ON THE STRATEGIC USE OF IDENTITY IN INTERMEDIATED INTERACTIONS – LESSONS FROM A TRUST GAME WITH DELEGATION IN SOUTH AFRICA*

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April 2017

Abstract

Culture is an understudied phenomenon in experimental economics. As determinants of human behavior, cultural factors are much more relevant than current research gives them credit for. We propose a framework accounting for the impact of group identity (based on racial segregation in post-Apartheid South Africa) on decisions in a trust game with delegated decision-making, where racial information is either common or private knowledge. We test our framework experimentally on a sample of young South Africans who had never been exposed to experimental economics research. By exogenously matching parties according to their race, we observe their endogenous trust and delegation behavior, which can be assumed to echo corresponding behaviors in real-life interactions such as contracting, team work and firm organization. Our results indicate that white players try to use information about racial identity strategically, albeit unsuccessfully. This may explain distrust and coordination failures observed in real life interactions.

Keywords: experiment, agency, delegation, trust, group identity, race, South Africa
JEL Classifications: C91, D02, D03, D83, J15, Z13

*We thank computer lab manager Mishwell Mathebula for his repeated technological support in conducting our experiment, and gratefully acknowledge funding by the German Max Planck Society. We also thank Alex Zimper, Don Ross, Amalia Álvarez Benjumea, Christoph Engel, Lars Freund and Oliver Kirchkamp for helpful feedback.

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1 Introduction

Our study investigates the interaction between in-group bias and strategic delegation in a trust game context.

Trust and reciprocity play important roles in the functioning of economic institutions (Mitchell, 1993; Blair & Stout, 2001) but also for societal cohesion in general (Ashraf *et al.*, 2006). "In-group bias" has been identified as an important mechanism that may enhance or erode trust in the theoretical and experimental literature[1]. According to this bias, members of a shared group treat each other differently compared to those not part of this in-group. For example, with respect to bilateral trust interactions Glaeser et al. (2000) find higher returns when players share race or nationality. Also in the context of bilateral trust games, Haile, Sadrieh and Verbon (2008) found an interaction effect of income and race on trust, while Zerfu et al. (2009) note that trust in Africa is influenced by the extent to which people's identities are based on "ethnicity" (identifying primarily with race/tribe rather than country).

This paper adds to the experimental literature on in-group bias in trust games by emphasizing the role of decision delegation when group identity matters. From corporations to societies, interactions governed by trust are typically more complicated than bilateral interactions. In particular, decision making is often delegated; e.g., from shareholders to managers, from lay people to professionals such as lawyers, recruitment or estate agents, from citizens to elected officials etc. Recently, Maximiano, Sloof & Sonnemans (2013) and Kvaløy & Luzuriaga (2014) have investigated the impact of delegated decision making on trust and reciprocity. In contrast to our approach, however, these authors do not consider the interaction of group identity (in-group bias) with delegation in a trust context. Since existing research has pointed to significant impacts of group identity on bilateral trust, one would expect that in-group bias should also impact trust in scenarios of delegated decision making.

We are particularly interested in how trust interactions play out in the South African context: South Africa has a history of racial segregation, formalized through Apartheid ("separate development") laws (1948-1991) separating education, access to amenities, land ownership, and most aspects of life for white and non-white South Africans. These laws gave unabashedly preferential treatment to white South Africans. Many years after

[1] Akerlof and Kranton (2000) extended the standard utility function by factoring in the identity (defined as "social differentiation" as expressed in mutually exclusive categories) of decision-makers. This approach, which was soon applied specifically to the economics of organizations (Akerlof & Kranton 2005), has spurred much follow-up research (for a review, see Akerlof & Kranton 2010 and Valtonen 2014), which generally shows that any criterion to differentiate people as belonging either to a group or its complement will bias behavior to favor members of their own group.

the end of Apartheid, racial identity continues to have cultural meaning in South Africa (Seekings, 2008). In particular, lack of trust between black and white South Africans persists. Consider some local news headlines: "Growing number of whites concerned about inter-racial trust"; "Blacks, whites don't trust each other"[2].

In addition to allowing us to better understand the real societal issues of trust and race relations in South Africa, a study of trust by race in this country offers a natural sample whereby we can examine the role of in-group bias in trust interactions.

Our experimental study modifies the original trust game on bilateral interactions[3] to include the selection of an agent to whom the trust decision is delegated. Recall that the original trust game has a "sender"/"principal" receiving a monetary endowment from the experimenter, and choosing how much of this endowment (including nought) to transfer to a "receiver". The receiver obtains three times the transfer and can then decide which amount to return to the sender. We include three variations in our game: First, we introduce delegation where the "principal" player must select an "agent", such that the agent decides on the amount to transfer to the "receiver". The agent is paid a fixed fee,[4] whereas the principal receives the amount not transferred by the agent, plus any amount returned by the receiver. Second, we vary group identity by having each principal face both in- and out-group receivers. Group identity is also present in the agent selection decision (where the choice is between an in-group and an out-group agent). This set-up allows us to see whether respondents are biased towards choosing agents of their own group, as well as whether their agent appointment decisions are made strategically based on assumed agent/receiver biases. Finally, we vary whether or not the receiver knows the race of the principal who has appointed the agent.

We find that principal expectations of agent and receiver behavior differ from actual agent and receiver behavior; and that principal decisions are rational under these (incorrect) assumptions: principals delegate strategically in the sense that agents are appointed based on differences in expected profit by agent and opponent race. This is particularly true for white principals: when faced with an out-group opponent, white principals are more likely to select an out-group agent, anticipating higher profits from

[2] http://www.news24.com/SouthAfrica/News/Blacks-whites-dont-trust-each-other-survey-20140814; http://www.timeslive.co.za/local/2016/06/28/Growing-number-of-whites-concerned-about-inter-racial-trust;

http://www.dailymaverick.co.za/article/2014-12-04-sa-reconciliation-barometer-2014-the-struggle-against-apartheid-amnesia/

[3] See the seminal contribution of Berg, Dickhaut & McCabe (1995) and, for a meta-analysis of experimental trust game studies, Johnson and Mislin (2011).

[4] The fixed fee payment to the agent (both selected and unselected agents receive the same fixed fee) was chosen over a "commission"-based payment (whereby the agent would share in the principal's profits) in order to avoid confounding in-group bias with profit-maximisation motives.

this choice. One possible explanation for this incorrect expectation of higher profits is that of attempting to draw attention towards the similarity between the agent's race and that of the opponent, thereby drawing focus away from the disparity between principal and opponent race. This strategic use of delegation to shift focus from the principal's identity in order to maximize profits complements existing research on delegation: Bartling and Fischbacher (2012) demonstrated that delegation shifts blame away from the party that profits from reduced regard to others. More broadly, delegation has been shown to shift people's focus away from their economic counterparty towards his/her representative/agent[5].

