Working Paper 234

Why Cooperate?

A Multi-Disciplinary Study of Collective Action

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February 2004

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Summary

The question of cooperation has fascinated and perplexed philosophers, economists, psychologists, sociologists and biologists from Aristotle to Darwin. It continues to do so today. At the heart of the debate is the relationship between the individual and the group or society to which he or she belongs: why cooperate when we believe our individual interests would be better served by acting unilaterally? This paper takes a broad, multi-disciplinary approach to answering the question 'why cooperate?'. It contains three sections.

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3.1   Why cooperate?
One key message filters through every discipline – we are simply not as uncooperative as theorists objectively expect us to be. Why? Because we may be closely related, because our selfish genes dictate that we must cooperate within groups to survive, and because we learn to reciprocate good behaviour.

3.2   Cooperation and imbalances of power
The 'powerful' cooperate with the 'weak' (and vice versa) to maximise efficiency and their chance of survival. When the powerful do not cooperate, it may still be to the advantage of others to do so as a 'second best' solution.

1. Introduction: What is Cooperation?

1.1   What is cooperation and is it a 'good thing'?

Cooperation is defined as a group of individuals acting together to a common end. This seems straightforward but must be clarified in two ways:

•   Firstly, this definition contains no value-judgements. This is something to be wary of – when we talk about cooperation, we almost always assume implicitly that it is a good. This is mostly, but not necessarily true. Collusion between firms is a form of cooperation and is bad for society. Thieves and murderers can cooperate to provide each other with alibis – also bad for society. On the other hand, in a market economy, we believe that competition, the antithesis of cooperation, is good for society. Cooperation is almost always good for those within groups, but not always good for those outside them.

•   Secondly, cooperation only tells us that a group of individuals is working together. It does not tell us if they are doing so voluntarily or by force. It is tempting to say that if the outcomes of cooperation are what matter, whether we are forced into it or not, is irrelevant. It is easy to picture this argument being made for forced membership of a trade union for example. Here, it is collective bargaining power or the product of cooperation that we care about. The next section exposes the fallacy of this assumption and lays out the importance of the voluntary/coerced distinction.

1.2 Voluntary vs. coerced cooperation

The costs of coercion

Information costs are the central cost of coercion and are two-fold:

•   A central authority is needed to coordinate and enforce coerced cooperation. That central authority will always be at an informational disadvantage – are people cooperating as they should and how do we know? Information costs are the literal costs of monitoring and policing coerced cooperation and they decrease its value.

•   Corruption costs might be the price of asymmetric information in the other direction. What is the central authority doing and how do we know? Where there is not complete transparency, which is highly likely, the central authority is susceptible to bribery from the 'losers' of cooperation. The obvious example is of an opaque 'Competition Commission' which overlooks collusion in the marketplace for a small fee. Cooperation is undermined and becomes ineffective.

The loss of positive benefits from voluntarism are also an important cost of coercion as these can amplify the benefits of cooperation.

The benefits of voluntarism

Clarification of what voluntarism actually entails here is important. There is a subtle distinction to be made between types of voluntary cooperation: one type is motivated by goodwill or even by the threat of sanction from society. The other type may be undertaken voluntarily, but induced by financial incentives. The former will be taken as our definition.

Ownership of collective action through voluntary participation makes cooperation more effective. Grootaert's study (Grootaert 2001) of cooperative water projects in Least Developed Countries (LDCs) demonstrates how returns to voluntary projects are greater than returns to similar projects implemented by governments. This has an informational and an emotional angle:

- Informationally, ownership is important because local people know what works in their community. Nuances of culture, norms and hierarchy may be overlooked by a central authority and may undermine the effectiveness of an imposed initiative.

- Emotionally, ownership is important because it enhances the commitment of participants.[1]

True voluntarism also demands trust (Gambetta 1988) – this amplifies payoffs to cooperation by reducing transaction costs. If we trust people, we do not have to spend so much time and money monitoring our fellow cooperators. Even worry is an important transaction cost which trust reduces. Axelrod (1984) presents a fascinating example of this from the First World War trenches. Here, the 'live and let live' strategy where soldiers on both sides stopped shooting to kill, was initially reciprocal. This was valuable in itself but was augmented by trust in the long-run. Cooperation demanded less vigilance and the freedom of the men increased. Mutual ceasefires became the norm and men on both sides became bold enough to walk around outside the trenches without fear.

The costs of incentivised voluntarism

Incentivised cooperation is officially classified as voluntary, but is far less valuable than the 'true' voluntarism described above.

Sociology

Titmuss' famous study on blood donation in the United States is the obvious example of this (Titmuss 1970). He considers the impact of moving from a voluntary to a commercialized system of blood donation, on both the quantity and quality of blood donated. The results are startling. Under the voluntary system, supply is found to be greater than in the commercial system. Why? Because those who donate under the voluntary system do so because they believe their actions to be valuable to society. The move to the commercial system devalues their donation and they stop giving blood. Titmuss suggests that the voluntary donations crowded out by commercialisation are not offset by the newly incentivised ones – overall levels fall.

Quality also declines in the commercial system. The financial incentives and change in donor motivation stop people from self-screening for disease. When donation is voluntary and people donate for the good of society, they reveal bad health out of their primary concern for the recipient. In the commercial system where incentives are reversed, donors tend to conceal bad health to ensure receipt of the money. More blood becomes contaminated with diseases such as Hepatitis B or HIV as a result. If this is to be avoided, funds need to be spent on monitoring blood quality. This decreases the money available to pay donors and results in a quantity/quality trade-off. Finally, Titmuss finds that under the commercial system, those who donate tend to do so too often out of financial desperation. This results in ill health and an increased strain on the health system.

In this case then, financial incentives to cooperate decrease efficiency, negate positive externalities to

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[1] We should note that in his study of Indonesia, Grootaert also illustrates how voluntary cooperation may not be a necessary condition of emotional ownership. He demonstrates that over time, with participation, communities come to see even government projects as their own and their effectiveness increases.

donation (self-screening) and introduce negative externalities to the system (excess strain on the health system).

Economics

Economic theory has much to say about incentive contracts and their sub-optimality or limitations. The central theme is 'asymmetric information and the principal-agent problem'. This describes a situation where the 'incentiviser' (principal) has imperfect information about the actions of the person being incentivised (agent). Agents are tempted to do as little work as possible because they know they can get away with it. This is the problem of moral hazard (Rasmusen 2001).

The most obvious example is of a factory manager who wants to employ a production worker. He/she needs to pay the worker according to some measure of performance or the worker will never do anything. The ideal measure is of worker effort. Output will always be inaccurate as 'noise' changes outcomes – machines break down, the worker might be a bit 'under the weather' or a newer employee might need some help. The problem is that the manager cannot know how much effort the employee is putting in as he/she cannot possibly monitor the workers all the time (or if they do it will be extremely expensive, which is a problem in itself). Output then has to be used as an inaccurate proxy for effort (unless effort is always translated perfectly and magically into output). This will always be sub-optimal.

The sister problem to moral hazard is that of adverse selection.[2] In the world of moral hazard, the principal offers the agent a contract on the basis of his/her actions. In the world of adverse selection, the principle offers a contract and then the agent decides how to act. This is easiest to describe in the world of loan-contracts (Hoff and Stiglitz 1990). Lenders have to decide on an interest rate to charge their clients. They want to charge something higher than inflation both to make a profit and to protect themselves against the odd debtor who defaults. The trouble is, the higher the interest rate they charge, the more likely they are to attract risky borrowers. Why? Because it is the risky borrowers who are more likely to default and thus, who are less likely to worry about paying back an inflated loan. Again, asymmetric information makes the situation sub-optimal.

An ideal world then would consist of costless monitoring, obvious labels that we can all wear to demonstrate how trustworthy or conscientious we are, or of honest cooperation. Anything else is sub-optimal.

Recently, Fehr and Gächter (2002) conducted an empirical study which demonstrates that introducing incentive contracts reduces overall levels of cooperation. As with Titmuss' example, the incentivised cooperation generated is not sufficient to replace the voluntary cooperation that it crowds out. As a result, incentive contracts are found to be less efficient than contracts without incentives in many instances.

1.3 Conclusion

Voluntary cooperation, where it exists, is more effective and more efficient than either coerced or financially incentivised cooperation. There are positive externalities to voluntary cooperation, and negative externalities to coerced cooperation and incentive contracts. The cooperation referred to in this paper will mainly be the voluntary kind. It is important to remember that within this voluntary definition, incentives of a sort always exist. These may be the threat of social sanctions or just enlightened self-interest itself.

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[2] First coined by Akerlof 1970.

2. The Approaches

2.1 Theories of Collective Action

A brief history

Theories of collective action have been puzzled over for centuries. Aristotle himself highlighted the famous 'Tragedy of the Commons' when he observed, 'What is common to the greatest number has the least care bestowed on it'.[3] Today, it is sociologists and economists who have adopted the subject as their own.

