Altruism, Group Identity and Political Participation: An Experiment.

Pedro Robalo, Arthur Schram, Joep Sonnemans*

University of Amsterdam (CREED) and Tinbergen Institute

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Abstract

We study the relationship between political participation, altruism and group identity using an experimental framework. Combining a participation game (Palfrey and Rosenthal, 1983) with an original group identity induction procedure and a measurement of other-regardingness, we find that the individual decision to participate in politics is increasing in identification with one's group and other-regarding concerns. We manage to implement environments where the group attachment of individuals varies, which allows us to conclude that the impact of group identity on aggregate turnout is not significant.

Keywords: political participation, group identity, altruism, social preferences.

JEL Classification: A13, C91, C92, D72.

1 Introduction

Groups in society frequently have conflicting interests. A peaceful solution to several of these conflicts is achieved through democratic politics. The winning group is often the one which manages to mobilize its members more effectively. This paper studies political participation in the context

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of interaction between groups that compete for benefits that accrue to the one that achieves higher participation. We are particularly interested in the interaction between the individual incentives that the members of these groups face, altruism, and group identity.

Individuals in these situations experience a social dilemma towards their group, i.e. a situation in which the members of the group would be better off if all of them cooperated (participated), but where individual incentives make defection (non-participation) more attractive (Dawes, 1980). Examples include contribution to a lobbying group or showing up at a demonstration: each of these actions is only successful if enough participation is achieved, but members of the group often free-ride on the efforts of their peers. However, competition for social benefits at the intergroup level might provide the incentives to participation. The prime example is an election where the two factions of an electorate compete for victory: the one which participates in higher numbers wins the election and reaps the benefits.

In such contexts we can reasonably expect the individual participation decision to take into account the ties that bind the groups together and what tears them apart. In other words, how much an individual cares for the individuals in both his or her group and the other group is likely to influence the sacrifices he or she is willing to make. This paper addresses these conjectures by studying the effect of altruism and group identity on participation behavior, at both the individual and the aggregate level. Both elements have been the object of recent attention within the rational choice approach to political participation, which has traditionally struggled with the so-called "paradox of participation".

The addition of altruistic concerns to the calculus of participation has lead to models that escape the prediction of low mobilization. If individuals have social preferences (preferences with an other-regarding component), participation becomes instrumentally rational since the benefit derived from one's group winning will not be overcome by the low probability of being pivotal. Models in this vein have been proposed by Jankowski (2002), Edlin et al. (2007), Feddersen et al. (2009), and Evren (2010). There is some field (Knack, 1992, Jankowski, 2007) and experimental (Fowler 2006, Fowler and Kam 2007, Dawes et al. 2011) empirical evidence supporting a positive relationship between social preferences and participation. Our results add to this stream of evidence

by relating a direct measure of an individual's level of altruism to the frequency at which he or she participates in laboratory instances of intergroup competition. Moreover, we contribute with novel evidence on the interaction between altruistic concerns and the strength of group identification sentiments. To some extent, this analysis supplements the work conducted by Fowler (2006), who shows that social identity acts as a catalyst on the positive impact of altruistic motivations on political participation.

Groups act as agents of intentional and unintentional mobilization and therefore play a crucial role in the study of political participation. In this paper we are concerned with the impact of different levels of group identification on the spontaneous mobilization of groups. There is a large literature dealing with the relationship between material resources and spontaneous mobilization (Verba and Nie, 1972). This literature has established a number of solid findings, like the positive correlation between income and participation. However, some puzzles subsist. For example, the positive correlation between income/education and participation is much weaker for African-American citizens, who participate beyond what their socioeconomic status would predict. According to Leighley and Vedlitz (1999) there are a number of candidate explanations for this phenomenon: psychological resources (e.g. political interest and participation efficacy beliefs), social connectedness, and group identity. All of these explanations have theoretical appeal and receive some empirical support. However, the mechanisms at work are difficult to identify in the field. For example, it is hard to disentangle the effect of group identity from the impact of social connectedness on participation. Do the members of a group voluntarily participate because of their strong sense of group-belonging, or because their environment is encouraging of participation? There is a large literature studying the role of social context and networks on turnout, whose main conclusions are that participative social environments induce higher individual participation (Kenny, 1992), and that exposure to similar views within one's social network leads to higher individual participation (Mutz, 2002). Notwithstanding, not only the magnitude of the effect of a citizen's social network participation levels on his participation decision is relatively small (Kenny, 1992), but also the impact of social group membership on individual political behavior is mediated by forms of social interaction and social pressure. This means that it is difficult to isolate the

effect of group composition *per se* on the participation decision. Moreover, social context, social networks and participation behavior might be endogenously determined, making it difficult to elicit the direction of causality. An easy and clean test of the *group identity* effect can be obtained experimentally. By comparing the behavior of groups that are heterogeneous with respect to their sense of group-belonging we can elicit the effect of group identity on participation behavior.

The group identity paradigm explores the influence of group-belonging sentiments on how individuals make decisions in instances of intergroup behavior. In short, it studies the influence of the "group in the individual " (Hogg and Abrams, 1998). According to Tajfel (1982), two criteria must be satisfied such that we can talk of group identification: a cognitive one, in that members of a group are aware of group membership, and an evaluative one, in that "awareness is related to some value connotations" (Tajfel, 1982). Group-based behavior thus arises from categorization processes that partition the social world into in-group and out-group; relative attachment to the in-group over the out-group (the so-called in-group bias) drives intergroup relations. The body of knowledge on group identity is quite extensive and has produced a number of robust findings (see Brewer, 2007). A number of recent works using an experimental economics framework have shown that group identity and its salience has an impact on strategic behavior (Charness et al., 2007) and that individuals tend to be more altruistic towards in-group members (Chen and Li, 2009), for example.

The main goal of our experimental design is to create environments with different levels of in-group bias, and whether this influences individual and aggregate participation. In addition, we want to know if participation depends on altruistic motivations, both in general and within each of these environments. Our experiment is composed of three main blocks. In the first one we measure subjects' social motives using a value orientation test. This test allows us to measure how each subject trades off his own welfare for the welfare of another individual. In the second block we manipulate the group attachment of subjects in order to obtain environments where the in-group bias is high or low. A crucial point of our design is the variable according to which groups should be differentiated. The minimal group paradigm has shown that, in some situations, mere awareness of belonging to a group, together with group competition for a prize, generates behavior consistent

with group discrimination. In a laboratory setting, the minimal group paradigm is unlikely to produce such results (Charness et al., 2007). For one, the salience of groups in the laboratory, where interaction takes place via computers, is likely to be low. In order to induce strong group identity feelings, we need to both differentiate groups along a dimension that matters for subjects, and to make this difference salient.

The number of potential differentiating variables is quite vast. We start by asking: what variables differentiate political groups? Ideology, of course, but also income, education, religion, occupation or race. It depends on the situation at hand, e.g. whether we are considering a general election or a two-sided gun rights rally. As such, there is no obvious choice. We use a personality trait and we do so for two reasons. First, there is evidence of an increasing influence of personal traits on political choices (the so-called "personalization" of politics; Caprara et al., 2006). Second, a personality trait is a deep psychological attribute: we expect individuals to care about their personality characteristics, and therefore feel highly attached to groups with a shared trait. It has been shown that group identity feelings depend on the differentiating category, with kinship being the most powerful and gender almost irrelevant (Ben-Ner et al., 2009). These authors find that political views is only second to kinship in influencing group identity-led discriminating behavior, and given the reasonable association between some forms of political action and personality traits, we think that using a personality trait is a good choice both for methodological and external validity purposes. Regarding the issue of group salience, our design makes groups salient by letting subjects choose a name for their group and by having the groups competing on a simple challenge.

The third block of our experiment consists in the participation game put forward by Palfrey and Rosenthal (1983). Groups compete for social benefits, which are the same for each member of a group; the group for which more members participate gets a higher reward. Participation is costly, which means that subjects face a friction between helping their group win the contest and free-riding on the effort of others in the same group. By comparing the participation behavior of subjects in environments where groups exhibit different levels of in-group bias, we can conclude what is the role of group identity on political participation.

In order to derive a number of conjectures on individual and aggregate behavior, we combine in-

sights from the conceptual analysis of the participation game and the available empirical evidence. The equilibria of the game allow us to obtain comparative statics that inform our hypotheses. First, we conjecture that more altruistic subjects will participate more often. This relationship is at the heart of many models of participation, as already mentioned. Second, we expect environments where favoritism towards the in-group is high to foster fiercer competition, and therefore higher aggregate participation. Third, we hypothesize that subjects who exhibit higher levels of identification with their group will participate more often, regardless of the environment they are in. We find the first conjecture to be true: individual participation is higher for more altruistic subjects. In particular, the most selfish subjects stand out from the rest as they abstaining much more often. For the remaining subject types the relationship is less pronounced. We manage to induce different levels of in-group bias across our treatments, which bears methodological relevance given the difficulty of creating group identity in the laboratory. This allows us to conclude that aggregate participation does not have a statistically significant relationship with group identity in our experiment, even though the relationship is positive, as conjectured. Regarding the individual impact of group identity, it is definitely positive in the absence of group identity manipulations. In other words, individuals who tend to feel more attached to their group will participate more often. This is in a way obvious. The surprising aspect is that this relationship seems to be muddled when we implement group identity manipulations, i.e. reinforcing or weakening group identity sentiments does not necessarily translate into a more extreme display of this relationship.

The next section presents the conceptual analysis of the participation game and our hypotheses. Section 3 describes our experimental design. In section 4 we carry an extensive analysis of our data. A final section concludes.

2 Conceptual Framework and Hypotheses

We study participation behavior using the game proposed by Palfrey and Rosenthal (1983). Two groups of equal size compete for victory, which depends on participation. Each player has to decide simultaneously whether or not to participate, which is costly (c). Players on the winning side obtain a monetary payoff (B^W) that is higher than the one accruing to players on the losing

side (B^L). In case of a tie the winning group is decided by a coin toss. The structure and payoffs of the game are common knowledge.

We assume that players have a utility function that with altruistic and group-discriminating components:

$$U_i = u_i + \alpha_i \left(\beta_i \sum_{j \in G_i} U_j + \gamma_i \sum_{h \in G_{-i}} U_h \right)$$

where u_i is player i's personal utility, which we assume to be linear in monetary payoffs; α_i is the weight put on other players' welfare; $\beta_i \geq 0$ is the weight put on the welfare of players in the same group and $\gamma_i \geq 0$ is the weight put on the welfare of players in the other group; G_i is player i's group (the in-group), and G_{-i} is the group against which i's group competes (the out-group). This utility function is the translation of a preference ordering which is increasing in other players' utilities, but the utility of individuals in the in-group is given a higher weight ($\alpha_i\beta_i$ for the in-group, $\alpha_i\gamma_i$ for the out-group). We define β_i and γ_i in such a way that $\beta_i + \gamma_i = 1$, which is always possible to obtain from any general $\beta_i' \geq 0$ and $\gamma_i' \geq 0$: $\beta_i = \frac{\beta_i'}{\beta_i' + \gamma_i'}$ and $\gamma_i = \frac{\gamma_i'}{\beta_i' + \gamma_i'}$.[1]

Define m as the number of other members in i's group that participate, and n as the number of players in the other group who participate. The expected utility of Participation and Nonparticipation are:

$$E\left[U_i|\text{Participation}\right] = \Pr\left[m+1 > n\right] U_i^W + \Pr\left[m+1 = n\right] \frac{\left(U_i^W + U_i^L\right)}{2} + \Pr\left[m+1 < n\right] U_i^L - c$$

$$E\left[U_i|\text{Non participation}\right] = \Pr\left[m > n\right] U_i^W + \Pr\left[m = n\right] \frac{\left(U_i^W + U_i^L\right)}{2} + \Pr\left[m < n\right] U_i^L$$

where U_i^W (U_i^L) is the utility derived if player i's group wins (loses).

