EXCLUSIVE GROUP FORMATION AS A COLLECTIVE ACTION PROBLEM

by

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By traditional economic reasoning, the production and sale of private goods is assumed to be efficient in a pure market because only the owners of privately held goods can access and enjoy them. In contrast, public goods are likely to be under supplied, because individuals can free ride on the contributions of others. Citizens can solve the free rider problem either spontaneously or through the use of coercive tools such as taxation. However, such solutions will rarely be efficient. An alternative solution, seldom studied by political scientists, is the formation of clubs. Clubs exist to provide semi-public goods to their members. If only contributing members of a club can access its product (the club good), the club should be free of the free-rider problem. Because club goods are finite and rivalrous, clubs are subject to "crowding effects"; that is, per-member benefits will decline if clubs grow too large. Clubs can minimize this crowding by

limiting the size of their membership. Clubs are traditionally formulated as consumer-driven arrangements, driven solely by the wealth-maximizing preferences of their memberships and not by external concerns. In an experimental setting, this dissertation demonstrates that clubs also tolerate crowding if club membership is the sole source of some club good for otherwise excluded individuals. Club members can minimize the effects of this crowding by making multilateral promises not to overuse the club good. This means that clubs members do consider the social ramifications of the club's membership policies, and those membership policies respond to government action (specifically, the presence of other funding for excluded individuals). This has implications for both the study of clubs and the associations that resemble them: firms, coalitions, and communities.

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CHAPTER I

THESIS

The political world is a world of groups. Individual politicians play key roles in many political events, but evaluating the importance of any single politician is the domain of history, not political science. For a political scientist, the collective behavior of actors gives structure to the political world. Political scientists study groups in the electorate (in the form of interest groups and social movements), in legislatures (in the form of committees and coalitions), in the executive (in the form of administrative units and bureaucracy), and in international relations (in the form of regimes, NGOs, and alliances). The formation, structure and behavior of groups has always been potential subject material in political science, as in most of the social sciences. To an extent, political science *is* the study of the performance of groups subject to the opportunities and limits of political institutions.

Note that some of the group types listed above are organized from the "top-down", as is the case with legislative committees created to lessen the workload of a general legislative body. Others are self-organized from the "bottom-up", as is the case with interest groups. In the latter context, groups can be thought of as productive associations whose primary purpose is to improve the welfare of group members. In the language of the economist, individuals join groups because it offers an increase in personal utility over not joining groups.

The classic pluralist framework saw the output of American government as a reflection of compromise and conflict between competing interest groups. The system was presumed to be a legitimate incarnation of democracy because concerned individuals would presumably join whichever groups furthered their own interests and views. Since the recognition of the "free-rider" problem, though, this presumption has been in doubt. Although group members have a common interest in obtaining collective benefits, they have no common interest in sharing the costs (Olson 1965). Collective action is not impossible, but some groups (especially small groups with clear goals) will be better at it than others and will have an organizational advantage. Likewise, public goods such as lighthouses will be under provided because there is no mechanism for limiting their use by non-contributing parties.

One potential solution to the free-rider problem[1] is, of course, government provision. Another one, frequently overlooked by political scientists, is the formation of clubs. Clubs are a type of group that provides a semi-public good available exclusively to contributing club members. One example of a potential club good is a swimming pool. Although an individual may build a personal swimming pool, the costs of installation are substantial and may outweigh the benefits. The local public swimming pool may be overused or non-existent. People have the option of creating a swimming pool club, and only members will be allowed to use it.

Although it is impossible to free-ride on a club good, clubs are sometimes

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1 Defined here as the failure of individuals to make voluntary contributions to collective goods.

susceptible to an in-club collective action problem. The free-rider problem can be overcome by excluding non-contributing members, but remaining members still have open access to the club good. If they are opportunistic, individual members will maximize personal use of the good, while shifting the costs onto the club as a whole. If the group good is rival in consumption, then this creates a second-tier collective action problem, structurally similar to a "tragedy of the commons" (Hardin 1968). All groups are subject to collective action problems in the absence of clearly enforced agreements about how to coordinate uses of group products. Members must also develop methods for minimizing internal problems, such as might develop if every member of a swimming pool club tried to access it every day of the summer.

When the demand on a club good increases, then we may say that the club is experiencing a "crowding effect." Crowding occurs whenever one member's utilization of a club good diminishes the amount available to other members. The amount of crowding depends on a variety of factors, including membership size, use per member, and total demands on the club good.

Clubs do not eliminate crowding so much as they minimize it. Crowding is minimized by limiting access to a club good either by limiting the size of the club's membership (coarse exclusion) or limiting per member usage (fine exclusion) (Helsey and Strange 1991). Clubs choose between these methods based on the source of the crowding.

If crowding is a result of having too large a membership, then coarse exclusion is the tool of choice. Oversized clubs can simply jettison extra members. However,

shrinking the membership rolls cuts into the economies of scale that make clubs attractive groups to join. Members balance crowding effects with membership costs. If increasing membership size decreases membership costs, then a club may accept more members. Since club membership is a mutually chosen association, people with similar tastes for this fee/crowding tradeoff should find and join with one another.

Clubs may also impose usage fees or otherwise limit member access. This fine exclusion is a more reliable mechanism for controlling crowding, but it has many drawbacks. If the cost of limiting member access to the club good is too high, clubs may be willing to tolerate some crowding effects. Members may also be unhappy with the prospect of limited access to a good which they "own."

These solutions are discussed in Chapter II, but the essential point is that specific clubs attract members with similar tastes for crowding and then seek to minimize crowding once they have formed. Clubs are formulated as consumer-driven arrangements, responding to the wealth-maximizing preferences of their membership and not to external concerns.

This dissertation demonstrates that clubs are also influenced by external opportunities. This is not a new idea, but I propose a different direction of influence than that of previous work. Clubs are traditionally thought to be influenced by other economic forces because they must compete for members. Since people freely choose to participate in clubs, they can also choose not to participate. Clubs without members will perish, and so clubs are thought to be most concerned with "the bottom line": providing the most benefits for members at the lowest cost.

That may sometimes be the case, but not always. This dissertation will demonstrate that in an experimental setting, *clubs will tolerate some crowding if club membership is the sole source of some club good for otherwise excluded individuals.* If the local swimming club is the only place to go swimming, then the swimming pool will be larger than it would otherwise be, despite the decrease this will cause in per-member utility. Sometimes clubs are sensitive to the circumstances surrounding them.

There are limits to this generosity. Clubs will be less willing to tolerate crowding if excluded individuals have other economic opportunities, such as a guaranteed source of the same type of benefits. Clubs also need time to develop this tolerance for crowding. Under conditions that only allow for short-term associations, clubs will generally be sized so as to maximize per-member benefits.

When people have no other place to go, though, clubs will include extra members despite the increased crowding effects. This inclusiveness seems to derive from an increasing sense of social community, although it may also be a result of risk-minimizing behavior. I discuss these possible explanations in Chapters 4 and 5.

As noted above, even "properly" sized clubs can experience crowding from members, since individual contributors to the club good have an incentive to maximize their access. Clubs can control this problem through use of an informal enforcement mechanism: promises. Although promising would appear to be a "toothless" contract, club members do take promises not to overuse the club good seriously. Promising (and especially multilateral promising) can reduce or eliminate the risk of members overaccessing the club good.

The literature that has contributed to the formulation of this problem is considerable. The next chapter will review it.

CHAPTER II

A HISTORY OF COLLECTIVE ACTION RESEARCH

The history of collective action research is both extensive and interdisciplinary. In this chapter, I will focus on those works that are of most interest to political science and the problem at hand: the literature on public goods and free riding, and the theoretical and experimental research on the Prisoner's Dilemma.

These two fields are closely related. As Russell Hardin (1971) has demonstrated, the logic of the Prisoner's Dilemma is the same as the problem of collective action. Both approaches frame a situation in which mutually beneficial cooperative behavior might fail to occur because individuals have dominant strategies not to cooperate. It neatly captures the conflict between the interests of the individual and the group. I will turn first to the formulation of the collective action problem.

The Logic of Collective Action and the Problem of Free-Riding

Pluralist models of democratic governance systems depend on the assumption that concerned and like-minded citizens will make a concerted and unified effort to voice their views in the political process. If this view is correct, then the presence of assorted interest groups is an accurate reflection of the underlying preferences of the electorate, and the democratic system is best viewed as a framework for forcing compromise (Truman 1951).

Unfortunately, this viewpoint ignores the impact of personal choices and incentives on group formation. Some goods are non-exclusionary by nature: non-contributing members cannot be prevented from accessing them. Government exists at least partially to provide these goods by forcing people to contribute through taxation (Samuelson 1954). Olson (1965) demonstrated that this same logic applies to collective action *within* the political system.

Olson proposed that the purpose of groups is to further the interests of their members; this seems self-evident, else they would not exist. The members have common interests, and should act together to advance them. They also have purely individual interests. There is a conflict inherent here, for the group outcome is as often as not going to be a collective good, raising the danger of free-riders. Although group members have a common interest in obtaining the collective benefit, they have no common interest in sharing the cost.

Garett Hardin's "The Tragedy of the Commons" (1968) posed a similar problem: how can a common good (one in which every person may partake) be preserved, when none have an incentive to refrain from overuse? While it might be worthwhile for everyone to limit his or her consumption of the commons, it would be even better to be the one individual who does not do so. When everyone believes this, however, the commons is destroyed. From this simple problem, Hardin later proposed a cardinal rule of policy as "*Never ask a person to act against his own self-interest.* How, then do we manage to achieve group goals? Necessarily, by coercion (Hardin 1978, 192)." Hardin's "rule" became a modern-day rearticulation of the Hobbesian problem of order.

In social psychology, Dawes (1980) termed these sorts of problems "social dilemmas" and noted that they are all fundamentally the same. Group benefits are non-excludable, and so underprovision is expected. Individuals have an incentive to *free-ride* on the constructive work of others, and society is the worse for them. This problem does not arise with private goods, because only the producer captures the benefits of production (unless one counts the effects of thievery). However, sometimes private provision will be economically infeasible because the personal costs of production will outweigh the expected benefits. Group production would be attractive but for the problem of free-riding. One potential solution to this problem is the formation of *clubs*.

Club Theory

A club is "...a voluntary group of individuals who derive mutual benefits from sharing one or more of the following: production costs, the members' characteristics, or a good characterized by excludable benefits (Cornes and Sandler 1996, p.347)." Clubs produce goods which non-members cannot access. Non-contributing individuals do not have access to the club good, so clubs do not suffer from the free-rider problem. Indeed, clubs are frequently posed as a *solution* to the free-rider problem for situations in which public provision is unrealistic and individual provision is prohibitively expensive. Club goods are finite, so clubs are subject to the "crowding effect" (congestion) if membership grows too large. Since clubs can regulate their membership, though, clubs should be able to find the optimal size for the provision of club goods.

Communities as Clubs

Building on the earlier work of Tiebout (1956), Hirschman (1970) proposed that the ability of unhappy members of communities to leave for greener pastures has a disciplinary effect. This "exit option" is available to individual residents as well as local businesses. Sometimes these people or groups can play towns off against one another, as is the case with professional sports teams which can make demands on cities for new stadiums and contracts by playing one potential host off against another (Euchner 1993).

This structure strongly resembles an economy of clubs. In Hirschman's model, individuals with similar tastes should end up in the same communities, and communities will be forced to provide a given level of services at an efficient price or they will lose residents (Orbell 1970). This is identical to the theoretical model of clubs, which predicts prospective members with similar tastes for crowding and membership fees will eventually wind up in the same clubs together.

Hirschman is not as optimistic about the potential efficiencies to be gained by this sort of competition. He notes that

> In the case of "connoisseur goods" [like education and wine]... the consumers who drop out when quality declines are not necessarily the marginal customers who would drop out if price increased, but may be intramarginal consumers with considerable consumer surplus; or, put more simply, the consumer who is rather insensitive to price increases is often likely to be highly sensitive to quality decreases...consumers with a high consumer surplus are, for that very reason, those who have most to lose through a deterioration of the product's quality. (49)

These are the very same sorts of consumers who are most likely to "voice" disagreement with existing policies, which is the other main tool for reform. If alternatives are available, voice can hence be paralyzed, and the ones who stay may be the ones who can

tolerate the deterioration the longest. This can create widening social cleavages. Rich people can more easily afford to exit an unsatisfactory situation than can the poor.

Firms as Clubs

One of the many applications of the prisoner's dilemma is to everyday exchange in markets. According to exchange theory, social interaction is a continuous process wherein rational individuals better themselves through exchanging material and non-material goods (Cook 1991). Individuals have multiple opportunities to cheat one another, for example by accepting delivery of goods and withholding payments. This is especially tempting in fleeting exchanges where neither party is likely to encounter the other again. This follows the format of a prisoner's dilemma game, and past research has examined the influences of various factors on defection rates.

The civil code and legal system exist as remedies for "suckered" individuals in such circumstances, but notably most people do not constantly cheat others in the "real world." Part of this has to do with reputation, of course, but people do pass up opportunities to cheat others even when no one would know (for example, correcting a check-out clerk who returns too much change).