In sociology, it was the 'Group Theorists' led by Arthur Bentley, who dominated the field at the beginning of the 20th Century (Richardson 1993). Group Theory asserts that where individuals have a common purpose and will benefit from cooperation, a group will form to cooperate for the common good. In the 1960s, this was turned on its head by Mancur Olson's seminal work, 'The Logic of Collective Action' (Olson 1965). His model of the 'rational' individual calls into question our willingness to cooperate. Olson suggests that where we believe we can receive the benefits of cooperation without contributing to the cost, we will free-ride and leave the cooperation to others. Most recently, theorists such as Schlozman (1995) have occupied the middle ground. They suggest that we are often motivated to act collectively by our emotions or passion for a cause and that Olson's definition of rationality is too thin.

In economics, the study of collective action focuses on public goods, common resources and club goods. To some extent, these areas all overlap and can be definitionally hard to separate but the contribution to our understanding of cooperation has been immense. The literature begins with Paul Samuelson's formal identification of the public goods problem (Samuelson 1947). It continues today with a burgeoning literature on global public goods, prompted by an increasingly 'globalised' world with global problems.

Sociology

Why should we cooperate?
On this, theorists from Bentley to Schlozman agree – we should cooperate because it is socially optimal to do so. As members of society, it is in our individual 'enlightened' self-interest to do so. This is elegantly illustrated by the famous 'Prisoners' Dilemma' (PD) game:[4] (see opposite)

The story is a simple and well-known one: Two criminals have been arrested on suspicion of a crime and are thrown into prison in two separate cells. Both prisoners can choose either to cooperate (deny everything) or defect (confess to the crime and implicate the other man). The prison officers cannot arrest either of them without the confession of one or both men so attempt to cut a deal:

*   If only one prisoner confesses, the confessor will be set free for collaborating and given a full pardon. The one who kept quiet will be thrown into jail with the harshest possible sentence as punishment for both the crime and for withholding evidence.

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[3] Taken from Ostrom 1995.

[4] This is only a 'one-shot' PD – for treatment of the iterated PD and its implications, see section 2.3, Game Theory and the Rational Individual.

	Cooperate	**2.** Defect
Cooperate	2 2	3 0
1.		
Defect	0 3	1 1

The grid represents every combination of possible moves and payoffs available to the two players. Both players can choose to either cooperate or defect in any round of the game. Player 1. is the 'row player' whose payoffs are in the bottom left-hand corner of each box. Player 2. is the 'column player' whose payoffs are in the top right-hand corner of each box. The numbers are arbitrary except in relation to each other: 3 > 2 > 1.

- If both prisoners confess, they will both be sent to jail but with commuted sentences as a reward for their cooperation.
- Both prisoners know full well that without a confession from either of them, the police will be forced to let them go.

So, why should they cooperate? Objectively, we can see for this 'society' of two men that cooperation, in which they deny everything, is the optimal outcome. The overall payoff to society of '4' is greater than the payoff of '3' which would accrue from only one man's confession and is certainly greater than the overall '2' which would result from both men defecting and confessing all. For Bentley and the group theorists, the story ends here – it is clearly in everyone's best interest to cooperate, so they do. For Olson though, there are countervailing reasons for the individual not to cooperate. These create the 'problem' of collective action.

Why shouldn't we cooperate?
Olson was an economist and assumes a model of the rational individual who chooses action based on a 'logic of consequences'. The individual is analogous to a small firm in the market – the firm acts to maximise profit, and the individual to maximise utility. Applying this to the prisoners' dilemma, it is clear that if prisoner 2 believes his opposite number is going to cooperate, it is in his interest to defect (or confess) and send prisoner 1 to jail. The payoff of '3' to prisoner 2 is just too tempting.

The analogy with the competitive market is a simple one. Collusion or cooperation between firms to maintain high prices by restricting output, delivers the whole group higher profits. Cooperation is collectively rational. However, for the small firm who believes it can increase output without affecting overall price levels, defection is optimal – it captures a larger portion of the market and higher profits for itself. The other firms should not notice because the market price is unchanged. The small firm should not rationally cooperate – it should 'free-ride' on the cooperation of others.

However, as Olson points out, if society is comprised of many rational individuals, it will not just be one, but every individual who attempts to free-ride. In the market, this plays out so that all firms increase output until market price is lowered to the 'perfectly competitive' level and all firms make zero profit. In the prisoners' dilemma, it means that both players will defect, confessing to the crime in the belief that it is in their individual best interests. The outcome is sub-optimal from the point of view of both society and individual.

The fundamental problem of collective action then is the perceived tension between individual and collective best interests. We believe we can do better as individuals by deserting the socially optimal solution – actually, we cannot. What is best for society or the group is best for us as part of it. Olson used this argument to suggest that in a large group, collective action will never occur unless very specific conditions exist.

When do we cooperate?

Olson's conditions for cooperation
Olson believed that we cooperate when any one or more of three conditions are in place:

- *The group is small enough that free-riding would be noticed:* In the example of a small market, if any firm increases output in an effort to capture greater individual profits, the overall market price will drop, alerting other firms to its action.

- *We are coerced into doing so:* Examples include compulsory trade union membership or mandatory taxation.

- *'Selective incentives' induce us to cooperate:* These could be cheap health insurance as a perk of trade union membership (first offered in Ghent, 1904, with great success (Tilley 2003)) or exclusive business conferences in corporate interest groups.

Cooperation for Olson, then, is only a by-product of narrowly conceived, individually rational actions.

A model of 'thick' rationality
In recent years, Olson's 'thin' model of the rational individual has been heavily criticised both theoretically and empirically (Elster 1989). Critics say it fails to take account of the characteristics which they see as making us human – emotion, passion and a limited ability to weigh up the exact pros and cons of a situation. Various versions of a 'thick' model attempt to flesh out Olson's rational individual to create a more realistic paradigm of human decision-making.

Walker and King (1992) undertook a broad empirical study of US interest groups and found that selective incentives were only rated 'very important' as a reason for joining by 12% of those surveyed. They conclude that we cooperate when:

- We are mobilizing against a collective bad and not in support of a collective good. Examples include the proliferation of 'pro-choice' groups in the US and of course, the current anti-war movement in this country.
  (72% cited 'purposive benefits' as being 'very important')

- We will gain 'solidary benefits' or the friendship and company of like-minded people, in joining. The prime example of this is the AARP (American Association of Retired Persons) who have an incredible 35 million members.
  (63% cited 'solidary benefits' as being 'very important')

- We are representing a company or professional interest.
  (71% cited professional benefits as being 'very important')

Schlozman (1995) supports and refines these findings in a later study of interest groups and participation in the US. He finds that our reasons for joining differ according to the type of collective action:

- Overall, selective benefits are only important as a reason for joining a group in less than a third of cases. In work-based groups however, they are important 44% of the time.

- 'Social gratification' – respect, solidary benefits and fun are very important for roughly half of the participants involved in collective action in a social context such as political campaigning. It is important for less than a quarter of those involved in 'solo' activities.

- Civic gratification or the intrinsic benefits to participation – fulfilling one's duty and supporting the cause one believes in, are important in nearly all examples. In voting, 71% of people cite it as the only important factor.

From this, we can extract three further factors to add to Olson's list. We cooperate when we believe passionately about a subject, particularly when we are mobilizing against a collective bad. We also cooperate when we will benefit from the companionship of like-minded people or are representing ourselves, or a firm, professionally.

If I don't do it, no-one else will
Oliver (1984) makes an interesting find in her study of collective action in Detroit, USA, which puts her in direct opposition to Olson. She finds that where individuals are pessimistic about a neighbourhood and its prospects, they are more likely to be actively involved in community projects. These active members of the community are also more educated and have more close ties in the community than 'inactive' members on average. Where Olson asserts that we will avoid contributing to the costs of collective action where we possibly can, Oliver suggests that we go out of our way to contribute for the good of the community if it is in peril. We cooperate when we believe no-one else will. This resonates with the findings of Walker and King who suggest that we are more likely to mobilise against a collective bad than in support of a collective good.

Education matters
Studies of 'New Social Movements' have yielded important findings on the role of demographics in successful collective action. Offe (1987) finds that people with a degree are ten times more likely to be members of Greenpeace than those without one. He concludes that the well-educated middle classes are more susceptible to the universalist messages of such movements. However, he also notes that education is over represented in political participation and interest groups in general. It is not restricted to issue-based movements. This is backed up by LSE's 2003 study of civil society, which shows that it is largely the 'middle classes' who comprise the newest civil society organisations. We cooperate more in all areas, when we are more educated.

Conclusion
Mancur Olson's logic of collective action led him to the conclusion that we will not cooperate as rational individuals, except under very limited circumstances. Yet, all around us we see many examples of cooperation which simply do not fit his criteria of 'when' we should cooperate. The Royal National Lifeboat Institution is not small, does not coerce people into joining and does not provide selective benefits for its members. Last year its voluntary activists rescued an average of nineteen people a day (RNLI 2003). When then, do we cooperate? We cooperate when we passionately believe in a cause, when we believe that others will not cooperate and when we are mobilising against a collective bad. We are more likely to do so the more educated we are. Having said this, these factors must be seen as an enrichment of Olson's model and not a replacement of it. Olson's critique remains an important one as anyone who has ever tried to form a neighbourhood watch group or corral a local political party will tell you.

