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**Working Paper**

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# BONN ECON DISCUSSION PAPERS

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**Experimenting over a Long Distance - A method  
to facilitate intercultural experiments**

by

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June 2004



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# **Experimenting over a *Long Distance***

## **A method to facilitate intercultural experiments**

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### **Abstract**

We report a new method for *Experimenting over a Long Distance* (ELD) allowing to simultaneously run decentralized interactive experiments in geographically separated subject pools. We apply ELD to an intercultural trust experiment with participants from Argentina, China and Germany.

*Keywords:* interactive intercultural experiments, investment game, trust

JEL classification: C72, C81, C91, F00, O57

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## 1. Introduction and motivation

When planning interactive experiments with geographically separated subject pools researchers face large logistic, financial and technical problems like incompatibility of computer equipment and software, high traveling expenses and communication costs. As a consequence, subject pool selection might be biased towards populations where experimentation facilities are readily available. Globalization, however, brings about interaction with populations where western technical standards are not met. Therefore, a method is needed that enables easy-to-run interactive experiments in international and intercultural settings leading to better mutual understanding and advice for practical work.

Most experimental studies related to our research topic are cross-cultural investigations without interaction of subjects in different countries<sup>1</sup>. Yet individuals hold different country-specific or culture-specific dispositions that, along with their perception of other cultures, determine their behavior in intercultural decisions (Hofstede 2001). Therefore, research should also focus on experimenting with subjects who interact in a real intercultural setting.

Almost no studies involve true intercultural experiments due to the problems mentioned above (see however Boarini et al. 2002, Bornhorst et al. 2004<sup>2</sup>). To overcome this deficiency we developed a new method for *Experimenting over a Long Distance* (ELD) that allows to simultaneously running decentralized interactive experiments in geographically separated subject pools. ELD minimizes logistic effort, technical requirements and travel expenditure. It is particularly suited for simple games. We apply ELD to the investment/trust game (Berg et al. 1995) with participants from Argentina, China and Germany. We, therefore, refer to this particular game when explaining ELD in the following.

The paper is organized as follows: Section 2 describes the ELD-method. In section 3, we briefly report results from applying ELD to an intercultural trust study. Section 4 discusses the method and concludes.

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<sup>1</sup> See for instance Willinger et al. 2003, Hennig-Schmidt et al. 2002, Anderson et al. 2000, Henrich et al. 2001, Roth et al. 1991, see also the survey by Oosterbeek et al. 2004.

<sup>2</sup> The subject pool of this experiment consisted of PhD. students all studying at the European University Institute (EUI) in Florence.

## 2. ELD-Method

Non-interactive one-shot single-player experiments as well as one-stage multi-player experiments involving separated subject pools can easily be handled because no actual interaction of subjects exists. Organizational problems arise, however, in multi-person multi-stage designs where participants have to take sequential decisions under time restrictions imposed by disposable resources at different locations. The crucial constraint in these experiments is the interdependence of decisions: One subject's choice depends on a prior decision of another person. ELD is designed to overcome this restriction by removing decision interdependence without creating incentive biases.

The usual sequential protocol for running investment game experiments is as follows: First, a sender sends an amount  $a$  of her endowment  $X$  to a receiver. While being sent,  $a$  is tripled by the experimenter. Then, the receiver chooses an amount  $b$  of the tripled transfer he wants to send back to the sender. Being dependent on the first mover's action, the second mover cannot take his decision without information on the first mover's choice. We solve this problem by applying the:

1. *Strategy method* (Selten 1967): It allows to organizationally disconnecting the second stage of the game from the first stage. By having the second mover indicate his choices for all possible first mover's decisions, the sequential two-person two-stage game is transferred into a two-person normal-form one-stage game. This game can be played independently at different locations and different points in time.

Other features of ELD involve decentralizing the decision process and particular information on subject pools:

2. *Pen-and-paper*: By using pen and paper the experimental design becomes independent of compatible equipment and software.
3. *Remote-control organization*: A central unit, the Chief Experimenter (CE) is responsible for overall planning and controlling. Local experimenters (LEs) are in charge of organizing and running the experiment at the different locations (see figure 1). CE briefs LEs in advance by a procedure and instruction manual to ensure comparable experimental conditions in all locations involved. He prepares

identical instructions and decision sheets and ships them to all LEs. After having finished the entire experiment, CE collects all decision sheets, computes payoffs and transfers the money to all LEs.

4. *Ex-ante coding and matching:* Before running the experiment, CE has to be provided with information on each participant necessary to ex-ante code decision sheets and match players randomly across subject pools. Participants randomly draw an ex-ante coded decision sheet in the experiment.
5. *Transfer of information on player's characteristics:* Players have to be informed about their counterpart's pool affiliation. According to research interests, information on additional characteristics is provided.

