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**Collective Trust Behavior**

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*Abstract*

This paper investigates trust in situations, where decision-makers are large groups and the decision-mechanism is collective, by developing a game to study trust behavior. Theories from behavioral economics and psychology suggest that trust in such situations may differ from individual trust. Experimental results here reveal a large difference in trust but not in trustworthiness between the individual and collective setting. Furthermore, an artefactual field experiment captures the determinants of collective trust behavior among two cohorts in the Swedish population. One result is that beliefs about the other and the own group are strongly associated with collective trustworthiness and trust behavior.

Keywords: Collective Trust, Voting, Experiment, Beliefs.

JEL-code: C72, C90, C93, D70.

# 1. Introduction

Trust and trustworthiness have often been regarded as rather fixed behavioral concepts, invariant to contextual factors. However, in reality, they are derivative concepts, depending on institutions, social preferences, risk and other aspects of the decision context. For instance, few would trust the sender of an e-mail promising a lucrative business relationship with the former manager of the Nigerian Petroleum Company, but many would trust a friend. In such concrete specific situations the contextual implications for trust behavior seem obvious to us. What is less apparent, and hence deserves more research, is how more general decision contexts relate to trust and trustworthiness. In this paper, we study trust behavior in a general institutional framework, which we believe is important for collective decision-making, but has not received attention until now. It will be demonstrated, both theoretically and empirically, that general differences in institutions may have a huge impact on trust.

This study concerns investments in trust, where the decision-makers are large groups and the decision-mechanism is collective. To distinguish trust in these contexts from others, we denote it collective trust. This kind of trust may be imperative for a society's ability to cope with various social dilemmas and collective decision problems, because political activity often involves the deliberate transfer and delegation of power to other groups.[1] For instance, democratic systems involve voting for representatives (i.e., usually a party), who in turn will vote upon matters affecting both the general population *and* the group of political representatives themselves. We claim that the willingness to delegate such decisions embodies collective trust, and

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[1] Like in the case of "social trust" (see e.g., Putzel, 1997) it is possible to envisage a "dark-side" of collective trust where a people naively delegates too much power to e.g., political representatives. This aspect is, however, outside the scope of the present paper.

that the inclination to positively reciprocate such trust embodies collective trustworthiness. This kind of trust and trustworthiness is likely to be important for the scope and functioning of systems relying on collective decision-making (like e.g., the political system and voluntary associations of various kinds). As a consequence, it will influence and interact with the institutional development of societies.

To study collective trust and trustworthiness, we develop a game to provide a behavioral measure of these concepts. This game is then used to compare collective trust behavior with individual trust behavior. In addition, an artefactual field experiment is conducted in order to test a number of hypotheses concerning the determinants of the collective trust behavior of two representative contemporary age cohorts from the Swedish population.[2]

## 2. Related Literature

To our knowledge there has been no previous behavioral study on collective trust. However, there is a small but growing literature in experimental economics concerning group or team decision-making and a larger literature dealing with the same area in social psychology (for a review see Kocher and Sutter, 2005). In different kinds of games it has been demonstrated that groups may behave more closely to game theoretic predictions (based on self-regarding preferences) than individuals.[3] This has been labeled an "interindividual-intergroup discontinuity" effect (Schopler et al. 2001; Wildschut et al. 2003) in social psychology. For instance, Bornstein and Yaniv (1998) demonstrated that group proposers made lower ultimatum offers than individual proposers, and group responders accepted lower offers than

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[2] We follow the proposed taxonomy of Harrison and List (2004) and denote experiments, that study abstract game behavior among uncommon subject groups, as artefactual field experiments.
[3] The only exception to this is Cason and Mui (1997) where it was observed that groups donated more than individuals in the dictator game.

individual responders. In the investment game or the so-called "trust game", Cox (2002) showed that groups (of three persons) of A-players sent as much as individual A-players, but groups of B-players returned significantly less than individual B-players. In another study of the investment game containing treatments, where groups played against individuals, the groups of A-players sent significantly less than individual A-players (Bornstein et al., 2005). There were no notable differences between individuals and groups for B-players.

These studies demonstrate that individuals and groups may arrive at different decisions in strategic situations. Differences between individuals and groups are often attributed to interactive communication processes facilitating group socialisation and establishment of a group norm to which its members adhere.[4] In short, (greedy) group members may support each other socially, facilitating violation of universal norms of kindness, fairness and reciprocity, in order to obtain higher material outcomes. Belonging to a group may also provide a shield of anonymity, in that the link to an individual group member and the "greedy" action of a group become blurred. If any of the mechanisms above are at work, the fear of being exploited will rightfully be greater in intergroup than in interindividual interaction. It has also been suggested that people exhibit learned beliefs that groups interact in more deceitful, competitive and aggressive ways than individuals, yielding lower trust in intergroup interactions (Wildschut et al. 2003).

Some important collective decisions are made after group members have interacted and communicated, but some very important ones, such as general elections and referenda, do not. Rather, these decisions differ from the situations studied in the group decision literature in a number of respects. Firstly, no agreement is required in

general elections or referenda. Instead, voters decide, independently and in most cases anonymously, upon how to cast their vote.[5] Secondly, the applied decision-mechanism is typically some kind of majority rule. Thirdly, unlike group or team decisions (like the ones in the experiments cited above), collective decisions concern large groups of people and the individual will not necessarily know the number of other people participating, implying that feelings of group identity may be weak.[6] These differences suggest that collective decisions are different from group decision-making and raise the question of whether the intergroup interindividual discontinuity effect also prevails in collective situations where people within each group are restrained from interacting and where group identity may be weak.

## 3. The Collective Trust Measure

In this section we will describe how we intend to measure collective trust. Before we do this, it is worthwhile to point out that trust is a motivation and not an action. Furthermore, trustworthiness is a positive character trait of a person (or group), which is usually assigned by another person and relates to the latter's expectations. The obvious problem in measuring motivations and expectations is that they are not directly observable. Consequently, there is no unique, perfect, behavioral measure of trust and trustworthiness such that confounding factors can be excluded a priori.[7] The

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[4] For instance, Kocher and Sutter (2005) refer to two theories, namely the so-called "persuasive argument" theory and "social comparison theory" of psychological group behavior, which make predictions of how individuals will act within the group.

[5] One might argue that there is a communication process in society before an election or referendum. However, this process is mostly one-way, where voters are not participators but typically merely passive observers.

[6] The importance of group identity has been emphasized by Tajfel and Turner (1979) and more recently in economics by Akerlof and Kranton (2000). For experimental evidence on this see Charness et. al. (2006).

[7] Some reflection will reveal that this is not only a problem for measures of trust and trustworthiness. Indirect behavioral measures of other motivations and expectations (such as preferences and various kinds of beliefs) share this deficiency to a larger or smaller extent. For studies that have demonstrated

strategy used here to measure collective trust is to use Ockham's razor to find the simplest possible *behavioral situation* that captures the central ideas of the concept.

Many definitions of trust contain the elements that Coleman (1990, p.97-98) requires for the placement of trust. These elements are: i) trusting increases the range of action of the trustee, ii) if the trustee reciprocates, the trustor is better off, iii) the trustor places trust without any prior conditions, and iv) the trustee's action is in the future. Coleman does not provide a corresponding list for trustworthiness, but it is fairly natural to require that trustworthiness means reciprocating in a trust situation.

Note that Coleman's requirements do not rule out the fact that other motivations are present in a trust situation that we normally would not call trust. For instance, increasing someone else's range of action might be considered an act of altruism or general kindness. A similar argument can be made about the motivation behind the act of reciprocating (i.e., trustworthiness). Thus, when a game is designed to capture trust and trustworthiness one must accept that behavior indicating trust may be motivated by a complex of factors. By choosing the simplest situation that captures trust and trustworthiness, we can, at least, exclude the fact that unnecessary factors are involved.

Below, we describe a game and denote it "the collective trust game" (henceforth CTG). This game includes Coleman's four elements and also involves majority decisions for groups. There are two groups and hence two player roles, $N_A$ A-players and $N_B$ B-players. In stage 1, A-player $i$ can vote between *I*(nvesting) which is denoted by $x_i^A = 1$, and *N*(ot investing) denoted by $x_i^A = 0$. If the majority of A-players vote for *N* (i.e., $\sum_{i=1}^{N_A} x_i^A / N_A < 1/2$) the game ends and the payoff for all

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that trust game behavior involves other motivations see Bohnet and Zeckhauser (2004), Cox (2004), Holm and Danielson (2005) and Karlan (2005).

players is $c$.[8] If no such majority is obtained (i.e., $\sum_{i=1}^{N_A} x_i^A / N_A \geq 1/2$) the game enters the second period, where B-players ($j = 1,2,...,N_B$) can choose between voting for $R$(eciprocating) denoted by $x_j^B = 1$ and $D$(efecting) denoted by $x_j^B = 0$. If the majority of B-players vote for D (i.e., $\sum_{i=1}^{N_B} x_i^B / N_B < 1/2$) the payoffs are $d_A$ and $d_B$ for A- and B-players, respectively. If at least half the B-players vote for $R$ the corresponding payoffs are $r_A$ and $r_B$. It is assumed that: $r_A > c > d_A$ and $d_B > r_B > c$.

Note that CTG includes all four trust elements required by Coleman. Firstly, by investing, the A-players increase the range of action for the B-players. Secondly, since $r_A > c > d_A$ group A is better off should the B-group reciprocate. Thirdly, there are no prior conditions. Fourthly, the B-group makes its decision after the A-group.

## 4. Some Hypotheses

In this section, hypotheses concerning collective trust and trustworthiness behavior (henceforth CTB) are generated from an economic perspective. Firstly, we contrast CTB with individual trust and trustworthiness behavior (henceforth ITB) and discuss how they may differ. Hereafter, we provide hypotheses about factors that may influence CTB.

*4.1 Why Collective Trust and Individual Trust May Differ – theoretical reflections*

Consider an individual trust game (henceforth ITG) with only one A-player and one B-player. The standard economic prediction for self-interested subjects is that the A-player chooses $N$ and the B-player chooses $D$ (contingent on A-player choosing $I$,

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[8] This paper confines itself to the simple majority rule since it is most common. One could consider other rules, for instance, that a qualified majority was required. The design of the voting rule is likely to

which he never does in equilibrium). Furthermore, applying standard economic theory to CTG (also with self-interested participants) the prediction should be the same, that is, A-players vote for $N$ and B-players vote for $D$.[9] Hence, according to standard economic theory, the null-hypothesis is that there should be no differences in behavior between ITG and CTG.

