% are risk-neutral, and 55% are risk-averse.[6] Only 3% of the sample with consistent choices fall into the extremely risk-loving group ($r < -0.95$) or the extremely risk-averse group ($1.37 < r$). Most people display moderate degrees of risk aversion. For subsequent analysis we code as the individual's risk aversion measure the midpoint of the r range or the level of the upper or lower bound on r for people at the extremes. Nobody in the sample failed the rationality test in the final choice in Table 2, and 17% of the sample switched decisions in Table 2 more than once. Subsequent empirical analysis will distinguish the people without r values and label them inconsistent respondents. The mean value of r for those with valid measures of r is 0.21, which is a slight degree of risk aversion. On average consistent subjects made 4.82 safe lottery choices.

Part II: Lotteries with Rising then Falling Expected Values

To introduce participants to the type of lottery structure used in the main part of the experiment, Part II presents subjects with lottery choice scenarios that have a more complex expected payoff pattern; expected payoffs rise and then fall. Table 4 has nine choices and choosing between options was designed to familiarize the subjects with more complex payoff patterns outside of contextual cues. As shown in Table 4, Option A is winning $2.50 with certainty, but Option B has both the probabilities and payments changing. Once again, after all subjects make their choices, the computer randomly picks one of the nine cases to pay. If subjects pick Option A in that case, $2.50 is paid. If they pick Option B, the computer again decides randomly whether they win the lottery in Option B. The expected value of Option B is shown in parentheses; these values were not given to subjects in the experiment.

[6] Our subjects seem to be slightly less risk averse than subjects in other papers who used the Holt-Laury mechanism: for example, in Holt and Laury (2002) itself, 8% were risk-loving, 26% risk-neutral and 66% risk-averse, while in Anderson and Mellor (2009) and Lusk and Coble (2005) those numbers were 5%, 21% and 75%, and 12%, 24% and 64%, respectively.

Notice the expected values of Option B are always greater than $2.50. A risk-neutral or risk-loving subject would always choose Option B over Option A. A very risk-averse person with an r value of greater than 1.14 will choose Option A from lottery 1 and never switch to Option B. Table 4 is something of a sterile version of the litigation decision that is presented to subjects in Parts III and IV of the experiment, for which the expected values of the lotteries are double the values in Table 4.

Table 5 displays the basic information on when subjects switch from the safe Option A to the lottery in Option B and back. Of all 144 subjects, 127 switch at least once, with an average first lottery switch of 2.18 (std. dev. 1.95) and average last switch (back to Option A) of 7.88 (std. dev. 1.82). The number of times individual subjects switch between Option A and B also are reported. It is not unusual for subjects to make as many as 4 switches between options. The largest number of switches in the raw data is six. Counts of how individuals are actually switching shows that most people have difficulty with the lottery choices. Just 56 or 39% of the subjects switch zero or two times; 60 (42%) subjects only switch once, and 28 (19%) switch more than twice.

Overall, most people have difficulty deciding when to enter and exit the lottery. The survey results from Table 5 present compelling evidence that individuals are uncertain about whether they have made their expected utility-maximizing choices. We believe this uncertainty about their expected utility-maximizing choice allows people to be guided by RTI in a group environment, a theme to which we return when we discuss the experimental results.

Part III: Individual Contributions

To implement the lottery decision and establish the litigation context for the subsequent group decision, Part III of the experiment gives subjects a hypothetical product liability case in which they must make a decision on going forward as a plaintiff. The instructions to subjects begin with the following case scenario.

> Imagine a defective product has led to a serious injury to a member of your family. A product safety expert has reviewed the accident and concluded that the company was negligent in the manufacture of the product. Your attorney believes that you have a strong case to recoup damages from the manufacturer for the medical costs and pain and suffering associated with the accident.
>
> The product manufacturer is a small firm that does not have a good safety record. The company has no insurance but relies instead on a policy of vigorously fighting any lawsuits against it. Your attorney advises you that the better you fund your potential case against the company the greater your chances of winning the case. However, the more you spend, the more the defendant spends, reducing the funds the company will have available to pay your claim. As a result, the amount of money you receive from winning the case falls as you spend more. If you lose the case you only have your original budget minus your payments.

Individuals in Part III of the experiment and groups of six in Part IV of the experiment are given a budget of $5.00 to spend on litigating this potential lawsuit. They must choose how much to spend and can choose to not file a complaint. The instructions present decision-makers with a sample table of what they can expect when they go forward with the case. The payoff structure is reported in Table 6, where the subjects were not informed of the expected lottery values that appear in parentheses. Outcome A is winning the case and Outcome B is losing the case. Since the decision variable is continuous, but the table shows only nine discrete choices, subjects are told that the table should be thought of "as nine example payments and possible outcomes."

Subjects are informed that the probability of Outcome A is (0.2 x payment) and the probability of Outcome B is (1- probability of Outcome A). The net amount paid if Outcome A results is $15-2 x ($ payment) and the net amount paid if outcome B results is $5 – ($ payment). Table 6 adjusts in fifty cent increments, but subjects were reminded that they could choose any dollar and cents amount from $0.00 to $4.99. The expected values of the outcomes are shown in parentheses to the far right of each entry. These values were not given to subjects in the experiment. Notice that the expected value function is concave. It starts at $5.00, rises to a maximum of $6.25, and then falls to $5.45.

The instructions for Table 6 are less demanding of subjects than those for Table 4. In Part II of the experiment, subjects who do not show an extreme risk loving measure are required to enter and then exit the lottery in order to maximize expected utility. Table 6 facilitates the subjects' task by simply asking them at what point they would like to be in the "litigation lottery" and not when they would like to enter and continue with this lottery as relative payoffs change.