A strategy in this game is simply a probability of participating. It is customary to derive quasi-symmetric equilibria of the game, i.e. equilibria in which all members of a group employ the same strategy. Given that our preference structure is richer, it is sometimes necessary to derive equilibria in which probabilities differ by player.

We derive Nash equilibria of the stage game for the case where groups have three players each.

[1] We rule out spiteful preferences, in the sense that the utility of others cannot decrease a player's utility.

Given that our goal is to derive comparative statics, this assumption does not restrict the generality of our results. We obtain the comparative statics by looking at the equilibria obtained in a number of different parameter configurations (Table 1; see Appendix A for more details).[2] We can then use these results in deriving some behavioral hypotheses.

Table 1 - Parameter Configurations for Equilibria Computation

	A	B	C	D	E	F	G
Altruism (α)	0.3;0.5;0.7		0.2		0.2	0.7	0.2
In-group bias (β/γ)	9	1.33	9	1.33	1		1;1.2;1.5

A comparison of A and B should allow us to conclude on the role of altruism for individual participation. However, the results that we obtain inconclusive. Both configurations produce an equilibrium where individual participation is increasing in altruism in the group that participates with lower probabilities, while it is decreasing in the group that participates with higher probabilities. We do observe that configurations where all players have a higher sense of altruism exhibit higher participation levels (comparing E and F).[3]

Intuitively, we expect individuals with a higher sense of altruism to be more willing to sacrifice themselves for their group, provided they prefer the in-group to the out-group, which is a rather weak assumption. This is another way of saying that there is more at stake for an individual who values the welfare of others in his group, and therefore stronger altruism will lead to more frequent participation. It is important to note that extremely altruistic individuals, i.e. those who value the welfare of an anonymous person more than their own welfare, will prefer the out-group to win. In such cases, non-participation is the individual best-response. As one can imagine, such levels of altruism are hard to encounter in the lab, let alone in the field. The existing empirical evidence provides some support to the conjecture that altruism fosters individual participation. Relating self-stated motivations with participation game behavior, Schram and Sonnemans (1996) found that subjects with individualistic goals were less likely to participate, whereas subjects with cooperative goals were more likely to participate. In fact, this is precisely what experimental

[2]We only make comparisons across configurations which produce a comparable equilibrium structure. Our parameters are chosen in order to make this possible.

[3]To be more precise, in equilibria where expected participation is above 40%, which are the empirically relevant cases.

subjects will tell you. When asked what moved a participant who participated often, more than 70% of our subjects said it was either cooperation towards the in-group or cooperation towards both groups. Moreover, a participant who participated rarely was attributed a selfish motivation by 77.5% of the subjects.[4] We formulate our first hypothesis accordingly:

Hypothesis 1: Individual participation is increasing in the level of altruism, i.e. more altruistic subjects participate at higher rates.

Regarding the role of group identity, we are mainly concerned whether participation is higher in scenarios where the in-group bias is more pronounced. A comparison of the strategies in configurations C and D can give us a testable prediction in this respect. The equilibrium we obtain in C is composed of participation probabilities that are more extreme than the equilibrium in D. This implies that the probability of observing participation levels equal to or above 50% is higher in C than in D. We thus conclude that, across settings, aggregate participation is increasing in group identity. This result is in line with the available evidence. A number of works using the participation framework (Bornstein et al. 1989, Bornstein 1992, Schram and Sonnemans 1996, Goren and Bornstein 2000) have experimentally explored the role of communication within the in-group. We can conjecture that the exchange of non-binding promises (cheap talk) between group members reinforces the sense of group identity. These studies have shown that communication significantly increases participation levels.[5] Schram and Sonnemans (1996) studied the effect of group identity on participation behavior by implementing different matching protocols in the participation game. They elicit group identity using the minimal group paradigm. They find that the effect of group identity is significant, though not pronounced. We formulate our second hypothesis accordingly:

Hypothesis 2: Environments where group identity is higher, i.e. where measured in-group bias is high, exhibit higher levels of aggregate participation.

[4]This data is reported in Appendix B.

[5]It has also been shown that inter-group discussion is successful in promoting overall efficiency, provided intra-group communication is not available. We can infer that group-allegiance supersedes social welfare concerns when intra-group information exchange is the coordination mechanism, and conversely when inter-group discussion is used. In addition, Goren and Bornstein show that in the absence of communication players associate high participation levels to cooperation towards the in-group and do not associate low levels of participation to inter-group cooperation. In the absence of communication, cooperation towards the in-group dominates overall cooperation for most players.

A further point of interest is how group identity operates at the individual level. Do subjects who feel more attached to their group participate more often? The set of equilibria we obtain under configuration G is diverse but allows us to draw some conclusions. In the high participation equilibria, the relationship between individual participation and group identity is positive. In the low participation equilibria the opposite is true. For the equilibria with an intermediate participation level, the relationship between individual participation and group identity is mostly non-monotonic. Even though no universal prediction arises from this analysis, we observe that the relationship between group identity and participation is likely to be positive, conditional on observing high levels of participation. Our third hypothesis follows:

Hypothesis 3: Individual participation is increasing in group identity, i.e. subjects exhibiting higher in-group bias participate at higher rates.

3 Experimental Design

The experiment consists of three main blocks: a value orientation test, a group identity induction procedure, and a participation game. The value orientation test and the participation game were common to all treatments, whereas the group identity induction procedure changed in order to implement the different treatments. In addition, allocation decisions and survey questions were used to assess the degree of in-group bias. Payoffs in the experiment are expressed in tokens, exchanged to Euros at a rate of 0.005 Euros per token. Screen instructions were provided in English in language free language. Practice questions were asked for all non-trivial parts of the experiment.[6]

The value orientation test used to measure altruism is usually referred to as the ring test. It makes use of Decomposed Games (Liebrand, 1984), a tool used by social psychologists to assess an individual's social motives. More precisely, value orientation can be described as the rate at which an individual trades off his welfare for the welfare of other individuals. For a discussion of this test see Liebrand (1984) and Offerman et al. (1996). The version of the test used in

[6]Experimental instructions are available upon request to the corresponding author.

this experiment is the one proposed by van Dijk et al. (2002). Each participant was paired with two other anonymous participants; his choices affected one of them, and the choices of the other affected him in an identical way. The two participants with whom each subject was paired remained constant throughout the first part of the experiment. The test consists of 32 pairwise choices, each presenting the participant with two alternative own-other allocations of monetary payoffs (Figure 1 represents a typical choice; see Appendix C for a list of all choices). For each pairwise choice the participant had to pick his most preferred allocation. For each of the 32 pairwise choices, allocations were shown on the screen, both in text and bar graphics. Participants were informed that they would only know the earnings or losses from this part of the experiment at the end of the session.

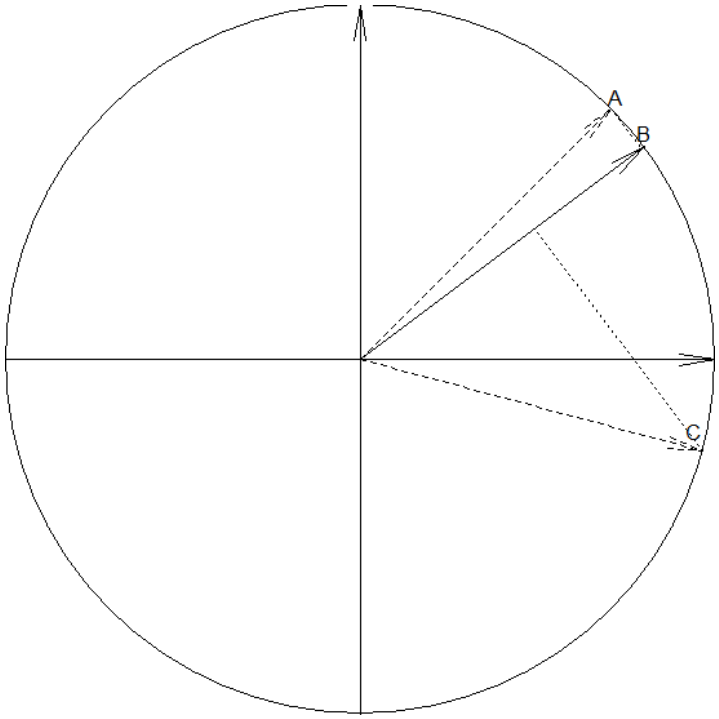

Figure 1: Typical choice in the ring test. Suppose B is the motivational vector of a given subject. When asked to choose between A and C, he will choose A as it is closest to his motivational vector (has the highest projection on it).

In the participation game, each group was composed of five participants, making up environments where ten participants compete. The parameter values used throughout the second part of the experiment were $B^W = 120$, $B^L = 30$, and $c = 30$. In each round of the game, participants were informed of how many participants turned out to vote in each group, what were his earnings

(in tokens) in that round, and what were his cumulative earnings (in tokens) in that part of the experiment. The stage game was repeated forty times.

The group identity induction procedure allowed us to implement three treatment configurations: maximal group identity (*Maximal*), minimal group identity (*Minimal*), and no group identity (*Control*). All elements of the procedure are known to participants. As discussed in the Introduction, in order to create groups we need a variable that differentiates them. For our inference to be valid, this variable should neither be correlated with value orientation nor influence behavior in the participation game. *Ex ante*, we were convinced that a personality trait variable would fulfill these requirements (which is verified *ex post*).

We measure personality traits under the Big Five taxonomy. This framework has shown that factor analysis performed on a multitude of personality data pools usually recovers the same five personality characteristics (Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism). Among these, we believe Openness (receptivity to novel experiences and ideas) complies with the requisites we want to fulfill. The tool we use in measuring personality traits is the Big Five Inventory (BFI; John et al., 2008). The BFI is a highly validated questionnaire consisting of 44 short sentences, each based on trait adjectives known to be prototypical markers of the Big Five. This test provides a 1-to-5 score of each personality trait. For all treatment configurations, the group identity induction procedure starts by requesting participants to answer the BFI. They are explained what Openness is and how different Openness scores translate into personal characteristics and habits.[7]

In the *Maximal* and *Minimal* treatments, the half of the participants whose Openness score ranking is highest are asked to move to a second lab, while the half who had the lowest rankings remains in the lab where the experiment started. After all participants have settled in their new computer stations, they have to decide on a name to identify their lab. Participants are presented with three pre-determined options. They have the possibility of discussing their choice with the other participants in the same lab via a chat interface. Each participant submits his choice, and the most picked option becomes the name that identifies the lab for the remainder of the experiment.