2 Design

2.1 Workhorse: Trust Game

In keeping with the previous research cited above, we turn to the trust game (Berg, Dickhaut & McCabe, 1995) as a workhorse for our experimental analysis. This two-person strategic interaction offers a way to effectively elicit trust preferences. In the one-shot trust game, one player (the "sender") is given a monetary endowment by the experimenter and has to choose which part of this endowment to transfer to a peer player (the "receiver"). The receiver obtains the amount transferred plus twice this amount from the experimenter. The receiver can then choose to return any part of the amount received, and the interaction ends. Under classic preference theory, the game's equilibrium follows from backward induction: Since the receiver has no incentive to return any amount to the sender, the sender should anticipate this and refrain from transferring anything. At the game's unique subgame perfect equilibrium the sender thus earns the initial endowment and the receiver leaves empty-handed.

Given this rational choice analysis, any amount that the sender transfers to the receiver can be seen as an indication of trust, while the amount returned by the receiver is an indication of trustworthiness or reciprocity. In general, evidence is found of both trust and reciprocity: A meta-analysis of 162 replications of trust games across 35 countries

[5] Hamman, Loewenstein & Weber (2010) experimentally analyzed allocation decisions taken by agents who compete to be (re)hired by a principal, and found that delegation, by dividing a decision up, essentially dilutes other-regarding concerns: Principals feel justified in hiring selfish agents, while agents feel justified in acting selfishly in order to conform to their principal's expectations. Fischer, Goerg & Hamann (2015) replicated and extended the study and found that even in a framed decision context with charity as a recipient and explicit priming to consider the recipient, delegation effectively suppressed other-regarding transfers. Studying the underlying mechanisms, both Oexl and Grossman (2013) and Hill (2015) replicated this effect even where the chosen agent had no power to affect the outcome.

(Johnson & Mislin, 2011) showed that 50 % of the endowment is transferred on average; with 37 % of the received amount being returned[6].

2.2 Experimental factors: intermediation, identity, knowledge

As our research question concerns the strategic use of identity in intermediated economic exchange, we varied three factors systematically:

INTERMEDIATION: Following the literature about intermediated economic exchange, we operationalized intermediation by introducing a delegation component under which senders were no longer allowed to transfer to receivers directly. Instead, they had to select an agent who would then transfer money on their behalf, but without any communication. The individual sender would thus be replaced by a minimal firm consisting of a principal (residual claimant) and an executive (money manager), jointly interacting with a third party.

IDENTITY: To systematically vary group identity, we utilized the South African racial divide, and matched senders in the trust game with receivers of either their own or a different race (black or white). In the agent game, principals (who always saw this race information) were given the choice between one black and one white agent and could thus condition on the racial parity between themselves and/or between the agent and the receiver. Whether chosen or not, agents received a flat payment equal to the initial endowment, in order to avoid confounding effects of inequality aversion and sender's sympathy towards own-race agents.

KNOWLEDGE: Lastly, we varied whether the receiver in the trust or agent game was able to see the race of the principal. This (dis)ability was public knowledge, so the principal could condition his decisions not only on the race of the receiver but also on whether the receiver was knowledgeable or blind as to which type of principal he/she was matched with. Note that the blind condition refers only to the receiver: the agent knew the principal race in this condition.

Varying our three experimental factors systematically yielded eight different treatments (2x2x2) which would be administered within-subjects. This was done without any feedback about each treatment's results until the end of the experiment, to avoid learning effects which would have jeopardized the mutual independence of observations.

[6] Variability of transfers and returns is fairly high: the standard deviation for transfers is 12%, while that for returns is 11%.

2.3 Experimental protocol

Participants were invited using the University of Pretoria online student communication system, "Click-UP", to register for a "decision making experiment". From the resulting pool of 412 registrants, students were invited in lots of 40 for specific sessions via email correspondence. Race information was gathered as one of a number of demographic variables upon registration. This allowed us to create balanced sessions of 50% black and 50% white respondents. Upon arrival at the laboratory (set up on campus at the natural sciences graduate computer lab), participants were seated randomly in front of prepared computer terminals. Each terminal was connected via Internet to a web server running a program written in PHP 5.3 (Lerdorf, 1995), exchanging HTML output and web form input with all terminals.

Prior to each stage of the experiment, participants received printed instructions which were read aloud by a South African instructor[7]. Any screen interaction required of participants was explained and demonstrated live through a projector presentation, giving participants an opportunity to ask any questions afterwards.

Before starting the first stage of the experiment, participants were required to complete a test run, in which they were paired with a randomized computer algorithm, played one unpaid round of the trust game with immediate feedback and had to confirm they understood the results shown to them. After every participant confirmed and no questions were left unanswered, the on-screen interaction between participants began. Subjects then played eight rounds of the experiment in two distinct stages (referred to as Parts): In the first Part, subjects played the baseline trust game, in the second they played the trust game with delegation. In each stage they played two rounds without receiver knowledge followed by two rounds with full knowledge. Within each pair of rounds, they once played against a receiver of their own and once against a receiver of the other race, where the sequence was randomized.

In order to avoid feedback throughout the experiment, it was conducted using the strategy method of experimental interaction (Selten, 1967): In each round, participants played each available role once – sender, then receiver in the baseline trust game; and principal (sender), agent and receiver in the agent game. In the role of agent, participants had to state their strategy for each of two principal-receiver pairings they could possibly be hired into; in the role of receiver they had to state their return for each of two senders (or sender-agent pairs) they could possibly confront, and for both the actual amount transferred as well as two randomly determined values, without knowing which

[7] The same instructor was used across all sessions to avoid possible confounds from instructor race.

amount was truly transferred[8]. Wherever appropriate, beliefs on other participants' actions were also elicited, albeit not incentivized.

At any point of the experiment, race information was conveyed in a novel way that had not been tried before. Previous experiments utilized race-specific surnames (van der Merwe & Burns, 2006), but this would have been prohibitively difficult in the campus setting where anonymity had to be guaranteed despite conveying identity information. Our approach built on work by Bornhorst et al. (2010) who conveyed nationality as one piece of information among others that could be assumed (and later shown) to be inconsequential. Similarly, we presented virtual information cards containing race and three decoy demographics that were designed to be irrelevant[9]: (a) whether a person's age was below or above 30 years; (b) whether a person's parents had an age difference of more or less than three years; (c) whether a person's parents, brothers and sisters numbered even or odd. While (a) was surely relevant, but guaranteed to not vary, (b) and (c) were supposed to have some air of relevance while not conceivably influencing decisions[10].

After the experiment, subjects answered surveys about socio-demographic details, motives for their decisions and assumptions about other participants. After this, they were presented with the outcomes of all previous decisions and with their calculated final payoff. After checking and confirming this feedback, participants were sent out of the lab one at a time to receive their payment in cash.

