# DEPARTMENT OF ECONOMICS AND FINANCE

# COLLEGE OF BUSINESS AND ECONOMICS

# UNIVERSITY OF CANTERBURY

# CHRISTCHURCH, NEW ZEALAND

**Group Identity and Relation-Specific Investment:
An Experimental Investigation**

Hodaka Morita

and

Maroš Servátka

# *WORKING PAPER*

## No. 16/2012

# WORKING PAPER No. 16/2012

## Group Identity and Relation-Specific Investment: An Experimental Investigation

Hodaka Morita[1] **and** Maroš Servátka[2]

13 November, 2012

**Abstract:** The hold-up problem has played a central role in the study of firm boundaries, which is a fundamental element of the economic study of organizations. We study a previously unexplored mechanism by which integration between two parties could resolve the problem. Based on the social identity theory, we conjecture that group identity strengthens agents' altruistic preferences towards group members, and this helps resolve the hold-up problem. We test this conjecture in a laboratory experiment. Our subjects were randomly divided into two teams and asked to wear their team uniform. Task 1 required them to answer questions about trivia, where the subjects had access to a chat program that enabled them to help their team members. For Task 2, the subjects played a hold-up game with either a member of their own team (representing integration) or a member of the other team (non-integration). The experimental results support our conjectures.

1. School of Economics, Australian School of Business, University of New South Wales.

2. New Zealand Experimental Economics Laboratory, Department of Economics and Finance, University of Canterbury.

*Corresponding Author: maros.servatka@canterbury.ac.nz

## Group Identity and Relation-Specific Investment:
## An Experimental Investigation

### 1. Introduction.

A fundamental question in the literature on the theory of the firm is how integration between two parties helps resolve the problem of inefficiency associated with relation-specific investment (often referred to as the "hold-up problem"). In this paper we focus on group identity, a central concept in social psychology, as a key element in our exploration of this important research question in the economic study of organizations.[1] According to the social identity theory, categorization of individuals as group members leads them to display in-group favoritism (Turner, 1975; Tajfel, 1978; Tajfel and Turner, 1979). Under integration, parties classify themselves as members of the same organization and share common goals, leadership, values, and practices. Organizational identification is often strengthened through the manipulation of symbols, traditions, and corporate culture in general (Ashforth and Mael, 1989).[2] Organizational identification is a specific form of social (or group) identification, which decreases the level of opportunism between members and facilitates better coordination and communication (Turner, 1982, 1984; Ashforth and Mael, 1989; Kogut and Zander, 1996).

We propose that group identity, which is present when two parties are integrated within the same organizational boundary, plays a critical role in resolving the hold-up problem, and we test our conjectures in the controlled environment of a laboratory experiment, which allows us to clearly identify the effects of group identity on investment incentives.

Under the standard setup, relation-specific investment in bilateral trade creates a surplus to be shared between two parties because the value of such investment is appreciably lower in any use other than supporting the transaction between the two parties. This surplus-sharing leads to the problem of inefficiency in a world of incomplete contracts, and the central theme of the theory of

---

[1] Hart (1995), for example, points out that a long-standing issue in organization theory concerns the determinants of the boundaries of firms.

[2] For example, Phil Knight, the founder of Nike, and many of his employees have the Nike "swoosh" logo tattooed on their calves (Camerer and Malmendier, 2007).

the firm is that integration between the two parties mitigates or resolves this inefficiency. The property-rights theory has focused on asset ownership as a critical element of the mechanism through which integration affects investment incentives (see Section 2.1 for details). We add to the literature by experimentally investigating group identity as another critical, and yet previously unexplored, element that contributes to the resolution of the hold-up problem.

Experimental economists have recently found that group identity strengthens other-regarding behaviour among group members. Additionally, a number of experimental studies show that people exhibit other-regarding behaviour under various setups of the hold-up problem. Based on these findings we conjecture that group identity strengthens agents' altruistic preferences, which in turn help resolve or mitigate the hold-up problem. In our experiment the seller decides whether or not to invest \$F. If no investment is made, the game ends. If the seller invests, \$G ($> F$) is made available to be split between the seller and the buyer. The buyer then makes a take-it-or-leave-it offer of \$p to split \$G. The seller can receive \$p by accepting the offer, in which case the buyer receives \$G – p. If the seller rejects the offer, \$G disappears and neither party receives any additional money. In this game, the seller does not invest if he and the buyer care only about their own monetary payoff, leading to inefficiency. ( Note that the investment is efficient given G–F $>0$). However, the seller may choose to invest in the presence of other-regarding preferences.

Prior to the game, we randomly divide the subjects into two teams, which we call Yellow and Orange. We then let members of the same team wear the same colour t-shirts and help each other through on-line chat to answer questions about trivia. These design features are intended to create and strengthen group identity through categorization of subjects (Yellow Team and Orange Team), usage of symbols (t-shirts), and cooperation to achieve the same goal (questions about trivia). We then compare subjects' behaviour in two treatments, one where each subject is anonymously paired with another subject of the same team, and the second where each subject on one team is paired with another subject of the other team.

We hypothesize that the seller is more likely to invest in the same-team treatment because the induced group identity between the seller and the buyer strengthens their altruistic preferences, giving the seller, in turn, higher incentives to invest. Findings from our experiment support this

hypothesis. We observe that: (i) sellers invested more often when paired with buyers from their own team than when paired with buyers from the other team, and (ii) buyers' offers to sellers from their own team were higher than to sellers from the other team.

The present paper contributes to the experimental economics literature by presenting the first experimental evidence of the effects of group identity on the hold-up problem. Due to the exploratory nature of our project, we test our conjecture in a laboratory experiment, which allows for increased control in the stylized and context-free environment of the lab. This research strategy enables us to clearly identify the incentives faced by individual decision-makers and to isolate confounds otherwise present in the field where transactions are repeated, reputation-building plays an important role, and where the results are possibly influenced by the existing institutional setup.[3]

Our finding contributes to the theory of the firm literature by indicating that group identity has a potential to act as a channel through which integration between two parties can resolve or mitigate the hold-up problem. It is widely recognized that mergers often fail in reality. Weber and Camerer (2003) used laboratory experiments to explore merger failure due to conflicting organizational cultures. In their experiments, they allowed subjects in non-integrated "firms" to develop a culture, and then merged two firms together to find that performance decreases following the merger. Although related, the focus of our study is different from theirs. Namely, we focus on the comparison of integration and non-integration, as two alternative governance structures, in the context of the hold-up problem, but not on the effects of the integration of two parties that had previously been separate entities. Our study should therefore be viewed as complementing Weber and Camerer's in studying the effects of integration.

The rest of the paper is organized as follows. Section 2 presents a more detailed discussion on our contributions to three relevant strands of literature. Section 3 presents the framework and hypotheses and explains our experimental design and procedures. Section 4 presents the results. Section 5 presents two additional treatments exploring the impact of weak social identity induced

---

[3] This is not to say that the results of a laboratory experiment are not influenced by the experimental design and chosen parameters, but rather that field experimentation in naturally occurring market conditions is an important second step in evaluating the insights obtained from the lab.

only by t-shirts and a neutral baseline treatment in which there are no teams at all. Section 6 offers concluding remarks.

## 2. Literature review.

This paper builds on earlier work of three types: (a) a large body of research on the theory of the firm, (b) the social psychology and experimental economics research on group identity, and (c) the experimental economics literature on the hold-up problem. In this section, we discuss our contributions to these three strands of literature.

### 2.1. The theory of the firm literature.

The literature on the theory of the firm, which originated with Coase's (1937) seminal essay, now spans a large body of research. Gibbons (2005) clearly defined and compared four theories of the firm, among which relation-specific investment plays a critical role in rent-seeking theory (Williamson, 1971, 1979, 1985; Klein, Crawford, and Alchian, 1978) and the property-rights theory (Grossman and Hart, 1986; Hart and Moore, 1990; Hart, 1995).[4] In the rent-seeking theory of the firm, a key element is individually optimal but socially destructive haggling over surplus (or "appropriable quasi-rents") that is created by relation-specific investment. Under nonintegration, two parties are unable to prevent this inefficient haggling induced by appropriable quasi-rents, while under integration their incentives are aligned and the inefficient outcome can thus be avoided. The theory asserts that larger appropriable quasi-rents make integration more likely, and a number of empirical studies supported this prediction (see, e.g., Shelanski and Klein, 1995 for a survey).