We will argue that there are sound theoretical arguments in behavioral economics about distribution preferences (see Fehr and Schmidt, 1999 and Bolton and Ockenfels, 2000) and intentions (see Rabin, 1993 and Dufwenberg and Kirschsteiger, 2004) suggesting that behavior may change between the two games.[10] We will first explain this in some detail by applying the model by Fehr and Schmidt (henceforth FS) and then shortly discuss why behavior may change in models based on intentions.

Two mechanisms that may generate a difference between ITB and CTB are identified, the "reference group effect" and the "belief polarization effect". In FS utility is based on the outcome for the individual and the outcome for persons in his reference group. While it may be natural to consider the other person to be the "reference group" in two person bargaining, the identification of the relevant reference group is not as straightforward when each participant belongs to one of two groups. For instance, if the reference group only consists of the group to which an individual belongs, FS predict group egoistic behavior. The prediction then coincides with the standard economic theory for CTG. However, the prediction of FS for ITG will depend on the parameters of the model and may deviate from the standard

affect expectations and behavior as has been demonstrated by Charness and Jackson (2006) in the Stag Hunt game. This interesting aspect is, however, outside the scope of this paper.
[9] This prediction would obviously coincide with the prediction of public choice theory.
[10] For theories about distribution preferences see Bolton and Ockenfels (2000) and Fehr and Schmidt (1999). This class of theories has also been used to understand political decisions (see e.g., Tyran and Sausgruber, 2006). Behavioral theories about intentions and reciprocity see Rabin (1993) and Dufwenberg and Kirschsteiger (2004).

economic prediction.[11] From this perspective, the average player in CTG will act more "greedily" and inclined to prefer *N* and *D* in comparison with the average player in ITG. The reference group in the example above is somewhat extreme. Still, it is shown below that CTB is likely to differ from ITB even if all A- and B-players are included in the reference group.

In FS, a reference group of both player types will reduce the impact of the inequality aversion component of the utility function in CTG compared to in ITG. Because the outcome for the players belonging to the same group will be the same, no player will feel any "inequality guilt" or "inequality envy" toward his fellow group players. This "reference group effect" will make B-players more likely to choose *D* in CTG compared to in ITG. This is expressed in the following observation:

**Observation 1**: *For a given distribution of B-players characterized by the parameters in a FS utility function, a larger proportion of B-players will choose D in a CTG compared to in an ITG.[12]*

The comparison between ITB and CTB for A-players is more complicated since it involves beliefs about what the B-players will do. In ITG, the A-players' beliefs focus on the probability that one randomly selected B-player will choose *D*. In CTB, the corresponding belief will be the probability that the *majority* of the $N_B$ B-players will vote for *D*. This probability is binomially distributed and will converge to 0 or 1 (for large $N_B$), depending on whether the probability that a randomly selected B-player will choose *D* is below or above $1/2$. This belief polarization effect will make each A-player more certain, the larger the group of B-players, about what the B-players will decide upon via majority voting. For sufficiently large $N_B$ an A-player

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[11] In the game above this follows trivially from the fact that all players of the same role receive the same payoffs. Hence, using FS notation, all their terms with alphas or betas are zeroed.

will never choose *I* if he believes that the probability of a randomly selected B-player choosing *D* is above $1/2$. If this probability is below $1/2$ it can also be shown under reasonable assumptions that the A-player will be more likely to choose *I* in CTG than in ITG. Hence, we make the following observation:

**Observation 2**. *For a sufficiently large $N_B$, A-players' decision to choose I in CTG will depend on the belief about the probability that a randomly selected B-player will choose D.*

*i) If this probability is larger than $1/2$, no A-player will choose I in CTG whereas a positive percentage of them may do so in ITG.*

*ii) If this probability is smaller than $1/2$, then more A-players will choose I in CTG than in ITG.[13]*

We can conclude that if behavior is governed by inequality aversion there are sound reasons to expect differences in behavior between individual trust and collective trust situations.[14] Differences may also result if behavior is intention based since it is not obvious that the reasoning of kindness and reciprocity can be extended to voting by groups. An action directed by one person toward another person sends the latter a clear intentional signal that may evoke natural emotions of e.g., reciprocity. It is not self-evident that a majority voting outcome in one group evokes similar emotions among members of another group. For one thing, the majority voting decision process is a relatively modern institution in the history of mankind, which makes it questionable if e.g., reciprocity emotions, similar to those obtained via inter-

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[12] The proof can be found in the Appendix. The reasoning behind the observations in this section makes the simplifying assumption that $r_B \geq r_A$. The parameters in the experiment satisfy this assumption.

[13] The proof can be found in the Appendix.

[14] It should be noted that the belief polarization effect does not restrict itself to FS. The effect may also be present in other models where the A-players' voting is partly or fully motivated by their beliefs about the probability that the B-group chooses *D*.

personal interaction, have evolved for this type of collective decision. Second, the intention of a group is less clear than the intention of an individual.[15]

To sum up, according to standard economic theory, there should be no differences between CTB and ITB. In contrast, two strands of behavioral economic theories suggest that such differences may exist. It is, therefore, justified to empirically investigate if this is indeed the case.

*4.2 Factors Associated with Collective Trust – Hypotheses*

This section contains the explanatory variables to study CTB are presented. The variables are divided into certain categories (displayed in Table 1) and will be motivated below. Motivations for including a certain variable are mainly based on theoretical reasoning. However, since this study of CTB is new, we have also included a restricted number of variables that have had a predictive power for individual trust, a concept that, although theoretically distinct, is related to collective trust. In addition, a few variables have been included for exploratory reasons.

I. *Demographics*: The *age* of a person may affect collective (dis)trust since it can be learnt through experience. Experience of untrustworthiness may make older people less naïve than younger people and hence, create collective distrust among older

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[15] A small amount of literature on group intentions shows that it is not straightforward to jump from conceptualisations of individual intentions to collective intentions (see e.g., Gold and Sugden, 2006). Furthermore, on a general level, Arrow's impossibility theorem makes discussions of "intentions" of groups of people rather complex. Usually it is meant that an intention is based on a purposeful "willingness" to do something. This presupposes some kind of preference, which may be problematic in the case of groups. For instance, how can a group be "kind" to another group if there is no unambiguous way to assess the preference of the latter group? Admittedly, for the simple game mentioned above, the aggregation problem of preferences has obviously no cutting edge since preferences for groups can be aggregated for binary choice problems, but, for more general situations, it has. However, even in this simple game, it is conceivable that the concept of intentions is diluted. For instance, if 51 percent of the A-players have voted for an investment that will benefit another group and 49 percent have voted against it, the intention to make a "friendly" investment may be "diluted" due to the even outcome.

people. Furthermore, if group interactions in general tend to be more competitive and aggressive, this may also be learnt via experience, making older people more cautious in such interactions. Some data indicate that different birth cohorts have diverse levels of individual social trust in the US (see e.g., Putnam, 2000 and Glaeser et al., 2000). Also, behavioral studies of ITB suggest that age may be important (see Kocher and Sutter, 2004, Holm and Nystedt, 2005b). It is therefore interesting to see if these differences also exist for CTB. To test for age effects, two different age groups, 20-year-olds and 70-year-olds, are included in the artefactual field sample.

We also include *gender* as a potential variable and a selection criterion in the artefactual field experiment. Some behavioral studies on ITB have reported gender effects. Croson and Buchan (1999) find higher female trustworthiness in ITG, but no significant gender differences in trust.[16] Holm and Nystedt (2005b) find that both male and female trustors preferred to be matched with a female trustee.

The *living area* (place of residency at age 15) may also have an effect. People growing up in smaller communities are probably closer to the political decision-making, which may generate collective (dis)trust compared to people growing up in bigger cities where such decisions are further away from the inhabitants. Empirically, the living area also seems to have a slight effect on attitudinal social trust (see Glaeser et al., 2000, Table II). Finally, we also include a variable called *sibling* since the effect of being the only child in a family had a relatively large negative effect on behavioral trustworthiness in Glaeser et al. (2000).

II: *Beliefs in the game*. Purposeful rational strategic behavior takes into account expectations about others' actions. A crucial element in trust is whether the trustor

expects the trustee to reciprocate. In CTG this expectation will concern the group of trustees (see Section 4.1). Consequently, we have elicited *expectations of reciprocity voting* in the group of trustors.

A second type of belief concerns *expectations of trust voting* in the group of trustees. The trustees' decision to reciprocate may be related to their belief about the other group's degree of trust. It has been shown that people, who say that they trust others, have a higher degree of behavioral trustworthiness than others (see Glaeser et al., 2000). If this self-revealing belief carries over to collective trust, trustee expectations of how the other group will vote may be related to the trustees' voting. For this reason, we have also elicited the trustees' expectation of trust in the group of trustors.

A third type of belief that may be important concerns how a subject believes other members of *his own group* will vote. There are complementary mechanisms that suggest a positive correlation between this belief and collective trust behavior. First, it is well known from social psychology that people have a desire to conform to norms. By definition, a norm is a socially-shared rule that people follow. Thus, if behavior is driven by norms, subjects prefer to act as they believe most people would do in the same situation (i.e., as a *majority* of subjects in their own group). Second, beliefs can be formed and tailored for certain actions. In this case it is conceivable that the individual simply infers by introspection that most people would act as he does himself, or that it is emotionally painful for him to believe that most others would act differently from himself, explaining why self-serving beliefs are formed.[17] To sum up, there are good reasons to expect that beliefs about others and one's own actions are

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[16] Because the last subgame in a trust game is identical to a dictator game, this gender effect is consistent with the finding by Eckel and Grossman (1998) that women donate more than men in dictator games.

deeply intertwined.[18] Although it is beyond the scope of this paper to distinguish between these mechanisms, they should have the same effect on the statistical relationship.

III). *Attitudes*

a) *Social attitudes toward others*. Glaeser et al. (2000) demonstrated that survey questions on social attitudes (like the GSS trust question) did not have the straightforward predictable effects on ITB that one might expect. Results from subsequent studies are relatively mixed. While some researchers find that attitudinal questions significantly predict ITB, others do not (see Bellemare and Kröger, 2003, Fehr et al., 2003, Holm and Danielson, 2005). Attitudinal questions are often included in large surveys, and thus an exploration of whether they have predictive power in terms of CTB is highly motivated.

The first attitudinal question we include concerns *trust*. The hypothesis is straightforward; people who say that they trust others are hypothesized to be more inclined to exhibit CTB than others since CTG includes the main features of a trust situation. We also include an attitudinal question concerning the subjects' belief about others' *fairness*. The reason for this is that the group of trustors may vote for *I* because they think that people in general (and therefore also the group of trustees) are fair-minded. By the same token, trustors may trust because they think that people in general are kind, and *kindness* is possibly linked to reciprocation in the game. Finally, we also included a question on the subject's assessment of his own *reciprocity* behavior, since we hypothesize it to be connected to the willingness to reciprocate in the group of trustees.

