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# Building trust? Conditional cash transfers and social capital

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**Experiments and Games in Surveys – cemmap**

**London, December 2010**

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# Introduction

- Conditional cash transfer, their social dimension and social capital
  - Anecdotes: (Mexico, Familias en Acción) no hard evidence
  - Social capital: **hard to measure**
  - This paper: an experiment at the inset of a CCT in an urban context.
  - A measure of social capital based on an experimental game.
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# Antecedents on measuring social capital in Colombia

- Since the start of the evaluation of *Familias en Acción* we started to think of using games in our surveys to measure social capital.
  - During the second follow up of the large rural evaluation we played games in 70 of the 122 municipalities in the evaluation.
    - Risk sharing games
    - Public good games (similar to those we discuss today).
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# Antecedents on measuring social capital in Colombia

- During the evaluation of a new intervention to address the consequences of conflict (*Laboratorios de Paz*) we played games in 45 municipalities.
    - Trust games,
    - Public good games.
  - At the onset of the expansion of urban FeA we played in two urban slums two types of games:
    - Public good games,
    - Minimal effort games.
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# Familias en Acción (FeA)

- A conditional cash transfer started in Colombia in 2001/2 in rural areas.
    - Modeled after PROGRESA/*Oportunidades* in México
    - Main emphasis on human capital accumulation (school, health and nutrition)
  - FeA has become the flagship program of Colombian social policy.
  - It benefits approx. 1.5 million households, growing steadily towards the new 3 million Government goal.
  - Most of the recent expansion has happened in urban areas.
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# CCTs and Social Capital

- The program FeA has an explicit Social Component:
    - attendance to social meetings (*Encuentros de Cuidado*)
    - beneficiary groups and scheme of democratic representation (*Madre líderes vs. Madres titulares*)
  - This may:
    - Creates networks and improves trust among beneficiaries
    - Promotes leadership
  - Anecdotic evidence on the strength of FA beneficiary networks:
    - Beneficiary mothers start working as “social groups” (strong identification effect with the programme)
    - Additional and parallel group initiatives (productive, community work, etc.)
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# Measuring the effect of FA on social capital.

- A possible definition of social capital: Norms and social networks facilitating cooperation and collective action (Putnam, 1993)
  - Standard institutional approach to measuring social capital: membership in civic groups
  - Negative effect of FA on participation in social organizations and civic associations, especially when they have an “economic” dimension (Pellerano, 2005).
    - Change in the risk-coping strategy. As the incentive to share risk decreases with the transfer, relatively better-off beneficiaries are more likely to leave social groups.
    - Network substitution effect.
    - Community tensions due to the targeting mechanisms (Adato, 2000)
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# Measuring the effect of FA on social capital.

- What is the best way to measure all this?
  - The fact we used several games is indicative of the difficulty involved in this.
  - This work:
    - Same public good game tried also in another two contexts.
    - For the first time we have a panel aspect.
    - We want to perform an impact evaluation in one municipality in an urban setting (Cartagena).
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# Empirical Strategy



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# FA and Social Capital in Cartagena

- Program officials think that FeA had a particularly strong effect on social capital in El Pozón.
  - 97% beneficiary mothers actively participate in the periodical meetings (*‘Encuentros de cuidado’*)
  - The local program coordinator (*Enlace municipal*) is very active and has promoted a number of initiatives around the programme.
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# The Evaluation Design

- In anticipation of the urban expansion FeA administration piloted the program in a few urban localities since 2005.
    - Cartagena: El Pozón
    - Soacha (Bogotá)
    - Medellín
  
  - In Cartagena it was decided to pilot the program in one poor neighbourhood.
    - El Pozón was short-listed together with another two neighborhoods (Ciénaga de la Virgen and Nelson Mandela) as a possible location for the program.
    - In the end El Pozón was chosen.
    - After conversations with the program administrator it was felt that, ex-ante, El Pozón and Ciénaga de la Virgen were very similar.
  
  - In October 2007 the programme expanded in all Cartagena (including Ciénaga de la Virgen)
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# The Evaluation Design

Joined the Programme in 2007

## Ciénaga de la Virgen

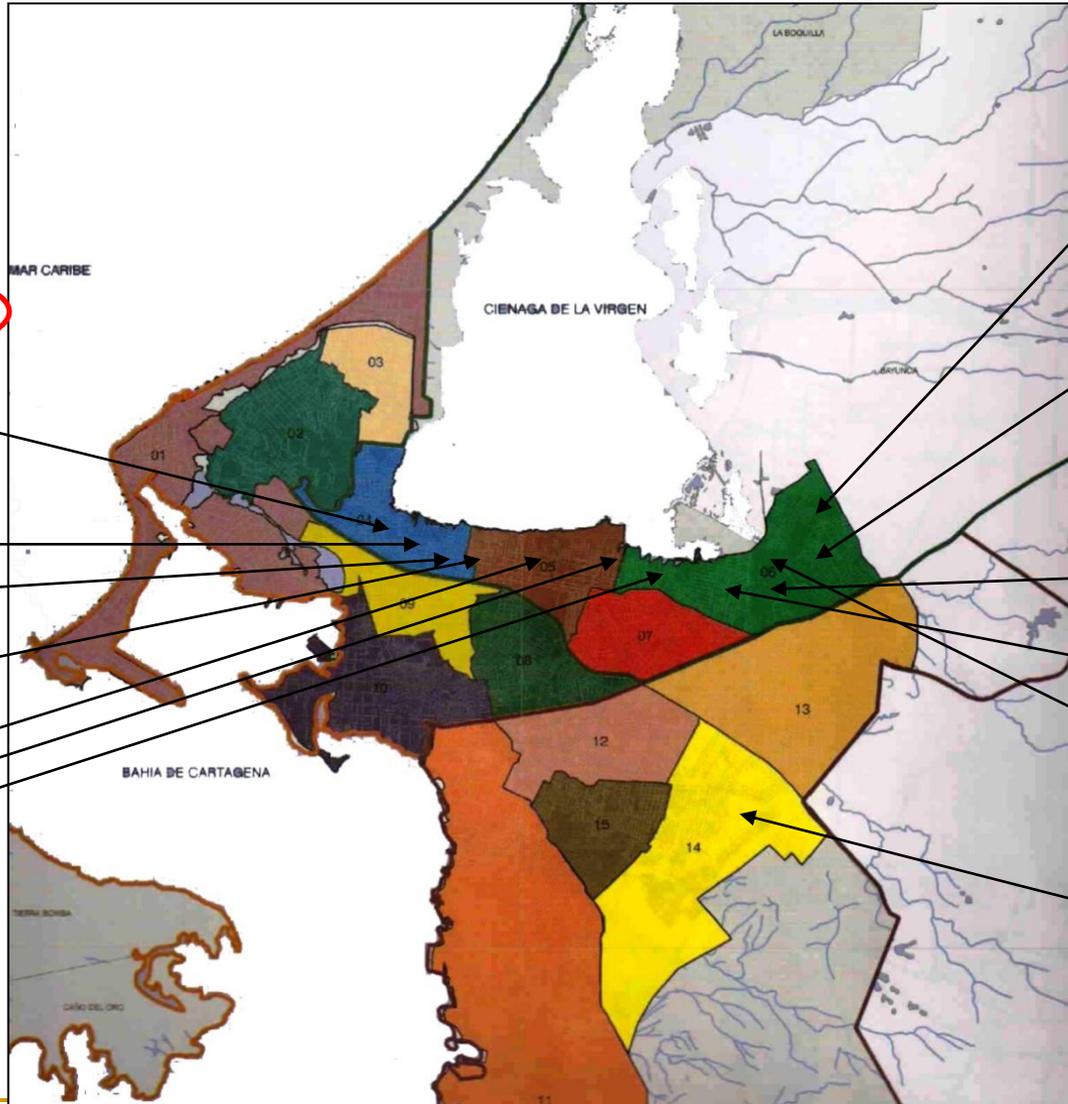
Líbano  
Boston  
Foco Rojo  
Ricaurte  
Candelaria  
Chiquinquirá  
11 de Noviembre  
Fredonia  
Las Américas  
Nuevo Paraíso  
Olaya Herrera  
Rafael Núñez

