


Introduction to Public Goods Experiments

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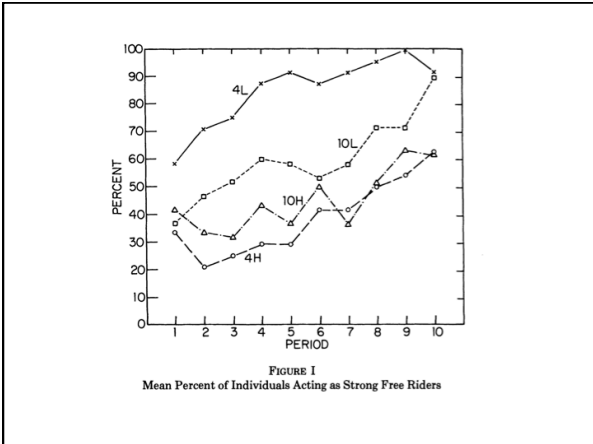
The Voluntary Contributions Mechanism (VCM) Experiment

- Subjects are in a group of size n and face several ‘investment’ decisions.
- In each period, the participant is endowed with Z_i tokens that can be allocated between:
 - Individual Exchange
 - Group Exchange
- The Individual Exchange is a private good
 - Earnings depend only on the subject’s own allocation

- The Group Exchange is a public good
 - Each individual receives a payment from the public good that is independent of one’s own contribution.
 - Each individual earns: $(1/n)G(m_i + \sum m_j)$
 - m_j is each individual’s contribution
 - Typically $G(\bullet)$ is a linear function and specified so that:
 - Contributing nothing is individually optimal
 - Contributing fully is socially optimal
- Tokens may be divided between exchanges in any way desired (but not carried over between periods)

- MPCR – marginal per-capita return
 - The per-person return to the public good relative to the private good.
 - The payment functions are typically specified so that $0 < \text{MPCR} < 1$
- For example:
 - $n = 4$
 - Earnings from the individual exchange = 1¢/token
 - Earnings from the group exchange = $1.2 \left(\sum m_i \right)$
 - Each person earns 0.3¢/token in the group exchange
 - MPCR = $.3/1 = 0.3$

- Isaac and Walker (*Quarterly Journal of Economics*, 1988)**
- Studied the effects of changes in group size and MPCR on free-riding and contributions to the public good.
 - Group Size = 4, 10
 - MPCR = 0.3 (L), 0.75 (H)
 - Strong Free Rider – one who contributes less than 1/3 of his endowment to the public good.



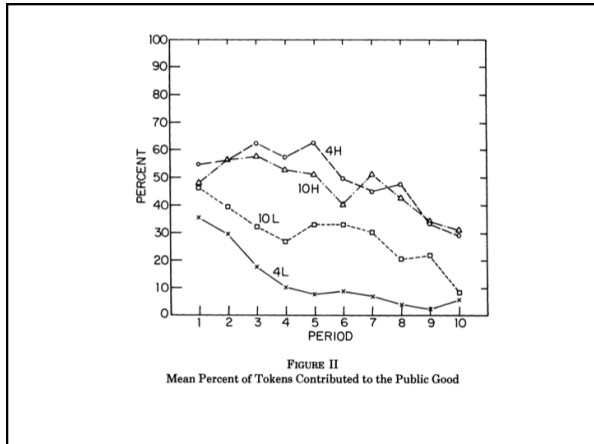


TABLE II
END-PERIOD RESULTS

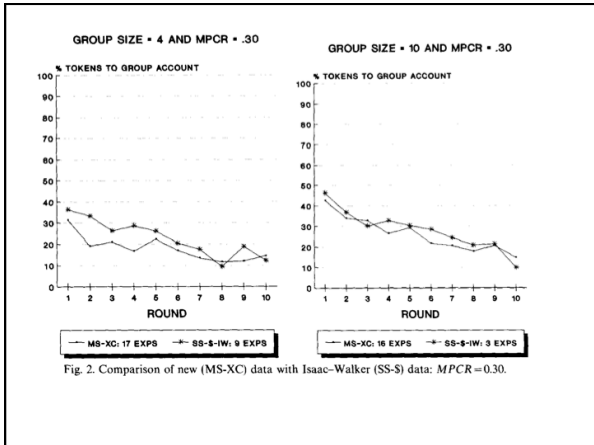
Experiment type	Replication	Percent of tokens contributed to the public good	Number of strong free-riders	Number of persons contributing zero
4L	1	0.0%	4	4
	2	0.0%	4	4
	3	0.0%	4	4
4H	1	25.0%	2	2
	2	52.0%	2	1
	3	10.0%	4	2
10L	1	0.4%	10	9
	2	11.6%	8	8
	3	10.0%	9	6
10H	1	25.0%	7	6
	2	21.0%	7	7
	3	25.0%	7	6