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[17] The latter explanation is related to Festinger's (1957) theory of cognitve dissonance. For discussion from an economic and experimental perspecitve see Konow (2000).

b) *Attitudes toward the welfare state*. It has been argued that trust in institutions is positively associated with the support and possibility of a large welfare state. For instance, Scholz and Lubell (1998) write that "vertical trust between citizen and state can expand the range of collective problems that legal authorities are able to tackle."(Ibid., p.399). They also provide empirical support for this assertion by demonstrating that trust in government will increase compliance among taxpayers. To test if attitudes to the welfare state in general are connected to CTB we include an attitudinal question where the subjects are asked if they think that the *public sector* is too large. It is also reasonable to expect that attitudes toward specific institutional systems relying on collective trust will be linked to CTB. To test this we include a question asking subjects to express their confidence in the Swedish *pension system*. The Swedish pension system has a significant pay-as-you-go component and thus relies on collective trust between generations.

IV. *Confidence in institutions and information*

For explorative reasons we also include a set of questions on confidence in certain institutions and information that may be connected to CTB.

a) *Institutions*. Political decisions in Sweden are either taken at the national level or at the local level (primarily in the municipalities or in the county councils). Hence, we include two questions on the confidence in the *parliament* and in the *municipality executive boards*. The hypothesis is that people exhibiting trust in the game also have trust in institutions at the national and local level where they are represented by a group of politicians. Collective trust may also be related to whether or not people think that laws are respected. For instance, inefficient or corrupt law enforcement

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[18] See Croson (2000) for a discussion and a review of the literature on this issue.

institutions are expected to negatively affect an individual's collective trust since illegal opportunistic behavior would go unpunished. Questions on confidence in the *police* and *courts* are therefore included. Confidence in the *defence* is included since the Swedish defence can be regarded as an institution that historically has not been subject to much party politics. By including it we test if "collective trust" is explained by a general "background trust" in institutions. We also include confidence in the *banks* since the decision in the experiment involves letting another group handle the group of trustors' money.

b. *Information*. Good collective decision-making requires reliable information. Confidence in people that have a central role in the gathering and disseminating of politically relevant information is a prerequisite for the maintenance of such reliability. Consequently, we include questions on the confidence in certain mediators of such information, namely *teachers*, *politicians* and *journalists*.

## 5. Design of the Study

We use two data sets. The first is primarily used to study if CTB differs from ITB. This data set consists of observations from undergraduate students. The second data set is mainly used to study the factors associated with CTB. It consists of observations from a mail-based CTG study conducted on two contemporary cohorts of 20 and 70 year olds of the Swedish population. Below we describe how the two data sets were generated.

### 5.1 Data on the Undergraduates

The data on undergraduates come from students in introductory economics at Linköping University, Sweden. As a part of a larger project, students in the introductory economics course have been invited each year since 2003 to participate

in an experiment during a certain week. The study on ITB, used as a benchmark in the analysis below, was conducted in 2003 and the CTB experiment was conducted on the corresponding cohort of undergraduate students in 2006. In this way demographic differences between groups are minimized. Both subject groups were invited to the experiment after a lecture in the classroom (8th and 9th of April, 2003 and April 6th, 2006). The ITG experiment consisted of one truncated trust game designed along the lines of Gunnthorsdottir et. al. (2002) with real financial incentives (see below) and a participation fee of SEK40.[19] After the game experiment, subjects were asked to fill in a questionnaire containing questions relating to the variables that were hypothesized to be associated to ITB.[20]

In ITG there are two sets of mutually anonymous players (A-players and B-players). The A-player can choose between *I*(nvesting) and *N*(ot investing). If *N* is chosen both players get SEK50 each. If *I* is chosen, the B-player decides between *R*(eciprocating) or *D*(efecting). If B chooses *R*, A gets SEK75 and B gets SEK125. If B chooses *D*, A gets 0 and B gets SEK200.

The only substantial difference between the ITG and the CTG was that the subjects participated in two different versions of the game just described above. The wording, etc. of the instructions to the participants was kept as similar as possible.[21] In CTG the subjects were informed that the action of the group (A or B) was determined by majority rule voting.[22] A-players were asked to vote on whether to let all players (both A and B) receive 50 or to let the group of B-players decide upon the final allocation via majority voting over the *R* and *D* alternatives, yielding

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[19] One US dollar bought roughly SEK8 at the time the experiments were conducted.
[20] Many, but not all, questions were similar for the studies. For instance, questions relating to beliefs and to certain institutions were only put to the subjects that participated in the CTG.
[21] See the corresponding author's homepage for instructions to the students.

$(r_A, r_B) = (75,125)$ or $(d_A, d_B) = (0,200)$, respectively. Hence, the resulting possible pay-off outcomes are identical in ITG and CTG.

To simplify data collection, B-players were asked which action they would choose if the A-player, with whom they were matched, chose *I*. Hence, the strategy method was used.[23] The questionnaire for subjects participating in CTG included belief elicitation questions, which were paid according to a random lottery method. The more accurate their guesses about the players' actions in the A-player and B-player group the more they earned if they were drawn in the lottery. A perfect guess of the percentage that made a certain decision in a given group was paid SEK 500.[24]

*5.2 The Artefactual Field Study on Collective Trust Behavior*

To investigate the determinants of collective trust, a random representative sample of the Swedish population, aged 20 and 70, were invited to participate in a CTG experiment, mainly corresponding to the one described above.[25] The sample consisted of 400 younger and 400 older individuals. The only fundamental difference from the student CTG experiment concerned the monetary payoffs. For practical reasons participants were paid according to a random lottery scheme in which subjectS were informed that *at least* one out of 100 participants would subsequently be randomly

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[22] To keep the similarity to collective decisions where group sizes are not exactly known beforehand, subjects were not informed about the number of participants in each group. However, they could infer from the number of subjects in the classroom that the groups were fairly large.

[23] The use of the strategy method can be debated (see e.g., Fehr et al., 2003). However, the problems associated with the use of the strategy method is probably more prominent in the case of complex strategies. The present game is quite simple and the B-player has only to react to one contingency.

[24] The probability of being drawn was at least 1/20. To avoid the belief elicitation questions affecting the trust game play, these questions were on a separate sheet and asked after the players had made their decisions in CTG. Croson (2000) has demonstrated that eliciting beliefs before players make their choices in public good games and prisoners' dilemma games may affect behavior.

[25] The sample was randomly selected according to the following principles. The two most common Swedish surnames were selected (Johansson and Andersson constituting approximately 6.6 percent of the Swedish population). Secondly, the first 100 male and female individuals of each name, who were 20 years old in March 2005 were selected. The same procedure was carried out for individuals aged 70. Hence the sample pool differed in age by exactly one half century. By this procedure, 800 individuals subdivided symmetrically in terms of gender and age, were obtained.

drawn and paid according to the outcome of the voting process.[26] Actual payoff outcomes were 20-fold compared with the student experiment. Hence, here $c = 1000$, $r_A = 1500$, $r_A = 2500$, $d_A = 0$, and $d_A = 4000$. Also, the answers to the belief elicitation questions were paid according to a random lottery method.

## 6. Results

The results of the experiments are shown below. We start with a general descriptive characterization of the data in the student and the artefactual field study. Hereafter, we show results relating to our hypotheses concerning collective trust vs. individual trust, and variables that are hypothesized to be associated with CTB. In order to facilitate comparison, data from the different game settings are shown in the same tables and analyzed concurrently.

*6.1 General Characterization of the Data*

The data from the benchmark ITG have been thoroughly described in a previous study (see Holm and Nystedt, 2005a) to which the reader is referred.[27] Descriptive statistics for CTG conducted among students are found in the first column of Table 2. In total,

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[26] The use of the random lottery method has been debated. However, in a study by Holm and Nystedt (2005a), comparing the all payment method with the random lottery payment method (with smaller expected payoff) for the ITG considered here, no large differences in behavior were recorded. Hence, we do not think that this method will create behavior that substantially deviates from an all payment method. The results in the subsequent section do not challenge this conviction.

[27] In this study 234 subjects were invited to participate of which half (117) participated from their homes whereas the other half were eligible to conduct the experiment in the classroom after an ordinary lecture. In total, 152 students participated. A main result was that the location did not seem to affect the trust game choices made in any serious way and similar results were obtained in both settings. However, when comparing individual and collective trust, we limit the benchmark sample pool analyzed below to the 75 classroom subjects. This minimizes any discrepancies between the physical settings of the environment in which the games were played.

146 individuals participated in the study.[28] The gender composition and other demographic characteristics were very similar to the ITG sample.

Descriptive statistics for the artefactual field study are found in the last column of Table 2. In total, 286 (or 36% of the sample pool) individuals participated in the study. The group of A-players consisted of 148 subjects and 138 subjects were members of the B group.[29] Overall, 65% stated that "most people can be trusted" in the questionnaire. This figure is in line with the World Value Survey of the year 2000 in which 66.3% of participating Swedes also thought that "most people can be trusted".

*6.2. Collective vs. Individual Trust*

In ITG 73% of the A-players chose *I* and 62% of the B-players chose *R*. In CTG 32% of the A-group voted for *I* and 65% of the B-group voted for *R*. Thus, the main observation is that, whereas the fraction of B-players choosing *R* seems to be consistent with the two treatments, A-player behavior differs starkly. A significantly higher percentage ($p = 0.000001$, Fisher-test) voted for *I* in ITG compared with CTG.

The conjecture (analyzed in Section 4.1) that ITB and CTB may differ gets strong support. The result can be explained by some, but certainly not all the mechanisms suggested in Section 4. From the perspective of the FS-model, A-player, but not B-player, behavior is consistent with the reference group effect, which should also make B-players in CTG more inclined to choose *D* than in ITG. This was not

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[28] About 20 students attending the lectures preceding the experiment left without participating. Five participants, four trustors and one trustee, did not fill in the voting choice, or filled it incorrectly, leaving 141 voting choices to be studied. However, some of the "blank vote" subjects filled the rest of the questionnaire and are used, whenever applicable, in the analysis below.

observed why we exclude this mechanism as a significant explanation. However, observed behavior is consistent with the belief polarization effect (see Observation 2) if A-player expectations of B-player behavior are pessimistic in terms of *R*-voting. If A-players in general believed that the majority of B-players would vote for *D*, we should expect a lower fraction of *I*-votes in CTG compared to *I*-actions in ITG. As we will see below, A-players actually held such pessimistic beliefs. Hence, A-player voting and A-player beliefs appear consistent with the belief polarization hypothesis.