All sessions lasted one to two hours with average payments of 111.57 ZAR (about 9 USD at the time of the experiment). For reference, an assistant lecturer (part-time student assistant) in the Economics department at University of Pretoria earned ~R75 per hour in 2015.

[8] The randomization was designed so that receivers always saw one value from each of the brackets [0,1,2], [3..7], and [8,9,10].

[9] To confirm that decoys were inconsequential, we later regressed transfer on each of the presented demographics in interaction with the corresponding demographic of the decision-maker, and on a dummy for whether the decision was made by Player A or X. This tobit regression (with standard errors clustered on individuals) revealed significant effects of opponent's race ($p < 0.01$), interaction between decision-maker's and opponent's race ($p < 0.01$) and player A/X dummy ($p < 0.02$); no other variable had significant effect ($p > 0.118$). The entire model was significant at $p < 0.02$.

[10] Upon seeing indications that they might do that (some subjects reported that "if your parents age difference is more than three years, I assumed that the person came from a wealthy family no matter what" and misunderstandings such as "I mostly looked at the even or odd parents as that plays a part in the upbringing of a person.") we eliminated decoys. To ascertain this didn't alter results, we later regressed transfers on a dummy for whether decoys were present or absent, and a player A/X dummy. While the latter was significant in a tobit regression ($p < 0.01$) as well as five of the ten possible transfer levels in a multinomial logistic regression ($p < 0.1$), the former was insignificant throughout ($p > 0.11$).

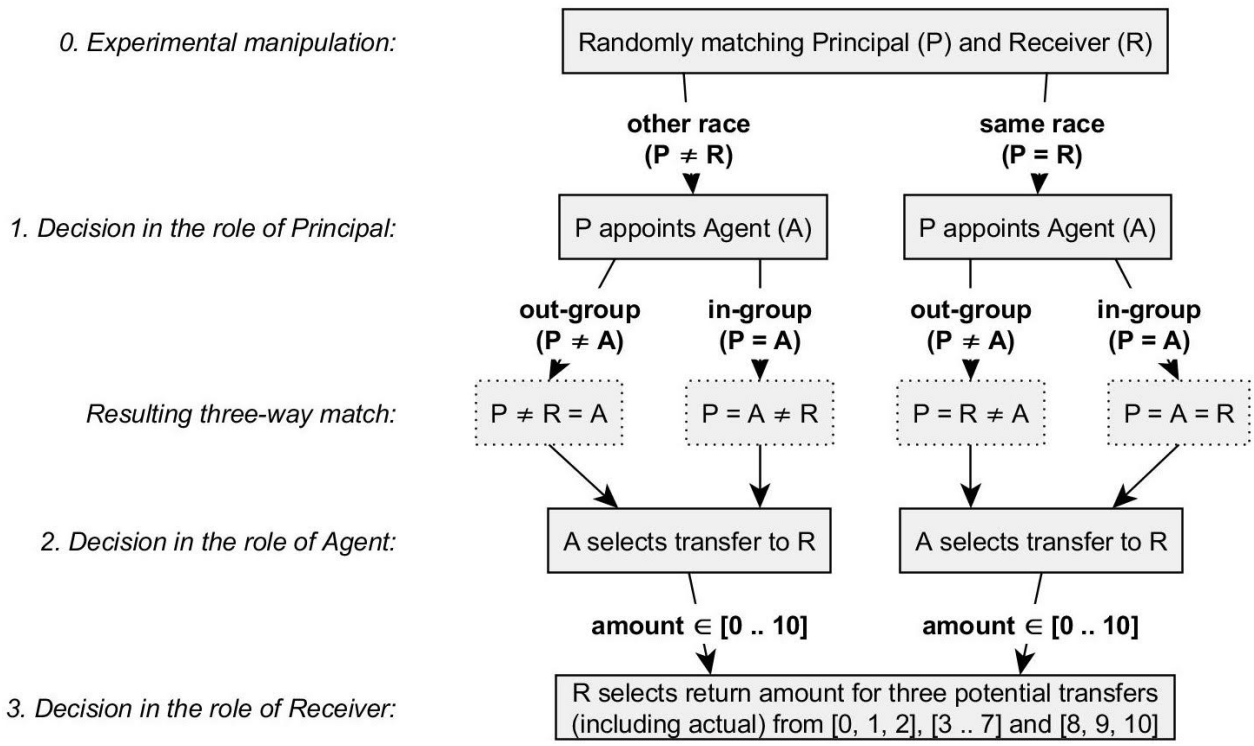
In keeping with the ethics requirements of the University of Pretoria, subjects were assured that all their responses would be anonymous No names or personal identifiers were recorded with the data.

3 Set-up and Hypotheses

3.1 Trust Game Set-up

Figure 1 shows the set-up of our Trust Game:

Figure 1: Trust Game Set-up



As shown in Figure 1, the principal is first paired either with an in-group receiver or an out-group receiver[11]. The Principal (P) chooses an Agent (A) from her own in- or out-group. The Agent (A) chooses how much to transfer to the Receiver (R). This could be any integer value from zero to ten. Finally, the Receiver (R) chooses an amount to return to the Principal (P). Again, this can be any portion of the tripled transfer amount.

[11] Where the receiver does not know the race of the principal, the balanced (50% white, 50% black) session set-up would make any guess about the principal race random.

We consider within our hypotheses the 3 stages of the game following the pairing of principal and receiver: agent transfer decision, receiver return decision and principal decision to appoint an agent. Since players play all three roles (agent, receiver and principal) in the course of the game, we assume that players are aware of the incentives of those in other roles. We therefore use an approach similar to the backward induction used in game theory (Selten, 1967), whereby we start with the receiver decision, and assume that in the role of agent and principal, players would consider the expected decision of the receiver and that of the agent (which in turn would be assumed to be based on expected receiver decisions).

Similarly, where the receiver is blind to the true race of the principal, we assume that the receiver would consider the expected agent appointment decision of the principal in deciding on a return amount. The pairing of in- or out-group principals and receivers was expected to impact decisions where there is a positive probability of in-group bias.

3.1.1 Return decision by receiver

We take the case where the receiver knows the principal race, and the principal race is the same as that of the receiver, as our benchmark case. Here we expect that receivers would transfer "average" returns (Johnson and Mislin's (2011) meta-analysis of trust games finds an average of ~37% returned) to a same race principal. Since the receiver has no way of punishing or rewarding the agent (given the fixed payment of the agent), for a given transfer the race of the agent should not impact the return decision of the receiver.