[7]We made a considerable effort to provide a description of the trait scale that was unrelated to normative judgments. We presented the scale graphically, from left to right, and without revealing the actual score. We reveal the individual ranking in our left-to-right scale.

Afterwards, the two labs compete in a trivia challenge. Each participant is presented with five timed trivia questions; a correct answer is worth one point and an incorrect one is worth zero points. The individual scores are aggregated by lab, and the lab with the highest score wins 2000 tokens, to be equally distributed among the members of the winning lab. The *Maximal* and *Minimal* treatments differ only with respect to the groups that interact in the participation game. In the *Maximal* treatment, a group of five participants interacts with a group of five participants drawn from the other lab. In the *Minimal* treatment, the interacting groups are drawn from the same lab. The *Control* treatment differs in that the group identity induction procedure consists of the BFI alone (with an underlying group formation protocol that mimics *Maximal*).[8]

In order to assess the in-group bias of subjects, we asked them to divide 200 tokens between a random participant of his or her group (except himself) and a random participant of the other group. This allocation decision was administered twice, before and after the participation game. In addition, the final questionnaire included an item asking subjects to rate, on a 1-10 scale, how attached they felt to their own group and to the other group.

4 Experimental Results

The experimental sessions were run at the CREED laboratory of the University of Amsterdam. Participants were recruited using an online registration system. Most participants were students, with a majority in the fields of Business and Economics. A total of 160 subjects participated in 8 sessions (3 for *Maximal*, 3 for *Minimal*, 2 for *Control*), which took place in June and October 2011. On average, participants earned 28,5 Euros. The experiment was programmed and conducted with the experiment software z-Tree (Fischbacher, 2007). In this section we present our results on the relationship between altruism, group identity and participation behavior.

[8] Since Openness does not influence participation, the *Control* session mimicking *Maximal* or *Minimal* is unlikely to make a difference.

4.1 Altruism and Participation Behavior

One of our main research questions is whether participation behavior changes across different levels of altruism. In order to make the comparison possible, we need to divide subjects into categories. To have an idea on how to do this, we start with a brief characterization of our measure of altruism. The construction of the ring test presupposes the existence of a motivational vector for each subject. This implies that the way in which a subject trades off his welfare for the welfare of another individual can be represented in a two-dimensional vector space, where one dimension indexes the payoff that accrues to the subject and the other dimension indexes the payoff accruing to the other individual. This space can be represented in a two-dimensional coordinate system, where each own-other allocation is a vector whose origin coincides with the origin of the coordinate system (see Figure 1). For each of the 32 pairwise choices, the participant chooses the allocation that has the biggest projection on his motivational vector. Averaging over the 32 choices, we obtain a reasonable approximation of the individual's motivational vector.

The motivational vector of each subject can be fully described by its length and direction. These two characteristics convey useful information. The length of the vector can be interpreted as the degree of consistency of a subject. Given that each vector (allocation) had length equal to 1000, we can check the length of each subject's motivational vector to investigate the consistency of his choices. As an indication, a random sequence of choices would result in a motivational vector with length equal to 500. Consistency was not a control variable of this experiment, and therefore we will not analyze it further. However, we decided to restrict our sample to the 152 subjects with a reasonable degree of consistency (average vector with length of at least 600).

The direction of the vector, which can also be expressed as the angle formed by the vector and the horizontal axis, describes how the individual trades off his welfare for the welfare of other individuals. One can think of an individual whose vector has an angle of 26.6 degrees, which corresponds to a slope of 0.5, as someone willing to give away 50 Euro cents to another individual for each Euro he keeps for himself.[9] The average angle of the motivational vector in our sample is

[9] In our analysis we use the average vector's angle and not the slope, for the reason that it makes a finer distinction between similar vectors.

6.77°, with a standard deviation of 19.98°; the two widest angles are −68.93° and 73.25°.[10]

The ring test has a standard classification of individuals (see Liebrand, 1984), which assigns them one of six labels ("aggressive", "competitive", "individualistic", "cooperative", "altruistic"), each corresponding to an area of the circle. This is as an *ad hoc* classification, as any such classification would be. The problem we find with this classification is that it makes for a poor classification of the data, since individuals tend to massively concentrate on the two main categories, "individualistic" and "cooperative".[11] We therefore put forward a new classification, which balances a good categorization of the data with an empirically relevant set of categories:[12]

Table 2 - Motivational Categories: Definition and Sample Distribution

	Angle (°)	Vector slope	Proportion of subjects in our sample (%)
1 - Competitive	<0	<0	19.74
2 - Individualistic	=0	=0	23.03
3 - Weakly Altruistic	(0,8.53]	(0,0.15]	20.39
4 - Mildly Altruistic	(8.53,21.8]	(0.15,0.4]	18.42
5 - Strongly Altruistic	>21.8	>0.4	18.42

The first category comprises those individuals who are willing to sacrifice part of their gains to decrease the other individual's earnings, which corresponds to the typical motivation of competitive types: increase the difference between oneself and others. The second category is composed of individualistic types: subjects whose only motive is to maximize personal gains, regardless of the trade-off imposed on the other. Altruists, on the contrary, are willing to give away some of their personal gains in order to increase the gains of an anonymous individual. If the rate at which this sacrifice is made is below 0.15 we call them weak altruists; if the rate is between 0.15 and 0.4 we call them mild altruists; and if the rate is above 0.4 we call them strong altruists. We want to stress that this classification is no less *ad hoc* than the standard one. To be sure, there exist no precise or meaningful cutoff values to separate motivational categories from each other, and such

[10] This corresponds to an average slope of 0.12, with a standard deviation of 0.36; the minimum and maximum values correspond to slopes of -2.60 and 3.32.

[11] In our sample, 93.13% of subjects fall within these two categories.

[12] The conditional distribution of subjects over motivational categories and treatments can be found in Appendix D.

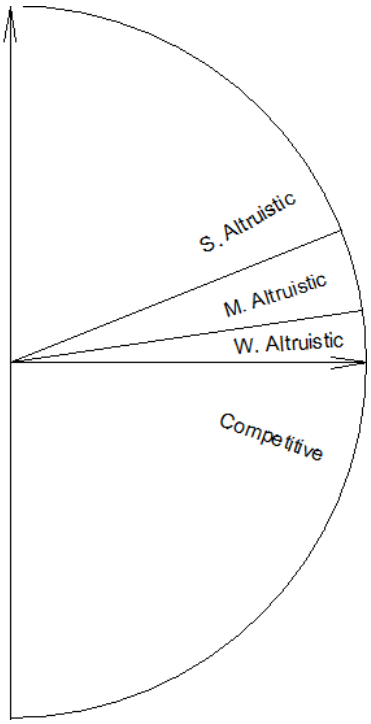

Figure 2: Motivational categories. Note that "Individualistic" coincides with the horizontal axis.

definitions would probably make little sense.

Figure 1 presents average participation behavior per motivational category throughout the participation game. We observe that competitive individuals clearly participate less often than all other types. This difference is statistically significant (Mann-Whitney p=0.00 for all comparisons). It is interesting to note that, other than competitors, strong altruists are the group which participates less often in the first twenty rounds, a tendency that is reversed in the second half of the participation game, where they are the group that participates the most. This pattern is consistent with an attempt at lowering participation on order to save on costs at first, with a subsequent embrace of participation. However, the behavior of the four types other than Competitive is sufficiently close to one another for there not to be statistical differences.

Consistent with previous evidence, there is a tendency for participation levels to decrease as the game unfolds (e.g. Schram and Sonnemans, 1996). In fact, if we regress the average participation of types on a linear trend we obtain a negative and significant relationship for all motivational categories except strong altruists, who exhibit a positive, albeit non-significant, increase in participation over time (see Table A2 in the Appendix). We conclude that strong altruists are the

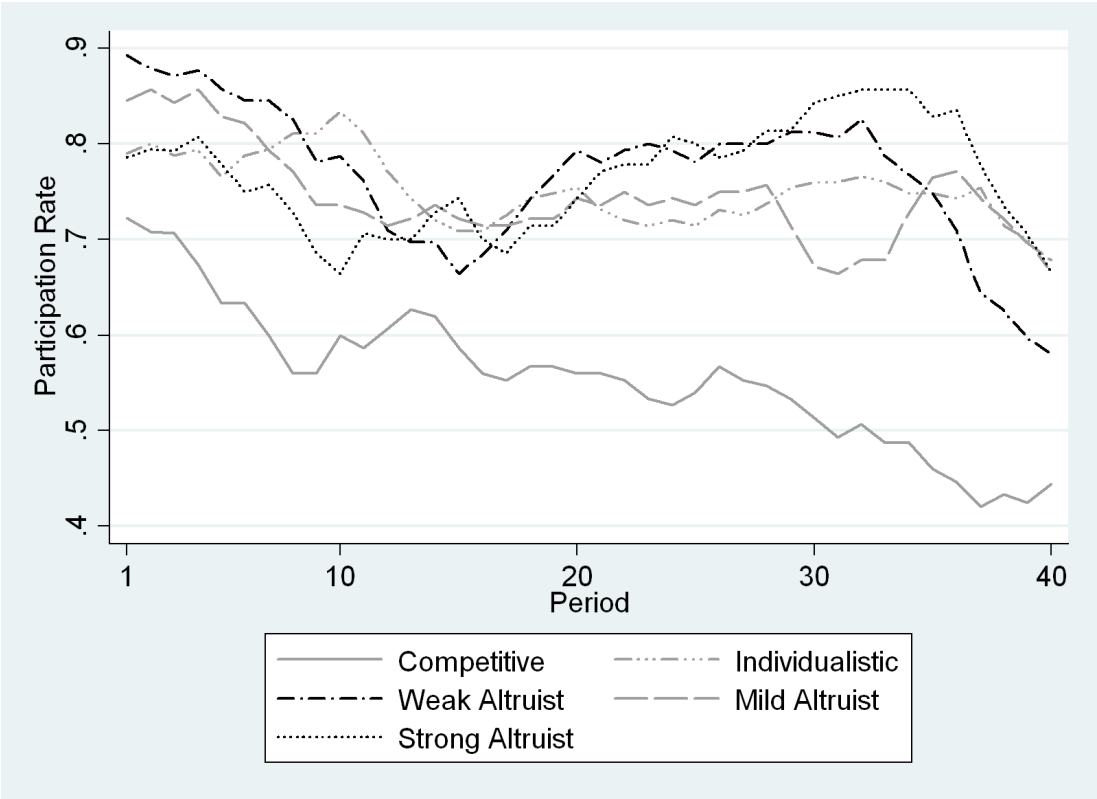

Figure 3: Evolution of Participation and Motivational Categories.

only type which manages to sustain in-group cooperation over time, since their participation levels do not decrease as the game unfolds. For all other categories there is a statistically significant decrease in in-group cooperation levels.