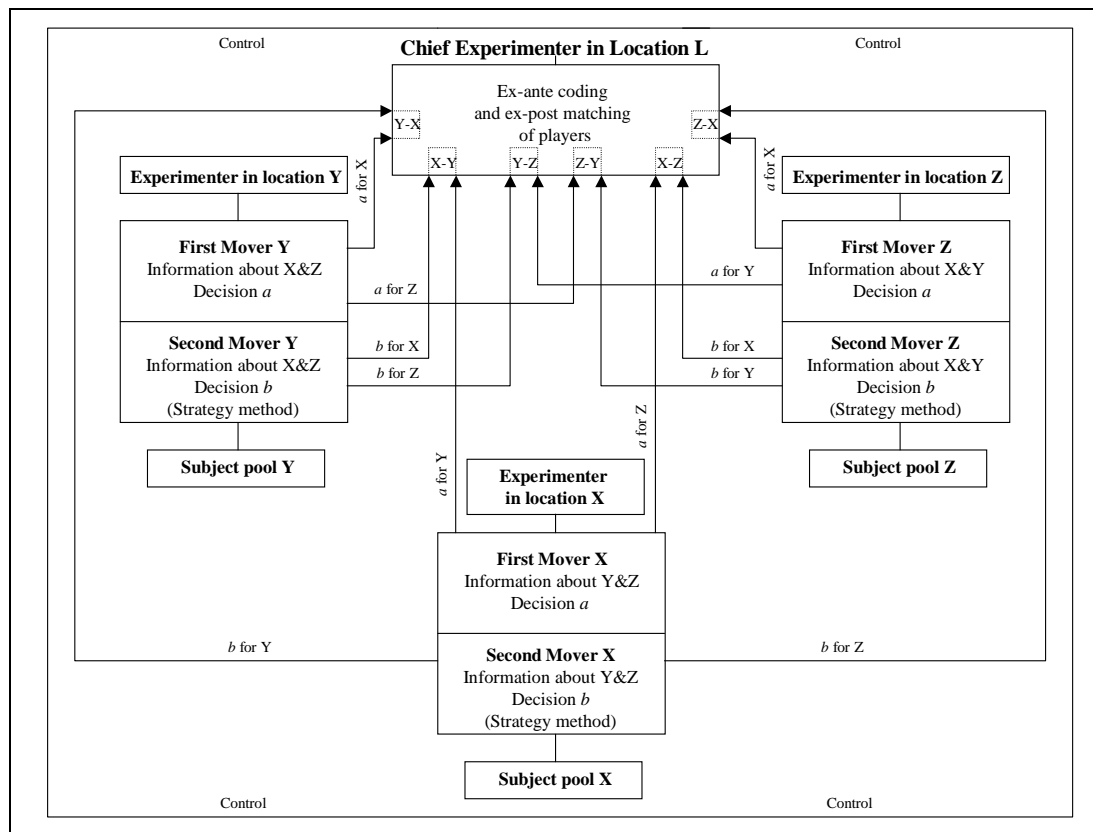


Figure 1: Schematic outline of ELD for the investment game with three subject pools. Intra-pool assignment is not shown.

Besides organizational requirements other aspects are important. (i) A subject has to make each choice on a separate decision sheet in order to prevent her from changing prior decisions or recouping information from previous choices. (ii) Instructions are to be translated into different languages using the back-translation method (Brislin 1970) to ensure equivalence. (iii) Each subject's minimum number of

decisions equals the number of participating subject pools; if subjects decide as sender and as receiver, i.e. when different player types exist, the number of decisions equals the number of subject pools times the number of player types. (iv) To provide similar incentives across pools, subject-pool specific hourly payments are to be calculated according to purchasing power<sup>3</sup>; (iv) Inter-pool comparison requires an intra-pool control with at least two sub-pools in order to distinguish between intra-pool and inter-pool behavioral variation. Subjects may not only behave differently towards counterparts from other countries/cultures but may also differentiate towards subject pool members within their own country/culture (c.f. Fershtman and Gneezy 2001).

### **3. Application of ELD to an intercultural investment game**

#### **3.1 Procedure**

We applied ELD to an intercultural trust study with interacting student participants from Argentina (Universidad Nacional de La Plata; Universidad Nacional de Tucumán), China (University of Finance and Economics; Tongji University, both Shanghai) and Germany (Humboldt University, Berlin; Medical University, Lübeck). 90 subjects participated; 15 per sub-pool. We used design features 1 to 5 of section 2. We modified the trust game design by doubling rather than tripling the amount a transferred by the sender. Moreover, senders were endowed with an amount  $X$  whereas receivers got no endowment.