Part IV: Group Decisions

Part IV, which is conducted in stage 3 or in stage 4 of the experiment, is the "group" decision. In all of the experimental sessions there were twelve subjects divided anonymously into two groups of six, half of whom considered individual and group decisions in the original order (O) and half considered group and individual choices in the reversed (R) order. The group contexts consist of majority (M) rule (either O-RTI-M or R-RTI-M), unanimous (U) rule (either O-RTI-U or R-RTI-U), and individual choice in a group of six with RTI so that they could observe (O) how the others were investing (O-RTI-O, or R-RTI-O). In the latter RTI treatments without a group decision rule, subjects were told that they could observe the choices of the other five members of the group, but otherwise there was no interaction between members. Individuals in all group settings had a two-minute period in which to observe and revise their investment decisions as many times as they wished.[7] Subjects were told that in majority rule the fourth-highest amount determined what the group pays. In unanimous rule the smallest amount

[7] Results in Blinder and Morgan (2005) indicate that the speed of decision making is similar for majority rule and unanimity.

determined the amount paid to undertake the lawsuit. This is the most that all six subjects will pay to go forward. Alternatively, it could be viewed as the marginal amount required for one individual to not go along with the group investment in the lawsuit.

3. Hypotheses

The choice situations in both the individual and group contexts involve investment decisions that affect the probabilities of a lottery outcome. Let w be the individual's initial wealth, x the investment amount, y the value of the top prize, z the value of the bottom prize, p(x) the probability of winning the top prize where p'(x) > 0, and v(w) the utility function where v'(w) > 0. The experimental task in person i's initial choice in the baseline situation is

$$\underset{x_i}{Max}\ p(x_i)v(w+y-x_i)+(1-p(x_i))v(w+z-x_i)\,. \tag{1}$$

We denote the optimal x_i chosen during the RTI part by person i at time t by x_i^*.

In the real-time information case, all participants can observe the entire vector of X_t of responses at any point t, where t is from 0 to 2 minutes. In the RTI environments, the value of x_{ir} will be the optimal choice conditional on observing this information, or

$$x_{ir} = (x_i^* | X_t)\ . \tag{2}$$

Because the p(x) function is shared information for all participants, observing X_t does not provide information about p(x) as in the standard models of herding and information cascades.

Observing X_t may provide information about whether the individual has made the correct lottery decision.[8] Consider a simple case in which the person initially chose x_{i0} but thought that there was a nonzero probability that $x_{i0} - \varepsilon$ or $x_{i0} + \varepsilon$ was the expected utility-maximizing choice

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[8] There is an emerging literature on noise exhibited using different elicitation procedures, such as the recent contributions by Anderson and Mellor (2009) and by Hey, Morone, and Schmidt (2009). Noise could arise due to the elicitation procedure or because of unstable preferences. For our situation, we hypothesize that one potential source of noise is error in making complicated decisions involving lotteries.

so that there could be errors in either direction. The error could arise because the individual may have difficulty performing the expected utility calculation for the lottery or may be uncertain about the underlying utility function that should guide decisions. If many group members pick x_i values above x_{i0}, the individual may increase the assessed likelihood that a higher investment choice is optimal even though there is no group aspect to the decision other than information regarding their decisions. Similarly, observing that others are disproportionately choosing lower investment levels may lead the individual to lower the chosen investment amount.

For the majority decision rule, an individual chooses an optimal x_{im} and under the unanimity decision rule an individual chooses an optimal x_{iu}, given both the information about X_t and knowledge of the group decision rule m or u, which affects the salience of the components of X_t. The experimental instructions specify that for majority rule the fourth-highest payoff will determine the decision affecting all members in the group, while for the unanimous choice rule it is the lowest, or sixth-highest investment amount in the group of six that determines the shared group's investment. If the i values are used to denote the ordinal rank in the group decision context, the investment value is x_{4m} for majority rule and x_{6u} for unanimity.

We examine our first hypothesis of risky shifts in investment amounts by comparing the values of x_{i0} and x_{ir}, which are affected only by the information X_t and not by the framing effect of a group decision rule. While it may, for example, be the case that $x_{im} > x_{i0}$ and $x_{iu} > x_{i0}$, the group decision rule's framing effects also may affect the observed shifts. For the range of choices selected by the respondents, increasing the investment in the group context raises the expected value of the lottery, and we examine both the direction of the shift and whether the investment level is beyond the point where the expected payoff is at its maximum value.

Hypothesis 1. Providing real-time information about others' choices will produce a risky shift.

Based on the initial distribution of investment values, $x_{40} > x_{60}$ by definition. Unless the framing effect of the decision rule alters this ranking in an unexpected manner, the fourth-highest investment amount with majority rule will exceed the lowest investment amount with unanimity. There is no unambiguous theoretical prediction for the relation of the average investment in the seeing environment $\bar{x}_{ir}$ and x_{40} and x_{60}, as that will depend on how the framing effect of the group decision rule alters the subsequent distribution of responses. We expect the majority rule and the unanimous rule to influence the group decision differently.

Hypothesis 2. The group investment choice with majority rule x_{4m} should exceed the group choice with unanimity x_{6u}.

For the RTI group treatments we expect the following trends in investment behavior.