*6.3. Collective Trust – Descriptive Statistics*

In this section we will show the results concerning the factors that were hypothesized to affect collective trust. Let us first note that although the data stems from two different independent subject groups that were exposed to similar tasks there are some differences in design. The students participated in a classroom and the artefactual field subjects participated from their homes, via mail.[30] Furthermore, in the artefactual field experiment, not all subjects were paid and the expected payoffs were smaller. In addition to this the two groups differed in demographic and socio-economic composition. Nevertheless, as will be shown below, the two CTG studies conducted here yielded strikingly consistent results overall, which suggests that many of the results appear robust.

Let us start with the voting results in the artefactual field study. Strong majorities voted for *N* and *R*. Of the A-players, 21% voted for *I* and the remaining 79% voted for *N*. Among the B-players 72% voted for *R* and 28% for *D*. These

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[29] Some participants (20 old and 6 young ones) did not fill in the voting choice, or filled it incorrectly, leaving 260 choices to be studied. Some of the "blank vote" subjects filled the rest of the questionnaire and are used, whenever applicable, in the analysis below.

[30] There is no obvious reason to expect that this treatment difference will matter much since the same treatment difference (home vs. classroom) did not yield different results in ITB (see Holm and Nystedt 2005a).

figures are rather similar across the age groups and do not differ very much from the student sample.

We now turn to the descriptive statistics of the explanatory variables (Table 2). The results of the artefactual field study are shown together with the student data, which are given in parentheses. The mean guess is that 38% (36%) of the A-players voted for *I* and 44% (40%) of the B players voted for *R*. Compared to the actual outcome, it can be concluded that the perception of *I*–voting is somewhat overestimated while the *R*-voting is grossly underestimated. One plausible explanation for this is that the A-players formed self-serving beliefs to motivate their extensive *N*-voting.[31]

It was argued, in the theoretical section that perception of how the *majority* of the respective groups will vote is crucial from both behavioral economic as well as norm-abiding perspectives. Therefore, we have extracted a dichotomized version of the voting beliefs, according to how the majorities will vote (see Table 2). Of all participants, 28% (25%) believed that a majority had voted for *I*, whereas 65% (69%) believed that they had voted for *N*. The remaining 7% (6%) believed in an equal split. However, 54% (60%) expected that the majority of the B-group would choose *D*. Only 38% (37%) guessed that the majority voted for *R*. The fraction believing in a split decision was 8% (3%). Hence, from this perspective as well, the beliefs about B-group behavior clearly deviated from the actual voting outcome. These pessimistic beliefs are clearly consistent with the few *I*-votes in the A-group.

Another observation is that beliefs on trust voting varied between groups. Only 20% (16%) of the A-players expected a majority to vote for *I*, whereas 37% (33%) of the B-players held the same belief. The difference is statistically significant

( $p = 0.01$, Fisher test). There is no such group difference in beliefs concerning the B-group's voting. A conceivable explanation for this is that the decision for the A-group is more complex (involving strategic reasoning and beliefs) than the B-group decision, which essentially is a binary donation decision. Experience of complex decisions may affect beliefs more than that of simple decisions, since the latter can be grasped without experience. Voting and beliefs in the artefactual field sample subdivided by age and gender are found separately in Table 3. Whereas about 30% of both young and old male A-players voted for *I*, only 7% of old and 19% of young women did. The overall differences between men and women are statistically significant ( $p < 0.01$, Fisher test). The differences between old men and old women are also significant at the same level. This gender difference in CTB may be related to a more fundamental gender difference concerning risk (see e.g., Powell and Ansic, 1997). There are no gender discrepancies for *R*-voting but old men were significantly more prone to vote for *R* than young men. Another observation is that both old and young subjects believed that the young were more inclined to vote for *I* and that both groups believed that the old were more inclined to vote for *R*. Believing that young people are more trusting than old people appears consistent with the common view that the young are considered more curious and naive than the old. The belief that the old are more inclined to *R*-voting may reflect that subjects believe that it takes time to learn the value of positive reciprocity.

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[31] It is also possible that people in general hold pessimistic beliefs about group generosity. For instance, expectations of (small) group generosity in dictator games appear to be underestimated (see Song et. al, 2004).

*6.4 Factors Affecting Collective Trust – Statistical Relationships*

This section contains the crude correlation coefficients in Table 4. For illustrative reasons, and as a complement, we also show results from logistic regressions on voting behavior in Table 5. The regression equations include all variables that have been theoretically motivated (see Section 4). The confidence variables (category IV) have been subject to stepwise backward elimination since these variables have mainly been included for exploratory reasons. The data sets are indeed quantitatively limited for regression purposes and the regression results should be interpreted with great caution (see also the text below Table 5). Since the artefactual sample is more representative than the student sample, we focus on the former and use the latter to crosscheck when spurious correlation is suspected.

According to the results, voting is, above all, connected to the perception of how other participants vote. The correlation coefficients between beliefs in the voting of the other group and actual voting are statistically significant in the same and predicted direction in both samples. Hence, A-voters are more prone to vote for *I* the greater the proportion of B-group members expected to vote for *R*. This result confirms the game theoretical reasoning (in Section 4) that A-voting depends on A's beliefs about the B-players. The correlations also suggest that B-players are more inclined to vote for *R* the greater the expected proportion of A-players voting for *I*.

The strongest associations are between intra-group beliefs and voting, i.e., people vote as they expect other members of their own group to vote. This is a very strong relationship with correlation coefficients ranging from 0.47 to 0.6. Furthermore, the relationships are highly significant in all samples and for all groups. As suggested previously there are two complementary mechanisms that may explain this effect. The first is that subjects to a large extent want to follow what they believe

to be the norm. From this perspective, subjects vote norm-abiding and they state what they believe to be the norm in the belief elicitation. The second suggests that subjects' beliefs are partially formed by their actions. One straightforward effect is the so-called "false consensus effect" (see e.g., Croson, 2000) according to which people tend to believe that other people think and act as they do. Another belief-forming effect involves self-serving beliefs, namely that it may be easier for subjects to justify voting *N* (or *D*) if they believe that the majority in their group have done the same. The fact that both mechanisms work in the same direction may explain the strength and robustness of this relationship.

Males were significantly more prone to vote for *I* than females in the artefactual field study but not among students. However, the robustness of this result can be questioned since the gender difference appears to be mostly accentuated among the 70-year-olds.

An interesting observation is that the correlation coefficient between R-voting and the attitude to the size of the public sector is close to significant ($p = 0.06$) in the artefactual field sample. In addition, the coefficients in both studies have the same sign and magnitude. The variable is also clearly significant in the artefactual field regression, implying that subjects who think that the public sector is too large are more likely vote for *D*.[32]

The statistical relationships for the bulk of questions concerning attitudes, confidence in institutions and information are insignificant. The exceptions are that *I*-voting is significantly negatively correlated with survey social trust and confidence in journalists in the artefactual field study. However, the signs of the correlation coefficients for survey trust in the two studies differ, which suggests that the

relationship is not robust. In addition, there are no evident theoretical reasons to expect such a negative relationship. The negative association between *I*-voting and confidence in journalists appears more robust, since the sign (and also the magnitude) of the coefficient is the same (although not significant). Furthermore, there are plausible explanations for such a relationship. For instance, it is conceivable that optimists, more than pessimists, have a low confidence in journalists because they think that the profession is too inclined to exaggerate negative aspects of life (i.e., scandals, hazards etc.). This would explain the negative correlation if it can also be assumed that optimists are more likely than pessimists to vote for *I*.

Concerning *R*-voting, only confidence in the police is significant, but only in the artefactual regression. However, the signs and insignificance of the crude correlation coefficients do not convince us that this relationship is robust.

## 7. The Main Results and Concluding Remarks

Many important decisions involve trust between large groups. In these decisions people often make their choices individually without communication within their respective groups and the groups' choices are determined by collective decision mechanisms. Theoretical arguments suggest that trust behavior in such situations differs from trust behavior between two individuals. The lack of previous studies in this area motivates an empirical study of collective trust behavior (CTB). Hence, we have experimentally investigated whether individual trust behavior (ITB) differs from CTB among students. We also study the factors associated with CTB in two cohorts

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[32] If voting for *D* is assumed to be linked to unwillingness to pay taxes, this result has the same flavour as the relationship between tax-paying compliance and trust in government detected by Scholz and Lubell (1998).

(aged 20 and 70) of the general Swedish population. We summarize our main findings below.

Result 1. *The fraction of trustees (B-players) that reciprocates seems to be invariant between individual social and collective settings.* This implies that behavioral reciprocity mechanisms or fairness concerns seem to work regardless of whether people act collectively in large groups or as individuals in two-person anonymous interactions. Some theories (see e.g., Wildschut et al., 2003; Insko et al., 1990) suggest that group decisions may increase competitive behavior as it may be rationalized by concerns for fellow in-group members, a redefinition of the relevant reference group to embrace only people with identical material incentives to oneself. More egoistic behavior in the collective setting compared to the individual one can also be motivated by reference group effects if the players have inequality aversion (see Observation 1). However, there are no signs in this study that B-players are more competitive or "greedy" in collective settings than in individual ones. One conceivable explanation is that there is virtually no interaction or socialization preceding the decisions in either group. Hence, the group identification may be too weak to allow for a redefinition of reference groups.

Result 2. *The fraction of trustors that invests is much lower in the collective than in the individual setting.* At first glance, this may seem somewhat surprising. Since the proportion of *R*-voting in the B-group exceeds ½, the risk of being matched with a *D*-decision is greater in individual interactions than in collective settings (see Section 4). However, the average A-player holds pessimistic beliefs about the proportion of B-voters choosing *R*. Given such a pessimistic distribution of expectations, the belief polarization effect (see Observation 2, Section 4) implies that less frequent *I*-choices in CTG compared to ITG is consistent with inequality

aversion. This indicates that investment decisions that require trust are governed by the reliability of the institutions surrounding them. Hence, in populations with pessimistic beliefs about the willingness of others to reciprocate (or to take decisions that favor a more equal distribution), actions that require trust cannot rely on collective decision-making, but have to rely on more individualistic institutions.

*Result 3. A-group voting is associated with beliefs about how members of the B-group will vote.* For the expected payoff of investments for the A-group to be sufficiently high, it is necessary for the probability that the B-group will reciprocate to be sufficiently high. Hence, A-group's belief about the proportion in the B-group that will reciprocate is essential.

*Result 4. Voting among both player groups is strongly associated with beliefs in how other members of the own group will vote.* The most straightforward interpretation of this result is that players act according to what they perceive to be the norm. However, there are also complementary explanations, namely that people tend to form beliefs that either directly mirror their own actions or justify them. Irrespective of which is the dominating mechanism, this result, together with Result 3 and the theoretical analysis, suggests that beliefs are essential to the analysis of collective trust. A further implication is that actors who can influence beliefs, or mediate information about such beliefs, may play a central role in collective trust decisions.