Where the receiver knows that the principal race is different from her own, a non-racially biased receiver would return an "average" amount, as above, while a racially biased receiver might return nothing (or at least, would return an amount strictly less than the "average" amount). Since there is no repeat play of the game and hence no strategic benefit to sharing for the receiver, a racially biased receiver has no incentive to share his earnings with an other race principal. With only a weak assumption of a non-zero probability of racial bias among receivers, we expect that the return amount to a receiver-race principal would be strictly greater than the return amount to a non-receiver-race principal in this scenario.

We next consider the "blind" scenario, where the receiver does not know the race of the principal. The principal can only condition on race, so the receiver assumes the principal's agent selection to signal principal race. Here the receiver makes assumptions about principal race based on the probability of principals selecting same- or other-race agents in the scenario where the principal is aware that the receiver does not know the principal's race (this is set out in detail in Section 3.1.3). The selection of a receiver race

agent is always dominant for the principal in this "blind" scenario: where the receiver and principal are of the same race, the principal is expected to choose an own race (= receiver race) agent; and where the principal and receiver races differ, the principal is expected to choose a receiver-race agent. Unless the principal shows some in-group bias by choosing an agent of his own group, the receiver would therefore expect to always be confronted by a receiver-race agent.

Deviations from receiver-race agent might arise where an other-race principal believes that an agent of his own race (but different from the receiver race) might better represent his interests (for example, by transferring less of his capital to a potentially biased receiver), even if this belief contradicts the most likely outcome from appointing such an agent. The receiver might then interpret the different race agent as a signal of a (racially biased) other-race principal. As such, even a non-racially biased receiver might be tempted to reduce the amount he would otherwise return.

Since no clear signal of principal race can be obtained from a receiver race agent choice, we assume that the receiver returns an "average" amount in this situation. Where a non-receiver race agent is encountered in the "blind" scenario, we anticipate a strictly lower receiver return.

Receiver return predictions based on the outline above are summarized in Table 1.

Table 1: Receiver decisions

Variation	Explanation	Hypothesized Return Transfer
Receiver knows Principal Race:		
R=P	Receiver same race as Principal	average
R≠P	Receiver different race to Principal	below average
Receiver doesn't know Principal Race:		
A=R	Agent same race as Receiver	average
A≠R	Agent different race to Receiver	below average

3.1.2 Transfer decision by agent

Recall that the agent is paid a fixed fee for his/her decision-making. Further, the non-appointed agent receives the same fixed fee. The agent therefore does not learn whether or not he was selected during the trust game. As such, the agent receives no benefit from being selected, and should have no incentive to repay the principal for his/her selection. We therefore assume that a neutral agent would favour a fair (~50/50) division of profits. We consider two possible motives for the agent's choice:

- Preference for efficiency: any decision by the agent to transfer money increases the total resources to be shared between principal and receiver (since any money transferred is tripled before reaching the receiver).

- Equity concerns: the agent's decision together with the receiver's return decision will determine the proportion of the total available funds accruing to principal and receiver. The agent must then take an assumed return decision of the receiver into account in deciding on a transfer amount.

A non-racially biased agent would be expected to target both efficiency and equity by transferring something in the region of the 50% average seen in trust games (Johnson and Mislin 2011)[12] We summarize the 8 scenarios for this transfer (4 where the receiver knows the race of the principal ("know"), and 4 where the receiver is "blind" to principal race) in Table 2. Recall that the agent is always aware of the race of both principal and receiver.

Table 2: Agent transfers

Variation	Explanation	Principal race	Hypothesized Transfer	Reason
P=R=A	Receiver same race as principal; Same Race Agent	Known	average	No discrimination possible.
P=R=A	Receiver same race as principal; Same Race Agent	Blind	average	Agent knows that receiver can't predict principal race with a same race agent, so no discrimination.
P=R≠A	Receiver same race as principal; Other Race Agent	Known	(slightly) below average	No discrimination possible BUT racially biased agent could choose to limit efficiency through lower transfer.
P=R≠A	Receiver same race as principal; Other Race Agent	Blind	(slightly) below average	Racially biased agent might limit efficiency. Receiver might interpret agent race as signal of biased other-race principal, so non-racially biased agent might limit transfer because of expected low return.
P=A≠R	Receiver different race to Principal; Principal Race Agent	Known	below average	Racially biased agent would transfer below average (possibly 0). Non-racially biased agent would transfer average.
P=A≠R	Receiver different race to Principal; Principal Race Agent	Blind	below average	Racially biased agent would transfer less than average (possibly 0). Non-racially biased might be concerned about signal of biased other-race principal and might limit transfer because of expected low return.
R=A≠P	Receiver different race to Principal; Receiver Race Agent	Known	above average	Racially biased agent would transfer above average (possibly 100%). Non-racially biased agent would transfer average.
R=A≠P	Receiver different race to Principal; Receiver Race Agent	Blind	above average	Racially biased agent would transfer above average. Non-racially biased agent would transfer average.

3.1.3 Agent appointment by principal

The principal faces 4 scenarios in which she has to choose between an own-race and other-race agent. As before, we assume that the principal is aware of the likely transfer

[12] An average transfer of ~50% being tripled, and an average return of ~37% of the tripled amount, together result in an approximately equal split between principal, receiver and agent).

decision of the agent, and of the likely return decision of the receiver (as discussed in 3.1.1 and 3.1.2).

The predicted outcomes are summarized in Table 3.

Table 3: Likelihood of selecting a principal race agent

Variation	Explanation	Hypothesized Preference	Reason
Receiver knows Principal Race:			
R=P	Receiver same race as Principal	Slight preference for principal (=receiver) race agent	Small risk of lower transfer from racially biased other race agent; in-group bias based preference also possible.
R≠P	Receiver different race to Principal	Strict preference for principal (=non-receiver) race agent	Racially biased receiver race agent might transfer all to biased other race receiver who might return nothing. Racially biased principal race agent might send nothing (or less) and biased receiver might return less, but the balance of the endowment would be higher due to the low agent transfer.
Receiver doesn't know Principal Race:			
R=P	Receiver same race as Principal	Strict preference for principal (=receiver) race agent	Small risk of lower transfer from racially biased other race agent and risk of false signal of biased other-race principal leading to low return. Average transfer and return expected with receiver race agent
R≠P	Receiver different race to Principal	Strict preference for other (=receiver) race agent	Although racially biased principal race agent might transfer less (keeping more for principal), biased receiver would return little and even non-biased receiver might punish perceived racial bias of principal (with signal of non-receiver race agent) ; biased receiver-race agent might transfer more, but receiver should offer average return to a receiver race agent, resulting in higher total returns to principal.

3.2 Hypotheses

Based on the informal game-theoretical analysis, we propose formal hypotheses for receiver returns, agent transfers and principal selection of agent.

3.2.1 Receiver returns hypotheses

We predict that agent race should only impact returned amount where principal race is unknown to the receiver (in which case a non-receiver-race agent would result in a lower return). Further, we predict lower returns to other-race principals where principal race is known to the receiver.