In the property-rights theory, ownership of non-human assets is the defining characteristic of firms in a world with incomplete contracts, where ownership conveys "residual rights of control" —that is, all the decision rights not specified in a contract. In contrast to the rent-seeking theory, the property-rights theory assumes efficient bargaining irrespective of whether the two parties are integrated or not, and requires non-contractible relation-specific investments. Efficient bar-

---

[4] Other two theories identified by Gibbons are the incentive-theory of the firm and the adaptation theory of the firm, in which relation-specific investment does not play major roles. Description and comparison of the two theories presented below heavily rely on Gibbons (2005). See Holmström and Roberts (1998) for another excellent discussion on the theory of the firm.

gaining then causes the parties to share the surplus from their relation-specific investments. Each party's asset ownership determines that party's surplus share, which in turn determines that party's investment incentive. If it is important to maximize one party's investment, then that party should own all the assets (integration), whereas if both parties' investment incentives are important, then dividing the assets between the parties (nonintegration) will lead to an efficient outcome.

One of the key contributions of the property-rights theory, pioneered by Grossman and Hart (1986), was that it gave a unified account of the costs and benefits of integration (Holmström and Roberts, 1998; Gibbons, 2005). However, in reality, incentives for relation-specific investment are provided by a variety of means, of which ownership is but one, as pointed out by Holmström and Roberts (1998). Their paper thus calls for taking a much broader view of the firm and the determination of its boundaries, and suggests there might exist various other mechanisms to be considered. Holmström and Roberts proposed that the long-term and repeated nature of the interaction between relevant parties was another important mechanism that affects the incentive to undertake relation-specific investments, pointing to the traditional procurement and subcontracting practices in the Japanese automobile industry as an example of such a mechanism.[5]

The present paper contributes to this literature by identifying group identity, which is present under integration, as a significant factor that influences incentives for relation-specific investment. Consequently, our finding implies that when one evaluates the costs and benefits of integration, the effects of group identity should be considered along with other important factors such as property rights and reputation effects.

## 2.2. Social psychology and experimental economics research on group identity.
Social psychologists trying to understand the psychological basis of inter-group discrimination have developed a social identity theory (Tajfel and Turner, 1979) that describes an individual's concept of self as being derived from perceived memberships of social groups (Turner, Hogg, and Oakes, 1987). Early experimental work in psychology provided evidence for the main

---

[5] Similarly, Gibbons (2005) argued that relational contracting is a promising area of future research for deepening the theory of the firm. These authors also discussed several other issues and concepts such as knowledge and its transfer as promising areas for future research.

prediction of the theory, namely that group membership will produce an in-group bias at the expense of the out-group (e.g., Tajfel, Billig, and Flament, 1971; Billig and Tajfel, 1973). These early studies were then followed by an extensive literature demonstrating the effects of group identity on behaviour and focusing on factors enhancing or diminishing in-group favoritism. A review of the social psychology literature on group identity can be found in Charness, Rigotti, and Rustichini (2007) and Chen and Li (2009).

Economists have become increasingly interested in the notion of group identity, applying group identity models to various aspects of economic decision-making (e.g., Akerlof and Kranton, 2000, 2002, 2005, and 2008; Basu, 2005, 2010; Chen and Li, 2008; Benabou and Tirole, 2011; Chen and Chen, 2011). In recent years there have been a number of economic experiments studying the interaction of group identities with human decision-making. Some experimental designs rely on natural identities within existing social groups (e.g., Bernhard, Fehr, and Fischbacher, 2006; Goette, Huffman, and Meier, 2006; Falk and Zehnder, 2007; Tanaka, Camerer and Nguyen, 2008; List, Neilson, and Price, 2009; Chen, Li, Liu and Shih, 2010) while others use priming techniques from psychology, such as pre-game questionnaires (e.g., Brown-Kruse and Hummels, 1993; Cadsby and Maynes, 1998; Afridi, Li, and Ren, 2009; Benjamin, Choi, and Strickland, 2010; Cadsby, Servátka, and Song, 2012) or group composition (e.g., Cadsby, Servátka, and Song, 2010). A third category of experimental design induces group identities along the lines of Tajfel, Billig, and Flament (1971), called minimal group paradigm, rather than relying on existing ones.[6] This approach allows the researcher to vary the strength of the induced identity (e.g., Eckel and Grossman, 2005) as well as to make it more likely that all subjects recognize their own and others' group membership, resulting in more experimental control.

The existing experimental literature that uses induced group identity provides evidence that group membership can affect subjects' choices in both non-strategic and strategic environments. Chen and Li (2009) measure the effect of group identity on subjects' other-regarding preferences

---

[6] Whether an experimental procedure satisfies all conditions of the minimal group paradigm will always be questionable, in particular with economic experiments that almost always involve a link between a decision-maker's self-interest and his choices. For a further discussion, see Charness, Rigotti, and Rustichini (2007) whose findings also point out that a strong cohesion might be crucial for group identity effects to manifest themselves in a scenario with a hold-up problem .

in simple allocation games as well as in a series of two-person sequential games. The subjects' choices display significant in-group favoritism in terms of (i) distributional preferences by giving more to an in-group member than an out-group member, (ii) preferences for reciprocity by rewarding an in-group member more often, but punishing less often, than an out-group member, and (iii) preferences for efficiency by choosing an action that maximizes social welfare when paired with an in-group member. Chen and Li's study thus provides strong evidence that group membership affects other-regarding preferences – the underlying mechanism on which our conjecture that group membership mitigates the hold-up problem is based.

## 2.3. Experimental economics research on the hold-up problem.

The studies mentioned above provide evidence for the fact that group influence and group identity can be important considerations in economic decision-making. The focus of our paper is more specific – we apply the idea of group identity to the theory of the firm and focus on the importance of group membership in a particular strategic environment of the hold-up problem. Perhaps the most related experimental study from this area is Sloof, Oosterbeek, and Sonnemans (2007) who show that social preferences can increase investment in the hold-up problem. Various other aspects of the hold-up problem have already been explored experimentally, for example, the ex-post process of negotiation and the ex-ante process of transaction-specific investment in anticipation of future surplus shares by Hackett (1994), the importance of threat points by Sonnemans, Oosterbeek, and Sloof (2001), and reliance levels of breach remedies by Sloof, Leuven, Oosterbeek, and Sonnemans (2003), among others. Ellingsen and Johannesson (2004a and 2004b) present experimental evidence that communication mitigates the lack of efficiency-enhancing investment, and the Hoppe and Schmitz (2011) study shows whether contracts can mitigate the hold-up problem when renegotiation cannot be prevented. One important aspect of the hold-up is the incompleteness of the contract (e.g., Charness and Dufwenberg, 2006 and 2010; Fehr, Kremhelmer, and Schmidt, 2008; Dufwenberg, Smith, and Van Essen, forthcoming; Dufwenberg, Servátka, and Vadovič, 2012), commonplace in labor markets. A detailed survey of labor market experiments is presented in Charness and Kuhn (2011). Even though this topic has been well explored, there are no previous experimental studies – to the best of our knowledge – on the effects of group identity on the hold-up problem or incomplete contracts.

## 3. Hypotheses, experimental design and procedures.

### 3.1. Framework and hypotheses.

Consider the following interaction between a seller and a buyer. At stage 1, the seller can make a fixed, non-contractible investment at the cost F. If the seller does not invest, the payoffs of the seller and the buyer are both zero. Suppose the seller invests; then there is a potential gain from trade G ($>$ F). At stage 2, the buyer makes a take-it-or-leave-it offer p to the seller to divide the gain G. If the seller accepts the offer p, the trade is realized and the total payoffs to the seller and the buyer are p $-$ F and G $-$ p, respectively. If the seller rejects the offer, there is no trade and the total payoffs to the seller and buyer are $-$ F and 0, respectively.

The simple model described above exhibits the hold-up problem, that is, inefficiency associated with non-contractible relation-specific investment, if agents care only about their own monetary payoff. To see this, suppose that the seller invests at cost F at stage 1. The buyer would then offer p $=$ 0, which would be accepted by the seller under the tie-breaking assumption that the seller behaves in favor of the buyer when the seller is indifferent between accepting and rejecting it. This yields a negative total payoff of $-$ F to the seller.[7] Anticipating this, the seller does not invest at stage 1. The no-investment outcome is inefficient because G $-$ F $>$ 0.