Joined the Programme in 2005

## El Pozón

1 de mayo  
19 de febrero  
El Pozón  
La paz  
Corazón de Jesús  
Los lagos  
Tamarindos  
Minuto de Dios  
14 de febrero  
Guarapero  
La conquista  
La estrella  
Miramar  
La Unión  
La Islita  
Nueva Cartagena  
San Nicolás  
Santa Eduviges  
Los Ángeles  
Central

Nelson Mandela



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# Empirical Strategy

- It was decided to measure social capital in two neighborhoods in Cartagena using a public good game.
  - In the first two weeks of July 2007 we played 14 sessions in El Pozón (TTO) and 14 sessions in Ciénaga de la Virgen (CTRL).
  - In July 2008, after the FA had expanded in all Cartagena, we played 19 sessions in El Pozón (TTO) and 24 sessions in Ciénaga de la Virgen (TTO).
  - We use a “reverse” diff in diff parametric approach for the estimation
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# Empirical Strategy

- In July 2008, in addition to the public good game we also played a 'minimal effort game'.
    - (social capital as coordination mechanisms) v.
    - (social capital as ability to internalize an externality).
  - As for the public good game we had to choose between playing with the same people (as far as possible) or with newly sampled individuals.
    - Old people: learning effects.
    - New people: we cannot reproduce session effects.
  - We did both:
    - The results I will show are from the new people sessions.
    - We found strong learning effects and convergence to Nash in the old sample.
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# The VCM Game

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# The Game

The experiment is a simple public good game in which subjects decide to invest in a 'public' or a 'private' project.



# Voluntary contribution mechanism (VCM) (Marwell y Ames, 1979)

- 25 players for each session simultaneously decide about their contribution to a public good
  - One individual decision: to invest a token in
    - a public account –Cuenta de Grupo or in
    - a private account –Cuenta privada
  - Your Earnings would be:
    - If you invest in the private account: COL\$5000 (US\$2.55)
    - In addition, you win COL\$400 (US\$0.20) per each token invested in the group account
-

# Examples



- You invest in P, and 13 people invest in G.  
You win  $\$5000 + (13 \times \$400) = \$10200$
  - You invest in G, and 13 people invest in G.  
You win  $(13 \times \$400) = \$5200$
  - You invest in G, and 20 people invest in G.  
You win  $(20 \times \$400) = \$8000$
  - You invest in P, and 20 people invest in G.  
You win  $\$5000 + (20 \times \$400) = \$13000$
  - You invest in P, and 5 people invest in G.  
You win  $\$5000 + (5 \times \$400) = \$7000$
  - You invest in G, and 5 people invest in G. You win  $(5 \times \$400) = \$2000$
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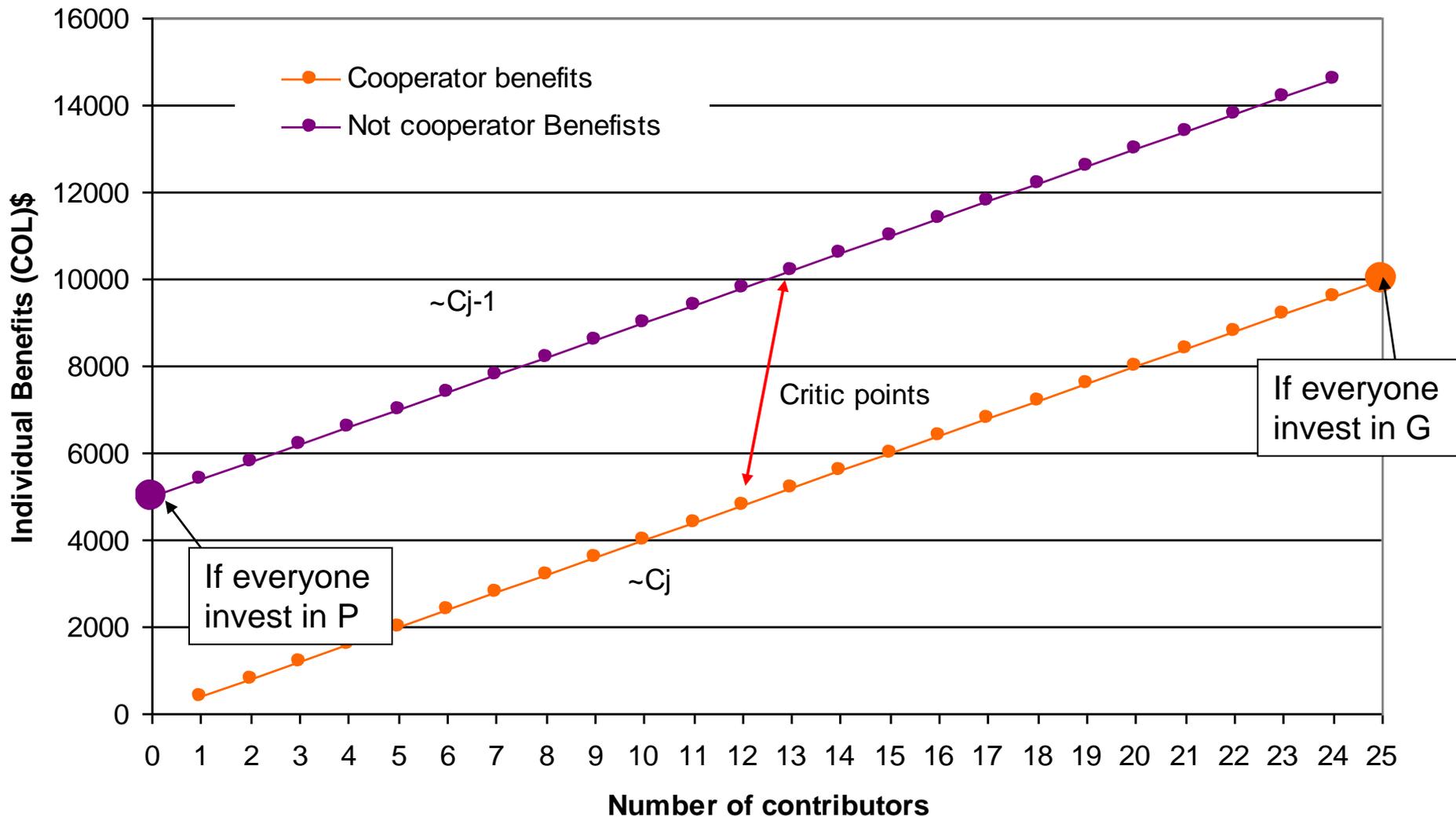
# Experimental design