We therefore posit the following hypotheses:

H1: Amounts returned where A = R (know) = amounts returned where A≠R (know)
H2: Amounts returned where A = R (blind) > amounts returned where A≠R (blind)
H3: Amounts returned where R = P (know) > amounts returned where R≠P (know)

3.2.2 Agent transfer hypotheses

We would expect to see higher transfers by agents to agent-race receivers, although the difference would be slight where receiver and principal are of the same race. Aligning with this predicted outcome, the literature on group identity predicts that each member of a group prefers to trust other members of this group over members of other groups (in-group favoritism).

We therefore propose:

H4: Amounts transferred where A = R > amounts transferred where A≠R, particularly where P≠R

3.2.3 Principal selection of agent hypotheses

Where principal race is known to the receiver, we expect the principal to favour principal race agents only marginally (based on possible slightly lower transfers from other race agents) when facing an own race receiver; while we expect strict preference for a principal race agent in facing an other race receiver. Where principal race is not known to the receiver, we expect a principal to prefer an agent of the same race as the receiver (and himself) where principal and receiver share a race: a non-receiver race agent risks sending a false signal of a racially biased other race principal to the receiver. Similarly, we anticipate a preference for receiver race agents (now non-principal race) where the principal and receiver race are different.

We hypothesize:

H5: Likelihood of selecting A = P where R = P (know) < likelihood of selecting A = P where R≠P (know)

H6: Likelihood of selecting A = P where R = P (blind) > likelihood of selecting A = P where R≠P (blind)

4 Results

We conducted one pilot and six experimental sessions at the University of Pretoria (Hatfield campus) between 19 March and 23 April 2015.

4.1 Demographics

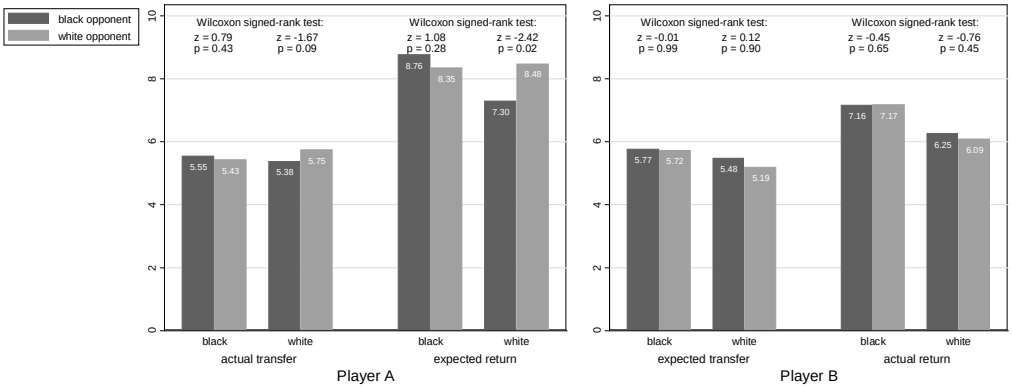
Of the 126 subjects participating in the experimental sessions, 67 identified as female (53 %), 65 as black (52 %). Participants ranged in age from 18 to 26 years, with an

average of 19.3 years. Excepting two, all subjects were in the first or second year of their studies.

4.2 Descriptives: Trust and race in South Africa

To contextualize our study within previous research, we first compare findings from our basic trust game with those from existing studies conducted in South Africa. In both the dictator game (van der Merwe & Burns, 2008) and the trust game (Burns, 2006), whites showed insider bias (transferring more to white partners than to non-white partners). To qualitatively compare this with our data, we first inspect interactions between sender and receiver race in the different constellations of our baseline trust game. Note that since we used the strategy method of elicitation, where actual transfers and returns were not revealed until all rounds had been concluded, we align actual transfers with associated expected returns; and actual returns with associated expected transfers.

Figure 2: Behavior by group identity in the basic trust game



Each of the eight pairs of bars in Figure 2 compares behavior across the race of the respective Receiver in the left panel, and Principal/Sender in the right panel). As far as transfer data and return expectations are concerned, Figure 2 reveals insider-bias among white senders: They transfer significantly higher amounts (7 % on average) to white than to black receivers and expect to receive significantly higher returns (16 % on average) from a white than from a black receiver.

Burns' (2006) research with high school students found general discrimination against black respondents (where even black senders transferred more to white than to black partners). Neither later research on dictator games (van der Merwe & Burns, 2008) nor our own data (Wilcoxon signed-rank test, z = -0.73, p = 0.47) confirm this pattern of

generally lower transfers to black receivers. Burns attributed the discrimination against black students to mistaken stereotypes – black receivers were expected to return a lower proportion of the received amount on average – but our data do not confirm that black receivers are expected to return significantly less than white receivers (Wilcoxon signed-rank test, z = -0.92, p = 0.36).

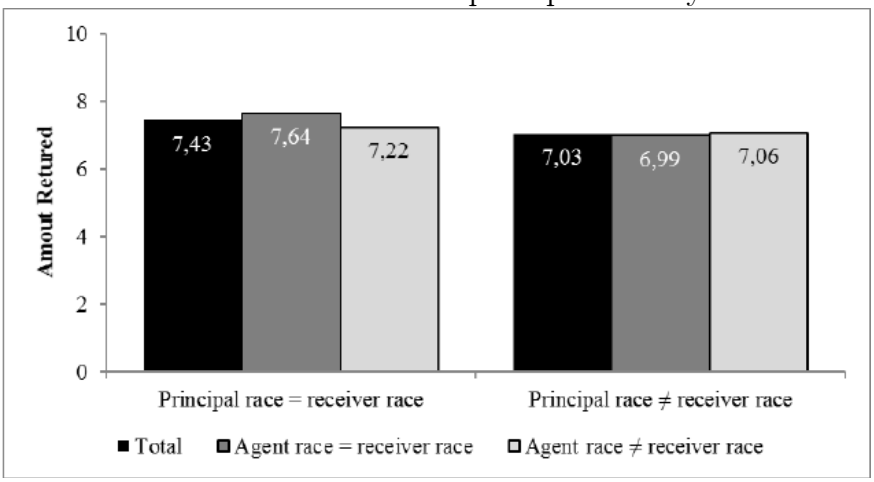
These differences may be explained either by the time that passed between the studies (apartheid-induced suspicion against black people is one more decade away) or by the different study contexts: While Burns (2006) used high schools students, where multiple schools were needed to achieve sufficient racial heterogeneity, both van der Merwe & Burns (2008) and our own study were conducted with a university student sample of considerable ethnic heterogeneity.