In reality, agents often behave in other-regarding ways.[8] In what follows, we argue that the hold-up problem may be resolved when agents exhibit other-regarding preferences. Upon investment by the seller, the buyer would offer a strictly positive price because of his altruism and inequality aversion, even if the seller accepts any non-negative offer p $\geq$ 0. But the seller may in fact reject low price offers because of his own inequality aversion. This would work in the direction of further increasing the buyer's offer, because by doing so the buyer can reduce the probability of rejection. Let $p_B$ ($>$ 0) denote the buyer's price offer made after the seller's investment. Let us assume that the seller does not know the value of $p_B$ because different buyers have different degrees of other-regarding preferences, but knows that $p_B$ is distributed according to a certain distribution function.

---

[7] Alternatively, the buyer would offer p $=$ $\varepsilon$ $>$ 0 (where $\varepsilon$ is the minimum monetary unit such as 1 cent), which would be accepted by the seller. This yields a negative total payoff of $\varepsilon$ $-$ F to the seller.

[8] See Camerer (2003) and Cooper and Kagel (2010) for nice surveys on distributive other-regarding preferences.

Now consider the seller's investment decision. We regard investment as the seller's altruistic action because investment creates a surplus to be captured by the buyer, and hypothesize that, by choosing to invest, the seller enjoys a certain positive payoff (call it altruism payoff). Once invested, the seller accepts the buyer's offer if it is perceived to be reasonably high, but rejects it otherwise due to inequality aversion. Let $p_S$ denote the minimum price offer that the seller would accept, where different sellers have different values of $p_S$. The seller's post-investment payoff is positive if $p_B > p_S$, where the payoff is increasing in $p_B$ and decreasing in $p_S$. The seller will invest if his altruism payoff and expected post-investment payoff are sufficiently high compared to the investment cost F. Hence agents' other-regarding preferences may resolve the hold-up problem.

Previous research shows that group identity strengthens agents' altruistic preferences towards group members (see, for example, Chen and Li, 2009).[9] In our framework, this implies two things. First, group identity strengthens the seller's altruism. We assume that different sellers have different levels of altruism payoff, and that group identity increases each seller's altruism payoff. Second, group identity strengthens the buyer's altruism and hence increases $p_B$, the buyer's price offer made upon the seller's investment. We assume that group identity shifts the distribution of $p_B$ to the right, and so the seller anticipates that the buyer's offer upon investment is more likely to be high. Hence the group identity increases the seller's expected post-investment payoff.

Then, in the presence of group identity, the seller's altruism payoff and expected post-investment payoff are more likely to be sufficiently high compared to the investment cost F so that the seller chooses to invest. This leads to our Hypothesis 1 below. Also, the second supposition mentioned above leads to Hypothesis 2.

*Hypothesis 1*:  The seller is more likely to invest in the presence of group identity.

*Hypothesis 2*:  Upon the seller's investment, the buyer's offer is higher in the presence of group identity.

---

[9] Chen and Li found that their subjects displayed significant in-group favoritism in terms of distributional preferences. See Section 2.1 of the present paper for more details.

### 3.2. Experiment design and procedures.

The experiment took place in the New Zealand Experimental Economics Laboratory (NZEEL) at the University of Canterbury, with 258 undergraduate students serving as subjects. The participants were selected randomly from the NZEEL database using the ORSEE recruitment system (Greiner, 2004). The recruited subjects had never participated in an economic experiment at this university. An experimental session lasted 75 minutes on average, including the initial instruction period and the payment of subjects. The subjects earned on average of NZD 10.33 (New Zealand dollars) from the game and up to NZD 4 from answering questions about trivia. At the end of the session the subjects completed a short survey on the experiment, for which they were paid NZD 5. This was not announced to the subjects at the start of the experiment.

Upon entering the laboratory, all participants were randomly divided into the Orange and Yellow teams, based on the colour of the paper they drew from a large manila envelope. The subjects were then seated in cubicles, the Orange Team in the front two rows of the room and the Yellow Team in the back two rows. They were free to choose any seat within their two rows. The experimenters then handed subjects their team-colour t-shirts, representing team uniforms, and asked everyone to put them on.[10] Next, we asked the teams to stand up and verify that all their teammates were wearing the same colour t-shirt. The use of jerseys or uniforms is a common way of strengthening group identity in the world outside the lab, and this is what prompted us to use the same-colour t-shirts in our experiment, rather than relying on other visible unifying signs.

Our experiment included two treatments (*Same-Team* and *Different-Team*) based on the pairing of subjects, implemented in an across-subjects design in which each subject participates in one treatment only. Each treatment consisted of two tasks: (1) answering two questions about trivia and (2) playing the one-shot hold-up game. The two tasks were implemented as follows.

The subjects were first given instructions to complete Task 1, which involved answering two questions about trivia. Prior to answering the questions, the subjects were given the opportunity to communicate via online chat for five minutes with their own team members (i.e., in both Same-Team and Different-Team treatments, a person on the Orange Team could chat with all remaining subjects on the Orange Team and a person on the Yellow Team could chat with all

---

[10] The subjects were also told they could keep their t-shirts after the experiment was over.

remaining subjects on the Yellow Team) about providing and receiving help.[11] After the chat was over, all subjects individually submitted their answers. The purpose of this task was to strengthen team identity. Research in social psychology on generalized reciprocity (e.g., Yamagashi and Kiyonari, 2000) suggests that team identity can be formed through a common goal and by helping other team members, and Eckel and Grossman (2005), Chen and Li (2009), and Chen and Chen (2011) provide experimental support for this hypothesis.

Our experimental design thus includes three key features meant to induce team identity: categorization of subjects (Yellow Team and Orange Team), usage of symbols (t-shirts), and cooperation to achieve the same goal (questions about trivia). As discussed in the Introduction, these are important means through which group identity is created and strengthened when two parties are integrated within the same organizational boundary.[12] Note that the conjecture which we test in the experiment crucially hinges on a strong identification with the team. Therefore, we do not follow the minimal group paradigm but rather strive to create a team identity that is sufficiently strong to answer to our research question.[13]

In the instructions to Task 1, subjects were told they would be paid NZD 2 for each correct answer, but would not find out the results until the end of the experiment. This was done to control for the level of created team identity that could vary in the event that an individual received poor advice from a team member. Once all subjects answered the questions about trivia, the experimenters collected their answer sheets.

Next, instructions for Task 2, framed in a neutral fashion, were handed out. In the Same-Team treatment, subjects were informed that each person from the Yellow Team would be randomly paired with another person from the Yellow Team and each person from the Orange Team with

---

[11] The chat was programmed and conducted with z-Tree (Fischbacher, 2007).

[12] Social psychology research shows that symbols -- visible manifestations of groups and organizations -- reinforce organizational or group identity and enhance cooperation among in-group members by differentiating them from out-group members. Symbols, such as dress or uniforms, provide a clear way of identifying group boundaries and thus allow for achieving the benefits of cooperation without the risk of excessive costs by limiting altruistic behaviour towards in-group members. Social psychologists describe 'in-group' as a bounded community of mutual and depersonalized expectations of cooperation. Such expectations motivate adherence to in-group norms and promote behaviour that ensures that one is recognized as an in-group member (Brewer, 1981 and 1999).

[13] Experiments reported in section 6 shed some light on the importance of the three group identity inducing design features.

another from the Orange Team. In the Different-Team treatment, subjects were informed that each person from the Yellow Team would be randomly paired with a person from the Orange Team. It was emphasized that no participant would learn the identity of the paired person and that the experimenters would keep track of all decisions using ID numbers.
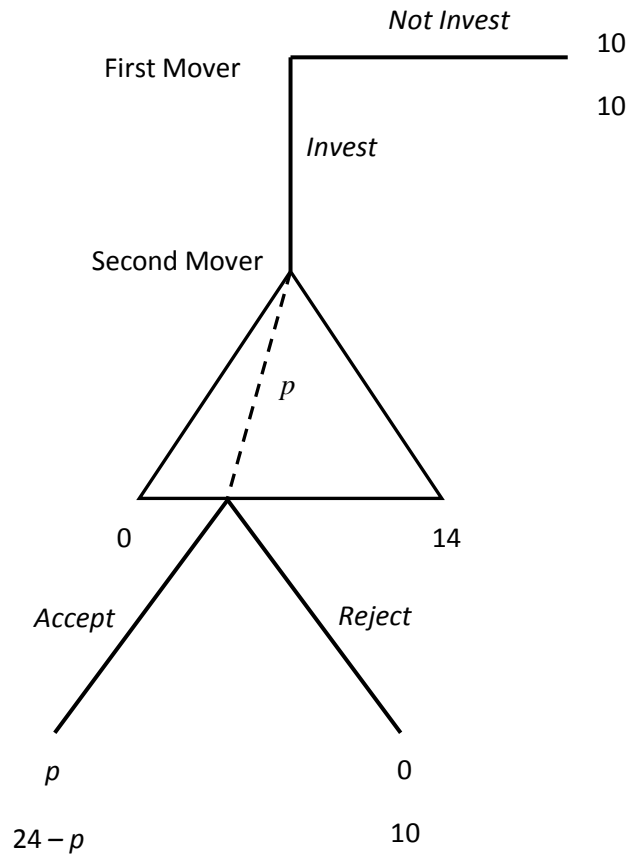