- If “todos ponen”
  - Maximum social efficiency per session: COL\$250000 (or 10000 per head)
    - \$400\*25 tokens in G\* (25 people)
- Prediction with rational and self-regarded players
  - Each player keeps her token and contributes nothing
  - Self-oriented maximizer prediction (Nash Equilibrium): COL\$125000.
    - \$5000\*25 tokens in P
- The social dilemma
  - There is a conflict between the self interest and the optimum social outcome
- Two rounds with communication
- Show up fee=COL\$2000.



# The basic structure of the dilemma

Not cooperating ( $\sim C$ ) is a dominant strategy for the  $(j-1)$  player



# Treatment: communication



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# The Minimum effort Game

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# Social Capital, norms and Coordination

- One aspect of social capital is related to *social norms* shared by people in a community.
  - A social norm can help people coordinate on an *efficient* outcome when multiple equilibria exist.
  - We introduced a second game to measure this component of social capital.
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# Minimum-Effort (ME) Game

- To examine the role of social norms as a decision rule
- Each of N players chooses simultaneously 1 (low), 2 (medium), or 3 (high).

		Minimum effort in a group		
		3	2	1
Individual decision	3	\$6000	\$3000	\$0
	2	---	\$5000	\$2500
	1	---	---	\$4000

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# ME game

- One-shot game
  - There are 3 pure-strategy, Pareto-ranked Nash equilibria.
    - All choosing 3 is efficient but potentially risky when facing strategic uncertainty;
    - All choosing 1 is inefficient but safe.
  - The game highlights the tension between Pareto-dominance and risk-dominance.
  - What would make the subjects choose 3?
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# Network connectivity

- Each subject was asked about his/her relationship with other people in the same session:
  - 0: don't know this person;
  - 1: acquainted with this person;
  - 2: acquainted with this person and think he/she is trustworthy;
  - 3: friends or family.
- Using this connectivity, subjects were divided into three different groups to play the ME game.



# Algorithm

- Group A is the most connected group and C is the least connected.
- $R = (r_{ij})_{i,j=1,\dots,N}$  is an  $N \times N$  matrix of self-reported connectivity among players.
- $x_k = (x_{ki})_{i=1,\dots,N}$  is an  $N \times 1$  vector with binary elements:
  - $x_{ki} = 0$  (player  $i$  does not belong to group  $k$ ) or 1 (player  $i$  belongs to group  $k$ )
- The algorithm we used is to choose  $\{x_k\}_{k=A,B,C}$  to maximize

$$Z_A - Z_C$$

s.t.

$$Z_A = x_A' R x_A, \quad Z_C = x_C' R x_C$$

$$\sum_i x_{ki} = 8 \quad \text{for } k = A \text{ and } C$$

$$\sum_{k=A,B,C} x_{ki} = 1 \quad \text{for each } i = 1, \dots, N$$

- We obtain:
  - Group A: 8 people with the highest level of acquaintance.
  - Group C: 8 people with the lowest level of acquaintance.

# Experimental set up



**First Stage:** network questionnaire

**Second Stage:** Group formation – who is in which group

**Third Stage:** Each subject makes its choice knowing who are the other group members.



**Last Stage:** we announce privately in each group which was the ME.



# Other instruments

- We collect a survey after the game that allows to control for observable characteristics both at the individual and at the session level and to collect additional and traditional measures of social capital.
- We also collect information on pre-existing networks and the understanding of the game



# Social Capital measures

- From the games:
  - % contribution to the public good;
  - Does communication improve on the outcome in the first round;
  - Behaviour in the minimal effort game.
- From the survey
  - Trust (WVS)
  - Membership in organizations
  - Participation in political and social processes within the community.
- Who knows whom: Density of the Social network in the group:
  - Friends
  - Acquaintances
  - Relatives



