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Highlights

- We run a Trust Game on members of different types of associations and non-members.
- Members of Putnam-type associations display more generalized trust than non-members.
- Members of Olson-type associations display no more generalized trust than non-members.
- The opposite pattern emerges when trustworthiness is analyzed.
- The causality issue is discussed through a structural equation model.

Groups and trust: Experimental evidence on the Olson and Putnam hypotheses

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Abstract

Mancur Olson and Robert Putnam provide two conflicting views on the effect of involvement with voluntary associations on their members. Putnam argues that associations instill in their members habits of cooperation, solidarity and public spiritedness. Olson emphasizes the tendency of groups to pursue private interests and lobby for preferential policies. We carry out the first field experiment involving a sample of members of different association types from different age groups and education levels, as well as a demographically comparable sample of non-members. This enables us to examine the differential patterns of behavior followed by members of Putnam-type and Olson-type associations. Coherently with both the Putnam's and Olson's view, we find that members of Putnam-type (Olson-type) associations display more (no more) generalized trust than non-members. However, when we examine trustworthy behavior we find the opposite pattern, with members of Olson-type (Putnam-type) associations more (no more) trustworthy than non-members. No systematic effect for the intensity of participation in associations emerges. We analyze the issue of self-selection through a structural equation model. This supports the view that membership has a significant effect on prosociality.

Keywords: Trust; Voluntary associations; Putnam; Olson; Field experiment
JEL classification: A13; D03; C93; Z13.

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1. Introduction

The role of groups in shaping individuals preferences and modes of behavior has attracted the attention of many scholars in the social sciences. Two main theories on the relationship between groups and individuals are contrasted in contemporary investigations. The first is due to Robert Putnam. Drawing on Tocqueville's (1840) seminal analysis, Putnam posits that "associations instill in their members habits of cooperation, solidarity and public-spiritedness." (Putnam et al. 1993: 89–90). The second theory is due to Mancur Olson (1965; 1982). Putnam's optimism on the beneficial role of associations is here replaced by a disenchanted view of the underlying reasons for the existence of associations. Olson emphasizes the tendency of groups to pursue private interests and lobby for preferential policies. Far from instilling public-spiritedness in the society, parochial and partisan interests prevail in the associations' objectives.

These two views are not necessarily irreconcilable. It has been argued that voluntary associations differ in characteristics and purposes. Some types of associations may operate in accordance with Putnam's theory, other with Olson's. In their seminal contribution, Knack and Keefer (1997) classify trade unions, political parties or groups, and professional associations as "Olson-type" associations, as these associations are "most representative of groups with redistributive goals" (Knack and Keefer, 1997; p. 1273). "Redistributive" here is synonym with rent-seeking behavior. The objective of these associations is mainly to redirect society's resources to the benefit of their own members. Education, arts, music or cultural activities; religious or church organizations; and youth work (e.g., scouts, guides, youth clubs, etc.) are defined as "Putnam-type" associations. They are "identified as those groups least likely to act as "distributional coalitions" but which involve social interactions that can build trust and cooperative habits" (Knack and Keefer, 1997; p. 1273).

The previous study, along with other contributions drawing on aggregate country-level data in order to study the effect of associational membership (see section 2 for a review), cannot take into

account either the possibility that individuals are members of more than one type of association, or the intensity of their associational activity. Other studies, reviewed in section 2, analyze the effect of associational membership using individual-level surveys (Stolle and Rochon, 1998, Stolle, 1998, Wollebaek and Selle, 2002). Although these contributions are better able to investigate the micro-mechanisms of the relationship between prosociality and membership in voluntary associations, the possibility of confounding effects and misreporting that is intrinsic in survey questions hamper their conclusions (e.g. Bertrand and Mullainathan,. 2001; Glaeser et al., 2000; Anderson et al., 2004). Moreover, the use of survey questions on trust has raised much criticism. As Glaeser et al. (2000: 800) put it, "While these survey questions are interesting, they are also vague, abstract, and hard to interpret".

In this paper we revert to an experimental analysis to examine the differential patterns of behavior followed by members of Putnam-type and Olson-type associations. We carry out the first field experiment involving a sample of members of different association types from different age groups and education levels, as well as a demographically comparable sample of non-members. We investigate the level of generalized trust (towards people from the general population) and particularized trust (trust towards fellow members),[1] of members of Putnam-type, Olson-type and other types of association within a Trust Game (Berg et al. 1994).

First of all, our analysis aims at testing four main hypotheses inspired by the Putnam's and Olson's approaches that we will call *PUTNAM HYPOTHESES* (*A* and *B*) and *OLSON HYPOTESES* (*A* and *B*):

[1] Generalized trust may be interpreted as a general predisposition toward other people, especially people whom one does not know (Uslaner, 2002) and may be defined as "a trust that goes beyond the boundaries of kinship and friendship and even beyond the boundaries of acquaintance" (Stolle and Rochon, 1998, p.48). It differs from the notion of particularized trust which consists in relying only on people who belong to one's own "moral community" and share the same characteristics (Uslaner, 2002). Berggren and Jordahl (2006, p.143) distinguish between particularized trust and generalized trust where "the former entails trusting people you know or know something about; the latter trusting most (but not all) people you do not know or know anything about.". In this perspective, the notion of knowledge-based trust (Yamigishi and Yamigishi, 1994) clarifies that particularized trust is strictly related to the available information.

1) *PUTNAM HYPOTHESIS A*: Members of Putnam-type associations display more trust towards the general public (i.e. generalized trust) than non-members;
2) *PUTNAM HYPOTHESIS B*: Putnam-type members display levels of trust toward their fellow members that are higher than the levels of trust towards the general public; that is, particularized trust is higher than generalized trust;
3) *OLSON HYPOTHESIS A*: Members of Olson-type associations do not show higher levels of generalized trust than non-members;
4) *OLSON HYPOTHESIS B*: Members of Olson-type associations display more particularized than generalized trust.

The two "B Hypotheses", i.e. that interaction *within* associations are characterized by higher level of trust than interactions between association members and strangers, are based on the concept of *direct* and *indirect reciprocity* (Fehr and Gächter 2000; Seinen and Schram 2006; Engelmann and Fischbacher 2009). Social networks generated through the association trigger mechanisms based on reciprocity, reputation, monitoring and sanctioning that increase cooperation among members of the same group (Putnam et al. 1993; Putnam 2000; Paxton 2007). Indeed, we should observe members of associations to trust fellow members more than people from the general public regardless of association types.

However, Putnam and other followers of the Tocquevillian tradition argue that participation in associations also fosters prosocial attitudes in interactions with generalised others in the society at large, that is, *outside* the association. This may be in part explained by the very fact that associations increase the density and the overlap of social networks, as this activates the mechanisms based on reciprocity, reputation, monitoring and sanctioning mentioned above. Nevertheless, in large part, this is also based on the conjecture that associational membership will work towards increasing trust in, and co-operation with, absolute strangers (Putnam et al. 1993, Brehm and Rahn 1997; Stolle and Rochon 1998; Putnam 2000; Wollebaek and Selle 2002). From this approach we derive our *PUTNAM HYPOTHESIS A.*

Conversely, Olson's view (1965; 1982) hinges upon the role of associations in pursuing private interests of members and in relegating the general public interest to a minor role. From this perspective, we expect associations not to affect positively generalized trust (*OLSON HYPOTHESIS A*).

Secondly, not only does the Trust Game allow us to analyze Putnam-type and Olson-type members' patterns of trusting behavior, but also it enables us to study their trustworthiness.[2] Our study is the first to tackle the issue of trustworthiness in relation to different types of association.

Thirdly, we also examine whether increasing one's involvement with associations affects the behavior of members of different types of associations in our Trust Game. For this purpose we analyze the impact of the number of associations that an individual has joined and the number of hours that individuals report as spending in associational meetings and activities every week.

Finally, we investigate what we call the causality issue. Does membership instill prosociality in association joiners, or are people endowed with stronger prosocial attitudes in the first place more likely to join associations? For this purpose we perform an analysis with a structural equation model (SEM) of our data, posing a relationship of co-causality between membership on the one hand, and prosociality attitudes on the other. We model prosociality as a latent variable whose indicators are the measures of trust and trustworthiness that we observe in our experiment. We also discuss the relevance of the intensity analysis for the causality issue.

We investigate the previous issues by randomizing our sample into an in-group and an out-group treatment. In the in-group treatment association members are paired with people from their own association. In the out-group treatment they are paired with people from the general population.

[2] We are aware that different motivational drivers may lead subjects' decisions in Trust Games (e.g. Becchetti and Degli Antoni, 2010). In particular, subjects may be motivated by other regarding preferences (Cox, 2004), altruistic or inequality-averse preferences (Fehr and Schmidt 1999), social-welfare preferences (Charness and Rabin, 2002), warm glow (Andreoni, 1989; 1990) and trust (only on the part of the first mover) or reciprocity (only on the part of the second mover). We are not able, neither is it an aim of our analysis, to disentangle among the different motivations behind subjects' decision in our Trust Game. We simply assume that a higher amount sent by the Sender and a higher share returned by the Receiver are representative of a greater propensity to cooperate. In what follows, we generically refer to trust and trustworthiness when talking about Senders' and Receivers' behavior.

Behavior in the in-group and out-group treatments gives us a measure of particularized and generalized trust, respectively. The comparison with the behavior of people from the general population also enables us to contrast generalized trust by members and non-members.

We follow Knack and Keefer's (1997) classification of Olson-type and Putnam-type associations. We involve in our experiment members of trade unions and cultural associations (see section 3). These are representative of the former and latter group, respectively. We also sample members of a group that, in the original Knack and Keefer's (1997) classification, are neither Putnam-type nor Olson-type. These are social welfare and health services associations, and we call them "Residual" associations. Including this category enables us to better understand the specificities of Putnam-type and Olson-type associations.[3]

Both the *PUTNAM HYPOTHESIS A* and the *OLSON HYPOTHESIS A* are confirmed by our experimental evidence. Members of Putnam-type associations trust people from the general population more than non-members (*PUTNAM HYPOTHESIS A*). Members of Olson-type associations treat people from the general population in the same way as non-members (*OLSON HYPOTHESIS A*). With respect to the "B hypotheses", no in-group effect emerges with respect to members of Putnam-type associations, i.e. they trust fellow members as they trust people from the general population. That is, *PUTNAM HYPOTHESIS B* is not supported by our evidence. Conversely, the level of particularized trust of members of Olson-type associations towards fellow members is higher than generalized trust towards general others. This supports *OLSON HYPOTHESIS B*.

[3] Results regarding members of Putnam-type and Olson-type associations do not significantly change when members of Residual associations are kept out of the analysis. More specifically, we re-run all the regressions (see section 4) excluding (a) subjects who were recruited in Residual associations and took part in the in-group treatment, and (b) subjects who declared they were exclusively members of Residual associations and took part in the out-group treatment (see section 3 for recruitment procedure). The only qualitative change in results concerns the emergence of weakly negative effects for both the number of hours spent in Putnam-type groups (*Hours_Putnam-type_Out*) on the amount sent and of the number of Putnam-type associations joined by subjects (*Number_Putnam-type_Out*) on the return rate. In the analyses including Residual associations both these effects are not significantly different from zero.