*Result 5. Trustees believing that the public sector is too big are more likely to defect in the collective trust game.* This finding indicate that general attitudinal questions about the size of the welfare state may, in fact, have a value in predicting actual CTB. It is intuitive that people who are unwilling to defect (thus creating what

many would consider an unfair outcome) are more inclined to defend the size of the public sector, since this sector is thought (at least in Sweden) to even out inequalities.

*Result 6. Collective trust behavior is not associated to general social trust or confidence in specific institutions.* This result suggests that such survey questions capture something other than is captured by the CTG. To explain this we believe that it is plausible that confidence in institutions reflects specific views and personal experiences that are unrelated to the game studied here. The fact that the general social survey trust is also unrelated to CTB is more difficult to grasp, but similar findings have been reported on the relationship between individual trust game behavior and survey trust (see e.g., Glaeser et. al., 2000 and Karlan, 2005). This suggests that researchers should be careful in their making of behavioral inferences about collective trust and trustworthiness from answers to survey trust questions.

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**Table 1. Variables and questions used in the study.**

| | | |
|---|---|---|
| *Demographic* | Gender* | Female/Male |
| | Age* | Age in years (students), 70 / 20 years-old (field sample). |
| | Living area | When I was 15 years old I lived in a:<br>O  Large city (Malmoe, Gothenburg or Stockholm).<br>O  Other city with more than 50 thousand inhabitants.<br>O  Community with more than five thousand and less than 50 thousand inhabitants.<br>O  Community with more than five hundred and less than five thousand inhabitants.<br>O  Community with less than five hundred inhabitants or at the countryside. |
| | Siblings | When I grew up I was:<br>O  The only child in my family.<br>O  Youngest in a family with more than one child.<br>O  Oldest in a family with more than one child.<br>O  I was neither the oldest nor  the youngest child in my family. |
| *Beliefs in the game* | Expectations about trust voting | % of A group participants voting for **N**. |
| | Exp. about reciprocity voting | % of B group participants voting for **D**. |
| | Exp. about age differences in voting | Believing that the old (young) voted for **N** to a higher extent than the young (old). |
| | Exp. about age differences in voting | Believing that the old (young) voted for **D** to a higher extent than the young (old). |
| *Social attitudes toward others* | Trust | Which of the following two statements do you find most correct:<br>O…most people can be trusted.<br>O…you can't be too careful in dealing with people. |
| | Fairness | Do you think most people would try to:<br>O…take advantage of you if they got a chance.<br>O…be fair. |
| | Kindness | Would you say that people most of the time:<br>O…try to be helpful.<br>O…are mostly just looking out for themselves. |
| | Reciprocity** | When somebody else is mean/nice  to you:<br>O… you go out of your way to be mean/nice back to them.<br>O …you let it pass as if nothing has happened. |
| *Attitudes toward the welfare state* | Public sector | Generally, speaking do you think that the public sector in Sweden is too large?<br>O… Yes.<br>O   No. |
| | Pension system | What do you expect of the current public pension system?<br>O   It will change within 5 years.<br>O   It will change within 5 to 20 years.<br>O   It will change within 20 to 60 years.<br>O   It will not change within 60 years. |
| *Confidence in:* | | Generally speaking, what confidence do you have in the way the following institutions and groups do their job? (from "very high confidence" to "very low confidence" in five categories). |
| *a)Institutions* | Parliament<br>Municipality<br>executive boards<br>Police<br>Courts<br>Defence<br>Banks | |
| *b)Information mediators* | Teachers<br>Politicians<br>Journalists | |

* Variable that was used as a selection criterion in the artefactual field study.
** For explorative reasons the reciprocity item was formulated in negative terms (mean) in one case (among students) and in positive terms (nice) in the other (artefactual field).

**Table 2. Descriptive statistics**

| | Collective Trust (Students) | | | Collective Trust (Artefactual field) | | |
|---|---|---|---|---|---|---|
| | **A Players** | **B Players** | **All** | **A Players** | **B Players** | **All** |
| **Selection** | | | | | | |
| Sample pool[#] | na | na | 249 | 400 | 400 | 800 |
| Participants | 73 | 73 | 146 | 148 | 138 | 286 |
| *%* | | | *59* | *37* | *35* | *36* |
| **Voting:** | | | | | | |
| Valid votes | 69 | 72 | 141 | 137 | 123 | 260 |
| % A players voting for **I**nvesting | *32* | | | *21* | | |
| % B players voting for **R**eciprocity | | *65* | | | *72* | |
| | | | | | | |
| **Explanatory Variables:** | | | | | | |
| **I. Beliefs in the game** | | | | | | |
| % Believing a majority of A players voting for *I* | *16* | *33* | *25* | *20* | *37* | *28* |
| % Believing a majority of B players voting for *R* | *36* | *38* | *37* | *40* | *37* | *38* |
| % Believing the old more likely to vote for *I* | na | na | na | *18* | *48* | *33* |
| % Believing the old more like to vote for *R* | na | na | na | *57* | *75* | *66* |
| | | | | | | |
| **II. Demographics (%)** | | | | | | |
| Age: 70 years old | na | na | na | *62* | *54* | *58* |
| Gender: Male | *51* | *47* | *50* | *46* | *54* | *50* |
| Living area: Less than 5000 inhabitants | *16* | *16* | *16* | *44* | *50* | *47* |
| Birth parity: Only child | *10* | *7* | *8* | *12* | *14* | *13* |
| | | | | | | |
| **III. Attitudes** (%) | | | | | | |
| a) social attitudes toward others* | | | | | | |
| Trust | *85* | *69* | *77* | *66* | *64* | *65* |
| Fairness | *71* | *64* | *67* | *67* | *70* | *68* |
| Kindness | *63* | *59* | *61* | *67* | *66* | *67* |
| Reciprocity | *33* | *39* | *36* | *9* | *13* | *11* |
| | | | | | | |
| b) attitudes toward the welfare state | | | | | | |
| Public sector is too big | *54* | *51* | *53* | *50* | *54* | *52* |
| Pension system will change within 5 years | *10* | *19* | *15* | *20* | *19* | *19* |
| | | | | | | |
| **IV. Confidence in institutions and information**** | | | | | | |
| Police | 3.40 | 3.33 | 3.36 | 3.30 | 3.60 | 3.45 |
| Parliament | 3.19 | 3.19 | 3.19 | 2.69 | 2.70 | 2.69 |
| Defense | 3.22 | 3.25 | 3.23 | 3.07 | 3.07 | 3.07 |
| Banks | 3.96 | 3.72 | 3.84 | 3.43 | 3.55 | 3.49 |
| Courts | 3.77 | 3.59 | 3.68 | 3.20 | 3.17 | 3.19 |
| Municipality executive boards | 3.05 | 2.88 | 2.97 | 2.78 | 2.64 | 2.71 |
| National politicians | 3.06 | 2.82 | 2.94 | 2.51 | 2.44 | 2.48 |
| Teachers in elementary schools | 3.79 | 3.73 | 3.76 | 3.78 | 3.75 | 3.77 |
| Journalists | 2.71 | 2.42 | 2.57 | 2.48 | 2.44 | 2.46 |

[#] In the two student settings, the forms were handed out in the classroom. Hence, exact sample pools for A and B players are inapplicable.

*The survey items are based on the questions in Table 1.

**Means from a five grade scale where 1 is very low confidence and 5 is very high confidence.

**Table 3.Voting and perception of behavior for older and younger subjects of respective sex in the artefactual field setting.**

| | ALL SUBJ. | OLD MALE | YOUNG MALE | OLD FEMALE | YOUNG FEMALE | ALL OLD | ALL YOUNG | ALL MALE | ALL FEMALE |
|---|---|---|---|---|---|---|---|---|---|
| **Voting:** | | | | | | | | | |
| Voting for **I** | 21% | 32% | 30% | 7% | 19% | 20% | 24% | 27% | 12% |
| Voting for **R** | 72% | 86% | 59% | 63% | 79% | 75% | 69% | 73% | 71% |
| | | | | | | | | | |
| **Age Related Voting Belief:** | | | | | | | | | |
| Elderly voting more for **I** | 33% | 24% | 49% | 24% | 39% | 24% | 44% | 35% | 31% |
| Elderly voting more for **R** | 66% | 66% | 63% | 64% | 71% | 65% | 67% | 65% | 67% |

**Table 4. Correlations between CTG choices and individual characteristics.**

| | Students | | | | Artefactual field | | | |
|---|---|---|---|---|---|---|---|---|
| | Voting for Investment (I) | | Voting for Reciprocity (R) | | Voting for Investment (I) | | Voting for Reciprocity (R) | |
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| **Explanatory Variables:** | | | | | | | | |
| **I. Beliefs in the game** | | | | | | | | |
| Proportion of A players voting for **I** | **0.60** | **<,0001** | **0.34** | **0,01** | **0.53** | **<0.0001** | **0.22** | **0.02** |
| Proportion of B players voting for **R** | **0.26** | **0.03** | **0.47** | **<.0001** | **0.19** | **0.03** | **0.49** | **<0.0001** |
| % Believing the old vote more for **I** than the young | | | | | **0.19** | **0.03** | 0.01 | 0.89 |
| % Believing the old vote more for **R** than the young | | | | | -0.09 | 0.30 | **0.20** | **0.03** |
| | | | | | | | | |
| **II. Demographics (%)** | | | | | | | | |
| Age: Age / 70 years old | 0.03 | 0.84 | **0.27** | **0.02** | -0.05 | 0.57 | 0.07 | 0.43 |
| Gender: Male vs. Female | 0.01 | 0.92 | 0.18 | 0.12 | **0.23** | **0.01** | 0.02 | 0.78 |
| Living area: Less than 5000 inh. | -0.10 | 0.39 | 0.09 | 0.45 | -0.007 | 0.93 | -0.13 | 0.21 |
| Only child | 0.12 | 0.33 | -0.15 | 0.22 | 0.09 | 0.31 | 0.09 | 0.31 |
| | | | | | | | | |
| **III. Attitudes** (%) | | | | | | | | |
| a) social attitudes toward others | | | | | | | | |
| Trust | 0.17 | 0.16 | 0.02 | 0.89 | **-0.23** | **0.01** | 0.01 | 0.88 |
| Fairness | -0.09 | 0.47 | 0.04 | 0.77 | -0.04 | 0.60 | 0.14 | 0.11 |
| Kindness | 0.06 | 0.62 | 0.14 | 0.26 | -0.01 | 0.91 | 0.13 | 0.15 |
| Reciprocity | 0.09 | 0.47 | 0.00 | 0.98 | 0.09 | 0.28 | -0.15 | 0.09 |
| | | | | | | | | |
| b) attitudes toward the welfare state | | | | | | | | |
| Public sector is too big | 0.05 | 0.65 | -0.17 | 0.16 | 0.06 | 0.50 | -0.17 | 0.06 |
| Pension system will change within 5 years | -0.13 | 0.29 | -0.02 | 0.86 | 0.06 | 0.44 | 0.02 | 0.79 |
| | | | | | | | | |
| **IV. Confidence in institutions and information**\*\* | | | | | | | | |
| Police | -0.007 | 0.95 | 0.01 | 0.92 | -0.11 | 0.18 | -0.05 | 0.55 |
| Parliament | 0.04 | 0.77 | 0.14 | 0.23 | -0.08 | 0.31 | -0.15 | 0.09 |
| Defense | 0.20 | 0.11 | 0.10 | 0.39 | 0.01 | 0.88 | -0.09 | 0.31 |
| Banks | -0.07 | 0.58 | -0.04 | 0.74 | 0.01 | 0.91 | 0.03 | 0.71 |
| Courts | -0.04 | 0.73 | 0.04 | 0.73 | 0.08 | 0.34 | -0.10 | 0.29 |
| Municipality executive boards | -0.12 | 0.33 | -0.19 | 0.11 | 0.08 | 0.35 | 0.03 | 0.75 |
| National politicians | 0.012 | 0.92 | 0.00 | 0.99 | -0.05 | 0.59 | 0.02 | 0.85 |
| Teachers in elementary schools | 0.03 | 0.80 | 0.02 | 0.85 | 0.09 | 0.29 | 0.01 | 0.92 |
| Journalists | -0.15 | 0.21 | -0.13 | 0.28 | **-0.18** | **0.04** | -0.15 | 0.10 |