Economics and three collective action problems

The collective action problem is precisely the one outlined in sociology: we should cooperate in our enlightened self-interest, but do not because our rational self says we should free-ride. This section will not repeat these arguments but will outline what solutions economics has to offer.

Pure public goods theory

A public good is non-excludable and non-rival (Samuelson 1947). That is, once it is provided, no-one can be excluded from its benefits and one person's consumption does not decrease the amount of the good left to be consumed by everyone else. We should cooperate by revealing our preferences for the good to ensure that the efficient amount is provided. We should be honest about how much we value a public good in the best interests of society.

When do we cooperate?

In theory, as Olson showed, we should only cooperate when we are coerced into it or when the group is small enough that our free-riding is obvious. Economic experiments show us that this is not necessarily the case:

Andreoni (1995) undertook an experiment using the 'public goods game' to clarify whether people are more altruistic than they 'should' be because of confusion or kindness. The public goods game involves ten players over ten periods:

- In each period, each player is given $1 for their private account.
- Whatever they donate to the public pot, they receive half back for their private account.
- Whatever is donated to the public pot creates some public good of equal worth of which everyone partakes.

The socially optimal solution:

- Everyone donates their whole $1 each time. Everyone ends up with $5 private income and a public good worth $50 to enjoy.

The individually rational solution:

- No-one gives anything and aims to free-ride on the donations of others. If everyone does this, each person ends up with $10 private income and no public good to share. In financial terms, they are $45 worse off than if they had been 'nice'.

The modal (most common) result of the ten period experiment was that everyone gave away half of their private income. When Andreoni took away any incentives to cooperate (he made the game both anonymous and only 'one-shot') free-riding increased by one third. Donations were still well above zero. He concludes that some of our cooperation is due to confusion (roughly one third) but that most of it is due to embedded norms of 'kindness' (two thirds).

Marwell and Ames (1981) undertook a similar experiment to assess whether the framing of a game makes a difference to our actions. They only used the one-shot version of the PD (least favourable to cooperation) and found the following:

- When they told participants they were playing the 'Wall Street Game', they cooperated one third of the time.
- When they told participants they were playing the 'Community Game', they cooperated two thirds of the time.

Overall then, the study of public goods tells us that we need to modify our model of the rational individual. Our self interest is diluted by norms of fairness and a 'logic of appropriateness' (see section 2.4 on Role Theory) which responds to the framing of a situation.

Common Resources

From discussions on public goods, moving to a discussion on common resources is a small step. Often, definitions of the two are confused. Common resources are similar to public goods because we cannot exclude people from using them. They differ from public goods because after a point, every additional user degrades the quality a bit more for everyone else.

The famous example is the 'Tragedy of the Commons' (Hardin 1968), which imagines a communal village grazing plot. Its optimal usage might be for ten cows to graze. Optimality means that for any number of cows less than ten, the land could be being more productive. With nine cows, some of the land becomes overgrown and is wasted. With eleven cows however, all will eat and produce milk, but the cost of overgrazing (less nutritious, scrubby grass, more fights amongst cows, lower quality milk etc.) is greater than the benefits gained from putting the extra cow out to pasture. Individuals put out the eleventh cow despite the cost to society because it delivers them a benefit greater than zero. Again, cooperation is in our enlightened self-interest.

When do we cooperate?

Elinor Ostrom's (1990) work on common resources examines the conditions needed for cooperation to occur. She cites many examples of successful cooperation including communal land tenure in high mountain meadows and forests in Torbel, Switzerland and the Zanjera irrigation communities in the Philippines. She finds that certain conditions are necessary (Table 1).

These findings echo those of Balland and Platteau (1996) who add the following three conditions:

• Costs of excluding anyone from the resource must be high.
• The infrastructure exists to settle disputes easily.
• People care about their status and reputation matters.

Club Goods

Club goods are excludable and rivalrous (when they become congested) and have two key features (Cornes and Sandler 1996):

• There are mutual benefits to participants from sharing costs.
• There are mutual benefits to participants from sharing consumption of the good.

When do we cooperate?

The obvious example is of a sports club. We benefit from sharing the cost of providing a tennis court or a gym because shared consumption does not decrease our utility. That is, unless the gym becomes unpleasantly crowded or people hassle us to get off the tennis court. Sharing consumption may even increase our utility: playing tennis against a wall is less fun than playing with an opponent, and taking a 'spinning' class is more enjoyable and often more productive than cycling alone on an exercise bike.

This sounds like a pure private good (it is non-excludable and non-rival) but is not for most people (to the very rich it may be) as our consumption depends on the consumption of others. We cannot buy the use of a tennis court as independently as we can buy a loaf of bread. On the other hand, it is not a pure public good. We cannot free-ride because membership and provision decisions are interdependent – there is no incentive not to pay for gym membership (if we can afford the luxury) because if we do not contribute, we cannot benefit.

Cornes and Sandler add two further necessary conditions for provision:

• *Costs of exclusion must be smaller than the value of membership:* The cost of putting up automatic

Table 1
Characteristics of a Resource Conducive to Self-Organised Management

* **Feasible improvement:** Resource units are not at a point of deterioration such that it is useless to organise or so under utilised that there is little advantage from organising.
* **Indicators:** Reliable and valid indicators of the condition of the resource system are available at a relatively low cost.
* **Predictability:** The flow of resource units is relatively predictable.
* **Spatial extent**: The resource system is sufficiently small, given the transportation and communication technology in use and users can develop accurate knowledge of external boundaries and internal microenvironments.

Characteristics of Users Conducive to Self-Organised Management

* **Salience:** Users are dependent on the resource system for a major portion of their livelihood or value it highly for other purposes.
* **Common understanding:** Users have a shared image of how the resource system operates and how their actions affect each other and the resource system.
* **Discount rate:** Users use a low discount rate in relation to future benefits to be achieved from the resource.
* **Distribution of interests**: Users with higher economic and political assets are adversely affected by a lack of co-ordinated patterns of appropriation and use.
* **Trust:** Users trust one another to keep promises and relate to one another with reciprocity.
* **Autonomy:** Users are able to determine access and harvesting rules without external authorities countermanding them.
* **Prior organisational experience:** Users have learned at least minimal skills of organisation through participation in other local associations or learning about ways that neighbouring groups have organised.

Source: Ostrom 1999

gates at reception at the gym, and paying a receptionist to oversee them must be less than the profit margin to the gym management after equipment and its upkeep have been paid for.

* *Membership must be voluntary:* The benefits we derive from going to the gym must have a greater monetary equivalent than the financial cost of membership as no-one can force us to join.

We should cooperate then because it is in our individual interest to share both the costs and consumption of a club good. We do so when we can afford it and when the club good can be provided: when costs of exclusion are smaller than membership value and when membership is individually rational.

2.2 Non-Cooperative Game Theory and the Rational Individual

A brief recap

In the last section, the Prisoners' Dilemma game was central to our understanding of the problems of cooperation. It demonstrated that in the one-shot game, the rational individual knows that it is in society's best interest to cooperate, but is too tempted by the prize of unilateral defection and free-rides instead. Cooperation collapses as both rational players do so. This was game theory's first contribution to the cooperation debate and has been much-refined since. This section looks at how game theory has moved past the one-shot prisoner's dilemma to change our understanding of collective action.

Refinements of the Prisoners' Dilemma

The single-shot Prisoners' Dilemma is such a problem for collective action because all the players care about is the here and now. They are looking to maximise their payoffs and have no reason to think about the long-term consequences of their actions because there are none.

When do we cooperate?

The obvious answer is that we cooperate when the game becomes an iterated PD (Rasmusen 2001). If we repeat the game, the future matters. From the one shot PD, we know that cooperation is in our best long-term interests (and we cannot expect others to cooperate again once we have defected once and made them suffer) so in the iterated PD, we should cooperate. Or should we?

When don't we cooperate?

The finite PD is subject to the fatal objection of backwards induction. If we know how long the game will be and when it will finish, we know that the last period of the game is identical to the one-shot PD. There is no shadow of the future so we should free-ride and reap the benefits. However, if the rational player free-rides in the last period of the game, and this fact is common knowledge (I know that you will and you know that I will), we both know that there is no point cooperating in the penultimate game: if cooperating today makes no difference to what the other player will do tomorrow, why not defect today and make the most of it? The game unravels as we travel back in time towards the first period because this logic applies at every stage. If in the last period it is rational to free-ride, and we know when that last period will be, it is never rational to cooperate.

Does this mean that non-cooperative game theory is terminally pessimistic about the rational individual's propensity to cooperate? No – the backwards induction argument breaks down for the infinite game, or the game where there is sufficient uncertainty about when the end-game will happen. So, under what conditions will we cooperate?