As far as Residual associations are concerned, their members show patterns of trusting behavior in our experiments that are alike members of Putnam-type associations' both toward generalized others and fellow members.

The analysis of receivers' decisions brings about a surprising result. In this case members of Olson-type associations return significantly more than people from the general public, both when they are matched with fellow Olson-type members, and when they interact with people from the general public. By contrast, Putnam-type association members are no more trustworthy than people from the general public, either in the in-group, or in the out-group treatment. As Olson-type members, Residual association members return significantly more than people from the general public both in the in-group and in the out-group treatment. However, they also show in-group favoritism, i.e. they return more to their fellow members than to people from the general public.

As for the causality issue, the SEM analysis supports the view that membership has a significant effect on prosociality, which is significantly stronger than the reverse effect. On the other hand, we do not find any systematic impact of increased involvement in association activities on prosociality. We discuss the limitations of our analysis and we conjecture that these two pieces of evidence can be accommodated by the idea that the beneficial effects of membership become "saturated" after a relatively short period of time. We point to empirical evidence supporting this claim.

The outline of the paper is as follows. Section 2 reviews the related literature on the relationship between association membership and trust. Section 3 summarizes the experimental design and describes our sample. Section 4 presents descriptive statistics and the econometric analysis. Section 5 is devoted to the causality issue. Section 6 concludes.

2. Related literature on the relationship between association membership and trust

In their cross-country survey analysis, Knack and Keefer (1997) find a negative, albeit insignificant, effect of Putnam-type associations on generalized trust, and a positive effect of Olson-

type associations. They also find that Olson-type (Putnam-type) associations are positively (negatively) associated with an index of civic attitude. Knack (2003) uses a larger country coverage than Knack and Keefer (1997) and finds a positive relationship between Putnam-type associations and generalized trust, while the relation between generalized trust and Olson-type associations is insignificant.[4] Other studies have used individual-level data to analyze the relationship between generalized trust and association membership distinguishing between different types of associations. Stolle and Rochon (1998) show that in 76.5% of the cultural associations they survey,[5] which are Putnam-type in character, members score significantly higher than non-members in an index based on questions on trust in others and on the frequency of interactions with neighbors, e.g. to borrow money or other items. They also find that members of as few as 30% of Olson-type associations[6] display higher levels of the previous index than non-members. Finally, as far as Residual associations are concerned, Stolle and Rochon (1998) find that 52.6% of Community groups' members and 57.9% of Private interest groups' members show higher levels of the index than non-members. [7] Wollebaek and Selle (2002) find that the percentage of respondents who say that "Most people can be trusted" is higher among members of Putnam-type associations (culture and recreational associations - 68% - and religious - 73%) and of Olson-type associations (parties and unions - 77%) than among non-affiliated (54%). However, the association type is not significant in explaining the presence of trustful members once multiple affiliations are considered

[4] Knack (2003) adopts the same classification used by Knack and Keefer (1997) with regard to Olson-type associations, while religious or church organizations are dropped from the Putnam-type associations where sport or recreation associations and local community action on issues like poverty, employment, housing, racial equality are included.

[5] According to Stolle and Rochon's classification, cultural associations include: associations for the preservation of traditional regional, national, or ethnic culture; church groups; literary, music, and art society. Members of this association type appear also to be characterized be high scores in indexes of Political Action, Political Trust and Optimism, Tolerance and Free-ridership (Stolle and Rochon, 1998).

[6] They consider economic associations that include unions, employers' associations, professional associations, agricultural associations, consumer groups, cooperatives, shareholders' organizations. Members of this association type appear also to be characterized be high values of indices of Political Action and Political Trust.

[7] Community groups include: local actions groups, resident's associations, service and welfare organizations, health care groups, parents' associations, voluntary defense associations. Members of this association type seem to be also characterized be high values of indices of Political Action, Political Trust and Optimism, Tolerance and Free-ridership. Private interests groups include: sport, outdoor, youth, hobby, auto. Members of this association type appear also to be characterized be high values of indices of Political Action, Political Trust and Optimism, Tolerance and Free-ridership.

as a control variable in a multivariate regression analysis. Stolle (1998) presents descriptive evidence detailing a higher level of generalized trust, measured through a set of trust questions, for members of sport associations and church choirs (Putnam-type association type) in comparison with customers of a commercial gymnasium. The latter are involved in activities similar to those of association members, but know each other less and spend less time together after joining the activity than association members.

Our study is innovative with respect to the existing literature because of its experimental character. This allows us to investigate the relationship between association membership and trust by using an experimental measure of trust and by taking into account both multiple membership and the effect of intensity of participation.

3. Experimental design and sample

In our Trust Game experiment both senders and receivers are endowed with 25 euros (€). The sender is the first player to move. She has to decide how much of her initial endowment to send to the receiver, in multiples of 5€. So six transfer levels are possible (0, 5, 10, 15, 20 or 25€). The amount sent is doubled by the experimenter. The receiver has to decide how much of the amount in her possession after the sender's choice - i.e. the initial 25€, plus the amount sent by the sender and doubled by the experimenter - to send back to the first mover. We adopted the strategy method, so receivers had to indicate the amount they would like to return for each of the possible six options available to the sender.

The experiment was conducted between May and October 2011 at the University of Parma library. Recruited subjects were randomly assigned to two different groups prior to the session, and were summoned to two different meeting points of the university. We took care that the two groups did not meet each other while they were conducted to two different rooms of the library. All sessions were run in parallel in the two rooms by the two researchers, following an identical script.

All subjects took two decisions, the first one as senders and the second one as receivers. When they took the first decision as senders, subjects did not know that they would have taken the second decision as receivers. Subjects present in one room were told that they would have been matched anonymously with another subject present in the other room. Pairs were changed after the first decision and no feedback was given at the end of each choice, so we consider the two choices as independent. Subjects were paid only for one decision, each of them having 50% probability of being drawn.

After the two experimental decisions, we elicited subjects' beliefs over sender and receiver behavior and we administered the post-experiment questionnaire. Payments were distributed in cash at the end of the session.

Sessions lasted on average 75 minutes. The average payoff was 31.7 Euros (std. dev. 11.99).

374 subjects took part in the experiment. 263 subjects were formally affiliated to a voluntary association, and attended meetings for at least one hour per month (*"members"* henceforth). They were recruited by the experimenters in ten different associations operating in the Province of Parma. Four were cultural associations (one ethnic and traditional dance association and three choirs). Following Knack and Keefer (1997), we classify them as Putnam-type associations. Two of the associations were trade unions, which we classify as Olson-type associations. Four associations were social welfare and health services associations (an association assisting hospitalized children, an association for medical research on cancer, the Italian association for blood donation and an association dedicated to charity and evangelization), which we classify as Residual associations.

111 participants were not formally affiliated to any association at the time the research was conducted (non-members henceforth). 77 non-members had never been members in the past, while 34 non-members had been members of associations in the past but not at the moment of the experiment (dropouts). Since we never find differences between these two latter groups we treat them as a single category in the rest of the analysis. Non-members were recruited by Demoskopea,

one of the most well-known opinion polls and market research agency in Italy.[8] Contact with potential subjects was carried out in person by experimenters through announcements at association meetings and over the phone by Demoskopea staff. In spite of the different type of contact we requested that all announcements with potential subjects were made following an identical recruitment script. In this way, potential subjects were given exactly the same information prior to coming to the research sessions.

3.1 The in-group treatment sample

109 members took part in the in-group treatment. Table 1 reports the number of subjects from each association type.

Table 1 Number of subjects per association type – in-group

	In-group
Putnam-type	38
Olson-type	30
Residual	41

In the in-group treatment subjects were informed that they were paired with a member of the same association from which they had been contacted by the experimenters and that this subject was taking part in the session in the other room. The instructions read: *"The person with whom you will be paired is a member of the Association "X" of which you are also a member, and is resident in Parma, or its province, or in neighbouring provinces. He was asked to take part in the research in a similar way to how you have been contacted"* ("X" was the name of the association).

[8] Four non-members were recruited by the experimenters to make up for no-shows.

3.2 The out-group treatment sample

265 subjects took part in the out-group treatment. They included all the 111 non-members and the remaining 154 members. Members were recruited by the experimenters in the same ten associations mentioned above except for 11 members who were recruited by Demoskopea.[9]

We operate a finer distinction in the out-group treatment than in the in-group with respect to assignment to association types. While in the in-group treatment we only take into account the association *where subjects had been recruited*, we consider *all associations of which a person is a member* for our analyses relative of the out-group treatment. This yields seven mutually exclusive categories: (1) People belonging to one type of association only – namely, people belonging to just Putnam-type associations (which we call "Putnam-type only" henceforth), or (2) just Olson-type associations ("Olson-type only" henceforth), or (3) just Residual associations ("Residual only" henceforth); People belonging to two types of associations – namely, (4) people belonging to Putnam-type and Olson-type associations ("Putnam-type & Olson-type" henceforth), or (5) to Putnam-type and Residual-type associations ("Putnam-type & Residual" henceforth), or (6) Olson-type and Residual-type associations ("Olson-type & Residual" henceforth); finally, (7) people belonging to all three types of association ("All types" henceforth).

The reason why we operate this finer distinction in the out-group treatment and not in the in-group is that in the latter treatment we only measure particularized trust, which strictly depends on the association where subjects have been recruited. In fact, members recruited from an association in the in-group treatment are paired with other members belonging to that same association. Conversely, generalized trust measured in the out-group treatment may be affected not only by

[9] We had asked Demoskopea to recruit only non-members or dropouts. However, during the recruitment interview with Demoskopea, 11 subjects answered negatively to the screening question on whether a person is part of an association but they reported in the post-experiment questionnaire that they actually were association members. We suppose that this may be due to subjects' absent-mindedness when answering the recruitment interview, so we have decided to keep these 11 subjects in the sample as members. They have been classified as belonging to "other associations".

membership in the association from where subjects were recruited, but also by the other different types of association where subjects were active.[10]

Table 2 summarizes the size of association membership per type of association in the out-group treatment.