Experiments were divided into two parts, consisting of three decision rounds each. Before starting the experiment, a subject was randomly assigned to a player type – sender or receiver – the assignment being valid throughout the first part. For each of the first three rounds, each sender (receiver) was randomly matched with one receiver (sender) from one of the other countries' sub-pools. In addition, he played against a receiver (sender) from the second sub-pool of his own country. In the second part of the experiment, players changed types, the decision and assignment procedure being identical to the first part. This was made explicit before the experiment started. The experimental protocol guaranteed each player's interaction with a counterpart from Argentina, China and Germany in each part of the experiment only once. Ex-ante matching was done before the decision sheets were mailed to the local experimenters.

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<sup>3</sup> Adaptation to local purchasing power must be realized with an adapted show up fee. Note that participants must have the same reference amounts within the experiment. Therefore experimental currency and exchange rate to one reference currency must be equal for all subjects.



To signal the counterpart's cultural affiliation, a participant was informed on the counterpart's family name and the university's official name. In each round, senders received an endowment  $X=10\text{ECU}$  ( $1\text{ECU}=2\text{USD}$ ).

The experiment was run in September 2002. Participants on average earned 8.70 USD in Argentina, 10.08 USD in Germany, and 9.26 USD in China.

### 3.2 Results

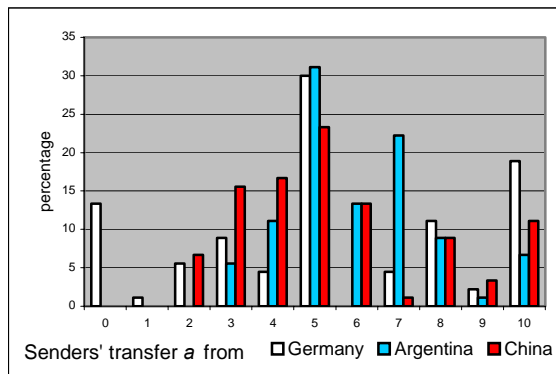


Figure 2a. Average senders' trust per country

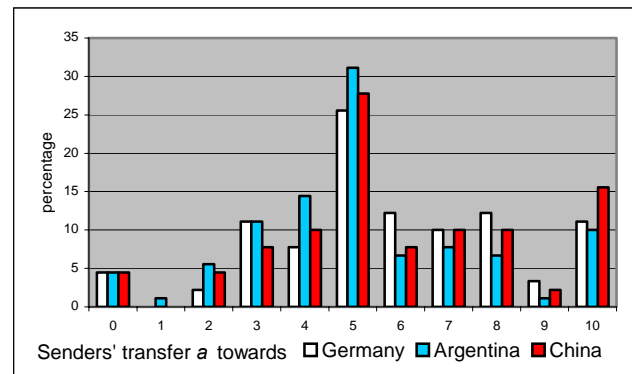


Figure 2b. Average senders' trust towards country

We found variations in trust behavior across countries to be weakly significantly different ( $p=0.069$ , Kruskal Wallis test). Argentines showed the *highest* average trust level ( $a=6.00$ ,  $\sigma=1.74$ ), followed by Chinese ( $a=5.43$ ,  $\sigma=2.36$ ) and Germans ( $a=5.36$ ,  $\sigma=3.26$ ), see figure 2a. To the contrary, trust *towards* Argentines was lowest ( $a=5.17$ ,  $\sigma=2.46$ ) whereas Chinese were trusted most ( $a=5.83$ ,  $\sigma=2.63$ ) followed by Germans ( $a=5.79$ ,  $\sigma=2.49$ ), see figure 2b. Trust behavior towards countries was highly significantly different as well ( $p=0.008$ , Friedman test). For a detailed evaluation of the experiment see Walkowitz and Oberhammer (2003).

### 4. Discussion and conclusion

ELD proved to be a powerful tool for interactive intercultural experiments. It allows to combine intra-pool and inter-pool research with subjects actually interacting with each other. ELD can be applied to any number of subject pools and participants. Sessions are run simultaneously and decentralized without time constraint. No computer-equipped laboratory is needed. Initiation costs are low, decisions sheets being shipped by mail. ELD's potential drawbacks should not be neglected either: ELD most likely applies to simple experiments with few decision stages. When a broad number of subject pools/choices is involved, spillover effects may influence

decisions. The pen-and-paper method does not permit computerized data collection and thus is prone to calculation and matching errors. The strategy method may induce different behavior as compared to subjects being confronted with actual choices (see, however, Brandts and Charness 2000). Weighing pros and cons, we consider ELD an important research method especially when other methods are inapplicable or particularly costly.

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