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**Working Paper**

## Are the elder more effective implementing punishment? Experimental evidence from urban Ghana

GlobalFood Discussion Papers, No. 39

**Provided in Cooperation with:**

Research Training Group (RTG) 1666: "GlobalFood" - Transformation of Global Agri-Food Systems, University of Göttingen

*Suggested Citation:* Asiedu, Edward; Ibanez, Marcela (2014) : Are the elder more effective implementing punishment? Experimental evidence from urban Ghana, GlobalFood Discussion Papers, No. 39, Georg-August-Universität Göttingen, Research Training Group (RTG) 1666 - GlobalFood, Göttingen

This Version is available at:

<https://hdl.handle.net/10419/98847>

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## **RTG 1666 GlobalFood**

Transformation of Global Agri-Food Systems:  
Trends, Driving Forces, and Implications for Developing Countries

**Georg-August-University of Göttingen**

## **GlobalFood Discussion Papers**

No. 39

Are the elder more effective implementing punishment?  
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Marcela Ibanez

July 2014

# Are the elder more effective implementing punishment?

## Experimental evidence from urban Ghana

Edward Asiedu\* and Marcela Ibanez\*\*

### Abstract

To study the persistence of cultural norms that mandate respect towards the elder, we conducted an artefactual field experiment in two cities in Ghana. Using a public good game with third-party punishment, we find that punisher's age is an important determinant of cooperation. Our results indicate the elder are more efficient using punishment than youngsters.

Keywords: Field experiment, status, age, punishment, public goods

*JEL classification:* H41; C92; C93

**Acknowledgements:** We thank the German Research Foundation (DFG) for financial support for this research.

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## 1. Introduction

In some regions in the world, including Asia and Africa, there is a deep respect for the elder (Sung, 2001, Van der Geest, 1997; Löckenhoff et al., 2009). The elder are regarded as repository of communal wisdom and hence are considered the teachers and directors of the young (Diamond, 2012). They are regarded as natural authorities and their opinions are requested in important decisions as well as in every day matters (Karlberg, 2003). However, as population migrate from rural to urban areas and as the younger get more educated the respect towards the elder seems to be decaying. The objective of this paper is to investigate if elders are more respected than juniors and hence are more effective when acting as authorities. We ask: if an authority is required to impose law and order who should it be?

Our experimental design is based on a public good game with third party punishment. We vary exogenously the age of the third-party punisher and compare elder versus junior punishers. We also vary the technology available to punish and compare non-monetary and monetary sanctions. To investigate how the urbanization process affects respect towards the elder we conducted an artefactual field experiment in two urban cities in Ghana. Ho, a relatively small city with about 100 thousand inhabitants, and Kumasi, the second biggest city in the country with a population of a little more than 2 million inhabitants.

There has been large empirical evidence supporting the effect of exogenous sanctioning mechanisms in inducing cooperation or overcoming social dilemmas (e.g. Andreoni and Gee, 2012; Baldassarri and Grossman, 2011; Fehr and Fischbacher, 2004, Kube and Traxler, 2011; Yamagishi, 1986). Nonetheless, one topic that has received little attention is how socioeconomic characteristics of the punisher affect the effectiveness of sanctions. We contribute to this research considering how the age of the punisher affects cooperation. Previous evidence supports that age matters for social preferences (Cardenas and Carpenter, 2009). It has also been shown that age affects individuals willingness to use punishment (Egas

and Riedl; 2008 and Gächter and Herrmann, 2009). Unlike previous work we focus on third party punishment. Moreover, we trace the origins of this difference and consider how the urbanization process changes traditional cultural values that subscribe respect towards the elder.

## **2. Experimental design and procedures**

Our experimental design is based on a repeated public good game with third-party punishment (see Fehr and Fischbacher, 2004). Upon arrival to the experiment, participants are assigned the roles of contributors or third party punishers. The oldest and youngest participants in a given session are assigned the role of third party punishers. The other participants are assigned the role of contributors. Yet, in order to avoid priming participants on age, we select punishers only based on visual inspection only so we do not ask age or make any reference towards age as selection criteria. To signal that the punishers are not exactly the same, punishers who look older sat in the first row, while punishers who look younger sat in the second row.