Firstly and most obviously, a necessary condition is that the payoff to defecting cannot be infinite:

In this case, it clearly does not matter how long the game is. As humans, we are impatient because we know we will die before the end of an infinite game so infinity today is better than infinity stretching into the future. This argument can be applied to any large number replacing ∞ which is greater than the (discounted) gains from cooperation that we can expect over a lifetime.

Secondly, our discount rate cannot be too high. Our discount rate is an indicator of the level of our impatience – a high discount rate makes any payoffs to cooperation in the future increasingly worthless. This is illustrated by the case of a dehydrated man in the desert. His discount rate is virtually infinite because even a small amount of water today is more valuable to him than a lifetime's supply of bottled Evian in the future. With a low discount rate, cooperation is at least plausible. This is not to say it necessarily happens all the time. As the Folk Theorem[5] tells us, in an infinite game, any number of different strategies are possible.

So, what are the most successful strategies? Axelrod's work on the evolution of cooperation (Axelrod and Hamilton 1981, Axelrod 1984) tells us that a strategy of

	Cooperate	**2.**	Defect
Cooperate	3		∞
1.	3		0
Defect	0		1
	∞		1

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[5] It is called the Folk Theorem because it is unclear who came up with the concept. It was first discussed in the 1950s.

reciprocal cooperation might be the most successful. It also illustrates how trust and a reputation for cooperation make 'rational' cooperation a more likely outcome (see next section).

Beyond the Prisoners' Dilemma

Game theory extends well beyond the PD (Rasmusen 2001) and various empirical experiments have shown how and why the rational individual cooperates more than we might expect him/her to do so. The previous section highlighted how norms and the framing of a game affect our cooperation in the public goods game (page 12). Section 2.4 on Role and Norm theories illustrates how a sense of fairness makes us less ruthless in bargaining games.

2.3   The Evolution of Cooperation

A brief history

Darwin saw a flaw in his survival of the fittest hypothesis (Darwin 1859). It simply could not explain the many instances of seemingly altruistic behaviour that he saw in nature. His solution was 'group selection', analogous to his 'natural selection', in which individuals cooperate for the good of the species. Until the 1960s, this theory went relatively unchallenged. Since then, it has been debunked both theoretically and empirically. According to Dawkins' 'selfish gene' hypothesis, from the gene's eye view, if any individual can do better by 'defecting' rather than cooperating, they should and will do so, starting a new mutation of the species. Empirically, if this were the case, we would expect to see both genetic and phenotypic (observable characteristics like hair colour) homogeneity within species. We do not.

Three main theories have risen up since to take the place of Darwin's Group Selection in the evolution of cooperation:

•   Kin Selection (Biology)
•   Group Selection – take two (Sociobiology, Economics)
•   Reciprocity (Economics, Biology)

Kin Selection

Why should we cooperate?
We should cooperate and behave altruistically for the good of our offspring. This is not motivated by any psychological altruism but by our selfish genes. Our descendants carry close copies of our genetic make-up and it is in our genetic interest to help them survive (Hamilton 1963).

We should cooperate with our kin because from a gene's eye view it is the best route to immortality.

When do we cooperate?
According to kin selection, we only cooperate when interacting with those who have a high degree of relatedness to us. In humans, this certainly explains the many instances we see of parents sacrificing themselves to protect their children. In nature, it illuminates the paradigm which Darwin himself sought to explain – that of the honeybee worker who guards the nest but will die stinging any intruders. Honeybees are all very close genetic relations – the Queen bee is mother to all worker bees.

Group Selection – Take Two

Why should we cooperate?

Darwin's theory of group selection was undermined at the genetic level – there is no reason that we should cooperate for the good of the species if we can defect and found a more successful one which yields more 'fitness' to the individual. Sober and Wilson's (1998) group selection proposes something different. Why should we cooperate? Because the benefits to creating competitive advantage at the group level may outweigh the individual benefits to being 'selfish'. Group selection makes the group an actor in its own right and members of the group cooperate to maximise the fitness of the joint-actor of which they are a part.

This conception of human society has a long history in political thought. Rousseau (1767) and Hegel (1807) both saw society as a 'superorganism' in its own right. Rousseau's 'general will' is the enlightened will of a people that is far more than a sum of its parts – it is this which biologists have alternately sought to capture and undermine.

Kropotkin went to Siberia in the late nineteenth century in search of evidence to back up Darwin's survival of the fittest thesis. He came back convinced that an 'abundance of mutual aid' was inherent in nature. From the migration patterns of birds who delay departure to wait for the last of their flock, to the mutual support and protection that apes and monkeys display for each other, he saw ample evidence that cooperation is pre-societal. He used this to support Rousseau's model of society and went as far as to advocate anarchy. He believed that in the 'state of nature', we do see ourselves as part of a larger 'superorganism' and that it is the state that breeds this out of us. Anarchy then would restore this natural order.

Most biologists recently, have positioned themselves on the other side of the debate (e.g. Hamilton 1963). They argue that in nature, the 'superorganism' hypothesis is only plausible in certain circumstances: where species reproduce asexually (as with coral) or where they all descend from the same genetic line (as with the bee hive where it is only the queen bee's eggs which are fertilised), it is rational for individuals to act on behalf of the common good. Kin selection tells us that this should be true – what is individually rational and what is collectively rational, or what is selfish and what is altruistic, coincide where actors are so closely related. It should not be true of humans who reproduce sexually.

Sober and Wilson examine the existence of 'evolutionary altruism' in an attempt to prove that the group selection argument can be applied more broadly than this. Evolutionary biologists define altruism purely in terms of survival and reproduction. Behaviour is altruistic when it increases the fitness of others and decreases the fitness of the actor. It is important to note that this definition strips the concept of any consideration of motivation – as we will see, altruism in this sense is ultimately self-serving. Sober and Wilson illustrate this with a fascinating and complex example of an ant, a parasite, a cow and a snail:

• The trematode parasite lives its adult life in the liver of cows and sheep. The eggs of these adults exit the host through its faeces and are eaten by land snails.
• The young parasites live in the snails during the asexual phase of their life and then exit in a mucus which is eaten by ants.
• In the ant, all but one of the parasite population bore through the stomach wall to live as 'thick-walled' cysts. A solitary parasite makes its way to the brain of the ant and lives as a 'thin-walled' cyst or brain worm.
• The brain worm changes the behaviour of the ant – it manipulates its grazing habits, encouraging it to spend more time on the tips of grass blades where it is more likely to be eaten by a cow or sheep.

- Once the ant has been ingested by the cow, the lifecycle of the parasite begins again.

From the point of view of cooperation, this is curious: the parasite sacrifices its ability to infect the cow when it becomes a brain worm. It gives its life for the good of the group. Why would it do so? It does so when the 'power' of group selection outweighs the power of individual selection. Within the group, the selfish parasite will always do better than the altruistic one. It will benefit from the increased likelihood of being eaten by a cow but does not risk self-sacrifice. Across groups though, it is entirely possible that altruists do better. How is this possible?

Assume a multi group model. One of these groups contains forty selfish parasites and ten altruistic ones. In this mixed group, the probability of being eaten by a cow is higher than in a purely selfish group ($P_1 > P_2$). The probability of having to sacrifice oneself is $1/10=0.1$. The probability of a selfish parasite ending up in a purely selfish group, is Q. In the global population, the altruist is better off when:

$$0.9(P_1) > Q(P_2) + (1-Q)(P_1)$$

At first glance, the obvious way to put this is that the average fitness of the altruist is greater than that of the selfish parasite. Sober and Wilson stress that this is a trap that should be avoided. To say this obscures the mechanisms at work – the 'average fitness' of the altruist increases because group selection is more successful than individual selection in this instance. This is important. Just because genes are selfish, it does not mean that humans (or parasites) are.

Lichen further illustrates how this works in practice (Bateson 1988); it is comprised of two separate algal and fungal organisms. Within the lichen, both algae and fungi mutate to make the composite organism more successful – they make the lichen taste bad so that reindeer are less tempted to eat it.

When do we cooperate?
From the ant/cow example, we can see that the higher the number of altruists or cooperators there are in a group, the lower is the probability of being called to self-sacrifice. Numerically, as the number of altruists within a group increases, the left-hand side of the equation increases (as '0.9' tends to 1) so there is a higher chance that the process of group selection will outweigh the process of individual selection. Logically then, we cooperate with others when they demonstrate that they are cooperators, or altruistic. Sober and Wilson stress that large, anonymous societies are a modern phenomenon. In the past, small communities allowed easy-reputation-building and easy monitoring of peoples' behaviour. In the past (and in nature), we cooperated in groups that we recognised as containing people who are as cooperative as we are.

Boehm (2000) asserts that this can be demonstrated as long ago as the Upper Palaeolithic period. Groups lived in egalitarian, consensual, nomadic and moral groups. Deviants were sanctioned and the aged and disabled were cared for. This cannot be explained as reciprocity. The old and infirm could never reciprocate such care. It also cannot be explained as kin selection – these groups were comprised of different families. These groups recognised each other as altruists and cooperated with each other to maximise their collective chance of survival.