Table 2 Number of subjects per association type – out-group

	Out-group
Non-members	111
Putnam-type Only	29
Olson-type Only	30
Residual Only	34
Putnam & Olson-type	12
Putnam & Residual-type	25
Olson & Residual-type	12
All Types	11

The script in the out-group treatment read that more than a thousand people of different age and socio-economic conditions residents in the province of Parma and surrounding provinces had been contacted. Sessions in the out-group treatment comprised members coming from many different types of association, so most of the people part of this group would, with high probability, not be acquainted with each other. In the post-experiment questionnaire we asked subjects to state whether they thought they knew personally persons present in the other room. Around 7% (41%) of members participating in the out-group (in-group) treatment answered positively to such question. This difference is statistically significant ($P<0.001$; Mann-Whitney test).[11]

[10] When we replicate econometric estimates reported in Table 6 by distinguishing, among subjects who took part in the in-group treatment, between members of only one association type (i.e. members of only Olson-type, only Putnam-type and only Residual associations) and members of more than one association type (i.e. members of Olson-type and other types of associations, members of Putnam-type and other types of associations and members of Residual and other types of associations) results do not significantly change. However, a few findings are not perfectly in line with estimates reported in the text. The in-group effect disappears with respect to senders and receivers who belong exclusively to Residual associations (the effect remains when senders and receivers belonging to Residual and other types of associations are considered). In the in-group treatment, receivers who are members of Olson-type associations and who are also members of other associations do not return more than non-members.

[11] One may wonder if our results in the in-group treatment may be caused by differences in social distance between Olson-type, Putnam-type and Residual association members, or by a possible reduction in anonymity if members knew the identity of the participants in the other group. First, we know that our recruitment procedures minimized the possibility that association members knew which other fellow association members took part in our research. Second, our results are virtually unchanged if we modify our sample taking into account who, in the post-experiment questionnaire, declares that she thinks that she personally knows people present in the other room in the in-group treatment. In fact, the two in-group effects emerging in the analysis (i.e. for the amount sent for Olson-type members

3.3 Sample properties

We test for the demographic comparability between the various member groups and non-member groups across the two treatments with Chi square and Wilcoxon non-parametric tests. We find two significant differences (Table 3). They concern the number of subjects who attained high-school diploma as their highest educational achievement among members of Residual associations in the two different treatments, and the satisfaction with personal financial situation as declared by the respondent between members and non-members. The latter is used as a proxy for the subject's economic condition. The econometric analysis will control for these differences.

Table 3 Balancing properties per experimental condition and type of association

	Age	*Female*	*Bachelor's_degree*	*Secondary_school*	*Income satisfaction*
H_0: Non-member = Members	1.522 (0.128)	0.0278 (0.868)	0.1840 (0.668)	1.4063 (0.236)	-2.941 (0.0033)
H_0: Members of Putnam-type associations (in-group) = Members of Putnam-type associations (out-group)	-1.008 (0.313)	0.1757 (0.675)	1.3271 (0.249)	0.2219 (0.638)	0.0341 (0.854)
H_0: Members of Olson-type associations (in-group) = Members of Olson-type associations (out-group)	-0.243 (0.8081)	2.0142 (0.156)	0.7629 (0.382)	2.5124 (0.113)	0.0770 (0.781)
H_0: Members of Residual associations (in-group) = Members of Residual associations (out-group)	1.683 (0.0924)	0.0049 (0.944)	1.2018 (0.273)	4.3787 (0.036)	0.0308 (0.8861)

*For continuous variables we tested - through nonparametric statistics - between-subject differences by using the Mann-Whitney test. For dichotomous variables we used the Chi square test to analyze the differences in proportions. P-value in squared brackets.

and for Residual association members for the amount returned) are confirmed when subjects (in the in-group) declaring that they know people in the other room are excluded from the sample (p=0.044 and p=0.034, respectively). We also note that the theory would predict that social distance is negatively correlated with in-group effects. Consequently, we should observe with higher probability in-group effects in Putnam-type and Residual associations than Olson-type associations, because meetings are more frequent and associations are generally smaller in the former than in the latter. In fact, only 13.33% of Olson-type associations members who took part in the in-group treatment answer that they knew personally people present in the other room, while the percentages rise to 43.59% and 65.52% for members of Residual and Putnam-type associations, respectively. Nevertheless, we find that an in-group effect emerges for Olson-type associations members, when acting as senders and for members of Residual association when acting as receivers. We never observe an in-group effect with respect to members of Putnam-types associations who show the highest percentage of positive answers to the question (see results presented in the next section).

4. Empirical evidence

4.1. Descriptive statistics

Drawing on the same dataset used in this paper, Degli Antoni and Grimalda (2013) show that members send and return significantly more than non-members. The novelty of the present paper is in showing that significant differences do emerge in this general pattern when we distinguish between Putnam-type, Olson-type and Residual associations. Tables 4 and 5 summarize descriptive statistics across treatment and per association type for the amount sent and the return rate respectively.

As far as the amount sent is considered (Table 4), descriptive statistics seem to reveal two main patterns, which are also confirmed by non-parametric tests:

1) Members of associations contribute significantly more than non-members in the out-group treatment in all cases but two. In both cases Olson-type associations are involved. Such are members of both Putnam-type and Olson-type associations (Mann-Whitney p=0.3266) and members of both Olson-type and Residual associations (Mann-Whitney p=0.8546).[12]
2) No difference emerges between the in-group and the out-group treatment in the amount sent by members of Putnam-type (Mann-Whitney p=0.5741), Olson-type (Mann-Whitney p=0.5147) and Residual (Mann-Whitney p=0.9125) associations. In order to analyze the existence of in-group/out-group effects we compare the difference in amounts sent for in-group members and out-group members who belong to strictly one association type.

[12] Differences between non-members and members of other combinations of associations as reported in Table 4 are always significant at the 5% level except when we consider members of Putnam-type, Olson-type and Residual where the level of significance is at the 10% level. The tests are available upon request.

Table 4 Amount sent across treatment and association membership

	Out-group		In-group	
	Median	Mean (Std.Dev)	Median	Mean (Std.Dev)
Non-members	10	10.496 (6.973)		
Members of Putnam-type only	15	15.172 (5.587)	15	14.342 (5.947)
Members of Olson-type only	15	14.5 (6.345)	15	15.833 (6.833)
Members of Residual only	15	15.441 (6.783)	15	15.610 (5.612)
Members of Putnam-type and Olson-type	12.5	12.917 (7.821)		
Members of Putnam-type and Residual	15	14.8 (6.994)		
Members of Olson-type and Residual	10	11.25 (6.440)		
Members of Putnam-type, Olson-type and Residual (All types)	15	14.091 (5.394)		
Members of at least one Putnam-type association	15	14.545 (6.344)		
Members of at least one Olson-type association	15	13.538 (6.479)		
Members of at least one Residual association	15	14.451 (6.667)		

Members of *at least one X association* identifies subjects who are members of at least one association of type X. For instance, members of at least one Olson-type association includes members of: Olson-type only; Putnam-type and Olson-type; Olson-type and Residual; All types.

As far as the amount returned is considered (Table 5 – we consider the average return rate on the six possible transfer rates available to the receiver in our Trust Game), descriptive statistics and non-parametric tests reveal that:

1. Members of all the different types of associations seem to return significantly more than non-members (this is also clearly shown in Figure 1). The statistical significance is stronger for members of Olson-type only associations (Mann-Whitney p=0.0025) and members of Residual-type only (Mann-Whitney p=0.0054) than for members of Putnam-type only (Mann-Whitney p=0.0256) associations. When we consider multiple associations versus

non-membership, statistically significant differences emerge with respect to members of Putnam-type and Residual (Mann-Whitney p=0.0199), at least one Putnam-type association (Mann-Whitney p=0.0029), at least one Olson-type association (Mann-Whitney p=0.0016) and at least one Residual association (Mann-Whitney p=0.0006).

2. No difference emerges between the in-group and the out-group treatment in the amount returned by members of Putnam-type (Mann-Whitney p=0.5145), Olson-type (Mann-Whitney p=0.7956) and Residual (Mann-Whitney p=0.1115) associations.

Table 5 Return rate across treatment and association membership (average on six possible transfer rates)*

	Out-group		In-group	
	Median	Mean (Std.Dev)	Median	Mean (Std.Dev)
Non-members	0.219	0.243 (0.180)		
Members of Putnam-type only	0.282	0.301 (0.146)	0.285	0.277 (0.106)
Members of Olson-type only	0.295	0.349 (0.185)	0.319	0.331 (0.169)
Members of Residual only	0.318	0.313 (0.151)	0.331	0.398 (0.207)
Members of Putnam-type and Olson-type	0.261	0.282 (0.133)		
Members of Putnam-type and Residual	0.300	0.303 (0.119)		
Members of Olson-type and Residual	0.299	0.278 (0.082)		
Members of Putnam-type, Olson-type and Residual (All types)	0.282	0.339 (0.229)		
Members of at least one Putnam-type association	0.282	0.304 (0.149)		
Members of at least one Olson-type association	0.295	0.322 (0.170)		
Members of at least one Residual association	0.298	0.308 (0.146)		

*In this table we consider the average return rate on the six possible transfer rates. Members of *at least one X association* identifies subjects who are members of at least one association of type X. For instance, members of at least one Olson-type association includes members of: Olson-type only; Putnam-type and Olson-type; Olson-type and Residual; All types.

Figure 1 - Here

4.2. Econometric analysis

In order to investigate the differences in choices by senders in consideration of their associational condition, we perform Ordered Logit estimates on the amount sent, which could vary between 0€ and 25€ in multiples of 5€. We define *Amount sent** a sender's unobservable willingness to trust others, modelled as a function of a vector of independent variables. The mapping between *Amount sent** and the variable we observe in the experiment, *Amount sent*, is then given by:

$$Amount\ sent_i^* = \alpha + G'_i\beta + X'_i\delta + \varepsilon_i \quad (1)$$

$$Amount\ sent_i = k \text{ if } m_{k-1} < Amount\ sent_i^* \leq m_k,\ k=0,\ldots,K \quad (2)$$

α is a constant term. The index i denotes the individual. G_i is a vector which includes dummy variables identifying the types of association to which subjects belong. Variables included in vector G_i change across different specifications and are described in detail below. X_i is a vector including a wide array of control variables. It includes socio-demographic characteristics, such as age, sex, education, occupational condition, satisfaction with health and income, the propensity to take financial risk and controls connected with the experimental conditions, namely, a dummy identifying the two experimenters who led the sessions in two different rooms and the number of errors in the comprehension questions. Finally, the vector X_i also includes a dummy variable identifying dropouts, which is never different from other non-members. The description of these variables is reported in Appendix A. β and δ are vectors of parameters of interest, and ε_i is the error term, assumed to be distributed according to a standardised Logistic distribution $\varepsilon_i \sim Logistic(0,1)$. The index k represents the discrete possible amounts sent and K the total number of categories. In our experiment, K=6. m_k are the (unobservable) cutoff points in the domain of $Amount\ sent_i^*$ at which the individual desires to switch to a higher $Amount\ sent_i$. We make the usual normalisation, $m_{-1}=-\infty$, $m_0=0$, and $m_k=+\infty$.

In order to investigate the effect of associational membership on receivers' decision, we fit a Tobit model where the dependent variable is the return rate. The receiver could return any amount ranging from zero up to a maximum given by the sum of the receiver's initial endowment (25€) and twice the amount sent to her by the sender. Returns were allowed up to the first decimal digit. We normalize this variable to the [0,1] interval by dividing it by the maximum possible amount that receivers may send back. We call this variable *Return rate*.