# Results



# The Sample

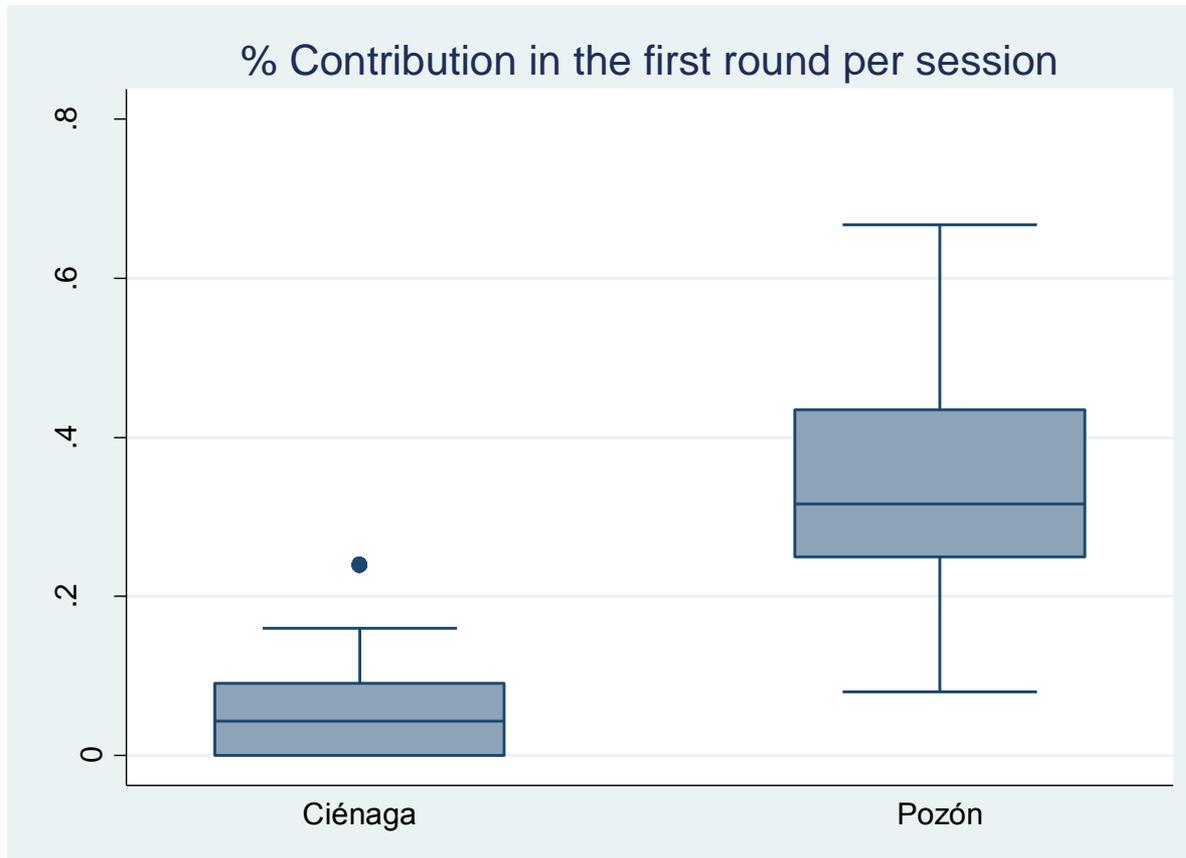
- Baseline: July 2007 (3 months before FA's expansion)
  - Treated Neighborhood: El Pozón
  - Control Neighborhood: Ciénaga de la Virgen
- Follow up: July 2008
  - Treated Neighborhood: El Pozón
  - Treated Neighborhood: Ciénaga de la Virgen
  - 2 strategies: panel (repeated games) and independent cross section

## ■ Sample

- 1,453 subjects in Total
- 98.8% women
- 71 sessions
- Average session size: 24.5 people

	<b>Number of Players (number of sessions)</b>		
	<b>Base Line</b>	<b>Follow-up</b>	
		<b><i>Independent Cross section</i></b>	<b><i>Panel</i></b>
El Pozón	342 (14)	299 (12)	173 (7)
Ciénaga	334 (14)	320 (13)	271 (11)
Total	676 (28)	619 (25)	444 (18)

# Results: Baseline



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	<b>El Pozón</b>	<b>Ciénaga</b>	<b>Total</b>
Average % of contributors per session (First Round)***	33.04	6.59	19.97

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# Baseline Differences

- Are the 2 neighbourhoods comparable?

Variable	El Pozón	Ciénaga	Total
<b>General Characteristics</b>			
%Woman***	100	97.90	98.96
Age (years)***	38.04	33.56	35.83
%Head ***	21.34	30.53	25.89
%Wife or partner***	76.90	62.87	69.97
%Single***	5.56	11.68	8.58
Number of Years living in the neighborhood***	14.49	22.37	18.38
%Displaced***	19.10	8.20	13.75
<b>Participation in <i>Familias en Acción</i></b>			
%Madre_lider***	16.70	-	-
Participation in <i>Encuentros de Cuidado</i>	97.06	-	-
<b>Level of Education (%)</b>			
None*	2.05	4.19	3.11
Primary Incomplete	18.12	18.56	18.34
Primary Complete	13.45	13.77	13.61
Secondary Incomplete**	37.43	30.24	33.88
Secondary Complete	23.98	25.45	24.70

\* Difference significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

# Baseline Differences

Variable	El Pozón	Ciénaga
<b>Dwelling characteristics</b>		
Number of people per room	3.22	2.88
Floor material (ground)***	24.3%	41.0%
Own housing***	82.7%	58.7%
Time spent to the nearest health center (minutes)	28.09	32.31
<b>Public services</b>		
Aqueduct***	94.7%	76.9%
Sewer System	64.3%	12.6%
Phone***	9.6%	26.6%
<b>Assets</b>		
Cell Phone***	86.3%	67.1%
Bicycle**	21.9%	14.4%
Tvcolor*	80.7%	74.6%
Washing machine***	23.7%	13.8%
Sound Player***	39.8%	25.1%
<b>Income variables</b>		
%Unemployed***	2.9%	10.8%
Access to credit	67.8%	66.8%
Access to formal credit	21.1%	22.2%
Food unsafety level (high)	9.6%	9.9%
Per capita Monthly Income** (COL\$)	49,364	43,550