In order to have a clearer picture on how participation depends on altruism, we look at average individual participation within each motivational category (Figure 4). The relationship between average individual participation (fraction of the 40 periods that a subject chose to participate) and altruism seems to be positive for most categories (the relationship is inexistent for Individualistic, by definition). A simple regression of average participation on the degree of altruism produces a positive coefficient for all categories, even though statistical significance is only achieved when we consider the full sample (Table 3). As conjectured, individual average participation is increasing in the degree of altruism of subjects. This result is corroborated by panel data regressions, which can be found in sub-section 4.5.

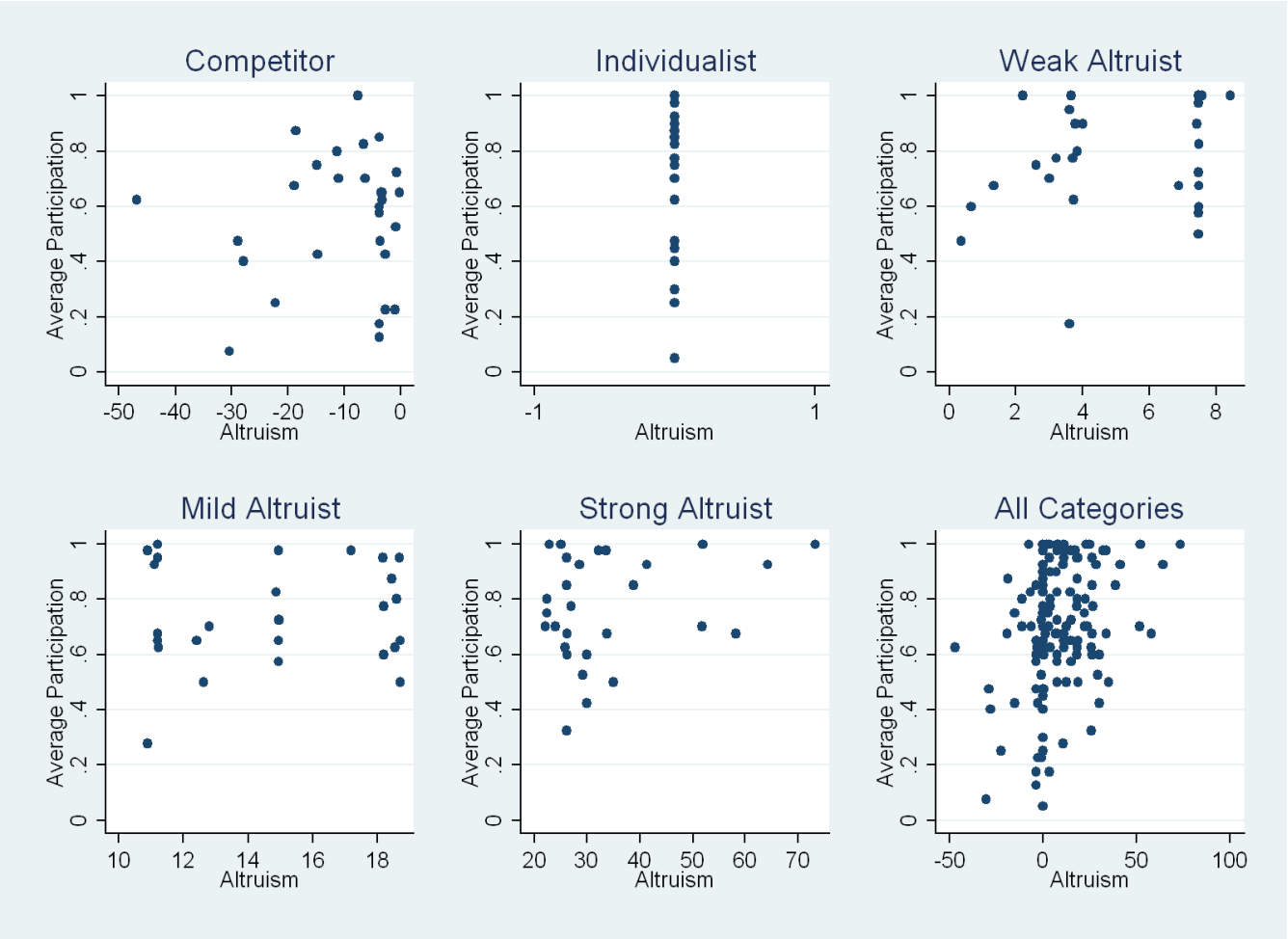

Figure 4: Average Individual Participation per Motivational Category.

Table 3 - Regression of Average Participation on Altruism	
Altruism	0.346**
	(3.14)
Constant	0.690**
	(33.90)

OLS regression, N=152. t-statistics in parentheses. *(**) indicates significance at the 10%(1%) level.

Altruism measured as the angle (°), coefficient multiplied by 10^2.

4.2 Group Identity Induction

In order to assess the extent to which group identity feelings were successfully induced, and to know how they vary across treatments, we look at measured in-group bias. As explained in the previous section, our measurement was done in two ways: first, through the division of a monetary endowment between random members of the in-group and the out-group; and second, through self-reported attachment to in-group and out-group in the questionnaire.

Figure 5 presents average allocation decisions across treatments. The percentage allocated to the in-group member in the *Maximal* treatment is higher and statistically different from the amounts allocated in the *Minimal* and *Control* treatments, both before (Mann-Whitney p=0.06 and p=0.08) and after (Mann-Whitney p=0.10 and p=0.03) the Participation Game.[13] In the *Maximal* treatment, a subject allocates approximately 80% of the total amount to the member of his group before interaction in the Participation Game takes place; in the *Minimal* and the *Control* treatments this figure is lower (approximately 72%). The pattern widens after groups interact in the Participation Game: the average allocation in the *Maximal* treatment increases to 82%, while in the *Minimal* treatment it decreases to 68% and in the *Control* treatment to 70%. However, allocation behavior before and after the Participation Game is not statistically different, neither overall nor for any specific treatment. If we average over the two allocation decisions made by each subject, behavior between *Maximal* and the other two treatments is still significantly different (p=0.01 and p=0.03 for comparisons with *Minimal* and *Control*, respectively). Allocation decisions in the *Minimal* treatment are not statistically different from those of the *Control* treatment.

The results of the allocation decisions are corroborated by the second indicator of group identity. In the questionnaire, subjects were asked to report their attachment to their group and to the other group, on a 1 to 10 scale. Computing the difference between these two values we obtain self-reported measure of in-group bias on a -10 to 10 scale. These data is depicted as the connected dots in Figure 3. Average stated in-group bias is 3.9 in *Maximal*, 2.2 in *Minimal*, and 2.9 in *Control*.[14] The difference between *Maximal* and *Minimal* is statistically significant (p=0.01).

The intended purpose of group identity induction was to introduce a wedge between the group

[13] Unless otherwise noted, all p-values reported henceforth correspond to Mann-Whitney tests.

[14] Standard deviations equal to 2.87, 3.42, and 4.50, respectively.

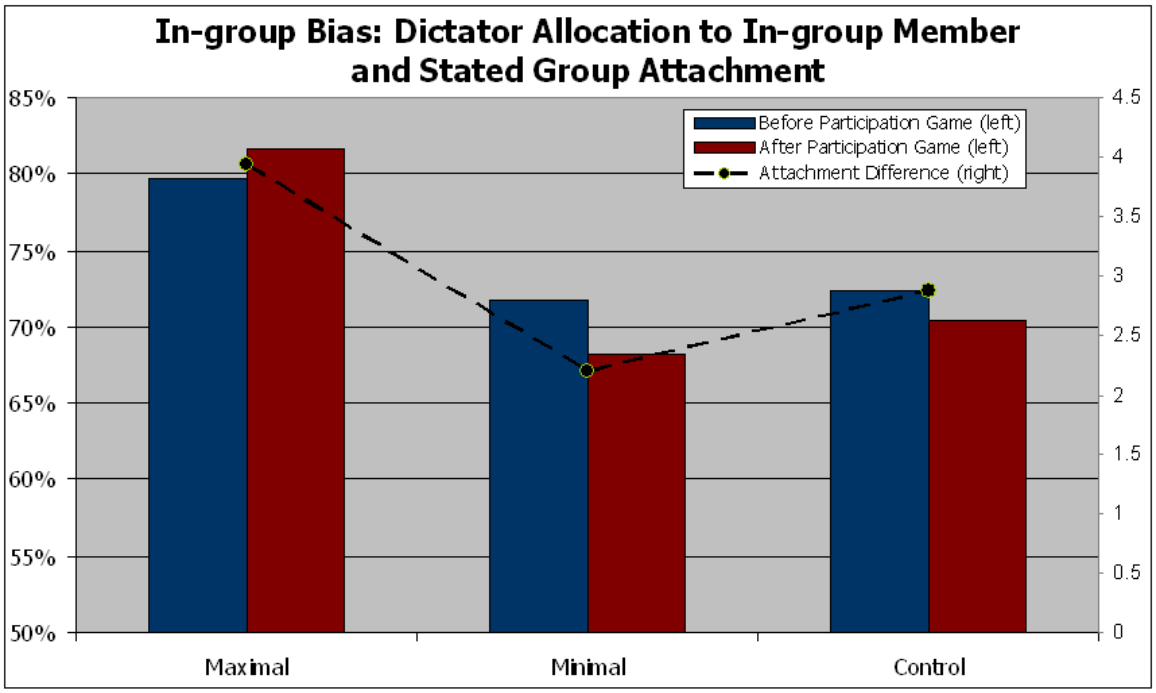

Figure 5: Group Identity: Allocation Decisions.

attachment of subjects in the *Maximal* and the *Minimal* treatments, with the *Control* treatment as an intermediate case. Our procedure was successful to a great extent. We observe that subjects in the *Maximal* treatment exhibit stronger group identity feelings than those in the *Minimal* and *Control* treatments.

4.3 Altruism and Group Identity

At this point, one might naturally ask what is the relationship between altruism and group identity. In other words, we would like to have an idea how a given motivational type reacts to different group identity manipulations. Figure 6 shows the average percentage of the endowment allocated to the in-group member, per category and treatment, both before and after the participation game.

The category that shows a higher degree of in-group bias is Individualistic, with an average allocation of 79,1% of the endowments to the in-group. The group showing the lowest in-group bias is competitors, for whom the average allocation is 67.4%. Despite the apparent diversity in allocation behavior, we only find a significant difference between the behavior of Competitors and Individualists (p=0.05), pooling the data of all treatments and using the average of the two deci-

sions. Looking at the allocation before the Participation Game, Individualists behave differently from Competitors and Mild Altruists (p=0.02 for both comparisons). For the allocation decision taking place after the Participation Game, there are no statistically different allocation decisions across motivational types. We conclude that subjects with different levels of altruism do not exhibit particular differences in in-group bias. However, conditioning on treatments will show that types react differently to group identity manipulations.