The human example extends our understanding of 'when' people cooperate. Our complex societies allow us not only to recognise fellow cooperators more easily, but also to enforce this cooperation once it exists. Social norms can alter the cost benefit analysis of cooperation. Sober and Wilson's study suggests that across cultures, we use social norms to forge groups of individuals into well-functioning units. Why? Because within close knit societies (discussed in depth in section 2.6) enforcement of norms is relatively costless to the enforcer (Coleman 1990) – it can be as simple as

gossip and ostracism of a deviant. To the group however, if these norms enhance or embed the competitive advantage of the group over others, it can be of great advantage to every individual as we saw in the original parasite example.

Sober and Wilson offer many examples of this. In culture after culture, individuals are expected to avoid conflict and practice benevolence and generosity toward all members of a socially defined group:

- Basehart (1974) observed of the Apache that the family group was part of a larger encampment – this precludes an explanation of kin selection. In these encampments, 'the norms requiring the sharing of food were so pronounced that the entire community could be considered a single production-distribution-consumption unit'.

- Shepardson's study of the Navaho (1963) is also fascinating. He witnessed norms of cooperation that governed economic subsistence, sexual satisfaction and even the raising of children. There was agreement on the value of hard work and the settlement of disputes through compromise and arbitration. Force would only be used against 'witches and aliens'. Punishment of deviance was through disrespect, ridicule and withdrawal of cooperation. This conforms with a model of sanctions which are relatively costless to the enforcer, but devastating to the sanctionee.

Finally, game theoretic experiments have illustrated these pro-social traits in today's society in people across cultures (Gintis 2000). An unexpected sense of fairness arises to 'corrupt' the expected 'rational' outcomes of bargaining and other games. Even in one-shot games which, as previously discussed, should preclude any incentives to cooperate, experiments consistently show the opposite.

Roth (1995) undertook extensive experiments using the 'ultimatum game'. This is a two player, two period game:

- In the first period, player 1 is given £10 and must offer player 2 between £0 and £10 of the money.
- In the second period, player 2 must either accept or reject the offer. If the offer is rejected, neither player gets to keep any money.

The rational solution:

- Rationally, player 1 should never offer player 2 anything. Why? Because in the second period, if player 2 rejects the offer, the best he/she can ever do is to end up with nothing. Given this, player 2 should be indifferent between accepting an offer of £0 and rejecting it. Player 1 should thus offer player 2 £0 and keep the £10 for his/herself. Player 2 should accept the offer.

Empirically:

- This does not happen. In practice, offers to player 2 of less than 30% of the money are rejected in the majority of instances. The modal (most common) outcome is for player 1 to offer half the money to player 2.

- Why? Because when player 2 rejects low offers, he/she is punishing player 1 for violating an inherent sense of fairness. Player 1 offers £5 in the majority of cases in acknowledgement of this norm.

Roth's experiments were carried out with Japanese, American, Yugoslavian and Israeli participants. The results were the same for all groups. The suggestion is a powerful one. It implies that a sense of

fairness has evolved in groups across cultures because it is advantageous to a group's evolution, regardless of the setting.

Why shouldn't we cooperate?
We can identify three reasons why cooperation on the basis of group selection might not be desirable for society as a whole.

Firstly, the development of a joint group identity, whilst yielding a competitive advantage to the group, may not benefit society as a whole. In section 2.6, the idea of 'bonding social capital' is explored (page 27/28). This is precisely the problem here – strong bonds within groups can lead to ethnocentrism and racism (Nesse 2000).

Secondly, in a context of environmental degradation or dwindling resources, group selection can encourage conflict. Groups look inwards, encourage exclusive 'group moralities' and aim to impress their competitive advantage on society by force. Mysterud (2000) stresses how important it is today that we acknowledge this. The context of climate change and the scarcity of common resources like fossil fuels are the perfect breeding ground for such conflict. Some people even argue that the war in Iraq was fought on this basis.

Finally, Laland and Feldman (et al 2000) emphasise that group selection can also increase conflict between groups when the spatial boundaries between them decrease. Again, this is not purely abstract theorising – one of the central features of a globalized world is the removal of boundaries, both virtual and literal. Cheap flights, easy internet access and global trade all contribute.

Reciprocity and tit-for-tat strategies

Why should we cooperate?
Axelrod and Hamilton's groundbreaking work in the evolution of cooperation (1981) combines game theory and biology. It tells us that we should cooperate if other people do, or play a 'tit-for-tat' (TFT) strategy because it is simply the most successful one we can play in the game of evolution. They go on to refine this by adding that we should reciprocate cooperation because:

- *It is an initially viable strategy:* This means that even if the majority of players in a group are being 'uncooperative', as long as there is a small cluster playing 'tit-for-tat', this strategy will be able to gain a foothold.

- *It is evolutionarily stable*, meaning that once 'tit-for-tat' is established, it can resist invasion by other strategies.

Hamilton and Axelrod set out to explore why, when the prisoners dilemma encourages people to be uncooperative, we see so many examples of cooperation in nature and society. They set up a tournament based on a 'probabilistic iterated prisoners dilemma'. This means that whilst the game was limited to 200 periods, there was a probability 'w' that any two players would meet again. They played the tournament twice.

In the first round, 14 game theorists submitted strategies. The simplest submission was the 'tit-for-tat' strategy. TFT dictates that you copy whatever move your opponent made in the last round. It is 'nice' in two ways: firstly, it will never defect from a cooperative partner and secondly, it is forgiving. Unlike the 'trigger' strategy which defects forever after an opponent defects just once, TFT only punishes a defector proportionately. TFT beat all the other more complicated and ruthless strategies in the competition.

Before the second round, the results of the first round were circulated to all players. Of the 62 entrants in the second round, tit-for-tat won again. At this point, Axelrod and Hamilton simulated further rounds, based on the results of the competition so far to assess what would happen in the future. As the different strategies continue to interact, TFT displaces the rest and becomes dominant or 'fixed'.

This is not a game played purely by humans. Since the early 80s when Axelrod and Hamilton published their findings, biologists have been looking for evidence of TFT in nature. They believe they have found it and examples abound:

• Guppie fish are the most cited example of this remarkable cooperation. When shoals of guppies are being stalked by a predator, individuals will separate from the shoal, approach to within a few body lengths of the larger fish and then slowly return to the pack. It is believed that in doing so, the guppies can gather information about the identity, location and 'motivational state' of the predator. How is this a prisoners' dilemma? When two fish approach the predator, they can get closer and presumably glean more accurate information than a single fish. However, if one fish lags behind the other, it will gain the benefit of the other's closeness, but suffer fewer costs – a classic defection. The evidence is debated, but Dugatkin (1991) claims that his data supports the use of TFT in guppies to solve the PD: they are initially 'nice' by starting their first inspection at the same time and they are retaliatory by turning back and leaving a defector closer to the predator. Finally, they are forgiving by sticking close to the original defector if they subsequently approach the predator. What is more, Dugatkin suggests that guppies are capable of identifying previous cooperators and favouring them.

• Work on vampire bats is less conclusive but interesting, and suggestive of the use of TFT. On any given night, 8% of adult vampire bats fail to find food. This is fairly serious as they only have a 48-72hr window before starvation sets in. Luckily, in these instances, they are often fed by roostmates who regurgitate some of their own blood meal. Is this TFT? It is certainly reciprocal and Wilkinson (1984) reports that bats do deny regurgitation to roostmates who have refused to regurgitate previously. The necessary conditions for TFT to occur also exist: bats have a long lifespan and live in fairly stable groups so the shadow of the future is sufficient for TFT to be worth playing. As seen above, they are also capable of recognising previous cooperators and defectors.

We should cooperate then because TFT (cooperation based on reciprocity) can get started in a predominantly noncooperative world, can thrive in a variegated environment, and can defend itself once fully established. In evolutionary terms, it is the strategy which will best ensure our survival.

When do we cooperate?
For humans, the answer is clear – we cooperate when we interact with people we know to be nice. We are able to recognise people we have interacted with before so retaliate when other players have defected in the past, or cooperate if they have done so previously.

It seems less clear how this can be applied to the evolutionary process of simple organisms. How do they know when to cooperate when they do not have our advanced capacity for recognition? The answer is to take the need for recognition out of the equation (Axelrod and Hamilton 1984). This yields a three-fold answer to when they cooperate:

• Firstly, simple organisms cooperate when they only ever 'play' with the same interactant and maintain constant contact with each other. The hermit crab and its permanent sea-anemone partner are a good example of this.

- Secondly, simple organisms cooperate where immediate and drastic retaliation is possible. A brilliant example of this is the fig wasp and the fig tree (Janzen 1979). The relationship is mutually beneficial: the fig wasp enters the young fig and both pollinates the fig's flowers and lays its own eggs. The tree benefits from the pollination and the wasp benefits from the protection of and nutrition for its offspring. However, if the wasp does too much egg-laying and too little pollination (it defects), the tree cuts the young fig off from its branches at an early stage and the wasps die.

