

Grimm, Veronika; Utikal, Verena; Valmasoni, Lorenzo

**Working Paper**

## In-group favoritism and discrimination among multiple out-groups

IWQW Discussion Papers, No. 05/2015

**Provided in Cooperation with:**

Friedrich-Alexander University Erlangen-Nuremberg, Institute for Economics

*Suggested Citation:* Grimm, Veronika; Utikal, Verena; Valmasoni, Lorenzo (2015) : In-group favoritism and discrimination among multiple out-groups, IWQW Discussion Papers, No. 05/2015, Friedrich-Alexander-Universität Erlangen-Nürnberg, Institut für Wirtschaftspolitik und Quantitative Wirtschaftsforschung (IWQW), Nürnberg

This Version is available at:

<https://hdl.handle.net/10419/110590>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



Institut für Wirtschaftspolitik und Quantitative  
Wirtschaftsforschung

Diskussionspapier  
Discussion Papers

No. 05/2015

**In-group favoritism and discrimination among multiple  
out-groups**

Veronika Grimm  
University of Erlangen-Nürnberg

Verena Utikal  
University of Erlangen-Nürnberg

Lorenzo Valmasoni  
University of Erlangen-Nürnberg

ISSN 1867-6707

# In-group favoritism and discrimination among multiple out-groups

*Veronika Grimm<sup>\*</sup>, Verena Utikal<sup>†</sup>, Lorenzo Valmasoni<sup>‡</sup>*

May 27, 2015

## Abstract

In this study, we investigate how and why people discriminate among different groups, including their own groups and multiple out-groups. In a laboratory experiment, we use dictator games for five groups to compare actual transfers to in-group and out-group agents with the respective beliefs held by dictators and recipients in these groups. We observe both in-group favoritism and discrimination among multiple out-groups. Individuals expect others to be in-group biased, as well as to be treated differently by different out-groups. Dictators' in-group favoritism is positively related to the degree of in-group favoritism they expect other dictators to exhibit. Moreover, we find that a dictator tends to be relatively more generous toward a specific out-group when he or she expects that dictators belonging to that out-group are generous toward members of his or her in-group.

JEL Classification: C91, C92, D84, D01, D64.

Keywords: discrimination, experiment, group identity, dictator game, beliefs.

---

<sup>\*</sup> Corresponding author. University of Erlangen-Nuremberg, Lehrstuhl für Volkswirtschaftslehre, insb. Wirtschaftstheorie, Lange Gasse 20, D-90403 Nürnberg, Germany, Tel 0049-911-5302-224, Email [veronika.grimm@fau.de](mailto:veronika.grimm@fau.de).

<sup>†</sup> University of Erlangen-Nuremberg, Lange Gasse 20, D-90403 Nürnberg, Germany, Tel 0049-911-5302-229, Email [verena.utikal@fau.de](mailto:verena.utikal@fau.de).

<sup>‡</sup> University of Erlangen-Nuremberg, Lehrstuhl für Volkswirtschaftslehre, insb. Wirtschaftstheorie, Lange Gasse 20, D-90403 Nürnberg, Germany, Tel 0049-911-5302-690, Email [lorenzo.valmasoni@fau.de](mailto:lorenzo.valmasoni@fau.de).

## 1. Introduction

Group affiliations play a major role in social interactions. Various studies have shown that human behavior is affected by membership to a group, for which membership can be based on various dimensions, such as ethnicity (Bernhard et al., 2006; Bouckaert and Dhaene, 2004; Fershtman and Gneezy, 2001), affiliation to a university (Ockenfels and Werner, 2014), or membership to an army platoon (Goette et al., 2006). Group identity can also be based on activities (Eckel and Grossman, 2005) or preferences, e.g., for paintings (Chen and Li, 2009; Tajfel, 1970), or even be randomly assigned (e.g. Currarini and Mengel, 2013) and still have a substantial influence on behavior. Evidence has shown that group identity affects interaction attitudes, such as reciprocity concerns, altruism, and the willingness to cooperate or punish (Bernhard et al., 2006; Chen and Li, 2009; Fershtman and Gneezy, 2001; Goette et al., 2006; Guala et al., 2013). Beginning with the pioneering work of Tajfel (1970), it has been extensively documented that individuals favor in-group members, which suggests that a transfer to an in-group member yields higher utility than does a transfer to an out-group individual. Despite the vast evidence for in-group bias and out-group discrimination<sup>1</sup>, the literature remains inconclusive on their causes. In addition, evidence is lacking regarding whether individuals discriminate against out-groups in general or against some more than others. Several motives might induce individuals to distinguish among different out-groups and therefore discriminate against them differentially. For instance, individuals might have preferences for some groups, associate them with more benevolent behavior which they would like to reciprocate, or may feel closer to some groups than to others. In this study, we shed light on how and why people discriminate among different groups (including their own groups and multiple out-groups) by analyzing their behavior and comparing it to beliefs they hold.

In a laboratory experiment, we recruit students from five departments at the University of Konstanz (Germany)<sup>2</sup> and conduct dictator games in which each dictator decides on transfers to members of each of the four other departments (out-groups) and a member of his or her own department (in-group). We also elicit beliefs of the dictators and the recipients of the transfers in order to relate behavior to perceptions about behavior.

---

<sup>1</sup> For an overview see, for instance, Tajfel and Turner (1986), Brown (2000), and McDermott (2009).

<sup>2</sup> Membership in a department represents an observable characteristic that is endogenously chosen. Individuals decide whether to study a specific subject, and this reflects their own attitudes and preferences that might affect their behavior. Other experiments that have used this type of group include Foddy et al. (2009) and Klor and Shayo (2010).

In line with previous literature, we find that individuals tend to be more generous toward in-group members than toward out-group members. Moreover, we provide evidence that individuals (correctly) believe that in-group favoritism is a common phenomenon. A significant share of dictators discriminates among different out-groups. In particular, we find that a dictator tends to be relatively more generous towards a specific out-group when she expects that dictators belonging to that out-group were generous towards members of her in-group. In our conclusion, we discuss several possible explanations for the observed patterns of behavior and beliefs.

Several authors have used economic experiments to investigate in-group favoritism. Most similar to our study are Yamagishi and Mifune (2008), Güth et al. (2009), and Ockenfels and Werner (2014). While Yamagishi and Mifune (2008) and Güth et al. (2009) create group identity in a laboratory setting, Ockenfels and Werner (2014) also use natural groups, namely students from the University of Cologne and the University of Düsseldorf (both in Germany). All three studies investigate the relationship between group-based beliefs and transfers in dictator games.<sup>3</sup> They focus on recipients' expectations and dictators' beliefs about recipients' expectations and find that dictators transfer higher amounts to in-group recipients when those recipients are aware of the shared membership.<sup>4</sup> Güth et al. (2009) also show that recipients expect larger transfers from in-group dictators than from out-group dictators, and the authors observe a positive relationship between dictators' transfers and their beliefs about recipients' expectations providing "evidence for the crucial role played by beliefs in mediating dictators' preferences" (p. 824). Ockenfels and Werner (2014) show that dictators are reluctant to be informed about the recipient's affiliation if it would require revealing their own affiliation.

Our study extends the analysis of group-based discrimination to a setup with multiple out-groups and focuses not only on the *recipients'* beliefs, but also on the *dictators'* beliefs and relationship to their behavior. This enables us to investigate whether dictators expect other dictators to be in-group biased and whether there exists a positive relationship between behavior and beliefs. Dictators may base their decisions on not only their beliefs about recipients' expectations (as previously shown)

---

<sup>3</sup> Various studies have focused on the importance of beliefs for pro-social behavior: (Bicchieri and Xiao, 2009; Grossman, 2010; Kagel et al., 1996; Ockenfels and Werner, 2012; Sapienza et al., 2013).

<sup>4</sup> In a related experiment, Guala et al. (2013) find that individuals cooperate less when their counterpart is not informed about their relative group identities than when their counterpart is fully informed.

but also their expectations about the behavior of their peers.<sup>5</sup> Previous evidence has suggested that in-group favoritism is not only driven by shared group identity *per se* but may also be reinforced by beliefs that others are in-group biased as well. However, the relationship between beliefs and behavior must be interpreted with caution, since the literature on social projection and the false consensus effect suggests that individuals tend to expect similarities between themselves and others (Robbins and Krueger, 2005; Ross et al., 1977). To account for this possibility, we elicit beliefs from both dictators and recipients and are thus able to control for projection to a certain extent.

The remainder of this paper is organized as follows. In Section 2, we present the design and the experimental procedures. In Section 3, we analyze the experimental data. Section 4 concludes.

## **2. Experimental design and procedure**

### **2.1 Design**

#### *2.1.1 Groups*

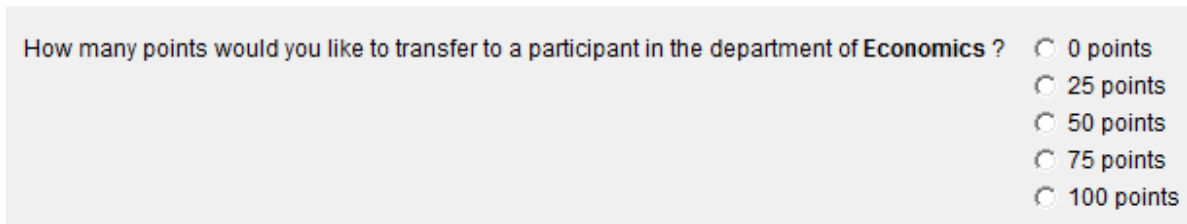
In our experiment, we conducted dictator games with natural groups to study transfers to different groups and individuals' belief about these transfers. The participants were students in the departments of Economics, Humanities, Law, Natural Sciences, and Psychology at the University of Konstanz, all situated on the same campus, with the five departments serving as the groups in the experiment. Each group, and therefore each participant, faces one in-group and four out-groups.

The experiment consisted of two phases. First, individuals played the dictator game with in-group and out-group counterparts. Second, all individuals assessed the transfers made by other dictators.

---

<sup>5</sup> Another study that analyzes the relationship between dictators' transfers and their beliefs concerning the behavior of other dictators is by Bicchieri and Xiao (2009), but their focus is on fairness preferences rather than group-based behavior.

### 2.1.2 Phase 1: Dictator games



How many points would you like to transfer to a participant in the department of Economics ?

☐ 0 points

☐ 25 points

☐ 50 points

☐ 75 points

☐ 100 points

**Figure 1 – Decision about making a transfer to an Economics recipient.** Note: Dictators made the same decision about transfers to recipients belonging to each of the five groups.

In the first phase, individuals played dictator games with counterparts from all five groups. Roles were assigned such that half of the group members acted as dictators and the other half acted as recipients. Dictators were endowed with 100 points and asked to decide whether to transfer 0, 25, 50, 75, or 100 points to the specified recipient. Figure 1 is a screenshot showing one of the five decisions to be made by each dictator. In order to facilitate the assessment phase (see Section 2.1.3), which is crucial for our study, we did not allow continuous choice. Dictators made a decision for one recipient from each group. The order of the groups' choices was random. All decisions were payoff relevant. Recipients could receive transfers from five different dictators, each from a different group. They were informed about the rules of the game but received feedback about their payoffs only after the assessment phase (see Section 2.1.3) so that the payoffs would not affect their assessments. The game was played only once, therefore each participant acted exclusively in the role of a dictator *or* recipient.