\* difference significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

# Results: Baseline

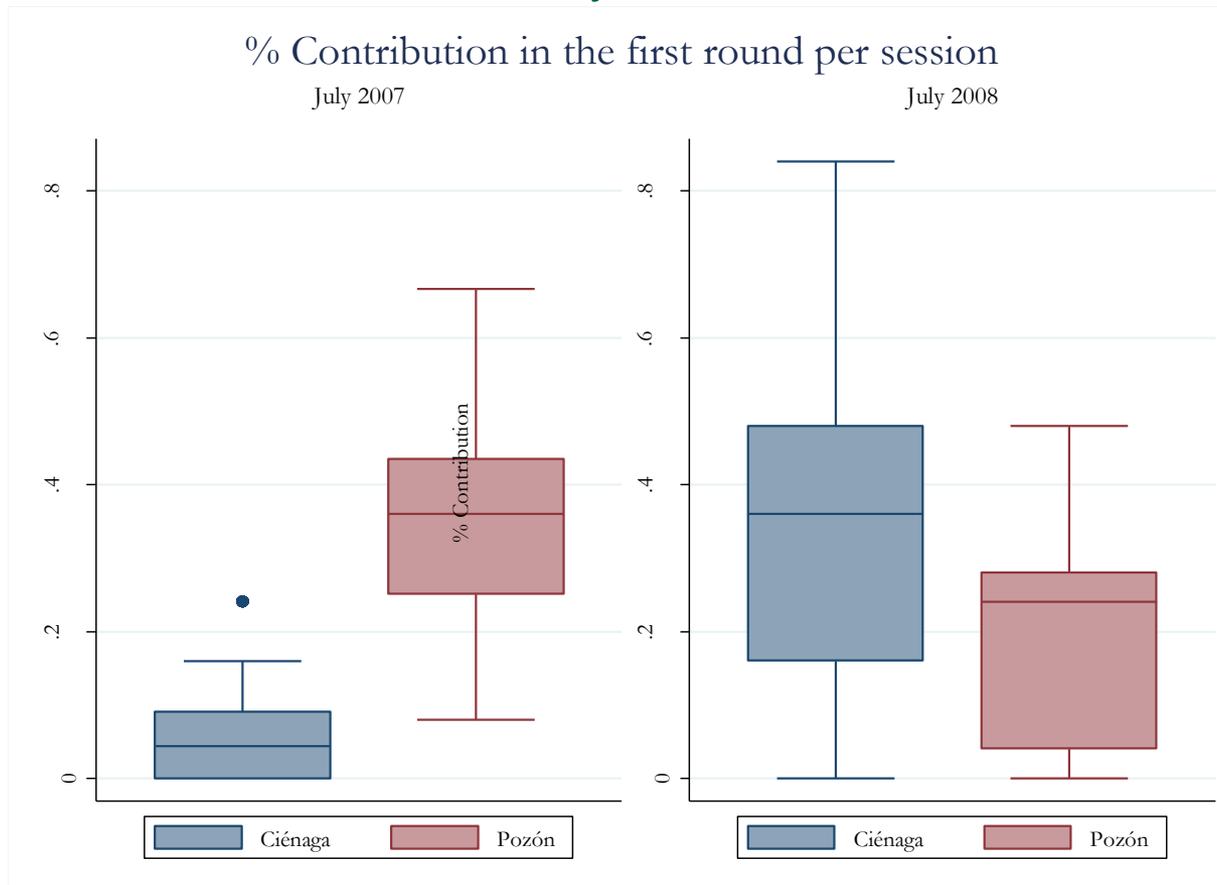
$$Y_{it} = \alpha + \beta X_{it} + \gamma D_{it} + \varepsilon_{it}$$

	Programme's Impact on First Round Cooperative Decision			
	(1)	(2)	(3)	(4)
Dummy Pozón*	0.285*** (0.072)	0.243*** (0.084)	0.202** (0.078)	0.152*** (0.051)
Basic Controls	YES	YES	YES	YES
Session Controls		YES	YES	YES
Session Correlation Controls			YES	YES
Group Heterogeneity Controls				YES
Observations	666	666	666	666

\* Marginal Probit. Cluster at the session level

# Results: Baseline and follow-up

## Independent cross sections only



		<b>El Pozón</b>	<b>Ciénaga</b>	<b>Total</b>
<b>2007</b>	Average % of contributors per session (First Round)***	33.04	6.59	19.97
<b>2008</b>	Average % of contributors per session (First Round)***	22.08	36.25	29.4

# Results: Baseline and follow-up

$$Y_{it} = \alpha + \beta X_{it} + \gamma D_{it} + \delta T_{it} + \lambda Diff_{it} + \varepsilon_{it}$$

## Programme's Impact on the Cooperative Decision (First Round)

	I	II	III	IV	V
Dummy <i>Ciénaga</i>	0.123* [0.067]	0.096 [0.064]	0.046 [0.067]	-0.008 [0.069]	-0.058 [0.078]
Dummy Time	-0.0975* [0.052]	-0.090* [0.052]	-0.095** [0.046]	0.018 [0.072]	0.108* [0.055]
Interacted ( <i>Ciénaga</i> , 2007)	-0.319*** [0.048]	-0.303*** [0.049]	-0.254*** [0.058]	-0.171** [0.084]	-0.134** [0.066]
Basic Controls		YES	YES	YES	YES
Session Correlation Controls			YES	YES	YES
Experimenter Controls				YES	YES
Group Composition Controls					YES
Observations	1295	1283	1283	1282	1282

Marginal Probit. Cluster at the Session level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

# Controls

## Selected Socioeconomic controls (first round).

	II	III	IV	V
Player's age	0.016** [0.008]	0.015* [0.008]	0.015* [0.008]	0.009 [0.008]
Household size	0.016*** [0.006]	0.016*** [0.006]	0.015** [0.006]	0.012* [0.006]
Ground Floor (house)	-0.045* [0.026]	-0.046* [0.026]	-0.039 [0.025]	-0.032 [0.024]
Water by Pipe	0.046 [0.037]	0.051 [0.036]	0.04 [0.036]	0.056* [0.032]
Sewage	-0.054* [0.029]	-0.055** [0.028]	-0.051* [0.028]	-0.032 [0.027]
No Electricity	0.158** [0.080]	0.154* [0.080]	0.131 [0.081]	0.105 [0.083]
Other programme support	-0.056* [0.031]	-0.05 [0.032]	-0.045 [0.032]	-0.041 [0.030]
Observations	1283	1283	1282	1282

Marginal Probit. Cluster at the Session level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

