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HERDING, SOCIAL PREFERENCES AND (NON-) CONFORMITY

LUCA CORAZZINI
BEN GREINER

Department of Economics
University of Cologne
Albertus-Magnus-Platz
D-50923 Köln
Germany

http://www.wiso.uni-koeln.de

Herding, Social Preferences and (Non-)Conformity

Luca Corazzini*and Ben Greiner†,‡

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Abstract

We study the role of social preferences and conformity in explaining herding behavior in anonymous risky environments. In an experiment similar to information cascade settings, but with no private information, we find no evidence for conformity. On the contrary, we observe a significant amount of non-conforming behavior, which cannot be attributed to errors.

Keywords: herding, information cascades, conformity, non-conformity, laboratory experiments
JEL Classification: C92, D31, D81

1. Introduction

Herding behavior has been explained by payoff externalities, correlated effects, information externalities or social preferences. Payoff externalities lead to herding when each agent's actions affect the payoffs of other agents in such a way that everybody choosing the same action constitutes an equilibrium (see, for example, Choi, 1997; Diamond and Dybvig, 1983; Scharfstein and Stein, 1990). Correlated effects are relevant when agents behave similarly because they are exposed to the same exogenous influences (Manski, 2000).

According to the third explanation, information inferred by observing predecessors' choices can induce an individual to ignore his private information in making his decision. As a consequence, his decision becomes uninformative for subsequent players. A cascade starts, as followers find themselves in the same situation (Banerjee, 1992; Bikhchandani et al., 1992; Welch, 1992). Experimental studies (including the seminal study by Anderson and Holt, 1997; and, among others, Drehmann et al., 2005; Hung and Plott, 2001; Kübler and Weizsäcker, 2004; Willinger and Ziegelmeyer, 1998) find support for rational herding behavior, but also observe cascade breaks which cannot be explained by standard theories. Goeree et al. (forthcoming) propose a Quantal Response error model to explain these breaks.

*University of East Anglia, School of Economics and Social Studies, Norwich, UK and University of Bocconi, Istituto di Economia Politica "Ettore Bocconi", Via Gobbi, 5, 20136, Milan, Italy.

†Harvard University, Harvard Business School, Boston, MA 02163.

‡Corresponding author. Tel: +1 617-495-6753, Fax: +1 617-495-5287.

E-Mail addresses: luca.corazzini@unibocconi.it (L. Corazzini), bgreiner@hbs.edu (B. Greiner).

Finally, in the psychology literature, agents are assumed to have a preference for conformity. Examples are the models of Jones (1984) and Bernheim (1994), while Asch (1958), among others, provides experimental evidence. Goeree and Yariv (2006) show in a similar setting to ours that choices of others matter to subjects, independently of their statistical information. As herding reduces expected inequality among subjects, also other-regarding preferences like inequality aversion (Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999) might play a role.

In this paper, we experimentally investigate the role of conformity and other social preferences on herding. Our setting differs from the standard information cascade setting (Anderson and Holt, 1997) only for the fact that no player has private information. Therefore, while they might be socially relevant, the decisions of predecessors are statistically uninformative. As conformity relies on the (expected) choices of others, we explicitly measure expectations. To see whether these decisions are correlated with other-regarding preferences, we conduct a dictator game subsequently with the same participants. Additionally, we vary between a "gain" and a "loss" frame, as preferences in risky environments often depend on the framing of outcomes (Tversky and Kahneman, 1991).

In our experiment we do not observe herding at all: most of our subjects exhibit non-conforming behavior, choosing the alternative which (they believe) the fewest others have chosen. A robustness check on the basis of a treatment in which one alternative had a higher chance to win shows that about a quarter of subjects are willing to sacrifice expected payoff in favor of non-conforming behavior. We do not observe different behavior between the 'gain' and 'loss' frame.

2. Experimental design and procedures

The experiment consists of three parts: the herding game, a dictator game and an expectations task.[1] In the first part, 12 individuals chose one of two alternatives (called "doors" A and B) sequentially, knowing that at the end of the experiment one of the two alternatives would be randomly selected. Before deciding, each individual was informed about the frequency of choices of her predecessors over the two alternatives. We conducted three different treatments. In the "gain" and "loss" treatment, the two doors had equal probability to pay out. In the "gain" frame, each individual who chose the alternative randomly drawn won a prize of 8 Euros while the others won nothing. In the "loss" frame, individuals were initially endowed with an income of 8 Euros, and the alternative randomly selected yielded a loss of 8 Euros for those who chose it. The "robustness" treatment differed from the "gain" treatment only in the probabilities attached to the doors, being 55% for door A and 45% for door B.