Clubs can be seen as the next step from this type of binary exchange. Three or more individuals create a group product for their mutual benefit. This also resembles the structure of a firm, the main difference being that clubs exist to produce goods for their members while firms exist to sell products or services to non-members (Coase 1937, Williamson 1985). Otherwise, both types of associations exist to provide a net gain in

benefits for their members. One simply takes the form of a club good while the other takes the form of profits.

Coalitions as Clubs

Coalitions are like clubs insofar as they produce benefits exclusively for coalition members, and are voluntary associations between individuals for mutual benefit. Coalitions differ from clubs because they are by nature competitive with other coalitions; the formation of one coalition prevents the formation of another. Coalition members also cannot "overuse" the coalition prize after the successful passage of a bill, since the bill that has been passed clearly specifies the division of benefits.

Development of Club Theory

Following Buchanan's original formulation of the structure of clubs (1965), the work in the field has been almost exclusively theoretical. Populations will likely be heterogeneous in terms of tastes, but clubs will more likely lean towards homogeneity in so far as members of the same club will likely have similar tolerances for the ratio between membership fees and congestion costs. Members who are unhappy with the product of a particular club (either because they consider fees to be too large, or congestion to be intolerable) are free to exit the system. They are free to join or found other clubs whose goods provision is more reflective of their personal tastes. The overall distribution of clubs in a society is thus likely to optimal in terms of goods production, quite unlike scenarios that can develop around public goods production. Individuals are

not forced to pay more for public goods that they would not naturally choose to purchase, nor will those goods be under provided because of free riding. The exclusionary nature of clubs will prevent that from occurring.

The concept of exclusion is important. Clubs must control access to the club good. Helsley and Strange (1991) propose two types of exclusion: *coarse* and *fine* exclusion. Coarse exclusion consists of simply charging a flat membership fee; once the fee has been paid, a member may access the club good at will. Fine exclusion adds a per-use charge to the membership fee every time that a member accesses the club good, such as the presence of green fees at many exclusive golf courses. Clubs vary in the type of exclusionary mechanism they employ because of the transaction costs of exclusion. If exclusion costs are non-existent, the club good is in danger of being overused because each member has an incentive to use the club good until he or she no longer derives any benefits (Berglas 1976). This problem can be solved by fine exclusion, but that may impose significant enforcement costs that outweigh the expected benefits (Helsley and Strange 1991). Raising the cost of exclusion may solve the problem without increasing transaction costs, a solution employed by many real-world clubs such as swimming pools, health clubs, and museums.

This research will concern itself with the problem with overuse within clubs where fine exclusion is not available. It will utilize an experimental framework related to the Prisoner's Dilemma, so I will now turn to the literature on that topic.

The Prisoner's Dilemma and the Exit Option

Suppose that two thieves rob a bank and are caught shortly thereafter. The prosecutor separates them and offers each an opportunity: sign an affidavit that your partner is responsible and you will not serve any time, or remain silent and see if he will do the same and blame *you*. In this case, the silent partner will receive the longest possible sentence. The prosecutor lacks sufficient evidence to jail you both for an extended period of time, so if neither signs an affidavit, then both will serve short sentences. If *both* sign affidavits, though, each will serve a medium-length prison sentence. Both prisoners are made completely aware of the potential outcomes resulting from their interdependent choices, but each must make his choice independently and simultaneously.

This is the standard form of the prisoner's dilemma. If we assign an ordinal value to each of the potential individual outcomes from 4 (no time served) to 1 (longest possible sentence), then we can illustrate the problem in Table 1 where 4>3>2>1 and (3,3) is the best group outcome while (2,2) is the worst-case scenario.

In the classic Prisoner's Dilemma, each player will choose to defect regardless of the choice of the other. When both players choose to defect, though, the worst possible payoff structure arises. The dominance of the defect strategy is a key factor: no matter what the decision of the other, each player is better off choosing the defect option. When both choose defection, however, they are both individually and as a group worse off than they could have been otherwise (see Figure 1).

	Player 2 cooperates (silence)	Player 2 defects (signs affidavit)
Player 1 cooperates (silence)	(3,3)	(1,4)
Player 1 defects (signs affidavit)	(4,1)	(2,2)

FIGURE 1. Standard Prisoner's Dilemma

This is the structure of the game of most 2-person social dilemma research. Social dilemma research that focuses on groups larger than 2 generally comes in the form of some sort of public goods problem, where subjects are asked to contribute to a group good that will be divided evenly among every subject present, whether they contribute or not (an *n*-PD game).

One of the earliest findings from PD research is that although the dominant incentive is to defect (or not contribute), people *do* frequently cooperate, leading one research team to initially question whether the only section of the population with a "cooperation problem" is that consisting of economists (Marwell and Ames 1980, 1981). However, defection does occur to a greater or lesser extent in all social dilemma experiments. The primary task of PD research, then, is to understand the conditions that increase or decrease defection independent of other factors.

Group Size

Olson (1965) argues that increases in group size will cause corresponding increases in free-riding (defection), as selfish behavior becomes more difficult to detect and punish. The experimental evidence for this is unclear. Marwell and Ames (1979) did *not* find this to be the case. Russell Hardin (1982) contended that increasing group size is tied to other structural changes in group interaction that might lessen free-riding. Experimentally, Isaac and Walker's research on group size (1988) has tried to eliminate the effect of the marginal per-capita incentive to contribute to public goods (a variable that decreases as group size increases). Their research has led them to conclude that group size is relatively unimportant apart from its effect on purely personal incentives.

Gender

The link between gender and cooperation is also muddy. Early research by Dawes, McTavish, and Shaklee (1977) found mild evidence that females are more likely to cooperate than males, a finding later confirmed by Mason, Philips, and Redington (1991) to hold true in the open stage of iterated games. More recent work finds no such link (Orbell, Schwartz-Shea, and Dawes 1994). It is fair to say there is not a general consensus on the relationship between gender and cooperation.

Insurance

People may defect in a PD or social dilemma framework not because they wish to exploit their partners but because they do not wish to be exploited ("suckered")

themselves. Research that provides some type of insurance against defection have higher cooperation rates than those without. A "money back" setup guarantees that if group efforts fail to win sufficient support, then players who contribute will receive their initial investment back. A "fair share" condition guarantees that if group efforts do meet an agreed-upon minimum, then non-contributors will be forced to contribute.

In a 7-person public goods game, contributions to a group good were 23% in a baseline condition, 43% under a "money back" condition, and 77% under a fair-share agreement (Dawes, Orbell, Simmons, and van de Kragt 1986). However, insurance provisions substantially change the incentive structure of a social dilemma by eliminating risk–indeed, that is the point of the condition itself–and arguably destroy the "dilemma" itself, as exploitation becomes impossible.

Tit-for-Tat

Political scientists such as Axelrod (1984) qualify the dominance of the defect strategy by disputing the prisoner's dilemma's one-shot nature. Through a computerized tournament that allowed programs to compete with one another in a PD format, Axelrod demonstrated the best strategy for iterated prisoner's dilemmas: a player should originally offer cooperation, then reward future cooperation with cooperation and punish future defection with more defection ("tit-for-tat"). A cooperative relationship can develop and endure that gets both players into the upper-left hand box. This type of decentralized solution to "the problem of cooperation" is stable, and beat all competitors in computer simulations. Axelrod offers empirical support with a description of the "live and let live"

behavior of German and English soldiers engaged in World War I trench warfare. Informal, unwritten agreements not to shoot to kill during certain times of day spontaneously erupted all over the Western front during the early years of the war between nominally enemy squads. Breaking of the agreements would result in immediate, but limited, retaliation. Despite the best efforts of military leaders to destroy it, these "tit-for-tat" agreements were rampant, ending only when troops were frequently reassigned.

More recent work has suggested that "tit-for-tat" is unduly belligerent, and have suggested using a more relaxed accounting system (Kullock 1993) in its place. However compelling these decentralized strategies for cooperation are, though, it needs to be noted that they face increasing difficulty in establishing and continuing themselves in the face of increasing group size, and so may in actuality not vary particularly far from Olson's original work. Furthermore, single-shot prisoner's dilemmas still retain the dominant mutual defection strategy. This has obviously negative connotations for once-in-a-lifetime encounters with strangers, such as those that occur in societies everyday (or between soldiers engaged in non-trench warfare).

Social Norms

Returning to the Prisoner's Dilemma, are there ways of restructuring the payoff structure so that individuals will be encouraged to cooperate? Ullman-Margalitt (1977) notes the importance of social norms in determining behavior in situations without a central enforcing agent. Using military examples again, two soldiers are in an isolated

post and facing enemy attacks; both remaining in their posts will produce a payoff of 1 (repel attack) for each, one deserting will gain 2 (freedom) while the remaining soldier will receive -2 (death), and both deserting will each receive a -1 (capture). How do military units prevent desertion when confronted with this problem? By changing the payoffs--deserting alone may result in capture and execution, producing a payoff of -1.5, or in the social denouncement of being considered a coward for the rest of one's life, -1. Since the contribution of any particular soldier to a battle is likely to be negligible, Olson's temptation to free ride exists. However, the "PD norm" helps counter this by producing social sanctions against noncooperation.

More recent work by Axelrod (1986) notes that norms provide a powerful mechanism for regulating conflict in groups without the presence of a central authority. Norms here are present when individuals usually act in a particular way and are punished if they are observed not acting in such a way. Through the imposition of norms and metanorms ("norms that one must punish those who do not punish a defection (Axelrod 1986, p.1101)"), groups can help reduce the selfish nature of individuals and promote more widespread cooperation. The importance of the metanorm cannot be overlooked: in computer simulations, norms without supporting metanorms frequently went extinct, while those with metanorm support thrived and asserted themselves into the population.

All norms do not necessarily make everyone better off by promoting cooperation where it might otherwise never rise, but they do serve an important function in coordinating expectations. Norms are behavior (not outcome) related in nature, unlike rationality (Elster 1989a, 98). Sanctions may exist for the failure to obey a norm, and the

norm-obeying behavior may produce cooperative rewards as a side product. Elster describes a number of different norms that may promote cooperation, such as "norms of fairness"(similar to "tit-for-tat") and "everyday Kantianism" (cooperate if cooperation would be best as a general social rule).

Norms are most easily established in small groups, though, and as Bendor and Mookerjee (1987) note, "these theoretical speculations about the fragility of conditional cooperation in large groups, as well as the evidence indicating that it is most common in small-*n* settings, suggest that a close inspection of the repeated game brings us full circle back to Olson's main conclusions (131)." In situations where punishment is not possible, but instead actors must rely on verbal cues of intent such as multilateral promises, larger group size would seem to indicate that cooperative success would be even harder to achieve (Orbell, Dawes, and van de Kragt 1990).

Evolution

The PD has applications beyond the social sciences, particularly in biology. Evolutionary competition has been mapped as a PD game, sometimes quite explicitly.[2] While the use of evolutionary arguments in explaining human behavior can be controversial, several authors have argued for a genetic base for cooperation. Rather than directly using full-blown cooperative "strategies", humans may instead have developed a

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For example, see Turner, Paul E. and Lin Chao (1999) "Prisoner's dilemma in an RNA virus." *Nature* April 1, 1999:441-443

number of psychological mechanisms for dealing with others in a society. These "short cuts" may manifest themselves in a number of different ways that will aid cooperative behavior. Emotions such as liking and disliking other people can lead to trusting behavior on a regular basis, formalized through the institution of friendship. Trying to instill feelings of guilt into defectors--and acting in a "morally aggressive" manner when they fail to show remorse--are human reactions that may have genetic basis (Trivers 1971). If these traits are present in all human populations for some actions that are deemed unfair, then a genetic basis seems likely. Cooperative behavior is one of the foundations of society, as successful cooperators are able to get returns that are "greater than the sum of the parts". We are social creatures, after all, and our close primate relatives such as chimpanzees have shown evidence of cooperative behavior that results in the splitting of the proceeds (de Waal 1984).

Of course, if our species uses a number of emotional signals to signify cooperative tendencies with others, the potential for defection by clever mimics remains. How might we be able to reduce the chances of being suckered by these types of defectors? Frank (1988) addresses this sort of danger by flipping the argument on its head: how can we display our sincerity so that others will accept and cooperate with us? Potentially, we might use signals that others understand are beyond our control. The incredible number of expressions possible from the heavily-developed muscles of the face can frequently show our emotions without our being aware of that fact. Given the limitations of the human mind and body, it must be stressed that evolution is not simply a process that produces valuable traits. Rather, these traits we possess must have been selected over

other, potentially useful ones, and have to fight for crowded space on the human frame. At some point, evolution may have stopped fighting for new and clever ways to deceive and begun filling in the space with cooperatively (rather than deceitfully) useful traits for human adaptation.

A somewhat different and contrasting argument was earlier advanced by Campbell (1975). Societies advance and change over time at a far more rapid pace than humans evolve. If we have individually selfish proclivities towards defecting behavior, what might help counteract those human"weaknesses" in a society? Campbell poses two controversial conclusions: human social complexity has been made possible by social (rather than biological) evolution, and this social evolution has had to evolve with norms that help prevent outbreaks of our inherently selfish biological inclinations. Many norms of behavior are in this sense evolutionary products, and all societies must posses certain ways of tabooing the most selfish human behaviors: tendencies to lie, steal, cheat, and always put self-interest first. Unfortunately, many of those taboos are being torn down in modern society. A balanced tension between the inherently selfish nature of the individual (driven by biological evolution) and the constraining norms of society (driven by social evolution) is in danger of shifting too far in favor of the former. The problem of cooperation was solved long ago, by our ancestors over the generations, but the solutions are weaker than biology and currently under assault. A belief that the way to guarantee individual cooperation through appealing to self-interested human behavior is hence misguided, destabilizing, and potentially dangerous. Social norms need to be maintained in order for trust (an important basis for cooperation) to flourish.