Hypothesis 3. Each of the three group environments will generate changes in levels of investment. 3a) For the RTI observe treatment (RTI-O), there should be an increase in x_{ir} levels above the x_{i0} values if there is a risky shift. There is no framing effect that will influence the distribution of these changes. 3b) For majority rule with RTI (RTI-M), there may also be a risky shift, but there should also be a convergence toward the median with decreases in high values and increases in low values. 3c) For unanimous choice with RTI (RTI-U), there may also be a risky shift, but the low values may rise relative to the higher values, and there may be downward movement from the higher values because of the role of social norms and the asymmetry of the decision rule.

We test these hypotheses in two ways. First, we examine the direction of movement. Do more people increase their x_i values or decrease them, and on balance is the magnitude of the increases greater? Second, we explore the within-group composition of the movement. Thus, do the particular ranks within the X_t group change their x_i values in the predicted manner?

The experiments were run both in the normal order in which individuals made their own investment decisions and reversed order in which the group context was first and the individual choice followed. If the provision of RTI provides information about the optimal risky investment choice that subjects take into account when valuing the lottery decisions, then for the reversed order there should be a lasting effect of RTI that also influences the subsequent individual choice. Thus, there should not be a reversal of the effect of the RTI group information if there is actual learning and information acquisition associated with the RTI.

Hypothesis 4. There should not be a reversal of the effects of RTI in the reversed order experiment if RTI has a lasting effect on the perception and valuation of lotteries.

Our fifth hypothesis examines the relation between the person-specific measures of the CRRA obtained using the Holt-Laury procedure and the group investment decision. More risk-averse respondents should make lower investment levels. The effect of respondent gender, which may be correlated with risk attitudes, will also be examined.

Hypothesis 5. Higher levels of individual risk aversion will tend to decrease the size of any risky investment.

4. Summary of Individual and Group Expenditure Decisions

Table 7 highlights data from Parts III and IV of the experiments with the choices in Table 6. Column (1) lists each group of six subjects by treatment. There are four groups in each treatment. In each treatment n=24. There are three treatments that have individual choices before subjects are placed in a group choice environment; original order and n=72. As already described, Part III and Part IV of the experiment may be switched. These are the reversed order treatments. There are three treatments that have individual choices after the group exposure; reversed order and n=72.

Columns 2-4 display the investment amounts. Column (2), labeled "Average Individual Contribution," is the amount that each person in the group of six would pay to go forward with the litigation. The Group Environment column, column (3), is the average that a group of six players would pay to go forward. This is Part IV of the experiment in its original order and may precede Part III in the reversed order treatment. This is not the actual amount paid when the decision was made by the majority or a unanimous rule. For the O-RTI-M and R-RTI-M groups the amount paid was decided by the fourth-highest amount. The amounts that each person actually settled upon in the group environment are shown on the right side of Table 7 in column (4). For example, the average that group O-RTI-M 1 wanted to pay was $1.46 and the amount paid was $1.25. The amounts listed from lowest to highest 1.25, 1.25, 1.25, 1.50, 1.50, 2.00 is what each person settled upon as their vote to pay, knowing that there was a majority rule enforced.

There are 72 subjects who make an individual choice in stage 3 before group interaction and 72 subjects who make the same choice in stage 4 after group interaction. Table 7 allows us to make some preliminary observations on how much a group invests, compared to what members would do individually. Comparing the contributions subjects make in and out of a group setting, it is clear that RTI-O has the greatest impact on individual behavior.

Individuals alone in the O-RTI-O and R-RTI-O treatments make an average contribution of $2.00, but when they observe the decisions of others in the group, their investment rises to $2.63. This is about a 30% difference so that there is a substantial risk shift consistent with the risky shift Hypothesis 1. However, this investment level is not different from $2.50 at 10% or less significance levels. Mandatory group action tempers the difference between what the individual would do alone and in a group setting. In the O-RTI-M and R-RTI-M treatments individuals alone would invest \$2.40, but with group input their average individual values rise to \$2.45. In the O-RTI-U and R-RTI-U treatments individuals alone would invest \$2.20, and with group input fall to \$2.07. Tests for significant differences in means are conducted by a simple difference of means test.[9]

The average individual payments in the O-RTI-O and R-RTI-O individual choice treatments are significantly different than the individual payments in the group setting at a critical level of 10% or less. Subjects pay significantly more when they are simply informed in an interactive process of what others are doing. In contrast, the average individual payments in the O-RTI-M and R-RTI-M treatments and the amounts actually paid in the group environment are not significantly different. As well, the average individual payments and those voted by the group in the O-RTI-U and R-RTI-U treatments are not significantly different.

Hence a group decision governed by a either a majority or unanimous rule will not yield a group average that is significantly different than what the average individual would recommend for litigation. A majority rule will not yield a payment decision that is significantly different from what the average individual in the group would recommend. The payment will be significantly lower with unanimous rule, as predicted by Hypothesis 2. Table 7 shows that the O-RTI-U and R-RTI-U groups respectively pay 22% and 34% less than the average individual in the group. Hence while majority rule represents the average individual in the group, unanimous rule is substantially more conservative in amounts spent.

This is not the case when the people make an individual decision to move forward when they simply observe what other individuals are doing. The O-RTI-O treatments in the

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[9] The sample variance of the difference is $s_D^2 = s_{(x-y)}^2 = s_x^2 + s_y^2 - 2s_{xy}$. $s_{\overline{D}}^2 = s_D^2 / n$. $\overline{D} = \overline{X} - \overline{Y}$. The test statistic is $\overline{D} / s_{\overline{D}}$. Number of observations is 24 unless otherwise noted. A normal table is used to decide significance.

experiment yield significantly higher payment amounts than when the payment amount is kept confidential. In the O-RTI-O treatment subjects pay 45% more to go forward with a case in the informed setting as opposed to the confidential setting. In the R-RTI-O setting they pay 19% more. We note that subjects in both the O-RTI-O and R-RTI-O group environments are inclined to spend more than the $2.50 amount that maximizes expected value. However the respective $2.63 and $2.61average investments are not significantly different from $2.50.