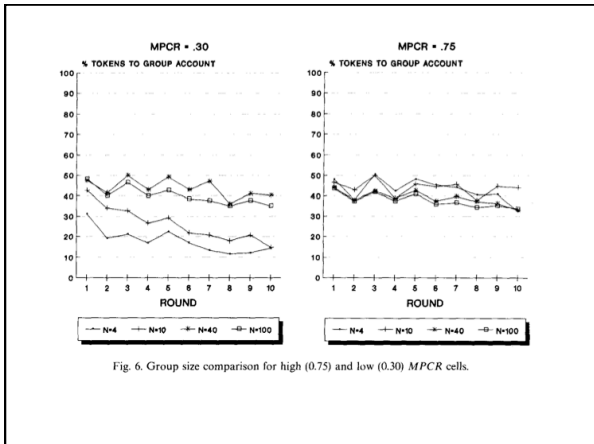
Isaac, Walker and Williams (J. Pub. Econ, 1994)

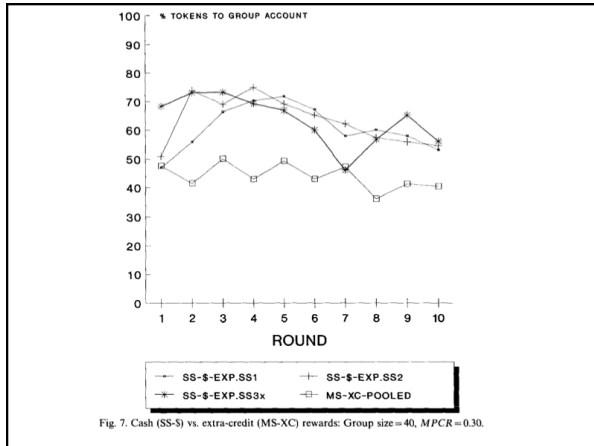
- Extends the earlier study by looking at even larger groups (N=40, N=100)
 - Extra-credit rewards are used instead of monetary incentives
 - Extra credit assigned via a 'performance index' = (actual earnings – min possible earnings)/(max possible earnings – min possible earnings)
 - Decision-making rounds last several days
 - Subjects had to make a round 1 decision to participate
 - If they did not log in for subsequent rounds the default decision was allocating all tokens to the individual account

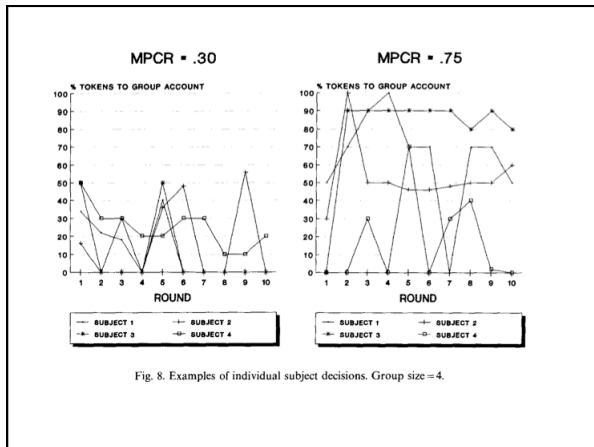
Table 1
Listing of experiments by initializations.