The collapse of social norms of trust has been used to describe the behavior of a "backward" society such as Sicily. A society of "amoral familists" (ones that only trust immediate family, and suspect all others of being defectors) survives in southern Italy, unable to use government or other social tools to correct societal ills (Banfield 1976). Trust most likely begins with immediate kin, then moves outward to include others. As long as cooperators stick together, a society of cooperators can flourish (Bateson 1988). However, a deep-seated social prejudice against trusting others makes those first steps particularly difficult. After sufficient time, the likely result is the presence of a strong enforcing agent to allow "cooperative" behavior. Unfortunately, this agent will look out for itself first and foremost, perhaps abusing its power, as has been the case with the Mafia in parts of Italy (Gambetta 1988).

Exit

In the past decade, research has shifted to include another option into the standard PD framework: *the option of not playing the game.* The exit option forces players to balance the potential benefits of a cooperative relationship against the potential risks of an exploitative one. The presence of the exit option complicates the game, but provides an arguably more applicable model for real-life social dilemmas, which are rarely forced (with the exception of a "tragedy of the commons"). They also allow for more "moral" behavior by exiting in response to defection, a factor that avoids the mutual recriminations ("feuds") that can develop from a tit-for-tat strategy (Vanberg and Congleton 1992).

The application of limited cognition models (see Simon 1957, Dawes 1988) to cooperative behavior yields a number of assumptions, but two are particularly interesting. First, even self-interested individuals may act as "cognitive misers", and make choices based on cognitive limits rather than on a complete awareness of options. Individuals may respond to neither personal incentives, nor the recognition of other cooperators. Instead, they may simply use the heuristic of projecting their own intentions onto others, and decide to cooperate based on that tool. The more frequently they tend to cooperate, the more frequently they will offer to cooperate with acquaintances. This has been shown to be a productive strategy because cooperators will not pass up as many chances for productive liaisons as non-cooperators (Orbell and Dawes 1991). Second, we must be aware that individuals perceive the options in different ways than rational choice would predict; they may not be willing to take "risky" choices to cooperate with strangers at all, or make them based on general heuristics that may produce inferior results. A key to understanding cooperation lies in understanding the operation of those heuristics. More recent theoretical work on the exit option frames society as a network within which individuals select the PD as one of many different types of two-person games (Morikawa, Orbell, Allen, Hanley, and Montgomery 1999, pending).

Conclusion and Synthesis

Looking at the history of PD and social dilemma research, we can see a trend towards increasingly complex games (see Figure 2).Moving social dilemma research to this next level, we notice that the paradigm is now actually beginning to resemble a

small-scale society. Individuals seek out prospective group partners for collaborative

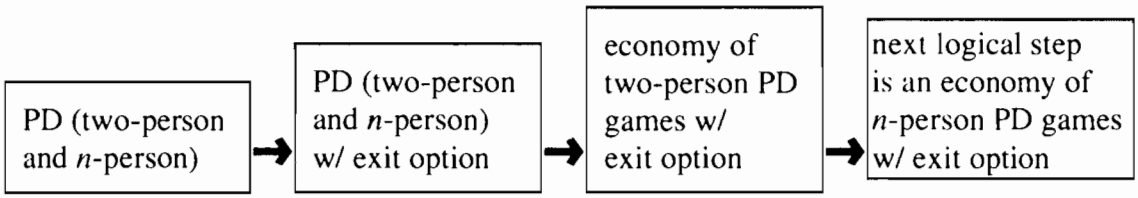

FIGURE 2. Evolution of Social Dilemma Research

efforts that can provide benefits exclusively for group members. Interestingly, this begins to resemble the notion of competing clubs that are subject to crowding effects from inadequate protection of the club good.

Imagine the following scenario: individuals interact in an environment that allows them to form one or more groups with excludable benefits (clubs), which prevents free riding by non-members. However, access to a club good by club members is open and unrestricted. Individual per-use fees are impractical or impossible, and so the potential exists for crowding effects to detract from members' enjoyment of the club good. Individuals should approach partnerships warily under these circumstances. In keeping with the development of the PD literature, predictions can be made and tested through an experimental methodology, so to that topic I will now turn.

CHAPTER III

HYPOTHESES AND METHODOLOGY

Based on the model at the end of the last chapter, we can anticipate that in an economy of clubs that rely solely on coarse exclusion:

Club size will maximize per-member benefits. Since clubs can control their size, this has been a principal since the concept of clubs was originally formulated (Buchanan 1965). If adding more members would decrease the utility of original members, then present members will prevent the club from growing. The primary solution to controlling size-related crowding effects is to limit club size.

Clubs that form under conditions that disallow long-term partnerships will be more likely to suffer demand-related crowding effects that those that do not face such restrictions. Iterated sequences of games force players to consider the possible future ramifications of their actions. In keeping with Axelrod (1984), players can retaliate against defectors (here, players who do not stick to the agreement), or opt out of future partnerships with those people altogether (Kullock 1993).

Clubs that utilize promising will be less likely to suffer demand-related crowding effects. This hypothesis is derived from previous work on the *n*-person PD (Orbell, Dawes, and van de Kragt 1990). Multilateral promises can be used as a type of "contract" among group members not to overuse the group good. In the absence of any other means for enforcing agreements, we would expect that clubs who make multilateral promises

will have fewer problems with the sort of "internal" crowding that results from member demands.

Experimental Methodology

The data for this dissertation is derived from laboratory experiments. Experimental methodology has a strong history in social dilemma research. Both binary and *n*-person prisoner's dilemma structures have been explored in the laboratory, as have coalition games. Psychology has traditionally used experiments and so (increasingly) has economics (Kagel and Roth 1995) .

Advantages of Experimental Methodology

Experimental methodology is the manipulation of independent variables for the testing of hypotheses, usually in a laboratory setting. As Kinder and Palfrey (1993) point out, the strengths of experimental methodology are considerable.

Perhaps the greatest strength of experimental methodology is internal validity. Like other quantitative methodologies, it employs large data sets. Barring any statistical errors, experimental research is internally valid. Compared to observation of naturally occurring phenomena, laboratory work is a superior methodology for testing causal hypotheses. Studies of naturally occurring phenomena do not always present a controlling variables, whereas an experiment traditionally does. This is extremely valuable when trying to separate the potential influences of several independent variables on a dependent variable. By holding one variable constant and changing another, the

researcher can test correlation relatively easily. If the measured results change, then the two variables are correlated with one another. When one condition produces one result, and another condition produces a different result, it is also difficult to argue that the change in one variable is not producing the change in the data. This is less frequently the case in the natural world, where other unmeasured independent variables may also be changing and influencing a measure effect.

The laboratory setting also allows for the clear separation of variables, which is always desirable when trying to identify causation. The researcher isolates and tests one variable at a time, then compares the results to a baseline. Complex situations can be simplified through a series of tests, and the researcher may test the impact of any variable that can be fit into the experiment.

Experimental research is active, not passive. It creates its own data without having to wait for it to appear "naturally." The researcher controls the volume, content and timeline of his or her own research, rather than having to rely on third parties or fate. Experimental methodology is flexible, more so than most political scientists recognize. Researchers can study many subjects in the lab: coalitions, alliances, voting, media, leadership and so on.

Last, experimental methodology is interdisciplinary, and many social scientists using it are aware of similar work in other disciplines. Experimental social dilemma research has been done by political scientists, social psychologists, anthropologists, sociologists, and economists. If political science is too insular a discipline, then this may be reason enough to employ it under some circumstances.

Limits of Experimental Methodology

There are limits to what research can be explored using experimental methodology (although the same can be said for other quantitative and qualitative methods as well). Experimental methodology cannot be used to study specific historical events well (such as a presidential election) or the evolution of a specific culture. There are ethical limits to what a responsible researcher can do with human subjects, and so anything that would cause physical harm or serious psychological distress is prohibited from laboratory work, even if it might be an important focus for a political scientist (for example, genocide or interclass conflicts).

Moreover, changes in experimental conditions do not explain themselves. Experimental work requires two steps: designing experimental variables to study a particular phenomena, and statistical analysis of the results. Either of these steps can be done incorrectly. The variables may be poorly designed, so that the experiment is not actually measuring its supposed subject. Statistical error is always possible, though no more likely than in other quantitative methodologies.

The most telling critique, though (and the one most often heard in political science circles) is external validity. The real world is exponentially more complex than a laboratory, and a simple causal relation found in the latter may be subsumed by other, "more important" factors. Although good experimental research is *internally* valid, it might not be *externally* valid to any "real" world events. This may be a critique of specific work or of the experimental approach generally. Specific works may be flawed, but the entire purpose of experimental work is to strip interfering variables out of the

research. If those other variables have a larger effect, then perhaps they should be tested as well, but this does not mean experimental methodology itself is to blame.

All science is reductionist. Models are only simplified descriptions of real situations or processes. An experimental model may be too simple, but experimentation itself is a fundamental tool of the scientific method and political scientists would be foolish to disregard its strengths.

Reasons for Experimentation

Roth (1995) suggest three central purposes for economics experiments. Although he is speaking to a different discipline, this reasoning is also applicable to political science. Roth refers to these different approaches as "Speaking to Theorists," "Searching for Facts," and "Whispering in the Ears of Princes."

An experimenter is "Speaking to Theorists" when he or she is using the experimental methodology in order to test the predictions of formal theorists. Laboratory work is valuable because it allows for very clear testing of theoretical models, and the results can be used to build new theories.

"Searching for Facts" refers to the use of experimental data to build (rather than test) theoretical models. Sometimes theory may have very little to say about the relationship between two or more variables. In these cases, experimental methodology can be a starting point for "thinking outside of the box." If scientific research is to be cumulative, then theory and data must continually feed off of one another: theories are distilled from data, tested for weaknesses, modified by the new data and tested again.

"Whispering in the Ears of Princes" is the dialogue between researchers and policymakers. Policymakers frequently engage in a sort of informal experimentation of their own when they "muddle through" policy changes, making small incremental steps to adapt programs and sticking with those changes if the results are positive (Lindblom 1959). Policymakers are (or should be) wary of making radical changes in policy without properly analyzing the potential impacts, since public policy can have a drastic impact on people's lives. Experiments are one of many ways that the impact of policy changes can be tested before they are actually implemented.

Like economists, political scientists sometimes give advice to policymakers. Experimental methodology can provide empirical evidence to support that advice without having the potentially disruptive influence of a "real" world test.

The hypotheses listed in the beginning of this chapter are well suited for laboratory testing. Experimentation allows us to

1. *Observe the formation of clubs in a standardized setting.* Standardization is also nearly impossible to find in the natural world, which is problematic if the researcher is interested in the effects of specific variables on club formation. Intergroup comparisons outside of the laboratory will frequently be filled with "noise" that changes over time and whose impact will be unpredictable. In contrast, a laboratory will allow the experimenter to closely monitor incipient clubs under a variety of conditions, with important variables (such as population size, resource distribution, and time pressures) held constant and others manipulated to test various theories.

2. *Define an "efficient" club size.* An efficient club size will maximize per-

member benefits. This can be easily arranged in a laboratory setting. In an experiment, subjects can easily determine an efficient group size by studying the monetary incentives.

3. *Provide a means for clubs to experience "crowding effects."* Crowding due to club size be allowed by setting a fixed reward for laboratory groups, regardless of size. Any groups that exceed this size will voluntarily experience crowding effects. Crowding due to internal demands can be replicated by incorporating an *n*-person PD game into each club and clearly informing subjects of the dangers of overuse. Additionally, this provides a clear theoretical and empirical link with previous work in the study of social dilemmas.

Research Design

A new experimental paradigm was forming at the University of Oregon's Institute of Cognitive and Decision Sciences at the same time that the author was beginning his dissertation studies. Social poker is an interdisciplinary paradigm for studying the formation of self-organized groups (Arrow, Bennett, Crosson, and Orbell 1999). A self-organized group is one that is formed by individuals who freely bargain and associate with one another in order to gain benefits not available by acting alone. With members from political science and social psychology, we formed the social poker research team to investigate the formation of multiple groups from a set population. The work has received a two year grant from the National Science Foundation's Decision, Risk, and Management Science program.[3]

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[3] Grant #9729320

As the name implies, there are parallels between regular poker and social poker. As in standard poker, players are allocated several cards and must try to use those cards to form a hand. Unlike regular poker, players are not given enough cards to form a hand alone. They must combine their cards together and receives their rewards as groups. The social poker paradigm incorporates most (but not all) of the theoretical structure for clubs outlined above.