5. Analyses of Individual Choices in the Group Decision Contexts

We now turn to a more careful comparison of the results in the different group decision contexts. Aggregated observations can cancel out differences in individual behavior patterns. Table 7 for example indicates that there are effects on the mean riskiness of decisions, but as Ambrus, Greiner, and Pathak (2009) have shown, focusing on the means and abstracting from the composition of individual choices may give an inaccurate characterization of risk shifts. Participants in the group contexts all shared the same information about decisions by others and could use this information either in making a decision affecting their payoffs alone or as part of the majority or unanimous rule group decision process. How the information is used, however, may be conditional on outcomes in other stages of the experiment and other factors such as risk aversion and gender. We present the analysis beginning with the original order results so that we can analyze the individual decision and the subsequent effect on these decisions of the group and RTI environments. We then consider the reversed order treatments to examine the permanency of the effect of the information presented in the group contexts.

OLS Regression Results

The regression results in Table 8 analyze the determinants of the person's individual contribution amount in the Part IV group decision context for original order. All group contexts include RTI, and the dependent variable is the person's individual expenditure level decision in Part IV of the experiment, not the total group expenditure level. The first model includes the value of the individual contribution in the Part III individual decision as well as indicators for O-RTI-M and O-RTI-O individual choice. The omitted category is that of group decisions when unanimity is required for decisions, O-RTI-U. The second and third equations include four additional demographic variables— the measure r of the person's CRRA, the number of safe choices made in Table 2, an indicator variable for whether the respondent is female, and an indicator variable for people who gave inconsistent answers to the choices in Table 2.[10]

The results indicate a consistent significant influence of O-RTI-O. Consider first the results for model 1 in Table 8. Individual contributions in group situations are not significantly increased by higher levels of individual investments in the earlier stage. Investments in the group context are higher for the O-RTI-O treatments than for the omitted category of unanimous choice, consistent with the risky shift Hypothesis 1. The effect for majority rule is positive, not as great as O-RTI-O, and not statistically significant at the usual levels. However, that treatment involves both RTI and framing effects that may affect any risky shift influence of RTI.

Models 2 and 3 in Table 8 add demographic variables to the analysis. The earlier effects remain the same. Female participants, who some studies suggest may be more risk-averse,[11] make larger contributions in the group context, but this difference is not statistically significant. There is no statistically significant effect of the measure of CRRA in model 2 and the alternative measure of risk aversion, the number of safe choices, which is included in model 3, so that there

[10] Estimates for the subsample of 118 consistent respondents are very similar as one might expect given the lack of statistical significance for the variable pertaining to inconsistent responses.
[11] We did not detect any gender effect on the lottery choices in Part I. For a review of experimental studies of gender differences in risk aversion, see Eckel and Grossman (2008).

is no evidence in support of the risk aversion Hypothesis 5.[12] Model 4 adds the interaction of the individual expenditure with an indicator for whether the person won the lottery in Part III, but this variable is also not statistically significant. The only significant effect for the average group expenditure results in Table 8 is O-RTI-O. Simply observing the investment behavior of other subjects, while continuing to ask each person for a personal decision on how much to spend causes subjects to increase their investment by about \$.70 in the first three models. This result is consistent with the raw data reported in Table 7. Before observing others, subjects were investing \$1.82 in the endeavor. The \$.70 increase after observing others is about a 38% increase.

To examine whether the RTI effects have a lasting impact on subjects' decisions, Table 9 reports the counterparts of the Table 8 models for the reversed order sample. The only difference is that for model 4 there is an indicator variable for whether the person's group had a successful lottery outcome in the initial group decision.[13] The absence of a statistically significant effect of the R-RTI-O variable in the individual expenditure round indicates that the original order effect of O-RTI-O is not reversed when people receive the group information in the initial round. There is a lasting informational effect of RTI, consistent with Hypothesis 4. This result is also reflected in the positive effect of the level of individual expenditure in the prior group situation on subsequent individual choices. It is interesting that after leaving the

[12] Some of the effect of risk aversion may be captured already in the individual expenditure variable. Omission of that variable from the various regressions sometimes boosts the statistical significance of the CRRA variable, leading to t statistics above 1.0 but falling short of the usual test levels for statistical significance.

[13] Including the measure of whether the person won in the earlier group lottery captures the outcome which, unlike the normal order case, depends on the group decision not necessarily on the individual decision.

group context, female respondents exhibit a downward risk shift so that the results indicate more risk taking behavior by females in the group context than the individual context.[14]

The decision patterns giving rise to these effects are shown in Table 10, which presents the fraction of respondents for each treatment who have a greater contribution amount, the same contribution amount, or a lower contribution amount in the different group RTI situations compared to the individual choice without RTI. Majority rule, in which the median person is most influential, is the neutral context as about an even number of people raise or lower their contributions in the group situation. For the original order results, more people raise their values in the majority rule situation, while for the reversed order results the distribution of changes is more even. Overall, 90% of the people in the majority rule groups change their values from when the decision was personal, even though there is no reason to change if others' choices have no information value.