Considering the average of the two decisions, we find evidence of differential behavior of Weak Altruists between *Maximal* and *Control* (p=0.07), Strong Altruists between *Maximal* and *Minimal* (p=0.04), and Mild Altruists between both *Maximal* and *Minimal*, and *Maximal* and *Control* (p=0.05 and p=0.08, respectively). The other comparisons do not reach statistical significance levels. Bearing in mind that we observed a difference between the average allocation in *Maximal* and in the other two treatments, the evidence suggests that differences in group attachment across treatments are mostly driven by the three altruistic types. The altruistic types not only share more with an anonymous other, they also allocate a relatively higher amount to the member of their in-group when group identity is high.

Another important aspect is whether we observe a change in behavior from one allocation decision to the other. Foremost among our concerns is whether the level of in-group bias that we induce changes after interaction in the participation game takes place. A glance at Figure 6 suggests similar patterns across the two decisions, with the exception of Competitors. Analyzing each decision separately can help us pin down which types change their behavior. Before the Participation Game, there is evidence of Competitive types behaving differently in *Minimal* and *Control* (p=0.06), and of both Weak Altruists and Mild Altruists behaving differently in *Maximal* and *Control* (p=0.08 in both cases). After the Participation Game, we observe Competitive and Mildly Altruistic types making different allocation decisions in *Maximal* and *Control* (p=0.10 and p=0.05, respectively). Strong Altruists make significantly different allocations in *Minimal* as compared to both *Maximal* (p=0.05) and *Control* (p=0.07). We conclude that the behavior of Competitors is the one which changes the most; Individualists' behavior across treatments cannot be distinguished for neither allocation decision; Weak Altruists behave in the same way before

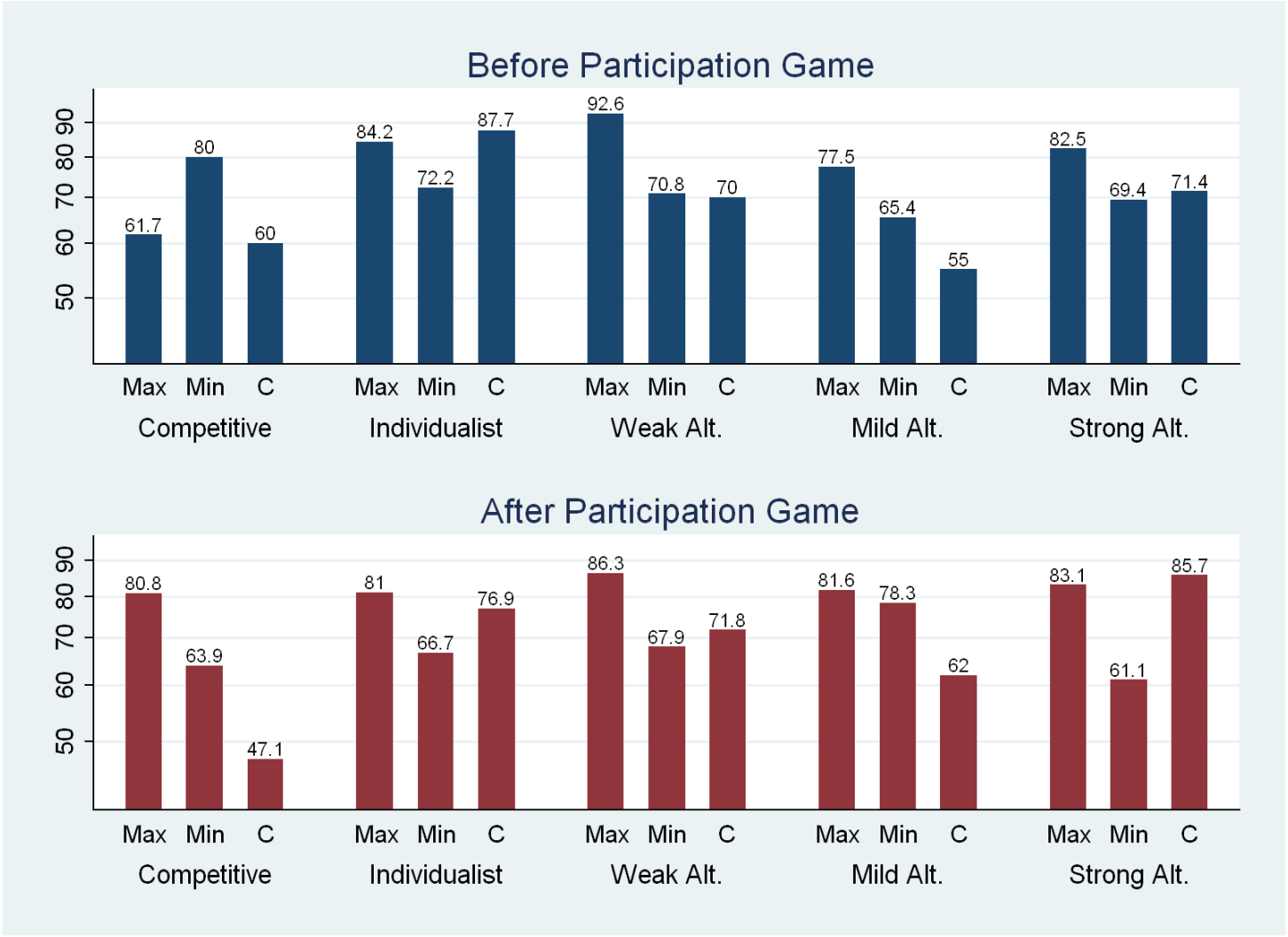

Figure 6: Altruism and Group Identity.

and after the Participation Game; Mild Altruists behave more similarly across treatments after the Participation Game, but the pattern is roughly the same; Strong Altruists, on the other hand, make more distinguishable decisions after the Participation Game, even though they also keep the pattern exhibited before the Participation Game. We conclude that interaction has some effect on the level of in-group bias, but to a limited extent.

The previous analysis focused on qualitative changes in behavior. We want to know if this translates into quantitatively different evidence. The difference between average in-group bias of a given motivational type in a given treatment across the two decisions is never statistically significant We must acknowledge that at this level of detail we are dealing with a small number

of observations. Aggregating the behavior of types at the treatment level, there is only evidence of different behavior for Mild Altruists across the two decisions (p=0.08). Aggregating types over treatment conditions, and comparing behavior before and after the participation game, renders undetectable differences.

Three conclusions are in order. First, without conditioning on group identity manipulations, the behavior of the different types is indistinguishable, except for Competitors and Individualists. Second, the differences of in-group bias we observe at the treatment level seem to be due to the behavior of the altruistic types. Third, except for Competitors, in-group bias follows the same general patterns before and after the participation game; in other words, the interaction with other group members and the observation of their behavior does not seem to radically alter the group attachment of subjects. Even though we observe some instances where subjects seem to be punishing their group (21.05% of the subjects decrease their allocation to the in-group after the Participation Game), the vast majority of subjects either exhibits the same level of in-group bias (54.61%) or an increase (24.34%).

4.4 Group Identity and Participation Behavior

Our main research question is whether and how group identity influences participation behavior. As hypothesized, we expect interacting groups with stronger group attachment to exhibit higher levels of aggregate participation. At the individual level, our conjecture is that subjects who show a higher sense of group identity participate more often.

Figure 7 depicts the evolution of aggregate participation throughout the forty interaction periods. Aggregate participation rates vary between 46 and 90%, with a higher overall participation rate in *Maximal* (74.3%) than in *Minimal* (69.3%) and *Control* (69.2%). Participation volatility is lowest in *Maximal*, followed by *Minimal* and *Control* (standard deviations equal to 4.3%, 7.1% and 10.9%, respectively; note that we have two more interacting groups in *Maximal* and *Minimal*). The participation pattern we observe is similar to the existing evidence in many respects (slight decrease in participation as interaction is repeated, an abrupt decline in the last couple of periods), and starkly different in at least one: participation levels are considerably high, twenty percentage

points above data obtained in similar settings. The reason for this is unknown to us. In the first 10 periods participation is remarkably similar in all three treatments. As groups interact we observe a departure of participation in *Maximal* from the levels observed in *Minimal*, while *Control* exhibits an erratic pattern. Despite the slightly higher participation rates observed in *Maximal*, neither mean nor median participation is statistically different from *Minimal* and *Control*.

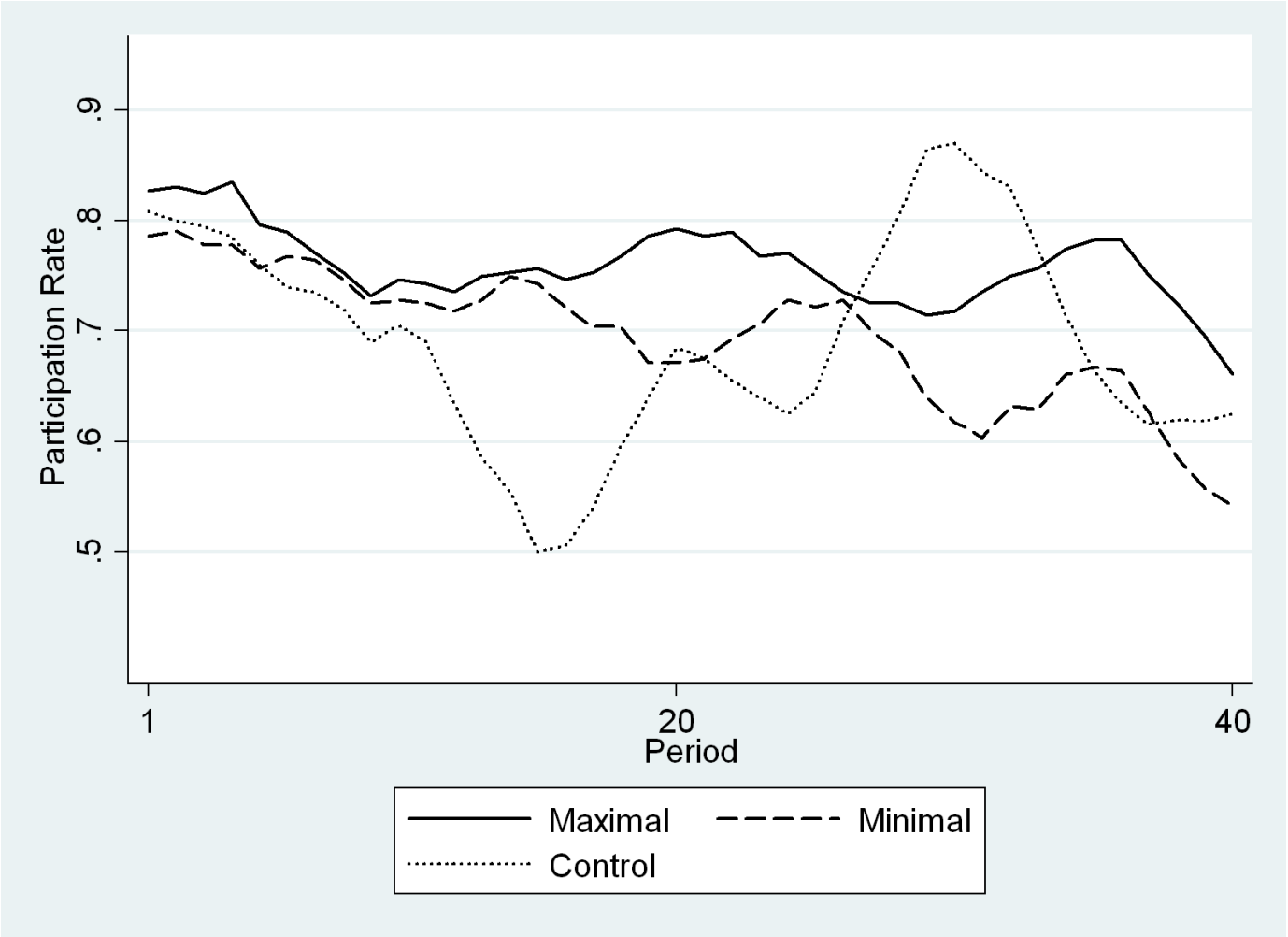

Figure 7: Evolution of Participation and Treatments.