4.3 Testing hypotheses

4.3.1 Receiver returns

Our first three hypotheses proposed that where agent and receiver shared a race group (in-group agent in the figure below) we would see no impact of agent race on returns where principal race is known; but that returns would be higher to a receiver race agent where principal race is not known. We further proposed in our H3 that where principal race is known, returns to a receiver-race principal would be higher than returns to a non-receiver race principal.

Figure 3: H1 and H3 - Impact of (dis)parity of principal/receiver and agent/receiver race on returns where receiver knows principal identity



Significant differences are tested using 2-sided Wilcoxon signed-rank tests, and are illustrated for figures 3 to 6 as follows:

***: significant at p = 0.01

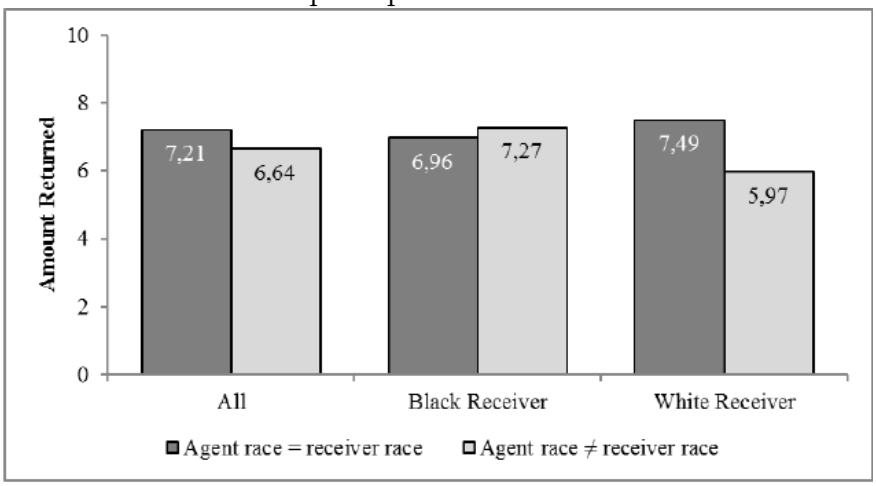
**: significant at p = 0.05

*: significant at p = 0.1

Figure 3 confirms our H1: no significant differences in returns are seen with either out-group or in-group principal with changes to agent race (p>0.70). Our H3 is, however, not confirmed: although returns are marginally higher to principals of the same race as the receiver (7.43 on average versus 7.03 to an other race receiver), this difference is not significant (p = 0.43)[13].

[13] As a robustness check, we noted that this difference was also not significant when black and white receivers were considered separately.

Figure 4: H2 - Receiver returns by (dis)parity between agent and receiver race where receiver is blind to principal race



***: significant at p = 0.01
**: significant at p = 0.05
*: significant at p = 0.1

Considering H2, Figure 4 shows that returns with receiver race agents are directionally slightly higher where principal race is not known by the receiver. Where we consider black and white receivers separately, we see that this difference is driven entirely by white receivers, for whom returns are significantly higher with receiver race agents. Recall that a non-receiver race agent was expected to indicate a racially biased non-receiver race principal, suggesting that white receivers discriminate against suspected (racially biased) other race principals.

To summarize, consider our 3 hypotheses on returns:

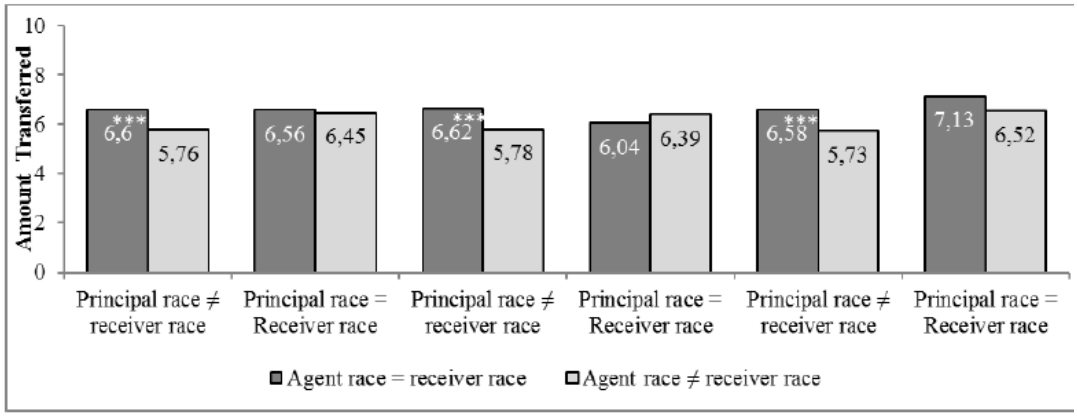
H1: Amounts returned where A = R (know) = amounts returned where A≠R (know)
H1 Result: Confirmed (significant)
H2: Amounts returned where A = R (blind) > amounts returned where A≠R (blind)
H2 Result: Significant only among whites
H3: Amounts returned where R = P (know) > amounts returned where R≠P (know)
H3 Result: Directional, not significant

4.3.2 Agent Transfers

H4 considered agent transfers, and whether these would be influenced by racial (dis)parity between principal and receiver and/or between agent and receiver. We anticipated higher transfers to agent-race receivers than to other race receivers. This difference was ex-

pected to be slight where principal and receiver race was the same, but significant where principal and receiver race was different.

Figure 5: H4 - Agent transfers by (dis)parity of principal and receiver versus agent and receiver



***: significant at p = 0.01

**: significant at p = 0.05

*: significant at p = 0.1

Figure 5 shows that transfers only differ by (dis)parity between agent and receiver race where principal and receiver race is different: significant differences are seen between same and other race agents where principal and receiver race differ; but no significant difference is seen (for either race) where principal and receiver race are the same. This aligns well with the predictions of our H4: agents discriminate against out-group receivers where the principal is from the agent's in-group.

H4: Amounts transferred where A = R > amounts transferred where A≠R, particularly where P≠R

H4 Result: Significant only where P≠R

4.3.3 Agent Selection

Our final 2 hypotheses predicted differences in agent selection based on racial (dis)parity between principal and receiver. Table 5 aligns the hypothesized outcomes with the actual findings from our research.