Participants assigned the role of contributors are assigned simultaneously to two random and anonymous groups. Each group consists of three contributors and one punisher. Subjects do not know the exact identities of the other members of their group. Yet, they know that contributions to Group 1 will be observed by one of the three punishers sitting in the first row (older punishers) while contributions to Group 2 will be observed by one of the three punishers sitting in the second row (younger punishers).

Contributor,  $i$ , receives an endowment of 250 pesewas (2.5 Ghana cedis) for each of the two groups he belongs to,  $j$ , and has to decide how to distribute the endowment between a public ( $c_{ij}$ ) and a private account in each of the two groups. Each pesewa invested in the

public account yields a payoff of  $b=2/3$  pesewas to each group member while each pesewa not contributed are deposited in the subject's private account where it yields a return of one to the contributor.

The third party punisher receives 500 pesewas. His task is to observe contribution levels for the three contributors in one group and decide whether or not to show disapproval sending sanctioning points,  $S$ . Under the non-monetary or social sanctioning treatment, the punisher can send a sad face to disapprove group members' contributions. Social sanctions are costless for both sender and recipient ( $v=p=0$ ). In the monetary punishment treatment, the punisher spends 8.33 pesewas to reduce the monetary payments of recipients by 25 pesewas (1:3). Punishers can send a maximum of only one punishment point. The punisher neither contributes to the public good, nor receives any payment from contributions in the public account. The payoff for contributors is:

$$\pi_i = \sum_{j=1}^2 \left( 250 - c_{ij} + \frac{2}{3} \sum_{i=1}^3 c_{ij} - vS_{ij} \right) \quad (1)$$

where  $S \in \{0,1\}$  indicates whether player  $i$  was sanctioned or not. The pay-off for punishers is:

$$\pi_i = 500 - \sum_{i=1}^{n=3} p_i S_i \quad (2)$$

Since monetary sanctioning is costly for the monitor, his optimal response is not to sanction. Since  $0 < b < 1 < nb$ , the optimal investment into the public good in each group is zero ( $\partial\pi_i/\partial c_{ij} = -1 + b < 0$ ). However, the social optimal is to contributing all endowments into the group account ( $\partial\pi_i/\partial c_{ij} = -1 + nb > 0$ ).

This game is repeated over 10 rounds. Subjects received feedback between rounds on the contributions of other group members, sanctioning decisions from the punisher and their

payoffs. One round is randomly selected to determine the actual payoffs. The experimental design is presented in Table 1.

Table 1. Experimental Design

Between Subject Treatment	Within Subject Treatment	
	Type of Monitor	
	Group 1	Group 2
Social Sanction	Old	Young
Monetary Sanction	Old	Young

We implemented the experiment in urban areas where there is high degree of anonymity across participants. We conducted the experiments in two cities that had different degrees of urbanization measured by population size: The small city of Ho with 100 thousand inhabitants and the medium sized city of Kumasi with over 2 million inhabitants. The recruitment process was done with collaboration from Assemblymen and women. The experimental sessions were conducted in the local school or the community center with participants from different neighborhoods. On an average a session lasted approximately three hours with an average earning of 700 pesewas (3 EUR) compared with a minimum daily wage of 448 pesewas.

### **3. Empirical results**

In total 120 subjects participated in 7 experimental sessions. As each participant took more than one decision, we can account for unobserved correlation across decisions using random effects models. Table 2 presents the estimated coefficients for sanctioning behavior and cooperation in each city separately. The first model is a linear probability model in which the dependent variable takes value equal to one for sanctioning and zero otherwise. The second model considers a random effects Tobit model to account for the left and right-censoring of the contribution levels.