**Figure 1. The Hold-up Game**

A coin was publicly flipped to randomly determine the roles depending on the row in which a subject was sitting. The allocation of a seller (referred to as the First Mover in the instructions in order to induce a context-free decision-making environment, henceforth FM) and a buyer (the Second Mover, henceforth SM) to a particular pair was done by the experimenter based on a pre-assigned matching that was unknown to the subjects. The decisions were divided into three stages. In Stage 1, the FM had to decide whether to invest his/her NZD 10 show-up fee in order

to create NZD 14 for the pair. If the FM decided not to invest the NZD 10 show-up fee, then no money was created and both movers kept their show-up fees. If the FM decided to invest, then NZD 14 was made available to split between the pair.  An offer of how to split the NZD 14 was determined by the SM in Stage 2. In Stage 3, the FM learned about the offer, and could either accept or reject it. If the FM accepted, both movers received the respective amounts stated in the offer. If the FM rejected, the NZD 14 disappeared and both the FM and the SM received NZD 0. (The SM still kept the show-up fee of NZD 10.) The parameterization of the hold-up game is presented in Figure 1. This game tree was *not* shown to the subjects.

In order to minimize confusion of subjects in this three-stage task, we opted to include three control questions, which all participants had to answer correctly before proceeding to the decision-making part of Task 2.[14] The SM's offers for the control questions were generated randomly for each session. After the subjects answered the questions, the experimenters verified their correctness by inspecting each subject's answers individually and, if necessary, provided additional assistance and explanation until the subject calculated all answers correctly. Then the three scenarios were reviewed publicly by the experimenter and correct answers projected on the screen.

When the decision-making part of Task 2 started, subjects were reminded about their pairing – either with another member of their own team or with someone from the other team, depending on the treatment. In order to transfer information between matched pairs, one of the experimenters collected and later redistributed all decision sheets, while the second experimenter copied the decisions from one sheet to another. This procedure was implemented with the aim to prevent the exchange of superfluous information during the game and to maintain the anonymity of individual decisions.

At the end of the session, we asked subjects to complete a short post-experiment questionnaire and offered NZD 5 for doing so. This procedure ensured that no subject left the experiment with zero payoffs. Upon completion of the questionnaire, the correct answers from Task 1 were revealed and all subjects were privately paid their earnings for the session.

---

[14] The control questions along with subject instructions are provided in the appendix.

## 4. Results.

Table 1 presents summary statistics from our two treatments. Forty-nine subject pairs participated in the Same-Team treatment. In Stage 1, twenty-one FMs invested, yielding an investment rate of 43.8%. Following an investment, SMs offered on average NZD 10.38 in Stage 2. Two of these offers (NZD 5 and 8) were rejected in Stage 3 by the respective FMs, resulting in a rejection rate of 9.5% and a rejected average offer of NZD 6.50.

Due to a lower investment rate in the Different-Team treatment, we had to run more subjects in order to generate sufficient and balanced across treatments number of observations on SMs' behaviour. Out of eighty-one FMs who participated in this treatment, twenty-one invested while the remaining sixty did not, yielding an investment rate of 25.9%. Following an investment, the twenty-one SMs who got to make a decision offered on average NZD 8.74. Four offers were rejected (NZD 2, 3.50, 6, and 7) resulting in a rejection rate of 19% and a rejected average offer of NZD 4.63. The distributions of all offers in both treatments are presented graphically in Figure 2.

### Table 1. Summary Statistics.

|  | Same-Team Treatment | Different-Team Treatment |
|---|---|---|
| **Number of subject pairs** | 48 | 81 |
| **Investment rate** | 21/48 = 43.8% | 21/81 = 25.9% |
| **Average offer** | 10.38 | 8.74 |
| **Median offer** | 12 | 10 |
| **Rejection rate** | 2/21 = 9.5% | 4/21 = 19% |
| **Average rejected offer** | 6.50 | 4.63 |

Hypothesis 1 states that the FM (seller) is more likely to invest in the presence of group identity. To test the hypothesis we compare the investment rates of FMs in our two treatments. The one-

sided Fisher's exact test reveals that the investment rate in the Same-Team treatment is significantly higher than in the Different-Team treatment ($p = 0.036$), suggesting that team membership mitigates the inefficiency related to the relationship-specific nature of investment.

Hypothesis 2 states that upon the FM's investment, the SM's (buyer's) offer is higher in the presence of group identity. The reason behind this increase is a higher level of SM's altruism induced by group identity. To test this second hypothesis, we compare the offers made by SMs to their counterpart FMs in both treatments. The one-sided Wilcoxon rank-sum test detects that the offers in the Same-Team treatment were significantly higher than in the Different-Team treatment ($p = 0.012$). In the Same-Team treatment, FMs who invested made an average profit of NZD 0.38, whereas in the Different-Team treatment, they made an average loss of NZD 1.26. This result provides further support for our conjecture that group identity mitigates hold-up by strengthening agents' other-regarding preferences.
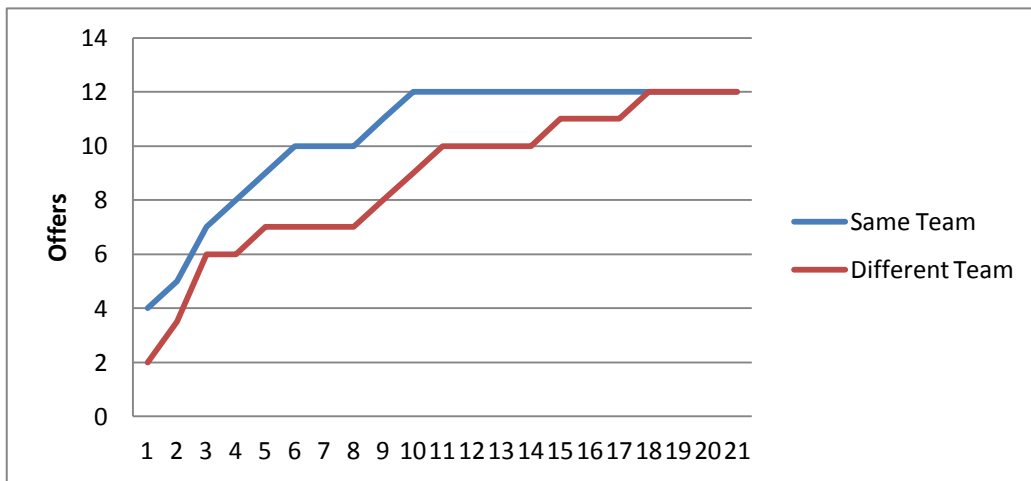


**Figure 2. Distributions of Offers**

Finally, some of the buyers' offers were rejected, as reported above. Our theoretical framework does not yield an unambiguous prediction concerning the relationship between rejection rates and group identity.[15] While it seems interesting to explore effects of group identity on rejection

---

[15] Our framework predicts that a larger fraction of FMs invest in the presence of group identity (Hypothesis 1). This means that some FMs with relatively high values of minimum acceptable price offers ($p_S$) would invest in the

rates, such a study is beyond the scope of the present paper, which focuses on testing whether group identity helps resolve the hold-up problem.

## 5. Further explorations.

In this section we shed some light on the importance of the group identity inducing features used in our design. We present two additional experiments: in the first one the group identity was induced by categorization and symbols only while in the second experiment no group identity was induced at all.

### 5.1. Group identity induced by symbols.

Social psychology research shows that symbols, such as dress or uniforms, play an important role in reinforcing group identity and enhancing cooperation among in-group members by differentiating them from out-group members.[16] From this point of view it is possible that categorization and the use of t-shirts could be sufficient to induce group identity strong enough to mitigate the hold-up problem. We tested this in a new experiment in which Task 1 was absent (i.e., there were no questions about trivia and online chat) and in which after receiving t-shirts subjects immediately proceeded to playing the hold-up game. In all other respects the procedures were identical to those of the main experiment described in the previous sections.