- Finally, cooperation can occur where a fixed place of meeting exists (Trivers 1971). In coral reefs this happens often – smaller fish act as cleaners to bigger fish who are potentially their predators, by removing and eating ectoparasites from their bodies. In the open sea, where fixed meeting places are impossible, such mutual cooperation is almost unknown.

It is also interesting to look at when and how we begin to cooperate. Axelrod and Hamilton suggest that the roots of reciprocity may often be in kin selection. As we already know, cooperation is often rational between closely related 'players' – once these genes for cooperation exist, reciprocity itself may become a proxy for relatedness. For simple organisms in particular, where reciprocity was associated with kin in the past, conditional cooperation with unrelated individuals may evolve.

Fischer (1980) sees evidence of this in seabass. Seabass are hermaphroditic and take turns in being the high investment partner (egg layer) and low investment partner (sperm donor). This system has allowed economy of testis size to evolve, which is better for the pair overall if not for a selfish, defecting individual. Fischer suggests that this cooperation might have begun when seabass populations were sparse and inbreeding was the norm. Cooperation evolved on the basis of kin selection but continues today with unrelated fish on the basis of reciprocity. He observes that pairs tend to break up if sex roles are not divided evenly.

Finally, when we do not cooperate is also enlightening in the evolution of cooperation. As Axelrod and Hamilton put it, when the probability of interacting with someone again (w) becomes too small, we stop cooperating. This is something we see often in nature, even at the level of bacteria, as future interaction decreases in relevance. Lots of bacteria live harmlessly or even beneficially in the gut under normal circumstances. If we suffer a perforated gut, suggesting a serious and potentially life-threatening wound, the same bacteria is known to contribute to sepsis and to hasten the body's decline. We only cooperate when reciprocity is sufficiently likely in the future.

2.4 Role and Norm Theories

Why are they linked?

Role and Norm theories are different strands of sociological thinking (Montgomery 1998, Coleman 1990). They are linked together here because their implications for cooperation are similar. They assert that ultimately, we cooperate in accordance with a 'logic of appropriateness'. We cooperate because the framing of the situation persuades us that it is the 'right' and appropriate thing to do.

Role Theory

Why should we cooperate?
The central message of role theory is that we should cooperate because it persuades others that we are a 'friend', can be trusted, and that they should cooperate with us.

Role Theory asserts that individuals are a collection of social roles (Montgomery 1998). They are not just the rational individual of economics who acts according to a 'logic of consequences' although this

may be one of our roles, perhaps as a businessman. A role is socially constructed, will be evoked in appropriate situations and dictates rules of behaviour in accordance with it.

Montgomery (1998) suggests visualising this process as a linear progression:

SITUATION   =>   meta-rules   =>   ROLE   =>   rules   =>   ACTION

- The 'meta-rules' map which role should be evoked, given the situation.
- The 'rules' are what dictate our action and are in turn dictated to us by the role which has been evoked.

Each step of this progression is governed by a 'logic of appropriateness' (March 1994).

When do we cooperate?
We cooperate when we believe we can persuade others we are a friend, and when it does not take too long to do so. We cooperate when we have a low discount rate and are not in too much of a hurry to maximise our payoffs.

This is illustrated by the relationship of manufacturers and contractors in the garment industry in New York. It is a classic example of the prisoners' dilemma. Uzzi (1997) made a study of industry practices and found remarkable results. Where mutual friends introduced the business partners, persuading both sides to undertake a 'trial' friendship, cooperation dominated. Most importantly, these new 'friends' even cooperated in the end-game of the prisoners' dilemma, when the relationship was about to be terminated. From this we see that it is not simply the shadow of the future and fear of protecting our own reputation that drives this cooperation. If this were the case, in the end-game, we should defect and maximise profits. That this does not occur suggests embedded friendships dictate rules of behaviour which override a short-termist 'logic of consequences'. They preclude selfish profit maximisation even when it does not matter what people will think of us in the future.

Montgomery's study of this example finds that cooperation is most likely to succeed when:

- Mutual friends introduce the business partners. This reduces the length of the trial period needed to persuade the other side that we are a true 'friend'.
- When the trial period is short and/or not too costly.
- When the shadow of the future is big enough – the relationship will last for a sufficiently long time.

We cooperate then to evoke the role of 'friend' and personal trust in those we are interacting with. This is not the same as calculative trust. Calculative trust evolves over the long-term in the iterated prisoners' dilemma as we learn that cooperation is in our best interests. According to role theory, we cooperate to embed cooperation as the appropriate rule for interaction, regardless of the future of the relationship.

Norm Theory

Why should we cooperate?
We should cooperate to solve the problem of externalities and establish social efficiency. Externalities occur where the actions of another person or group of people affect our own quality of life. They can be either positive or negative and it is norms that turn the demand for action to solve the externality problem, into a reality.

Norms are said to exist where 'the socially defined right to control an action is held not by the actor but by others'. (Coleman 1990) They are supported not by coercion, but by authority derived from the consensus of society and the threat of sanctions that society can impose.

Demand for a norm arises where a market solution to an externality problem does not exist. Norms of office politics are a good example. Hoarding tea-bags from the communal kitchen creates a negative externality for one's work-mates. There is no market through which we can purchase the right to ensure that tea-bags remain in the kitchen so in this instance, demand would arise for a norm that prevents tea-bag hoarding.

How would such a norm be enforced? Sanctions are needed to prevent people from free-riding according to the classic Prisoners' Dilemma. Within an office, this is easy. The free-rider would not get invited to lunch or to the Christmas party. People might gossip about his/her meanness making life lonely and unpleasant. 'Network closure' is what makes social sanctions low cost and easy to administer in this context. Office members have relationships both with the hoarder and with each other so the culprit cannot escape the consequences of his/her action. There is no-one else for them to associate with.

This idea leads us to a second reason why we should cooperate. We should cooperate in accordance with social norms because it is often a positive sum game. Within a closed network, sanctions, both positive and negative often cost very little to the sanctioner. To the sanctionee on the other hand, the benefit (cost) of positive (negative) sanctions is often disproportionately large. This results in what Coleman terms 'excess zeal' in the sanctionee. He cites athletes who play team sports and who 'on average exert more effort than is seen in individual sports'. This is because the flattery and support of his team mates means more to him in receiving it than it does to the team-mates in offering them. Social structures lead to the amplification of cooperation as sanctions are more effective than they need to be in solving the original externality problem.

When do we cooperate?
We cooperate when:

- An externality is experienced similarly by a group.
- There is frequent contact among the sufferers.

At the most basic level, gossip is the perfect example. Within a highly connected, morally homogenous social network, gossip allows consensus to quickly crystallise and for action to be taken. The gossip itself may be sanction enough to an errant member. This is not possible to the same extent when networks are not closed. If the sanctionee can find solace in another group or members can float in and out diluting consensus, sanctions and the legitimacy of norms are threatened.

When do we not cooperate? We do not necessarily cooperate when we are more powerful than the rest of the group. A CEO for example would not necessarily be susceptible to the tea-bag sharing norm. His/her power can influence the quality of life of subordinates on a far greater scale than their happiness at finding an available tea-bag can. On this basis, the group willingly make an exception so there is no incentive for the CEO to cooperate.

2.5 Social Capital

What is Social Capital?

Social Capital describes the value of social networks and the ways in which they make our lives more productive. It refers to the connections between individuals and the 'norms of reciprocity and

trustworthiness that arise from them' (Putnam 2000). It is not always a benevolent concept. 'Negative' social capital encourages ethnocentrism and exclusion of outsiders. In the nineties, Putnam brought social capital to the mainstream of sociological thought and policy making, but the idea itself pre-dates this 'vogue' period by at least a century. Durkheim highlighted the importance of 'group life' as a solution to 'anomie' in the Nineteenth Century.[6] L.J.Hanifan, a progressive American school reformer in the early 1900s, was the first to coin the phrase 'social capital'. He used it to describe the importance of community involvement in school success.

Social Capital – weighing up the balance

Why should we cooperate?

We should cooperate within our community and broader society, to create social capital. Social capital is both a private and a public good: as individuals, we benefit from networks to get jobs, to confide our fears in friends and to call in favours. As a society, we benefit from the positive externalities to the cooperation of others and the networks they create. Spillovers could include a crime-free neighbourhood thanks to a neighbourhood watch team. We do not have to be a member to benefit.

'Norms of reciprocity and trustworthiness' are how Putnam describes the mechanism through which social capital works. Social capital engenders a code of conduct, which operates on two levels: again, both in public and private spheres:

- In our private lives, we benefit from specific reciprocity. This may involve direct repayment of a favour. As Yogi Berra points out: 'If you don't go to somebody's funeral, they won't go to yours'. It may also involve indirect reciprocity. Putnam powerfully illustrates this: in 1997, John Lambert, a black, 64 year old retiree, was on a waiting list for a kidney replacement. Andy Boschma, a white, 33 year old accountant offered him his. Why? Because through their local bowling league, the two had struck up a friendship and made a connection. Boschma had come to like and respect the older man and simply wanted to help him out.