In contrast, if unanimous choice governs the group decision, the focal point becomes the lower bound of the individual contributions. Once again there is no conventional economic rationale for people to alter their contribution as they should continue to express their own preferences. Yet, almost twice as many people reduce their contribution amount as compared to the number who raise the amount; 75% of the subjects in unanimous rule choose lower or the same amounts voted individually. For the unanimous choice original order case, almost twice as many people reduce their contribution as compared to the number that raise the contribution, and

[14] There is mixed evidence over whether males and females exhibit different levels of risk aversion; see for example Schubert et al., (1999). Charness and Gneezy (2007) however present evidence showing that when it comes to making investment decisions, women are more risk-averse than men. Gneezy, Niederle, and Rustichini (2003) and Niederle and Vesterlund (2007) raise the argument "that males and females preferences are affected differently by changes in the institution. . .(2003, p.1052)." The competitiveness of the decision environment, in particular, causes men and women to behave differently. It is possible in this treatment that after observing the choices of others, females gained the confidence to take more risk.

there is also a much greater tendency to not change one's decision compared to the frequency of change under majority rule.

The strongest differential effect is that for the RTI-O treatment. For the original order case, three-fourths of the respondents raise their investments, and only one-fifth lower their investments. For the full sample 58% raise their investment level when they can observe what others do. On balance, observing others' choices makes people willing to incur a greater upfront investment in the litigation. This pattern reflects the strong herding effects in Hypothesis 1 and 3a, which are not offset by any framing effects that would arise if there were a group decision rule. Knowledge of the greater investments by others may make people more willing to engage in similar behavior than they would otherwise be doing individually. Increasing investment amounts displays a risky shift that on average takes respondents, who are generally risk-averse, to an investment level slightly beyond expected value maximization.

Ordered Probit Results

The determinants of whether individual contributions increase, stay the same, or decline when placed in a group situation can be explored through the ordered probit results in Table 11. Model 1 includes the individual expenditure amount, O-RTI-M, and O-RTI-O; model 2 adds the demographic variables. Higher individual contributions in the initial round in Part III make it more likely that the respondent will reduce the contribution rather than increase the contribution in the group treatments in Part IV. The effect of the variable on the direction in which contribution levels change in the group context is positive for both majority rule and the simple observing treatment, where these effects are relative to the unanimity treatment. RTI alone without majority rule has a greater positive effect than unanimity, but the difference of RTI compared to the majority rule case is not statistically significant. Neither the measure of risk aversion nor the variable for female respondents is statistically significant. Inconsistent respondents display a negative effect.

The results thus far do not pertain to how one's relative position within a group affects the influence of the group decision treatments. RTI-O has no focal point and is purely informational. RTI-M makes the median the focal point; and individuals tend to pull toward the median from both extremes due to the social norm role of the median. RTI-U makes the lower bound the focal point. The rule creates power for the lowest contributor.

The ordered probit regressions in Table 12 address these within-group effects on the composition of the determinants of whether people increase, do not change, or decrease their individual expenditure in the group context. The focus of this analysis is somewhat different than in Table 11 in that we consider who within the group is altering their behavior. Here we create dummy variables for whether the person's individual contribution in the individual choice case in Part III is in the top two contributions or the bottom two contributions in their group of six individuals. The omitted dummy variable category consists of the individuals who rank third and fourth in the level of their individual contributions. Relative to this median group, how do individuals alter their contribution amount in each of the three situations?

The regressions in Table 12 address this question after breaking up the sample into the three pertinent group decision subsamples—whether the respondent was in the O-RTI-O group, the O-RTI-M group, and the O-RTI-U group. Within the O-RTI-O group, the bottom two expenditures rise after observing RTI. The provision of RTI creates a positive risky shift on the part of the participants with lowest rates of investment.

The existence of significant effects at the extremes for majority rule is consistent with the median focal point nature of majority rule. The top expenditure group decreases their investment, while those at the bottom raise their investment. This pattern indicates a convergence of the valuations toward the median within the majority rule treatment, where the change is exhibited at both extremes. This result is consistent with Hypothesis 3b.

For the unanimous choice rule, there is an asymmetric effect relative to the median, which is consistent with the unanimous choice rule's focus on only the extreme lower end of the expenditure distribution and with Hypothesis 3c. The bottom two individual contributions, which will be instrumental in driving the group decision, rise relative to the median within this group as these individuals apparently attempt to accommodate the preferences of the group by raising their valuations in the group context. However, the extent of the upward movement is far less than for either RTI-M or RTI-O, which are significantly larger than the RTI-U effect at the 1% level. Thus, the additional unanimous choice component leads the subjects with the bottom expenditure levels to display less upward flexibility than either the RTI or majority rule case. Information alone without the unanimity group decision rule creates more upward movement on the part of the low end investors than in the unanimity group decision context so the presence of the low bid framing effect for unanimity has a marginal effect that lowers rather than raises the bottom bid.

6. Conclusion

In a standard simple economic model of group decisions, individual preference structures carry over to the group context.[15] Our work shows that group investment decisions are driven by individual preferences that are not the same as when people make individual choices in isolation. We believe the root cause of the shift is that people are undecided about the expected utility-maximizing choice when risky investment decisions must be made at a personal level.

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[15] Similarly, empirical simulations of group decisions generally are based on random draws of individual choices to construct a synthetic group. This approach has been used in several law and economics studies of jury behavior.

Information about others' choices has very strong effects. Even when people have full, accurate knowledge of the probabilities, observing others' choices creates a risky shift.[16] Unlike models of herding and information cascades, in our experiments people have full knowledge of both the probabilities and the payoffs. Moreover, unlike other studies of risky shifts in group contexts, there is no personal interaction within the group, only exchanges of real-time information. Observing others' decisions with real-time information may enable people to make better decisions if their initial private choices are derived from noisy preferences in a complex decision environment where it is difficult to ascertain the expected utility-maximizing choice.