We recruited 232 new subjects whose behaviour is presented in Table 2. Fifty-four subject pairs participated in the Same-Team treatment. In Stage 1, twenty FMs invested, yielding an investment rate of 37%. Following an investment SMs offered on average NZD 8.55 in Stage 2. Only one of these offers (NZD 6) was rejected in Stage 3 by the respective FM, resulting in a rejection rate of 5%.

Sixty-two subject pairs participated in the Different-Team treatment. In Stage 1, sixteen FMs invested, yielding an investment rate of 25.8%. Following an investment SMs offered on average

---

presence of group identity. Hence, group identity, even though it shifts the distribution of $p_B$ to the right, may increase or decrease the rejection rate.

[16] There exists a vast literature studying roles of uniforms and organizational dress in symbolizing values and beliefs of an organization, conveying identity, and asserting organizational control and compliance (see for example Joseph and Alex, 1972; Joseph, 1986; de Marley, 1986; Davis, 1992; Roach-Higgins and Eicher, 1992; Rafaeli and Pratt 1993; Rafaeli, Dutton, Harquail ,and Mackie-Lewis, 1997 and for a nice survey of this literature Pratt and Rafaeli, 1997).

NZD 7.75 in Stage 2. Two of these offers (both NZD 4) were rejected in Stage 3 by the respective FM, resulting in a rejection rate of 12.5%.

Just as before we first test whether the group identity created by t-shirts was strong enough to induce FMs to invest more often when paired with their team members as opposed to members of the other team. While the investment rate in the Same-Team treatment is higher than in the Different-Team treatment, the one-sided Fisher's exact test reveals that the difference is marginally insignificant ($p = 0.135$).

Second, we compare whether upon the FM's investment, the SM's offer is higher in the presence of group identity induced by the use of t-shirts. The one-sided Wilcoxon rank-sum test detects no statistical difference between offers in the Same-Team and Different-Team treatments ($p = 0.282$). In both of these treatments FMs who invested lost money on average (NZD 1.45 and NZD 2.25 in the Same-Team and Different-Team treatment, respectively), unlike in our main experiment where FMs in Same-Team treatment made on average NZD 0.38. This result suggests that group identity induced by categorization and t-shirts was not strong enough to sufficiently strengthen subjects' other-regarding preferences to mitigate the hold-up problem.

### 5.2. A between-experiment comparison: The effect of cooperation on creating group identity.

In this subsection we compare the behaviour of subjects between the two experiments. Any resulting differences are due to varying strength of group identity. In the Same-Team treatments the investment rate is higher when chat is included (43.8% vs. 37%), however the Fisher one-sided test does not detect such increase to be significant ($p = 0.344$). In Different-Team treatments the investment rate has not changed at all (25.9% vs. 25.8% in the experiment with chat and without, respectively). This result suggests that it is both t-shirts and chat together that are *jointly responsible* for the high investment rate in the Same-Team treatment of the main experiment. Note that the no change in investment rate in the Different-Team treatments is in line with Brewer (1999) who remarks that in-group favoritism does not have to be accompanied by out-group discrimination.

On the other hand, including chat has significantly increased the average offers in the Same-Team treatment (NZD 10.38 vs. NZD 8.55 in the experiment with chat and without, respectively;

$p = 0.014$), but not in the Different-Team treatment (8.74 vs. 7.75; $p = 0.234$). This result suggests that it is mainly the cooperation in the team chat that is responsible for the higher investment rate in the Same-Team treatment of the main experiment.

We conclude with a remark that the findings from our between-experiment comparison are consistent with the everyday practice observed in the field where organizations often make significant investments in team-building and socialization activities such as company retreats and Christmas parties. Our findings thus suggest that an important objective of such activities might be to strengthen group identity so that it is effective even in highly strategic environments.

**Table 2. Subject Behaviour in the 'T-shirt Only' Experiment**

|  | **Same-Team Treatment** | **Different-Team Treatment** |
|---|---|---|
| **Number of subject pairs** | 54 | 62 |
| **Investment rate** | 20/54 = 37% | 16/62 = 25.8% |
| **Average offer** | 8.55 | 7.75 |
| **Median offer** | 8.50 | 8 |
| **Rejection rate** | 1/20 = 5% | 2/16 = 12.5% |
| **Average rejected offer** | 6 | 4 |

### 5.3. Hold-up game with no group identity.

To what extent does group identity increase altruism within the team? Does team membership lead to out-group discrimination in our setup? To provide answers to these questions we run a neutral baseline experiment in which there were no teams and in which subjects played the hold-up game with a randomly and anonymously paired participant (who was not identified by the colour of the t-shirt.) Comparing the investment rates and offers in the Same-Team treatment of our main experiment with such baseline will allow us to separate out the incremental impact of group identity on altruistic behaviour within the team. On the other hand, the comparison of the

Different-Team treatment with the baseline will highlight any discrimination against members of the other team. [17]

We recruited additional 134 subjects whose behaviour is presented in Table 3. In Stage 1, twenty-one out of sixty-seven FMs invested, yielding an investment rate of 31.3%. Following an investment SMs offered on average NZD 8.48 in Stage 2. Three of these offers (all equal to NZD 5) were rejected in Stage 3 by the respective FM, resulting in a rejection rate of 14.3%.

First, we focus on the impact of team membership. While we observe that the investment rate of the FMs in the Same-Team treatments is higher than in the baseline (43.8% vs. 31.3%), this increase is marginally insignificant ($p = 0.122$). As for the SMs, team membership increased their offers by NZD 1.90 comparing to the baseline. This increase is statistically significant ($p = 0.034$).

**Table 3.  Subject Behaviour in the 'Baseline' Experiment.**

|  | No-Team |
| --- | :---: |
| **Number of subject pairs** | 67 |
| **Investment rate** | 21/67 = 31.3% |
| **Average offer** | 8.48 |
| **Median offer** | 8 |
| **Rejection rate** | 3/21 = 14.3% |
| **Average rejected offer** | 5 |

Next we test for out-group discrimination. While being on a different team appears to decrease the investment rate comparing to the baseline (31.3% vs. 25.9%, respectively), such decrease is not significant ($p = 0.293$). As for the SMs, being on a different team insignificantly increases their offers comparing to the baseline ($p=0.435$), providing no evidence of out-group discrimina-

---

[17] We thank an anonymous referee for suggesting this experiment.

tion in our setting. [18] If one considers all the presented results jointly, it is the combination of strong group identity induced by the use of t-shirts and team chat with a slight discrimination towards out-group members that makes our investment rate results in the main experiment significant.

## 6. Concluding remarks.

Group identity helps resolve or mitigate the hold-up problem by strengthening agents' altruistic preferences. We have presented experimental evidence showing that under team membership, the investment rates as well as offers in the hold-up game increase, thus supporting our conjecture. This finding suggests that group identity should be an important consideration when one compares the costs and benefits of integration. In order to isolate the effects of group identity, we have abstracted away from other important factors, such as property rights, that affect incentives for relation-specific investment. In our framework, integration can be beneficial when it creates and strengthens group identity, whereas we do not study the cost of integration. We also abstract away from other psychological factors caused, for example, by a hostile takeover or conflict of corporate cultures, which could affect performance after integration and cause a merger to fail (Weber and Camerer, 2003).

We have developed our conjecture based on an assumption that agents exhibit other-regarding behaviour. In our set-up, we can observe investment if the FM is unconditionally altruistic and cares about the final distribution of monetary payoffs (Fehr and Schmidt, 1999; Bolton and Ockenfells, 2000; Cox and Sadiraj, 2007), has preferences for social efficiency (Charness and Rabin, 2002), and/or trusts that the SM will split the created surplus in a "fair" way (Berg, Dickhaut, and McCabe, 1995). The SM, on the other hand, shares the surplus if he is unconditionally and/or conditionally altruistic (i.e., reciprocal as in models of Dufwenberg and Kirchsteiger, 2004; Falk and Fischbacher, 2006; Cox, Friedman, and Gjerstad, 2007; and Cox, Friedman, and Sadiraj, 2008) or guilt-averse (Battigalli and Dufwenberg, 2007). Cox (2004), Cox and Deck (2005), and Cox, Sadiraj, and Sadiraj (2008) present experiments which separate trust and

---

[18] For completeness we also provide a comparison of the baseline with the 't-shirt only' experiment: The increase in investment rate caused by team membership was insignificant ($p = 0.321$) and so was the increase in offers ($p=0.495$). Being on a different team insignificantly decreased the investment rate ($p = 0.309$) as well as the offers ($p = 0.485$).

reciprocity from unconditionally altruistic preferences in various settings. Similarly, it is possible to design an experiment that would identify the effects of group identity on different types of other-regarding behaviour in the context of the hold-up game. Such a study, however, is left for future research. In the present paper, we have focused on investigating whether group identity has the potential to resolve the hold-up problem.