The second part consisted of a dictator game played in strategy method. In the dictator game, one player decides freely about the split of a fixed monetary amount between herself and another player. Subjects were randomly and anonymously matched to groups and roles, but before roles were revealed, decisions were made by everybody in the role of the dictator. Individuals knew that only part one

[1] Instructions can be found at http://www.people.hbs.edu/bgreiner/supplements/.

or part two would be randomly selected for payment by tossing a coin at the end of the session.

In the third part, which was not announced before, we asked for subjects' expectations of the final number of choices for door A and door B in part one, and the average amount given by the other individuals in part two. Each question was paid with one Euro extra when subjects got the right numbers (or the difference was at most 50 cents, respectively).

The experimental sessions took place in September and October 2005 in the Cologne Laboratory for Economic Research and lasted about 30 minutes on average. Participants were recruited using an online recruitment system (Greiner, 2004). Altogether 266 subjects, mostly students in economics and business administration, participated in 9, 9 and 5 sessions, respectively. The experiment was computerized using the zTree software (Fischbacher, forthcoming). To ensure public knowledge, all instructions were additionally displayed publicly and read aloud. No payoff feedback was given between the parts. At the end of the experiment, random draws were taken publicly and subjects were paid out privately. Average payoffs were about 7 Euros, including a show-up fee of 2.50 Euros.

Table 1: Choices and expectations in gain and loss frame

	Gain sessions			Loss sessions		
	Decisions	A	E_A	Decisions	A	E_A
Session 1	BAAABBBBAAAA	7	5.92	AABBAAAAABBA	8	7.33
Session 2	BABABABAAABA	7	6.17	BABAABABABBB	5	5.92
Session 3	ABAAABBABBAB	6	6.75	AABBABBAAABA	7	6.58
Session 4	BBBBAAABBBAA	5	6.83	AABABABBABAA	7	6.92
Session 5	BABABBAAAABB	6	5.83	BAABBAAABABA	7	6.25
Session 6	AABAABAABBAA	8	7.42	ABBABBAABAAB	6	6.00
Session 7	AABBBAAABAAB	7	6.67	ABBAABAAABAA	8	6.50
Session 8	ABBABBBAABAA	6	5.92	ABABBBABAABB	5	6.08
Session 9	ABBAAAABBBAA	7	6.58	BABAABABABAA	7	6.25
∅		6.56	6.45		6.67	6.43

Note that $B = 12 - A$ and $E_B = 12 - E_A$, respectively.

3. Experimental results

Table 1 lists for each frame and session the sequence of individual choices and the average of individuals' expectations on the length of the final queue A, E_A. We do not find herding at all. Using a Sign test taking sessions as independent observations, we cannot find a significant predominance of any door. On the other hand, individual expectations reveal that door A is expected to be chosen more often than door B (2-sided Sign test based on individual expectation statements, p=.000). Since our data do not exhibit any significant difference between the two frames (including the analysis below), in the following we report statistics only for the pooled data.[2]

[2]Note that conclusions would not have been different with separate analysis of the two frames.

Using individual data, we question whether subjects either chose randomly or they showed preferences for the shorter/longer queue.[3] Table 2 reports the choices for the shorter or longer queue with respect to subjects' actual observed queue sizes and to subjects' stated expectations about final queue sizes.

Table 2: Correlations and tests on decisions with respect to observed and expected final queues

		with respect to	
		observed queue sizes	expected queue sizes
Two-sided Spearman-Rho Correlations of Decision (A=0, B=1) with			
longer queue (A=0, B=1)	Coeff	-.264***	-.203***
	N	148	214
	p	.001	.003
queue size A − queue size B	Coeff	.235***	.212***
	N	214	214
	p	.001	.002
Distribution of individual choices	$N_{qA \neq qB}$	150	214
	long queue	59	88
	short queue	91	126
Binomial test	p-Value	.011**	.011**
Sign test on session aggregates	p-Value	.006***	.011**
Robustness Treatment			
Distribution of individual choices	$N_{qA \neq qB}$	54	60
	long queue	40	46
	short queue	14	14
Binomial test	p-Value	.001***	.000***
Sign test on session aggregates	p-Value	.188	.036**

All tests are two-sided. $N_{qA \neq qB}$ denotes the number of choices where corresponding observed/expected queue sizes were different. *,**, and *** denote significance at a level of 10%, 5%, and 1%, respectively.