Significant correlations in bold.

\*\*The "confidence in" items are originally 5-class categorical. To compute the correlations these 9 variables have been transformed into binaries. The respective cutoff points were chosen in order to make the two resulting categories (i.e., relatively more or less "confident" in the considered institutions) as equal in size as possible. This dichotomization was also used in the logistic regressions accounted for below.

**Table 5. Logistic regressions of voting behavior on the explanatory variables.***

| | Students | | | | Artefactual field | | | |
|---|---|---|---|---|---|---|---|---|
| | Voting for Investment (I) | | Voting for Reciprocity (R) | | Voting for Investment (I) | | Voting for Reciprocity (R) | |
| | coeff. | p-value | Coeff. | p-value | Coeff. | p-value | Coeff. | p-value |
| **Explanatory Variables:** | | | | | | | | |
| INTERCEPT | **-9.48** | **0.02** | **-13.99** | **0.05** | **-6.27** | **0.01** | **-3.62** | **0.02** |
| **I. Beliefs in the game** | | | | | | | | |
| Proportion of A players voting for *I* | **0.12** | **0.01** | 0.02 | 0.17 | **0.07** | **<.0001** | 0.02 | 0.16 |
| Proportion of B players voting for *R* | 0.01 | 0.64 | **0.08** | **0.01** | **0.05** | **0.01** | **0.08** | **<.0001** |
| % Believing the old vote more for **I** than the young | | | | | 1.42 | 0.158 | -0.33 | 0.64 |
| % Believing the old vote more for **R** than the young | | | | | -0.30 | 0.68 | **2.79** | **0.01** |
| **II. Demographics (%)** | | | | | | | | |
| Age | 0.06 | 0.68 | 0.54 | 0.08 | | | | |
| Age: 70 vs. 20 years old | | | | | -1.49 | 0.12 | 1.11 | 0.12 |
| Gender: Male vs. Female | 1.02 | 0.24 | -0.18 | 0.84 | **1.94** | **0.02** | 0.98 | 0.20 |
| Living area at the age of 15: | | | | | | | | |
| Less than 5000 inhabitants | -0.58 | 0.67 | 0.84 | 0.55 | -1.14 | 0.14 | -1.54 | 0.05 |
| Birth parity: Only child | 1.12 | 0.50 | -2.61 | 0.18 | -0.19 | 0.86 | 1.39 | 0.29 |
| **III. Attitudes** (%) | | | | | | | | |
| a) social attitudes toward others | | | | | | | | |
| Trust | 2.67 | 0.09 | -0.76 | 0.48 | **-1.91** | **0.04** | -0.94 | 0.32 |
| Fairness | 1.80 | 0.11 | 0.60 | 0.57 | 0.79 | 0.36 | **1.96** | **0.04** |
| Kindness | -1.44 | 0.12 | 1.57 | 0.11 | 1.68 | 0.11 | 1.14 | 0.218 |
| Reciprocity | 0.60 | 0.52 | -0.96 | 0.31 | 0.28 | 0.86 | -0.88 | 0.447 |
| b) attitudes toward the welfare state | | | | | | | | |
| Public sector is too big | -0.52 | 0.58 | -1.58 | 0.07 | 0.00 | 0.99 | **-2.54** | **0.01** |
| Pension system will change within 5 years | -0.88 | 0.58 | 0.55 | 0.59 | -0.10 | 0.93 | 1.44 | 0.24 |
| **IV. Confidence in institutions and information*** | | | | | | | | *vi* |
| Police | | | | | | | **-2.05** | **0.02** |
| Journalists | | | | | **-1.68** | **0.04** | | |
| **Goodness of fit:** | | | | | | | | |
| Nagelkerke (1991) R$^2$ | *0.61* | | *0.56* | | *0.66* | | *0.63* | |

Significant variables at 5%-level in bold.
* The confidence variables (category IV) were selected via stepwise backward elimination (significance threshold criteria, 5%). Estimated in R v. 4.2, crosschecked with SAS v. 8 yielding consistent results. Apparently, the regressions contain an excess of variables in relation to the number of observations, variables that may be inter-related, raising concerns about overfitting as well as multicollinearity. Reestimation of the artefactual field sample regressions, starting out with all exogenous variables, using a more thorough general variable selection method suggested by Collett (2003, pp 91-93), yield final models (results not shown) in essence containing only variables corresponding to the significant (bold) ones, presented in Table 5, with similar parameter values. The exceptions are that i) the "Age" factor is present in (and hence significantly associated with) Investment Voting, and ii) "Confidence in Journalists" enters and "Confidence in the Police" is removed from Reciprocity Voting. That said, there might obviously still be overfitting. The Pearson correlation coefficients between the explanatory variables are below 0.4 for all and below 0.25 for all but one correlation. Further, estimates of the variance inflation factors (VIFs, computed via the Design package in R, adapted for generalized linear models) associated with these models are less than 2 for all included variables. Hence, these measures do not indicate any serious multicollinearity.

# Appendix

**Derivation of Observation 1 and 2:**
This appendix contains a more elaborate analysis of the difference between ITB and CTB in FS. Furthermore, Observations 1 and 2 of Section 4.1 are derived. We will apply the linear FS model in which the utility of a player $i$ in a game with $n$ players and the allocation $X \equiv \{x_1, x_2, x_3, ..., x_n\}$ is given by the following expression:

$$U_i(x) = x_i - \frac{\alpha_i}{n-1} \max \sum_{i \neq j} (x_j - x_i, 0) - \frac{\beta_i}{n-1} \max \sum_{i \neq j} (x_j - x_i, 0). \qquad (1)$$

It is assumed that $\beta_i \leq \alpha_i$ and $0 \leq \beta_i < 1$. ITG and CTG will be analyzed when the players' utility functions are given by (1). It is assumed that the players differ with respect to their parameters (i.e., $\alpha$ for $\beta$) and that the players have the same beliefs about the distributions of the parameters of the other players. B-players will be characterized in terms of their $\beta$-values and A-players by their $\alpha$-values. We let $F_B(x)$ be a cumulative distribution function denoting the probability that a randomly selected B-player has a lower $\beta$-value than $x$. The payoffs in the trust games are as assumed in Section 3. In addition, it is also assumed that $r_B \geq r_A$.[33] This condition holds for the trust games in the experiments.

## Individual Trust

In ITG (following FS) it is natural to assume that the reference group only consists of the other player in the transaction. Thus, each player compares his payoff with the other player in the pair. The condition a B-player chooses $R$ is then that:

$$u_B(R,I) \geq u_B(D,I) \Leftrightarrow r_B - \beta(r_B - r_A) \geq d_B - \beta(d_B - d_A) \Rightarrow$$

$$\beta \geq \overline{\beta}^I = (d_B - r_B)/(d_B - d_A - r_B + r_A). \qquad\qquad (2)$$

This means that $\overline{\beta}^I$ is the critical value on $\beta$. Any B-player with a lower $\beta$-value

than $\overline{\beta}^I$ will choose D. Hence, the proportion of B-players that will choose D is

$F_B(\overline{\beta}^I)$, which is also the probability a randomly selected B-player will defect.

Obviously, $F_B(\overline{\beta}^I)$ is increasing in $\overline{\beta}^I$.

Because the A-player does not know which B-player he is matched with in the

game, he will compare the expected utility of defecting with the expected utility of

choosing R. Hence, A will choose *I* iff

$$F_B(\overline{\beta}^I)u_A(I,D) + (1 - F_B(\overline{\beta}^I))u_A(I,R) \geq u_A(N,*) \Leftrightarrow \qquad\qquad (3)$$

$$\Leftrightarrow F_B(\overline{\beta}^I)(d_A - \alpha(d_B - d_A)) + (1 - F_B(\overline{\beta}^I))(r_A - \alpha(r_B - r_A)) \geq c \qquad\qquad (4)$$

The expected value of choosing *I* (expressed in the LHS of 4) is decreasing in $\alpha$, $d_B$,

and $r_B$ and it is increasing in $d_A$, and $r_A$. For a set of payoff parameters and $F_B(\overline{\beta}^I)$,

let $\overline{\alpha}^I$ be the parameter for the "marginal" A-player that is indifferent between *D* and

*R* so that

$$F_B(\overline{\beta}^I)(d_A - \overline{\alpha}^I(d_B - d_A)) + (1 - F_B(\overline{\beta}^I))(r_A - \overline{\alpha}^I(r_B - r_A)) = c.^{34} \qquad\qquad (5)$$

The expression for the critical $\alpha$-value will then be:

---

[33] The theoretical analysis will be affected by this assumption since thanks to it $\alpha$ will not enter the B-players' utility. This simplifies the analysis.
[34] Note, for some parameter settings and some distributions of players no such $\alpha$ may exist. For instance, if $F_B(\overline{\beta}^I) = 1$ then $d_A - \overline{\alpha}^I(d_B - d_A) < c$, since by assumption $\overline{\alpha}^I > 0$. In such a case all A-players will choose N. We will concentrate on those cases where there are some A-players that choose *I* in the individual trust game. To focus on interesting distributions it is assumed that there are at least some A-players that would invest if it was certain that the B-players would reciprocate, i.e., that $r_A - \alpha(r_B - r_A) \geq c$.

$$\overline{\alpha}^I = \frac{r_A + F_B\left(\overline{\beta}^I\right)\left(d_A - r_A\right)}{r_B - r_A + F_B\left(\overline{\beta}^I\right)\left(d_B - d_A - r_B + r_A\right)} \tag{6}$$

By construction we have that $d_A - r_A < 0$ and that $d_B - d_A - r_B + r_A > 0$, which means that $\overline{\alpha}^I$ is decreasing in $F_B\left(\overline{\beta}^I\right)$. In the same way we characterized B-players, we can characterize A-players in terms of their $\alpha$-values so that the cumulative density function, $F_A\left(\overline{\alpha}^I\right)$, denotes the probability that a randomly selected A-player will choose $I$. Clearly, $F_A\left(\overline{\alpha}^I\right)$ is increasing in $\overline{\alpha}^I$.

