A Theory of Peer-Induced Fairness in Games

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In many real-life situations, people get upset when they receive a worse deal than their peers. We term this concern for social comparison peer-induced fairness. We formally model this phenomenon in the context of two independent ultimatum games played in sequence by a leader and 2 followers. Our experimental results show that the leader does formulate the second offer based on the second follower’s expectation of what the first offer is. In addition, the second follower is more likely to reject when she believes that the first follower receives a high offer. We discuss how peer-induced fairness might limit the extent of price discrimination due to a risk of boycott by some customers.

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Emotions, Social Comparison, and Deception in Interpersonal Interactions

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**SESSION OVERVIEW**

Consumers’ daily activities usually rely on interpersonal interaction: a car shopper who tries to avoid the unfair offer from a car dealer, two consumers who after a quick chat realize they have gotten different deals on the same product, or a patient who exaggerates his symptoms in order to increase the chances of getting an early appointment.

In a series of three papers we address those phenomena using standard games developed in experimental economics. We hope to contribute to our understanding of the role of interpersonal interactions in consumer behavior as well as to demonstrate how incentive-based games can shed light into this realm of research.

In paper 1, Andrade & Ho address what the authors call “emotional gaming”—i.e., people’s willingness to either conceal a current emotional state or display an emotional state which diverges from the true state, in a strategic attempt to optimize the chances of success in a given social interaction. Examples of such phenomenon are widespread in consumer behavior: a waiter who, in an attempt to get a bigger tip, smiles to the customer when he hands her the check; a poker player who hides his emotional expressions to avoid providing unwanted information to competitors; and an HMO patient who exaggerates his reported level of pain to the doctor as to increase the chance of getting an early appointment with a specialist. In a series of three experiments, the authors show that during a given social interaction (e.g., ultimatum games and trust games) people deliberately conceal (experiment 1) or misrepresent (experiments 2 and 3) their emotional state in an attempt to succeed in the negotiation process.

Also using a game format, the role of emotions in interpersonal interaction is also addressed in paper 2. Ho & Su argue that in many consumption-related situations, people get upset when they receive a worse deal than their peers, which limit the extent of price discrimination. For instance, Apple has recently faced this problem after their decision to significantly reduce the price of the iPhones just a few months after the launching. Angry consumers, who had bought the product previous to the price reduction, forced the company to provide “retroactive” discounts to avoid further boycott and damage to company’s brand image. Ho & Su tested such concern for peer-induced fairness in the context of two independent ultimatum games played in sequence by a leader and 2 followers. Their results show that the leader does formulate the second offer based on the second follower’s expectation of what the first offer is. In addition, the second follower is more likely to reject when she believes that the first follower receives a higher offer.

As already pointed out, Andrade and Ho address the extent to which people misrepresent their feelings (e.g., inflate how happy or angry they are) for purely strategic reasons. Such willingness to convey “cheap talk” in a social interaction is certainly not constrained to emotions. In paper 3, Wang, Spezio, & Camerer point out that such phenomenon is common to many companies and consumers. Companies might be tempted to inflate earning prospects, MBA students might inflate course evaluations to improve school rankings, and HMO patients might inflate whatever symptoms they might have in order to get more quickly to the specialist. To test the extent to which participants’ “inflate the truth,” when they have an incentive to do so, the authors rely on sender-receiver games. Moreover, they use eyetracking measures to assess the potential costs of deception. Among other findings, the authors show that people indeed convey untruthful information. Moreover, deception can be tracked at the physiological level. Right before and after the message is sent, senders’ pupils dilate more when their deception is larger in magnitude. This suggests that subjects feel guilty for deceiving, or that deception is cognitively difficult.

In short, all three papers attempt to understand a few of the multiple nuances consumers and companies face in any given social interaction (Do people inflate emotions [Andrade & Ho] or other types of information [Wang, Spezio, & Camerer]?, How do they physiologically react to it [Wang, Spezio, & Camerer]?, How does information about peers influence one’s decision making [Ho & Su]?). Moreover, all papers adopt a similar methodology (i.e., economic games) to help us better understand how consumers and companies might interact when actual incentives are at stake.

**EXTENDED ABSTRACTS**

“Gaming Emotions”

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A car shopper pretends to feel angry in an attempt to reduce the chances of an unfair offer from a car dealer. A teacher hides his anxiety in front of students to avoid showing lack of confidence, which in turn, could reduce students’ receptivity to the lectures. By wearing appropriate apparels (e.g., dark sunglasses), professional poker players hide both bad and good feelings from their competitors to avoid revealing any clues about their cards. Waiters smile when they hand customers the check in an attempt to get a bigger tip. Finally, parents pretend to be very angry at their kids’ misbehavior just to make sure the children behave appropriately.