# Controls

## Experimenter, Session Correlation and Group Heterogeneity Controls (first round).

		III	IV	V
Session Correlation Controls	First Session in the Day	0.121** [0.056]	0.166*** [0.061]	0.216*** [0.042]
	Deviation from the Mean of Previous 2 Sessions	0.411** [0.205]	0.391* [0.217]	0.247 [0.153]
Experimenter Controls	Player did not understand the instructions		-0.039* [0.020]	-0.041** [0.020]
	Experimenter n°1 (2008)		-0.101* [0.060]	-0.103** [0.049]
	Experimenter n°2 (2007)		-0.015 [0.074]	0.048 [0.058]
	Experimenter n°3 (2007)		0.095 [0.071]	0.095** [0.048]
Group Conformation Controls	Session size			-0.047*** [0.009]
	At least one Man in the Group			0.129** [0.055]
	Average Education in the Group			0.01 [0.008]
	S.D. of Education in the Group			-0.018 [0.011]
	Average Age in the Group			-0.074 [0.055]
	S.D. of Age in the Group			-0.382*** [0.138]
	Average Years in the Neighbourhood in the Group			0.023*** [0.009]
	S.D. of Years in the Neighbourhood in the Group			-0.048*** [0.011]
Observations	1283	1282	1282	

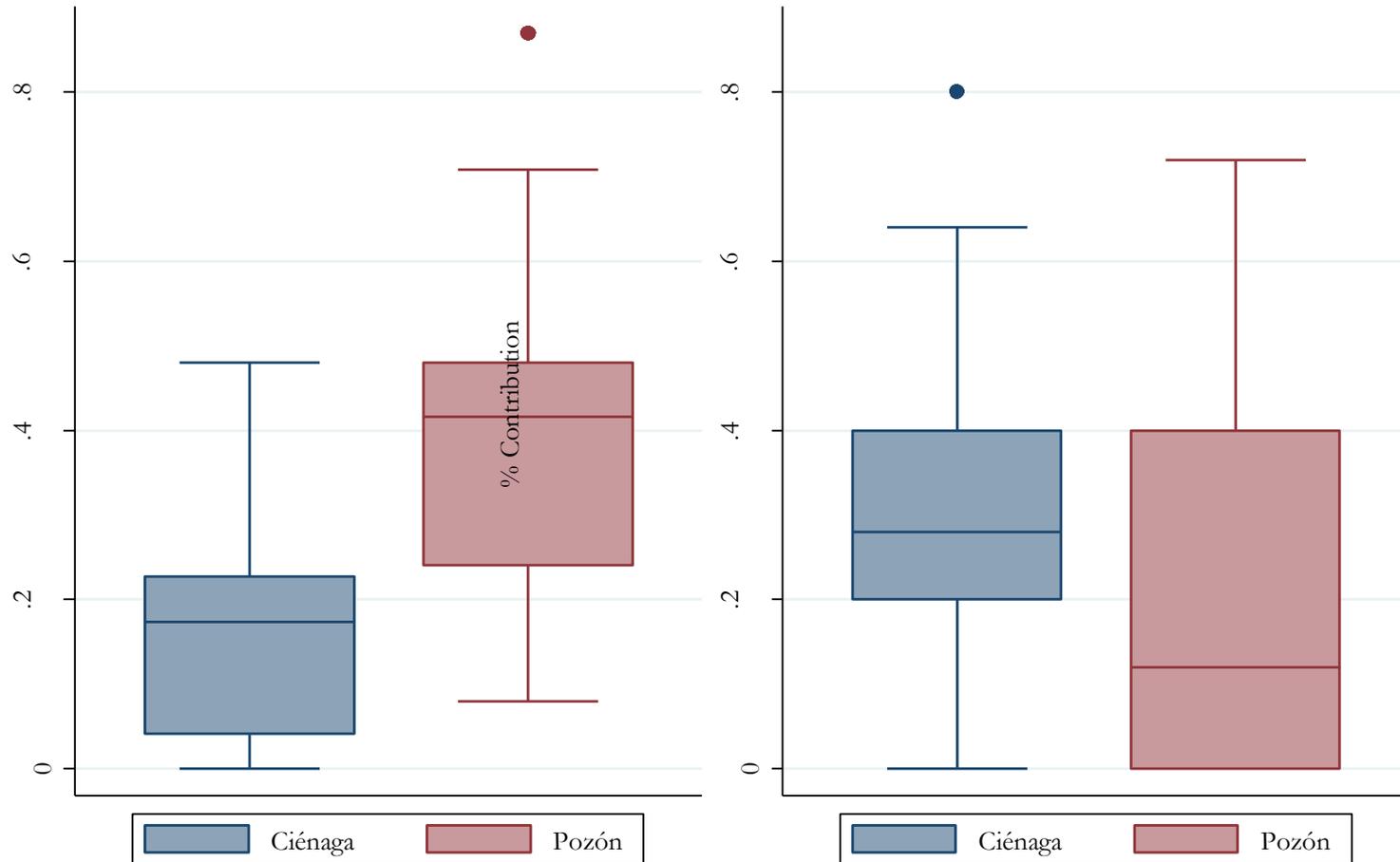
Marginal Probit. Cluster at the Session level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

# Further Results: Second Round

% Contribution in the Second round per session

July 2007

July 2008



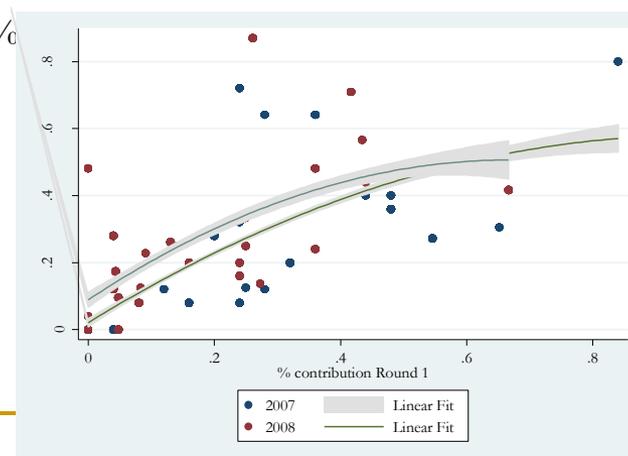
# Further Results: Second Round

## Programme's Impact on the Cooperative Decision (Second Round)

	I	II	III	IV	V
Dummy <i>Ciénaga</i>	0.08 [0.092]	0.028 [0.087]	-0.002 [0.088]	-0.147 [0.124]	-0.138 [0.115]
Dummy Time	-0.136 [0.086]	-0.122 [0.084]	-0.126 [0.082]	-0.195* [0.114]	-0.217* [0.113]
Interacted ( <i>Ciénaga</i> , 2007)	-0.261*** [0.077]	-0.241*** [0.079]	-0.202** [0.091]	-0.182 [0.116]	-0.123 [0.122]
Basic Controls		YES	YES	YES	YES
Session Correlation Controls			YES	YES	YES
Group Composition Controls				YES	YES
Cooperation in Round 1					YES
Observations	1295	1283	1283	1283	1283