A second set of factors that alter individual choice stem from the group decision rule itself. How the decision rule is framed alters the individual choices people make even when their change in preferences will not alter the group decision in the majority rule and unanimity situations considered. The anchoring effect of focusing on the median group member for majority rule or the member with the lowest valuation for unanimity may influence social norms in a manner that alters individual choices when placed in a group context. The degree of accommodation of the preferences of the other members of the group is greater for majority rule than for unanimous choice. These effects may become even more pronounced when there is greater personal interaction that goes beyond observing others' decisions on a computer screen.[17]

Movement from individual decisions to a group decision context often creates many economic ramifications, including strategic behavior and related game-theoretic effects. However, even apart from such influences, there are quite fundamental changes in individual choice behavior in terms of the information affecting decisions, how people use the information

[16] Interestingly, this result is somewhat in contrast to findings in Shupp and Williams (2008) that groups tend to be less risk-averse in low-risk situations. The difference in results is not surprising as studies have found risk shifts in both directions.

[17] Evidence in Charness, Rigotti, and Rustichini (2007) and, for non-strategic environments, Sutter (2009) suggests that increasing the salience of group membership enhances group effects.

available in group contexts to make decisions when preferences are noisy, and how the group decision rule frames decisions in a manner that alters subsequent behavior. These alterations can have lasting effects on an individual's subsequent decisions.

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Table 1

Experimental Treatments

Treatment	Stage 1	Stage 2	Stage 3	Stage 4
Original Order, Majority (O-RTI-M)	Risk Aversion Elicitation	Lottery with non-linear expected values	Part III: Individual Investment	Part IV: Group Investment with Majority Rule
Original Order, Unanimity (O-RTI-U)	Risk Aversion Elicitation	Lottery with non-linear expected values	Part III: Individual Investment	Part IV: Group Investment with Unanimity Rule
Original Order, Observe (O-RTI-O)	Risk Aversion Elicitation	Lottery with non-linear expected values	Part III: Individual Investment	Part IV: Individual Investment with Observing Others
Reversed Order, Majority (R-RTI-M)	Risk Aversion Elicitation	Lottery with non-linear expected values	Part IV: Group Investment with Majority Rule	Part III: Individual Investment
Reversed Order, Unanimity (R-RTI-U)	Risk Aversion Elicitation	Lottery with non-linear expected values	Part IV: Group Investment with Unanimity Rule	Part III: Individual Investment
Reversed Order, Observe (R-RTI-O)	Risk Aversion Elicitation	Lottery with non-linear expected values	Part IV: Individual Investment with Observing Others	Part III: Individual Investment

Table 2

Lotteries Used to Develop a Measure of Risk Aversion

1	Option A	□ 0.1 probability of winning $2.00 and 0.9 probability of winning $1.60
	Option B	□ 0.1 probability of winning $3.85 and 0.9 probability of winning $0.10
2	Option A	□ 0.2 probability of winning $2.00 and 0.8 probability of winning $1.60
	Option B	□ 0.2 probability of winning $3.85 and 0.8 probability of winning $0.10
3	Option A	□ 0.3 probability of winning $2.00 and 0.7 probability of winning $1.60
	Option B	□ 0.3 probability of winning $3.85 and 0.7 probability of winning $0.10
4	Option A	□ 0.4 probability of winning $2.00 and 0.6 probability of winning $1.60
	Option B	□ 0.4 probability of winning $3.85 and 0.6 probability of winning $0.10
5	Option A	□ 0.5 probability of winning $2.00 and 0.5 probability of winning $1.60
	Option B	□ 0.5 probability of winning $3.85 and 0.5 probability of winning $0.10
6	Option A	□ 0.6 probability of winning $2.00 and 0.4 probability of winning $1.60
	Option B	□ 0.6 probability of winning $3.85 and 0.4 probability of winning $0.10
7	Option A	□ 0.7 probability of winning $2.00 and 0.3 probability of winning $1.60
	Option B	□ 0.7 probability of winning $3.85 and 0.3 probability of winning $0.10
8	Option A	□ 0.8 probability of winning $2.00 and 0.2 probability of winning $1.60
	Option B	□ 0.8 probability of winning $3.85 and 0.2 probability of winning $0.10
9	Option A	□ 0.9 probability of winning $2.00 and 0.1 probability of winning $1.60
	Option B	□ 0.9 probability of winning $3.85 and 0.1 probability of winning $0.10
10	Option A	□ winning $2.00 with certainty
	Option B	□ winning $3.85 with certainty

Table 3

Measures of Risk Aversion for the Sample

Number of safe choices	CRRA (r) Implied by Option B	Fraction in group
0-1	r < -0.95	0.017
2	-0.95 < r < -0.49	0.025
3	-0.49 < r < -0.15	0.125
4	-0.15 < r < 0.15	0.283
5	0.15 < r < 0.41	0.217
6	0.41 < r < 0.68	0.225
7	0.68 < r < 0.97	0.075
8	0.97 < r < 1.37	0.017
9	1.37 < r	0.017
10	Failed rationality test	0.000
Multiple switches	Inconsistent r values	0.17

The mean (std. deviation) of the number of safe choices is 4.82 (1.48), and the mean (std. deviation) of CRRA for those with valid r: 0.21 (0.43).