As expected, we find that the likelihood to sanction decreases with contribution levels. Whereas in the small city of Ho, older and younger punishers are equally likely to use sanctioning (both social and monetary), in the larger city of Kumasi, the elder are less likely to use sanctions than the junior punisher. This behavior could indicate that in larger cities, the young are more severe judges as a strategy to compensate for their lower status.

In Kumasi the elder are less likely to impose sanctions than the junior punishers, hence one would expect that cooperation would also be lower in groups with elder punishers compared with junior ones. However, our results indicate that there are no significant differences in contributions between groups with elder and junior punishers under the non-monetary and monetary sanctioning treatments. This result indicates that the severity of sanctioning by the junior punishers in Kumasi does not translate into higher contribution levels. The respect to the elderly compensate for their lower use of punishment compared with junior punishers. More evidence in support of higher respect towards the elder is found in Ho. Even though the elder and the junior punishers sanction as much, cooperation is significantly higher towards elder punishers in the monetary sanctions treatment.



Table 2. Sanctioning and cooperation by treatment

	Random Effects GLS		Random Effects Tobit	
	Sanctions		Contributions	
	Ho	Kumasi	Ho	Kumasi
	(1)	(2)	(3)	(4)
Total Contribution	-0.0526** (0.0229)	-0.106*** (0.032)		
Senior Punisher	-0.107 (0.115)	-0.367** (0.145)	-0.0788 (0.061)	-0.0692 (0.047)
Monetary Sanction	0.0299 (0.108)	-0.111 (0.143)	-0.199 (0.159)	0.288** (0.129)
Senior X Monetary	-0.0436 (0.151)	0.176 (0.195)	0.159* (0.087)	0.0402 (0.067)
Period	-0.0255*** (0.009)	-0.0479*** (0.0116)	0.0300*** (0.009)	0.0330*** (0.008)
L.Others Contrib.			0.0772 (0.058)	0.193*** (0.055)
L.Sanction			-0.0628 (0.090)	-0.0885* (0.054)
Constant	0.642*** (0.155)	1.371*** (0.162)	1.822*** (0.159)	1.314*** (0.115)
Observations	216	204	648	648

Standard Errors in parenthesis. \*\*\* Significant at the 1 percent level,  
\*\* Significant at the 5 percent level, \* Significant at the 10 percent level.

#### 4. Concluding discussion

Our results indicate that cultural norms that dictate respect for the elder persist in urban areas in Ghana. Older third-party monitors tend to induce higher levels of cooperation. While the elder is less or equally likely to impose sanctions than junior third party punishers, cooperation is equal or higher in groups with an elder third party punisher. This result indicates that the age of the judge is an important determinant of cooperative behavior. To induce cooperation in the field, policy makers must understand the social norm that permeates the society in question.

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## **Instructions**

Hello and welcome to the workshop. Thank you all very much for making time to come to this workshop. We really do appreciate. In this workshop you will have the option to earn some money. How much money you earn will depend on your decision and the decision of others in the group. Money earned in the workshop will be paid to you in cash at the end of the workshop. During this workshop you will be asked to perform a task. We will explain to you the task at its due time. In total the workshop will last about 2 hours.

Before we start the different tasks, we please ask that you all come to the front of the room so we can reorganize the seats.

Please do not open the envelopes on the table.

In order to maintain comparability across different participants in the workshop we have prepared some instructions that we will read to you.

For the task, you will have different roles in the workshop. Some of you will be called ‘workers’ and others will be called ‘inspectors’.

### **What do workers need to do?**

For the next task, you will have different roles in the workshop. Some of you will be called ‘workers’ and others will be called ‘inspectors’.

Each worker will be assigned to two independent groups ‘Group Pink’ and ‘Group Blue’. Each group consists of three participants; you and two others participants. You will not know who is in each of the groups you belong.

Each worker will receive €2.5 for each group they belong. So in total you will receive €5. In each group there is a group account. Your task is to decide how much you want to invest in

the group account and how much to put in your pocket. Whatever money you put in your pocket will multiply by one. The money that you invest in the group account will be multiplied by two and will be equally shared by the three group members. Similarly, the money that other group members invest in the group account will be multiply by two and will be equally shared among the three group members.

