

Groupthink: An Experimental Study of Group Decision-Making

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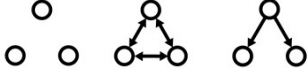
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I. ABSTRACT

Do we make better decisions in a group? Does group decision-making suffer from groupthink? In this paper, I conduct an innovative laboratory experiment to investigate the causal impact of group setting (compared with solo situation) and identify the group effect free from free-riding incentives.

Key experimental design: an individual's own expected investment prospect coincides the expected investment prospect of one's group, making solo and group settings directly comparable. The experiments provide strong evidence that group settings induce overinvestment. When subjects are in groups, they 1) choose to invest more often (by 12 to 17 percent), lowering their final payoff, and 2) exhibit a rosier estimation of their own ability in making profitable investment decisions by 36 percent. (JEL: C91, C92, D71, D81)

II. EXPERIMENTAL DESIGN

- Subjects take an incentivized pretest and the scores remain unknown to them until the end of the experiment.
 - The last question on the pretest asks the subjects to predict whether they score above the median or not. (Question is incentivized.)
- Each subject then independently makes binary investment decisions (invest or not) in two settings: a solo setting and a group-of-three setting.
- Investment returns are determined by whether a subject scores above the median (subject defined as 'high-type') or otherwise (subject defined as 'low-type').
 - Each setting contains six rounds of investment decision with the costs randomly varying.
 - Half of the subjects were randomly chosen to start with the solo setting. Other half, group setting.
 - Group members do not change throughout the group phase.
- In the group phase, three structures of communication are considered: no communication, full communication (open meeting), and one-way leadership.
 - Communication structures:
 
 - In one-way leadership, leader is randomly assigned. The leader can talk to the other two group members, but the group members can only listen.
 - In the treatments with communication, subjects have 90 seconds to communicate before each round of the investment decision.

Order	1: Individual → Group	2: Group → Individual
A: No chat	Treatment A1	Treatment A2
B: One-way leadership	Treatment B1	Treatment B2
C: Full chat	Treatment C1	Treatment C2

- The experiment sessions were conducted at Rutgers University – New Brunswick in the Gregory Wachtler Experimental Economics Laboratory in May, June, and September 2016. The total number of subjects over all sessions was 138.

IV. RESULTS

III. MODEL AND THEORETICAL PREDICTIONS

- There are a total of N subjects in an experiment session.
- $\theta_{ij} = \begin{cases} 1 & \text{if } \theta_{ij}^0 \geq \bar{\theta} \\ -1 & \text{if } \theta_{ij}^0 < \bar{\theta} \end{cases}$, θ_{ij} is the type of individual i in group j . θ_{ij}^0 is the raw score on the pretest. $\bar{\theta}$ is the median score.
 - Intuition: A high-type has positive impact on the group investment prospect and vice versa.
- The expected returns to investment positively correlate with the ability of the subject (in the solo setting) and with the ability of the group (in the group setting).
- Let $p_i \equiv p_i(\theta_i = 1)$ be agent i 's belief of himself being a high type. Agent i 's expected payoff from investing is $E_i(\pi_i) = p_i[\omega + R^+e^i - ce^i] + (1 - p_i)[\omega + R^-e^i - ce^i] = \omega + E_i[R_i(\theta_i)]e^i - ce^i$.
 - Solo setting (group subscript j dropped): individual i would invest if $E_i[R_i(\theta_i)] \geq c$.
 - Group setting: individual i would invest if $E_i[R_i(\theta_j)] \geq 3c$. θ_j is the type of individual i 's group j .
 - The gross return entirely depends on individual's own type and her investment decision.
- Key: in the group setting, since the two teammates' types are unknown like the individual's own, given the equal probability of having a high-type, an individual's rational expectation of its group type is equal to the expectation of its personal type.

- By design (size of given costs), an average risk-neutral profit maximizer should invest in exactly half of the rounds. Therefore, the average contribution would be 0.5 (one being investing and zero being not investing).
- Overall, the average contribution is significantly higher when the subjects are involved in groups (0.61 in groups vs. 0.44 in solo).

Overall: Individual → Group	Overall: Group → Individual	Overall
Individual: 0.47 (n=360)	Individual: 0.44 (n=330)	Individual: 0.44 (n=690)
In group: 0.58 (n=432)	In group: 0.65 (n=396)	In group: 0.61 (n=828)
Difference: 0.11***	Difference: 0.25***	Difference: 0.17***

- When it was unprofitable to make an investment due to high costs (the rational prediction for each of such rounds is zero), individuals chose to make investments 14% of the time when the investing alone and invest 46% of the time when being in groups.

Overall: Individual → Group	Overall: Group → Individual	Overall
Individual: 0.13 (n=144)	Individual: 0.15 (n=132)	Individual: 0.14 (n=276)
In group: 0.43 (n=216)	In group: 0.51 (n=198)	In group: 0.46 (n=414)
Difference: 0.29***	Difference: 0.36***	Difference: 0.28***

- Probit analysis (probability of choosing to invest):

$$P(e^i = 1 | X^i = x) = \Phi(\beta_0 + \beta_1 \text{group}_i + \beta_2 \text{groupfirst}_i + \beta_3 \text{group}_i \times \text{groupfirst}_i + \beta_4 \text{chat}_i + \beta_5 \text{group}_i \times \text{chat}_i + \beta_6 \text{chat}_i \times \text{groupfirst}_i + \beta_7 \text{group}_i \times \text{chat}_i \times \text{group}_i + \gamma X_i)$$

Dependent variable: $P(e^i = 1 X^i = x)$	Model (1)	Model (2)	Model (3)	Model (4)
Group	.175*** (.023)	.123*** (.026)	.175*** (.022)	.123*** (.025)
Group first	-.003 (.025)	-.015 (.028)	-.012 (.024)	-.022 (.026)
One-way leadership (No chat = 0)	-.045 (.030)	-.048 (.034)	-.047 (.031)	-.054 (.035)
Full chat	.044 (.031)	.047 (.034)	.036 (.030)	.040 (.033)
Group type (ref. -3)				
-1 (2 low 1 high)	.054 (.064)	.039 (.064)	.040 (.061)	.025 (.060)
1 (1 low 2 high)	.019 (.060)	-.012 (.059)	.015 (.058)	-.018 (.058)
3 (3 high)	.084 (.070)	.055 (.071)	.072 (.066)	.040 (.065)
Exclude costs near zero (cost = 2 & -2)	No	Yes	No	Yes
Self-eval (to be high type = 1)	No	No	.029 (.029)	.045 (.031)
Male	No	No	.054 (.030)	.070*** (.031)
Pseudo R-squared	0.0336	0.0236	0.0398	0.0307
Number of observations	1,518	1,242	1,518	1,242

V. CONCLUDING REMARKS

- Data from the experiment sessions indicate strong evidence of overinvestment in the group settings.
- Compared to the solo part, subjects are more likely to make investments in the group part by 12 to 17 percentage points.
 - The true group type does not explain the tendency to invest, which explains why communication structures do not have a significant impact (learning is minimal).
 - Male subjects tend to invest more often than females.
- A subject's belief of being a high type increases by 36 percentage points on average. (Not shown on the poster. Available upon request.)
- Being in the group part before the individual part makes a subject more likely to have an increase in belief by 14 percentage points. (Not shown on the poster. Available upon request.)
- Implication:** A significant part of "investments," including financial investments, commitments, political movements, as well as time and energy devoted to social groups such as non-profit organizations, amateur sports teams, and religious institutions, may simply be the result of the nature of the group setting.

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