Table 4

Lotteries with Rising then Falling Expected Values

1 Option A □ winning $2.50 with certainty
Option B □ 0.1 probability of winning $7.00 and 0.9 probability of winning $2.25 ($2.725)

2 Option A □ winning $2.50 with certainty
Option B □ 0.2 probability of winning $6.50 and 0.8 probability of winning $2.00 ($2.90)

3 Option A □ winning $2.50 with certainty
Option B □ 0.3 probability of winning $6.00 and 0.7 probability of winning $1.75 ($3.025)

4 Option A □ winning $2.50 with certainty
Option B □ 0.4 probability of winning $5.50 and 0.6 probability of winning $1.50 ($3.10)

5 Option A □ winning $2.50 with certainty
Option B □ 0.5 probability of winning $5.00 and 0.5 probability of winning $1.25 ($3.125)

6 Option A □ winning $2.50 with certainty
Option B □ 0.6 probability of winning $4.50 and 0.4 probability of winning $1.00 ($3.10)

7 Option A □ winning $2.50 with certainty
Option B □ 0.7 probability of winning $4.00 and 0.3 probability of winning $0.75 ($3.025)

8 Option A □ winning $2.50 with certainty
Option B □ 0.8 probability of winning $3.50 and 0.2 probability of winning $0.50 ($2.90)

9 Option A □ winning $2.50 with certainty
Option B □ 0.9 probability of winning $3.00 and 0.1 probability of winning $0.25 ($2.725)

Table 5

Switching in Lotteries of Part II, Table 4

Average Stage of First Switch:	2.18 (1.95)
Average Stage of Last Switch:	7.88 (1.82)
Number with 0 Switches:	17
Number with 1 Switch:	60
Number with 2 Switches:	39
Number with 3 or more Switches:	28

N=144, Standard deviations in parentheses.

Table 6

Lottery Structure for the Individual and Group Contribution Experiments

Payment	Probability of Outcome A	Net Amount Paid for Outcome A	Probability of Outcome B	Net Amount Paid for Outcome B
□ $0	0.0	–	1.0	$5.00 ($5.00)
□ $0.50	0.1	$14.00	0.9	$4.50 ($5.45)
□ $1.00	0.2	$13.00	0.8	$4.00 ($5.80)
□ $1.50	0.3	$12.00	0.7	$3.50 ($6.05)
□ $2.00	0.4	$11.00	0.6	$3.00 ($6.20)
□ $2.50	0.5	$10.00	0.5	$2.50 ($6.25)
□ $3.00	0.6	$9.00	0.4	$2.00 ($6.20)
□ $3.50	0.7	$8.00	0.3	$1.50 ($6.05)
□ $4.00	0.8	$7.00	0.2	$1.00 ($5.80)
□ $4.50	0.9	$6.00	0.1	$0.50 ($5.45)

Table 7: Individual and Group Expenditures

(1)	(2) Average Individual Contribution	(3) Group Environment	(4) Group Amounts Lowest to Highest*					
Group[a]	(Table 6)	(Table 6)	Lowest					Highest
O-RTI-M 1	1.71	1.46	1.25	1.25	1.25	1.50	1.50	2.00
O-RTI-M 2	3.06	2.60	2.00	2.50	2.55	2.75	2.77	3.00
O-RTI-M 3	1.88	2.20	0.20	1.00	1.50	2.50	4.00	4.00
O-RTI-M 4	2.46	3.05	2.50	2.75	3.00	3.25	3.27	3.50
All O-RTI-M	2.28 (1.29)	2.32 (0.99)			2.08 (0.84)*			
R-RTI-M 1	2.54	2.34	1.00	1.50	2.52	2.55	2.99	3.50
R-RTI-M 2	2.19	2.32	0.50	2.00	2.20	2.50	3.23	3.50
R-RTI-M 3	1.92	2.75	2.50	2.50	2.50	3.00	3.00	3.00
R-RTI-M 4	3.41	2.89	2.50	2.50	2.50	3.00	3.33	3.50
All R-RTI-M	2.52 (1.29)	2.58 (0.29)			2.43 (0.15)			
O-RTI-U 1	2.29	2.01	1.25	1.50	2.00	2.15	2.15	3.00
O-RTI-U 2	2.50	2.33	2.00	2.00	2.50	2.50	2.50	2.50
O-RTI-U 3	2.83	1.83	1.50	1.50	1.50	2.00	2.25	2.25
O-RTI-U 4	1.45	1.77	1.50	1.50	1.75	1.85	2.00	2.00
All O-RTI-U	2.27 (0.84)	1.99 (0.43)	1.56 (0.31)					
R-RTI-U 1	1.88	1.35	0.00	1.00	1.30	1.90	1.90	2.00
R-RTI-U 2	1.79	2.83	2.00	3.00	3.00	3.00	3.00	3.00
R-RTI-U 3	2.92	1.93	1.15	1.75	2.00	2.00	2.20	2.50
R-RTI-U 4	1.92	2.50	2.50	2.50	2.50	2.50	2.50	2.50
All R-RTI-U	2.13 (1.10)	2.15 (0.74)	1.41 (1.09)					
O-RTI-O 1	1.54	2.92	2.50	2.50	3.00	3.00	3.00	3.50
O-RTI-O 2	1.79	3.49	2.00	3.50	3.50	3.70	4.00	4.25
O-RTI-O 3	1.76	1.77	0.50	1.15	2.00	2.22	2.25	2.50
O-RTI-O 4	2.19	2.36	0.25	1.75	2.40	3.00	3.00	3.75
All O-RTI-O	1.82 (1.14)	2.63 (1.03)						
R-RTI-O 1	2.42	2.83	1.50	2.50	2.50	3.00	3.50	4.00
R-RTI-O 2	1.92	2.29	0.50	2.00	2.00	2.50	3.00	3.25
R-RTI-O 3	2.00	2.58	1.50	1.50	2.50	3.00	3.50	3.50
R-RTI-O 4	2.42	2.75	0.00	2.50	3.00	3.50	3.50	4.00
All R-RTI-O	2.19 (1.23)	2.61 (1.05)						

* Standard deviations of four observations are in parentheses.