Marginal Probit. Cluster at the Session level. \* significant at 10%

The decisions in Rounds 1 and 2 are positively correlated





# Preliminary hypothesis on the channels of impact



# The role of the *Madres Líderes*

## El papel de las *Madres Líderes* (First Round, treatment only)

	II	III	IV	V
<i>Madre Líder</i>	-0.102** [0.049]	-0.103** [0.049]	-0.103** [0.049]	-0.099** [0.049]
Proportion of <i>Madres Líderes</i> in the Group	0.713** [0.334]	0.554* [0.290]	0.951** [0.472]	0.801* [0.424]
At least a <i>Madre Líder</i> in the Group	0.226*** [0.055]	0.207*** [0.060]	0.234*** [0.043]	0.235*** [0.033]
Basic Controls	YES	YES	YES	YES
Session Correlation Controls		YES	YES	YES
Experimenter Controls			YES	YES
Group Composition Controls				YES
Observations	958	958	958	958

Marginal Probit. Cluster at the Session level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

- We find analogous results in the Second Round (even when controlling for 1<sup>st</sup> round decision)

# Cooperation, Communication and Connectivity

## Networks and Cooperation in the Second Round

	II	III	IV	V
Group Average Connectivity Index	0.639*** [0.237]	0.656*** [0.241]	0.843*** [0.242]	0.797*** [0.234]
Basic Controls	YES	YES	YES	YES
Session Correlation Controls		YES	YES	YES
Group Composition Controls			YES	YES
First Round Decision				YES
Observations	1283	1283	1283	1283

Marginal Probit. Cluster at the Session level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

- Evidence suggests that the FA may be increasing the connectivity measures.

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# Conclusions

- We have presented some evidence on the effect of *Familias en Acción* , a conditional cash transfer program, on 'social capital'.
  - We introduce a specific measure of social capital, as the outcome of a controlled game.
  - We find evidence that in the specific context urban context we considered, *FeA* seem to have had a strong effect on social capital
  - Key issues:
    - The importance of group composition and connectivity
    - The role of *Madres Líderes*
  - Some caveats are in order:
    - *Strong assumption on the functional form of cooperation along exposure.*
    - *External validity of the results outside Cartagena (the results are different in rural areas).*
-

# Two initial Questions/Hypotheses

Q1: Is there a difference of the behavior of subjects between Ciénaga and El Pozón?

- On average, people in El Pozón have been exposed to FeA for a longer period than those in Ciénaga.

## Time of Exposure of the FeA program July 2008

Months	El Pozón	Ciénaga	Total
Mean	33.11	10.02	22.36
Median	39.00	9.00	10.00
Sd	13.88	4.62	15.67

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# Two initial Questions/Hypotheses

Q2: Are there behavioral differences across groups?

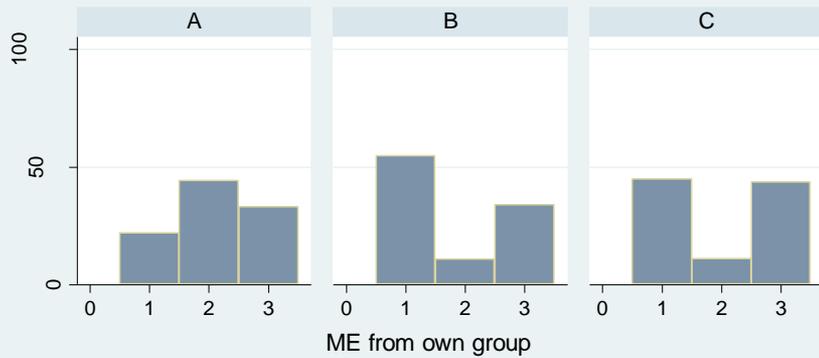
- The connectivity measure is only used for group formation and has nothing to do with the play of the game.
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# Algorithm's Validity

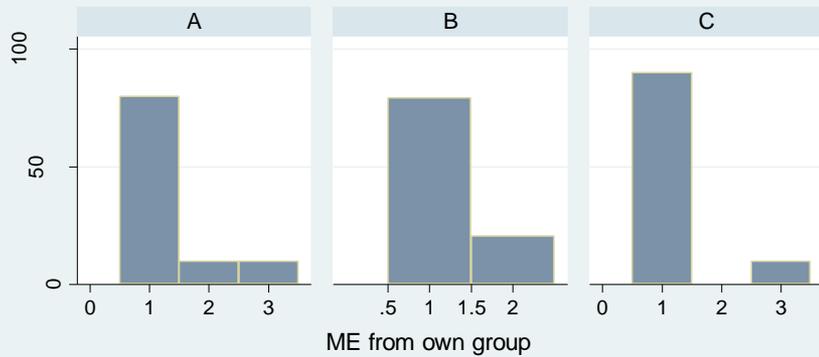
- Correlations between the group formation and connectivity variables (\*sig at .0001%)

		Participants	
		In Group A	In Group C
Individual level	Connected (all)	0.3854*	-0.3049*
	Number of friends	0.3986*	-0.3177*
	Number of relatives	0.1502*	-0.1006*
	Number of acquaintances	-0.1299*	0.0603
Session Level (controlling by size)	ratio_connected (all)	0.3810*	-0.2979*
	ratio_friends	0.4012*	-0.3172*
	ratio_relatives	0.1515*	-0.1016*
	ratio_acquaintances	-0.1303*	0.0604
Group (A,B,C) level	connected_ME (all)	0.4750*	-0.3758*
	friends_ME	0.5163*	-0.4115*
	relatives_ME	0.3016*	-0.2020*
	acquaintances_ME	-0.2641*	0.1226*