In order to further explore participation behavior, we have to look at what happens for the different motivational categories (Figure 8). We observe some striking differences in the participation rate of types across treatment conditions. While Individualists in *Maximal* participate at an average rate of 86%, a Competitor in *Control* participates roughly half of the times (52.5%). The most pronounced differences can be observed for Individualists. Individualistic subjects behave

differently in *Maximal* and *Minimal* after participation levels stabilize (p=0.09 and p=0.08 for the second half and last quarter of the Participation Game, respectively). A test on the difference of medians reinforces this pattern (p=0.03, for the second half of the Participation Game). Mild Altruists show a similar pattern, but the difference between *Maximal* and *Minimal* is much tighter. Strong Altruists, on the other hand, seem to revert this pattern: they always participate more in *Minimal* than *Maximal*, even though this difference falls short of statistical significance.

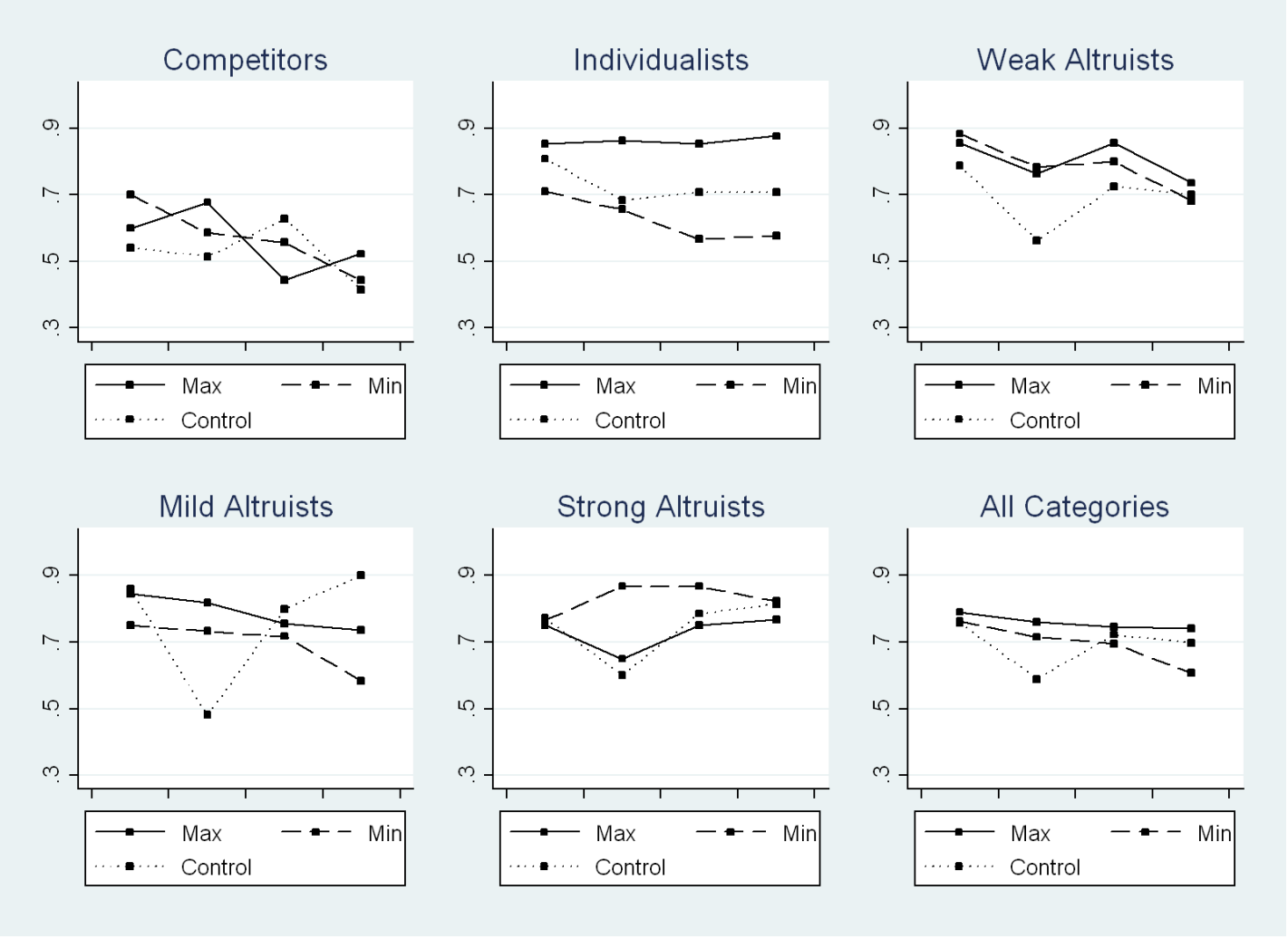

Figure 8: Individual Participation per Motivational Category and Treatment.

Across treatments, average individual participation seems to be slightly increasing in sense of group identity. Splitting the sample in terciles according to average allocation decision, we find that the first tercile participates less often (69.6%) than the second (73%) and third (72.8%) ones. The difference is not statistically significant.

The evidence presented so far suggests that group identity has a small impact on aggregate behavior. Our preliminary conclusion is that contexts in which groups care relatively more for the members of their group will not necessarily be associated with higher participation levels. Regarding the different motivational categories, we found that Individualists are likely to be the group for which this is not the case. For this type of subjects the fact that they are paired with like-minded individuals, while competing with non-like-minded ones, leads them to participate significantly more than when they would compete with their equals. At the individual level, higher in-group bias seems to lead to more participation, but the statistical evidence is not conclusive. In the next section we run a series of regression models which allow us to give a more definite answer to our conjectures.

4.5 Regression Analysis

In this section we analyze the experimental data using regression techniques. We make use of the panel structure of our data, which allows us to account for individual and period-specific heterogeneity in the participation game. We employ a logit specification in order to better accommodate those individuals with relatively extreme degrees of altruism and group identity.

Two points related to our empirical strategy are in order. First, since we observe decreasing participation rates through repetitions, with a steep decrease in the last few periods (a regularity of these games), we estimate models that include trend and squared trend terms. Second, we employ the average of the two allocation decisions as the in-group bias measurement. We would like to have the best indicator of group identity at every period in time in our models. Given that our measurements are made only at the beginning and at the end of the participation game, we are convinced that the average of the two provides a more accurate indicator of group attachment, since in the beginning this is more likely to be captured by the first decision, and conversely towards the end of the game. Moreover, we saw that there is a great degree of consistency between the first and the second allocation decision.

At first glance, Table 4 conveys a number of important messages. First, and as expected, the trend coefficient is negative and significant. Second, altruism has a positive and visible impact on

individual participation. The coefficient is positive and significant for the two reported specifications. This analysis confirms the result we obtained with a simple regression of average individual participation on altruism (Table 2). Third, group identity seems to be related to participation behavior, as the coefficient on both measures of in-group bias is significant. Fourth, in line with previous hints, group identity might translate into different patterns of participation behavior in *Maximal* as compared to *Minimal*.

Table 4 - Determinants of Individual Participation

	(1)	(2)
Altruism	0.022**	0.020*
	(2.74)	(2.49)
In-group bias: allocation	0.005*	
	(1.72)	
In-group bias: survey		0.116*
		(2.05)
Maximal	1.096*	0.590
	(2.07)	(1.24)
Minimal	0.397	0.070
	(0.89)	(0.18)
Trend	-0.032**	-0.032**
	(2.66)	(2.66)
Trend^2	0.000	0.000
	(1.19)	(1.20)
In-group bias**Maximal*	-0.007*	-0.063
	(1.72)	(0.67)
In-group bias**Minimal*	-0.005	-0.009
	(1.31)	(0.11)
Constant	1.083**	1.171**
	(2.99)	(3.69)

Random Effects Logit estimation coefficients (N=152). *Maximal* and *Minimal* are treatment-specific dummy variables. Individual-level standard-error clustering. Absolute z-scores in parentheses. *(**) indicates significance at the 10% (1%) level.

In what the second point is concerned, in addition to showing the significance of the relationship, we can try to quantify the impact of altruism on individual participation. This is achieved by calculating the marginal effects implied by our models. Our models predict that the average

individual in our sample will participate 79.59% and 79.70% of the times.[15] Assuming random effects with zero mean and evaluating the effect at sample averages, we find that a marginal increase in altruism leads to an increase in the probability of participating equal to 0.36% and 0.32% in models (1) and (2), respectively, an effect that is statistically significant at the 1% level for both models.

Regarding the third point, the conjecture is based on the fact that the *Maximal* treatment dummy and the interaction effect are significant in model (1). Using model (1), a test on the hypothesis that *Maximal* differs from *Minimal* produces evidence that is not enough for us to conclude so (p=0.15).[16] An analogous comparison can be made between each of the two treatments and *Control*. We find evidence of a significant difference between *Maximal* and *Control* (p=0.04) but not between *Minimal* and *Control* (p=0.38).[17][18]

A further and crucial question is whether the two treatments induce a different relationship between group identity and participation. Recall that in *Minimal* subjects compete against a group of like-minded others with whom they have cooperated, and therefore we expect less fierce competition than in *Maximal*, where subjects compete against others who are dissimilar and with whom they have competed against. We might be tempted to draw conclusions from analyzing the interaction terms in models (1) and (2). However, unlike in linear models, the reported interaction coefficients do not correspond to the true interaction effects.[19] We follow the procedure summarized by Ai and Norton (2003) to derive the true marginal effects and their standard errors; we evaluate these at different data points (Table 5). Overall, the positive impact of in-group bias on participation seems to be confirmed: in model (2) the marginal effect is positive and significant in 3 out of 4 cases, while in model (1) this is true in the baseline case. Regarding the interaction effect

[15] By "average individual" we mean the one for which the independent variables take their sample average value.

