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爱知大学  
博士学位论文

惩罚机制、社会身份与集体合作  
——基于公共品实验的研究

Punishment, Social Identity and Cooperation:  
Evidences from Public Goods Experiments

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## 摘要

社会合作秩序何以可能是社会科学领域最重要的未解决难题之一。“合作演进的原因”被《科学》(*Science*)杂志评为“驱动基础科学研究以及决定未来科学研究方向”的 25 个重大科学难题之一，引发了大量的理论研究、自然科学实验以及经济学实验。其中的核心难题是如何破解集体合作困境，当个人利益与集体利益相冲突时，搭便车者能在无需承担成本的情况下享受集体利益，使得集体难以长久维持高水平的合作。

为了对集体合作行为进行深层探索并设计出维持合作的有效机制，研究者开始使用经济学中最新的实验方法进行研究。在实验室内对合作困境进行抽象提炼，用公共品实验再现个人理性与集体理性、私人利益与公共利益相矛盾的集体合作困境，用被试者对公共品的自愿供给水平度量其合作意愿，设计并检验促进合作的相关机制。其中最受关注的便是惩罚机制，早期研究者证明惩罚机制可以有效提高合作水平。但是随着研究的深入，学者逐渐开始质疑惩罚的效力，认为反社会惩罚和逆反惩罚、报复、惩罚成本与社会福利损失等都在一定程度上削弱了惩罚机制对合作的促进作用。尤其当允许报复行为存在时，惩罚机制是促进还是损害集体合作行为，尚存争议。

本文尝试改进惩罚机制以提高集体合作水平，通过改变信息结构来解决惩罚机制的负面效应，并在此框架下分析不同社会身份对集体合作与惩罚行为的影响。本文使用实验经济学的方法，招募中国大学生为被试者进行一系列公共品实验，在公共品实验中引入不同的惩罚机制与信息结构，根据实验结果定量分析新机制对合作水平的影响，并结合被试者的不同社会身份来分析中国各类社会群体的行为偏好。

本文的实验结果显示，尽管在三阶段惩罚实验局中允许报复性惩罚，惩罚机制仍能显著提高公共品自愿供给水平，有效维持集体合作。人们愿意承担惩罚的成本以惩戒搭便车者，虽然也存在给予高贡献者的逆反惩罚和反社会惩罚，但仅为少数。大部分惩罚都是给予低贡献者的，大多数报复行为针对的是反社会行为

惩罚，这都有利于解决搭便车问题，提高集体合作。在完全信息结构的三阶段实验局中，二阶惩罚的引入并没有显著降低贡献或收益，即没有损害合作。

关于社会身份和个体异质性对合行为的影响，考虑到中国的社会背景特征，本文从性别、专业（经济学/非经济学）、居民身份（农村/城镇）和独生子女身份这四个角度展开。实验发现男性被试者的平均贡献水平与惩罚的强度和频率都高于女性被试者的；经济学专业被试者的贡献水平和实施惩罚的频率低于非经济学专业被试者的，但给予的惩罚中亲社会惩罚和正当惩罚占比更高；农村被试者的平均贡献水平高于城镇被试者的，实施惩罚的强度和频率却低于城镇被试者；非独生子女被试者的平均贡献水平和实施惩罚的强度显著高于独生子女被试者的。在受到惩罚后，男性被试者的报复强度和频率都高于女性被试者，非经济学专业被试者的报复强度和频率高于经济学专业被试者，农村被试者的报复强度高高于城镇被试者的。

本文的实验结果再次证明公共品自愿供给是可行的，但需要恰当机制的引导。本文不仅在理论上有助于丰富和完善相关的经济理论，还有助于提高对中国各类社会群体行为模式的认识，有利于相应的政策设计。本文建议在惩罚监督机制的基础上，辅以信息披露机制以降低报复和反社会惩罚行为带来的负面影响，在拟定政策时也应充分考虑到不同受众群体的行为偏好，有针对性地进行分类治理和激励。

**关键词：** 公共品实验 集体合作 惩罚机制 社会身份

## Abstract

One of the most important and unsolved problems in social sciences is that how to maintain social cooperation. "How does human cooperation develop?" is listed as top 25 of the most challenging scientific issues by *Science*. It has caused a large body of theoretical research, scientific experiments and economical experiments. The core problem is how to solve the collective cooperation dilemma. The free riders can enjoy collective interests without paying the cost when individual interests and collective interests conflict, making it hard to maintain a high level of cooperation in a long-term.

In order to deeply explore the collective cooperation and develop an effective mechanism to maintain cooperation, researchers began to use the new research method in economics: experiments. Researchers refined and reproduced the cooperation dilemma in the laboratory with public goods experiment, which showed the conflict between individual rationality and collective rationality, the conflict between private interests and public interests. The cooperation level is measured by the voluntary supply of the subjects. Researchers design and check the mechanisms to promote cooperation in public goods experiments. One of the most popular mechanism is punishment. The early researches demonstrated that punishment can effectively improve the level of cooperation. But with the deepening of the research, scholars have gradually begun to question the effectiveness of the punishment. They put forward that antisocial punishment and perverse punishment, revenge, punishment cost and welfare loss can weaken the effectiveness of punishment to some extent. Especially in the case that revenge is allowed, whether punishment can improve cooperation is still controversial.

This paper tries to improve punishment mechanism to promote cooperation, by changing the information structure to eliminate the negative effects of punishment. Then I analyze the impact of different social identities on cooperation and punishment in the public goods experiments. I conduct this research in experimental economics, recruit Chinese university students as the subjects. I use different punishment mechanisms and information structures in the experiments. According to the results of

experiments, I analyze the impact of new mechanisms and different social identities on cooperation and punishment.

The experimental results show that, despite retaliation is allowed in the three stages experiment, punishment can significantly improve the level of cooperation. People are willing to pay the punishment cost to punish free riders. Although some subjects punished high contributors, which is called perverse punishment or antisocial punishment, only a few subjects did this. Most punishments are given to low contributors, and the vast majority of retaliation is aimed at punishing antisocial behavior, which are beneficial to solving the free-rider problem and improving cooperation. In the three stages experiment with full information, the introduction of the second-order punishment did not significantly reduce the contributions or earnings, which is to say, it did no damage to cooperation.

Given the social background characteristics in China, when I analyze the influence of social identities and individual heterogeneity on cooperation, I choose four identities: the gender, the major (economics/ non-economics), the resident status (rural/urban) and the one-child identity. It was found that the average contribution, punishment intensity and frequency of male subjects were higher than those of female subjects. The contribution and punishment frequency of the subjects in economics major level are lower than those subjects in other majors, while the proportions of prosocial punishment and normal punishment are higher. The average contribution of rural subjects is higher than that of urban subjects, while the punishment intensity and frequency are lower than that of urban subjects. The one-child subjects' average contribution level and punishment intensity is significantly higher than others. After being punished, the revenge intensity and frequency of male subjects are higher than those of female subjects. The revenge intensity and frequency of subjects in economics major are lower than those of subjects in other majors. The revenge intensity of rural subjects is higher than that of urban subjects.

In this paper, the experimental results proved that voluntary contribution mechanism is feasible, and the proper mechanism to promote cooperation is needed. This paper not only helps to enrich the relevant economic theory, but also improve the

understanding of the behavior characters of different social identities, which is advantageous to the corresponding policy design in China.

This article suggested that, complementary information disclosure mechanism can reduce the negative influence of punishing supervision mechanism, such as revenge and antisocial punishment. And the behavioral preferences of different social identities should be taken into considered when drafting new policy.

**Keywords:** Public goods experiment; Cooperation; Punishment; Social identity.