[a] Groups are O (original order), R (reversed order), M (majority), U (unanimity), and RTI (real-time information). The final O symbol refers to situations in which the individuals can observe others' choices, but there is no group decision aspect.

Table 8

Regressions of Individual Expenditures in Group Decision Contexts, Original Order [a]

Independent Variable	1	2	3	4
Individual expenditure	0.160 (0.104)	0.145 (0.101)	0.145 (0.101)	0.306 (0.195)
Individual expenditure × Win lottery	–	–	–	-0.167 (0.129)
O-RTI-M	0.338 (0.218)	0.317 (0.223)	0.317 (0.223)	0.145 (0.214)
O-RTI-O	0.720 (0.217)**	0.701 (0.233)**	0.700 (0.233)**	0.574 (0.250)**
CRRA	–	-0.044 (0.299)	–	-0.074 (0.281)
Number of safe choices	–	–	-0.012 (0.086)	–
Female	–	0.309 (0.206)	0.309 (0.206)	0.356 (0.191)
Inconsistent respondent	–	-0.265 (0.453)	-0.279 (0.557)	-0.280 (0.433)
Constant	1.622 (0.242)**	1.567 (0.258)**	1.614 (0.472)**	1.547 (0.263)**
R^2	0.13	0.16	0.20	0.19

[a] Statistics in parentheses are standard errors.
* Statistical significance at the 0.10 level, two-tailed test; ** statistical significance at the 0.05 level, two-tailed test.

Table 9

Regressions of Individual Expenditures in Individual Decision Contexts, Reversed Order [a]

Independent Variable	1	2	3	4
Individual expenditure in group context ×	0.468	0.494	0.493	0.526
	(0.157)**	(0.175)**	(0.174)**	(0.170)**
Win lottery in group context	–	–	–	-0.264
				(0.396)
R-RTI-M	0.194	0.237	0.236	0.152
	(0.344)	(0.340)	(0.338)	(0.329)
R-RTI-O	-0.154	-0.058	-0.058	-0.005
	(0.330)	(0.349)	(0.349)	(0.378)
CRRA	–	0.092	–	0.118
		(0.266)		(0.270)
Number of safe choices	–	–	0.029	–
			(0.079)	
Female	–	-0.615	-0.613	-0.624
		(0.280)**	(0.279)**	(0.278)**
Inconsistent respondent	–	0.200	0.258	0.248
		(0.543)	(0.639)	(0.554)
Constant	1.116	1.235	1.117	1.229
	(0.395)**	(0.380)	(0.479)	(0.385)
R^2	0.13	0.19	0.19	0.20

[a] Statistics in parentheses are standard errors.
* Statistical significance at the 0.10 level, two-tailed test; ** statistical significance at the 0.05 level, two-tailed test.

Table 10

Investment Decision Transitions [a]

	Fraction with Value in Group Decision RTI Context		
	Below Individual Value	Same as Individual Value	Above Individual Value
Full Sample			
RTI-M	0.42	0.10	0.48
RTI-U	0.44	0.31	0.25
RTI-O	0.19	0.23	0.58
Original Order			
O-RTI-M	0.38	0.08	0.54
O-RTI-U	0.46	0.29	0.25
O-RTI-O	0.21	0.04	0.75
Reversed Order			
R-RTI-M	0.46	0.13	0.42
R-RTI-U	0.42	0.33	0.25
R-RTI-O	0.17	0.42	0.42

[a] Each of the three full sample groups include 48 observations. Each of the two subsample groups include 24 observations. Numbers in row do not always add to 1.0 due to rounding.

Table 11

Ordered Probit Regression for Whether Individual Expenditure in Group Context Is Higher or Lower than Individual Expenditure for Original Order [a]

Independent Variable	1	2
Individual expenditure	-1.137	-1.436
	(0.300)**	(0.287)**
O-RTI-M	0.695	0.801
	(0.367)*	(0.423)*
O-RTI-O	1.059	1.193
	(0.474)**	(0.461)**
Constant relative risk aversion	–	-0.520
		(0.605)
Female	–	0.043
		(0.351)
Inconsistent respondent	–	-2.001
		(0.940)**
Pseudo R^2	0.31	0.36

[a] Statistics in parentheses are standard errors.
* Statistical significance at the 0.10 level, two-tailed test; ** statistical significance at the 0.05 level, two-tailed test.

Table 12

Ordered Probit Regression for Effect of Relative Position on Whether Group Expenditure is Higher or Lower Relative to Median Respondents for Original Order [a]

	O-RTI-O	O-RTI-M	O-RTI-U
Top two individual expenditures	-0.750	-2.155	-0.177
	(0.671)	(0.660)**	(0.824)
Bottom two individual expenditures	7.359	9.004	1.243
	(0.633)**	(1.162)**	(0.755)*
Constant relative risk aversion	-0.842	0.797	-0.106
	(1.172)	(1.004)	(1.067)
Female	-0.197	0.837	-0.186
	(0.801)	(0.618)	(0.493)
Inconsistent respondent	-17.830	-0.224	-0.087
	(1.880)**	(1.649)	(1.401)
Pseudo R^2	0.36	0.46	0.13

[a] Statistics in parentheses are standard errors.
* Statistical significance at the 0.10 level, two-tailed test; ** statistical significance at the 0.05 level, two tailed test.