[16] We test whether the sum of the treatment dummy coefficient and the corresponding interaction effect with in-group bias is different in the two treatments. The test statistics, which follows a $\chi^2_{(1)}$ under the null, takes the value 2.04.

[17] We test whether the sum of the treatment dummy coefficient and the corresponding interaction effect with in-group bias is different from zero. The test statistics, which follows a $\chi^2_{(1)}$ under the null, take values 4.29 and 0.78 for the first and second comparison, respectively.

[18] Performing the same analysis for model (2) delivers no statistically significant differences.

[19] Crucially, the marginal effects of interacted variables in non-linear models will always be a non-linear combination of regression coefficients. As for non-interacted variables, marginal effects will also depend on what data points are used in evaluating them. However, unlike non-interacted variables, the standard errors are also conditional on the data.

between group identity and participation behavior there is no statistical evidence of a difference between *Maximal* and *Minimal*. The only interaction effect to achieve significance is found in *Maximal*. This number can be interpreted as the change in the marginal impact of group identity on individual participation in *Maximal* as compared with other treatments. The effect is negative, which means that individuals in *Maximal* are likely to participate below what would be expected solely based on their sense of group attachment.

To have an idea of what the models are telling us it might be useful to have a look at their in-sample predictions, i.e. what are the participation levels implied by the levels of altruism and in-group bias in our sample. This exercise, which can be found in Figure 9, is useful in showing that our data describes a clear relationship between altruism and participation. What the model predicts based on in-group bias is less clear, especially when we use the average allocation decision (Model (1)).

Table 5 - Marginal Effects

	Average	Max=1, Min=0	Max=0, Min=1	Max=0, Min=0
Model (1)				
In-group bias	0.011	-0.024	0.002	0.087**
	(0.024)	(0.035)	(0.042)	(0.038)
In-group bias*_Maximal_		-0.112**		
		(0.050)		
In-group bias*_Minimal_			-0.086	
			(0.057)	
Model (2)				
In-group bias	0.016**	0.008	0.020*	0.022**
	(0.007)	(0.012)	(0.012)	(0.009)
In-group bias*_Maximal_		-0.014		
		(0.016)		
In-group bias*_Minimal_			-0.002	
			(0.016)	

Standard errors in parentheses. Values for Model (1) are multiplied by 10^2.*(**) indicates significance at the 10% (1%) level. "Average": all variables evaluated at sample average values. Remaining columns: variables evaluated at sample average values, except for the indicated dummies.

The models we have estimated so far convey three messages. First, the role of altruism in participation decisions is clear: more altruistic subjects participate in higher numbers. Second, our evidence points towards a modest but positive relationship between group identity and individual participation. The fact that the higher average in-group bias observed in *Maximal* does not translate into higher *aggregate* participation levels is by no means an impossibility. Third, contrary to our conjecture, there seems to be no evidence of group identity acting differently across our treatments.

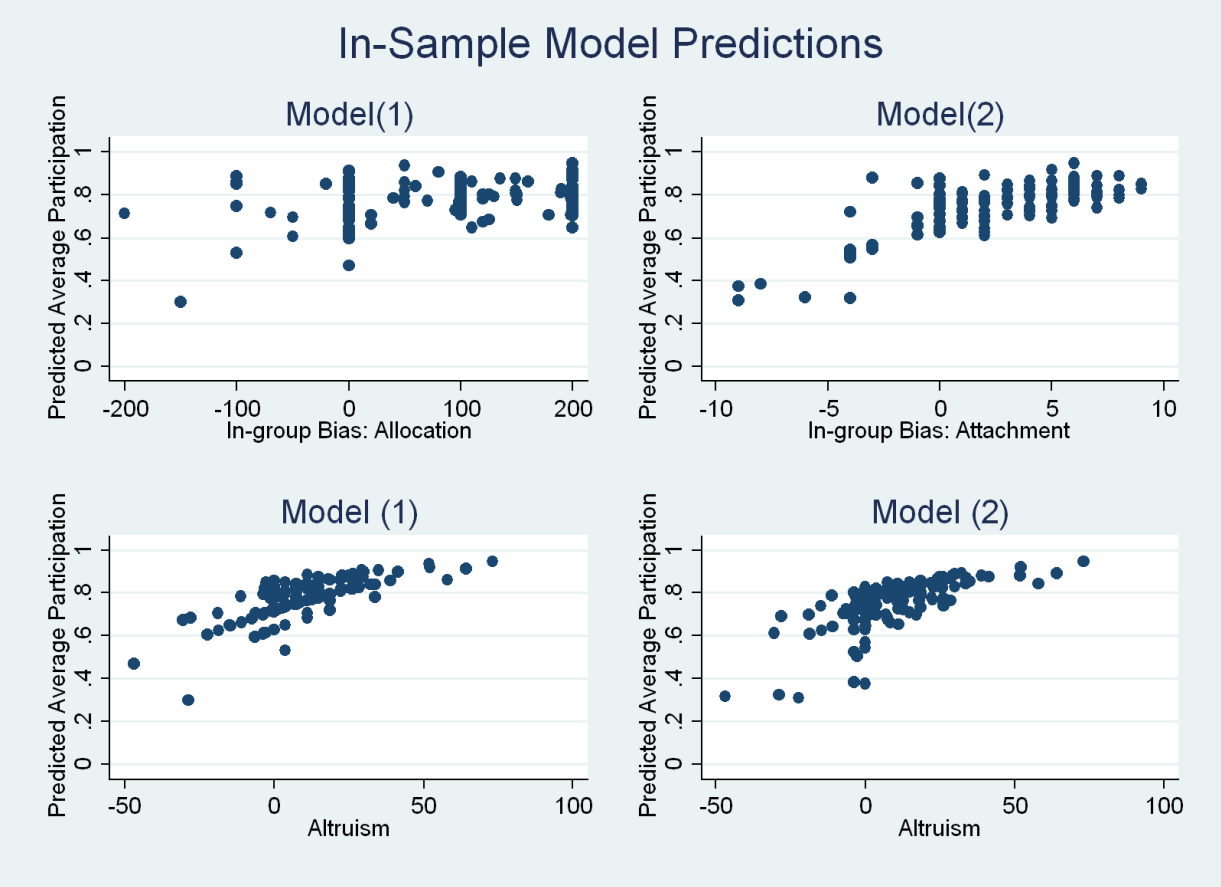

Figure 9: In-Sample Model Predictions

5 Conclusion

In his appraisal of the rational choice literature on election participation, Feddersen (2004) claimed that "while a canonical model does not yet exist, the literature appears to be converging toward a "group-based" model of turnout, in which group members participate in elections either because they are directly coordinated and rewarded by leaders as in "mobilization" models or because they believe themselves to be ethically obliged to act in a manner that is consistent with the group's interest as in "ethical agent" models." This paper is an attempt to provide further evidence to the large stream of literature which tries to evaluate participation in light of other-regarding concerns and group-directed duties. In particular, we adressed the influence of altruistic motivations and group identification on political participation decisions using an experimental framework. There is a considerable empirical literature studying the impact of group membership on participation, which has shown that higher social connectedness leads to higher participation levels. However,

the mechanism at work is difficult to identify in the field, in the sense that it is impossible to disentangle the impact of group-level mobilization processes from the impact of group identity concerns.

In this paper we study political participation as a competition between groups, where victory depends on the sum of the individual efforts of the individuals in a group. We implemented an experimental design that allows us to measure the altruistic concerns of subjects and implement environments with different levels of group identity. Our main conclusions are that individual participation is increasing in altruistic concerns and group attachment, as conjectured. Regarding the impact of group identity on aggregate participation levels, it seems to be statistically insignificant contrary to our conjecture. In other words, environments where the competing groups tend to show high in-group favoritism do not necessarily exhibit a higher degree of participation. The main message of our paper is that the higher participation levels observed in environments where group identification is high (e.g. contexts with pronounced ethnic divisions and high political participation) might be due more to the underlying mobilization processes than to an heightened sense of group identification.

References

[1] Ai, C. and E. Norton (2003). "Interaction terms in logit and probit models." *Economics Letters* 80: 123–129.

[2] Ben-Ner, A., McCall, B., Stephane, M. and H. Wang (2009). "Identity and in-group/out-group differentiation in work and giving behaviors: Experimental evidence." *Journal of Economic Behavior & Organization* 72: 153–170.

[3] Bornstein, G. (1992). "The Free-Rider Problem in Intergroup Conflicts Over Step-Level and Continuous Public Goods." *Journal of Personality and Social Psychology* 62 (April): 597-606.

[4] Bornstein, G., Rapoport, A., Kerpel, L. and T. Katz (1989). "Within- and Between-Group Communication in Intergroup Competition for Public Goods." *Journal of Experimental Social Psychology* 25: 422-436.

[5] Brewer, M. (2007). "The Social Psychology on Intergroup Relations: Social Categorization, Ingroup Bias, and Outgroup Prejudice." in *Social Psychology: Handbook of Basic Principles*, Kruglanski, A. and E. Higgins (eds.), The Guilford Press, New York.

[6] Caprara, G., Schwart, S., Capanna, C., Vecchione, M. and C. Barbarenelli (2006). "Personality and Politics: Values, Traits, and Political Choice." *Political Psychology*, 27 (1): 1-28.

[7] Charness, G., Rigotti, L. and A. Rustichini (2207). "Individual Behavior and Group Membership." *American Economic Review*, 97 (4): 1340-1352.

[8] Chen, Y. and S. Li (2009). "Group Identity and Social Preferences." *American Economic Review*, 99 (1): 431–457.

[9] Dawes, R. M. 1980. "Social dilemmas." *Annual Review of Psychology* 31: 169-93.

[10] Dawes, C., Loewen, P. J. Fowler (2011). "Social Preferences and Political Participation." *The Journal of Politics* 73 (3): 845–856.

[11] Edlin, A., Gelman, A. and Kaplan, N. (2007). "Voting as a Rational Choice: Why and How People Vote to Improve the Well-Being of Others." *Rationality and Society* 19 (3): 293 - 314.

[12] Evren, O. (2010). "Altruism and Voting: A Large-Turnout Result That Does not Rely on Civic Duty or Cooperative Behavior." Working Paper.

[13] Feddersen, T., Gailmard, S. and A. Sandroni (2009). "Moral bias in large elections: Theory and experimental evidence." *American Political Science Review* 103: 175-192.

[14] Fischbacher, U. (2007) "z-Tree: Zurich toolbox for ready-made economic experiments." *Experimental Economics* 10 (2): 171-178.

[15] Fowler, J. (2006). "Altruism and Turnout." *The Journal of Politics* 68 (3): 674-83.

[16] Fowler, J. and C. Kam (2007). "Beyond the Self: Social Identity, Altruism, and Political Participation." *The Journal of Politics* 69 (3): 813–827.