### 2.1.3 Phase 2: Assessments

In the second phase, all individuals (dictators and recipients) were asked to assess the previous transfer decisions of the dictators. More precisely, they were asked to assess the transfers of 10 randomly selected dictators from each of the five groups. The order in which individuals provided assessments was randomly determined and then kept constant across the two stages (for individuals who previously acted as a dictator, the order was the same as in the first phase).

In the first stage of the assessment phase, individuals were asked to guess how many out of 10 randomly selected dictators from each group had transferred 0, 25, 50, 75, or 100 points to a member of the assessor's group. Thus, each assessment consisted of five answers. For example, as shown in Figure 2, an assessor from the Economics department was asked how many of the 10

randomly selected dictators from the Law department (and the Humanities, Natural Sciences, Psychology, and Economics departments) had transferred each point amount to an Economics recipient.

How many of the 10 students of Law transferred to a participant of your department, i.e. of the department of Economics, each of the following amount of points?

0 points	<input type="text"/>
25 points	<input type="text"/>
50 points	<input type="text"/>
75 points	<input type="text"/>
100 points	<input type="text"/>

**Figure 2 - Assessment of dictators' allocations to recipients of the assessor's group (Stage 1).** Note: The figure considers the point of view of an individual belonging to the Economics department and shows the assessment about dictators from the Law department. Assessors performed this same Stage 1 assessment about dictators from each of the five departments (Law, Humanities, Natural Sciences, Psychology, and Economics).

In the second stage of the assessment, the assessors were asked to guess how many out of the same 10 randomly selected dictators from each group had transferred 0, 25, 50, 75, or 100 points to a member of the dictator's own group. Thus, as for the first stage, each assessment consisted of five answers. For example, the assessor from the Economics department was asked to guess how many of the 10 dictators from the Law department had transferred each point amount to a Law recipient, how many Humanities dictators had transferred each point amount to a Humanities recipient, and so on.

The assessment was incentivized. One group was randomly selected and the answers of the two assessments concerning this group were payoff relevant—one from Stage 1 and one from Stage 2. The payoff was calculated according to the accuracy of each of the five answers provided in the assessment (note that for each assessment five answers had to be entered). If an answer was correct, the participant received 10 points; if the participant's answer was within one point of the true value, he or she received 1 point; otherwise, he or she received zero.

$$answer\ payoff = \begin{cases} 10\ points\ if\ error = 0 \\ 1\ point\ if\ 0 < error \leq 1 \\ else\ 0 \end{cases}$$

in which  $error = |answer - actual\ value|$



Therefore, participants could obtain at most 50 points in each assessment (i.e., 5 answers x 10 points). From the assessor's answers concerning a specific group, we calculate the corresponding average values, which measure the beliefs of a specific participant.<sup>6</sup> We did not elicit average beliefs directly, because comprehension of the concept of average might differ across groups—for instance, Natural Sciences or Economics students could have a much more precise knowledge of averages than Humanities or Law students. Therefore, rather than asking for averages directly, our assessment procedure calculates them from the individual assessment responses. Table 1 provides an overview of the beliefs elicited from an individual belonging to the Economics department.

		Recipient				
		ECO	HUM	LAW	NAT	PSY
Dictator	ECO	*				
	HUM	X	X			
	LAW	X		X		
	NAT	X			X	
	PSY	X				X

**Table 1 – Beliefs elicited in the assessment phase from an Economics participant.** Note: Each X indicates the beliefs that were elicited from individuals affiliated with the Economics department. The X entries in the first column indicate the beliefs elicited in Stage 1, regarding how much each out-group dictator transferred to an Economics recipient. The diagonal represents the beliefs elicited in Stage 2, regarding how much each out-group dictator transferred to a recipient from his or her own group. The asterisk indicates that, although we elicited beliefs regarding the generosity of the assessors' in-group dictators toward the in-group, this paper focuses mainly on beliefs about out-groups.

We did not elicit beliefs concerning in-group dictators' transfers to out-group recipients, because they would have corresponded directly to the decisions made in the dictator game (Phase 1) and, therefore, could be highly influenced by those decisions.<sup>7</sup> Indeed, as we show in Section 3.5, recipients and dictators state different beliefs, which indicates that behavior may influence beliefs. For completeness and to avoid possible experimenter demand effects, we asked individuals for their beliefs regarding in-group dictators' transfers to in-group recipients (the asterisk shown in Table 1). Table 2 summarizes the experiment.

<sup>6</sup> For example, if an individual assesses that out of the ten randomly selected dictators in the Law department five gave zero points, three 25 points and two 50 points, his or her belief for the Law department is calculated as  $(5 * 0 + 3 * 25 + 2 * 50 + 0 * 75 + 0 * 100) * 1/10 = 17.5$

<sup>7</sup> Bicchieri and Xiao (2009) raise this point but do not provide evidence supporting it.

<u><i>Phase 1:</i></u> <u><i>Only dictators</i></u>	→	<u><i>Phase 2, Stage 1:</i></u> <u><i>dictators and</i></u> <u><i>recipients</i></u>	→	<u><i>Phase 2, Stage 2:</i></u> <u><i>dictators and</i></u> <u><i>recipients</i></u>
Dictator game		Elicitation of beliefs about dictators' transfers to the individual's in-group		Elicitation of beliefs about dictators' transfers within their own groups
Dictators decide on one transfer to each group		Each assessor makes an assessment about dictators from each of the five groups		Each assessor makes an assessment about dictators from each of the five groups

**Table 2 – Phases of the experiment**

## **2.2 Procedure**

Participants in the experiment consisted of 360 individuals, with 72 individuals in each of the five groups. The sessions were conducted between January and November 2013 at the Lakelab at the University of Konstanz, and each lasted about 30 minutes. Individuals could leave the laboratory after they had completed a questionnaire,<sup>8</sup> without needing to wait for other individuals to finish. The exchange rate was set to 100 points= € 1 (about \$1.12). Individuals earned on average € 8.1 including a € 5 participation fee. Individuals received the participation fee immediately after the experiment, and additional payments were made within one week.<sup>9</sup> The experiment was computerized by use of z-Tree (Fischbacher, 2007), and participants were recruited by use of the Online Recruitment System for Economic Experiments (ORSEE) (Greiner, 2004).

## **3. Results**

Before we present our results, we introduce some useful notation in Section 3.1. In Section 3.2, we provide an overview of the data. In Sections 3.3 and 3.4, we address our two main research questions regarding in-group favoritism and out-group discrimination. Section 3.5 contains some discussion of the causal relationship between behavior and beliefs.

<sup>8</sup> At the end of each session, the individual was asked to respond to a questionnaire about demographic characteristics and the number of acquaintances they had in each group.

<sup>9</sup> Full payments could not be made immediately after the experiment, because we had to run more sessions to collect the decisions of all dictators before we could determine the accuracy of participants' answers and the resulting payoffs. Participants were allowed to ask another person to collect payment on their behalf.

### 3.1 Notation

Each individual, regardless of his or her role—dictator or recipient—faces an in-group and four out-groups. In Table 3, we specify the notation for all possible transfers made by dictators and all possible beliefs stated by participants (dictators and recipients).

Variable name	Description
$Transfer(I \rightarrow I)$	Transfer from a dictator in group $I$ to a recipient from the same group $I$
$Transfer(I \rightarrow J)$	Transfer from a dictator in group $I$ to a recipient from a different group, $J$
$Transfer(I \rightarrow OUT)$	$= \frac{1}{4} \sum_{J \neq I} Transfer(I \rightarrow J)$ , the mean transfer made by a dictator from group $I$ to all out-groups
$Transfer(J \rightarrow I)$	Transfer received by a recipient in group $I$ from a dictator in a different group, $J$
$Transfer(OUT \rightarrow I)$	$= \frac{1}{4} \sum_{J \neq I} Transfer(J \rightarrow I)$ , the mean transfer received by a recipient in group $I$ from dictators in the four out-groups
$Belief(I \rightarrow I)$	Belief of an assessor in group $I$ regarding the average transfer made by dictators in group $I$ to recipients in group $I$
$Belief(J \rightarrow I)$	Belief of an assessor in group $I$ regarding the average transfer made by dictators in group $J$ to recipients in group $I$
$Belief(J \rightarrow J)$	Belief of an assessor in group $I$ regarding the average transfer made by dictators in group $J$ to recipients in group $J$ .
$Belief(OUT \rightarrow I)$	$= \frac{1}{4} \sum_{J \neq I} Belief(J \rightarrow I)$ , the mean belief of an assessor in group $I$ regarding the average transfer made by out-group dictators to recipients in group $I$
$Belief(OUT \rightarrow OUT)$	$= \frac{1}{4} \sum_{J \neq I} Belief(J \rightarrow J)$ , the mean belief of an assessor in group $I$ regarding the average transfer made by out-group dictators to recipients in their respective in-groups

Table 3 –Notation for transfer decisions and stated beliefs

## Transfers

Consider a dictator who belongs to group  $I$ . She decides on five transfers to recipients belonging to groups  $J$ , in which  $J \in \{\text{Economics, Humanities, Law, Natural Sciences, Psychology}\}$ . In the experiment we collect information about  $Transfer(I \rightarrow I)$ , the transfer from this dictator in group  $I$  to a recipient in her own group,  $I$ , and  $Transfer(I \rightarrow J)$ , the transfers from this dictator to recipients in each of the other groups,  $J$ . For our analysis, we aggregate these transfers to out-group recipients and compute  $Transfer(I \rightarrow OUT)$ , the mean transfer made by a dictator in group  $I$  to a recipient in an out-group.

Now consider a recipient who belongs to group  $I$ . She receives five transfers, namely from dictators in groups  $J$ , in which  $J \in \{\text{Economics, Humanities, Law, Natural Sciences, Psychology}\}$ . We define  $Transfer(J \rightarrow I)$  as the transfer received by a recipient in group  $I$  from a dictator in a different group,  $J$  and  $Transfer(OUT \rightarrow I)$  as the mean transfer received by the recipient in group  $I$  from dictators in each of the four out-groups.

## Beliefs

Consider an assessor who belongs to group  $I$ . In the assessment phase, she states different beliefs regarding transfers. We elicit  $Belief(I \rightarrow I)$ , the belief of an assessor in group  $I$  regarding the average transfer made by dictators in group  $I$  to recipients in that same group,  $I$ . We also elicit  $Belief(J \rightarrow I)$ , the belief of an assessor in group  $I$  regarding the average transfer made by dictators in group  $J$  to recipients in group  $I$ , and  $Belief(J \rightarrow J)$ , the belief of an assessor from group  $I$  regarding the average transfer made by dictators in group  $J$  to recipients in that same group,  $J$ . For further analysis, we compile these beliefs and compute two new measures:  $Belief(OUT \rightarrow I)$ , the mean of the beliefs of an assessor in group  $I$  regarding the average transfer made by out-group dictators to recipients in the assessor's group,  $I$ , and  $Belief(OUT \rightarrow OUT)$ , the mean of the beliefs of an assessor in group  $I$  regarding the average transfer made by out-group dictators to recipients in their own respective in-groups.