We believe that an interesting extension of our work would be a study of interaction between group identity and property rights that would shed light on both the costs and benefits of integration in the presence of group identity. Below we outline one simple way to incorporate the interaction based on the formulation devised by Baker, Gibbons, and Murphy (2002). Consider a model consisting of a seller, a buyer, and an asset. The seller may use the asset to produce a good. The buyer values the good, but the good also has an alternative use. Ownership of the asset conveys ownership of the good produced using the asset. That is, if the buyer owns the asset, then he could simply take the good, refusing to pay the seller anything, whereas if the seller owns the asset, then he could cosign the good to its alternative use. The asset is owned by the buyer when the two parties are integrated, while it is owned by the seller when they are not integrated.

In this set-up, consider the interaction between the seller and the buyer similar to the one presented in Subsection 3.1. If the seller invests F, he produces a good that has value G ($> F$) for the buyer. Under integration, the good belongs to the buyer, who provides p to the seller. In contrast, under non-integration, the buyer makes a take-it-or-leave-it offer p to the seller. If the seller accepts p, then the buyer obtains the good, while if the seller rejects p, he sells the good to an alternative use at the price of A ($< G$). At the same time, assume that both the seller and the buyer have other-regarding preferences.

The set-up outlined above can potentially capture the costs and benefits of integration, which not only strengthens group identity between the two parties but also transfers the ownership of the asset (and the good produced upon investment) from the seller to the buyer. This trade-off can be incorporated in our experimental design by interpreting the Same-Team treatment as integration and the Different-Team treatment as non-integration, just as in the current paper.

# References

Afridi, Farzana, Sherry Xin Li, and Yufei Ren. 2009. "Social Identity and Inequality: The Impact of China's Hukou System." Working paper.

Akerlof, George A., and Rachel E. Kranton. 2000. "Economics and Identity." *Quarterly Journal of Economics*, *115* (3): 715–753.

Akerlof, George A., and Rachel E. Kranton. 2002."Identity and Schooling: Some Lessons for the Economics of Education." *Journal of Economic Literature*, *40* (4): 1167–1201.

Akerlof, George A., and Rachel E. Kranton. 2005. "Identity and the Economics of Organizations." *Journal of Economic Perspective*, *19* (1): 9–32.

Akerlof, George A., and Rachel E. Kranton. 2008. "Identity, Supervision, and Work Groups." *American Economic Review Papers and Proceedings,* 98 (2), 212-17.

Ashforth, Blake E., and Fred Mael. 1989. "Social Identity Theory and the Organization." *Academy of Management Review*, *14* (1): 20–39.

Baker, George, Robert Gibbons, and Kevin J. Murphy. 2002. "Relational Contracts and the Theory of the Firm." *Quarterly Journal of Economics*, 117(1): 39-83.

Basu, Kaushik. 2005. "Racial conflict and the malignancy of identity." *Journal of Economic Inequality,* 3, 221–241.

Basu, Kaushik. 2010. "Altruism, Other-Regarding Behavior and Identity: The Moral Basis of Prosperity and Oppression." *Economics and Philosophy,* 26, 189-216.

Battigalli, Pierpaolo and Martin Dufwenberg. 2007. "Guilt in Games." *American Economic Review Papers and Proceedings*, 97, 170-76.

Benabou, Ronald and Jean Tirole. 2011. "Identity, Morals and Taboos: Beliefs as Assets." *Quarterly Journal of Economics,* 126, 805–855.

Benjamin, Daniel J., James J. Choi, and A. Joshua Strickland. 2010. "Social identity and preferences." *American Economic Review*, 100(4), 1913-1928.

Berg, Joyce, John Dickhaut, and Kevin McCabe. 1995. "Trust, Reciprocity, and Social History." *Games and Economic Behavior*, 10(1), 122-4.

Bernhard, Helen, Ernst Fehr, and Urs Fischbacher. 2006. "Group Affiliation and Altruistic Norm Enforcement." *American Economic Review*, *96* (2), 217–221.

Billig, Michael and Henri Tajfel. 1973. "Social categorization and similarity in intergroup behavior." *European Journal of Social Psychology*, 3, 27-52.

Bolton, Gary E. and Alex Ockenfels. 2000. "ERC: A Theory of Equity, Reciprocity, and Competition." *American Economic Review*, *90*, 166–193.

Brown-Kruse, Jamie, and David Hummels. 1993. "Gender Effects in Laboratory Public Goods Contribution: Do Individuals Put Their Money Where Their Mouth Is?" *Journal of Economic Behavior and Organization*, *22* (3): 255–267.

Brewer, Marion. 1981. Ethnocentrism and its role in intergroup trust. In M. Brewer & B. Collins (Eds.), *Scientific inquiry in the social sciences,* (214–231). San Francisco: Jossey-Bass.

Brewer, Marion. 1999. "The Psychology of Prejudice: Ingroup Love or Outgroup Hate?" *Journal of Social Issues,* 55(3), 429–444.

Cadsby, Bram, and Elizabeth Maynes. 1998. "Gender and Free Riding in a Threshold Public Goods Game: Experimental Evidence." *Journal of Economic Behavior and Organization*, *34*(4): 603–620.

Cadsby, Bram, Maroš Servátka, and Fei Song. 2010. "Gender and Generosity: Does Degree of Anonymity or Group Gender Composition Matter?" *Experimental Economics*, 13(3), 299-308.

Cadsby, Bram, Maroš Servátka, and Fei Song. 2012. "How Competitive are Female Professionals? A Tale of Identity Conflict." Working paper.

Camerer, Colin. 2003. *Behavioral Game Theory: Experiments in Strategic Interaction*, Princeton University Press.

Camerer, Colin F., and Ulrike Malmendier. 2007. "Behavioral Organizational Economics." In Peter Diamond and Hannu Vartiainen, eds., *Behavioral Economics and Its Applications*. Princeton and Oxford: Princeton University Press.

Charness, Gary and Martin Dufwenberg. 2006. "Promises and Partnership." *Econometrica,* 74, 1579-1601.

Charness, Gary, and Matthew Rabin. 2002. "Understanding Social Preferences with Simple Tests." *Quarterly Journal of Economics*, *117* (3): 817–869.

Charness, Gary, Luca Rigotti, and Aldo Rustichini. 2007. "Individual Behavior and Group Membership." *American Economic Review*, 97: 1340-1352.

Charness, Gary and Peter Kuhn. 2011. "Lab Labor: What Can Labor Economists Learn from the Lab?"*Handbook of Labor Economics, 4a*, 229-330. .

Chen, Yan and Sherry Xin Li. 2008. "A CES Model of Group Identity and Social Preferences." Working paper.

Chen, Yan and Sherry Xin Li. 2009. "Group Identity and Social Preferences." *American Economic Review*, 99 (1), 431–457.

Chen, Roy and Yan Chen. 2011. "The Potential of Social Identity for Equilibrium Selection," *American Economic Review*, 101 (6): 2562{2589..

Chen, Yan, Sherry Xin Li, Tracy Xiao Liu and Margaret Shih. 2010. "Which Hat to Wear? Impact of Natural Identities on Coordination and Cooperation," Working paper.

Coase, Ronald. 1937. "The Nature of the Firm." *Economica*, 4(16): 386-405.

Cooper, David J. and John H. Kagel. 2010. "Other Regarding Preferences: A Selective Survey of Experimental Results."*In Handbook of experimental economics (eds Roth A., Kagel J. H.). Princeton*, NJ: Princeton University Press.

Cox, James C. 2004. "How to Identify Trust and Reciprocity." *Games and Economic Behavior*, 46, 260-281.

Cox, James C. and Cary Deck. 2005. "On the Nature of Reciprocal Motives." *Economic Inquiry*, 43(3), 623-635.