In short, knowing that one’s expressed affective state can influence other’s decisions, people are usually tempted to game emotions—that is, to either conceal a current emotional state or display an emotional state which diverges from the true state, in a strategic attempt to optimize the chances of success in a given social interaction.

Survey and observational-based evidence have suggested that individuals do display non-experienced emotions, especially when their jobs require them to do so. This so-called emotional labor literature has addressed (a) the extent to which the workplace demands specific emotional expressions and (b) how much such requirements influence employees’ wellbeing. This research stream shows that employees have frequently been obliged either by implicit social norms or by explicit company policies to display, and usually fake, specific emotional states. The service industry has numerous examples. Amusement parks, airline companies, and fast food chains, to mention a few, usually suggest—or request—their employees to continuously display positive feelings when they interact with their customers.

Nevertheless, it is possible that people, when given the opportunity, may deliberately choose to game emotions on their own in an attempt to succeed in a given negotiation and, as a result, improve their overall wellbeing. This paper investigates this emotion gaming hypothesis experimentally. In a series of three experiments, we show that people deliberately conceal (experiment 1) or misrepresent (experiments 2 and 3) their emotional state in a negotiation setting. When given the opportunity to either hide or express their current emotions before playing an ultimatum game, receivers who
have reported low (vs. high) level of anger are more likely to conceal their emotion right before the proposers decide on the division of the pie (experiment 1). When the procedure allows participants to change their previously reported emotion, receivers choose to inflate their reported level of anger prior to proposers’ decision (experiment 2 & experiment 3). Moreover, gaming emotions is financially beneficial as long as the partner does not realize them and choose A=M. When b>0 senders prefer that receivers choose S, so they almost always just announce S (i.e., M=S), and receivers believe them and choose A=M. When b<0 senders would prefer to exaggerate and announce M>S if they thought receivers would receive belief.

A long-standing assumption in economics is that people are purely self-interested. This assumption has been challenged recently by accumulating experimental evidence based on the so-called ultimatum game. Behavioral economists propose several models of distributional fairness to relax the self-interest assumption. In this paper we introduce the concept of peer-induced fairness because people have a drive to make social comparison.

That is, they look to similar others as a reference in order to form their opinions and evaluate their endowments. We investigate peer-induced fairness by considering two independent ultimatum games played in sequence by a leader and two followers. In the first ultimatum game, the leader makes a take-it-or-leave-it offer to the first follower. Before the next ultimatum game is played, the second follower obtains a public signal of this offer. Then, in the second game, the leader makes an offer to the second follower. The second follower infers what the first follower receives, uses this inference to form a reference point, and is averse to accepting offers that falls short of this benchmark. This generalized model nests the standard and several existing models of fairness. This model makes two sharp predictions. First, the leader’s offer to the second follower should be non-decreasing in the common belief of what the first offer is. Second, condition on an offer, the second follower’s likelihood of acceptance is inversely proportional to the reference point derived from the signal. We test both predictions experimentally and find strong support for them. We structurally estimate the model and show that peer-induced fairness is 2.5 times larger than distributional fairness. We incorporate heterogeneity by allowing subjects to be either purely self-interested or fairness-minded. Our estimation results suggest that half of the subjects exhibit peer-induced fairness. We show how peer-induced fairness might influence the occurrence of labor strikes, explain low variability in CEO compensation, and limit the extent of price discrimination.

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**“Pinocchio’s Pupil: Using Eyetracking and Pupil Dilation To Understand Truth-telling and Deception in Sender-Receiver Games”**

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Michael Spezio, California Institute of Technology & Scripps College, USA
Colin Camerer, California Institute of Technology, USA

During the tech-stock bubble, Wall Street security analysts were alleged to inflate recommendations about the future earnings prospects of firms, in order to win investment banking relationships with those firms. They usually gave two separate 1-5 ratings for short run (0-12 months) and long run (more than 12 months) performance. Henry Blodget, Merrill Lynch’s famously optimistic analyst, “did not rate any Internet stock a 4 or 5,” while privately admitting some were “POS [piece of shit].” He was later banned from the security industry for life and fined millions of dollars.