### 3.2 Data overview

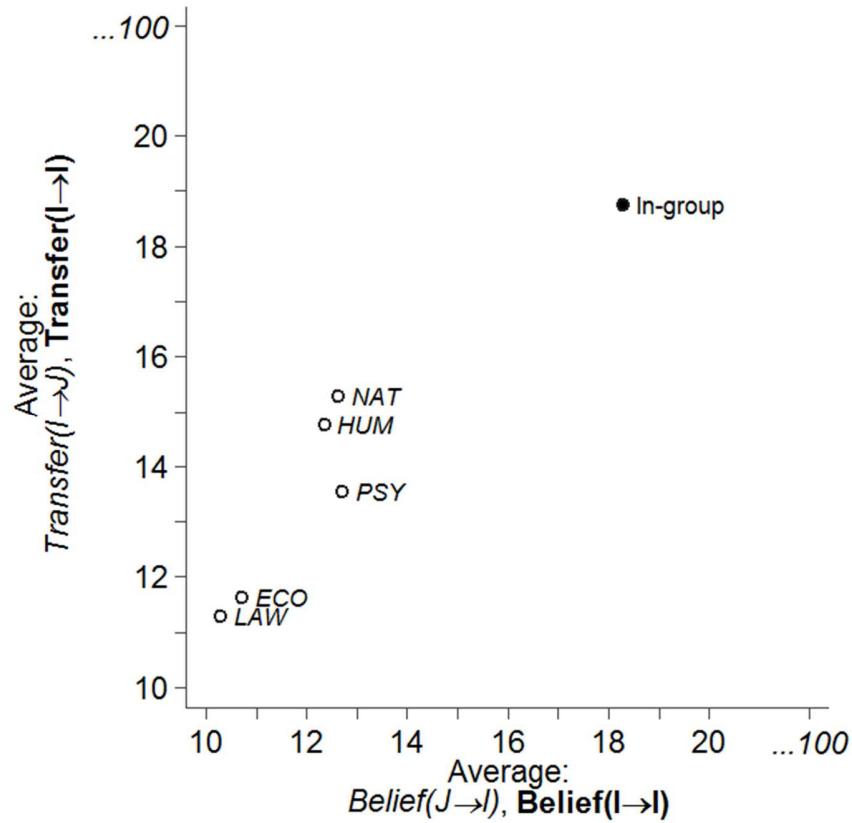
Table 4 summarizes the behavioral patterns observed in our data. We also show the distribution of the population by various categories of favoritism and discrimination. Of the 180 dictators, 81 were selfish, in the sense that they maximized their payoffs by transferring zero points to all five potential recipients. The remaining 99 dictators each transferred a positive amount at least once. Among them, 48 practiced in-group favoritism, transferring more to recipients in the in-group than to recipients in the out-groups, on average. In contrast, 12 dictators practiced in-group disfavoritism, behaving in the opposite way. An analysis of transfers to out-group recipients reveals that, of the total 180 dictators, 52 dictators discriminated among out-groups. The remaining 128 dictators did not discriminate among out-groups. Among them, 90 did not make any transfer to potential recipients in out-groups and 38 made the same transfer amount to all potential recipients in out-groups.

	Number of dictators	Share of total
Total dictators	180	100%
<u>All transfers</u>		
Selfish	81	45.0%
Non-selfish	99	55.0%
In-group favoring	48	26.7%
In-group disfavoring	12	6.7%
Non-favoring	39	21.7%
<u>Transfers to out-group recipients</u>		
Discriminator among out-groups	52	28.9%
Non-discriminator among out-groups	128	71.1%
Non-discriminator among out-groups, selfish	90	50.0%
Non-discriminator among out-groups, non-selfish	38	21.1%

**Table 4 – Classification of dictators by behavioral pattern in the dictator game.** Note: A *selfish* dictator transferred zero points to all five potential recipients. A *non-discriminator among out-groups* did not transfer a different amount to recipients in different out-groups. A *non-discriminator among out-groups, selfish* transferred zero points to potential recipients in all four out-groups.

Figure 3 illustrates the relationship between expected and realized transfers. The white dots show the relationship between participants beliefs regarding the transfers expected to be made by out-group dictators to in-group recipients ( $Belief(J \rightarrow I)$ ) on the x-axis and the corresponding actual transfers made ( $Transfer(I \rightarrow J)$ ) on the y-axis. The black dot indicates the relationship between

participants beliefs regarding in-group transfers ( $Belief(I \rightarrow I)$ ) on the x-axis and the corresponding actual in-group transfers ( $Transfer(I \rightarrow I)$ ) on the y-axis.



**Figure 3 - Relationship between expected and realized transfers.** *Belief* is defined as the transfer amount a participants in group  $I$  expected, on average, a dictator in a given group  $J$  or in group  $I$  to make. *Transfer* is defined as the actual amount dictators, on average, actually transferred to recipients in the respective groups.

We can observe two patterns from Figure 3.

First, dictators tend to be in-group biased and expect other dictators to be as well, as shown by the black dot's location above and to the right of the white dots. That is, it seems to be a “custom” to be *particularly* generous to one's own in-group. Note that dictators gave about 18 points, on average, to recipients in their in-group and expected that other dictators had also given about 18

points<sup>10</sup>, on average, to recipients of their own in-groups.<sup>11</sup> This suggests that there is a strong relationship between transfers and beliefs.

Second, dictators seem to discriminate among the various out-groups. Recipients who belonged to the Economics and Law departments received smaller amounts than those in other groups. At the same time, beliefs regarding the transfers expected to be made by dictators in those groups were lower (see the white dots in Figure 3). Thus, dictators in the Law and Economics departments were not only expected to have transferred relatively small amounts as compared to dictators in other groups, but recipients in those departments also received relatively less, on average, from dictators in other groups.

Based on these two results, we analyze two main issues. First, in Section 3.3, we investigate *(i)* whether individuals tend to favor in-group members and *(ii)* whether they expect that this is common behavior. In addition, we examine whether *(iii)* in-group favoritism increases with the belief that others are in-group biased. Second, in Section 3.4, we analyze *(iv)* whether individuals also discriminate among multiple out-groups and *(v)* whether this discriminatory behavior depends on the transfer that a participant in one group expects an out-group dictator to make to a recipient in his or her own in-group.

Note that, when analyzing the relationship between transfers and beliefs, we cannot control for the phenomenon of dictators adapting their beliefs to behavior. Consequently, including elicited beliefs as independent variables to explain actual transfers could lead to a reverse causality problem. Consequently, we will cautiously interpret our results as indications of statistically significant associations.<sup>12</sup> In Section 3.5, we compare dictators' and recipients' beliefs to further explore this issue.

---

<sup>10</sup>  $Belief(I \rightarrow I)$  is calculated as the average of the answer in the assessment of the own group in Stage 1 of Phase 2. However, if we consider the assessment of the own group in Stage 2 of Phase 2, the average value is again about 18 points.

<sup>11</sup> This relationship is also demonstrated by the strong positive correlation between these two variables, namely Spearman's rank correlation coefficient is 0.750,  $p < 0.01$ , suggesting that individuals anchor their beliefs to their transfer decisions. Our experiment design allows us to further analyze this relationship by comparing the beliefs of dictators with those of recipients. This allows us to identify a possible effect of transfer decisions on beliefs.

<sup>12</sup> Güth et al. (2009) make a similar clarification.

### 3.3 In-group favoritism

#### Results 1:

- (i) Dictators practice in-group favoritism.
- (ii) Both dictators and recipients correctly expect in-group favoritism.
- (iii) Dictators' in-group favoritism is positively associated with their belief in in-group favoritism.

In the following, we summarize the data that supports these conclusions regarding in-group favoritism.

**Item (i): In-group favoritism.** As reported in Table 4, of the 99 non-selfish dictators, 48 favored their in-group by transferring a larger amount, on average, to in-group recipients than to out-group recipients. Of the remaining 51 non-selfish dictators, 12 disfavored the in-group, and 39 transferred equal positive amounts to in-group and out-group recipients. At the aggregate level, in line with previous literature (see Section 1), dictators transferred significantly larger amounts to in-group recipients than to out-group recipients.

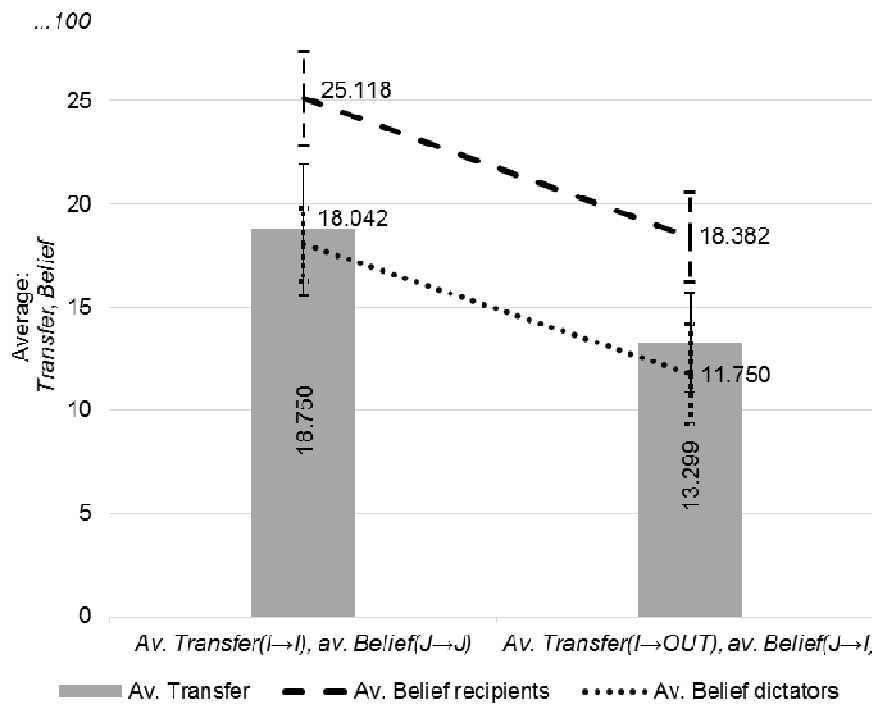
Figure 4 shows that dictators transferred, on average, 18.750 points to recipients in their in-groups but only 13.299 points to recipients in out-groups.<sup>13</sup> The difference is statistically significant (Wilcoxon signed-rank test:  $z = 4.817$ ,  $p < 0.01$ ). Figure 5 shows that this behavior is common to dictators in all groups: dictators in all groups transferred more points, on average, to recipients in their in-groups than to recipients in other groups.<sup>14</sup>

