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GROUP DYNAMICS IN THE STATE OF NATURE

ABSTRACT. One common interpretation of the Hobbesian state of nature views it as a social dilemma, a natural extension of the well-known prisoner's dilemma to a group context. Kavka (1986) challenges this interpretation, suggesting that the appropriate way to view the state of nature is as a *quasi* social dilemma. I argue that Hobbes's remarks on the rationality of keeping covenants in the state of nature indicate that the quasi social dilemma does not accurately represent the state of nature. One possible solution, I suggest, views the state of nature as a social dilemma between *groups* rather than individuals. Although this cleanly represents the strategic problem faced in the state of nature, it also means we should take intergroup dynamics into account when putting forth a solution. I argue that Hobbes's solution of commonwealth by institution – the favored solution for Hobbesian social contract theories – will not work in the state of nature viewed this way.

1. INTRODUCTION

A social dilemma is a situation where each member of the population is confronted with two choices, typically called “cooperate” and “defect,” such that each individual in the population benefits more from choosing to defect than to cooperate, and each individual benefits more if everyone cooperates than if everyone defects (Dawes 1980). The labels “cooperate” and “defect” are usually used even if the structure of the situation under consideration does not naturally lend itself to these descriptions. The term “cooperate” designates the choice which generates or increases the public good, while the choice that does not increase the public good, receives the label “defect.” This terminology should not be seen as making any implicit value claims; labelling one choice as cooperative and the other as defective should not be seen as suggesting that the cooperative choice is better than the other.¹

In political philosophy, one tradition, beginning with Plato, seeks to justify certain types of obligation by considering the role they play in resolving social dilemmas. In the *Republic*, Glaucon sketches a theory anticipating the contractarian theories advanced in the 17th and 18th centuries:

What they say is that it is according to nature a good thing to inflict wrong or injury and a bad thing to suffer it, but that the disadvantages of suffering it exceed the advantages of



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inflicting it; after a taste of both, therefore, men decide that, as they can't evade the one and achieve the other, it will pay to make a compact with each other by which they forgo both. They accordingly proceed to make laws and mutual agreements, and what the law lays down they call lawful and right. (*Republic*, 358e–359a)

Although certainly contractarian in spirit, note that Glaucon seeks an explanation of the origins of *moral* obligation, whereas 17th and 18th century contractarians, such as Hobbes, tended to concentrate on the origins of *political* obligation. While Glaucon did not clearly articulate the underlying social dilemma, it can be recovered.

Let us assume, as Glaucon suggests, that in the “natural state” each person has two choices: inflict injury on others or refrain from doing so. If we consider the act of refraining to be “cooperating” and the act of inflicting injury to be “defecting,” then the initial situation envisioned by Glaucon has the structure of a social dilemma: the benefit conferred by inflicting injury on others nevertheless fails to balance the cost incurred by having injury inflicted upon oneself. Thus, each individual benefits more if everyone cooperates than if everyone defects. However, if a person can inflict injury upon others while, at the same time, not having others do likewise, that person receives the positive benefit of defecting in addition to the benefits of everyone else cooperating. Individuals benefit more from choosing to defect than to cooperate.

The structure of this reminds us of the situation underlying Hobbes's account of the origins of political obligation, which one common interpretation sees as having the form of a social dilemma. In the absence of a common power, given Hobbes's assumptions of approximate equality of both brawn and brain among men, individuals find themselves in a war of all against all. In such conditions, no one engages in industry, agriculture, trade, science, or art because of their common uncertainty over whether each will enjoy the fruits of their labor.

Does the Hobbesian state of nature really have the structure of a social dilemma? In the state of nature “wherein the will to contend by battle is sufficiently known” (xiii, 8),² we may think of individuals as having two choices: anticipating an attack by others, a person may attack first in hopes of catching his enemy off-guard; or, a person may choose to “lie low” in the hope that no such attack will occur. Given this interpretation of the options available in the state of nature, the question of whether we may adequately represent it as a social dilemma depends on whether the payoff to the population has the correct form. Hobbes's description of the state of nature leaves no doubt that the second condition of a social dilemma is satisfied: every individual would clearly be better off if everyone refrained from initiating an attack. Yet what of the first condition? If individuals

should always prefer to anticipate, regardless of the composition of the population, then the state of nature would be a social dilemma. The question remains, though, whether Hobbes's description of the state of nature supports such payoffs.