Standardized "efficient" club size. The experimenter determines both the population of potential group members and the most "efficient" group size (that which maximizes per-member benefits). The standardized population for these games was 8 players. Any subset of three or more players was needed to form a hand. This structure ensured that three person groups were the optimal size. A group could only turn in one hand, and no player could be in more than one group at a time. Players were allowed to make agreements about the division of group goods during the discussion period if they wished.

Individual and collective resources. In social poker, each player receives a set of predetermined cards. The experimenter can decide if those card will have value alone, collectively, or both. By varying the distribution of cards, the experimenter can limit the number of potential groups that can form and the opportunities of individual players.

In all of the social poker games discussed here, any subset of three or more players could form a hand and redeem it for a $10 prize. In some versions of the game, players could also choose to keep their cards in exchange for $1 (see below).

Crowding effects. Groups did not receive more money for incorporating extra

players into their groups. Therefore, any groups that chose to do so would experience size-related crowding effects in the form of reduced per-member benefits.

Demand-related crowding effects were experience in the form of an in-group social dilemma. Once a group formed, group members were separated and each member privately checked off a claim[4] on his or her group's earnings for the round. If a group's total claims exceeded the $10 prize, then a penalty of $.50 was inflicted on every group member for each $1 over the $10 limit. This provided a small-scale social dilemma within the structure of each group in which members had a limited capacity to exploit one another, but mutual exploitation would lead to a decline in the group's "productivity."[5]

Free association. Rather than being placed into groups by the experimenter, players were allowed to form groups themselves. The groups in social poker are voluntary associations. Players choose to which groups to enter and groups choose which players to accept. All communication is open and unrestricted, allowing players to convince or deceive others about their intentions.

Summary. The specific structure of the experiment outlined above matches the model synthesized at the end of Chapter 2. Players are each given a set of resources (cards). They choose partners from a set pool (population) to form groups (clubs) that provide exclusive benefits. Once a group has formed, members may access the group good at will. If the demand on the group good exceeds the set limit, then the costs of

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[4] The claims had to be a whole dollar amount from $0 to $10.

[5] The expected payoff for being in a group was hence x1-((x1+x2...x*n*)-10/2) when x is a player's claim, *n* is the size of the group and mean group claims are equal to or exceed $10.

overuse are distributed among the various members of the club. This adds a second-level collective action problem to the experiment, as may occur in clubs that only offer coarse exclusion from the club good.

This laboratory model does differ in some ways from the club model. The associations formed in the laboratory are fleeting and may be less subject to interpersonal influences. The number of potential clubs and club members is small, which limits individual choice. However, the advantages of standardization make laboratory testing an interesting and productive methodology for research on size- and demand- related crowding effects.

CHAPTER IV

FINDINGS

The thesis divides crowding effects into two different categories: those that are caused by the size of the club, and those that are caused by internal incentives to overuse the club good. This chapter will address both of these concerns, and concludes that players will tolerate the first and use preventative measures to minimize the second.

Experiment 1

Experiment 1 was designed to test the hypotheses about club size and productivity outlined in the beginning of Chapter 3. Specifically, we would expect that in a social poker setting

Groups will be sized so as to maximize per-member benefits. Each experiment has 8 subjects. Minimum group size is 3, and no benefits are derived from adding more members. Therefore, we will see 2 groups form with 3 members each, with 2 subjects excluded.

Groups that form under the single-shot conditions will be more likely to overuse the group good that those that do not face such restrictions. In the experiment, group that form under an iterated sequence should make smaller claims than groups that form under a single-shot condition. Mean group claims should be smallest in the opening round of the iterated game. Detecting cheaters requires some effort, but players should at

least seek other groups if payoffs are substantially lower than expected. Cheating in the single-shot game is attractive both because there is no future penalty to incur, and because players must consider the possibility of being "suckered" (sticking to the agreement while other group members do not) in the single shot game and act preemptively.

Groups that utilize multilateral promising will put smaller demands on group goods than those that do not.. Since these experiments do not provide a means for enforcing agreements, we would expect that some groups will recognize and utilize the option of making a group promise. Based on the previous research of *n*-person PD games, we would expect that these groups will have fewer problems with overclaiming. According to Orbell, Dawes, and van de Kragt (1990) only groups with complete multilateral promises (IE everyone agrees that everyone has promised) should see this effect.

Participants

366 University of Oregon students (100 men and 266 women) participated in these experiments.[6] Of these, 267 were Caucasian, 40 were Asian, 14 were "mixed", 9 were Hispanic, 5 were Native-American, 3 were African-American. The remaining 26 subjects were either "other" or left the question blank. The average age of all participants was 20. All participants received partial credit toward an introductory psychology course

[6] All of the subjects in these experiments (both Experiment 1 and Experiment 2) were drawn from the same subject pool and so are reported as one set.

requirement. Any monetary earnings were in addition to this credit and were dependent entirely on the choices made during the game.

Design

In one condition of the game, participants played one round of social poker and were aware that the game was of a one-shot variety. In a second condition, players were informed that the game would repeat at least once. Subjects were actually allowed four rounds in this iterated version, and each player was privately informed of his or her earnings in the previous round before the next round began. There were several reasons for using a single-shot and an iterated version of the game. According to the thesis in Chapter 1, crowding effects are influenced by either the size of clubs or member demands on club goods. As with the literature on social dilemmas in Chapter 2, we would expect that players will behave in a more opportunistic manner in the single shot games than in the iterated games.

Materials and Procedure

Eight subjects were seated in a large room with an instruction sheet. An experimenter stood and read further instructions. The experimenter emphasized that it was important for everyone to understand the exact structure of the game, and answered questions until it was clear that everyone understood the consequences of their choices in the game.

Subjects then moved to the front of the room and received a numbered bib (one

through eight), a set of playing cards, and a list of the cards of all of the other players. Once the game began, players were allowed to freely interact with one another and discuss group formation at various spots around the room. Players could form groups by finding others with compatible playing cards, and the card distribution allowed any subset of three players or larger to form a "hand" which was redeemable for a $10 group prize. This structure ensured that three-person groups were the optimal size. A group could only turn in one hand, and no player could be in more than one group at a time. Players were allowed to make agreements about the division of group goods during the discussion period if they wished.

Once a group formed, group members were separated and each member privately checked off a claim[7] on his or her group's earnings for the round. Penalties were assessed on groups that exceeded the $10 limit in the manner outlined above.

Players filled out questionnaires after the claiming process but before they found out how much they earned. These questionnaires asked them if they had been able to form an agreement, and if so whether they personally had stuck to it. They were also asked their confidence that each of the members of their group would honor the agreement. Following the end of the game, players filled out a second questionnaire that gathered demographic data, then were sent one at a time into the hallway outside where they received their payoffs for the game and dismissed. Players were told before the game started that each player would be well clear of the hallway before the next player was dismissed.

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[7] The claims had to be a whole dollar amount from $0 to $10.

Results and Discussion

Although we began with the assumption that clubs would be minimally-sized across all runs, this did not occur. The willingness of subjects to form clubs that would maximize per-member payoffs was significantly dependent on the conditions that framed the various games. Specifically, players were likely to allow superfluous members to be added to their clubs in iterated but not single-shot games. This finding was important enough that it generated new hypotheses and eventually a new set of experiments designed to test the limits of this inclusionary norm.

Under both the single-shot and iterated conditions, many groups formed that were larger than the 3-person minimum necessary for provision of the group prize. However, mean group size was not identical under both conditions, and trends emerged over the sequence of the iterated game.

Did groups form a size that would maximize per-member benefits? The answer to this question is a resounding no. Groups regularly exceed the 3 person minimum, although adding more members did not increase group- or member- profits.

Under the single shot condition, mean group size of all groups was 3.3 members. This is significantly smaller than the 3.7 average of all of the groups of the iterated sequence (t = -4, df = 53, P <.001). Furthermore, this difference holds true when comparing all single shot groups against each of the rounds of the iterated game: round one (P = .05), round two (P = .01), round 3 (P = .001), and round 4 (P = .001). The trend that emerges over time is one of increasing group size over the rounds, as the wallflowers get incorporated into groups even under games with extreme problems in overclaiming

(see Figure 3).

Figure 4 illustrates the ratio of 3-person groups to larger groups. Initially, 3-person groups dominate (though not so much as in the single-shot game), but inclusion increases in every round. By the final round, larger groups are the predominant arrangement.

Wallflowers should rationally push to get into groups since entry (in this version) is costless and exclusion means that no profits are possible for that round. The reasoning group members would use to justify including extraneous players was less clear. There are three potential explanations for why larger groups formed:

1. Individual players may have recognized the personal benefits of including excluded players.

2. The players as a whole adopted a risk-averse norm of inclusion.

3. The players as a whole may have developed a sense of social community.

Personal benefits. We initially surmised that the decision by group members to include extraneous members was based on fear of potential ostracism in future rounds. Essentially, players recognize the dangers of being left out of groups and allowed extra members into their groups with the understanding that the favor would be returned should they later find themselves on the "outs." This explanation is based on self-interest but does not hold up under close scrutiny.

Suppose you are an individual group member of a 3-person group, and an excluded player asks to be admitted. According to this personal benefits logic, you would only include this person if you expect to have the favor returned in a future round.

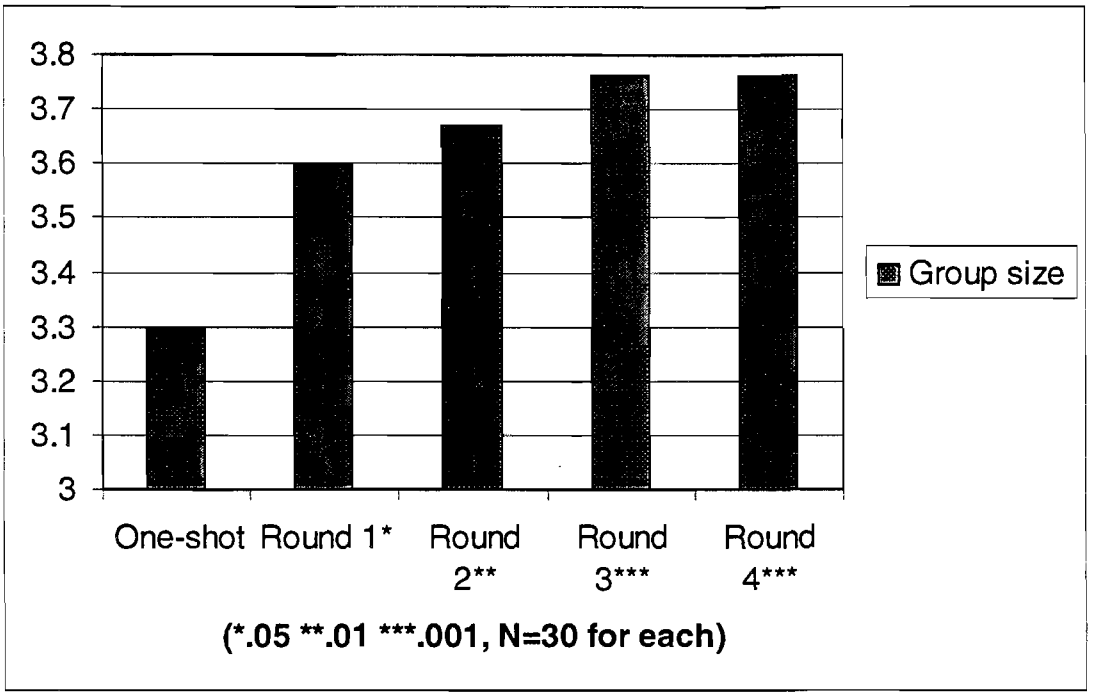

FIGURE 3. Mean Group Size in Single-Shot and Regular Iterated Rounds

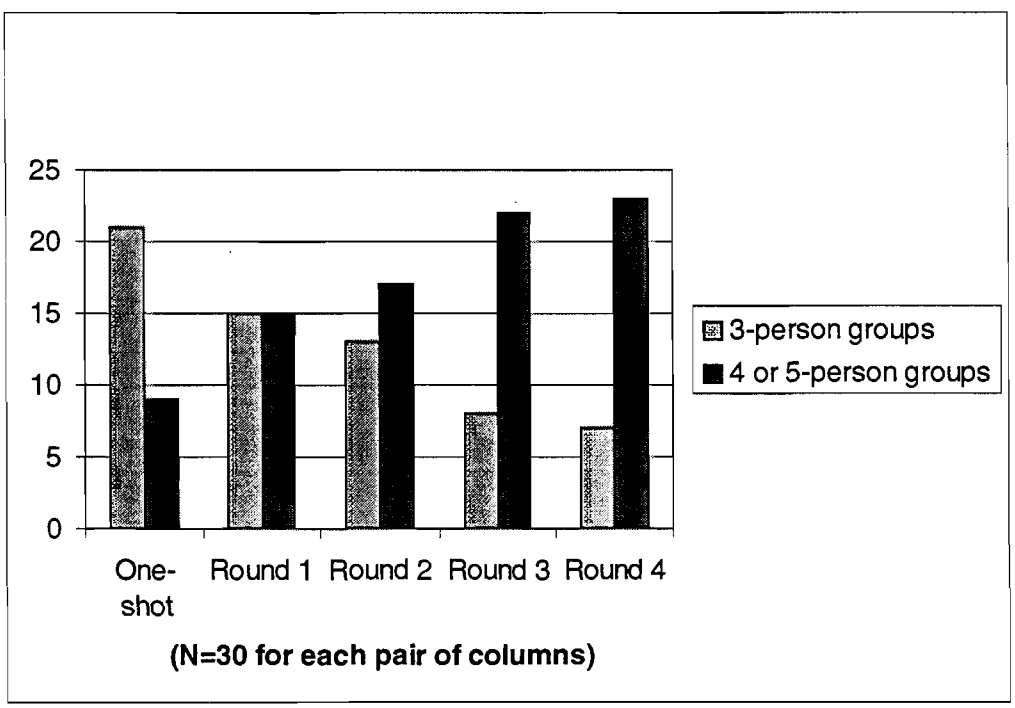

FIGURE 4. Ratio of Minimum to Larger-Than-Minimum Groups in Single-Shot and Regular Iterated Rounds

Adding another person to a 3-person group means that the average member payoff will drop from $3.33 to $2.50 (barring any overclaiming). In an iterated sequence, the expected payoff if you do not allow this player to join is

choice to exclude = $3.33 + ((probability of another round) * (.75($3.33))

where $3.33 is your reward for this round and .75 represents the likelihood of your being in another 3-person group next round.