The econometric analysis of the *Return rate* is based on the following Tobit model with random effects:

$$Return\ rate_i^* = \gamma_0 + \gamma_1 Amount\ sent_j + \gamma_2 (Amount\ sent_j)^2 + G'_i\beta + X'_i\delta + \vartheta_i + \theta_{ai} \quad (3)$$

$$Return\ rate_i = \begin{cases} 1 & \text{if } Return\ rate_i^* \geq 1 \\ Return\ rate_i^* & \text{if } 0 < Return\ rate_i^* < 1 \\ 0 & \text{if } Return\ rate_i^* \leq 0 \end{cases} \quad (4)$$

Eq. (3) describes an individual's latent propensity to send back to the sender a share of the money in her possession. This is modelled as a function of $Amount\ sent_j$ (where the index j indicates the individual with which individual i is paired). G_i and X_i includes the same variables of interest and control variables used in the Ordered Logit estimates. β and δ denote vectors of parameters. Finally, ϑ_i *and* θ_{ai} are an individual-specific and an idiosyncratic error term, respectively. The quadratic form in $Amount\ sent_j$ is added to capture possible non-linearities in the way receivers respond to the amount received (Bellemare and Kröger, 2007). Eq. (4) presents the censoring rules that force receiver with either extremely high or extremely low propensity to send back money to return a rate of one or zero, respectively, with positive probability.

First, we examine whether members of different types of associations showed different patterns of behavior in relation to non-members in the in-group treatment (Table 6, column 1). Amounts sent by members are significantly higher than the amounts sent by non-members when members interact with fellow members for any of the three association types (*Putnam-type_Ing*; *Olson-type_Ing* and *Residual_Ing*; $p<0.01$ in all three cases - Table 6, column 1). When association members interact

with people from the general population in the out-group treatment, we find that people who are member of only Olson-type associations (*Olson-type_Only_Out*) do not show any significant difference in their amount sent in comparison with non-members (p=0.116 - Table 6, column 1). On the contrary, members of only Putnam-type associations (*Putnam-type_Only_Out*) do show significantly higher amount sent than non-members (p=0.020 - Table 6, column 1). As members of Putnam-type associations, Residual association members (*Residual_Only_Out*), too, send a significantly higher amount than non-members when paired with people from the general population (p=0.010 – Table 6, column 1). Interestingly enough, people who are members of both Putnam-type and Residual associations (*Putnam-type_&_Residual_Out*) send significantly higher amounts than non-members (p=0.011), while in cases in which individuals are involved with two associations and one of them is Olson-type (*Putnam-type_&_Olson-type_out, Olson-type_&_Residual_out*), their amount sent is not significantly different from non-members (Table 6, column 1). When we consider members of all association types (*All_Types_Out*) we find that they send more than non-members, but only at a weak level of significance (p=0.093). We conclude:

Result 1: *Previous evidence support both the PUTNAM HYPOTHESIS A, according to which members of Putnam-type associations are expected to show higher level of generalized trust than non-members, and the OLSON HYPOTHESIS A, according to which members of Olson-type associations are not expected to be endowed with higher generalized trust than non-members.*

Second, we test for in-group favoritism for each of the association types. We start comparing the difference in the amount sent for in-group members and out-group members who belong to strictly one association type (Table 6, column 1). These three tests fail to reject the null hypothesis of equality of coefficients for all three association types, even though the level of significance for members of Olson-type associations is not far from 10% (p=0.673 for Putnam-type; p=0.110 for Olson-type associations; p=0.252 for Residual associations). The failure to reject the null for the in-group effect may be caused by the regression coefficients being estimated with less precision due to

the increased number of categories used to control for multiple membership in the out-group treatment. For this reason we run three further regressions where we introduce a dummy identifying all cases in which a subject is a member of *at least* one certain type of association. For instance, the dummy *At_Least_One_Putnam-type_Out* includes the four categories formed by: {*Putnam-type_Only_Out*; *Olson-type_&_Putnam-type_Out*; *Putnam-type_&_Residuals_Out*; *All_Types_Out*} (Table 6, column 2). We also run analogous regressions using *At_Least_One_Olson-type_Out* (Table 6, column 3) and *At_Least_One_Residual_Out* (Table 6, column 4). Note that the previous result 1 holds when we use members of "at least one type of association" instead of strictly one type of association. When we consider members of at least one Olson-type association, the difference between sending directed to fellow members and sending towards the general population by people who are member of at least one Olson-type association is strongly significant (p=0.006) (Table 6, column 3). No effect emerges for Putnam-type associations (p=0.850) (Table 6, column 2). Members of at least one Residual association show in-group favoritism only at weak levels of significance (p=0.063) (Table 6, column 4).. We conclude:

Result 2: *The comparison between behavior in the in-group and out-group treatments seems to support only the OLSON HYPOTHESIS B: members of Olson-type associations reveal higher levels of particularized trust than generalized trust. By contrast, members of Putnam-type associations show similar levels of particularized and generalized trust.*

With respect to the effect of socio-demographic controls on the amount sent, we find: a) a non-linear effect of the participant's age; b) that women send significantly less than men; c) that dissatisfaction with one's income has a negative effect on the amount sent; d) that people born in the South of Italy send less than people born in other areas; e) people who declare to believe in God, rather than being agnostic or atheists, send significantly less than others.

When we look at return rates across association types, we find that members of both Olson-type and Residual associations return significantly more than non-members, both when they are matched

with fellow members (*Olson-type_Ing* p=0.022 and *Residual_Ing* p=0.001 - Table 6, column 5), and when they interact with people from the general population (*Olson-type_Only_Out* p=0.013 and *Residual_Only_Out* p=0.044 - Table 6, column 5). Perhaps surprisingly, Putnam-type association members are no more trustworthy than non-members, either in the in-group (*Putnam-type_Ing*, p=0.294), or in the out-group treatment (*Putnam-type_Only_Out*, p=0.582). The same results hold if we use members of "at least one type of association" instead of strictly one type of association.

Only Residual association members show some significant differences in behavior between the in-group and out-group treatment. This is the case both when members of strictly Residual associations are considered (p=0.088 – Table 6, column 5) and when members of at least one Residual associations are considered (p=0.021 Table 6, column 8). With respect to our third research question, namely, how members of different types of association behave when acting in response to a previous decision by another (trusting) subject, we conclude that:

Result 3: *Members of Olson-type and Residual associations result as more trustworthy than non-members both in the in-group and the out-group treatment, while Putnam-type association members' return rates are indistinguishable from non-members; in-group favoritism only emerges for Residual association members.*

Among the controls, we find a non-linear effect of the amount received by the sender; that people born in the South and retired persons return significantly less; a negative effect of the number of family members. We also find a positive effect of the numbers of mistakes in the experiment comprehension test.[13] We then explored possible differences in the effect of mistakes on the amount returned between the different association types. For this purpose we interact mistakes with each single dummy variable identifying the different association types (Table 6, column 5).

[13] The *Mistakes* variable measures the number of mistakes in the 6-question comprehension quiz administered after the instructions. We preferred not to ask subjects to re-answer the questions in case of mistakes in the comprehension quiz, because we thought this would have conveyed the impression that subjects had "to pass an exam" to qualify for the experiment. This would have likely sounded unnatural and stressful for many subjects. We preferred to collect subjects' answers, and use the number of mistakes in the quizzes as a covariate in the econometric analysis.

Since the F-test on the null hypothesis that the coefficients of these interaction terms were jointly equal to 0 is not rejected (p=0.6399), we conclude that no significant differences emerged in the way mistakes affect our dependent variable across groups of members.

5. Analysis of intensity of involvement with association activities and the issue of self-selection

In this section we investigate if the intensity of participation in different types of associations has an effect on trusting and trustworthy behavior of members, and we develop a SEM analysis. We finally draw inferences for the causality issue from both pieces of evidence.

5.1 Analysis of intensity

We consider the number of hours actually spent volunteering with associations and the number of associations joined by members. In both cases, we include in the regressions the dummy variables identifying membership in the different types of associations. Indeed, the coefficients of the variables measuring the intensity effect reveal the effect of the intensity net of the effect of the mere participation.

First we focus on the number of hours spent volunteering with associations of different types (defined as *Hours*). In regard with subjects involved in the in-group treatment, we considered the number of hours spent in the associations where they had been recruited. This was a natural choice, since these associations are those used to create the in-group condition (see section 3). With respect to subjects in the out-group condition, we restricted the analysis to members who belong strictly to one type of association. In fact, in case of members belonging to more than one association type, we are not able to impute the hours spent volunteering to the type of association where these have been spent.[14] The number of hours spent volunteering is never significant when we consider subjects in the in-group treatment belonging to the three different types of associations (*Hours_Putnam-*

[14] Asking the number of hours spent volunteering in each association would have of course been interesting, but the overall length of the questionnaire prevented us from doing that.

type_Ing, Hours_Olson-type_Ing, Hours_ Residual_Ing) (Table 7, column 1). In the out-group treatment, the number of hours is not significant either for Putnam-type (*Hours_Putnam-type_Only_Out*, p=0.103) or for Residual associations (*Hours_Residual_Only_Out*) (p=0.420), but has a negative and significant effect for Olson-type associations (*Hours_Olson-type_Only_Out*) (p=0.022) (Table 7, column 1).

As for the relationship between *Hours* and members behavior when acting as receiver, we do not detect any significant effect (Table 7, column 2).

A second analysis related to the intensity of the associational life, reveals that the number of associations joined by members (*Number_ Putnam-type_Out, Number_Olson-type_Out, Number_Residual_Out*) does not affect the amounts sent (Table 8, column 1).

As for return rates, we do not detect any significant effect of number of associations on trustworthiness in this case, either (Table 8, column 2).

In conclusion, we do not find evidence of a clear effect of intensity of participation on the level of trust and trustworthiness of members of different types of associations. We only find an effect of the intensity of participation in relation to the number of hours spent volunteering in associations, showing a negative effect of the number of hours spent volunteering on trust of members of Olson-type associations when they are paired with people from the general public.

5.2 The causality issue: background literature and SEM analysis

The results presented in the foregoing sections raise an obvious question on the direction of causality in the relationship between association membership and prosociality. Does participating in an association induce individuals to become more prosocial? Or are individuals who are endowed with higher prosocial attitudes in the first place more likely to join associations? The best way to address this issue is through longitudinal data. For instances, samples of people would be randomly assigned to two different conditions – one in which they mandatorily join either an association or an activity supposedly instilling prosocial behavior or civic attitudes in an individual, and the other in

which the association or the activity are neutral. Putnam (2000: 405) relies on field studies of this type (e.g. Janoski et al., 1998; Astin and Sax, 1998; Niemi et al., 2000) stemming from the implementation of service learning programs (Battistoni, 1997) or community programs in US secondary schools. He concludes that early involvement in such programs is beneficial "to strengthen the civic muscles of participants", and that voluntary programs seem to work as well as mandatory ones. Galston (2001: 230) provides a nuanced view over the effectiveness of service learning programs, emphasizing both cases of success and failures (e.g. Melchior et al., 1999). He nonetheless concludes that the overall evidence is "encouraging" that participation in such programs stimulates the development of civic skills.