There are two reasons for believing that the Hobbesian state of nature fails to satisfy the first condition. The first reason, as Kavka (1986) argues, is that if a population is sufficiently heterogenous, one cannot consistently treat the dilemma encountered in the state of nature as a social dilemma. In Kavka's framework, agents may vary in the degree to which they seek power over others, in their capacity for rational planning, and in their anticipation threshold (the number of expected attacks an individual is willing to incur before finally responding). If individuals vary in their desire for power over others, although some agents will be aggressive and seek power over others for its own sake, other agents will not. This latter group seeks power over others only insofar as it provides a reasonable defense against the aggressive tendencies of the former group. We would then expect members of the latter group, the non-aggressors, to have anticipation thresholds strictly greater than zero. However, interpreting the state of nature as a social dilemma requires the anticipation threshold of all population members to be *precisely* zero, since only then would an agent be willing to anticipate when everyone else lies low – as required by the first clause of the definition of a social dilemma. Thus we cannot consistently model the state of nature as a social dilemma if we accept Kavka's model of the population.

Kavka suggests that the proper way to conceive of the strategic problem posed by the state of nature is as a *quasi* social dilemma. Following this, let us say that a move in a game is *quasi-dominant* if and only if that move yields a higher payoff for that player than any other move for every likely, plausible, or reasonably expectable combination of moves by other players. (Kavka uses the label "quasi-dominant" because this is a strictly weaker notion than dominance, where a move in a game is *dominant* if and only if a player ought to make that move no matter what.) Then a quasi social dilemma is a game in which:

1. universal cooperation is better for all players than universal noncooperation; and
2. noncooperation is a quasi-dominant move for each player.

Under Kavka's assumptions governing the types of agents in the population, one may consistently model the state of nature as a quasi social dilemma, but not as an ordinary social dilemma. However, I harbor some doubts over whether the quasi social dilemma correctly represents the strategic problem of the state of nature, as I shall explain.

There is another reason for believing that the Hobbesian state of nature fails to satisfy the first condition of the definition of a social dilemma, even if we choose not to construe the population as Kavka does. A social dilemma requires defection always to dominate, no matter what, but it seems that even in the state of nature Hobbes did not believe defection always dominated. Part of the confusion stems from Hobbes's conflicting remarks on the subject. Though he writes "covenants without the sword are but words, and of no strength to secure a man at all" (xvii, 2), his reply to the Fool suggests otherwise.

Recall that the Fool asserts the rationality of breaking covenants in the state of nature:

The fool hath said in his heart: "there is no such thing as justice"; and sometimes also with his tongue, seriously alleging that: "every man's conservation and contentment being committed to his own care, there could be no reason why every man might not do what he thought conduced thereunto, and therefore also to make or not make, keep or not keep, covenants was not against reason, when it conduced to one's benefit." (xv, 4)

A covenant is stronger than a simple agreement; covenants, for Hobbes, are agreements in which one party has already fulfilled their end of the bargain and expects the other party to do likewise:

Again, one of the contractors may deliver the thing contracted for on his part, and leave the other to perform his part at some determinate time after (and in the meantime be trusted); and then the contract on his part is called PACT or COVENANT. (xiv, 11)

Hobbes carefully distinguishes covenants from the more general class of contracts or mutual promises, claiming, contrary to the Fool, that it is rational to keep covenants even in the state of nature:

For the question is not of promises mutual where there is no security of performance on either side (as when there is no civil power erected over the parties promising), for such promises are no covenants, but either where one of the parties has performed already, or where there is a power to make him perform, there is the question whether it be against reason, that is, against the benefit of the other to perform or not. And I say it is not against reason. (xv, 5)

Thus we cannot model the state of nature as a social dilemma between individuals since Hobbes explicitly denies the first clause of the definition of a social dilemma: that defection always dominates.