Table 4: Actual versus predicted agent selection: likelihood of selecting a principal-race agent

Variation	Explanation	Hypothesized Preference	Overall Outcome	Black Principals	White Principals
			Percent choosing own race agent		
Receiver knows Principal Race:					
R=P	Receiver same race as Principal	Slight preference for principal (=receiver) race agent	60%	42%	78%
R≠P	Receiver different race to Principal	Strict preference for principal (=non-receiver) race agent	50%	52%	48%
Receiver doesn't know Principal Race:					
R=P	Receiver same race as Principal	Strict preference for principal (=receiver) race agent	63%	53%	73%
R≠P	Receiver different race to Principal	Strict preference for other (=receiver) race agent	56%	46%	67%

Recall that H5 predicted that where principal race is known to the receiver, a principal facing a same race receiver would be less likely to choose an own race agent than a principal facing a different race receiver. Overall, we see the opposite effect: principals facing a same race receiver are more likely to select an own-race agent (60%) than principals facing an opposite race receiver (50%). Interestingly, this effect is different for black and white principals: although not statistically significant ($p = 0.30$), black principals show the expected direction predicted by H5; while white principals show a significant effect ($p<0.01$) in the opposite direction. Since there is limited rationale for a strong preference for an own race agent where receiver race and principal race are the same, and indeed actual transfers and returns do not point to such a choice being beneficial in terms of principal profit, this finding suggests simple in-group favoritism on the part of the white principals.

Where principal race is not known to the receiver, we see a slight directional effect in line with the predictions of H6: Principals are marginally more likely to select same race agents when facing a receiver of their own race than when facing a receiver of a different race. The effect is not, however, statistically significant for either race ($p>0.26$).

We see a particularly striking (and surprising) result where we compare the condition of known (to receiver) principal race to that of unknown principal race for white principals where principal and receiver race are different: We anticipated that the principal should always appoint an own race agent in the former condition, but should never appoint an own race agent in the latter. Yet the former condition sees the lowest likelihood of own race agent selection. A possible explanation for this can be found in social psychology: principals might hope to use the out-group agent to draw focus away from the known group discrepancy between herself and the out-group receiver. By present-

ing themselves as "good-willed" and other-regarding, they might hope to elicit higher returns.

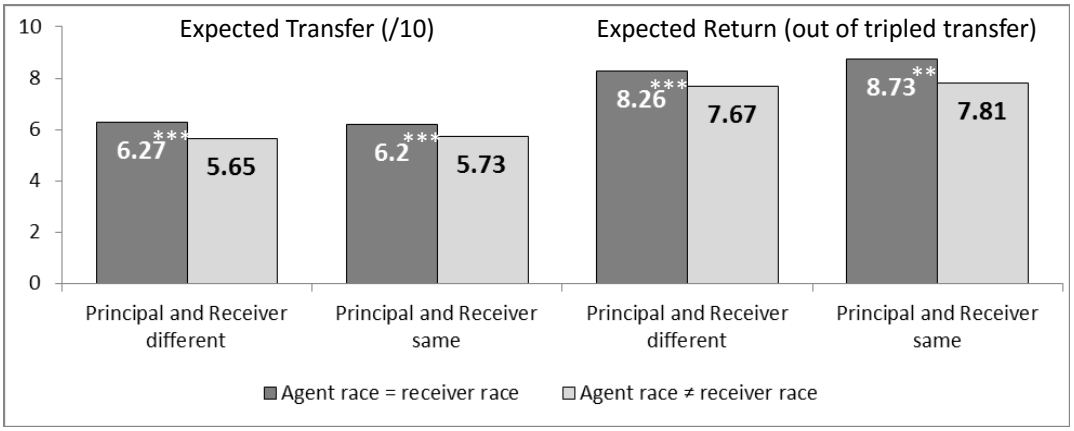
H5: Likelihood of selecting A = P where R = P (know) <
likelihood of selecting A = P where R≠P (know)
H5 Result: Not confirmed: opposite effect noted
H6: Likelihood of selecting A = P where R = P (blind) >
likelihood of selecting A = P where R≠P (blind)
H6 Result:Directional, not significant

We summarize our main finding over these hypotheses as follows:

Result 1: Directional effects in agent transfer and receiver return decisions point to strategic in-group preference, particularly among white respondents. However, white principals' agent choice does not align well with our predictions, particularly where principal and receiver race differ. Here we noted a surprising preference for receiver group agents where principal race was known to the receiver.

To elucidate the surprising findings on principal preference for receiver race agents, we consider the expectations of principals in selecting agents. Specifically, we consider whether principals correctly anticipate the way in which agent transfers and receiver returns condition on racial disparities.

Figure 6: Principal expectations of agent and receiver behavior by (dis)parity between receiver and agent race



***: significant at p = 0.01

**: significant at p = 0.05

*: significant at p = 0.1

Figure 6 shows that regardless of the (dis)parity between principal and receiver race, principals expect higher transfers where agent race is the same as receiver race. This contradicts the actual transfer behavior observed in Figure 5: Higher transfers for agent-receiver parity only occurred where the principal's race was different from the receiver's. Where principal's and receiver's race were the same, there was no difference in transfers with (dis)parity between agent and receiver race. Similarly, our results show that principals expected receivers to condition on agent/receiver (dis)parity. This too was not the case in actual return behavior except where the receiver based his assumption of principal racial bias on agent race (in the blind scenario). This expectation of higher transfers and returns with a receiver-race agent offers an explanation for white principals favouring black agents when confronting black receivers. We thereby derive our second result:

Result 2: Principal expectations of agent transfers and receiver returns do not align well with actual agent and receiver behavior. These incorrect expectations are driving the agent selection decisions[14], explaining deviations from our predicted principal decision making.

[14]Where expected transfers and returns of selected versus not selected agents are examined, we see that selected agents are expected to generate higher profit for the principal than not selected agents.

5 Summary and perspectives

This paper investigated the role of group identity, and specifically of racial in-group bias, on strategic delegation. We conducted a modified trust game experiment where capital ownership was divorced from decision making. The group identities (operationalized as racial identities in South Africa, where race remains highly salient) of principal, agent and receiver were systematically varied for players in all three roles in order to understand the impact of group identity in a delegated decision-making context.

We predicted behavior of receivers, agents and principals where we assumed that all players take into account the impact of possible in-group biased behavior of other players. Agent transfers and receiver returns were directionally in line with most of our predictions, driven largely by the behavior of white respondents: Agents transferred more to own-race receivers when the principal was other-race; and where receivers were not aware of the principal race, white receivers returned more when facing an agent of their own race.

Agent appointment decisions, however, differed systematically from our predictions. In particular, while we expected that concealing the identity of the principal from the receiver might lead to increased selection of out-group agents when facing out-group opponents (indeed, this was the only time when selecting an out-group agent was expected to be a dominant strategy), we noted the opposite effect in our data. (White) principals were significantly more likely to select an out-group receiver when facing an out-group opponent where their own (white) identity was known to other players. This ties in with a body of literature suggesting that delegation can be used to shift focus away from the opposing player to his/her representative: white principals anticipate higher profits from choosing a black agent to face a black opponent, possibly hoping to draw attention away from their own (different) race.