---

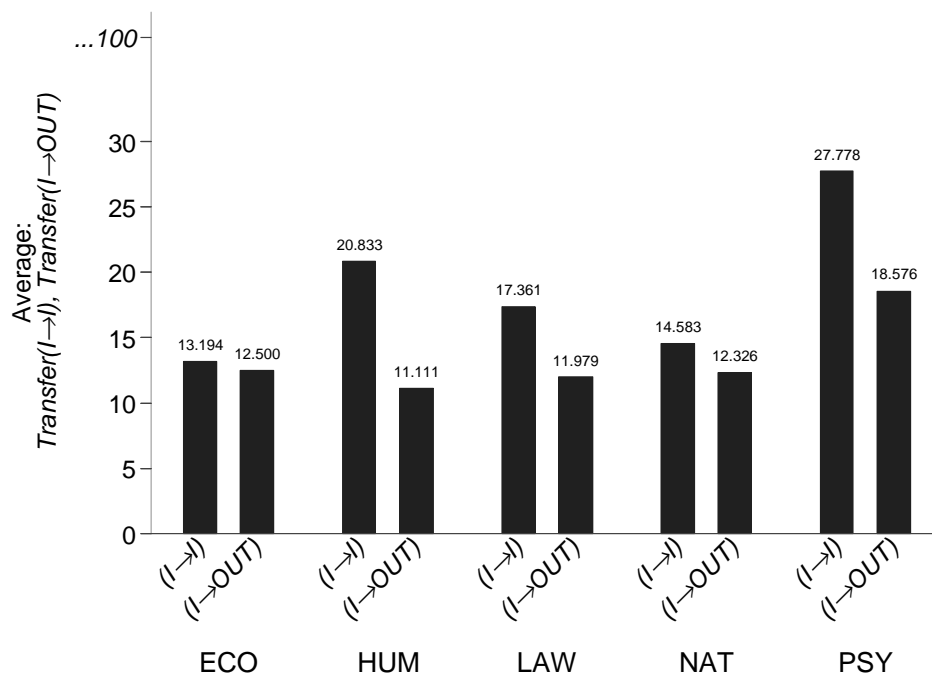
<sup>13</sup> The results for in-group recipients are similar to those from previous dictator games: dictators share about 20% of their endowments. See the meta study of dictator games (Engel, 2011).

<sup>14</sup> The differences are significant for dictators in the Humanities (Wilcoxon signed-ranks test:  $z = 3.431$ ,  $p < 0.01$ ), Psychology (Wilcoxon signed-ranks test:  $z = 3.500$ ,  $p < 0.01$ ), and Law departments (though weakly, with Wilcoxon signed-ranks test:  $z = 1.655$ ,  $p = 0.0980$ ) but not for dictators in the Economics and Natural Sciences departments.





**Figure 4 – In-group and out-group transfers and related beliefs.** The bars display the average amounts transferred. The dotted and dashed lines display the average beliefs of dictators and recipients, respectively. The internal bars show the 95% confidence interval around each average belief.



**Figure 5 – Average in-group ( $Transfer(I \rightarrow I)$ ) and out-group transfer ( $Transfer(I \rightarrow OUT)$ ) by dictator group.**

**Item (ii): Belief in in-group favoritism.** In Figure 4, we compare the beliefs of dictators and recipients with the actual amounts transferred.<sup>15</sup> Generally, for most individuals  $\text{Belief}(\text{OUT} \rightarrow I)$  was less than  $\text{Belief}(\text{OUT} \rightarrow \text{OUT})$ . That is, individuals expected out-group dictators to be in-group biased.<sup>16</sup> On average, for both dictators and recipients, this belief relationship holds: both types of assessors expected that out-group dictators transfer higher amounts to recipients in their own groups than to recipients in the assessor's group (Wilcoxon signed-ranks test: dictators,  $z=9.207$ ,  $p<0.01$ ; recipients,  $z=10.065$ ,  $p<0.01$ ).

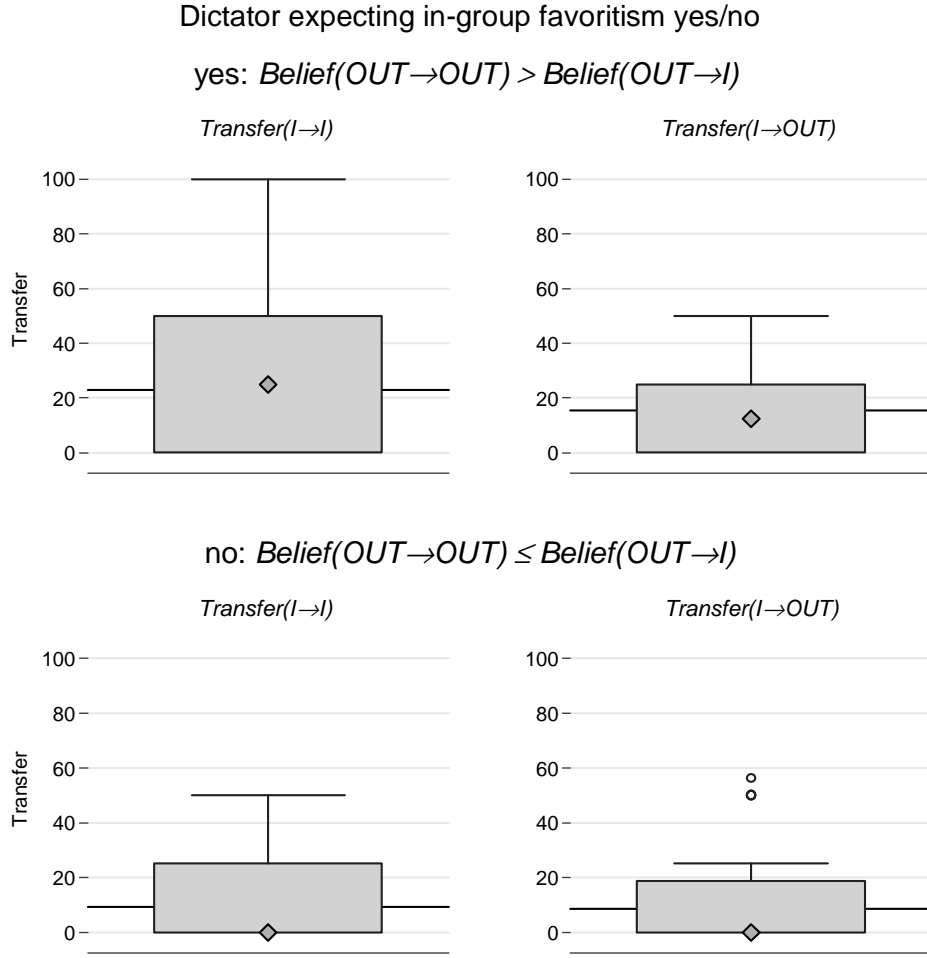
Moreover, dictators' beliefs are more accurate than are recipients' beliefs. Namely, the confidence intervals of recipients'  $\text{Belief}(\text{OUT} \rightarrow I)$  and  $\text{Belief}(\text{OUT} \rightarrow \text{OUT})$  are higher than the actual amounts transferred. The confidence intervals of dictators' beliefs, however, overlap with the actual amounts transferred.

**Item (iii): Relationship between in-group favoritism and beliefs.** We now explore the link between the extent of in-group favoritism shown by dictators and those dictators' beliefs regarding in-group favoritism shown by other groups' dictators. Figure 6 illustrates the relationship between expected in-group favoritism (i.e., the pattern that  $\text{Belief}(\text{OUT} \rightarrow \text{OUT}) > \text{Belief}(\text{OUT} \rightarrow I)$ ) and the respective dictators' transfers to their in-group individuals ( $\text{Transfer}(I \rightarrow I)$ ) and to out-group individuals ( $\text{Transfer}(I \rightarrow \text{OUT})$ ). Of the 180 dictators, 126 expected other dictators in other groups to exhibit in-group favoritism. Moreover, only dictators who expected in-group favoritism from other groups' dictators transferred significantly larger amounts to recipients in their own groups than to recipients in out-groups (Wilcoxon signed-ranks test  $z=4.653$ ,  $p<0.01$ ; for those dictators who did not expect in-group favoritism: Wilcoxon signed-ranks test  $z=1.593$ ,  $p=0.111$ ), as shown in Figure 6.

---

<sup>15</sup> Notice that the beliefs are those of out-group dictators, i.e., they do not include the beliefs of other in-group dictators, which are excluded for the reasons explained at the beginning of Section 2.1.3.

<sup>16</sup> Of the 360 individuals, 269 (126 dictators and 143 recipients) expected out-group dictators to be in-group biased.



**Figure 6 – In-group and out-group transfer amounts for dictators who do and do not expect out-group dictators to exhibit in-group favoritism.** Note: The internal diamond markers and the external lines correspond, respectively, to the median and mean of each distribution.

To gain a deeper understanding of the relationship between in-group favoritism and related beliefs, we employ a regression analysis. We measure the in-group favoritism that a dictators expects to be exhibited by dictators in other groups as

$\text{Belief}(\text{in-group-favoritism OUT}) = \text{Belief}(\text{OUT} \rightarrow \text{OUT}) - \text{Belief}(\text{OUT} \rightarrow \text{I})$  and use the dictator's actual transfers to form the dependent variable.

In the regression, we include an in-group dummy variable equal to 1 if the dependent variable refers to the dictator's transfer to an in-group recipient ( $\text{Transfer}(\text{I} \rightarrow \text{I})$ ) and equal to 0 if it refers to the average transfer to out-group recipients ( $\text{Transfer}(\text{I} \rightarrow \text{OUT})$ ). We also include an interaction

term between the in-group dummy variable and *Belief(in- group- favoritism OUT)*. Given the panel structure of our data set, we can control for individual invariant characteristics, such as gender, age, and field of study.

Table 5 shows that the coefficient on the in-group dummy variable is positive and significant (at significance level 5%), confirming that dictators tend to favor recipients in their in-groups. Moreover, the coefficient on interaction term between the in-group dummy variable and the belief that internal favoritism is exhibited by dictators in other groups is positive and statistically significant (at significance level 1%). This suggests that dictators who expect that out-group dictators are in-group biased exhibit even stronger in-group favoritism, than those who do not expect them to be in-group biased.

Independent Variables and Statistics	Dependent variable:
	<i>Transfer(I → I), Transfer(I → OUT)</i>
Transfer to an in-group recipient=1; 0 else	2.479** (1.156)
Transfer to an in-group recipient x <i>Belief(in- group- favoritism OUT)</i>	0.472*** (0.152)
Constant	13.30*** (0.513)
Number of observations	360
Number of individuals	180
R-squared	0.216
F(2,179)	15.26
P > F	0.000

Robust standard errors are shown in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5 - Fixed effects regression of dictators' transfers to in-group recipients and out-group recipients.** Note: For each individual the dependent variable reports the actual in-group transfer, *Transfer(I → I)*, and the average amount transferred to out-group recipients, *Transfer(I → OUT)*. *Belief(in- group- favoritism OUT)* is an invariant variable and it is deleted via fixed effects. Cluster robust standard errors at individual level are included. The Hausman test for fixed vs. random effects does not reject the null hypothesis that the difference in coefficients is not systematic, p>0.1. The same results are obtained by using the square-root transformation to increase symmetry of the distribution of the dependent variable.