You have to make this decision for your 'Pink Group' and as well as for your 'Blue Group'. You will receive two decision cards like these ones (show example). The pink card refers to group Pink, while the light blue card refers to the group Blue. The cards have boxes with the numbers, ranging from 10 pesewa to C 2.5. Your task is to 'circle' the amount of money that you want to invest into the group account. For instance if you want to invest all your C 2.5, then you need to circle C 2.5. If you want to invest only 10 pesewas, then you circle 10p. The money that is not invested in the group account will be automatically transferred to your private pocket. Let's demonstrate with the following example (use posters)::

*Example1:*

Assume that you invested 60pesewas into the Group Pink and kept C 1.90 in your pocket. Hence in the decision card for Group Pink, pink, you 'circle' 60p. For 'Group Blue', let's assume that you invested 80pesewas into the group account and kept C 1.70 in your pocket. Now in the decision card for group blue, light blue card, you 'circle' 80p. How much do you receive? Well, what you earn will depend on how much money you and the other two subjects in each group invested in the group account and how much money each person kept in their own pockets. If the others did exactly the same as you, and invested 60p each to Group Pink's account and 80p to Group Blue's account, the total investment in the Group Pink's account will be:  $60p \times 3 = C1.8$  and in Group Blue is  $80p \times 3 = C 2.4$ . Your earning from Group Pink would be  $C 1.90 + C 1.8 \times 2/3 = C 3.10$ . And how much would you earn from Group Blue?  $C 1.70 + C 2.4 \times 2/3 = C 3.30$ .

*Example2:*

Assume that for 'Group Pink' you invested Opesewa into the group account and kept all C2.50 in your pocket. Hence in the decision card for Group Pink, pink, you 'circle' 0p. If the other two participants in Group Pink invested on average C2.0 into the Group Pink Account, then the total amount of money in Group Pink account is  $0p + C2 * 2 = C4$ . And your earnings from Group Pink is  $C2.5 + 4 * 2/3 = C5.17$ .

For 'Group Blue', let's assume that you invested C2.5 into the group account in 'Group Blue' and kept nothing in your pocket. Now in the decision card for group blue, light blue card, you 'circle' C2.5. If the other participants in Group Blue invested on an average invested 0p each into the group account, the total amount of money in the group account would be  $C2.5 + 0p * 2 = C2.5$ . How much would your earnings be?  $0p + 2.5 * 2/3 = C1.67$

After making your decision as a worker on the Decision Cards, the assistant will pass by to collect the decision cards and send them to the inspectors.

### **What do inspectors need to do?**

The job of the inspectors is to observe workers group investment and to fill a report. For carrying out this task the inspectors will receive C5.0. After observing each worker's investment to the group account, the inspector has the opportunity to show dissatisfaction or disapproval of any worker's investment level to the group account. If the inspector is dissatisfied, the inspector can send one sadface to one worker. Each inspector will observe decisions for ONLY one group.



After the inspectors have made their decision workers will receive two REPORTS. One from the inspector for group pink and one from the inspector for group blue. The REPORT is at the back of the DECISION CARDS. The inspectors will also put the sadface if any, in the middle of the report card and fold it (Demonstrate) to be sent to the workers. The report card looks like this one (show with example on poster). In the report workers will see how much money in total is investment in the group account and how much money each person receives back from the group account.

Let's consider our last example. Two of the 'workers' invested 0p in the group account and the other invested all £ 2.5 into the group account. Hence the inspector needs to write:

Total investment in the group account: £2.5.

We double the total investment in the group account, so the group account now has £5. This value is divided equally among all the three participants in the group. In this case, everyone will get £1.67.

### REPORT (Example)

Total investment in group account	Double	Payback from group account
C2.5	C5	C1.67

The inspectors also have to complete an ‘Inspector History Form’. The inspectors have to complete the ‘Inspector History Form’ first which looks like this one (show example and explain on poster) before completing the report cards for each of the three participants.