- In the public sphere, we can benefit from generalized reciprocity. This is a powerful concept. It means that when we do favours for others, we do not expect immediate repayment. We are happy to act knowing that at some point, when we need it, someone else should do the same for us. We pick up a wallet and hand it in to the police station to help perpetuate a norm that might one day help us out. We help an old person to cross the road in the knowledge that we will appreciate such a norm in years to come.

This idea of generalized reciprocity can help us to identify some concrete reasons why we should cooperate to create social capital:

Efficiency

'Trustworthiness lubricates social life' says Putnam. What does this mean? It means that where social capital and trust are the context for economic (or any other) transactions, opportunities for free-riding and corruption are reduced. Dense, closed networks generate norms of mutual obligation and responsibility and preclude the need for costly coercion or incentive contracts. Efficiency increases. An extreme example of this is the Jewish diamond traders in New York. Here, the networks are so dense, gossip so rife and the threat of ostracism so severe that legal contracts are unnecessary for enforcing cooperation. This is efficient firstly, because traders do not have to waste money on lawyers to draw up contacts. Secondly, as a recent study by Fehr and Gächter has pointed out (2002), incentive contracts reduce overall cooperation by crowding out the voluntary variety. Trust arising from social

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[6] Anomie is the absence of social justice and norms.

capital makes business more efficient and more productive.

Effectiveness
A recent World Bank study has shown that the existence of social capital makes rotating credit associations more effective. Farlan (2003) demonstrates that in communities where there is lots of social capital, lenders can distinguish between those who default through no fault of their own and those who default as a result of poor effort. More information means that money-lenders can lend more effectively. More money goes to 'good risks' and less to 'bad risks'. In an earlier study, Grootaert (2001) demonstrates for Indonesia that where levels of social capital are high, participation in water projects is higher and their effectiveness increases.

Poverty
The central aim of Grootaert's study is to demonstrate that social capital is not just good for the poor, but relatively better for the poor than for others. He claims to have done so and runs various regressions involving the social capital variable to demonstrate his point mathematically. He suggests that reason for this is the way in which social capital impacts on the lives of the poor. As we have seen, in LDCs, social capital makes capital lending easier and it makes vitally important water projects more effective. Both outcomes are central to improving quality of life in a way that joining a bowling league is not. In the developed world, social capital may also be of particular importance to the poor. Social capital and generalized norms of reciprocity have been shown to reduce crime rates (Putnam 2000). It is the poor who are both more likely to be involved in crime and suffer from its effects. More social capital may mean less imprisonment and fewer killings.

Equality
Putnam's most recent work (Putnam 2003) demonstrates a positive correlation between social capital and equality. It is unclear which way the causal lines run. It is easy to imagine how more social capital could lead to greater equality: where 'connections' are not limited to an 'old boys network' but to a broader base in society, social mobility is likely to be easier to achieve. It is also easy to imagine that a close knit community and norms of reciprocity prevent great inequality from arising in the first place. In the other direction, in a relatively equal society, connections and social capital are easier to make. Where similarities exist between people, there are fewer hurdles to be overcome in making friends. Scandinavia has amongst the lowest levels of equality and the highest levels of social capital in Europe.[7] Cooperation in pursuit of either goal then, is likely to lead to amplification of the other. If we see both equality and social capital as a good, it is a win-win situation.

Why we should cooperate is also relevant in a temporal context. We should particularly cooperate to create social capital in 2003 for two reasons:

Diversity
The second strand of Putnam's new work concerns diversity and its impact on social capital. He finds that where diversity is high, levels of social capital are low and vice versa. His study in L.A., where the population is largely split between Whites and Hispanics, initially showed an encouragingly high incidence of inter-racial friendships. However, when he controlled for the high Hispanic proportion of the population, the incidence of random inter-racial friendships was lower than average. The absolute incidence of inter-racial friendships was higher than average but the relative incidence of inter-racial friendships was lower than average. Diversity, he finds, decreases trust, connectedness and participation amongst the population. This resonates within groups as well as between them – lack of trust pervades the homogenous groups within a population as well as increasing hostility between racial groups.

This is highly relevant today as societies become more diverse. Globalisation brings down boundaries as we increasingly trade and interact with people of other races and cultures. Migration, both temporary

and permanent, is more and more common. External to the social capital argument, we see this as a good. Cultures have much to learn from one another: skills, traditions, music and food for example. Diversity will continue to increase and we should welcome it. Given this, solutions are needed to counter the decline in social capital and not to counter the increase in diversity itself. This is where Putnam's concept of 'bridging' social capital is so important. This is the social capital that we build across cultures, religions, ages and genders. It is the social capital that transmits knowledge and understanding through its links. It is much harder to build than the bonding social capital that arises easily in homogenous societies. Today then, we should put particular effort into cooperating across group boundaries to create this valuable commodity.

Decline in Social Capital
Putnam's work is centred round the hypothesis that America's social capital is declining. Reasons for this include the increasing hours we spend at work and women working in the market and not in the home. Television and the internet also have an important role to play in the atomisation of society. He cites huge numbers of statistics to support his case. Examples include:

- The number of bowlers playing in leagues decreased by 10% between 1980 and 1993.
- The number of parents involved in a PTA declined from 12.1 million in 1962 to 5.3 million in 1981.
- In 1996, 50% of American's surveyed believed that we are becoming 'more untrustworthy'.

The evidence is not uncontested. Everett Ladd (1996) has challenged Putnam's hypothesis, asserting that social capital has simply moved location and not declined: parents have moved from PTAs to disaffiliated, independent PTOs and participation in 'organised' activities has been replaced with an increase in informal, voluntary participation in small community groups. Putnam rejects this. He accepts that the general trend is less extreme than the picture painted by some of his examples. He stresses that it is a general trend nonetheless.

If we accept this, says Putnam, then making an effort to cooperate and to recreate lost social capital, is the solution. He explains that today is not the first time we have faced this challenge. At the turn of the last century, in a newly industrialised society, the problems were similar. In the US, affluence was rising but contentment was falling. Liberalization brought increased freedom but an increased atomisation of society. Urbanization broke up families and traditional rural communities, and immigrants flooded American cities. The solution then was to regenerate civic life. Between 1870 and 1910, there was a boom in the building of local associations. Handbooks appeared on how to establish a boys' club or a women's club. Little League was born and was established from the big cities to small rural towns. American's invented the solution that fitted the context. Today, says Putnam, we should do the same. We should cooperate in a way that is meaningful given the context, and recreate the social capital we have lost.

Why shouldn't we cooperate?
This long section on why we should cooperate creates the impression that social capital is the utopian solution to all society's problems. This is definitely not the case. Putnam makes an important distinction in his work between the bridging social capital mentioned earlier and 'bonding' social capital. He uses a simple analogy to distinguish them – bonding social capital is the glue of society and bridging social capital is the WD40 ('trustworthiness lubricates society').

Bonding social capital tightly links community members together in homogenous groups. Connections are easily made and reinforced between people with similar backgrounds, traits, interests and prejudices. This is not necessarily a bad thing: church groups often fit this bill but reach out into society; bonding social capital and the trust between members make rotating credit institutions more effective (Grootaert

2001). But, there is a definite dark side. Bonding social capital closes groups; it exaggerates their common ground, enhances prejudice and most importantly, excludes outsiders and leads to ethnocentrism. The Ku Klux Klan are rich in social capital – towards each other they exhibit reciprocity, trust and care. To society and their black neighbours, their social capital destroys lives.

To Portes (1998), a critic of Putnam's 'loose' use of social capital, the negative influences of social capital do not end at the bonding definition. His three additional points are a refinement of the problems of bonding social capital:

Excess claims on community members:
Norms may lead to inefficiently stringent claims on community members. Geartz (1963) studied norms of mutual assistance in Bali. Norms at the time dictated that businessmen must always help out their peers if they are in financial trouble. The effect was to stifle entrepreneurship – any success would be undermined by the failure of 'bad' businesses which in the free market, would simply fold.

Restrictions on individual freedoms:
Norms and dense, closed societies may dictate impossible standards of conduct. Boiserain (1974) studied social norms in Malta. The intensity of community life and constant judgement of behavioural standards resulted in all the young people leaving as soon as they were able. Social capital was leading to the downfall of the community.

Downward levelling norms:
Where communities have traditionally been excluded from the mainstream, group solidarity may be based on opposition to the rest of society. Bourgeois (1995) studied Puerto Rican immigrants in the Bronx and found that individuals looking to escape poverty and join the mainstream, were singled out for attack. Social capital was perpetuating the deprivation suffered by the community.