These studies rely on self-reported measures of civic attitudes or of activities that in some cases are only planned for the future. They are as such subject to criticism of measurement error and bias (Bertrand and Mullainathan, 2001). More evidence coming from controlled randomized experiments seem to be necessary to corroborate these claims. The available evidence is still fragmented. Solow and Kirkwood (2002) find a negative, albeit not statistically significant, effect of group-bonding activities on cooperation rates, while both Eckel and Grossman (2005) and Lotito et al. (2014) find a positive effect of the creation of a team identity on experimental cooperation rates. Chen and Li (2009) do not find an additional effect of group-bonding activities in addition to mere group categorization on a large set of prosocial indicators, although their experiments are framed in an in-group-out-group context. These experiments have the advantage of control from confounds and random assignment, but the drawback is that the group-bonding activity has a clearly ephemeral, and in some cases rather meaningless, character. Clearly nothing can be said about the persistence of these effects over time.

Additional evidence comes from survey studies. By using longitudinal data, Claiburn and Martin (2000) do not find evidence in their "youth sample", and contrasting evidence in their "parent sample", for a causal effect of voluntary membership on trust. The authors argue that the effect of membership may be relatively short-lived. Wollebaek and Selle (2002) find no

confirmation of the idea that active membership positively affects generalized trust. Conversely, in their structural equations model Brehm and Rahn (1997) demonstrate a stronger effect *from* civic engagement – of which associational membership is a component - *to* trust than for the reverse link. Stolle (1998) analyzes the link between engagement levels in associations, measured by time spent in an association, and trust levels, without finding a durable relationship between the two variables. However, she finds an early trust increase from joining, which occurs within the first year of membership.

Our data are cross-sectional so it is impossible to find any direct effect at the individual level of a change in status from non-membership to membership on the development of prosocial attitudes. To address the causality issue in our study we develop an SEM. MacCallum and Austin (2000) claim that two conditions are sufficient to legitimate the study of causal inference from cross-sectional SEM. The first is that the effect from a variable of interest to another variable is instantaneous. This condition is most likely not to be satisfied in our model. Not even the most enthusiast advocate of the thesis that joining associations causes prosociality would claim that mere membership instantaneously increase people's propensity to trust and reward trust. The theory is mute on how long the period of membership should be to observe effect on prosociality, and the above mentioned study by Stolle (1998) shows a rise in trust within the first year of joining an association. The alternative condition is that the variables of interest do not change over the relevant period of time that is needed for a variable to exert an effect on the other. We believe that this second condition is likely to be satisfied in our case. If we take Stolle's study as an even wild estimate of the time that is needed for participation in associations to exert some effects on prosociality, then our sample, should arguably satisfy this second condition. On the one hand, our sample includes at 97% people who are active more than one year in an association. On the other hand, prosociality is a relatively permanent trait of one's personality. Several studies find for instance that volunteering activities at an early age are a reliable predictor of volunteering activities later in life (Putnam, 2000; Hart et al., 2007). Experimental evidence also supports the stability over

time of prosocial preferences (Carlsson et al., 2014), although external shocks, particularly negative ones, can have long-lasting effects (Malmendier and Nagel, 2009).

For these reasons, we believe that it is appropriate to analyze our data with an SEM with the purpose of drawing causal inferences. The key aspect of our model is the existence of a bi-directional relationship between the two main variables of interest, that is, membership and prosociality. We model prosociality as a latent variable (*Prosociality*). Latent variables are unobserved variables, which can be estimated through some indicators. In our model we use *Amount sent* and *Return rate*, which we observe in our experiments, as two such indicators. In the "measurement model" of the SEM, both variables have a significant effect on *Prosociality* at $p<0.001$, thus confirming the validity of the construct.

The bi-directional relationship between *Prosociality* and membership (*Membership*) generates a so-called "non-recursive" model. Such models are characterized by a "loop" between the endogenous variables, such that the two variables mutually influence each other. This makes more difficult to obtain convergence to a solution than recursive models. If the eigenvalues of the model lie outside the unit circle, a non-recursive model will be characterized by an explosive behavior. This calls for a careful selection of the variables that enter the model. It is essential to find some unique predictors of the two endogenous variables of the model. For this reason we have identified a set of variables that predict either *Prosociality* or *Membership* in independent separate regressions, or a set of variables that appear important predictors based on theoretical analyses, and included them in the SEM.[15] We have also included a set of demographic controls. A final

[15] The preliminary regressions used models similar to those adopted in the previous sections. We included demographic controls in all regressions (*Female, Age, Age squared, Bachelor's_degree, Secondary_school*) adding one new covariate at a time. We fitted a logit model to predict the probability that an individual belonged to an association. The variables that turned out to be significant predictors at the 1% level were the *Generosity index*, "Donations to humanitarian associations" (this variable was not included in SEM because it is a component of the Generosity Index), *Vote*, the *Civic_Norm_Index*, whether avoiding paying a fare on public transport may be justified (this variable was not included in SEM because it is a component of the *Civic_Norm_Index*), *Income_dissatisfaction*, *House_ownership*. As for predictors of *Prosociality*, we fitted an ordered logit model to predict *Amount sent* (similar results emerge in a model predicting *Return rate*). The variables that turn out to be significant at the 1% level are *Amount returned_ exp* (i.e the

precaution that we have taken is to expunge the observations relative to the in-group treatment from the SEM analysis. Such observations inflate the observed prosociality of members and introduce a relative high collinearity between *Membership* and the in-group dummy, which makes the convergence of the model particularly difficult.

The results of the analysis are reported in Table 9. It is first of all important to evaluate the overall fit of the model. The goodness of fit of SEM is generally assessed with a likelihood ratio test contrasting the fitted model with a saturated model that has no degree of freedoms. This test measures the extent to which the fitted model is capable of reproducing the original matrix of variances and co-variances of the variables in the model. In our case, the chi2(25) distribution has value of 29.02, and the associated probability is 0.2629. This ensures that the hypothesis that the fitted model and the saturated model are different fails to be rejected, and guarantees that our fitted model is capable of reproducing the covariance matrix. All other four tests of goodness of fit and stability of the model are all satisfied and concord in ensuring the validity of our fitted model.[16]

Once the fit of our model is ensured to be good, we can analyze the significance of the relationships between *Prosociality* and *Membership*. Table 9 reports in the first column the significance of the model used to predict *Prosociality*, and in the second column that to predict *Membership*. All of the coefficients are standardized. The clear-cut result that we obtain is that the

expectation on the amount that the receiver will return), the expectation on the amount sent by another sender (this variable was not included because of the high collinearity with the previous variable), *South*, *Believer*, *Income_dissatisfaction*. We have also included the widely used measure of individual trust in generalized others (*Trust*), and a measure of individual trustworthiness in real-life (*Past_trustworthiness*) in the equation to predict *Membership*. We have included a measure of an individual's propensity to take financial risks (*Risfin*) in both the equations. All these variables are described in Appendix A, Table A1.

[16] The Comparative Fit Index (CIF) compares the fitted model with a baseline model that assumes that there is no relationship among the observed variables. The CIF is in our case equal to 0.975, which is above the threshold of 0.95 that is normally taken to guarantee the good fit of the model. MacCallum and Austin (2000) advice for the use of the root mean squared error of approximation (RMSEA). This measure considers how much error the model produces, taking into account the degrees of freedom. This measure penalizes models that have unnecessary complexity. In our model, the RMSEA is 0.026, which is below the threshold of 0.05 that is normally taken to represent a good fit. We can also construct a confidence interval for the RMSEA, which tells us that with probability 0.850 the RMSEA lies below the 0.05 threshold. Another widely used indicator is the standardized root mean squared residual (SRMR), which is a measure of how well our model, on average, reproduces each correlation. The SRMR tells us that the error in reproducing correlations is below 0.018, which is less of the 0.05 threshold. Another important test for a non-recursive model is its stability, that is, the degree to which the model solution follows a bounded trajectory. The stability index equals the largest eigenvalue in absolute value. In our case this is 0.23, which is below the stability threshold of 1.

path going from *Membership* to *Prosociality* is statistically significant (*p= 0.014*) and quantitatively large (*β=0.706* – the largest coefficient we find in our SEM analysis), while the reverse link from *Prosociality* to *Membership* is not significantly different from zero (*β=0.078; p= 0.506*). A Wald test on the hypothesis that the two coefficients are equal to each other is soundly rejected (*chi2(1) = 131.23; p< 0.001*). Among the other covariates used in the model (see Table A1 for the variable legend), the expectation on receivers behavior is particularly relevant in predicting *Prosociality* (*β=0.456; p<0.001*), as well as coming from the South (*β=-0.171; p=0.014*), and declaring to believe in God (*β=-0.123; p=0.064*). The model also captures a weak effect for the experimenter conducting the session (*β=0.132; p=0.052*). As for the equation predicting *Membership*, we find significant effects of our measure of risk tolerance (*β=-0.138; p=0.028*) and of being unemployed (*β=-0.150; p=0.017*). Not surprisingly, some variables that are normally associated with social capital also turn out as being significant predictors of the choice to become member. This is in particular true for whether the participant had voted in the past political elections (*β=0 163; p=0.012*), whether the participant declares that others can be trusted (*β=0.132; p=0.017*), and if the participant scores higher in a composite index measuring the frequency of donations towards reconstruction after natural disasters, to charities or to beggars (*β=0. 119; p=0.051*). We can also analyze the goodness of fit of the two equations separately. The model explains 32% of the variance of *Prosocial*, and only 16% of the variance of *Membership*. We thus have to take into account that some important explanatory variables may have been omitted from the model, particularly in the explanation of the decision to become a member of an organization.

The ensuing analyses reported in Table 9 are robustness checks for these results. We impose that the standard errors are White-Huber robust to heteroschedasticity, and we let the in-built algorithm compute estimations for the missing observations. A comparison of the coefficients magnitudes between Columns 1 and 2, and 3 and 4, shows that results are virtually identical.