If you choose to include this person now, your expected payoff will change in two ways: you will lose $.83 now with the understanding that on the chance that you do not get into a group next round (.25) and the other person does (.75) you will be admitted to this 4-person group. Your expected reward is now

choice to include = $2.50 + (probability of another round) * (.75($3.33) +
.25(.75*$2.50))

Assuming that there *is* another round, you would earn an expected future gain of $.47 for a sacrifice of $.83. This is irrational, and players should not choose to include others on this basis.

Risk Aversion. The players as a whole might have chosen to adopt an inclusive norm as a method for minimizing risk. Putting the possibility of overclaiming for the moment, the expected value of a player in a population that *did not* include wallflowers

was

(Probability of being in a group) * (expected payoff) = .75 ($3.33) = $2.50

if we assume no player was more likely to be included than any other. Likewise, the expected value of a player in a population that *did* include wallflowers was

(Probability of being in a group) * (expected payoff) = 1 ($2.50) = $2.50

According to prospect theory, people would not be indifferent to these two choices (Kahneman and Tversky 1979). Players would be risk averse in terms of prospective gains, and as the second choice was a "sure thing" while the first is not, players choose inclusion over exclusion. If including more players increases the potential for overuse, then risk aversion was valued more highly than that risk.

This hypothesis of risk-aversion is similar to the argument for universalism in Congress (Klingaman 1969, Weingast 1979) which attempts to explain the failure of minimal winning coalitions to form despite the predictions of the rational actor model (Riker 1962). Universalism attempts to explain why congressional members prefer to form continuous large coalitions that pass all distributive projects rather than continually form and reform minimal winning coalitions for specific bills. Congressional representatives are considered to be risk-averse in terms of re-election and in terms of being members of the majority coalition. They form larger coalitions because they prefer

a strong chance of getting a small distribution of government services to be superior to a weak chance of getting a large distribution of those goods.

Of course, players did not collectively choose a norm of inclusion or exclusion before the game begins. The principal objection to universalism is that the danger that universalism would mitigate against (being excluded in future rounds) decreases as players inevitably get closer to the end of the game. Therefore, if inclusiveness started high and then decreased during the games, we could make an argument for this hypothesis. As shown in Figure 3, this did not happen. They also chose to reject extra group members in the single-shot game, where this logic would predict inclusion as well.

Social Community. An alternative hypothesis that might explain the growth in inclusiveness is a form of social community, whereby individuals "take care" of others, even at some cost to themselves, because they accept responsibility for others, perhaps without any expectation of reciprocity. If inclusiveness develops as the game progresses, that would be evidence of the subjects developing a sense of "we-ness" as a "little society" and a sense of social responsibility to others in that society. There is indirect evidence of this happening. Although group size consistently increased throughout the iterated sequence, mean group claims did not. Player questionnaires also reveal no increase in desire for new group arrangements despite declining per-member profits.[8]

Were clubs that formed under the long-term sequence less likely to have

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[8] In response to the question: "If you play this game another round, would you try to form a group with the same people?", more people answered positively in the last round than in the first round of the iterated game, despite the larger groups sizes (p=.08).

overclaiming problems than those in the single-shot games? A large amount of the theoretical research in the social dilemma literature suggests that a "shadow of the future" will influence individuals NOT to choose defection (here, overclaiming) for fear of reprisal or ostracism. *That theory was not supported here.* Mean group claims were actually smallest under the single-shot condition, but not significantly so. Comparing the single-shot claims to any of the rounds of the iterated sequences yields no significant results. There were also no significant differences between the mean group claims of the regular iterated sequence and the "consolation" version.

Did promising affect group productivity? Some experimental social dilemma research suggests that multilateral promises (that is, promises by everyone) can reduce instances of defection or overuse (Orbell, Dawes and van de Kragt 1990, Orbell and Dawes 1991). That research is strongly supported here.

On the questionnaires, every group member was specifically asked who in their group had made a promise not to overclaim.[9] If we put promising on a scale from 0 (no promising) to 1 (some promising) to 2 (multilateral promising), then those groups with overclaiming problems are on the left side of scale (mean=.88) and those without overclaiming are on the right (1.3).[10]

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[9] The question was "Did the people in your group PROMISE to one another that you would only claim what you had agreed to?" They were then asked to fill in the player numbers of anyone who promised or did not. During the iterated sequences, these questions were asked on the final questionnaire so as not to induce promising where it might not otherwise appear on its own.

[10] $P<.0001$

Figure 5 illustrates the mean group claims of groups[11] with multilateral promises ($10.20), those with some promising ($10.90), and those without any promising ($13.40),the effect of promising is very obvious. The difference between the first and last types of groups ($3.20)[12] is more than most individual subjects received during the bargaining sessions, and indicates that lack of promising inflicts a serious penalty on self-restraint. Not only did promising have a bigger impact on group claims than did group size, but larger sized groups did not have more of a problem reaching promises than smaller groups. Racial composition also had no effect on a group's likelihood in achieving a multilateral promise. It seemed to be something subjects either discovered, or did not; and if discovered it was an effective tool in controlling overclaiming problems.

Experiment 2

Experiment 2 ("iterated with consolation") repeated the structure of the iterated game but any players who were not in groups ("wallflowers") automatically received $1 at the end of the round. This benefit was not available to wallflowers in the regular iterated condition. If clubs are willing to tolerate size-related crowding if club membership is the sole source of a good for otherwise excluded individuals, then we would expect that other means of provision would reduce or eliminate that toleration.

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[11] Note that this data set includes results from the groups in Experiment 2 as well as Experiment 1. Groups were not more or less likely to promise in either set of experiments.

[12] $P<.0001$

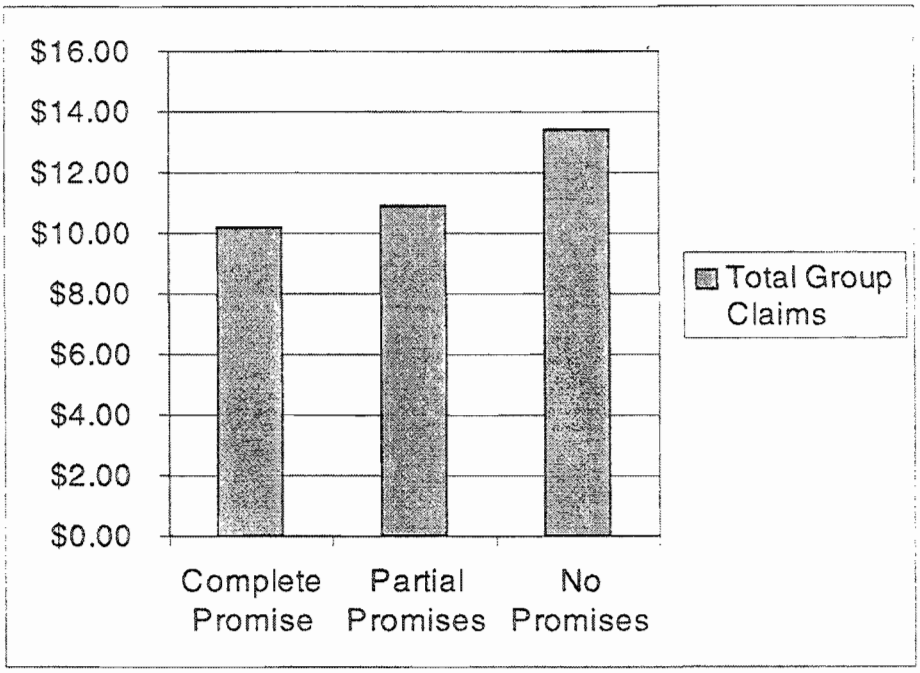

Figure 5. Mean Group Claims and Promises

Specifically we would expect that

Groups that form under the "consolation" iterated condition will be smaller than those that formed under the "regular" iterated condition. Under the consolation condition, the experimenter provides $1 for excluded individuals. We would expect that groups will be less inclined to include superfluous members when external support is provided, and that initially excluded individuals will have less incentive to try to get into groups.

Larger groups will have more problems with overuse than smaller groups. In all of the experiments, we would expect that minimally sized groups will be less likely to incur the overuse penalty than any larger groups that form. We would also expect that mean group claims will be smaller for the 3-person groups that for other groups.

This is derived from Olson's *Logic of Collective Action* (1965). Olson proposed that smaller groups *are* able to regulate (within limits) the selfish behavior of individuals. Smaller groups are able to police the actions of members by detecting and chastising uncooperative individuals. They are also better able to reduce the transaction costs of cooperation, such as communicating intentions and organizing group agreements. Not only are larger groups less able to accomplish these same tasks, but the contribution (or lack of contribution) is less likely to affect the final cooperative output, further reducing the incentive for each individual to "kick in" his or her fair share.

Participants

As in Experiment 1, all participants were University of Oregon students who

received partial credit toward an introductory psychology course requirement. Any monetary earnings were in addition to this credit and were dependent entirely on the choices made during the game.

Design

The design was identical to the iterated sequence described above, except that individuals who were not in groups at the end of a round (either voluntarily, or through exclusion) were given $1 for that round. This money was "guaranteed" and not dependent on the claims of others.

Materials and Procedure

The materials and procedures were identical to the "regular" iterated sequence except that subjects were told of the presence of the $1 payoff for individuals who did not wind up in groups.

Results and Discussion

Did the presence of the "consolation" dollar decrease average group size compared to the "regular" iterated sequence? If a sense of social community did develop, then adding some mechanism for taking the responsibility for excluded members from the group members should lead to a decline in inclusiveness compared to situations absent that mechanism. In fact, that happens.

We expected the presence of the "consolation" dollar to decrease group

membership for two reasons. First, all players would have to consider the risks inherent in joining groups, as groups with severe overclaiming problems can strip one or more players of all of their earnings for the round. Players' resources are now "fungible": they can now invest their cards in a potentially risky venture with others, or just take a "consolation" dollar. Second, group members would feel less pressure to include extra members with the presence of a "safety net."

The "consolation" option did indeed decrease average group size compared to the regular iterated version. The mean group size of all of the regular iterated groups (3.7, n=120) is significantly larger than that of all of the consolation groups (3.36, n=120) at the .05 level (p=.001) (see Figure 6).

Comparing the same rounds in the different versions, we find that the mean group size is smaller in each of the consolation rounds. Although this difference is not significant in the first round, it is significant at the .01 or lower level for all of the subsequent rounds.

The presence of the $1 consolation for wallflowers was an effective mechanism for decreasing group size, essentially keeping groups at the minimal size encountered in the single-shot games.

Did larger groups have more of a problem with overclaiming than smaller groups? The answer to this is *yes, but barely.* According to Olson (1965), smaller groups are more able to regulate individual demands because members are more aware of one another's actions. The lack of direct feedback in this game prevented such close scrutiny, but players were aware of previous earnings, and members of larger groups had

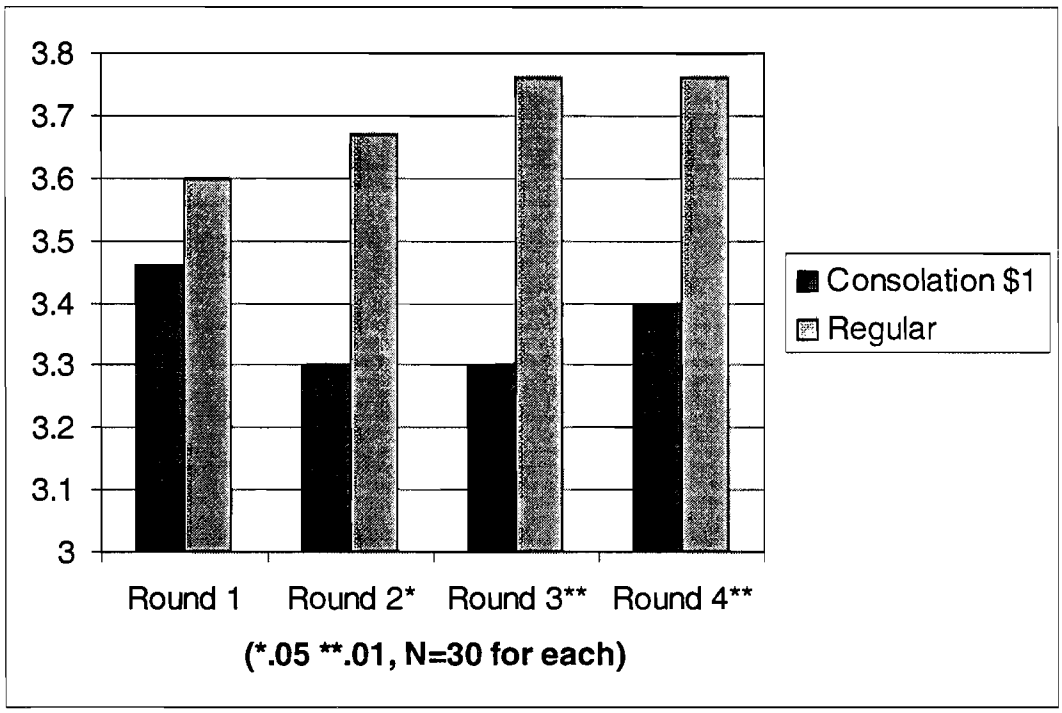

FIGURE 6. Mean Group Size in Regular and Consolation $1 Iterated Rounds

to make significant concessions during negotiations, which may have increased the temptation to overclaim.