### 3.4 Discrimination among multiple out-groups

#### Results 2:

- (iv) On average, dictators discriminate among the various out-groups. This effect is caused by 29% of dictators discriminating among out-groups. 50% of dictators behave selfish with regard to all out-groups, and only 21% exhibit unselfish, nondiscriminatory behavior.
- (v) Both dictators and recipients correctly expect recipients to be treated differently, on average, by dictators in different out-groups.
- (vi) A dictator tends to be relatively more generous to recipients in a specific out-group when he or she expects that dictators in that out-group are generous to members of his or her in-group.

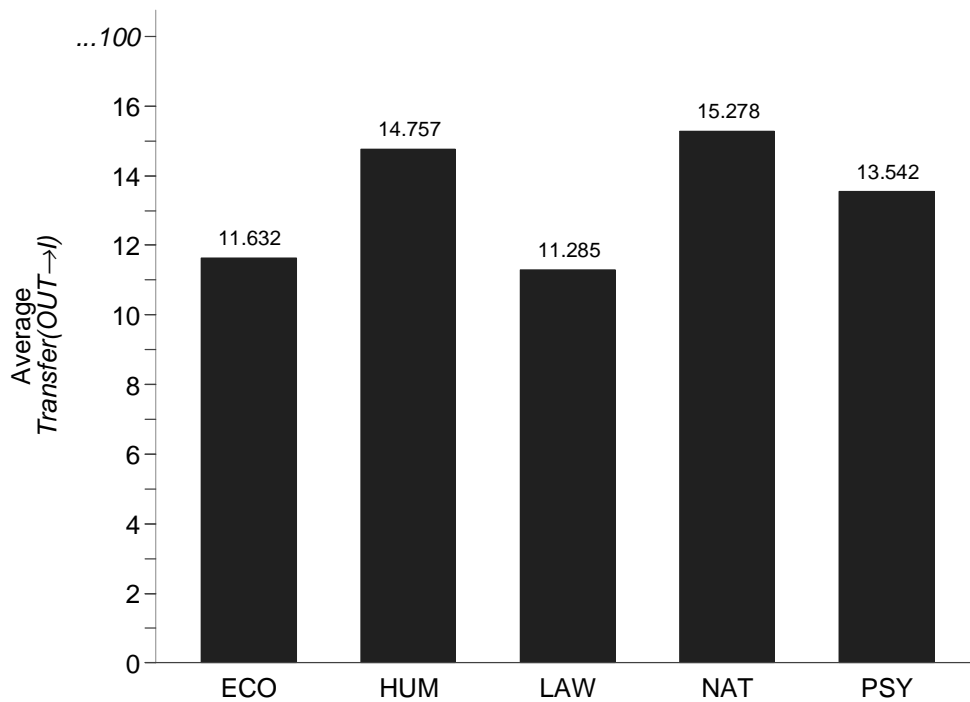


Figure 7 – Average transfer amount received by each out-group ( $Transfer(OUT \rightarrow I)$ ).

**Item (iv): Dictators discriminate among out-groups.** We first focus on transfers to recipients in out-groups and thus exclude in-group transfers from the analysis. Of the 180 dictators, 52 discriminated among the various out-groups (see Table 4), transferring to recipients in at least one out-group a smaller or larger amount than to recipients in other out-groups. Figure 7 shows the

average transfer that recipients received from out-group dictators, illustrating that out-groups are treated differently by dictators. A repeated measure analysis of variance (ANOVA,  $F(4, 179)=6.57$ ,  $p<0.01$ )<sup>17</sup> rejects the hypothesis that recipients from different out-groups are treated in the same way.

**Item (v): Beliefs about transfers made by dictators in various out-groups.** We now focus on individuals' beliefs about transfers made by dictators in the various out-groups. Table 6 reports repeated measure analyses of variance (ANOVA) of  $Belief(J \rightarrow I)$  by dictators and recipients. This variable is statistically different across groups for both dictators and recipients. Thus, we find that assessors generally expect that each out-group dictator will not exhibit the same generosity toward the assessors' in-group. To shed some more light on the details behind these beliefs, Table 6 distinguishes among the following types of dictators: those who discriminated among out-groups, transferring at least one smaller or larger amount to recipients in at least one out-group, those who did not discriminate and were selfish, transfer zero amounts to recipients in all out-groups, and those who did not discriminate and were non-selfish, transferring the same positive amount to recipients in each out-group. All of these sub-groups expected different amounts to be transferred by dictators in different out-groups.

	F	P-value
Recipients	23.19	<0.01
Dictators	12.61	<0.01
Out-group discriminator	5.73	<0.01
Out-group non-discriminator, selfish	3.16	0.015
Out-group non-discriminator, non-selfish	5.50	<0.01

**Table 6 - Repeated measure analysis of variance (ANOVA) of  $Belief(J \rightarrow I)$  by role and behavior in the dictator game.**

**Item (vi): Relationship between belief and behavior.** In Section 3.2, we outline a positive relationship between transfers and beliefs (see the white dots in Figure 3). Here we analyze whether a dictator is more generous toward recipients in groups whose dictators are expected to be more generous toward recipients in his or her group.

<sup>17</sup> Despite the large sample size, which supports the reliability of our results, as a robustness check we rerun ANOVA by using the square-root transformation of the dependent variable to increase the symmetry of its distribution. Results are unchanged.

To begin, we report a positive and significant correlation between a dictator's transfer to a specific out-group  $J$  ( $\text{Transfer}(I \rightarrow J)$ ) and that same dictator's  $\text{Belief}(J \rightarrow I)$ . The Spearman correlation coefficient is 0.653 ( $p < 0.01$ ). We further explore this relationship via regression analysis. As mentioned in Section 3.2, we cannot exclude that dictators shape their behavior on the basis of their beliefs. Therefore, using elicited beliefs as independent variables to explain transfers could suffer from endogeneity bias. We provide valuable insights from a more detailed comparison of dictators' and recipients' beliefs (see Section 3.5). Here, following Bicchieri and Xiao (2009), we exploit the variation induced by various out-groups, taking into account that each individual submitted decisions and beliefs in random order. Because the order was exogenous, the treatment variables should not correlate with the error term. We use the out-groups as instruments for the variables  $\text{Belief}(J \rightarrow I)$  and  $\text{Belief}(J \rightarrow J)$ .<sup>18</sup> Therefore, in addition to the fixed effects estimation, we provide fixed effects regressions with instrumental variables (IV) with cluster-robust standard errors at the individual level. Table 7 reports the regression of the transfer conditional to the  $\text{Belief}(J \rightarrow I)$ . The related coefficient is positive and significant for both fixed effects (column 1,  $p < 0.01$ ) and IV regressions (column 3,  $p = 0.017$ ). The coefficient of  $\text{Belief}(J \rightarrow J)$  is smaller than the coefficient of  $\text{Belief}(J \rightarrow I)$  and not significant in the IV regression ( $p = 0.926$ ). This means that a dictator tends to be more generous toward members of groups whose dictators are expected to be more generous toward recipients of his or her in-group. However, we must also consider that a dictator might be partially motivated to be more generous toward recipients in out-groups that include more acquaintances. We disentangle this effect by including a variable (*Familiar*) reporting an individual's number of acquaintances in a specific group (columns 2 and 4); this information was gathered in the questionnaire. The associated coefficient is not significant in any specification, which indicates that the number of acquaintances in a specific out-group does not affect the dictators' decision regarding how much to transfer to the out-group. Thus, a dictator tends to be relatively more generous toward a specific out-group when he or she expects that dictators belonging to that out-group are generous toward members of his or her in-group, regardless of the relative number of acquaintances the dictators has in the out-group.

---

<sup>18</sup> We control for  $\text{Belief}(J \rightarrow J)$  in order to disentangle the belief about generosity specifically directed to the in-group from a general generosity independent of group. For example, a dictator belonging to the Economics department might expect that a dictator in the Psychology department is generous toward a recipient in the Economics department simply because he or she is expected to be generous toward any group.

	(1)	(2)	(3)	(4)
	FE		IV/GMM FE	
Independent Variables and Statistics	Dependent variable: <i>Transfer(I → J)</i>			
<i>Belief(J → I)</i>	0.303*** (0.108)	0.303*** (0.108)	1.227** (0.514)	1.245** (0.522)
<i>Belief(J → J)</i>	0.260*** (0.0696)	0.260*** (0.0699)	0.0269 (0.288)	0.0186 (0.289)
Familiar		0.200 (2.878)		-0.721 (3.435)
Constant	5.051*** (1.724)	5.027*** (1.783)		
Observations	720	720	720	720
Number of individuals	180	180	180	180
R-squared	0.073	0.073		
F	11.65	7.79	10.70	7.53
P>F	p<0.01	p<0.01	p<0.01	p<0.01

Robust standard errors are shown in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 7 – Fixed effects and instrumental variable (IV)/generalized method of moments (GMM) regressions of *Transfer(I → J)* on *Belief(J → I)* and *Belief(J → J)*.** Notes: Columns 1 and 2 report the individual fixed effects (FE) regression results; cluster-robust standard errors (shown in parentheses) at individual level are included in all specifications. Columns 3 and 4 report the IV/GMM regressions with individual fixed effects; cluster-robust standard errors (shown in parentheses) at individual level are included in all specifications. The variable Familiar is defined as the number of acquaintances the dictator has in a specific out-group. The Hausman test for fixed vs. random effects rejects the null hypothesis that the difference in coefficients is not systematic, p<0.01. Instrumented variables are *Belief(J → I)* and *Belief(J → J)*. Instrumental variables are the treatment dummy variables for the assessed departmental groups: Economics, Humanities, Law, Natural Sciences and Psychology. The Hansen J statistic overidentification test for all instruments does not reject the null hypothesis (p>0.1). We arrive at the same conclusions by using the square-root transformation as a robustness check to increase the symmetry of the dependent variable's distribution.

### 3.5 Do transfer decisions affect beliefs?

#### Results 3:

- (vii) Decision making prior to belief elicitation affects the expected level of transfers but not the expected relative transfer amounts to the various groups.

**Item (vii): Effect of transfer decisions on beliefs.** Our experiment design allows the comparison of dictators' beliefs and recipients' beliefs. Because recipients were informed about the dictators' decisions only after the belief elicitation stage, we can explore whether and, if so, how beliefs are



systematically affected by prior decision making.<sup>19</sup> If behavior does not influence beliefs, we should observe no difference in beliefs between dictators and recipients. However,  $Belief(J \rightarrow I)$  for recipients is significantly higher than for dictators (average values 19.708 and 13.061, respectively; Wilcoxon sum-rank test:  $z=9.186$ ,  $p<0.01$ ). Similarly,  $Belief(J \rightarrow J)$  for recipients is significantly higher than for dictators (average values 24.955 and 18.031, respectively; Wilcoxon sum-rank test:  $z=9.266$ ,  $p<0.01$ ). These results suggest that recipients systematically overestimate transfers, probably because they lack a reference point.