The analysis conducted so far addressed the general issue of the co-causation between *Prosociality* and *Membership* in the whole sample. The next question we would like to investigate

is whether we observe significant differences in the results commented above between the various association categories to which members belong. Unfortunately, SEM analysis does not enable us to carry out a direct test of this issue. The standard procedure to test group comparison fails to yield results because of the lack of the convergence of the model. This is the case both when we use jointly all of the seven possible group categories which take into account multiple memberships – namely, *Putnam-type_Only*, *Olson-type_Only*, *Residual_Only*, *Putnam-type_&_Olson-type*, *Putnam-type_&_Residual*, *Olson-type_&_Residual*, *All_Types* - and when we use such individual categories one at a time. As a (rather minimal) form of control of this issue, we have thus resorted to introduce in the model dummies identifying participants who were members of at least a Putnam-type association (*At_Least_Putnam-type*; see Table 9, columns 5-6) or of at least an Olson-type association (*At_Least_Olson-type*; see Table 9, columns 7-8). We insert these two dummies in both equations of our SEM separate regressions. The results are qualitatively the same as before. First, all of the diagnostic indicators satisfy the goodness-of-fit tests. In the SEM including *Putnam-type* (Table 9, columns 5-6), again do we find a significant effect of the path going from *Membership* to *Prosociality* (*β=0.916; p=0.017*), but no significant effect for the reverse path (*β=0.089; p=0.394*). Likewise, in the SEM including *Olson-type* (Table 9, columns 7-8), the path going from *Membership* to *Prosociality* is significant (*β=0.711; p=0.046*), unlike the reverse path (*β=0.087; p=0.408*). Most of the covariates keep the same significance levels as the previous regressions. These results are confirmed introducing Huber-White heteroschedasticity-robust standard errors, and/or estimating missing values (not reported, available upon request).[17]

The overarching message coming from our SEM analysis is that it is significantly more likely that *Membership* exerts a positive effect on *Prosociality* rather than the contrary. Once these two variables are fitted into a model allowing for reciprocal co-causation, and other control factors are included in the analysis, then the path from *Membership* to *Prosociality* maintains a significant

[17] The regression including *At_Least_Residual-type* fails to converge, thus we cannot perform this robustness check.

effect, while the significance of the reverse path from *Prosociality* to *Membership* is exhausted. This lends support to the thesis that membership creates prosociality, rather than prosocial individuals being more frequently attracted to join associations. It would of course be wrong to overstate this result. As stated above, causal inferences based on SEM within cross-sectional models should be taken with caution. The fit of our model is generally remarkably good with respect to our data (see footnote 16), but the variance that we can explain is relatively small. This points to the existence of some relevant explanatory variables that are omitted from the analysis. We clearly cannot speculate about the robustness of our results if such additional explanatory variables were included in the model.

An additional piece of evidence about the causality issue comes from the analysis of the intensity of association involvement (see section 5.1). If participation in associations has some effect on trust and trustworthiness, then one may expect members characterized by higher intensity of participation to reveal a greater propensity to trust and reward trust than others. Our data, nevertheless, do not support this conjecture. In fact, we only find a significant and negative correlation between the number of hours spent volunteering by members of Olson-type associations and their level of trust in the out-group treatment. This piece of evidence speaks against the idea of a possible formative effect of association membership on the development of prosociality.

These two contrasting pieces of evidence, one coming from the SEM analysis and the other from the intensity analysis, can in principle be reconciled if one thinks that the positive effect of membership on prosociality is limited in time and occurs in the early stages of one's involvement with an association. It is quite plausible that a "saturation effect" sets in after the initial period of involvement with an association. It would be surprising if the involvement in association continued to exert effects after many years since joining. The theory is mute on how long this "formative" period may be. The only piece of evidence on the issue comes from Stolle (1998) who, as we noted, finds an increase in trust in the first year since joining an association, followed by a plateau or even a decline (after 6-7 years) in trust. Nearly the entirety of our sample includes people who

participated in association for more than a year. From this respect, it is therefore not surprising that we do not find positive effects of association membership on prosociality. Overall, we believe that the evidence in our possession is not strong enough to conclusively resolve the issue of causality. All the same, we believe that the magnitude and the stability of our SEM analysis provides some grounds to refute the idea that the higher level of prosociality displayed by association members is *uniquely* the result of self-selection of highly prosocial people into associations. We believe that our evidence grounded on the SEM analysis supports the view that, to the very least, a non-negligible formative effect of membership on prosociality does exist. We leave to future analysis to provide further test for this idea, and to quantify more precisely the magnitude of the effects. We conclude:

Result 4: *A SEM analysis of the co-causation between membership and prosociality shows a significant positive effect of the path going from membership to prosociality but no significant effect for the path going in the opposite direction. Given the cross-section nature of our data and the relatively small amount of variance that can be explained by the SEM, we refrain from drawing general conclusion from this analysis. Nevertheless, we believe that this evidence favors the view that the observed higher prosociality displayed by association members cannot be uniquely the result of self-selection of prosocial people into associations.*

6. Conclusions

Putnam's hypothesis on the positive effect of associational participation on spirit of cooperation conflicts with Olson's hypothesis, which sees voluntary groups as pursuing private interests and setting up activities conducive to rent-seeking behavior. The existing empirical literature, based on survey data, provides only mixed evidence that is not conclusive on the Putnam vs. Olson debate. Moreover, the lack of experimental studies on this issue is particularly critical, since survey questions on trust and cooperative behavior are characterized by commonly recognized interpretative problems. By distinguishing between different types of associations, we provide the first experimental analysis on trust and trustworthiness of members of Putnam-type and Olson-type

associations when paired with fellow members and with people from the general population and we compare members' behavior with that of non-members.

First, we find that members of Putnam-type associations trust people from the general public significantly more than non-members. Moreover, they do not discriminate between fellow members and people from the general population. The latter result opens interesting questions for further research revealing that direct and indirect reciprocity, reputation and sanctioning, which should have a specific effect on spirit of cooperation *within* associations, are not relevant when Putnam-type associations are considered. Second, members of Olson-type associations trust people from the general population in the same way as non-members do. Moreover, they trust fellow members more than people from the general population.

As far as receivers' behavior is concerned, we note that members of Olson-type associations return significantly more than non-members, both when they are paired with fellow Olson-type members, and when they are matched with people from the general public, and without in-group effect. Conversely, Putnam-type association members are no more trustworthy than people from the general population, either when they are paired with fellow members or when they interact with people from the general population. This is a particularly original and interesting result. It highlights that membership in different types of associations may be associated with patterns of behavior that vary significantly when different motivational drivers are analyzed. It also indirectly confirms previous evidence that different motivational characteristics account for trust and trustworthiness (Johnson and Mislin, 2011; Sapienza et al., 2013).

We also show that the intensity of participation presents only one significant effect. That is the negative effect of the number of hours spent volunteering in the associations on trusting behavior of members of Olson-type association when paired with people from the general public. This is consistent with the idea that social relationships in Olson-type associations lead primarily to "bonding" rather than "bridging" social capital (Putnam, 2000). In principle, this piece of evidence may be interpreted to support the view that involvement in associations does not have any formative

effect on prosociality. Nevertheless, this result may be inconclusive because such formative effect is likely to be limited to the very initial period of membership (less than one year according to Stolle, 1998), but the vast majority of association members in our sample has a seniority that spans a longer period. Conversely, our SEM analysis supports the opposing view that a significant portion of the observed correlation between membership and prosociality is due to a positive impact of the former on the latter.

Finally, we analyze behavior of members of Residual associations with respect to the Olson vs. Putnam distinction. As members of Putnam-type associations, these subjects trust people from the general public significantly more than non-members. However, as members of Olson-type association, they trust fellow members more than people from the general population. When acting as receivers, members of Residual associations behave as Olson-type members. No significant effect of the intensity of participation on members of Residual associations emerges.

Our contrasting evidence on the behavior of members of Putnam-type and Olson-type associations when acting as sender or receiver in a Trust Game experiment opens interesting questions for further research. How do members of different types of association behave when the context of interaction does not ask mainly for trust but for other types of motivational driver? In this perspective, it would be useful to replicate experimental analysis involving associational members in different games, such as Public Good Games, Ultimatum Game and Dictator Game.

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Table 6 Analysis of amounts sent and return rates: effects of association type

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	*Amount sent*	*Amount sent*	*Amount sent*	*Amount sent*	*Return rate*	*Return rate*	*Return rate*	*Return rate*
Model	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit	Tobit	Tobit	Tobit	Tobit
Putnam-type_Ing	1.041***	0.966**	1.027***	1.000***	0.041	0.041	0.042	0.039
	(0.386)	(0.379)	(0.381)	(0.381)	(0.039)	(0.037)	(0.036)	(0.035)
Olson-type_Ing	1.767***	1.826***	1.746***	1.789***	0.114**	0.115**	0.110**	0.115**
	(0.488)	(0.483)	(0.486)	(0.486)	(0.050)	(0.046)	(0.047)	(0.047)
Residual_Ing	1.754***	1.678***	1.711***	1.668***	0.172***	0.170***	0.170***	0.168***
	(0.430)	(0.426)	(0.426)	(0.421)	(0.050)	(0.048)	(0.047)	(0.049)
Putnam-type_Only_Out	1.272**		1.287**	1.248**	0.029		0.035	0.028
	(0.547)		(0.541)	(0.536)	(0.053)		(0.053)	(0.050)
Olson-type_Only_Out	0.848	0.870		0.852	(0.125)**	0.124**		0.124***
	(0.540)	(0.538)		(0.540)	(0.050)	(0.049)		(0.048)
Residual_Only_Out	1.202**	1.151**	1.182**		0.085**	0.084**	0.084**	
	(0.468)	(0.462)	(0.463)		(0.042)	(0.042)	(0.042)	
Putnam-type_&_Olson-type_Out	-0.083			-0.051	0.038			0.039
	(0.645)			(0.636)	(0.049)			(0.046)
Putnam-type_&_Residual_Out	1.186**		1.174**		0.081**		0.084**	
	(0.469)		(0.461)		(0.039)		(0.038)	
Olson-type_&_Residual_Out	-0.035	-0.043			0.017	0.018		
	(0.622)	0.618)			(0.056)	(0.055)		
All_Types_Out	0.808*				0.042			
	(0.481)				(0.061)			
At_Least_One_Putnam-type_Out		0.893**				0.050		
		(0.354)				(0.032)		
At_Least_One_Olson-type_Out			0.496				0.075**	
			(0.374)				(0.034)	
At_Least_One_Residual_Out				0.954***				0.069**
				(0.343)				(0.031)
Dropout	-0.228	-0.225	-0.230	-0.230	0.000	0.000	0.000	0.000
	(0.511)	(0.504)	(0.505)	(0.503)	(0.046)	(0.043)	(0.044)	(0.042)

Table 6 (continued)