Cox, James C., Daniel Friedman, and Steven Gjerstad. 2007. "A Tractable Model of Reciprocity and Fairness." *Games and Economic Behavior*, 59 (1), 17–45

Cox, James. C., Daniel Friedman, and Vjollca Sadiraj. 2008. "Revealed Altruism." *Econometrica*, 76, 31-69.

Cox, James C. and Vjollca Sadiraj. 2007. "On Modeling Voluntary Contributions to Public Goods." *Public Finance Review*, *35*, 311–332.

Cox, James C., Klarita Sadiraj, and Vjollca Sadiraj. 2008. "Implications of Trust, Fear, and Reciprocity for Modeling Economic Behavior." *Experimental Economics, 11*, 2008, 1-24.

Davis, Fred. 1992. *Fashion, culture and identity*. Chicago: University of Chicago Press.

de Marley, Diana. 1986. *Working dress*. London: B. T. Batsford.

Dufwenberg, Martin and Georg Kirchsteiger. 2004. "A Theory of Sequential Reciprocity." *Games and Economic Behavior*, 47, 268-98.

Dufwenberg, Martin, Maroš Servátka, and Radovan Vadovič. 2012. "ABC on Deals." Working paper.

Dufwenberg, Martin, Matt Van Essen, and Alec Smith. "Hold-up; With a Vengeance," *Economic Inquiry*, forthcoming.

Eckel, Catherine C., and Philip J. Grossman. 2005. "Managing Diversity by Creating Team Identity." *Journal of Economic Behavior & Organization*, *58* (3): 371–392.

Ellingsen, Tore and Magnus Johannesson, M. 2004a. "Is There a Hold-up Problem?" *Scandinavian Journal of Economics*, 106(3), 475-494.

Ellingsen, Tore and Magnus Johannesson, M. 2004b. "Promises, Threats, and Fairness", *Economic Journal* 114, 397-420.

Falk, Armin and Urs Fischbacher. 2006. "A Theory of Reciprocity." *Games and Economic Behavior*, *54* (2): 293–315.

Falk, Armin and Christian Zehnder. 2007. "Discrimination and In-Group Favoritism in a Citywide Trust Experiment." Working paper.

Fehr, Ernst, Kremhelmer, Susanne and Schmidt, Klaus. 2008. "Fairness and the Optimal Allocation of Ownership Rights." *Economic Journal* 118, 1262-84.

Fehr, E.; Schmidt, K.M. 1999. "A Theory of Fairness, Competition, and Cooperation." *Quarterly Journal of Economics, 114*, 817–868.

Fischbacher, Urs. 2007. "z-Tree: Zurich Toolbox for Ready-made Economic Experiments." *Experimental Economics* 10(2), 171-178.

Gibbons, Robert. 2005. "Four Formal(izable) Theories of the Firm?" *Journal of Economic Behavior and Organization*, 58(2): 200-245.

Goette, Lorenz, David Huffman, and Stephan Meier. 2006. "The Impact of Group Membership on Cooperation and Norm Enforcement: Evidence Using Random Assignment to Real Social Groups." *American Economic Review*, *96* (2): 212–216.

Greiner, Ben. 2004. "An Online Recruitment System for Economic Experiments." In: Kurt Kremer, Volker Macho (Eds.): Forschung und wissenschaftliches Rechnen 2003. GWDG Bericht 63, Göttingen : Ges. für Wiss. Datenverarbeitung, 79-93.

Grossman, Sanford and Oliver Hart. 1986. "The Costs and Benefits of Ownership: A theory of Vertical and Lateral Integration." *Journal of Political Economy*, 94(4): 691-719.

Hackett, Steven C. 1994. "Is relational exchange possible in the absence of reputations and repeated contact?" *Journal of Law, Economics, and Organization* 19, 360–389.

Hart, Oliver. 1995. *Firms, Contracts, and Financial Structure*. Oxford University Press.

Hart, Oliver, and John Moore. 1990. "Property Rights and the Nature of the Firm." *Journal of Political Economy*, 98(6): 1119-1158.

Holmström, Bengt, and John Roberts. 1998. "The Boundaries of the Firm Revisited." *Journal of Economic Perspectives,* 12(4): 73-94.

Hoppe, Eva I. and Patrick W. Schmitz. 2011. "Can Contracts Solve the Hold-Up Problem? Experimental Evidence." *Games and Economic Behavior*, 73 (1): 186-199.

Joseph, Nathan. 1986. *Uniforms and nonuniforms: Communication through clothing*. New York: Greenwood Press.

Joseph, Nathan and Nicholas Alex. 1972. "The Uniform: A Sociological Perspective." *American Journal of Sociology*, 77(4): 719-730.

Klein, Benjamin, Robert G. Crawford, and Armen A. Alchian. 1978. "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process." *Journal of Law and Economics*, 21(2): 297-326.

Kogut, Bruce, and Udo Zander. 1992. "Knowledge of the Firm, Combinative Capabilities, and the Replication of the Technology." *Organization Science*, 3(3): 383-397.

Kogut, Bruce, and Udo Zander. 1996. "What Firms Do? Coordination, Identity, and Learning", *Organization Science,* 7(5): 502–518.

List, John A., William S. Neilson, and Michael Price. 2009. "The Effects of Group Membership in a Strategic Setting: Evidence from the Field." Working paper.

Pratt, Michael G. and Anat Rafaeli. 1997. "Organizational Dress as a Symbol of Multilayered Social Identities." *The Academy of Management Journal*, 40(4): 862-898.

Rafaeli, Anat, Jane Dutton, Celia V. Harquail and Stephanie Mackie-Lewis. 1997. "Navigating by Attire: The Use of Dress by Female Administrative Employees." *The Academy of Management Journal*, 40(1): 9-45.

Rafaeli, Anat and Michael G. Pratt. 1993. "Tailored Meanings: On the Meaning and Impact of Organizational Dress." *The Academy of Management Review*, 18(1): 32-55.

Rafaeli, Anat and Monica Worline. 2000. "Symbols in Organizational Culture" In: N. M. Ashkanasy, C. Wilderom, and M. F. Peterson (Eds.) *Handbook of Organizational Culture and Climate,* Sage. (Available at: http://iew3.technion.ac.il/Home/Users/anatr/symbol.html)

Roach-Higgins, Mary Ellen and Joanne B. Eicher. 1992. "Dress and Identity." *Clothing and Textiles Research Journal*, 10(4): 1-8.

Shelanski, Howard A. and Peter G. Klein. 1995. "Empirical Research in Transaction Cost Economics: A Review and Assessment." *Journal of Law, Economics, and Organization*, 11(2): 335-361.

Sloof, Randolph, Edwin Leuven, Hessel Oosterbeek and Joep Sonnemans. 2003. "An experimental comparison of reliance levels under alternative breach remedies." *Rand Journal of Economics* 34, 205-222.

Sloof, Randolph, Hessel Oosterbeek, and Joep Sonnemans. 2007. "Does Making Specific Investments Unobservable Boost Investment Incentives*?" Journal of Economics and Management Strategy*, 16(4), 911–942.

Sonnemans, Joep, Hessel Oosterbeek and Randolph Sloof. 2001. "On the Relation between Asset Ownership and Specific Investments." *Economic Journal* 111, 791-820.

Sutter, Matthias. 2009. "Individual behavior and group membership: Comment." *American Economic Review* 99, 2247-2257.

Tajfel, Henri, Michael Billig, R. Bundy, and Claude L. Flament. 1971. "Social Categorization and Inter-Group Behavior." *European Journal of Social Psychology*, *1*: 149–177.

Tajfel, Henri, and John Turner. 1979. "An Integrative Theory of Intergroup Conflict." In Stephen Worchel and William Austin, eds., *The Social Psychology of Intergroup Relations*, Monterey CA: Brooks/Cole.

Tomomi Tanaka, Colin Camerer and Quang Nguyen. 2008. "Measuring norms of redistributive transfers: Trust experiments and survey data from Vietnam." Working paper.

Turner, John C., Hogg, M. A., Oakes, P. J., Reicher, S. D., and Wetherell, M. 1987. *Rediscovering the social group: A self-categorization theory*. Oxford, England: Basil Blackwell.

Weber, Roberto and Colin Camerer. 2003. "Cultural Conflict and Merger Failure: An Experimental Approach." *Management Science*, 49( 4), 400–415.