Nicholls and Zimper (2017) propose a game theoretic model to explain this preference for out-group receivers. Their model uses the modified trust game from this paper as a starting point. They propose a game solved through backward induction whereby they allow for varying probabilities of in-group bias among both agents and receivers; as well as varying degrees of altruism among receivers. The principal's optimization problem derived from this set-up shows that principals should rationally select a receiver-group agent when facing an out-group receiver provided that the expected probability of bias on the part of the receiver is sufficiently low and the likelihood of altruism (sharing of profits) in the receiver group is sufficiently high. The intuition behind this is that higher transfers to an unbiased, altruistic receiver will increase the principal's returns. A (potentially biased) principal group agent might transfer less to this unbiased, altruistic receiver, thereby limiting the principal's profits.

The reason for the higher prevalence of group-based strategic behavior (differential transfers and returns as well as agent selection decisions) among white versus black respondents cannot be conclusively determined from the data we have, and would make for interesting further research. Some possibilities include:

1. Racial bias propagated by the historical Apartheid institutions has left many white South Africans holding biased views about their black compatriots, leading to greater discrimination by white respondents.

2. A more homogenous group identity might exist within the white versus black in-group: Apartheid laws prevented black South Africans from free movement within South Africa, maintaining some separation between different black cultural and language groups with different geographic origins within South Africa.

3. Educational disparities created by differential access to quality education under Apartheid might lead to more white respondents engaging in strategic backward induction thinking (of the type proposed in Nicholls and Zimper's model) in making decisions.

Since actual returns do not conform to principal expectations in our experiment, the strategic use of group identity by white principals does not increase profits. This raises the question of whether different results might be seen in an environment where learning is permitted. Replications with repeated interactions could shed light on this question.

Our findings suggest that where group identity is salient, this can have significant impacts on trust in a delegation environment. The higher prevalence of in-group bias in white versus black respondents suggests that the impact of group identity varies by cultural group. Research in different cultural contexts could confirm whether the biases we see in white respondents are common or exceptional.

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Appendix: Instructions to Participants

Participants received the initial instructions (before part 1) at the beginning. Following this, the instructions for each part were handed out (and read out) at the beginning of that part. Where different instructions were given for the blind and knowledge treatments, these are highlighted in the below.

Thank you for participating in this decision making experiment. The following instructions should answer most questions you might have. Otherwise, please raise your hand so that one of the researchers can assist you.

Now that the experiment has begun, we ask the following:

- Please do not talk (except to ask questions of the researchers).
- Please respect the privacy of other participants and do not look at their computer screens.
- Please do not use your cell phone for anything.
- Please do not access any website other than the one you have been directed to.

Should you break any of these rules, you may be excluded from the experiment and any payments.

The experiment consists of a number of parts in which you will have to make decisions about sending money to someone in this room. You will be given limited demographic information about the person concerned in each case. Please note that this demographic information is not detailed enough for you to be identified. Your decisions will therefore be anonymous. Not even the researchers can link your name with the data you provide.

In the experiment you will earn money. How much you earn depends both on your decisions and on the decisions by other participants. Note that, throughout the experiment, you will see all money amounts without a currency. Those amounts are in "lab dollars". Once the experiment is over, the total amount of lab dollars you have earned will be divided by three and paid to you cash in Rands.

Detailed instructions for each part in the experiment follow. Some instructions are included on-screen. The below should offer additional clarity, but if you do have questions not covered by these instructions, feel free to ask the researchers.

Part 1:

In this part you will be paired with another person in this room. You will interact with this person by taking decisions on the computer screen, then your interaction ends. After this, you will be paired with another person and the process repeats. You are free to take different decisions each time and to use the information provided on the computer screen to help you with your decision-making. Part 1 consists of five such interactions, each with a different person in this room.

The first interaction is a test run. It is exactly like the other four, except the "other person" will be simulated by a computerized random algorithm and the round will not be paid. It is merely meant to familiarise you with the basic set-up and to allow for any questions not covered in the text. The first round will be clearly labelled "Test Run" and you will be told the results right afterwards.

The other four interactions are set-up as follows:

- As "Player A", you are given 10 lab dollars and can send any part of this money to Player B.
- The researchers add another two times the amount you sent, so that Player B will receive three times the amount you sent.
- As "Player B", you can send any of the money you received back to Player A.

You will first play the role of Player A, then the role of Player B. After the end of this interaction, you will not be told immediately what the other player did, but will continue directly with the next interaction. This means that where you are Player A, Player B will not know the amount you sent until the end of the entire experiment. Similarly, when you are Player B, Player A will not know the amount you returned until the very end of the experiment.

At certain points of the interaction, you will be asked what you assume the other player will do. In these cases, please state your honest opinion. Assumptions will never be disclosed to other participants and will only be used by the researchers to better understand your decision-making process.

Part 2:

In this part you will be asked to guess what other people in this room did in Part 1. You will be shown two pairs of people that interacted exactly like you did before. Then you are asked, for each of the pairs, to state the amount you think that Player A in each scenario sent to Player B in that scenario and the amount which you think Player B returned to Player A. At the end of the experiment, your assumptions will be compared to what the respective pairs actually did, and you will get 10 lab dollars for each correct assumption you have stated.

Part 3:

In this part, you will again be paired with one other person. But instead of Player A sending and Player B returning money directly, you will select an extra person in this room (player X) to take this decision for you. The program will give you a choice between two people in this room, from which you have to select one. This Player X will

act on behalf of Player A to make the decision of how much of Player A's money to send to Player B.

So the game now proceeds as follows:

- Player A has 10, some of which can be sent to Player B (as before).
- Player A cannot send money directly, so needs to select a Player X.
- The computer presents two people (candidates) from the room. Player A selects one of these to be Player X. Both candidates for the role of Player X receive 10 lab dollars to keep, no matter which of them is selected to make the decision.
- The selected Player X decides on how much of Player A's money to send to Player B. Player X can choose any amount from 0 to 10. Player X cannot communicate with Player A.
- As before, researchers add money so that Player B receives three times what Player X sent.
- Any money that Player B sends back will go to Player A, as before (NOT to Player X).

You will take decisions in each of the three roles (A,X,B), then the interaction ends and you are paired with different people. There will be four interactions in total (as before, but without the test run) and in each interaction, you will play each of the three roles (A, X, B) once.

Note that where you are Player A, you will have demographic information about the Player B you will be paired with. You will then be able to choose a Player X based on demographic information about 2 possible Player X options.

[*Know condition instructions:*] Where you are Player B, you will know demographic details about both the Player A who selected the Player X to send you money; and about the Player X who made the decision about the amount of money to send to you.

[*Blind condition instructions:*] Where you are Player B, you will know demographic details about the Player X who made the decision about the amount of money to send to you. You will not, however, know anything about the Player A who selected the Player X to send you money (remember that the Player A is the person to whom you will be returning money).

Where you are Player X, you will know demographic details about the Player A whose money you are sending AND the Player B to whom you are sending the money (and who will return money to Player A).