The above point also applies to Kavka's quasi social dilemma. In a quasi social dilemma, as explained above, defection is a quasi-dominant move. In traditional game theory, one expects rational agents only to play dominant moves, except when no dominant move exists. In that case, a quasi-dominant move suffices as the next best alternative. What are we to make of the fact that Hobbes explicitly denies the rationality of not

complying with one's covenants? One possibility would be that Hobbes's conception of rationality is not entirely congruous with the traditional game theoretic conception of rationality. Another alternative, suggested by Curley (1994), simply points out that the structure of interactions between two people in the state of nature once a covenant has been made no longer has the form of a prisoner's dilemma. In particular, Curley notes it may be more accurate to represent the form of interactions by an assurance game.³ An assurance game, though, has a different structure than a prisoner's dilemma or a quasi social dilemma. While it would certainly be possible to represent the interactions between agents in the state of nature by a variable game whose structure depends on whether covenants exist between agents, this introduces additional complexity with little gain in clarity.

I believe an alternative approach has some merit. In the following, I offer a generalization of social dilemmas which explicitly takes the group structure of the population into account. This reconciles the rationality of compliance with covenants and the rationality of following dominant (or quasi-dominant) strategies while allowing us to model interactions in the state of nature as a social dilemma. Assuming that two individuals who have entered into a covenant belong to the same group, we can represent competition between individuals in the state of nature as a social dilemma whose players are *groups* rather than individuals. This eliminates the need to represent interactions between agents by a variable game.

When modeling the state of nature as a social dilemma, one straightforward solution to social dilemmas seems appropriate: by increasing by a sufficient amount the penalty for not cooperating, eventually it will not be true that each individual in the population benefits more from defecting than cooperating. This, of course, is essentially Hobbes's solution. I argue that research on the dynamics of intergroup relations calls into question the feasibility of this solution.

2. GENERALIZED SOCIAL DILEMMAS

We should not assume from Hobbes's description of the state of nature as a war "of every man against every man" (xv, 8) that he neglected to consider the effects of social groups. Hobbes considers the possibility that people may form defensive coalitions in the state of nature, but believes them ineffective in preventing war. For small coalitions, slight inequalities on either side carry great weight in determining the victor, whereas in large coalitions, members readily turn against each other:

Nor is it the joining together of a small number of men that gives them this security; because in small numbers, small additions on the one side or the other make the advantage

of strength so great as is sufficient to carry the victory; and there gives encouragement to an invasion. (xvii, 3)

And be there never so great a multitude, yet if their actions be directed according to their particular judgments and particular appetites, they can expect thereby no defence, nor protection, neither against a common enemy, nor against the injuries of one another. For being distracted in opinions concerning the best use application of their strength, they do not help, but hinder one another, and reduce their strength by mutual opposition to nothing ... when there is no common enemy, they make war upon each other, for their particular interests. (xvii, 4)

Hobbes's criticism against small groups is difficult to dispute: smaller groups simply are more fragile to disruption than larger groups. Given Hobbes's assumption of proximate equality among men, adding or subtracting a few members from a small group easily tips the precarious balance of power in favor of one. Hobbes's criticism against large groups, though, relies on additional assumptions and does not rest on as firm a foundation as his criticism against small groups. In particular, Hobbes assumes that the mere act of group membership does not change the group members attitudes towards members of the ingroup.⁴ Hobbes's commitment to this assumption can be seen from his reliance on earlier arguments concerning individual behavior in the state of nature. When drawing the conclusion that "when there is no common enemy, [members of large groups] make war upon each other for their particular interests," Hobbes offers no supporting argument. How are we to account for this omission? Given that Hobbes has already established, in chapter 13 of *Leviathan*, that the natural condition of mankind is the war of all against all, if group membership does not change the attitudes of individuals toward one another, then members of a large group stand in the same relation to each other as in the state of nature. This provides a natural explanation for why members of large groups would remain at war with each other.