Groups were divided into two categories: those that were minimally sized at three members, and those that were larger (either four or five members). The mean claim of the smaller groups was $10.60 and 20% of these groups exceeded the $10 limit. The mean claim of the larger groups was $11.40 and 30% of these groups incurred the penalty. The difference between the number of expected and observed penalty-incurring groups is significant ($p<.01$). These differences are not large, though, and note that mean per-member claims are actually smaller in the larger groups than in the smaller ones.

Summary

Players were more likely to form large groups only in those iterated games without any payoffs to excluded players. They did this despite the increasing demands this put on the group goods, which was a significant cost and risk. This trend increased over time, while it should have decreased if players were being inclusive with the expectation that the favor would be returned in future rounds. Inclusiveness was much less evident in games that were either single-shot or where excluded players were "taken care of" by the experimenter. This implies that subjects were including extraneous members into groups for social rather than personal benefits.

Promising was effective in keeping down instances of overclaiming. The claims of groups that did not make any promises were over 30% larger than those that made a multilateral promise. Even a "partial" promise (one that several players had made) was

effective in keeping down overclaiming. Promising seems to be the tool of choice for minimizing potential conflicts of interest between group members.

CHAPTER V

CONCLUSIONS

In a presidential address to the American Political Science Association, Ostrom called for an "empirically grounded theory of collective action (1998, p.1)." Noting that social dilemmas are and have always been a problem in all societies, Ostrom observed that the split between the predictions of rational choice theory and actual empirical evidence was sizable, and

> Field research also shows that individuals systematically engage in collective action to provide local public goods or manage common-pool resources without an external authority to offer inducements or impose sanctions. Simply assuming that individuals use long-range thinking "to achieve the goal of establishing and/or maintaining continued mutual cooperation" (Pruitt and Kimmel 1977, p. 375) is not a sufficient theory either. It does not explain why some groups fail to obtain joint outcomes easily available to them or why initial cooperation can break down.

We can clearly see that people do not always act selfishly, despite the predictions of social dilemma theory, and we sow cynicism when we pretend otherwise. This dissertation seeks to further the continued development of such an "empirically grounded theory," and poses two potential contributions: *clubs will tolerate some crowding if club membership is the sole source of some club good for otherwise excluded individuals*, even when there is no clear incentive to do so, and *promising is an effective tool for controlling selfish behavior inside existing clubs.*

Both of these theories are based on a dichotomy of crowding effects: those that

happen because clubs are too large, and those that happen because club members put more demands on their club goods than these goods can satisfy. Clubs tolerate the first when excluded individuals have no alternative means for acquiring the same type of good. This has the potential to increase the risk of the second, but clubs may limit this problem by the use of informal enforcement mechanisms.

This has applications beyond the study of clubs. As described in Chapter 2, clubs are only one type of exclusive group. Other club-like organizations that exist to provide benefits exclusively to members include coalitions, communities, and firms. This final chapter will consider possible applications of the thesis to these alternative arrangements.

Club Size

Clubs will tolerate crowding in a laboratory setting because excluded people would be forced to do "without." What are the limits to this generosity, and what are the overall implications for political scientists?

Limitations

According to the defense of experimental methodology in Chapter 3, other researchers sometimes accuse laboratory work as lacking external validity. The best method for countering this sort of attack is to recognize the limits of the experimental setting itself before applying it to "real" world problems.

The interactions documented here are based on a series of interactions within a laboratory experiment between strangers and with guaranteed anonymity of payoffs. The

small size of the experimental populations (8) meant that players were generally aware of who was being excluded from groups. Although players' earnings were kept private, it was obvious that being excluded meant no earnings unless the experimenter was willing to provide additional support. Large societies offer considerably greater anonymity. People may feel more comfortable excluding people whom they will never see again. This was the case in the single shot games. There are plenty of small societies still left in the world, though, and we might expect that clubs and other economic associations may pick up some of the slack in the place of a social welfare state.

Coalitions

As noted earlier, Riker's theory of the minimal winning coalition has been discredited as a positive model of coalition formation within legislatures. The theory of universalism (that coalitions include extra members with the expectation the favor will be returned in the future) is one alternative hypothesis. Members of a legislature agree to form one continuous coalition, rather than continually reform minimum winning coalitions for every legislative vote (Weingast 1979). Another hypothesis is that extraordinary majorities form in order to prevent one coalition member from threatening to "walk" unless the coalition accedes to the individual's demands (Groseclose and Snyder 1996).

The data from these experiments suggest that the logic of universalism in the congressional literature may be somewhat misguided. If coalitions are oversized because members of the legislature are risk-averse, then coalitions should shrink in size as

sessions draw towards a close–especially those sessions immediately followed by an election, in which a significant number of the representatives will presumably be defeated. If coalitions do not shrink accordingly, then something else may be causing those large coalitions. The evidence here hints towards an empathetic cause–not necessarily pity for the excluded, but an unwillingness to boot coalition members solely to form a minimum winning coalition. Conversely, we would expect to see minimum winning coalitions frequently in short term coalitions, such as can develop when several interest groups combine their resources to pass a single bill.

Communities, Charity and the Social Contract

One potential conclusion that can drawn from this data is that the presence of the $1 support for wallflowers allows for a "crowding effect" (Abrams and Schmitz 1978), wherein the $1 support decreases what is essentially charity from included players to excluded players. This sort of "crowding effect" is different from the crowding that occurs inside clubs. In terms of charity, a "crowding effect" occurs when government provision of social services or other collective goods decreases private contributions to charity. People feel less responsible for the welfare of "the poor" because of the perception that someone else is "taking care of them."

The implications of the data from this project are that if community members are put in close and continuous proximity to "underprivileged" individuals, they may be willing to accept them as a "social burden" if these individuals have no place else to go. Note that this implies that excluded individuals "deserve" access to certain types of

goods, and denial of that access would be wrong. In the experiments, money was the only type of good available.

A primary justification for the existence of social safety net programs is the "veil of ignorance" theory (Rawls 1971). Rawls asks us to imagine that everyone to be born into a society had the ability to collectively vote on the distribution of resources first, and that no one knew beforehand where they would wind up in the social hierarchy. What sort of society would we collectively choose to design? We would choose a just and equitable one, since the chances of being in the rich minority would be relatively slim compared to the possibility of winding up in the poor majority.

Rawls's theory is similar to classic state of nature theory in the tradition of Locke, since we are choosing the terms of the social contract before accepting it. The "veil of ignorance" is relevant to the discussion here for two reasons. Without claiming it as such, Rawls assumes that individuals are risk-averse in terms of gains. If the total wealth of society is fixed, then rational individuals should be indifferent to a choice between a horrendously inequitable society where a very few persons own all of the wealth and a completely equitable one where wealth is evenly distributed. If placement in the society is completely random, then the expected utility of entering it is equal under both scenarios. This is true for the same reason that the expected utility of choosing exclusion or inclusion as a social norm is equal in the games here: the diminished chance of being a wealth-achieving group member is offset by its increased value.

The core of the "veil of ignorance" theory is also relevant here because it is essentially the same as the psychology embodied in the phrase "there but for the grace of

God go I." Our birthright as wealthier members of society is only an accident, so it is argued, and we could have easily ended up poor and wretched. Therefore, we should support the existence of a social welfare state or some alternative method for caring for the less fortunate. In a club setting, we could easily have ended up excluded with no alternative means for gaining whatever good club members can use.

Small communities are more likely to include these sort of charities because it is easier to keep track of one another in smaller populations. The small size of the experiment's population (8) meant that players were generally aware of who was being excluded from groups. Although players' earnings were kept private, it was obvious that being excluded meant no earnings unless the experimenter was willing to provide additional support.

Demands on the Club Good

Promising works to reduce overuse of club goods in an experimental setting. Previous work indicated that this only applied to multilateral promises, but this data indicates partial promises are nearly as effective. What are the limits of promising, and what sorts of organizations might employ it as a means of self-control?

Firms and Promising

The basic structure of both clubs and firms parallels that of the experiment here, with the added potential of individuals in the group to take more than their "fair share" and undermine the entire cooperative agreement. Results from the experiments would

imply that promising can be a useful tool for controlling mutually exploitive tendencies in the initial stages of both firms and clubs.

Firms exist to reduce transaction costs (Coase 1937). Since transaction costs are so widespread, there are many different types of firms. One type is the corporate giant, which vertically integrates to avoid opportunism among suppliers (Williamson 1985). Another type is the small "firm of equals" where two or more partners join together to share mutual resources and share profits: witness the law firm. In this latter arrangement, each of the partners has opportunities to "defect" at the expense of the everyone. We would expect that informal trust mechanisms like promising would be utilized to minimize that risk.

Alliances

Just as individuals join clubs to provide services that would otherwise be prohibitively expensive to create alone, individual countries create alliances to provide mutual benefits (Olson and Zeckhauser 1967). Some of these alliances exist solely to compete with other alliances, such as the NATO and Warsaw defense organizations. Others are also designed to improve the lot of members countries and potentially compete with other groups: witness the European Union common market.

The groups that formed in these experiments only compete with one another for members. The lack of direct competition between groups means that it lacks a crucial

aspect of defense alliances.[13] On the other hand, economic alliances do resemble the exchange theory model described above. Both partners gain from bilateral free trade allowed by economic treaties or they would not have agreed to the partnership.[14] Likewise, a multilateral trade agreement like the European Community or North American Free Trade Agreement resembles a club. Given the difficulty of international monitoring of some trade violations (such as subsidized industries), and the anarchic structure of international law, the games in these experiments map onto this simple model of international relations. The effectiveness of a "toothless" enforcement mechanism such as a promise lends support to the liberal theory that countries do abide by treaties sometimes even when it might be in their short term self-interest not to do so.

Final Conclusions

This study of clubs and similar exclusive groups demonstrates that a traditional view of organization as a strictly self-interested phenomenon is insufficient. Laboratory work indicates otherwise. Clubs are traditionally formulated as consumer-driven arrangements, driven solely by the wealth-maximizing preferences of their memberships and not by external concerns. When excluded individuals will be denied access to a type of good that they "need", however, club members may rethink their policies and expand beyond the most "efficient" size.

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[13] However, tweaking the game so that only one group can succeed (perhaps by having one hand defeating another, just as in real poker) would be a relatively easy way to remedy that situation.

[14] Although one partner might be forced to do so.

Generosity has its limits. A private swimming pool club might allow more memberships, particularly during a hot summer, but not if there is a city pool. A business in a small community might have more workers than necessary, but only if those workers would have no other means of support. Promising has its limits. It should not be considered a substitute for a formal contract, but it may play a supplemental role, and it may be a viable alternative if contractual enforcement is impossible or prohibitively expensive. A small firm may have a network of promises restricting opportunistic behavior, but a large corporation may need more formal procedures. Within these limitations, both should be considered further contributions to the development of empirically based models of organizational and collective behavior.