Amount sent					0.029***	0.029***	0.029***	0.029***
					(0.002)	(0.002)	(0.002)	(0.002)
Amount sent Square					-0.001***	-0.001***	-0.001***	-0.001***
					(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.534**	-0.475*	-0.545**	-0.525**	-0.036	-0.037	-0.040	-0.037
	(0.259)	(0.254)	(0.259)	(0.255)	(0.026)	(0.024)	(0.024)	(0.025)
Age	0.154**	0.151**	0.149**	0.140**	0.008	0.007	0.007	0.007
	(0.071)	(0.071)	(0.0701)	(0.069)	(0.006)	(0.006)	(0.006)	(0.006)
Age Squared	-0.002**	-0.002**	-0.00167**	-0.002**	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.000740)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Income_dissatisfaction	-0.570*	-0.606**	-0.595**	-0.610**	0.015	0.016	0.015	0.012
	(0.292)	(0.290)	(0.291)	(0.291)	(0.031)	(0.031)	(0.030)	(0.032)
South	-1.077***	-1.166***	-1.097***	-1.087***	-0.099***	-0.100***	-0.106***	-0.101***
	(0.379)	(0.365)	(0.369)	(0.370)	(0.032)	(0.032)	(0.031)	(0.033)
Town-size	0.127	0.150	0.0952	0.106	0.028	0.025	0.022	0.026
	(0.239)	(0.232)	(0.239)	(0.238)	(0.022)	(0.021)	(0.021)	(0.021)
Bachelor's_degree	0.624*	0.559	0.544	0.579	-0.004	-0.003	-0.010	-0.005
	(0.358)	(0.358)	(0.343)	(0.355)	(0.036)	(0.034)	(0.034)	(0.034)
Secondary_school	0.326	0.248	0.279	0.322	0.010	0.009	0.009	0.011
	(0.293)	(0.284)	(0.288)	(0.297)	(0.032)	(0.030)	(0.031)	(0.030)
Retired	0.268*	0.308	0.314	0.289	-0.074*	-0.076*	-0.070*	-0.073*
	(0.379)	(0.375)	(0.374)	(0.374)	(0.040)	(0.040)	(0.040)	(0.041)
Unemployed	-1.186	-1.132*	-1.133	-1.125	0.027	0.030	0.033	0.031
	(0.690)	(0.683)	(0.711)	(0.684)	(0.064)	(0.062)	(0.063)	(0.063)
Family_size	-0.112	-0.119	-0.117	-0.108	-0.014*	-0.014*	-0.014*	-0.014*
	(0.075)	(0.075)	(0.0741)	(0.075)	(0.007)	(0.008)	(0.007)	(0.007)
Unmarried	-0.506	-0.409	-0.471	-0.483	-0.025	-0.025	-0.028	-0.024
	(0.355)	(0.343)	(0.349)	(0.352)	(0.029)	(0.027)	(0.027)	(0.026)
Only_Child	-0.135	-0.117	-0.136	-0.154	0.005	0.004	0.001	0.002
	(0.274)	(0.274)	(0.280)	(0.283)	(0.027)	(0.025)	(0.028)	(0.027)
Believer	-0.992***	-0.927***	-0.976***	-0.960***	-0.043	-0.041	0.041	-0.041
	(0.333)	(0.328)	(0.331)	(0.327)	(0.026)	(0.025)	(0.027)	(0.026)

Table 6 (continued)

Practicing	0.348	0.386	0.347	0.398	0.037	0.040	0.034	0.039
	(0.306)	(0.307)	(0.301)	(0.306)	(0.026)	(0.025)	(0.027)	(0.026)
Divorced	0.033	0.012	0.0844	-0.040	-0.018	-0.015	-0.007	-0.021
	(0.611)	(0.605)	(0.584)	(0.572)	(0.090)	(0.093)	(0.094)	(0.090)
Health_satisfaction	0.047	0.060	0.0662	0.061	0.020	0.020	0.021	0.021
	(0.152)	(0.153)	(0.153)	(0.156)	(0.017)	(0.017)	(0.017)	(0.017)
Risfin	0.084	0.087	0.0878*	0.087*	-0.005	-0.005	-0.005	-0.005
	(0.052)	(0.053)	(0.0527)	(0.052)	(0.005)	(0.005)	(0.006)	(0.005)
Mistakes	-0.009	-0.022	-0.0151	-0.011	0.018**	0.017**	0.017**	0.017**
	(0.080)	(0.077)	(0.0764)	(0.078)	(0.008)	(0.008)	(0.008)	(0.008)
Experimenter	0.375	0.400*	0.371	0.384*	0.032	0.031	0.032	0.033
	(0.230)	(0.229)	(0.229)	(0.223)	(0.023)	(0.022)	(0.022)	(0.022)
Other_Associations	-1.397*	-1.108*	-1.429**	-1.391**	0.004	0.003	-0.006	0.003
	(0.730)	(0.643)	(0.697)	(0.636)	(0.051)	(0.050)	(0.053)	(0.051)
Constant	*Constants omitted*	*Constants omitted*	*Constants omitted*	*Constants omitted*	-0.235	-0.213	-0.209	-0.220
					(0.161)	(0.158)	(0.155)	(0.150)
Observations	319	319	319	319	1914	1914	1914	1914
Pseudo R2	0.0967	0.0930	0.0940	0.0936				
sigma_u					0.159	0.159	0.160	0.160
sigma_e					0.148	0.148	0.148	0.148
chi2					431.8	438.1	424.9	458.6

Notes: *Putnam-type_Ing*, *Olson-type_Ing* and *Residual_Ing* identifies subjects involved in the in-group treatment and recruited in Putnam-type, Olson-type and Residual associations respectively. Variables denoted by *X_Only_Out*, X={Putnam-type, Olson-type, Residual} identify subjects who are members of type of association X in the out-group treatment. *X_1_&_X_2_Out*, X_1= X; X_2=X; identify subjects who, in the out-group treatment, are members of both association types X_1 & X_2 , but are not member of the third association type, where X_1 and X_2 identify different types. For instance, *Putnam-type_&_Residual_Out* identifies members who belong to at least one Putnam-type association, at least one Residual association, but are not members of Olson-type associations. *All_Types_Out* identifies subjects who are members of all three types of association in the *out-group* treatment. Finally, *At_Least_One_X_Out* identifies subjects who are members of at least one association of type X. For instance, *At_Least_One_Olson-type_Out* includes the four categories: {Olson-type_Only_Out; Olson-type_&_Putnam-type_Out; Olson-type_&_Residual_Out; All_Types_Out}. Robust standard errors (columns 1,2,3, and 4) and bootstrapped standard errors generated in 1000 repetitions (columns 5,6,7, and 8) are reported in parentheses; *** p<0.01, ** p<0.05, * p<0.1. See Appendix A for the description of the control variables included in the regressions.

Table 7 Analysis of amounts sent and return rates: Effects of length of hours spent in association per week

	(1)	(2)
Dependent Variable	*Amount sent*	*Return rate*
Hours_ Putnam-type_Ing	0.002	0.000
	(0.005)	(0.000)
Hours_ Olson-type_Ing	-0.013	0.001
	(0.009)	(0.001)
Hours_ Residual_Ing	0.001	0.000
	(0.003)	(0.001)
Hours_ Putnam-type_Out	-0.296	-0.007
	(0.182)	(0.039)
Hours_ Olson-type_Out	-0.235**	0.002
	(0.102)	(0.019)
Hours_ Residual_Out	-0.068	-0.006
	(0.084)	(0.006)
Putnam-type_Ing	1.139	0.004
	(0.946)	(0.083)
Olson-type_Ing	2.599***	-0.014
	(0.631)	(0.085)
Residual_Ing	1.539***	0.174***
	(0.547)	(0.063)
Putnam-type_Only_Out	2.212	0.007
	(1.473)	(0.172)
Olson-type_Only_Out	1.896***	0.107
	(0.659)	(0.065)
Residual_Only_Out	1.258	0.071
	(0.899)	(0.057)
Dropout	-0.426	-0.033
	(0.528)	(0.041)
Amount sent		0.030***
		(0.002)
Amount sent Square		-0.001***
		(0.000)
Female	-0.722**	-0.061**
	(0.320)	(0.030)
Age	0.067	0.004
	(0.092)	(0.009)
Age Squared	-0.001	0.000
	(0.001)	(0.000)
Income_dissatisfaction	-0.323	0.019
	(0.318)	(0.040)
South	-1.109***	-0.131***
	(0.404)	(0.040)
Town-size	-0.046	0.039
	(0.274)	(0.027)

Table 7 (continued)

Bachelor's_degree	1.119***	0.040
	(0.407)	(0.046)
Secondary_school	0.562	0.051
	(0.369)	(0.040)
Retired	0.048***	-0.126*
	(0.534)	(0.068)
Unemployed	-2.166	-0.048
	(0.716)	(0.075)
Family_size	-0.139	-0.023*
	(0.135)	(0.012)
Unmarried	-0.668	-0.035
	(0.444)	(0.033)
Only_Child	-0.057	0.035
	(0.299)	(0.034)
Believer	-1.439***	-0.070**
	(0.381)	(0.032)
Practicing	0.884**	0.031
	(0.344)	(0.034)
Divorced	-0.397	0.009
	(0.707)	(0.113)
Health_satisfaction	0.254	0.022
	(0.183)	(0.021)
Risfin	0.079	-0.011**
	(0.062)	(0.005)
Mistakes	-0.009	0.023**
	(0.094)	(0.010)
Experimenter	0.155	0.033
	(0.270)	(0.025)
Constant	*Constants omitted*	-0.108
		(0.211)
Observations	232	1392
Pseudo R2	0.1299	
sigma_u		0.161
sigma_e		0.132
chi2		411.2

Notes: see Table 6. Variables whose name starts with "Hours" measure the number of hours per week spent volunteering in the type of association specified by the variable name. For example, *Hours_ Olson-type_Out* measures the number of hours spent volunteering per week in Olson-type associations by members involved in the out-group treatment. Robust standard errors (column 1) and bootstrapped standard errors generated in 1000 repetitions (column 2) are reported in parentheses; ***; *** p<0.01, ** p<0.05, * p<0.1. We omitted the variable *Other_Associations* because of problems of multi-collinearity. See Appendix A for the description of all the control variables included in the regressions.