**Collective Trust**

The following analysis will derive the corresponding probabilities in CTG and compare it to ITG. First note that the decisions in CTG are affected by assumptions about reference groups. While it is natural to consider the other person to be the "reference group" in two-person bargaining, the same cannot be said about the reference group in CTG. If the reference group is the group to which the individual belongs, then behavior would be group egoistic, which would lead to the prediction that all A-players vote for $N$ and all B-players would have chosen $D$ in the last subgame.[35] To make the situation comparable to the two-person game we will assume that the players incorporate all other $N$-1 players in their reference group.

Let us start by analyzing how the B-players will vote. From the analysis above a B-player will vote for $R$ iff:

---

[35] In the game presented above this follows trivially from the fact that all players of the same role receive the same payoffs. Hence, all terms with alphas or betas are zeroed.

$$u_B(R,R) \geq u_B(D,I) \Leftrightarrow r_B - \frac{N_A}{N-1}\beta(r_B - r_A) \geq d_B - \frac{N_A}{N-1}\beta(d_B - d_A) \Leftrightarrow$$

$$\beta \geq \overline{\beta}^P = \frac{(d_B - r_B)}{\frac{N_A}{N-1}(d_B - d_A - r_B + r_A)} \qquad (7)$$

Due to the additional term in the nominator it must be the case that $\overline{\beta}^P > \overline{\beta}^I$ for the

same distribution of B-players and consequently that $F_B(\overline{\beta}^P) > F_B(\overline{\beta}^I)$. We will

denote this effect the "reference group" effect. This leads to our first observation:

**Observation 1**: *For a given distribution of B-players characterized in terms of their*

$\beta$ *-values ( $F_B(\beta)$ ), a larger proportion of B-players will choose D in CTG compared*

*to in ITG.*

Let us now turn to the A-players' choice. Two things will change the decision by A-

players. First, like the B-players, they will be affected by the reference group. Second,

A-players will be affected by the probability that the group of B-players will vote for

$D$. This probability is not $F_B(\overline{\beta}^P)$, but the probability that in a randomly selected

group of $N_B$ B-players, at least $(N_B + 1)/2$ ) choose $D$. This probability can be

calculated from the binomial distribution and will be given by

$$\sum_{i=(N_B+1)/2}^{N_B} \binom{N_B}{i} F_B(\overline{\beta}^P)^i \left(1 - F_B(\overline{\beta}^P)\right)^{N_B-i} = \rho_B^P \qquad (8)$$

For parameter configurations where there is a critical $\alpha$ -value, the expression for this

will be:

$$\overline{\alpha}^P = \frac{r_A + \rho_B^P(d_A - r_A)}{\frac{N_B}{N}\left(r_B - r_A + \rho_B^P(d_B - d_A - r_B + r_A)\right)} \qquad (9)$$

Note, that (9) differs from (6) in two ways. First, the reference group effect dilutes the negative effect on having less than the B-player if the A-group invests. The fact that the players end up with the same outcome mitigates the effect of "envy". This is captured by the fact that the nominator is multiplied by $N_B/N$. Second, $\rho_B^P$ will differ from $F_B\left(\overline{\beta}^P\right)$. From the properties of the binomial distribution, $\rho_{_B}^P$ will be decreasing in $N_B$ if $F_B\left(\overline{\beta}^P\right) < 1/2$ and $\rho_{_B}^P$ will be increasing in $N_B$ if $F_B\left(\overline{\beta}^P\right) > 1/2$. We assume that the groups are large in CTG. To emphasize this "belief polarization effect" it is assumed that $N_B$ is sufficiently large to make $\rho_{_B}^P$ approximately equal to 0 if $F_B\left(\overline{\beta}^P\right) < 1/2$ and approximately equal to 1 if $F_B\left(\overline{\beta}^P\right) > 1/2$.

Let us now compare how A-players will behave in the CTG compared to ITG. We have two main cases:

Case i) $F_B\left(\overline{\beta}^P\right) > 1/2 \Leftrightarrow \rho_B^P = 1$ and Case ii) $F_B\left(\overline{\beta}^P\right) < 1/2 \Leftrightarrow \rho_B^P = 0$.

Case i: All A-players choose N. The reason is that expected utility of investing cannot be higher than that of not investing, i.e.,

$\rho_B^P\left(d_A - \alpha\frac{N_B}{N-1}(d_B - d_A)\right) + \left(1 - \rho_B^P\right)\left(r_A - \alpha\frac{N_B}{N-1}(r_B - r_A)\right) \geq c$. This inequality

cannot be satisfied when $\rho_B^P = 1$, since, in this case, $d_A - \alpha\frac{N_B}{N-1}(d_B - d_A) < c$.

<u>Case ii:</u> A larger proportion of A-players invests in CTG than in ITG. Compare the critical $\alpha$-values in (6) and (9) and note that $\rho_B^P = 0$. By inspecting the respective expressions, it should be clear that $\overline{\alpha}^P > \overline{\alpha}^I \Rightarrow F_A(\overline{\alpha}^P) > F_A(\overline{\alpha}^I)$. This means that a larger proportion will vote for *I* in CTG than in ITG. The intuition for this is straightforward; due to the belief polarization effect A-players will be certain that B-players will reciprocate in this case. This is typically not the case in ITG where the probability for reciprocation is $1 - F_B(\overline{\beta}^P)$. In addition to this, the reference group effect reduces the negative envy effect of choosing *I*. This will also make the A-players more prone to choose *I*. We can now sum up our result for the two cases in the following observation.


**Observation 2**. *Under the assumption that the number of players is sufficiently large, A-players' decision to choose I in CTG (for a given distribution of A- and B-players) will strongly depend on whether* $F_B(\overline{\beta}^P)$ *is above or below* $1/2$.

*i) If* $F_B(\overline{\beta}^P) > 1/2$, *then no A-player will choose I in CTG whereas* $F_B(\overline{\beta}^I)$ *percent of them will do so in the ITG.*

*ii) If* $F_B(\overline{\beta}^P) < 1/2$, *then more A-players will choose I in CTG than in ITG.*

# SUPPLEMENTARY INFORMATION FOR REFEREES:

INSTRUCTIONS AND INFORMATION TO PARTICIPANTS

**ARTEFACTUAL FIELD EXPERIMENT**

Lund 2005-06-10

You belong to a group of people who is given the opportunity to participate in a minor study. It will take you about 15 minutes to read and complete the enclosed forms. Naturally it is voluntary to participate, and if you don't want to do that, you simply don't fill the forms. Nevertheless, we hope that you'll to participate as it is important that as many as possible volunteer.

To make it extra interesting, we will, via drawing of lots, appoint some people who may earn some money by participating. (See below how the drawing of lots and payments will be carried out).

You will be confronted with a choice situation (described in form 1) and are also asked to answer some questions (in form 2). The purpose of the study is to gain additional insights into economic behavior. Your answers and your personal data will be confidential and only used for research purposes. Put the filled forms in the enclosed pre-stamped return envelope and post it before 1/7.

If you have any questions regarding the study, contact:

Håkan Holm, Professor, Department of Economics, Lund University, hakan.holm@nek.lu.se, tel. 046-2229551
Paul Nystedt, Lecturer, Department of Economics, Linköping University, paul.nystedt@eki.liu.se tel. 013-281584.

Kindest Regards

Håkan Holm and Paul Nystedt

**About drawing of lots and payment of earnings.**
Via drawing of lots, a number of participants, who have filled the forms, will be appointed in each study group. Are you among those you may earn at most SEK 4000. The final sum you will earn depends upon how your group chooses and how the group, which your group has been matched with, chooses. Only those group members that have been selected in the lottery will earn any money. The probability of being selected is at least 1 out of 100 but may be greater depending upon the number of people participating. The ones that are selected in the lottery will be personally notified. Preliminary taxes of 30% will be drawn from the total amount by Lund University. Payments are planned to be effectuated during the period August/September.

**Form 1 (GREEN):**

In the choice situation there are two groups. Your group is called GREEN ant the other YELLOW. Both groups will receive identical information about the choice situation.

Group YELLOW may choose between:

1. Each member of your group and group YELLOW receives SEK 1000. (This is denoted Alternative 1).

2. Let the members of your group to choose between Alternative A and B (see below). (This is denoted Alternative 2).

As the voting outcome of group YELLOW is yet unknown, it is required that you state which alternative you prefer (of A and B below), in case group YELLOW would choose Alternative 2.

**Choice situation:** *You have two alternatives to choose from, Alternative A and B. Information about the alternatives is given below.*

☐          **A:** *Each member of your group drawn in the lottery receive SEK 4000 and each member drawn from group YELLOW receive SEK 0.*

☐          **B:** *Each member of your group drawn in the lottery receive SEK 2500 and each member drawn from group YELLOW receive SEK 1500.*

When we get the votes from the different groups we will count them and calculate actual payments according to the following principle:

- If most of the members of group YELLOW choose Alternative 1, this alternative prevails.

- If most of the members of group YELLOW choose Alternative 2, we will count the votes of your group. If most of the members of your group have chosen A, alternative A prevails, otherwise alternative B prevails.

**Now tick the box in front of the Alternative A or B above you vote for.**

**Form 1 (YELLOW):**

In the choice situation there are two groups. Your group is called YELLOW and the other GREEN. Both groups will receive identical information about the choice situation.

**Choice situation:** *You have two alternatives to choose from, Alternative 1 and 2. Information about the alternatives is given below.*

☐ **Alternative 1**. Each member of your group and group GREEN who are drawn in the lottery receive SEK 1000.