[17] Goren, H. and G. Bornstein (2000). "The Effects of Intragroup Communication on Intergroup Cooperation in the Repeated Intergroup Prisoner's Dilemma (IPD) Game." *Journal of Conflict Resolution* 44 (5): 700-719.

[18] Hogg, A. and D. Abrams (1998). *Social Identifications: A Social Psychology of Intergroup Relations and Group Processes*, Routledge, London.

[19] Jankowski, R. (2002). "Buying a Lottery Ticket to Help the Poor: Altruism, Civic Duty, and Self-interest in the Decision to Vote." *Rationality and Society* 14: 55-77.

[20] Jankowski, R. (2007). "Altruism and the Decision to Vote: Explaining and Testing High Voter Turnout." *Rationality and Society* 19: 5-34.

[21] John, O., Naumann, L., and C. Soto (2008). "Paradigm Shift to the Integrative Big-Five Trait Taxonomy: History, Measurement, and Conceptual Issues." In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114-158). New York, NY: Guilford Press.

[22] Kenny, C. (1992). "Political Participation and Effects from the Social Environment." *American Journal of Political Science* 36 (1): 259-267.

[23] Knack, S. (1992). "Social Altruism and Voter Turnout: Evidence from the 1991 NES Pilot Study." *1991 NES Pilot Study Reports.*

[24] Leighley, J. and A. Vedlitz (1999) "Race, Ethnicity, and Political Participation: Competing Models and Contrasting Explanations." *The Journal of Politics* 61(4): 1092-1114.

[25] Liebrand, W. (1984). "The effect of social motives, communication and group size on behaviour in an n-person multi stage mixed motive game." *European Journal of Social Psychology* 14: 239-264.

[26] Mutz, D. (2002). "The Consequences of Cross-Cutting Networks for Political Participation." *American Journal of Political Science* 46 (October): 838–55.

[27] Offerman, T., Sonnemans, J. and A. Schram (1996). "Value orientations, expectations and voluntary contributions in public goods." *Economic Journal* 106: 817–845.

[28] Palfrey, T., and H. Rosenthal (1983). "A Strategic Calculus of Voting." *Public Choice* 41 (1): 7-53.

[29] Schram, A. and J. Sonnemans. (1996). "Why People Vote: Experimental Evidence." *Journal of Economic Psychology* 17 (4): 417–442.

[30] Tajfel, H. (1982). "Social Psychology of Intergroup Relations." *Annual Review of Psychology* 33: 1-39.

[31] Van Dijk, F., Sonnemans, J. and F. van Winden (2002). "Social Ties in a Public Good Experiment." *Journal of Public Economics* 85 (2): 275-299.

[32] Verba, S. and N. Nie (1972). *Participation in America: Political Democracy and Social Equality*. New York: Harper and Row.

Aldrich, J. (1997). "When is it Rational to Vote?" in *Perspectives on Public Choice: A Handbook*, Dennis Mueller (ed.), Cambridge University Press, New York, 373–90.

6 Appendix

Appendix 6.A Equilibria of the participation game

In this Appendix we report the equilibria that we derived for the configurations reported in Table 1. As explained in section 2, the equilibria correspond to a situation of 3 players; the game parameters are a monotonic transformation of the ones used in the experiment, i.e. $B^W = 4$, $B^L = 1$, and $c = 1$. Given that the two groups are always symmetric, each equilibrium is in fact a pair. A "*" means that all the possible combinations are also an equilibrium. For example, E2* stands for $\{0.2, 0.2, 0.8; 0.2, 0.2, 0.8\}$, $\{0.2, 0.8, 0.2; 0.2, 0.8, 0.2\}$, etc. The seven columns on the right correspond to the probability of obtaining each of the seven possible levels of participation for each equilibrium.

Table A.1- Equilibria of the Participation Game - configurations A to F

	p_1	p_2	p_3	p_4	p_5	p_6	0%	17%	33%	50%	67%	83%	100%
A	0.74	0.81	0.95	0.26	0.19	0.05	0.00	0.04	0.23	0.46	0.23	0.04	0.00
B	0.55	0.64	0.81	0.45	0.36	0.19	0.01	0.08	0.24	0.34	0.24	0.08	0.01
C	0.68	0.68	0.68	0.32	0.32	0.32	0.01	0.08	0.24	0.34	0.24	0.08	0.01
D	0.57	0.57	0.57	0.43	0.43	0.43	0.01	0.09	0.24	0.32	0.24	0.09	0.01
E1	0.20	0.20	0.20	0.20	0.20	0.20	0.27	0.39	0.24	0.08	0.01	0.00	0.00
E2*	0.20	0.20	0.80	0.20	0.20	0.80	0.02	0.15	0.40	0.31	0.10	0.02	0.00
E3*	0.20	0.80	0.80	0.20	0.80	0.80	0.00	0.02	0.10	0.31	0.40	0.15	0.02
E4	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00	0.01	0.08	0.24	0.39	0.27
F1	0.06	0.06	0.06	0.06	0.06	0.06	0.71	0.25	0.04	0.00	0.00	0.00	0.00
F2*	0.06	0.06	0.94	0.06	0.06	0.94	0.00	0.08	0.73	0.17	0.01	0.00	0.00
F3*	0.06	0.94	0.94	0.06	0.94	0.94	0.00	0.00	0.01	0.17	0.73	0.08	0.00
F4	0.94	0.94	0.94	0.94	0.94	0.94	0.00	0.00	0.00	0.00	0.04	0.25	0.71

Table A.2 - Equilibria of the Participation Game - configuration G

	p_1	p_2	p_3	p_4	p_5	p_6	0%	17%	33%	50%	67%	83%	100%
G1	0.36	0.25	0.15	0.36	0.25	0.15	0.17	0.36	0.31	0.13	0.03	0.00	0.00
G2	0.42	0.33	0.25	0.58	0.12	0.01	0.11	0.33	0.36	0.17	0.04	0.00	0.00
G3	0.64	0.25	0.15	0.64	0.25	0.15	0.05	0.24	0.38	0.24	0.07	0.01	0.00
G4	0.30	0.70	0.07	0.70	0.30	0.21	0.03	0.198	0.37	0.29	0.10	0.02	0.00
G5	0.24	0.12	0.76	0.76	0.32	0.24	0.02	0.15	0.37	0.32	0.12	0.02	0.00
G6	0.36	0.75	0.15	0.36	0.75	0.15	0.02	0.14	0.34	0.33	0.14	0.03	0.00
G7	0.31	0.20	0.80	0.39	0.80	0.20	0.01	0.10	0.32	0.35	0.17	0.04	0.00
G8	0.42	0.88	0.25	0.58	0.67	0.01	0.01	0.08	0.28	0.38	0.21	0.04	0.00
G9	0.36	0.25	0.85	0.36	0.25	0.85	0.01	0.07	0.28	0.37	0.21	0.06	0.01
G10	0.43	0.99	0.29	0.57	0.01	0.71	0.00	0.05	0.25	0.40	0.25	0.05	0.00
G11	0.40	0.29	0.90	0.60	0.71	0.10	0.00	0.06	0.24	0.38	0.24	0.06	0.00
G12	0.64	0.75	0.15	0.64	0.75	0.15	0.00	0.06	0.21	0.37	0.28	0.07	0.01
G13	0.42	0.33	0.99	0.58	0.12	0.75	0.00	0.04	0.21	0.38	0.28	0.08	0.01
G14	0.61	0.20	0.80	0.69	0.80	0.20	0.00	0.04	0.17	0.35	0.32	0.10	0.01
G15	0.64	0.25	0.85	0.64	0.25	0.85	0.00	0.03	0.14	0.33	0.34	0.14	0.02
G16	0.24	0.68	0.76	0.76	0.88	0.24	0.00	0.02	0.12	0.32	0.37	0.15	0.02
G17	0.30	0.70	0.79	0.70	0.30	0.93	0.00	0.02	0.10	0.29	0.37	0.19	0.03
G18	0.36	0.75	0.85	0.36	0.75	0.85	0.00	0.01	0.07	0.24	0.38	0.24	0.05
G19	0.42	0.88	0.99	0.58	0.67	0.75	0.00	0.00	0.04	0.17	0.36	0.33	0.11
G20	0.64	0.75	0.85	0.64	0.75	0.85	0.00	0.00	0.03	0.13	0.31	0.36	0.17

Appendix 6.B Reported Motivations in the Questionnaire

Table B.1 - Reported Motivations in the Questionnaire

	Main goal of a participant who...	
	participated...	did not participate...
	most of the times	
Make as much money as possible for himself or herself.	27.50%	77.50%
Increase the difference between his or her earnings and the earnings of other participants.	1.88%	20.00%
Help his or her group make as much money as possible.	63.75%	1.25%
Help both his or her group and the other group make asmuch money as possible.	6.88%	1.25%

Appendix 6.C Value Orientation Test: Ring Test of van Dijk et al. (2002)

The value orientation test of van Dijk et al. (2002) is reproduced here.

Question	Alternative A		Alternative B		Question	Alternative A		Alternative B	
	Self	Other	Self	Other		Self	Other	Self	Other
1	0	500	304	397	17	0	-500	-304	-397
2	304	397	354	354	18	-304	-397	-354	-354
3	354	354	397	304	19	-354	-354	-397	-304
4	397	304	433	250	20	-397	-304	-433	-250
5	433	250	462	191	21	-433	-250	-462	-191
6	462	191	483	129	22	-462	-191	-483	-129
7	483	129	496	65	23	-483	-129	-496	-65
8	496	65	500	0	24	-496	-65	-500	0
9	500	0	496	-65	25	-500	0	-496	65
10	496	-65	483	-129	26	-496	65	-483	129
11	483	-129	462	-191	27	-483	129	-462	191
12	462	-191	433	-250	28	-462	191	-433	250
13	433	-250	397	-304	29	-433	250	-397	304
14	397	-304	354	-354	30	-397	304	-354	354
15	354	-354	304	-397	31	-354	354	-304	397
16	304	-397	0	-500	32	-304	397	0	500

Appendix 6.D Regression and Classification of Subjects

Table D.1 - Regression of Average Participation per Motivational Category on a Linear Trend

	Competitors	Individualists	Weak Altruists	Mild Altruists	Strong Altruists
Constant	0.682**	0.794**	0.845**	0.804**	0.734**
	(34.42)	(40.12)	(30.58)	(37.05)	(23.83)
Linear Trend	-0.601**	-0.210*	-0.373**	-0.296**	0.150
	(-7.21)	(-2.49)	(-3.18)	(-3.21)	(1.15)
R^2	0.58	0.14	0.21	0.21	0.03

OLS regression. t-statistics in parentheses, *(**) indicates significance at the 10%(1%) level.

Linear Trend coefficient multiplied by 10^2.

Table D.2 - Conditional Distribution of Subjects

Treatment\Type	Competitive	Individualistic	Weak Alt	Mild Alt	Strong Alt
Max	0.06	0.09	0.07	0.07	0.08
Min	0.09	0.06	0.08	0.08	0.06
Control	0.05	0.09	0.05	0.03	0.05