Overall then, social capital can have both powerfully positive and negative consequences. We should still cooperate to create social capital because we can distinguish between its types: we should cooperate across cultures, genders and wealth to create bridging social capital which brings both private and public benefits and specific and generalized reciprocity. We should do so today for two reasons: firstly, because increased diversity threatens to reduce both social capital overall and bridging social capital specifically. As interracial trust declines, bonding social capital replaces much of the remaining bridging variety. Secondly, we should cooperate to replace the social capital that has been in decline since the sixties.

When do we cooperate?
We cooperate and create social capital when connections are easy to make. This occurs when:

•   Communities are homogenous. Links are easily made when people look and think like us and have the same interests. Axelrod's work on the evolution of cooperation backs this up (Axelrod 2000). He shows how 'tag-based' cooperation leads to ethnocentric behaviour – even if we can only identify others as being part of the 'green group' or the 'blue group', we are more likely to cooperate with those who wear the same tag as us.

•   Communities are relatively equal. Explained above.

•   Political culture is conducive to cooperation. Almond and Verba's seminal work, 'The Civic Culture' explains how political culture is deeply embedded in a society's history and traditions. It is not the same as the transient political environment which may change with a different party of government. Political culture describes the 'orientations' of its citizens and how they are

inclined to see the political world and their role in it. They identify three main types: subject, parochial and participatory cultures. In a participatory culture, citizens see their participation as part of the political fabric of society. It is in cultures such as these where we see most cooperation.

- Political environment is conducive to cooperation. This is most easily described with a counter-example. Even Everett Ladd, Putnam's most vocal critic accepts that there was a drop in social capital in the 80s. Both men attribute this to the individualism being exalted by political elites at the time. In the 90s, with a return to social democracy in the States and in Britain, Ladd perceives a subsequent rise.

2.6 Sharing competencies

A Brief Overview

An old cliché tells us that 'two heads are better than one'. In his theory of the 'Six Thinking Hats', Edward de Bono (1999), a psychologist, illustrates that this is not just because two people have more thoughts than one individual. It is because the value of two people thinking cooperatively on one issue at a time is more productive than their arguing individual viewpoints.

Psychology and Six Thinking Hats

Why should we cooperate?
Edward de Bono stresses that the Western norm of argument, in which every individual argues their point, is not as productive as 'parallel thinking'. Parallel thinking involves all participants in a meeting or discussion considering the same aspect of a problem from the same angle, at the same time. 'A magnet is powerful because all the particles are aligned in the same direction' says De Bono and uses the following story to illustrate the importance of this: once upon a time there was a man who painted half his car white and the other half black. His friends asked him why he did such a strange thing. He replied: 'Because it is such fun, whenever I have an accident, to hear the witnesses in court contradict each other'.

We often have arguments in which both sides are right, but where we are looking at different aspects of the situation. Parallel thinking uses the force of everyone's intellect to look first at the white side of the car and then at the black side to build up a true picture of circumstances. To facilitate this, he recommends the 'Six Hats' approach. The six hats are different colours – white, red, black, yellow, green and blue. They represent different types of thinking and are used to direct the group in how to approach the subject under discussion. The use of one hat may be all that is needed to resolve an issue. A combination of all six may also sometimes be necessary:

- White is a neutral approach and deals only with the facts.
- Red is 'fiery' and emotional and asks for gut instincts.
- Black is dark and negative and looks for any potential problems.
- Yellow is sunny and positive and looks for any potential benefits.
- Green is fertile – the breeding ground for creative thinking and new ideas.
- Blue represents the sky, an overview of thinking and what is to be achieved.

Why are they necessary? De Bono emphasises that we cannot possibly be 'sensitized' in all directions of thought at once. He uses the example of an antelope in the savannah who hears a sound in the grass. Immediately, all the neuronal clusters concerned with danger are activated so that the lion is recognized as soon as it emerges from the grass and the antelope can escape. We cannot possibly maximise this sensitization in different directions at the same time and it is for this reason that the Six Hats method

is so important. It allows the brain to maximise its sensitization in different directions at different times.

This is not merely a theoretical assertion. De Bono claims the method has had much success in private and public sectors all over the globe:

- Optus in Australia, has set aside four hours for an important discussion. Using the Six Hats method the discussion was concluded in forty-five minutes.
- Statoil in Norway had a problem with an oil rig that was costing about one hundred thousand dollars a day. A certified trainer introduced the Six Hats method and in twelve minutes the problem was solved. The one-hundred-thousand-dollar-a-day expenditure was reduced to nil.
- An aid worker in Cambodia was helping Khmer villagers drill for water but was finding it difficult to get them involved. He taught them the Six Hats method and they became so enthusiastic that they told him that learning to think was more important than drilling for water!

We should cooperate in our thinking because it makes us more efficient, more productive and more effective in our thought. 'The focusing of the sun's rays can melt the toughest of metals' says De Bono.

3. Conclusion

3.1 Why cooperate?

Encouraging cooperation is often a problem. Olson rightly points out that as individuals, we are often too intent on short-term gain to see the ultimate cost of our selfish free-riding. As a criticism of earlier Group Theory or idealised hypotheses of inherent 'mutual aid' in nature, it is valid. As a model, it is insufficient. Biology, psychology, sociology and economics help to enrich the model. They go some way to explaining why we see more cooperation than we 'should' in nature, in history and in modern society. We cooperate with our close relatives to ensure 'kin selection'. We cooperate in accordance with norms, such as an innate sense of fairness, that are in place to maximise our chances of survival. We cooperate when other people do, or when we believe they will reciprocate. We also cooperate when we believe that other people will not do so.

3.2 Cooperation and imbalances of power

What we have not yet established is why we cooperate when there are power asymmetries. Why cooperate if you are the stronger actor and dominate a group? Why cooperate if you are one of the weaker actors in a dominated group? From both points of view, possible answers across disciplines fit into two broad categories: cooperate for the sake of efficiency and ultimately, for survival.

Efficiency

Multilateralism minus one
The CEO does not get ostracised for hoarding teabags because his patronage means more to his employees than his adherence to the 'sharing' norm (page 24). Where long-term relationships matter and asymmetries of power exist – the short-term benefits to the weaker party of enforcing a norm are outweighed by the future consequences of doing so – it is not rational for the dominant actor to cooperate. This is why, for example, what would be 'weird' behaviour in an average member of society is often dismissed as merely 'eccentric' in the rich and powerful (Coleman 1990). Broadly accepted norms of behaviour do not apply.

So, why does everyone else cooperate? The answer is that it is more efficient to do so than not. The CEO hoarding the teabags makes the norm of sharing only marginally less valuable for everyone else – sharing teabags amongst employees is still a vast improvement in efficiency over a free-for-all where everyone hoards a pile.

The principal-agent problem
The principal-agent 'problem' is only a problem because cooperation between unequal partners does not occur – inefficiency results. It does not matter how dominant or powerful the principal is if he/she must employ agents to do the jobs which he/she cannot do: once an agent is employed, efficiency can only result from perfect information about their actions or from voluntary cooperation between parties.

As we have already seen, 'true' voluntary cooperation is more efficient than cooperation induced by financial incentives, so it is in the interests of both parties to do so.

Size and power as a disadvantage
Consider the small fish who eat the ectoparasites off the bodies of larger fish. The big fish benefit from a service they cannot perform themselves. The small fish benefit from a decrease in the number of

predators they face. In human society, politicians provide an equivalent example. However powerful they are, they are at an informational disadvantage and must consult local people about problems in their communities. Local people benefit, theoretically, from appropriate solutions to their difficulties. Politicians benefit from electoral support and successful policies.

There are comparative advantages to size and power in both directions and cooperation is necessary to make efficient use of these.

Survival

Problems which are bigger than power
Climate change does not respect the powerful, and even the most powerful groups cannot secure global peace unilaterally. Global public goods illustrate how cooperation between seemingly unequal partners can be vital for survival. They highlight how dominance or power in some areas can disguise an equal playing field others.

In these areas it is in the interests of both 'weak' and 'strong' parties to cooperate and ensure survival.

Group selection
In New Guinea, 'the execution of a prominent individual who has overstepped his prerogatives is secretly arranged by other members of the multiclan community, who persuade the target's own kinsmen to accomplish the task' (Sober and Wilson 1998). By cooperating according to this norm, the large group of weaker individuals is more powerful than the supposedly dominant leader. Why do all members of society, including the dominant ones, cooperate with this power-limiting norm? The answer is that egalitarian groups, in which leaders are controlled as well as controlling, often have a comparative advantage over dominated communities. As a joint actor, these groups function more effectively and are more likely to survive.

This is not to say that exceptional members cannot be singled out and that successful groups cannot have leaders. It just means that these individuals can be outvoted by the rest. This resonates with the argument made earlier that ownership promotes commitment. Sober and Wilson tell us that in feuding societies, the tribes which favour within group solidarity (or ownership) are most successful in conflict.

Why then should the powerful member of a group cooperate with his/her kin? Because it is advantageous to the evolution of the group, and every member as a part of it.

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