We also explore whether beliefs regarding particular groups differ between dictators and recipients. An ANOVA with one between-subject factor, the role of dictator, and one within-subject factor, the assessed group, rejects the null hypothesis that there is no interaction between the two factors for both types of beliefs  $Belief(J \rightarrow I)$  ( $F(4, 359)=3.42$ ,  $p<0.01$ ) and  $Belief(J \rightarrow J)$  ( $F(4, 359) = 3.07$ ,  $p=0.0157$ ).<sup>20</sup> However, the pattern seems to be similar between dictators and recipients: for example, both dictators and recipients expect larger transfers from dictators in the Psychology, Humanities, and Natural Sciences departments and smaller transfers from dictators in the Economics and Law departments. This can be seen in Figure 8 (A), which shows  $Belief(J \rightarrow I)$  for both dictators and recipients and compares their beliefs with the actual amount transferred,  $Transfer(I \rightarrow OUT)$ . Pairwise comparisons between the various groups confirm that this belief pattern is common to both dictators and recipients (see Table 8). Therefore, the rejection of the null hypothesis in the ANOVA is probably due to more pronounced differences in recipients' beliefs than in dictators' beliefs, which, however, reflect the same pattern. Hence, the decision in the dictator game seems to affect beliefs in the same direction for all groups. Figure 8 (B) provides further support for this hypothesis. Like Figure 8 (A), it displays average beliefs on transfers, but it distinguishes among various types of dictators (discriminating, nondiscriminating selfish, and nondiscriminating non-selfish, as in Table 6). We observe the same relative patterns among out-

---

<sup>19</sup> The results described in this paragraph contribute to a recent strand of literature aimed at understanding how belief elicitation interacts with decision making (see Schlag et al. (2014) for a survey). Belief elicitation has been shown to affect decision making, for instance in prisoner's dilemmas or public good games (Croson, 2000; Gächter and Renner, 2010; Hoffmann, 2013).<sup>19</sup> Evidence exploring the other direction—the effect of decision making on belief—is scarce. The only exception we have found is Offerman et al. (1996), who does not find any effect of decisions on belief elicitation in public good games. This issue has recently been addressed by Bicchieri and Xiao (2009) in dictator games; however, they cannot provide evidence on this aspect. Although this issue has been often neglected, researchers should consider it when designing their experiments.

<sup>20</sup> These tests are conducted omitting observations regarding the in-group. However, we also reject the null hypothesis, with  $p<0.05$ , when we include them.

groups as in Figure 8 (A), suggesting that the behavior in the dictator game does not substantially affect expectations regarding relative transfers. To summarize, the decisions in the dictator game seem to affect the level but not the relative expectations regarding transfers.

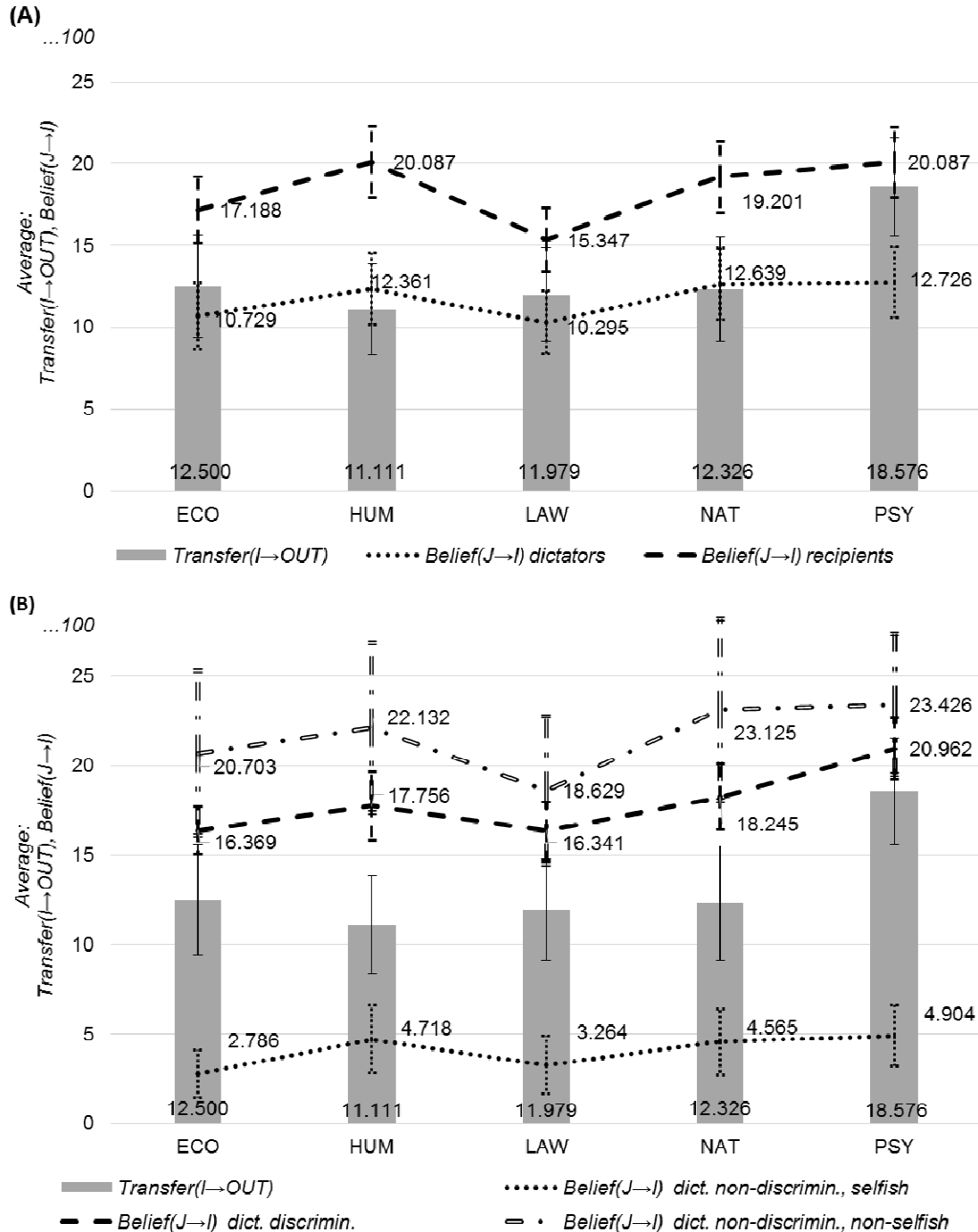


Figure 8 – Actual transfers to out-groups (average  $Transfer(I \rightarrow OUT)$ ) and corresponding beliefs about those transfer by dictators in the out-groups to the assessor's in-group (average  $Belief(J \rightarrow I)$ , average of beliefs by assessors in group  $I$ ). Note: the error bars display the 95% confidence intervals.

		ECO HUM	ECO LAW	ECO NAT	ECO PSY	HUM LAW	HUM NAT	HUM PSY	LAW NAT	LAW PSY	NAT PSY
<i>Belief(J → I)</i>	<b>Dict.</b>	---	n.s.	--	---	+++	n.s.	n.s.	---	---	---
	<b>Recip.</b>	---	n.s.	---	---	+++	n.s.	+++	---	---	---
<i>Belief(J → J)</i>	<b>Dict.</b>	---	n.s.	---	---	+++	+++	n.s.	--	---	--
	<b>Recip.</b>	---	n.s.	---	---	+++	+++	n.s.	---	---	---

**Table 8 - Pairwise comparisons via Wilcoxon signed-ranks tests for *Belief(J → I)* and *Belief(J → J)* by role in the dictator game (dictator vs. recipient).** Note: The sign of the z statistic is indicated by + or -, with significance levels as follows: +++ / --- for  $p < 0.01$ , ++ / -- for  $p < 0.05$ , + / - for  $p < 0.1$ , and n.s. (not significant) for  $p > 0.1$ . All  $p$ -values  $< 0.05$  are confirmed by false discovery rate.

#### 4. Conclusions

In this study, we analyze transfer decisions in dictator games, from dictators to recipients in a dictator's own in-group and to recipients in various out-groups, and explore the corresponding beliefs of both dictators and recipients. We identify both in-group favoritism and discrimination among out-groups as important behavioral patterns. In line with the observed behavior, individuals believe that in-group favoritism is widespread and expect that not every out-group dictator exhibits the same generosity toward recipients in the assessor's in-group. In-group favoritism behavior is more pronounced for dictators who expect in-group favoritism of other dictators. Moreover, a dictator tends to be relatively more generous toward a specific out-group when he or she expects that dictators belonging to that out-group are generous toward members of his or her in-group.

Our results are, thus, in line with a situation in which dictators conform to a behavioral rule that suggests in-group favoritism and form their beliefs accordingly. Following Bicchieri (2006), a behavioral rule can be associated with a social norm if there exists a sufficiently large subset of the population whose individuals are aware of the rule, and people conform to it if they believe in turn that a sufficiently large subset of the population conforms to the rule (empirical expectations) or expect other individuals to conform to it (normative expectation). Therefore, having a preference for a behavioral rule is different from saying that one has a preference to follow the norm associated with the behavioral rule. In the first case, individuals behave according to the behavioral rule regardless of their belief concerning other people's behavior or beliefs. In the second case, individuals behave according to the behavioral rule if certain belief conditions are met.

Our results are also in line with preferences for income equality at the group level (Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999). Our data indicate that dictators are especially in-group

biased if they perceive out-group dictators to be in-group biased. In-group favoritism by only a single group's dictators leads to inequality across groups. From the point of view of a dictator who believes that an out-group dictator is in-group biased, the disadvantage of his or her own in-group can only be corrected by him or her also being in-group biased. Though we cannot show direct causality, dictators may try to restore equality across groups by being in-group biased. Similar fairness motives can also explain discrimination among out-groups. If aversion to inequality drives behavior, we should see larger transfers to those groups whose dictators are perceived to transfer more to out-groups. This is exactly what we find. Restoring equality across groups is a possible explanation for dictators' discrimination among out-groups.

Another plausible driver of dictators' discrimination among out-groups could be indirect group-based reciprocity, i.e., the situation in which a dictator in group A is generous toward recipients in group B, because she expects dictators in group B to be generous toward recipients group A (see, for example, Nowak and Sigmund (2005) for a discussion on indirect reciprocity). Although in previous experiments on indirect reciprocity (Engelmann and Fischbacher, 2009; Seinen and Schram, 2006) the third party is generally a random unknown individual, in our experiment there is a connection between the out-group decision maker and the recipient.

The insight that dictators react to expected behavior of out-group dictators complements the work of Ockenfels and Werner (2014), Güth et al. (2009), and Yamagishi and Mifune (2008). We show that dictators might not only condition their decisions on their perception of recipients' expectations but also on the behavior they expect from out-group dictators. This confirms an insight stated by Ockenfels and Werner (2014), who argue that outcome-based group identity models, which do not include belief-dependent preferences (e.g., Chen and Li (2009)), do not fully capture in-group favoritism.