APPENDIX A

EXPERIMENTAL PROTOCOL

Protocol for Iterated (4 rounds)

8-person game, Partial Disclosure

Materials needed:

8 subjects, seated in 3 rows, facing the whiteboard
1 experimenter + 1 assistant + 1 cameraman (or woman)
subject money ($ 80)
Human Subjects Reimbursement Form
"do not enter" sign on door
signs point out way from sign-up sheet area,
sign-up sheet
whiteboard for explaining the game
experimenter stopwatch to time
(32) payoff slips
(1) experimenter mastersheet for recording groups & point divisions
(8) experimenter tally sheets for figuring out payoffs
(32) player claim forms for taking from the group prize
(8) "Player Instruction Sheet
(32) player notesheets (4 different kinds, 8 of each)
(11) clipboards
(11) pens
a stapler
(8) ID tags/bibs
(32) inter-round questionnaires-A
(16) inter-round questionnaires-B
(8) post-experiment questionnaires-C
(8) debriefing forms
(16) consent forms
(8) Video release forms
2 videotapes

2 packs of playing cards arranged as follows:

Round 1:

Player	**Cards (any suits)**
#1	5 5 2
#2	2 2 3
#3	3 3 4
#4	4 4 5
#5	5 2 3
#6	5 2 4
#7	5 3 4
#8	2 3 4

Round 2:

Player	**Cards (any suits)**
#1	6 3 4
#2	6 3 5
#3	6 4 5
#4	3 4 5
#5	6 6 3
#6	3 3 4
#7	4 4 5
#8	5 5 6

Round 3:

Player	Cards (any suits)
#1	7 7 4
#2	4 4 5
#3	5 5 6
#4	6 6 7
#5	7 4 5
#6	7 4 6
#7	7 5 6
#8	4 5 6

Round 4:

Player	Cards (any suits)
#1	8 5 6
#2	8 5 7
#3	8 6 7
#4	5 6 7
#5	8 8 5
#6	5 5 6
#7	6 6 7
#8	7 7 8

BEFORE THE SUBJECT ARRIVE:

Experimenter: Clear out the center of the room and make sure the areas around the microphones are clear (everyone). Clear in area A. Place the paperwork on it.

Experimenter and Cameraman: set up tables. Hook up microphones. Turn on audio/video equipment. Position cameras to microphone areas, and test audio/video setup.

Assistant: Set up a table with subject sign-up sheet, consent forms, videoconsent forms, and debriefing forms. Mark experiment name on incoming doors. Arrange 8 chairs in the center of the room in 3 rows, facing the whiteboard, and place a clipboard on each with the following attached: 1 Player Instruction Sheet and 1 pen. Take playing cards from pack and set them up on a separate table near the east entrance for distribution in the game, as described above, next to the appropriate ID tag.

As subjects arrive, **Experimenter** detains them in the hallway and asks them if they know anyone else there. If two people know one another, the one who signed up second is ineligible (use judgement here to determine if it was accidental, if so then they receive a credit slip). Check subjects off on the sign-up sheet. If more than eight subjects show up, then **Experimenter** has the extra subjects do a small group rating scale form, gives them a signed credit slip, checks them off on the sign-up sheet, and dismisses them. If fewer, **[alternate task]**

Experimenter accepts their consent forms, and puts the forms in a marked folder. When everyone is done, **Assistant** brings them into the main room and tells them:

Sit down at any of the chairs in the center of the room. Please read the instructions carefully and fill out the questions on the back as best you can. We will over the answers before the experiment begins.

[wait 5 minutes or until everyone is done, whichever comes first]

Cameraman begins the recording process in the video room.

the **Experimenter** explains the experiment as follows:

We are running a larger number of these experiments, and to make sure that everyone gets the same initial instructions, I will be reading them for the next few minutes. If you have any questions, raise your hand at any time. We are going to be playing a game today that involves repeatedly forming groups. Your task is to find people in this room to form a group with you. Every time you get into a group, then you will have access to a $10 prize.

The game will have multiple rounds. Whenever a round begins, you need to find

at least two other people to pool your cards together with. Before each round, you'll each receive 3 playing cards, hold onto them, you can't trade them with anyone else. You'll also get a sheet that tells you what cards everyone else has, you can take notes on it if you wish.

We are videotaping the conversations. To be sure that we can pick up whatever you say, you can only talk when you are at one of the recording stations. When you want to discuss forming a group, you will need to go to Table A (point) or Tabled B (point) on this side of the room. If both of these are occupied, remaining people may use Table C (point). Do not use Table C if the other tables are free. Do not move the chairs at the tables, we have them set up so that the cameras can pick everyone up.

After three minutes, I'll declare the round is over, and if your group has either 3 pairs of cards or 4 of a kind, raise your hands and we'll come over and verify it. Everyone will sit back down and the people in each group will have access to a $10 prize. A pair of cards is just that: 2 2s, or 2 4s, or what have you. A four of a kind is 4 of the same card value–four kings, for example. **[illustrate]**

OK, on the first question on the back, could these players form a recognized group? Do they have the right cards? **[answer: 4 4s on left, 2 5s 2 4s 2 3s on right]**

Player #1:	4 ♡ 4♢ 2♢	Player #1:	A ♡ 4♢ 3♢
Player #2:	4♤ 7♤ 5♤	Player #2:	4♤ K♤ 5♤
Player #3:	3♤ 6♤ 4♡	Player #3:	3♤ 2♤ 5♡

OK, so if your group has those cards, you'll be recognized. Keep something in mind when you're looking for group partners: in between rounds, after the discussion period ends, you will have no contact with any of the people in your group. You will be reseated apart from each other, facing the wall, for the remainder of the experiment. Each group member will get a slip of paper, and will PRIVATELY write down his or her claim on the $10 that their group earned. You can only claim whole dollar amounts--so $2, $3, or $5 claims are fine, but $3.50 or $6.25 claims are not. If the claims add up to $10 or less, each group member will get what he or she claimed. If they add up to more than $10, the group will be overdrawn. For every dollar that the total claims go over $10, 50 cents will be subtracted from each members' claim. OK, on the next question on the back: how much would the players receive in the following groups?

[answer: the total adds up to $16, which is $6 more than $10. This means each person loses $3 from their request]

Player	Claims	Receives
1	$ 6	
2	$ 4	
3	$ 6	

[answer; the total adds up to $21, which is $11 more than $10, each person loses $5.50 from their request. Make sure to note that we can't take money from them here; anything less than $0 is $0).

Player	Claims	Receives
1	$ 3	
2	$ 3	
3	$ 5	
4	$ 10	

[answer: no penalty, doesn't exceed $10]

Player	Claims	Receives
1	$ 3	
2	$ 4	
3	$ 3	

4. During the claims process, can you discuss your choices with others? Yes _X_ **No**___

5. Will your fellow group members ever find out how much you claimed? Yes ___ **No** _X_

Your decisions will be kept anonymous. None of the other players will find how much you claimed. Before the next round, I will give you a slip of paper that tells you how much you earned in the previous round. Only you will be able to see it. After the experiment, everyone will be dismissed one at a time, with breaks in between. You'll

walk out in the hallway, receive your $$ and credit slips for your class, and be dismissed. Furthermore, once the experiment is over, we will know what Player 1 or Player 5 did in this game, but not what Joe Smith did. Your name is not going to be part of the data set. Your involvement as a person ends after the experiment. OK?

OK, we're going to begin the game in a second. When I indicate, go over to the table over here **[points to Assistant at the table with cards]** receive a player ID tag, your playing cards, and a notesheet that tells you what everyone else else has. Go to the center of the room. Take a minute to study the notesheet and think about who you want to talk to, then when I indicate, go to any of the three talking stations **[point out microphone locations again]** and talk. OK, stand up, put your things on your chair, and pull your chairs out of the way right now, then pick up your cards and tags. Take a minute and look at the notesheet you just got; it asks you to fill out a few things. When you are done, come to me in the center of the room.

When all subjects have done so, the experimenter waits for a minute and then says

You can move to the talking stations now. Remember, WE WILL NOT MEET WITH ANY SET OF PEOPLE UNTIL THREE MINUTES HAS PASSED.

Subjects begin the game. **Experimenter** and **Assistant** each get a clipboard with a tally sheet and several claim forms, and arrange excess chairs as far apart as possible, facing the wall. At the end of three minutes, **Experimenter** says

OK, the discussion time has ended. Are there any groups?

As subjects raise their hands to signify that they have formed a group, **Experimenter** and **Assistant** go over and verify it. If verified, they note the numbers of the group members on the tally sheets, take their cards, and seat them at chairs, as far apart as possible. Wallflowers get *wallflower* questionnaires (B). **Experimenter** and **Assistant** then fill out the player # on the top of the claim forms, and hand them to the subjects face down.

Experimenter says

We will pick up claim forms when you are done. Fold them in half after you fill them out.

After one minute, **Experimenter** and **Assistant** collect the claim forms (folded in 1/2), and give each player a questionnaire (A) in exchange to fill out. **Experimenter** tallies up the individual payoffs, fills out payoffs slips, and distributes them. **Experimenter** collects questionnaires and notesheets IN RETURN and puts them into a folder. NO GIVING OUT PAYOFF SLIPS UNTIL THE QUESTIONNAIRE HAS

BEEN GATHERED. **Assistant** gets the cards set up for the next round.

Experimenter says

We will be playing another round now. The same setup as before–come over here, pick up your cards and notesheet, and take a minute to look at your choices. Then the next 3-minute round will begin.

When all subjects have done so, the experimenter waits for a minute and then says

You can move to the talking stations now.

REPEAT UNTIL 4 ROUNDS HAVE PASSED. After collecting questionnaires for the last round and giving out payoff slips, **Experimenter** announces

OK, that was the last round. In a few minutes, we will begin dismissing people one at a time, with breaks in between. You will receive your payoffs one at a time, as you leave.

Subjects are given Questionnaire C while Experimenter goes into the hallway and prepares payoffs. **Experimenter** instructs **Assistant** to call each player out into the hallway, one at a time. They should take their belongings with them. Players receive a debriefing form, credit slip, and second consent form from **Cameraman** at the door. They then walk over to the **experimenter** at the table, trade in their payoff slips, and asked to sign the Human Subjects Reimbursement Form. MAKE SURE THAT THE PREVIOUS PRINTED NAMES IN THE FIRST COLUMN ARE COVERED. They are asked not to disclose the format for the experiment with others. They receive their cash and are dismissed. Human Subjects Reimbursement Form and tally sheets are placed in the cash envelope and put into room 172 drawer by **Experimenter**. **Assistants** and **Experimenter** restore room to its natural state. Player questionnaires, notesheets, and experimenter mastersheet go into folders to be filed in Small Groups Lab. (See **filing protocol).** Excess papers are discarded and materials returned to Small Groups Lab. Field notes are filled out and stapled together.

APPENDIX B

EXPERIMENTAL FORMS

Claim Form

Complete this form *privately*. Don't tell anyone else what you are choosing to do, discuss your choice with them, or let them see your decision. When you are done, fold the claim form in half. We will pick them up in one minute. We will not accept them before that point.

I am Player # _____ Round # _____

Other Players in my Group:

Player # _____ Player # _____ Player # _____

Player # _____ Player # _____ Player # _____

How much of the $ 10 group prize are you claiming for yourself ? (check one)

$0 ___ $1 ____ $2 ____ $3 ____ $4 ____ $5 _____

$6 ____ $7 ____ $8 ____ $9 ____ $10 _____

When you are done, please fold the form in half.

Player Instruction Sheet

In this experiment, you will be playing a card game. This side gives the game rules. The back has a few questions to check your understanding of the rules. Please read the instructions below carefully and answer the questions on the back. The experimenter will review the rules and quiz results before the actual game begins.

- This game will have multiple rounds. Before each round begins, you will each be given 3 playing cards. Your task is to find people in this room to form a group with and combine your cards to form either three pairs (for example, a pair of 10s, a pair of 9s, and a pair of 8s) or four-of-a-kind (for example, four kings). Groups that are successful at forming one of these card hands will gain access to a $10 reward. You will need AT LEAST 3 PEOPLE to form a successful group.

- Once the round begins, we will clear away the chairs and you will have 3 MINUTES to talk to people about forming a group. Please talk at the areas marked by the experimenter so that we can record the conversation on videotape, and STAND SO THAT YOU ARE FACING THE CAMERA AND MICROPHONE.

- WE WILL NOT MEET WITH ANY SET OF PEOPLE UNTIL THREE MINUTES HAS PASSED. If you are in a group at the end of 3 minutes, raise your hand and an experimenter will come over and verify that a successful group has formed. You will then be reseated apart from each other, facing the wall, until the next round.

- Each group member will get a slip of paper, and will PRIVATELY write down his or her claim on the $10 that their group earned. Your personal request must be a whole dollar amount--$2 or $6 would be OK, but $2.50 or $5.25 would not. If the total claims of group members come to less then or equal to $10, then each person will get the amount he or she claimed. However, if the total exceeds $10, each member of that group will lose 50 cents from their claim for every dollar over $10. For example, if there are three people in your group, and one person claims $5 while the other two request $3 each, then the total comes to $11 and the group is "overdrawn" by $1. Each person loses $.50 from his or her claim. So the person who requested $5 will get $4.50, and the two people who requested $3 will each get $2.50.

- You will then fill out a questionnaire while the Experimenter tallies up the payoffs for that round. Before the next round begins, you will receive a payoff slip (to be cashed in after the experiment) that tells you how much of the group reward you received and new cards for the next round.

- After filling out a final questionnaire, you will be brought out into the hallway ONE AT A TIME with intervals after each person, where you will receive a debriefing form explaining the purpose of the game and a credit slip for participating in the experiment. You will then cash in your payoff slips, and be dismissed.