This case is an example of a sender-receiver game with divergent preferences (sometimes called a “cheap talk” or strategic information transmission game). Sender-receiver games are simple models of economic situations in which one agent has an incentive to exaggerate the truth to another agent. The central issues in these games are how well uninformed players infer the private information from the actions of players who are better-informed, and what informed players do, anticipating the inference of the uninformed players.

Incentives for strategic information transmission are common. Besides the Blodget case mentioned above, similar dramatic accounting frauds in the last few years, such as Enron, Worldcom, and Tyco, might have been caused by the incentives of managers (and perhaps their accounting firms) to inflate earnings prospects. Expert advisors in consumer markets might also be tempted to paint a rosy picture when presenting in front of their clients. In universities, grade inflation and well-polished recommendation letters help schools promote their graduates. Other examples of incentives for strategic information transmission include government-expert relationships in policy making, doctor-patient relationships in health care choices, teacher cheating on student tests and the floor-committee relationship in Congress.

This paper reports experiments on a sender-receiver game. In the game, a sender learns the true state (a number S) and sends a costless message M to a receiver who then chooses an action A. Payoffs only depend on S and A, so the message M is “cheap talk.” The receiver prefers to choose an action that matches the state, but the sender wants the receiver to choose an action closer to S+b, where b is a known bias parameter. The value of b is varied across rounds. When b=0 senders prefer that receivers choose S, so they almost always just announce S (i.e., M=S), and receivers believe them and choose A=S. When b>0 senders would prefer to exaggerate and announce M>S if they thought receivers would believe them.

Besides measuring choices in these games, our experiment uses “eyetracking” to measure what payoffs or game parameters sender subjects are looking at. Eyetracking software records where players are looking on a computer screen every 4 milliseconds. These data are a useful supplement to econometric analysis of choices, when decision rules which produce similar choices make distinctive predictions about what information is needed to execute these rules.

The eyetracking apparatus also measures how much subjects’ pupils “dilate” (expand in width and area). Pupils dilate under stress, cognitive difficulty, arousal and pain. Pupillary responses have also been measured in the lie-detection literature for many years. These studies suggest that pupil dilation might be used to infer deceptive behavior because senders find deception stressful or cognitively difficult.

The experimental choices, eyetracking, and pupil dilation measures generate four basic findings:

1. Overcommunication in sender-receiver game is consistent with L0, L1, L2, and equilibrium (Eq) sender behavior produced by a level-k (cognitive hierarchy) model of the sender-receiver game in which L0 sender behavior is anchored at truth-telling.
2. Eyetracking data provide the following justifications for the level-k model of overcommunication:
   a. Attention to basic structure: Sender subjects pay attention to important parameters (state and bias) of the sender-receiver game.
   b. Self-centeredness: Sender subjects focus too much on the true state payoff row.
   c. Incorrect beliefs: Sender subjects focus too much on the true state payoff row.
d. Strategizing from a truth-telling anchor: Sender subjects focus on the payoffs corresponding to the action \( a=s \), as well as actions up to \( a=s+b \).

3. Right before and after the message is sent, senders’ pupils dilate more when their deception is larger in magnitude. This suggests that subjects feel guilty for deceiving (as in Gneezy, 2005), or that deception is cognitively difficult (as the level-k model assumes).

4. Prediction: Based on the eyetracking results, we can try to predict the true state observed by the sender using lookup data, messages, and pupil dilation. This prediction exercise suggests it could be possible to increase the receiver’s payoff (beyond what was earned in the experiments) by 16-21 percent. Finally, this study shows the possible relevance of psychology and neuroscience to economics. Douglas Bernheim (2008) suggests that Neuroeconomics will be successful if it can show how new non-choice data can solve a prediction or normative problem that could not be solved by standard choice data. Our data satisfy this criterion because lookups and pupil dilation enhance prediction of the true state beyond the predictions derived simply from observed messages (choice) and equilibrium theory.

This is the first study in experimental economics to use a combination of eyetracking and pupil dilation, and is, of course, exploratory and is therefore hardly conclusive. But the eyetracking and pupil dilation results by themselves suggest that the implicit assumption in theories of “cheap talk” in games with communication—namely, that deception has no cost—is not completely right. Mark Twain famously quipped, “If you tell the truth, you don’t have to remember anything.” The corollary principle is that if subjects want to misrepresent the state to fool receivers, they have to figure out precisely how to do so (and whether receivers will be fooled). This process is not simple and seems to leave a psychological signature in the form of looking patterns and pupil dilation. Future theories could build in an implicit cost to lying (which might also vary across subjects and with experience) and construct richer economic theories about when deception is expected to be widespread or rare.