**Acknowledgements**

We thank Sandro Casal and Anja Dieckmann for helpful discussion and seminar participants in Nuremberg, Germany and Florence, Italy for helpful comments. We also thank Armenak Antinyan for excellent research assistance and the Lakelab at the University of Konstanz (Germany) for providing facilities at which to conduct the experiments. Financial support by the GfK Foundation and the Emerging Field Initiative (EFI) of the University of Erlangen-Nuremberg is gratefully acknowledged.

## References

- Bernhard, H., Fehr, E., and Fischbacher, U., 2006. Group affiliation and altruistic norm enforcement. *American Economic Review* 96(2), 217-221.
- Bicchieri, C., 2006. *The Grammar of Society: The Nature and Dynamics of Social Norms*. Cambridge University Press, Cambridge.
- Bicchieri, C., Xiao, E., 2009. Do the right thing: but only if others do so. *Journal of Behavioral Decision Making* 22(2), 191-208.
- Bolton, G. E., Ockenfels, A., 2000. ERC: A theory of equity, reciprocity, and competition. *American Economic Review*, 90(1), 166-193.
- Bouckaert, J., Dhaene, G., 2004. Inter-ethnic trust and reciprocity: results of an experiment with small businessmen. *European Journal of Political Economy* 20(4), 869-886.
- Brown, R., 2000. Social identity theory: Past achievements, current problems, and future challenges. *European Journal of Social Psychology* 30(6), 745-778.
- Chen, Y., Li, S. X., 2009. Group identity and social preferences. *American Economic Review*, 99(1), 431-457.
- Croson, R. T., 2000. Thinking like a game theorist: factors affecting the frequency of equilibrium play. *Journal of Economic Behavior & Organization* 41(3), 299-314.
- Currarini, S. and Mengel, F. (2013). Identity, homophily and in-group bias. Retrieved May 27, 2015 from: <https://sites.google.com/site/friederikemengel/>.
- Eckel, C. C., Grossman, P. J., 2005. Managing diversity by creating team identity. *Journal of Economic Behavior & Organization* 58(3), 371-392.
- Engel, C., 2011. Dictator games: a meta study. *Experimental Economics* 14(4), 583-610.
- Engelmann, D., Fischbacher, U., 2009. Indirect reciprocity and strategic reputation building in an experimental helping game. *Games and Economic Behavior* 67(2), 399-407.
- Fehr, E., Schmidt, K. M., 1999. A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics*, 817-868.
- Fershtman, C., Gneezy, U., 2001. Discrimination in a segmented society: An experimental approach. *Quarterly Journal of Economics* 116(1), 351-377.
- Fischbacher, U., 2007. z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics* 10(2), 171-178.
- Foddy, M., Platow, M. J., and Yamagishi, T. (2009). Group-based trust in strangers: The role of stereotypes and expectations. *Psychological Science* 20(4), 419-422.
- Gächter, S., Renner, E., 2010. The effects of (incentivized) belief elicitation in public goods experiments. *Experimental Economics* 13(3), 364-377.
- Goette, L., Huffman, D., and Meier, S., 2006. The impact of group membership on cooperation and norm enforcement: Evidence using random assignment to real social groups. *American Economic Review* 96(2), 212-216.
- Greiner, B., 2004. An online recruitment system for economic experiments. Working Paper Series in Economics, University of Cologne.
- Grossman, Z., 2010. Self-signaling versus social-signaling in giving. Departmental Working Paper, Department of Economics, University of California, Santa Barbara.
- Guala, F., Mittone, L., and Ploner, M., 2013. Group membership, team preferences, and expectations. *Journal of Economic Behavior & Organization* 86, 183-190.
- Güth, W., Ploner, M., and Regner, T., 2009. Determinants of in-group bias: Is group affiliation mediated by guilt-aversion? *Journal of Economic Psychology* 30(5), 814-827.

- Hoffmann, T., 2013. The Effect of Belief Elicitation on Game Play. Working Paper, University of Mannheim.
- Kagel, J. H., Kim, C., and Moser, D., 1996. Fairness in ultimatum games with asymmetric information and asymmetric payoffs. *Games and Economic Behavior* 13(1), 100-110.
- Klor, E. F., Shayo, M., 2010. Social identity and preferences over redistribution. *Journal of Public Economics* 94(3), 269-278.
- McDermott, R., 2009. Psychological research in identity: Definition, measurement, and experimentation. In: Abdelal, R. (Eds), *Measuring Identity: A Guide for Social Scientists*. Cambridge University Press, Cambridge.
- Nowak, M. A., Sigmund, K., 2005. Evolution of indirect reciprocity. *Nature* 437(7063), 1291-1298.
- Ockenfels, A., Werner, P., 2012. "Hiding behind a small cake" in a newspaper dictator game. *Journal of Economic Behavior & Organization*, 82, 82-85.
- Ockenfels, A., Werner, P., 2014. Beliefs and ingroup favoritism. *Journal of Economic Behavior & Organization*, 108, 453-462.
- Offerman, T., Sonnemans, J., and Schram, A., 1996. Value orientations, expectations, and voluntary contributions in public goods. *Economic Journal*, 817-845.
- Robbins, J. M., Krueger, J. I., 2005. Social projection to ingroups and outgroups: A review and meta-analysis. *Personality and Social Psychology Review* 9(1), 32-47.
- Ross, L., Greene, D., and House, P., 1977. The "false consensus effect": An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology* 13(3), 279-301.
- Sapienza, P., Toldra-Simats, A., and Zingales, L., 2013. Understanding trust. *The economic journal*, 123(573), 1313-1332.
- Schlag, K. H., Tremewan, J., and Van der Weele, J. J., 2014. A penny for your thoughts: a survey of methods for eliciting beliefs. *Experimental Economics*, 1-34.
- Seinen, I., Schram, A., 2006. Social status and group norms: Indirect reciprocity in a repeated helping experiment. *European Economic Review* 50(3), 581-602.
- Tajfel, H., 1970. Experiments in intergroup discrimination. *Scientific American* 223(5), 96-102.
- Tajfel, H., Turner, J., 1986. The social identity theory of intergroup behavior. In: Worchel, S., Austin, W. (Eds.), *The Psychology of Intergroup Relations*. Nelson-Hall, Chicago, pp. 7-24.
- Yamagishi, T., Mifune, N., 2008. Does shared group membership promote altruism? Fear, greed, and reputation. *Rationality and Society* 20(1), 5-30.

## **Appendix – Instructions for experiment participants (on-screen instructions)**

### **WELCOME**

Today you will take part in an experiment in the field of economics.

During the experiment you are not allowed to talk with the other participants.

If do you not understand any part of the experiment, please ask the experimenter.

At the end of the experiment, you will receive a show-up fee of 5 euros.

Moreover, during the next few days you will receive an amount that you will earn today based on your decisions.

You will learn how and where you can obtain this amount at the end of the experiment.

All points that you obtain will be converted in euros.

The exchange rate is 100 points=1 euro.

Click on OK, and then we will explain to you the procedure for the experiment.

*(Next screen)*

### **GENERAL INSTRUCTIONS**

This experiment consists of two stages: a task and an assessment.

Task: you complete a task.

Assessment: you assess the decisions of 10 other participants in the task.

The participants are students in the following departments: Economics, Law, Psychology, Humanities, and Natural Sciences.

Only the assessment of one randomly selected department will be relevant for your payoff.

*(Next screen)*

### **TASK – INSTRUCTIONS**

This task has 5 parts.

In each part you are matched with a participant from a specific department.

You have an endowment of 100 points, and you can decide how many of your points you want to transfer to the other participant.

You can transfer 0, 25, 50, 75, or 100 points.

Your profit is 100 points minus the amount you transfer to the other participant.



Example: You decide to transfer 25 points to the other participant. Then, the other participant earns 25 points, and you earn 75 points (since  $100-25=75$  points).

Please click on OK to start the task.

*(Next screen)*

How many points would you like to transfer to a participant in the department of Economics<sup>21</sup>?  
0 points, 25 points, 50 points, 75 points, or 100 points

*(Next screen)*

#### ASSESSMENT – INSTRUCTIONS

Other participants made their decisions on how to transfer from their 100 point endowments. They belong to the departments of Economics, Law, Psychology, Humanities, and Natural Sciences.

Please now assess the decisions of the other participants. For each question you will be asked to assess how many of the 10 participants have transferred, respectively, 0, 25, 50, 75, and 100 points.

You provide an assessment for each of the 5 departments. The department which will be relevant for your payoff will be randomly chosen.

You will make 10 assessments.

First, you will assess how the participants behaved when they were matched with a participant belonging to your department.

Second, you will assess how the participants behaved when they were matched with a participant belonging to their own department.

Only the assessments of one randomly selected department will be relevant for your payoff.

The figure above explains how you can earn money.

If you guess the exact correct value, you will obtain 10 points.

If your guess is within 1 unit of the correct value, you will obtain 1 point. If your guess is more than 1 unit above or below the correct value, you will not obtain any points.

Thus, you can obtain at most 50+50 points.

Consider the following example: Suppose that the actual number of Economics students out of 10 that reported 4 correct answers is 3.

Then:

---

<sup>21</sup> Dictators made the same decision about transfers to recipients belonging to each of the five groups.

If you report 3 participants, the exact correct value, you obtain 10 points.

If you report 2 participants, within 1 unit of the correct value, you obtain 1 point.

If you report 1 participant, more than 1 unit below the correct value, you do not obtain any points.

Now, please click OK to start the assessment phase.

*(Next screen)*

Now you must assess participants' decisions when they were matched with a participant in your department, i.e., the department of Economics.<sup>22</sup>

*(Next screen)*

How many of the 10 Law<sup>23</sup> students transferred to a participant of your department, i.e., of the department of Economics, each of the following number of points?

0 points, 25 points, 50 points, 75 points, and 100 points

*(Next screen)*

Now you must assess the decisions of the other participants toward participants belonging to their own departments.

*(Next screen)*

How many of the 10 Law students transferred each of the following number of points to a participant in the Law<sup>24</sup> department?

0 points, 25 points, 50 points, 75 points, and 100 points

*(Next screen)*

Thank you.

This is the end of the experiment.

Now you can approach the experimenter.

Please take all of your belongings and your seat number.

---

<sup>22</sup> A participant affiliated to another department (Humanities, Law etc.) assessed dictators' decisions when they were matched with a participant of his or her department (Humanities, Law etc.).

<sup>23</sup> Participants performed this assessment about dictators from the other departments.

<sup>24</sup> Participants performed this assessment about dictators from the other departments.

You will receive 5 euros and information about the payment of the additional amount earned from this experiment.