Unfortunately for Hobbes, this last assumption rests on dubious social psychology. Current social psychological theories and experiments suggest that group membership does have a dramatic affect on how group members perceive both in- and outgroup members. In general, group cohesiveness enhances group productivity (Schachter et al. 1951), enhances performance (Goodacre 1951), increases conformity to group norms (Festinger et al. 1950), improves morale (Exline 1957; Gross 1954), facilitates intergroup communication (Knowles and Brickner 1981), and, most importantly for the case at hand, reduces intragroup hostility and directs it toward an outgroup (Pepitone and Reichling 1955).

How these studies affect our assessment of the Hobbesian state of nature depends greatly on how we characterize "group cohesiveness." Although many different ways of operationalizing the concept of group

cohesiveness exist, one common method reduces group cohesiveness to the degree of attraction among group members (how much group members like one another). According to Turner et al. (1987), the fundamental hypothesis underlying this (and other) operationalizations of group cohesiveness is the belief that people who depend upon each other to satisfy needs, and who expect to achieve satisfaction from their association, develop feelings of mutual attraction and, thus, become a group.

We must exercise some caution in applying these results to the case at hand, though, for the above experiments do not apply without qualification to large groups. Most of these studies have focused on *small* group behavior; consequently, researchers caution against the too-rapid generalization of results to large groups. One important caveat, though, mitigates this worry as far as we are concerned.

As Hobbes anticipated, studies show that as groups become larger structural divisions emerge, creating subgroups and friendship cliques that tend to lower overall cohesiveness, even though the internal cohesion of individual subgroups or cliques may be quite high (Gerard and Hoyt 1974; Kinney 1953; Porter and Lawler 1968). If we see the influence of group membership upon the attitudes of group members as primarily determined by the interpersonal relations among group members, then larger groups would naturally weaken cohesiveness. However, increasing group size may, at the same time, also increase the impact of the group on the individual by strengthening adherence to group norms (Latané 1981). The possibility Hobbes failed to consider, most likely due to its paradoxical nature, is that as group size gets larger and cohesiveness decreases, the impact of group norms on the individual may nevertheless become stronger, making the group “groupier.”

These well-documented features of social groups suggest that the logic of the state of nature may change once we attempt to take them into account. To begin, note that we need to modify the definition of “social dilemma” to make it amenable to the presence of a group structure over a population. How we modify the first condition depends on how the rewards and costs incurred by the social dilemma are distributed over the population, and whether we take the act of choice to be at the level of the individual or the group.⁵ It may also make a difference whether we require groups to be pairwise disjoint (nonintersecting), whether trivial groups consisting of a single person are allowed, and whether we require every individual in the population to belong to a group. For the purposes of this paper, I restrict attention to the special case where we have nontrivial, nonintersecting groups where every member of the population belongs to one and only one group – primarily because this is the case most frequently

encountered in the social psychology literature. In this case, we have four possibilities for a generalized (group-sensitive) social dilemma:

1. Each group benefits more from choosing to defect than to cooperate, and every group benefits more if all groups choose to cooperate than to defect.
2. Each individual benefits more from choosing to defect than to cooperate, and every group benefits more if all individuals choose to cooperate than to defect.
3. Each group benefits more from choosing to defect than to cooperate, and every individual benefits more if all groups choose to cooperate than to defect.
4. Each individual benefits more from choosing to defect than to cooperate, and every individual benefits more if all individuals choose to cooperate than to defect.

Definitions 1 and 3 employ group choice and Definitions 2 and 4 employ individual choice. Notice how Definition 4 is very similar to Dawes's definition of a social dilemma.

Even when we restrict attention to nontrivial, nonintersecting groups, these four possible definitions show the absence of a natural way to extend Dawes's definition of a social dilemma to a group-relevant context. For all four of the above definitions we may envision a situation in which that particular definition is the appropriate extension of the idea of a social dilemma to use. Thus a case can be made for the reasonableness of each of the above definitions, making it impossible to rule out *a priori* any of the proposed definitions.