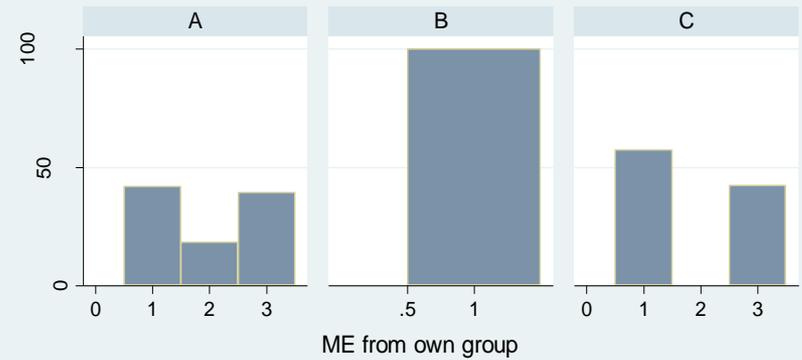
# Result 1 – group behavior



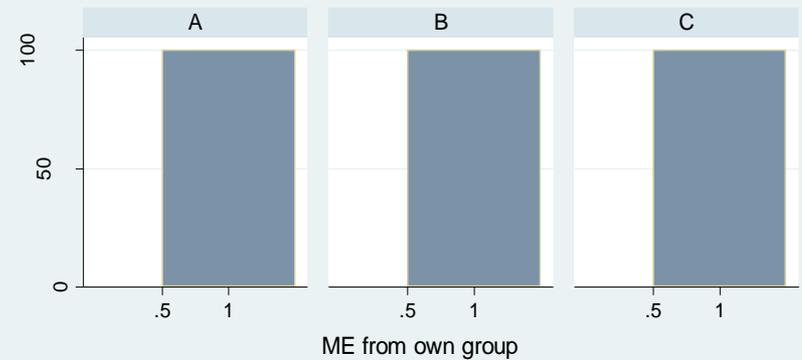
Graphs by Group (A, B, C)



Graphs by Group (A, B, C)

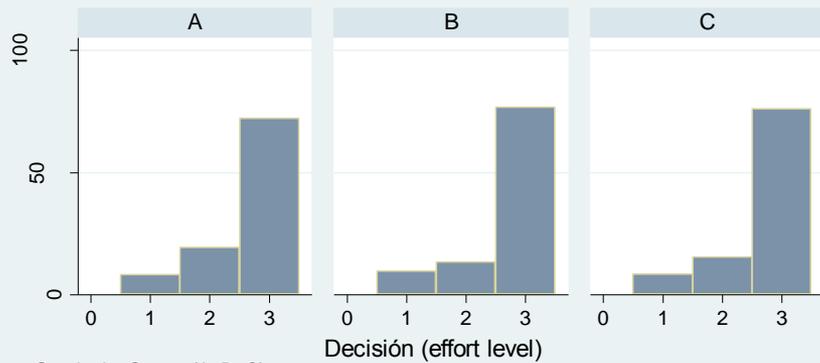


Graphs by Group (A, B, C)

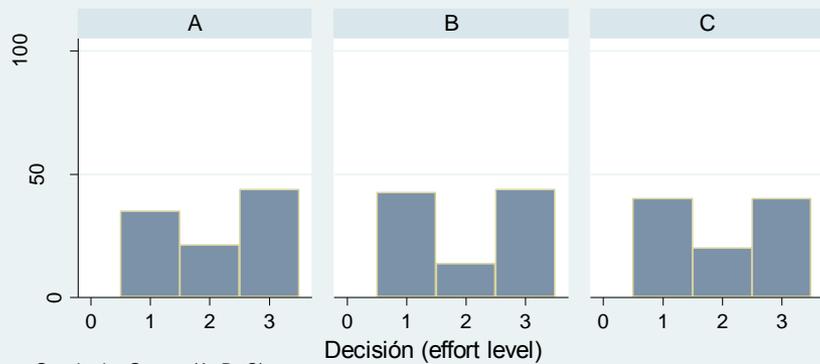


Graphs by Group (A, B, C)

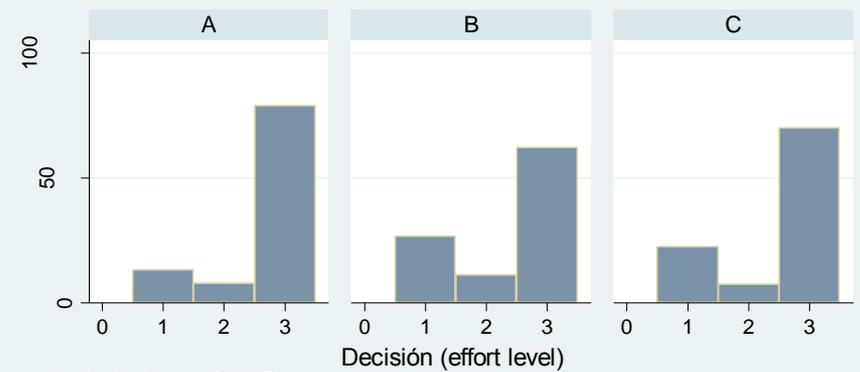
# Result 2 – individual behavior



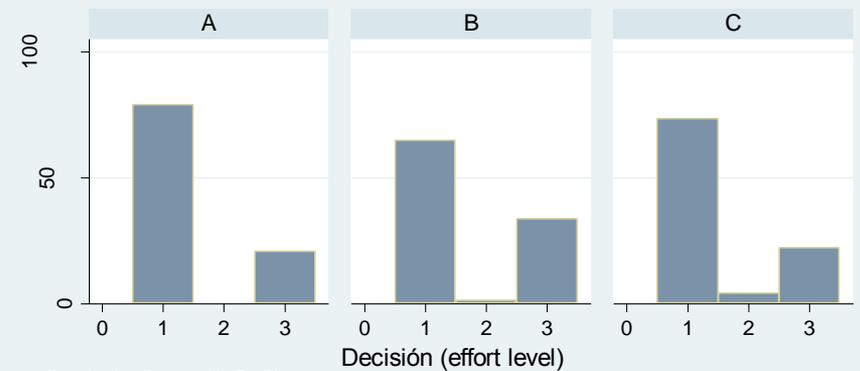
Graphs by Group (A, B, C)



Graphs by Group (A, B, C)



Graphs by Group (A, B, C)



Graphs by Group (A, B, C)

# Regression

VARIABLES	2	3	2	3	2	3	2	3	2	3	2	3	2	3
TTO	1.554***	2.173***	1.839***	2.426***	1.723***	2.237***	1.831***	2.301***	2.208***	2.739***	2.188***	2.741***	2.284***	2.865***
	[0.445]	[0.429]	[0.461]	[0.441]	[0.486]	[0.467]	[0.499]	[0.459]	[0.721]	[0.537]	[0.718]	[0.538]	[0.612]	[0.551]
Basic Controls	YES													
Session correlation controls			YES											
Experimenter controls					YES									
Group Composition Controls							YES		YES		YES		YES	
Observations							1031							

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¡Gracias!

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