Williamson, Oliver. 1971. "The Vertical Integration of Production: market Failure Considerations." *American Economic Review*, 61(2): 112-123.

Williamson, Oliver. 1979. "Transaction-Cost Economics: The Governance of Contractual Relations." Journal of Law and Economics, 22(2): 233-261.

Williamson, Oliver. 1985. *The Economic Institutions of Capitalism*. Free Press.

Yamagishi, Toshio, and Toko Kiyonari. 2000. "The Group as the Container of Generalized Reciprocity." *Social Psychology Quarterly*, *63* (2): 116–132.

**Appendix I. Subject Instructions and Decision Forms.**

*[These instructions were handed out at the beginning of the experiment]*

## GENERAL INSTRUCTIONS

**No Talking Allowed**
Thank you for coming. The purpose of this session is to study how people make decisions in a particular situation. From now until the end of the session, unauthorized communication of any nature with other participants is prohibited. If you violate this rule we will have to exclude you from the experiment and from all payments. If you have a question after we finish reading the instructions, please raise your hand and the experimenter will approach you and answer your question in private.

**Two Tasks**
You will be asked to participate in two tasks during the experiment. The instructions for Task 2 will be given to you after finishing Task 1. Your earnings from both tasks will be paid to you in cash at the end of the experiment.

**Two Teams**
You have been divided randomly into two teams, called the Yellow Team and the Orange Team. People from both teams are wearing their respective team uniforms: The Yellow Team is wearing yellow t-shirts and the Orange Team is wearing orange t-shirts.

## TASK 1 INSTRUCTIONS

**Task 1 Earnings**
Below you have received two trivia questions. For each correct answer, you will be rewarded with $2. Meanwhile, you can use a computerized team chat program to get help from or offer help to other members on your own team. Except for the following restrictions, you can type whatever you want in the lower box of the chat program. Messages will be shared *only* among all the members from your own team. You will not be able to see the messages exchanged within the other team. People on the other team will not see the messages exchanged within your own team either. You will learn the correct answers and your earnings from Task 1 at the end of today's session.

**Restrictions on Messages**
1. Please do not identify yourself or send any information that could be used to identify you (e.g. age, race, professional background, etc.).
2. Please refrain from using obscene or offensive language.

**How to Use the Chat Program**
When asked by the experimenter, please enter the colour of your team on the initial screen of the chat program. You will be given 5 minutes to communicate with your team members. Are there any questions?

**TASK 1 DECISIONS**

Please answer the following two trivia questions.  For each correct answer, you will be rewarded with $2.  You can also use a team chat program to get help from or offer help to other members on your own team.

**Trivia 1:** *[text here]*

**YOUR ANSWER: ……………………………………….**

**Trivia 2:** *[text here]*

**YOUR ANSWER: ……………………………………….**

## TASK 2 INSTRUCTIONS

**Earnings**
In Task 2, every participant will get $10 as a show up fee. Your final experimental earnings will depend on your decisions and on the decisions of others.

**Anonymity**
Each person from the Yellow Team will be randomly paired with another person from the Yellow Team. Each person from the Orange Team will be randomly paired with another person from the Orange Team. No one will learn the identity of the person (s)he is paired with.  Your role and your ID number will be written on the top of your decision sheet.  The experimenters will keep track of your decisions and your paired person's decisions by your ID numbers.  Because your decision is private, we ask that you do not tell anyone your decision or your earnings either during or after the experiment.

**Pairing and Roles**
Within each pair, one person is going to be randomly assigned to be the First Mover and the other person to be the Second Mover.  The decisions are divided into three stages:

**Stage 1: The First Mover's Investment Decision**
The First Mover decides whether or not to invest his/her $10 show up fee in order to create $14 for the pair:
- If the First Mover invests his/her $10 show up fee, then $14 will be made available to split between the two paired persons.  The split of $14 will be determined by the Second Mover.

- If the First Mover does not invest, then no money is created and stages 2 and 3 are cancelled.

**Stage 2: The Second Mover's Offer**
If the First Mover invested in Stage 1, the Second Mover decides how much money out of $14 to offer to the First Mover and how much of it to keep.

**Stage 3: The First Mover's Acceptance/Rejection**
The First Mover learns about the offer, and either accepts it or rejects it.  If the First Mover accepts, both movers receive the respective amounts stated in the offer.  If the First Mover rejects, the $14 disappears and both the First Mover and the Second Mover get $0. (The Second Mover still keeps his/her show up fee of $10.)

**Payment of Experimental Earnings**
Once all participants have made their decisions, the experimenters will collect the decision forms and calculate the payoffs.  Then you will be asked one by one to approach the experimenter in the hallway for the payment of your experimental earnings.  Once paid, please leave using the stairs and do not gather in front of the elevator.

Are there any questions?

**Practice Questions**

Please answer the following questions:

1. If the First Mover invests and the Second Mover offers …. which is accepted by the First Mover, what are the First Mover's final earnings? …………
What are the Second Mover's final earnings? …………..

2. If the First Mover invests and the Second Mover offers …. which is rejected by the First Mover, what are the First Mover's final earnings? …………
What are the Second Mover's final earnings? …………..

3. If the First Mover does not invest what are the First Mover's final earnings? …………
What are the Second Mover's final earnings? …………..

**Decision Form**                                                                    **First Mover #**

<div align="center">

## Stage 1: THE FIRST MOVER'S INVESTMENT DECISION

</div>

The First Mover makes his/her decision by circling (1) or (2):

**(1) I choose not to invest my $10 show up fee**

<div align="center">

**OR**

</div>

**(2) I choose to invest my $10 show up fee**

<div align="center">

## Stage 2: THE SECOND MOVER'S OFFER

</div>

The paired First Mover chose to invest the $10 show up fee. Therefore, $14 is made available for the Second Mover to split between the two paired persons. The Second Mover makes his/her decision how much money out of $14 to offer to the First Mover by completing both statements below:

**I offer $_____ to the paired First Mover.**

**Therefore, I will keep $_____ for myself.**

If no investment was made in Stage 1 the Second Mover writes "No investment" in the space below: _____

<div align="center">

## Stage 3: THE FIRST MOVER'S ACCEPTANCE/REJECTION

</div>

The First Mover makes his/her decision by circling (A) or (R):

**(A) I accept the Second Mover's offer.**

<div align="center">

**OR**

</div>

**(R) I reject the Second Mover's offer.**

If no investment was made in Stage 1 the First Mover writes "No investment" in the space below: **_____**

**Decision Form**                                                                                   **Second Mover #**

## Stage 2: THE SECOND MOVER'S OFFER

The paired First Mover chose to invest the $10 show up fee. Therefore, $14 is made available for the Second Mover to split between the two paired persons. The Second Mover makes his/her decision how much money out of $14 to offer to the First Mover by completing both statements below:

**I offer $_____ to the paired First Mover.**

**Therefore, I will keep $_____ for myself.**

If no investment was made in Stage 1 the Second Mover writes "No investment" in the space below: **_____**

**Appendix II. Questions about Trivia**

*[The trivia questions for each session were selected without replacement from the following trivia bank.]*

**TRIVIA BANK**

What is Oktoberfest intended to celebrate?

Hudson Bay is a large inland sea in which country?

What country was the 1986 Soccer World Cup held at?

What is the name of the three bones that make up a human finger?

Which art movement, founded in a Zurich café during World War I and consolidated at a meeting held

During the Cold War, what Eastern European alliance was the equivalent of NATO?

What does the "E" stand for in UNESCO?

In the southern hemisphere, the winds associated with a cyclone, a region of low pressure, blow in which direction?

In the northern hemisphere, the winds associated with a cyclone, a region of low pressure, blow in which direction?

What is the name of the index of average daily prices on the New York Stock Exchange?

What determines the sex of crocodile embryos?

What elemental event rejuvenates a prairie by causing more plants to grow taller, flower and produce seed?

Who was the first female to register 30 top ten hits?

What is Europe's most mountainous (in % of total area) country?

What's the second most populous continent?

What's the University of Paris more commonly called?

What European country uses its Latin name, Helvetia, on its stamps?

What city boasts the largest Greek population in the world outside of Greece?

What South American capital's name means "I saw the mountain"?

Croatia and Slovenia used to be part of which country?

Which country hosted the 1998 Winter Olympics?

What country is only bordered by Spain?

In which country was the Titanic launched?

The island of Rhodes belongs to which Mediterranean country?

Which country is also called the Hellenic Republic?

What weather phenomenon is measured by the Beaufort scale?