3. RECONSIDERING THE STATE OF NATURE

At this point, we need to determine which generalization of the idea of a social dilemma best captures the competition present in the Hobbesian state of nature. Recall that Hobbes's description of the state of nature employs the following assumptions:

The proximate equality of individuals. All individuals are approximately equal with respect to their physical and intellectual ability. In particular, no single person is sufficiently powerful to render herself immune to threat from others, and whether this threat is one-to-one or many-to-one is not relevant.

The right of nature. Everyone has the right to defend themselves by whatever means are deemed necessary to insure their preservation.

Either these assumptions should be rewritten to reflect the fundamental group structure of the population or these assumptions should be kept as is. While changing the model of the population in the state of nature to allow for some sort of primitive group structure does not seriously deviate from Hobbes's intent – as it simply replaces an inaccurate model with a more accurate one, rewriting the above principles would stray far from Hobbes's original statement. The task, then, is to determine what consequences these assumptions have for a population containing a group structure.

If the group structure is divided along salient categories – that is, the categories determining group membership are known to the members, then the following assumption becomes plausible:

Minimal intragroup competition. If an individual who belongs to a social group has a choice between competing with a member of the outgroup or competing with a member of the ingroup, then that individual will always elect to compete with a member of the outgroup.

Social psychologists have compiled much evidence supporting this assumption. Hobb and Abrams (1988) and Brewer and Miller (1996) provide good introductory surveys of relevant experimental results.

Given minimal intragroup competition, the proximate equality of individuals, and the right of nature, it seems that the relevant form of the social dilemma will be the third possibility previously presented. Forms 1 and 2 can be ruled out since individuals, not groups, are the recipient of benefits during cooperation.⁶ Form 4 can be ruled out based on experimental evidence: Tajfel (1972, 1982) shows how salient categorization of individuals into groups increases the extent to which outgroup members are seen as homogeneous and hence interchangeable representatives of the outgroup. Categorization induces many forms of ingroup bias, leading individuals to act in ways benefiting the ingroup at the expense of the outgroup, and to maximize the difference between ingroup and outgroup. Competition, though conducted on the individual level, will thus be perceived by group members as indicative of *intergroup* competition, with each person acting as a representative of his group. Thus Form 4, which treats competition individually instead of at the group level, should be dropped in favor of 3, which employs group level competition.

Assuming that the appropriate generalized social dilemma has the form of the third proposed definition, we now consider the feasibility of Hobbes's purported solution. Recall that Hobbes's authoritarian solution, in essence, imbues the sovereign with sufficient power to transform cooperation from a dominated to a dominating strategy. When we consider

the possible ways of arriving at this solution in a world containing salient group categorizations, several difficulties undermine its plausibility.

4. ETIOLOGICAL DIFFICULTIES

Hobbes's solution to the problem of strategic choice in the state of nature appeals to a strong, effective, centralized, coercive government. Where does this government come from? Hobbes explicitly considers two possibilities: commonwealth by institution and commonwealth by acquisition. Under commonwealth by institution, we must account for how a population split into groups via salient categorizations can overcome strong intergroup biases and come to agree on a social contract as Hobbes envisions:

The only way to erect such a common power as may be able to defend them from the invasion of foreigners and the injuries of one another . . . is to confer all their power and strength upon one man, or upon one assembly of men, that may reduce all their wills, by plurality of voices, into one will . . . This is more than consent, or concord; it is a real unity of them all, in one and the same person, made by covenant of every man with every man, in such manner as if every man should say to every man *I authorise and give up my right of governing myself to this man, or to this assembly of men, on this condition, that thou give up thy right to him, and authorize all his actions in like manner.* (xvii, 13)

Studies of group dynamics lead me to suspect that commonwealth by institution will not be easily attained. Sherif (1966) describes three classic experiments of intergroup conflict relevant to our concern, conducted at a summer boys' camp known as "Robbers Cave" during the years 1949, 1953, and 1954. In all three studies, the boys were unacquainted before attending the camp and were identified as "normal" in terms of standard intellectual, social, and physical attributes.⁷ In the first two experiments, Sherif allowed spontaneous friendships to form by having the boys share a common cabin and activities. Later, the boys were divided into two groups, segregated in separate cabins, such that the majority of each boy's closest friends were located in the other cabin.