☐ **Alternative 2**. You let the members of group GREEN choose between:

**A:** *Each member of group GREEN drawn in the lottery receive SEK 4000 and each member drawn from your group receive SEK 0.*
**B:** *Each member of group GREEN drawn in the lottery receive SEK 2500 and each member drawn from your group receive SEK 1500.*

When we get the votes from the different groups we will count them and calculate actual payments according to the following principle:
- If most of the members of your group choose Alternative 1, this alternative prevails.
- If most of the members of your group choose Alternative 2, we will count the votes of group GREEN. If most of the members of group GREEN have chosen A, alternative A prevails, otherwise alternative B prevails.
**Now tick the box in front of the Alternative A or B above you vote for.**

**Form 2**                          No:_____

This form contains questions we want to you to answer. Firstly, you'll make guesses about the other participants' choices in form 1. A few guesses will be drawn in a lottery and rewarded. The closer your guess is to the real voting result, the greater the reward. The maximum reward is SEK 1000. At least one out of hundred guesses will be rewarded. For the remaining questions, tick the ring in front of the alternative that suits you best, and where appropriate, write answers on the broken lines. If you find it difficult to answer a question or if you do not want to, please write a short comment why you did not answer.

1. How many of the YELLOW group members do you believe chose Alternative 1 (see form 1)?

I guess that _____percent chose Alternative 1.

2. How many of the GREEN group members do you believe chose Alternative A (see form 1)?

I guess that _____percent chose Alternative A.

3. In this study, the participants are either 20 or 70 years old. How do you believe that these age groups chose when it comes to Alternative 1 and 2 (se form 1)?
        O  I believe that the older chose Alternative 1 to a higher extent than the younger.
        O  I believe that the younger chose Alternative 1 to a higher extent than the older.

4. How do you believe that these age groups chose when it comes to Alternative A and B (se form 1)?
        O  I believe that the older chose Alternative A to a higher extent than the younger.
        O  I believe that the younger chose Alternative B to a higher extent than the older.

5. When I was 15 years old I lived in a:
O  Large city (Malmoe, Gothenburg or Stockholm).
O  Other city with more than 50 thousand inhabitants
O  Community with more than five thousand and less than 50 thousand inhabitants.
O  Community with more than five hundred and less than five thousand inhabitants.
O  Community with less than five hundred inhabitants or at the countryside.

6. When I grew up I was:
O  The only child in my family
O  Youngest in a family with more than one child
O  Oldest in a family with more than one child
O  I was neither the oldest nor the youngest in my family.

7. Which of the following two statements do you find most correct:
O…most people can be trusted.
O…you can't be too careful in dealing with people

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8. Would you say that people most of the time:
O…try to be helpful
O…are looking out for themselves

9. Do you think most people would try to:
O…take advantage of you if they got a chance
O…be fair

10. When somebody else is kind to you:
O… you go out of your way to be kind back to them
O …you are grateful but don't respond in any particular way

11. Generally, speaking do you think that the public sector in Sweden is too large?
O… Yes
O… No

12. Generally speaking, what confidence do you have in the way the following institutions and groups do their job?

|  | Very high confidence | Rather high confidence | Neither high nor low confidence | Rather low confidence | Very low confidence |
|---|---|---|---|---|---|
| PoliceO | O | O | O | O | |
| Parliament | O | O | O | O | O |
| Defence | O | O | O | O | O |
| Banks | O | O | O | O | O |
| Courts | O | O | O | O | O |
| Municipality executive boards | O | O | O | O | O |
| National politicians | O | O | O | O | O |
| Elementary school Teachers | O | O | O | O | O |
| Journalists | O | O | O | O | O |

13. What do you expect of the current public pension system
O   It will change within 5 years
O   It will change within 5 to 20 years
O   It will change within 20 to 60 years
O   It will not change within 60 years

**STUDENT COLLECTIVE TRUST EXPERIMENT**

Hi!

You belong to a group of people who is given the opportunity to participate in a minor study. It will take you about 15 minutes to read and complete the enclosed forms. You may also earn some money by participating.

All participants have been divided into two groups. You will be confronted with a choice situation (described in form 1) and are also asked to answer some questions (in form 2). The purpose of the study is to gain additional insights into economic behavior and to compare different research methods.

In the study all participants are paid SEK 40. In addition, you may earn at most SEK 200 and at least SEK 0. The sum you will earn depends upon how you and the other participants in your group, and how the participants in the other group choose. You will not know the choice of the other participants and they will not know yours. Your answers and personal data will be confidential and used only for research purposes.

Payment is arranged by Lund University via postal giro service at the end of May. To the sum that you've earned an additional amount of SEK 30 will be paid in order to compensate for the withdrawal fee. Preliminary taxes of 30% will be drawn from the total amount.

We hope that you want to participate and we would like to emphasize that, from a research perspective, it is important that as many as possible volunteer.

If you have any questions regarding the study, turn to:

Håkan Holm, Professor, Department of Economics, Lund University, hakan.holm@nek.lu.se, tel. 046-2229551

Paul Nystedt, Lecturer, Department of Economics, Linköping University, paul.nystedt@eki.liu.se tel. 013-281584.

**Kindest Regards**

**Håkan Holm and Paul Nystedt**

**Form 1a:**

In the choice situation your group has been matched with another group called X. Participants in your group and in group X will receive identical information about the choice situation. Both groups' decisions are determined via voting. The alternative that receives the greatest number of votes in the respective group prevails.

**Choice situation**: *The members of your group choose between two alternatives, Alternative 1 and 2. Information about the alternatives is given below.*

*Alternative **1**. This implies that each member of your group and group X receives SEK 50.*

*Alternative **2**. This implies that your group let the members of group X choose between the following alternatives:*
*A) Each member of group X receives SEK 200 and each member of your group receives 0.*
*B) Each member of group X receives SEK 125 and each member of your group receives 75.*

Hence, you do not know how group X will vote but merely which alternatives group X has.

**Now, circle which of Alternative 1 and Alternative 2 you vote for.**

When we receive the votes from your group and group X we will calculate the actual payments for you.

**Form 1b**

In the choice situation your group has been matched with another group called X. Participants in your group and in group X will receive identical information about the choice situation. Each group's decision is determined via voting. The alternative that receives the greatest number of votes in the respective group prevails.

**Choice situation**: The members of group X choose between two alternatives, Alternative 1 and 2. Information about the alternatives is given below.

*Most members of group X vote for Alternative 1. This implies that each member of your group and group X receive SEK 50.*

*Most members of group X vote for Alternative 2. This implies that group X lets your group choose between alternatives A and B below:*

*A. Each member of group X receives SEK 0 and each member of your group receives 200.*

*B. Each member of group X receives SEK 75 and each member of your group receives 125.*

As the voting outcome of group X is yet unknown, it is required that you state which of the alternatives (A and B above) you vote for, in case most people of group X vote for Alternative 2.

I vote for alternative: (circle one of the alternatives below)

**A.** Each member of group X receives SEK 0 and each member of my group receives 200.

**B.** Each member of group X receives SEK 75 and each member of my group receives 125.

When we receive the votes from your group and group X we will calculate the actual payments.

**Form 2**

This form contains questions we want to you to answer. Tick the ring in front of the alternative that suits you best, and where appropriate, write answers on the broken lines. If you find it difficult to answer a question or if you do not want to, please write a short comment why you did not answer.

My name is:…………………………………………………..

1. My Gender: O   Female            O   Male

2. My birth year: ……………………

3. When I was 15 years old I lived in a:
O   Large city (Malmoe, Gothenburg or Stockholm).
O   Other city with more than 50 thousand inhabitants
O   Community with more than five thousand and less than 50 thousand inhabitants.
O   Community with more than five hundred and less than five thousand inhabitants.
O   Community with less than five hundred inhabitants or at the countryside.

4. The one of my parents with highest formal education had:
O   Elementary school
O   Degree from upper secondary school
O   Degree from university education

5. When I grew up I was:
O   The only child in my family
O   Youngest in a family with more than one child
O   Oldest in a family with more than one child
O   I was neither the oldest nor the youngest in my family.

6a. Are you member of any association?
E.g., The Red Cross, Amnesty, Political party, Sports club, Economic organization, Church choir.          O Yes
                                    O No

If you answered no on 6a, then you can move on to question 7.

6b. How many associations are you a member of?          Answer:………..

6c) How many hours do you spend on activities related to these associations under an ordinary week?                    Answer:…………….

7. Which of the following two statements do you find most correct:
O…most people can be trusted.
O…you can't be too careful in dealing with people

8. Would you say that people most of the time:
O…try to be helpful
O…are looking out for themselves

9. Do you think most people would try to:
O…take advantage of you if they got a chance
O…be fair

10. When somebody else is mean to you:
O… you go out of your way to be mean back to them
O …you let it pass as if nothing has happened

11. Generally, speaking do you think that the public sector in Sweden is too large?
O… Yes
O… No

12. Generally speaking, what confidence do you have in the way the following institutions and groups do their job?

|  | Very high confidence | Rather high confidence | Neither high nor low confidence | Rather low confidence | Very low confidence |
|---|---|---|---|---|---|
| PoliceO | O | O | O | O | O |
| Parliament | O | O | O | O | O |
| Defence | O | O | O | O | O |
| Banks | O | O | O | O | O |
| Courts | O | O | O | O | O |
| Municipality executive boards | O | O | O | O | O |
| National politicians | O | O | O | O | O |
| Elementary school Teachers | O | O | O | O | O |
| Journalists | O | O | O | O | O |

13. What do you expect of the current public pension system
O   It will change within 5 years
O   It will change within 5 to 20 years
O   It will change within 20 to 60 years
O   It will not change within 60 years

Now, you will guess how the other members of your group and group X voted in form 1. A few guesses will be rewarded. The closer your guess is to the real voting result, the greater the reward. The maximum reward is SEK 500. At least every twentieth guess will be rewarded.

14. Here you'll state your guess on the voting result in your group (see form 1a/1b).

I guess that _____percent voted for Alternative A/1.

15. Here you'll state your guess on the voting result in group X who had to choose between Alternative 1/A and 2/B (see form 1a/1b).

I guess that _____percent voted for Alternative 1/A.
(editorial note, for item 14 and 15, trustors were directed to form 1a and trustees to form 1b. Similarly trustors guessed about Alternative 1 on item 14 and about A on item 15, whereas trustees guessed about Alternative A on item 14 and Alternative 1 on item 15.)

**STUDENT INDIVIDUAL TRUST EXPERIMENT**

See Appendix of the paper at: http://swopec.hhs.se/lunewp/abs/lunewp2005_026.htm