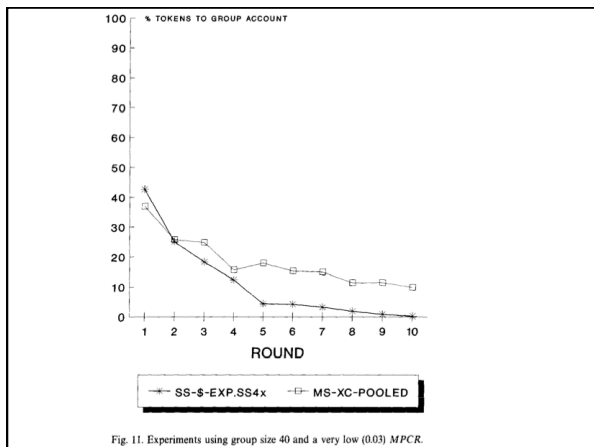
Procedure used for sequencing – motivation	Group size	MPCR	Number of experiments
MS-XC	4	0.75	10
MS-XC	4	0.30	17
MS-XC	10	0.75	10
MS-XC	10	0.30	16
MS-XC	40	0.75	6
MS-XC	40	0.30	6
MS-XC	40	0.03	6
MS-XC	100	0.75	3
MS-XC	100	0.30	3
SS-S	40	0.30	3
SS-S	40	0.03	1
SS-S	10	0.30	6

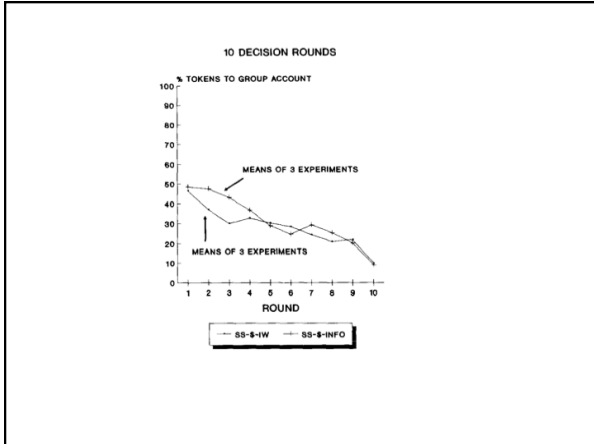


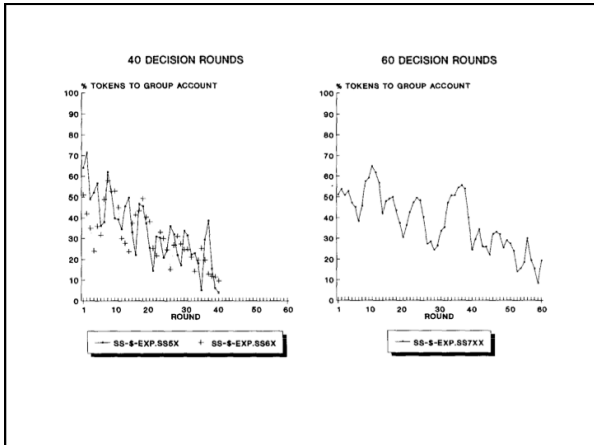












- Consider the following two treatments.
 - Treatment A - A token invested in:
 - Private account earns 10-cents
 - Group account earns 3-cents to every person in the group (including you)
 - Treatment B - A token invested in:
 - Private account earns 10-cents
 - Group account earns 8-cents to every person in the group (including you)
- Comparing A and B confounds two effects:
 - The benefit to others from a contribution increased.
 - The net cost to you of contributing decreased

Goeree, Holt, and Laury (J. Pub. Econ, 2002)

- Separates:
 - Internal Return: how much the individual contributing earns from a token in the group exchange
 - External Return: how much others in the group earn from a token in the group exchange
- Also looks at the effect of group size on contributions
- Terminology also somewhat different than IW, IWW

- Each subject made 10 different allocation decisions under a variety of conditions for:
 - Internal Return, External Return, Group Size
 - Earnings from token kept = 5-cents always
- All 10 allocation problems were given to the subject at one time.
 - They could be answered in any order and revised until submitted.
 - After all submitted, one randomly selected to be used for payment
 - A test for understanding was completed during the instructions

Group Size = 2						
Internal Return		2	4	4	4	4
External Return		6	2	4	6	12
Mean (Median)		7.7 (7.0)	6.7 (5.0)	12.4 (14.0)	11.7 (14.0)	14.5 (16.5)
Group Size = 4						
Internal Return	2	2	4	4	4	
External Return	2	6	2	4	6	
Mean (Median)	4.9 (5.0)	10.5 (10)	10.7 (10)	10.6 (11.0)	14.3 (17.0)	