Table 8 Analysis of amounts sent and return rates: Effects of number of joined associations

Dependent variable:	(1) *Amount sent*	(2) *Return rate*
Putnam-type_Ing	1.034***	0.039
	(0.387)	(0.037)
Olson-type_Ing	1.778***	0.115**
	(0.492)	(0.049)
Residual_Ing	1.746***	0.169***
	(0.431)	(0.047)
Number_ Putnam-type_Out	-0.099	-0.051
	(0.465)	(0.033)
Number_ Olson-type_Out	0.025	0.051
	(1.013)	(0.068)
Number_ Residual_Out	0.145	0.023
	(0.160)	(0.021)
Putnam-type_Only_Out	1.388*	0.090
	(0.814)	(0.069)
Olson-type_Only_Out	0.822	0.062
	(1.267)	(0.086)
Residual_Only_Out	0.980*	0.051
	(0.591)	(0.053)
Putnam-type_&_Olson-type_Out	0.007	0.039
	(1.165)	(0.107)
Putnam-type_&_Residual_Out	1.139	0.132*
	(1.064)	(0.074)
Olson-type_&_Residual_Out	-0.236	-0.070
	(1.490)	(0.101)
All_Types_Out	0.726	0.039
	(1.524)	(0.127)
Dropout	-0.230	0.001
	(0.511)	(0.046)
Amount sent		0.029***
		(0.002)
Amount sent Square		-0.001***
		(0.000)
Female	-0.533**	-0.038
	(0.259)	(0.025)
Age	0.152**	0.008
	(0.072)	(0.006)
Age Squared	-0.002**	0.000
	(0.001)	(0.000)
Income_dissatisfaction	-0.578**	0.011
	(0.294)	(0.031)
South	-1.075***	-0.101***
	(0.381)	(0.032)

Table 8 (continued)

Town-size	0.126	0.028
	(0.239)	(0.021)
Bachelor's_degree	0.620*	-0.008
	(0.356)	(0.034)
Secondary_school	0.327	0.010
	(0.295)	(0.030)
Retired	0.269	-0.070
	(0.388)	(0.043)
Unemployed	-1.187*	0.033
	(0.704)	(0.062)
Family_size	-0.112	-0.014*
	(0.075)	(0.008)
Unmarried	-0.496	-0.025
	(0.363)	(0.027)
Only_Child	-0.148	0.001
	(0.275)	(0.028)
Believer	-0.967***	-0.036
	(0.345)	(0.027)
Practicing	0.348	0.039
	(0.306)	(0.026)
Divorced	0.047	-0.010
	(0.619)	(0.089)
Health_satisfaction	0.042	0.019
	(0.156)	(0.017)
Risfin	0.085	-0.005
	(0.054)	(0.006)
Mistakes	-0.012	0.017**
	(0.080)	(0.008)
Experimenter	0.368	0.032
	(0.231)	(0.022)
Other_Associations	-1.396*	-0.002
	(0.767)	(0.052)
Constant		-0.229
		(0.156)
Observations	319	1914
Pseudo R2	0.0971	
sigma_u		0.158
sigma_e		0.148
chi2		475.5

Notes: see Table 6. Variables whose name starts with "Number" measure the number of associations of the type specified by the variable name joined by the subject. For example, *Number_Putnam-type_Out* measures the number of Putnam-type associations joined by subjects involved in the out-group treatment. Robust standard errors (column 1) and bootstrapped standard errors generated in 1000 repetitions (column 2) are reported in parentheses; *** p<0.01, ** p<0.05, * p<0.1. See Appendix A for the description of the control variables included in the regressions.

Table 9- Structural Equation Model Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	*Prosocial*	*Membership*	*Prosocial*	*Membership*	*Prosocial*	*Membership*	*Prosocial*	*Membership*
Model	Structural model	Structural model	Structural model	Structural model	Structural model	Structural model	Structural model	Structural model
Membership	0.706**		0.598**		0.916**		0.711**	
	(0.287)		(0.266)		(0.402)		(0.356)	
Prosocial		0.078		0.118		0.089		0.087
		(0.118)		(0.120)		(0.106)		(0.105)
Female	-0.111	-0.078	-0.113	-0.060	-0.084	-0.076	-0.153*	0.005
	(0.084)	(0.066)	(0.082)	(0.062)	(0.093)	(0.056)	(0.080)	(0.058)
Risfin	0.065	-0.138**	0.071	-0.126**	0.070	-0.111**	0.058	-0.108*
	(0.084)	(0.063)	(0.080)	(0.060)	(0.089)	(0.054)	(0.085)	(0.055)
Age	0.101	-0.064	0.073	-0.102	0.149*	-0.111*	0.103	-0.049
	(0.080)	(0.069)	(0.071)	(0.068)	(0.085)	(0.059)	(0.079)	(0.060)
Bachelor's_degree	-0.064	-0.018	-0.076	0.023	0.019	-0.117	-0.067	-0.008
	(0.120)	(0.101)	(0.102)	(0.087)	(0.133)	(0.086)	(0.119)	(0.088)
Secondary_school	-0.127	-0.043	-0.128	-0.019	-0.089	-0.069	-0.131	-0.031
	(0.118)	(0.098)	(0.093)	(0.085)	(0.126)	(0.084)	(0.117)	(0.086)
Income_dissatisfaction	-0.010	0.076	0.062	0.087	0.006	0.014	-0.027	0.128**
	(0.096)	(0.072)	(0.105)	(0.066)	(0.093)	(0.061)	(0.109)	(0.062)
Unemployed	-0.044	-0.150**	-0.083	-0.152**	-0.041	-0.103*	-0.063	-0.095*
	(0.083)	(0.063)	(0.067)	(0.068)	(0.086)	(0.054)	(0.079)	(0.056)
Believer	-0.123*		-0.116*		-0.120		-0.106	
	(0.067)		(0.065)		(0.065)		(0.070)	
South	-0.171**		-0.158		-0.170**		-0.170**	
	(0.070)		(0.070)		(0.068)		(0.070)	
Amount returned_ exp	0.456***		0.425***		0.437***		0.454***	
	(0.078)		(0.085)		(0.086)		(0.079)	
Experimenter	0.132*		0.140**		0.129*		0.135	
	(0.068)		(0.067)		(0.066)		(0.067)	

Table 9 (continued)

Generosity_index		0.119*		0.134**		0.075		0.097*
		(0.061)		(0.065)		(0.049)		(0.054)
Vote		0.163**		0.157***		0.109**		0.148**
		(0.065)		(0.055)		(0.054)		(0.057)
Trust		0.132**		0.151***		0.087*		0.105**
		(0.056)		(0.055)		(0.045)		(0.049)
Past_individual_trustworthiness		-0.083		-0.092		-0.100**		-0.024
		(0.058)		(0.058)		(0.049)		(0.053)
Civic_Norm_Index		-0.064		-0.053		-0.025		-0.064
		(0.059)		(0.063)		(0.046)		(0.053)
House ownership		0.047		0.033		0.063		0.026
		-0.062		(0.057)		(0.051)		(0.055)
At_Least_Putnam-type					-0.412*	0.505***		
					(0.231)	(0.047)		
At_Least_Olson-type							-0.211	0.447***
							(0.190)	(0.060)
Constant		0.252		0.220		0.625		-0.322
		(0.469)		(0.402)		(0.391)		(0.417)
Structural model								
Amount Sent -> Prosocial	0.691***		0.713***		0.684***		0.692***	
	(0.088)		(0.100)		(0.101)		(0.087)	
Return Rate -> Prosocial	0.661***		0.647***		0.660***		0.661***	
	(0.077)		(0.066)		(0.084)		(0.073)	
Observations	235	235	265	265	234	234	234	234
Wald test on equality of coefficients β[Member->Prosociality]=β[Prosociality->Member]	131.23	131.23	172.2	172.2	79.78	79.78	143.4	143.4
Prob>chi2	<0.001	<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001
LR test of model vs. Saturated: chi2(df)	29.02	29.02			29.59	29.59	33.89	33.89
Prob>chi2	0.263	0.263			0.285	0.285	0.138	0.138

Table 9 (continued)

RMSEA	0.026	0.026			0.024	0.024	0.036	0.036
90% CI, lower bound	0	0			0	0	0	0
upper bound	0.061	0.061			0.059	0.059	0.067	0.067
pclose	0.85	0.85			0.869	0.869	0.742	0.742
CFI	0.975	0.975			0.985	0.985	0.965	0.965
SRMR	0.018	0.018			0.017	0.017	0.017	0.017
Coefficient of determination	0.594	0.594	0.578	0.578	0.725	0.725	0.692	0.692
Stability index	0.235	0.235	0.266	0.266	0.293	0.293	0.249	0.249
R-squared per equation	0.325	0.166	0.196	0.392	0.394	0.202	0.365	0.366

APPENDIX A- Table A1 - Variables description

Age	Subject's age
Female	Dummy Variable (DV) taking value one (=1) if the respondent is a female
Dropout	DV=1 if the respondent had been member of an association in the past
Income_dissatisfaction	DV=1 if the answer to the questions "How well would you say that you are doing financially these days?" is "Living in a comfortable way". Other possible answers: "Living in an acceptable way"; "Barely getting by"; "It goes really badly"
Town_size	DV=1 if the town where the respondent lives has more than 100.000 inhabitants
South	DV =1 if the respondent was born in the South of Italy
Bachelor's_degree	DV =1 if the respondent has a university degree or higher title
Secondary_school	DV=1 if the respondent has attained high-school diploma ("Maturità" or "Licenza" in the Italian education system) as their highest educational achievement
Retired	DV=1 if the respondent is retired
Unenmployed	DV=1 if the respondent is unemployed
Family_size	Number of family members
Unmarried	DV=1 if the respondent is single
Only_child	DV=1 if the respondent is an only child
Believer	DV=1 if the respondent states s/he is not atheist nor agnostic
Practicing	DV=1 if the respondent is a church-goer, i.e. s/he attends religious services at least once a month
Divorced	DV=1 if the respondent is divorced
Health_satisfaction	DV=1 if the respondent declares to be very satisfied with his/her health condition
Risfin	variable measuring the general willingness of the respondent in taking financial risk (it takes integer values from 1 to 10). We used the measure of risk aversion based on a question in the survey (Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale, where the value 0 means: 'unwilling to take risks' and 10: 'fully prepared to take risk'), which proved to be a good measure of risk aversion (see Dohmen et al., 2011)
Mistakes	Numbers of mistakes in the experiment comprehension test
Experimenter	Dummy variable which distinguishes between the two experimenters who conducted all the experimental sessions
Other_Associations	11 members were inadvertently recruited by Demoskopea, and classified as belonging to "other associations" (see footnote 8).
Amount returned_ exp	The belief over the receiver's return rate, given the sender's actual transfer
Trust	Answer to the standard GSS trust question "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" 1 identifies answer to option "Most people can be trusted"
Vote	DV=1 if the respondent had voted in the past political elections
Generosity_index	Index measuring the frequency of the following behaviors: a) Contribute to the campaigns of international aid for victims of natural disasters (such as hurricanes, earthquakes, tsunamis); b) Donate to humanitarian associations; c) Give alms. The index is a summative scale of the answers given to these three questions.
Past_trustworthiness	Index measuring an individual's real-life trustworthiness. It is based on answers to a set of questions asking the frequency with which an individual borrows personal belongings from parents or family members, friends, colleagues and neighbors, and on whether an individual has benefitted from spontaneous and selfless behaviour by a stranger. The index is a summative scale of the answers given to these five questions.
Civic_Norm_Index	Index measuring the degree to which the individual agrees that the following behaviors may be justified: To receive social benefits (e.g invalidity pension) without having the right; To avoid a fare on public transport; To evade taxes. Participants had three possible answers. The index is a summative scale of the answers given to the three questions.
House ownership	It is a dummy variable identifying individuals whose family owns a house

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Short biography

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Fig. 1. Return share across treatment and association membership distinguishing between members of different types of associations and non-members.
Association members and non-members return share in out-group treatment
Association members return share in in-group treatment (and non-members in out-group treatment).