The correlation statistics show that subjects were more likely to choose the shorter queue. Also, the larger the difference in length between the queues, the higher the probability for an individual to choose the door with the shorter queue. Binomial tests corroborate these statistics: we can reject the hypothesis that decisions stem from a distribution of random choices (with a probability of .5 for either the long or the short queue). Additional sign tests based on single session outcomes show that we observe more choices for the shorter queue than for the longer queue in our sessions.

Distributions of dictator giving in the second part of the experiment are shown in

[3]The expectations of two subjects in the gain treatment were not consistent with the queue sizes they observed and their own decisions. We excluded these subjects from the analysis.

Figure 1: Dictator giving and expectations

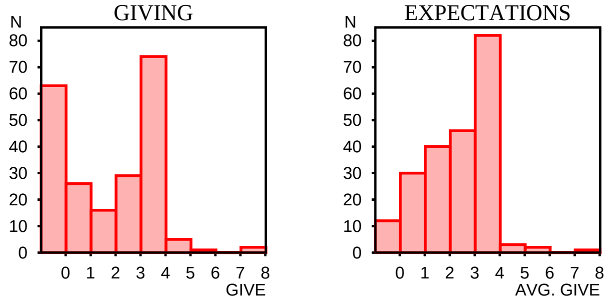

Figure 1. We find no correlations between actual dictator giving and behavior in the herding game. Also non-parametrical tests on differences in giving behavior between conforming and non-conforming subjects do not yield significance at any level. When considering participants who give zero in the dictator game and participants who give a positive amount separately, the results of binomial tests on herding decisions do not change for both subgroups, although – due to a lower number of observations – they are only significant at the 10%-level. Correspondingly, a Chi-Square test does not yield differences in decision distributions between these groups.

In order to test for the robustness of the observed non-conforming behavior we conducted 5 sessions on a ”robustness” treatment in which door A had an 80 cents higher expected payoff than door B. The lower part of Table 2 reports the results. While most of the subjects go with the crowd and choose door A, about one quarter of our subjects choose door B, showing robust non-conform behavior. Also, subjects who behaved non-conforming gave significantly more in the dictator game (on average 3.61 Euros) than those who conformed (on average 2.24 Euros; two-sided Mann-Whitney-U test, $P = 0.049$).

4. Discussion and Conclusions

In a study carried out independently of this paper, Goeree and Yariv (2006) let subjects choose between observing a statistically informative signal or the history of play of other uninformed subjects.[4] The latter option was chosen by up to 51% of their subjects, thereby forgoing expected payoff in the form of better information. Of those who chose the history of play, about 77% behaved conforming and followed the current majority. In a treatment where all subjects are paid according to the majority decision Goeree and Yariv (2006) rule out inequality aversion as a possible motivation for history of play selections.

Our results partially contradict the findings of Goeree and Yariv (2006). While we also find that inequality aversion plays no role in cascade settings, we do not observe conformity at all. On the contrary, we observe a significant number of non-conforming choices. Even in the treatment with asymmetric probabilities assigned to the doors we observe that about 25% of our subjects chose the door with the

[4] Or, to put it differently: Subjects choose between participating in our experiment rather than in an individual risky choice task.

smaller queue and lower expected payoff. These results cannot be explained by symmetrically distributed errors around payoff maximizing choices (see, for example, the model of Goeree et al., forthcoming).[5]

We did not observe significant differences between the gain and the loss frame. The lack of correlation between dictator giving and choices in the baseline treatments suggests that although two-thirds of subjects might entertain other-regarding preferences, this does not straightforwardly translate to (non-)conformity. On the other hand, strongly non-conforming subjects in the robustness treatment give more in the dictator game than others, suggesting that expected payoff maximizers in the herding game put more weight on their own payoff in the dictator game.

Our results suggest that social preferences do not explain herding in information cascade settings, but that it is more than just errors that makes these cascades break. One can think of several sources of non-conforming behavior. Monetary outcomes of lotteries can be "positional goods" (Frank, 1985), such that the lower the number of winners, the higher their satisfaction. People can exhibit a preference for symmetry, as observed in a number of biological and psychological studies.[6] Another explanation could be that people take over the perspective of a risk-averse social planner such that an equal distribution of individuals between doors maximizes expected social utility.

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[5]In an experiment involving private information and market prices for alternatives, Drehmann et al. (2005) also find no support for pure herding, but evidence for "contrarian" behavior, which, however, is compatible with an error model applied to their setting.

[6]See, for example, Møller and Swaddle (1997) and Perret et al. (1999).

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