Let’s demonstrate how the ‘Inspector History Form’ should be completed by the inspectors:

Let’s consider our last example. Let’s assume ‘worker1’ and ‘worker 2’ are those who invested 0p in the group account and ‘worker 3 invested all C 2.5 into the group account. Let’s assume the inspector sent a sadface picture to ‘worker 2’. Hence the inspector needs to write and tick as follows:

Round 1				
	Worker			
	1	2	3	Total Investment
Investment group account	0	0	C 2.5	C2.5
Sad Face		1		

Total investment in the group account: C2.5. When the inspectors' finishes completing the 'Inspector History Form' and the report cards, our assistants will come round and collect them.

This process will be repeated a total of 10 rounds. At the end of the 10 rounds, one round will be selected at random for payment in cash. The money you receive will be yours to take home and use as you please.

**<CONTROL QUESTIONS>**

Before starting the third task, we would like to verify that we had been clear in explaining the task.

*Please open envelope 1 and solve the questions.*

Imagine that you are a worker and want to invest C1.2 in the group account. 1. Please represent this case using the following decision card.

DECISION CARD  
CONTROL QUESTION  
PARTICIPANT \_\_\_\_

0p				
10p	20p	30p	40p	50p
60p	70p	80p	90p	C1.0
C1.10	C1.20	C1.30	C1.40	C1.50



€1.60	€1.70	€1.80	€1.90	€2.0
€2.10	€2.20	€2.30	€2.40	€2.50

Assume the other two group members together contributed 60p each into the group account.

1. How much money is left in your pocket after investing?
2. How much money (payback) will you receive from the group account?
3. How much money will you receive in total?
4. How much money will you receive if the inspector sends you a sadface?

*Please open envelope 2 and solve the second question.*

Imagine that you are an inspector for a group and observed that two people invested €1.50 each in the group account and the other invested 0p in the group account. Please represent this case using the following REPORT CARD.

**REPORT CARD**

Total investment in group account	Double	Payback from group account
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**<Random selection into roles>**

Now we will continue by separating some of you to be ‘workers’ and others to be ‘inspectors’. As I told you before, some of you will serve as inspectors. These people will

serve as inspectors. The others will be 'workers'. I would like to ask participants with the following numbers at the back of their big white envelope to come to the front (*mention the numbers of the 6 selected inspectors*). Please bring all your belongings along. We would like to ask the participants standing in front with the following numbers (*mention the numbers of the 3 older inspectors*) to sit on the front row and those with the following numbers (*mention the numbers of the 3 younger inspectors*) to sit on the chairs on the second row.

### **Actual Task**

Now we will start the third task. Please, participants who are sitting behind from third row 'workers' should open envelop 3 and take out decision card pink and light blue for round 1. The pink card will be observed by one of the participants sitting in the first row and the blue by one of the participants sitting in the second row. Please when finish making your decisions; turn the decisions sheets upside down on the table so our assistants can collect them. Please begin by making your first investment decisions into group pink and group blue.

### **Exit Questionnaire**

Please open envelop 4. Envelop 4 contains a questionnaire. We will please ask that you complete the questionnaire. Raise your hand if you need any help to complete the questionnaire.

DECISION CARD  
GROUP PINK

PARTICIPANT \_\_\_\_

ROUND \_\_\_\_\_

0p				
10p	20p	30p	40p	50p
60p	70p	80p	90p	€1.0
€1.10	€1.20	€1.30	€1.40	€1.50
€1.60	€1.70	€1.80	€1.90	€2.0
€2.10	€2.20	€2.30	€2.40	€2.50

DECISION CARD  
GROUP BLUE

PARTICIPANT \_\_\_\_

ROUND \_\_\_\_\_

0p				
10p	20p	30p	40p	50p
60p	70p	80p	90p	€1.0
€1.10	€1.20	€1.30	€1.40	€1.50
€1.60	€1.70	€1.80	€1.90	€2.0
€2.10	€2.20	€2.30	€2.40	€2.50

## COSTLY SANCTIONS