## Diskussionspapiere 2015

### Discussion Papers 2015

- 01/2015     **Seebauer, Michael:** Does Direct Democracy Foster Efficient Policies? An Experimental Investigation of Costly Initiatives
- 02/2015     **Bünnings, Christian, Schmitz, Hendrik, Tauchmann, Harald and Ziebarth, Nicolas R.:** How Health Plan Enrollees Value Prices Relative to Supplemental Benefits and Service Quality
- 03/2015     **Schnabel, Claus:** United, yet apart? A note on persistent labour market differences between western and eastern Germany
- 04/2015     **Dieckmann, Anja, Fischbacher, Urs, Grimm, Veronika, Unfried, Matthias, Utikal, Verena and Valmasoni, Lorenzo:** Trust and Beliefs among Europeans: Cross-Country Evidence on Perceptions and Behavior

## Diskussionspapiere 2014

### Discussion Papers 2014

- 01/2014     **Rybizki, Lydia:** Learning cost sensitive binary classification rules accounting for uncertain and unequal misclassification costs
- 02/2014     **Abbiati, Lorenzo, Antinyan, Armenak and Corazzini, Lucca:** Are Taxes Beautiful? A Survey Experiment on Information, Tax Choice and Perceived Adequacy of the Tax Burden
- 03/2014     **Feicht, Robert, Grimm, Veronika and Seebauer, Michael:** An Experimental Study of Corporate Social Responsibility through Charitable Giving in Bertrand Markets
- 04/2014     **Grimm, Veronika, Martin, Alexander, Weibelzahl, Martin and Zoettl, Gregor:** Transmission and Generation Investment in Electricity Markets: The Effects of Market Splitting and Network Fee Regimes
- 05/2014     **Cygan-Rehm, Kamila and Riphahn, Regina:** Teenage Pregnancies and Births in Germany: Patterns and Developments
- 06/2014     **Martin, Alexander and Weibelzahl, Martin:** Where and when to Pray? - Optimal Mass Planning and Efficient Resource Allocation in the Church
- 07/2014     **Abraham, Martin, Lorek, Kerstin, Richter, Friedemann and Wrede, Matthias:** Strictness of Tax Compliance Norms: A Factorial Survey on the Acceptance of Inheritance Tax Evasion in Germany
- 08/2014     **Hirsch, Boris, Oberfichtner, Michael and Schnabel Claus:** The levelling effect of product market competition on gender wage discrimination

09/1014	<b>Mangold, Benedikt:</b> Plausible Prior Estimation
10/2014	<b>Gehrke, Britta:</b> Fiscal Rules and Unemployment
11/2014	<b>Gehrke, Britta and Yao, Fang:</b> Phillips Curve Shocks and Real Exchange Rate Fluctuations: SVAR Evidence
12/2014	<b>Mäder, Miriam, Müller, Steffen, Riphahn, Regina and Schwientek, Caroline:</b> Intergenerational transmission of unemployment - evidence for German sons
13/2014	<b>Casal, Sandro, Ploner, Matteo and Sproten, Alec N.:</b> Fostering the Best Execution Regime. An Experiment about Pecuniary Sanctions and Accountability in Fiduciary Money Management
14/2014	<b>Lochner, Benjamin:</b> Employment protection in dual labor markets - Any amplification of macroeconomic shocks?
15/2014	<b>Herrmann, Klaus, Teis, Stefan and Yu, Weijun:</b> Components of Intraday Volatility and Their Prediction at Different Sampling Frequencies with Application to DAX and BUND Futures

## Diskussionspapiere 2013 Discussion Papers 2013

01/2013	<b>Wrede, Matthias:</b> Rational choice of itemized deductions
02/2013	<b>Wrede, Matthias:</b> Fair Inheritance Taxation in the Presence of Tax Planning
03/2013	<b>Tinkl, Fabian:</b> Quasi-maximum likelihood estimation in generalized polynomial autoregressive conditional heteroscedasticity models
04/2013	<b>Cygan-Rehm, Kamila:</b> Do Immigrants Follow Their Home Country's Fertility Norms?
05/2013	<b>Ardelean, Vlad and Pleier, Thomas:</b> Outliers & Predicting Time Series: A comparative study
06/2013	<b>Fackler, Daniel and Schnabel, Claus:</b> Survival of spinoffs and other startups: First evidence for the private sector in Germany, 1976-2008
07/2013	<b>Schild, Christopher-Johannes:</b> Do Female Mayors Make a Difference? Evidence from Bavaria
08/2013	<b>Brenzel, Hanna, Gartner, Hermann and Schnabel Claus:</b> Wage posting or wage bargaining? Evidence from the employers' side

- 09/2013      **Lechmann, Daniel S. and Schnabel Claus:** Absence from work of the self-employed: A comparison with paid employees
- 10/2013      **Bünnings, Ch. and Tauchmann, H.:** Who Opts Out of the Statutory Health Insurance? A Discrete Time Hazard Model for Germany

## Diskussionspapiere 2012 Discussion Papers 2012

- 01/2012      **Wrede, Matthias:** Wages, Rents, Unemployment, and the Quality of Life
- 02/2012      **Schild, Christopher-Johannes:** Trust and Innovation Activity in European Regions - A Geographic Instrumental Variables Approach
- 03/2012      **Fischer, Matthias:** A skew and leptokurtic distribution with polynomial tails and characterizing functions in closed form
- 04/2012      **Wrede, Matthias:** Heterogeneous Skills and Homogeneous Land: Segmentation and Agglomeration
- 05/2012      **Ardelean, Vlad:** Detecting Outliers in Time Series

## Diskussionspapiere 2011 Discussion Papers 2011

- 01/2011      **Klein, Ingo, Fischer, Matthias and Pleier, Thomas:** Weighted Power Mean Copulas: Theory and Application
- 02/2011      **Kiss, David:** The Impact of Peer Ability and Heterogeneity on Student Achievement: Evidence from a Natural Experiment
- 03/2011      **Zibrowius, Michael:** Convergence or divergence? Immigrant wage assimilation patterns in Germany
- 04/2011      **Klein, Ingo and Christa, Florian:** Families of Copulas closed under the Construction of Generalized Linear Means
- 05/2011      **Schnitzlein, Daniel:** How important is the family? Evidence from sibling correlations in permanent earnings in the US, Germany and Denmark
- 06/2011      **Schnitzlein, Daniel:** How important is cultural background for the level of intergenerational mobility?

07/2011	<b>Steffen Mueller:</b> Teacher Experience and the Class Size Effect - Experimental Evidence
08/2011	<b>Klein, Ingo:</b> Van Zwet Ordering for Fechner Asymmetry
09/2011	<b>Tinkl, Fabian and Reichert Katja:</b> Dynamic copula-based Markov chains at work: Theory, testing and performance in modeling daily stock returns
10/2011	<b>Hirsch, Boris and Schnabel, Claus:</b> Let's Take Bargaining Models Seriously: The Decline in Union Power in Germany, 1992 – 2009
11/2011	<b>Lechmann, Daniel S.J. and Schnabel, Claus :</b> Are the self-employed really jacks-of-all-trades? Testing the assumptions and implications of Lazear's theory of entrepreneurship with German data
12/2011	<b>Wrede, Matthias:</b> Unemployment, Commuting, and Search Intensity
13/2011	<b>Klein, Ingo:</b> Van Zwet Ordering and the Ferreira-Steel Family of Skewed Distributions

## Diskussionspapiere 2010 Discussion Papers 2010

01/2010	<b>Mosthaf, Alexander, Schnabel, Claus and Stephani, Jens:</b> Low-wage careers: Are there dead-end firms and dead-end jobs?
02/2010	<b>Schlüter, Stephan and Matt Davison:</b> Pricing an European Gas Storage Facility using a Continuous-Time Spot Price Model with GARCH Diffusion
03/2010	<b>Fischer, Matthias, Gao, Yang and Herrmann, Klaus:</b> Volatility Models with Innovations from New Maximum Entropy Densities at Work
04/2010	<b>Schlüter, Stephan and Deuschle, Carola:</b> Using Wavelets for Time Series Forecasting – Does it Pay Off?
05/2010	<b>Feicht, Robert and Stummer, Wolfgang:</b> Complete closed-form solution to a stochastic growth model and corresponding speed of economic recovery.
06/2010	<b>Hirsch, Boris and Schnabel, Claus:</b> Women Move Differently: Job Separations and Gender.
07/2010	<b>Gartner, Hermann, Schank, Thorsten and Schnabel, Claus:</b> Wage cyclicity under different regimes of industrial relations.

08/2010      **Tinkl, Fabian:** A note on Hadamard differentiability and differentiability in quadratic mean.

## Diskussionspapiere 2009

## Discussion Papers 2009

- 01/2009      **Addison, John T. and Claus Schnabel:** Worker Directors: A German Product that Didn't Export?
- 02/2009      **Uhde, André and Ulrich Heimeshoff:** Consolidation in banking and financial stability in Europe: Empirical evidence
- 03/2009      **Gu, Yiquan and Tobias Wenzel:** Product Variety, Price Elasticity of Demand and Fixed Cost in Spatial Models
- 04/2009      **Schlüter, Stephan:** A Two-Factor Model for Electricity Prices with Dynamic Volatility
- 05/2009      **Schlüter, Stephan and Fischer, Matthias:** A Tail Quantile Approximation Formula for the Student t and the Symmetric Generalized Hyperbolic Distribution
- 06/2009      **Ardelean, Vlad:** The impacts of outliers on different estimators for GARCH processes: an empirical study
- 07/2009      **Herrmann, Klaus:** Non-Extensivity versus Informative Moments for Financial Models - A Unifying Framework and Empirical Results
- 08/2009      **Herr, Annika:** Product differentiation and welfare in a mixed duopoly with regulated prices: The case of a public and a private hospital
- 09/2009      **Dewenter, Ralf, Haucap, Justus and Wenzel, Tobias:** Indirect Network Effects with Two Salop Circles: The Example of the Music Industry
- 10/2009      **Stuehmeier, Torben and Wenzel, Tobias:** Getting Beer During Commercials: Adverse Effects of Ad-Avoidance
- 11/2009      **Klein, Ingo, Köck, Christian and Tinkl, Fabian:** Spatial-serial dependency in multivariate GARCH models and dynamic copulas: A simulation study
- 12/2009      **Schlüter, Stephan:** Constructing a Quasilinear Moving Average Using the Scaling Function
- 13/2009      **Blien, Uwe, Dauth, Wolfgang, Schank, Thorsten and Schnabel, Claus:** The institutional context of an "empirical law": The wage curve under different regimes of collective bargaining



14/2009      **Mosthaf, Alexander, Schank, Thorsten and Schnabel, Claus:** Low-wage employment versus unemployment: Which one provides better prospects for women?

## Diskussionspapiere 2008 Discussion Papers 2008

01/2008      **Grimm, Veronika and Gregor Zoettl:** Strategic Capacity Choice under Uncertainty: The Impact of Market Structure on Investment and Welfare

02/2008      **Grimm, Veronika and Gregor Zoettl:** Production under Uncertainty: A Characterization of Welfare Enhancing and Optimal Price Caps

03/2008      **Engelmann, Dirk and Veronika Grimm:** Mechanisms for Efficient Voting with Private Information about Preferences

04/2008      **Schnabel, Claus and Joachim Wagner:** The Aging of the Unions in West Germany, 1980-2006

05/2008      **Wenzel, Tobias:** On the Incentives to Form Strategic Coalitions in ATM Markets

06/2008      **Herrmann, Klaus:** Models for Time-varying Moments Using Maximum Entropy Applied to a Generalized Measure of Volatility

07/2008      **Klein, Ingo and Michael Grottko:** On J.M. Keynes' "The Principal Averages and the Laws of Error which Lead to Them" - Refinement and Generalisation