Comprehension Quiz

1. Could these players form a successful group?

Yes ___ No___ Yes ___ No___

Player #1:	4 ♡ 4♢ 2♢	Player #1:	A ♡ 4♢ 3♢
Player #2:	4♧ 7♧ 5♤	Player #2:	4♧ K♧ 5♤
Player #3:	3♧ 6♤ 4♡	Player #3:	3♧ 2♤ 5♡

2. What hand can they make? _____ _____

3. How much would the players receive in the following groups?

Player	Claims	Receives
1	$ 6	
2	$ 4	
3	$ 6	

Player	Claims	Receives
1	$ 3	
2	$ 3	
3	$ 5	
4	$ 10	

Player	Claims	Receives
1	$ 3	
2	$ 4	
3	$ 3	

4. During the claims process, can you discuss your choices with others? Yes ___ No ___

5. Will your fellow group members ever find out how much you claimed? Yes ___ No ___

Release Form for Videotaping

I have received an adequate description of the purpose and procedures for videotaping the proposed research study. I give my consent to be videotaped during the study, and for those videotapes to be viewed and coded by members of the research team. I understand that all information will be kept confidential and reported anonymously, and that my name will not be connected to the videotape or any other information gathered in this study. With my signature below, I give permission for research purposes of the tape.

Consent for videotaping and use of data for research purposes (necessary to participate in study)

Signature _____ Date _____

Consent for additional uses for videotape (not necessary to participate in study)

By my signature below, I give consent to additional uses of the videotape beyond the basic research purpose. I recognize that if the tape is used in these ways, there is a small probability that someone from the intended audience might recognize me from the tape. I understand that I may withdraw my consent for these additional uses at any time by contacting Holly Arrow at (541) 346-1996 or at harrow@darkwing.uoregon.edu.

1. Presentation to future research subjects

Signature _____

2. Presentation to professional audiences during colloquia or conferences

Signature _____

3. Presentation to students during lectures about group processes or decision making

Signature _____

Experimenter Mastersheet, iterated

Date: _____ Experimenter initials ____

Game #: _____

Wallflowers are marked with an X for that round.

Player	Rnd 1 claim	Rnd 1 payoff	Rnd 2 claim	Rnd 2 payoff	Rnd 3 claim	Rnd 3 payoff	Rnd 4 claim	Rnd 4 payoff	Total Payoff
1									
2									
3									
4									
5									
6									
7									
8									

Social production (all payoffs added together)

Round 1=_____ Round 2=_____ Round 3=_____ Round 4=_____

Total payoffs=_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Payoff Slip

Player #_____

Round #_____

Payoff $_____

Experimenter Tally Sheet

Round # ____

Player	Claim (in $)	Received (in $)

Total claims: _____ if < or = $10, they receive their claim; if > $10 then penalties per player are below the total:

$11	**$12**	**$13**	**$14**	**$15**	**$16**	**$17**	**$18**	**$19**	**$20**
$ .50	$ 1.00	$ 1.50	$ 2.00	$2.50	$ 3.00	$ 3.50	$ 4.00	$ 4.50	$ 5.00

$21	**$22**	**$23**	**$24**	**$25**	**$26**	**$27**	**$28**	**$29**	**$30**
$ 5.50	$ 6.00	$ 6.50	$ 7.00	$ 7.50	$ 8.00	$ 8.50	$ 9.00	$ 9.50	$10.00

Take this amount **from each person's claim** and post the difference in the received column. Claims of less than $0 are $0.

Player # _____

Card Distribution & Player Notesheet

Round 1

This notesheet is for any notes you may want to take during the course of the experiment, and to inform you of the distribution of cards:

You will have one minute to study the distribution and decide who you want to form a group with.
Please **CIRCLE** the numbers of the players you hope to form a group with before the game begins.

Player	Cards (any suits)
#1	5 5 2
#2	2 2 3
#3	3 3 4
#4	4 4 5
#5	5 2 3
#6	5 2 4
#7	5 3 4
#8	2 3 4

Player # _____

Card Distribution & Player Notesheet

Round 2

This notesheet is for any notes you may want to take during the course of the experiment, and to inform you of the distribution of cards:

You will have one minute to study the distribution and decide who you want to form a group with.
Please **CIRCLE** the numbers of the players you hope to form a group with before the game begins.

Player	Cards (any suits)
#1	6 3 4
#2	6 3 5
#3	6 4 5
#4	3 4 5
#5	6 6 3
#6	3 3 4
#7	4 4 5
#8	5 5 6

Player # _____

Card Distribution & Player Notesheet

Round 3

This notesheet is for any notes you may want to take during the course of the experiment, and to inform you of the distribution of cards:

You will have one minute to study the distribution and decide who you want to form a group with.
Please **CIRCLE** the numbers of the players you hope to form a group with before the game begins.

Player	Cards (any suits)
#1	7 7 4
#2	4 4 5
#3	5 5 6
#4	6 6 7
#5	7 4 5
#6	7 4 6
#7	7 5 6
#8	4 5 6

Player # _____

Card Distribution & Player Notesheet

Round 4

This notesheet is for any notes you may want to take during the course of the experiment, and to inform you of the distribution of cards:

You will have one minute to study the distribution and decide who you want to form a group with.
Please **CIRCLE** the numbers of the players you hope to form a group with before the game begins.

Player	Cards (any suits)
#1	8 5 6
#2	8 5 7
#3	8 6 7
#4	5 6 7
#5	8 8 5
#6	5 5 6
#7	6 6 7
#8	7 7 8

Consent Form

You are invited to participate in a research study of the choices involved in group formation. The study is conducted by Scott Crosson at the University of Oregon Political Science Department. We hope to gain a better understanding of how people make choices in a dynamic social setting. The study involves playing a social card game with several other people and answering a series of questions about the reasons for the choices you make while playing the game. The study will take about one hour, and the games will be videotaped.

The videotapes are made for research purposes only and will be coded under strict confidentiality. Your name will not be connected at any time with the videotape, with your questionnaire data, or with any other information obtained in this study. On a separate release form, you will have the opportunity to give the researchers partial or full information to use the tapes for additional purposes beyond coding. You may, however, withdraw permission for these additional uses at any time by contacting the researcher. You may also request deletion of your image from the tapes if you change your mind about their use for research purposes. Again, you need to contact the researcher, but you will not need to give any explanation for this request.

You will receive 2 hours of subject pool credit for the experiment. Because the game has a reward system, you may also up to earn $10 or more. We see only minimal risks in this study. Some people enjoy social card games, but others find such games stressful. How well you do in the game will depend on your choices, the choices of other players, and what resources you are given. Depending on the choices players make and the distribution of resources, some players may not be included in the groups that form, and thus will not earn any money, though they will still receive subject pool credit. At the end of the session we will give you more information about the purposes of the research.

Your participation is voluntary, and your decision whether or not to participate will not affect your relationship with the University of Oregon. You may withdraw your consent and discontinue participation at any time. However, you will only earn subject pool credit (and possibly cash) if you stay for the duration of the experiment.

If you have any questions regarding your rights as a research participant, contact the Human Subjects Compliance Office, University of Oregon, Eugene OR 97403; (541) 346-2510.

If you have any questions regarding the experiment, contact Scott Crosson, Department of Political Science, University of Oregon, Eugene OR 97403; (541) 346-4128; scrosson@darkwing.uoregon.edu, Professor John Orbell, Department of Political Science, (541) 346-5061, or Professor Holly Arrow, Department of Psychology, (541) 346-1996.

Your signature indicates that you have read and understood this information, that you willingly agree to participate, that you understand you may withdraw your consent and discontinue participation at any time without penalty, that you have been offered a copy of this form, and that you are not waiving any legal claims, rights, or interests.

Debriefing

Data from the *social poker* game you just played will be used to study the formation of groups. In this study, the sequence of individual and collective choices that result in the emergence of new groups will be studied, in particular with regard to its effect on "social productivity" (in the experiment, how much subjects earned in aggregate).

Social scientists in a variety of disciplines (including economics, political science, and social psychology) have studied "social dilemmas": situations in which individual incentives for behavior produce negative results at the social level. One example is public television: individuals receive public television signals whether or not they contribute to public television, so most people who watch public television do not contribute. Public television would not be able to exist if it only relied on viewer contributions (PBS solves this problem by seeking corporate and government sponsorship).

Another potential solution to a social dilemma is to form a type of group called a "club", where only members who contribute to the group good receive the benefits of joining. However, when people join groups for personal gains, their own interests sometimes diverge with those of others in the group. In particular, members of a group may overdraw from the group good and destroy it. We are interested in the types of strategies people use to resolve this problem: whether promise-making helps people form productive groups, and whether playing several games as opposed to a single game affects the strategies people use. In particular, we expect people will be more likely to keep their promises and strive for fairness when they know they will be playing multiple games with others, rather than engaging in a single interaction.

The process of group formation is central to the creation of new business, to the emergence of political interest groups and political coalitions, to the development of collaborative research, and to the proliferation of other voluntary groups that pose either serious threats (gangs) or other substantial benefits (charitable organizations) to society. If you are curious about this topic, the reading list below is a survey of some of the main ideas in this area. In addition, feel free to contact Scott Crosson at (541) 346-4128 or scrosson@darkwing.uoregon.edu, Professor John Orbell, Department of Political Science, (541) 346-5061, or Professor Holly Arrow, Department of Psychology, harrow@darkwing.uoregon.edu, (541) 346-1996.

Suggestions for further reading:

Axelrod, Robert. 1984. *The Evolution of Cooperation.* New York: Basic Books.
Buchanan, James. 1965. "An Economic Theory of Clubs." *Economica.* 32:1-14.
Cornes, Richard and Todd Sandler. 1996. *The Theory of Externalities, Public Goods, and Club Goods.* Cambridge University Press.
Olson, Mancur. 1965. *The Logic of Collective Action.* Cambridge: Harvard Press.

Questionnaire: A

I am Player # _____ Round # _____

1) Did the people in your group reach an agreement on how to split up the prize BEFORE going to the experimenter? Yes _____ No _____

2. (If **YES**) How did you reach this agreement?_____

_____

(If **NO**) Is there any particular reason why not? _____

_____

3) If there WAS an agreement, we need to know what it was, and what you think the chances are that people honored this agreement. In the "chance" column give your estimate from 0% (no chance) to 100% (absolutely certain). Fill out the following questions for all members in your group EXCEPT yourself.

Player #	Amount player agreed to claim	Chance that player claimed this amount	Explain why you think each player WILL or WILL NOT claim what they agreed on
Player # ____	$ ____	_____%	_____
Player # ____	$ ____	_____%	_____
Player # ____	$ ____	_____%	_____
Player # ____	$ ____	_____%	_____
Player # ____	$ ____	_____%	_____

NOTE: If there was NO agreement, please just guess what you think each player will claim, and fill out **the first two columns** only.

I agreed to: $ _____

PLEASE TURN OVER AND COMPLETE THE OTHER SIDE

4. After the group formed, how much did you claim from your group's prize?

$_____ Why?_____

(Question 5 omitted.)

6) If we play this game another round, will you try to form a group with the **SAME** people you formed a group with this time? Yes___ No ___

If **YES**, explain why _____

If **NO**, which players would you NOT want to form a group with, and why not?

_____

(Question 7 omitted.)

8) If we play this game another round, will you make the same claim?

Yes___ No ___

If NO, how much would you claim instead? _____

Please explain _____

9) Sex: Male ___ Female ___ (10) Age: _____

(11) Major: _____ (12) Ethnicity: _____

(12) Year in school: 1ST ___ 2ND ____ 3RD ____ 4TH ____ 5TH ____ Other ____

Questionnaire: B

I am Player # _____ Round # _____

1) Which players did you try to form a group with?

Players # _____

2) For each player mentioned, explain why you wanted to form a group with that particular person, whether you talked to them or not, and if so, what happened.

a) Player # ____ Reason for choosing_____

Did you talk with this person? Yes _____ No _____

(If yes) What happened?

_____

b) Player # ____ Reason for choosing_____

Did you talk with this person? Yes _____ No _____

(If yes) What happened?

_____

c) Player # ____ Reason for choosing_____

Did you talk with this person? Yes _____ No _____

(If yes) What happened?

_____

d) Player # ____ Reason for choosing_____

Did you talk with this person? Yes _____ No _____

(If yes) What happened?

_____

PLEASE TURN OVER AND COMPLETE THE OTHER SIDE

3) If we play the game for another round, what will you do differently?

_____

_____

(Questions 4-8 omitted).

9) Sex: Male ___ Female ___ (10) Age: _____

(11) Major: _____ (12) Ethnicity: _____

(12) Year in school: 1ST ___ 2ND ____ 3RD ____ 4TH ____ 5TH ____ Other ____

Questionnaire: C

I am Player # _____

5) If you got into a group in any of these rounds, please fill this out as best you can remember:

Round 1: If you were in a group in Round 1, did the people in your group PROMISE to one another that you would only claim what you had agreed to?

Yes ___ No ____ If some promised and others did not, give the numbers of

those who DID promise _____ and those who DID NOT _____.

Round 2: If you were in a group in Round 2, did the people in your group PROMISE to one another that you would only claim what you had agreed to?

Yes ___ No ____ If some promised and others did not, give the numbers of

those who DID promise _____ and those who DID NOT _____.

Round 3: If you were in a group in Round 3, did the people in your group PROMISE to one another that you would only claim what you had agreed to?

Yes ___ No ____ If some promised and others did not, give the numbers of

those who DID promise _____ and those who DID NOT _____.

Round 4: If you were in a group in Round 4, did the people in your group PROMISE to one another that you would only claim what you had agreed to?

Yes ___ No ____ If some promised and others did not, give the numbers of

those who DID promise _____ and those who DID NOT _____.

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