Once groups were formed, a tournament consisting of several competitive activities (such as baseball games and treasure hunts) was held. Over the course of the tournament, Sherif witnessed an increase in taunting and name-calling and the gradual dissolution of the initial spirit of camaraderie developed during the first stage of the experiment. By the end of the tournament, there was virtually no communication between the two groups, and each group had begun conducting secret raids and attacks on the other's cabin. In particular, the 1953 experiment had to be prematurely terminated due to excessive intergroup animosity.

These two experiments indicate the power that salient group categorizations have on perception of both in- and outgroup members. Not only does group categorization reduce intragroup hostility and direct it toward an outgroup, but it also increases mutual feelings of friendship and camaraderie. When the boys were asked to identify their best friends at the end of the experiment, 90% were from their current cabin. When these effects are coupled with the additional tendency for people to prefer members of the ingroup over the outgroup when distributing goods and benefits (see Tajfel 1982), commonwealth by institution seems quite implausible. Would individuals in the state of nature willingly give up their right of self-governing to a man, or assembly of men, composed exclusively (or primarily) of outgroup members? The above experiments suggest not, as do numerous historical examples (the conflict between the Palestinians and Israeli, and the conflict between the IRA and the English immediately come to mind).

In fairness to Hobbes, it should be noted that Sherif's 1954 experiment suggests one possible response which a Hobbesian might profitably pursue. Sherif found the presence of superordinate goals sufficient, if given enough time, to induce group cooperation in pairs of mutually hostile groups.⁸ For example, a breakdown in the camp's water supply required the two groups to pool information in order to determine the source of the problem. If the state of nature is commonly perceived as a threat to the individual security of everyone, much as the breakdown in the water supply was perceived by the boys in the camp, then the superordinate goal of leaving the state of nature could induce cooperation between groups, just as the superordinate goal of repairing the water supply helped induce cooperation between the two groups at Robbers Cave.

Yet there are important differences between the condition encountered in the state of nature and that of the Robbers Cave experiment. First, Sherif only tested the effect that superordinate goals have in reducing intergroup hostility between two competing groups. In the state of nature where, presumably, there is a multitude of groups, the effect of superordinate goals on intergroup hostility may be significantly reduced. In the Robbers Cave experiment, it was clear that *both* groups were required to cooperate to achieve the superordinate goal, and that the superordinate goal would not be achieved if both groups did not cooperate. In the presence of several groups, most likely cooperation among all will not be required – only among that number sufficient to achieve the superordinate goal. The fact that it is not necessary for *all* groups to cooperate would likely negate some of the positive effects of superordinate goals. Moreover, when only some of the groups need to cooperate to achieve the superordinate goal, we have the necessary condition for diffusion of responsibility. It has been

repeatedly shown that diffusion of responsibility leads to a decrease in the probability that any one individual, or group, will take effective action, where the decrease in probability of effective action is a function of the number of individuals (or groups) present. These facts suggest that in a multigroup state of nature, each group would be less likely to take coordinated effective action so as to achieve any superordinate goal, including leaving the state of nature.

Let us set these criticisms aside, for a moment, and concentrate on the superordinate goal of leaving the state of nature itself. Where does this superordinate goal come from? The most natural explanation of the superordinate goal of leaving the state of nature would be the awareness of a common fate shared by all. Yet Bouas and Komorita (1996) suggest that mere perception of a shared "common fate" does not suffice to promote cooperation in social dilemmas. This poses a serious problem for explaining intergroup cooperation in the state of nature via superordinate goals. The superordinate goal of leaving the state of nature arises from the mutual knowledge that this is a common fate shared by all, and, if Bouas and Komorita are correct, we should not expect groups in the state of nature to cooperate, even though *some* superordinate goals (just not this one) might bring about such cooperation.

What of the other possible way of leaving the state of nature – commonwealth by acquisition? The extent to which salient group categorizations reduce ingroup hostility and increase outgroup hostility makes this route appear the more plausible alternative. Although this would not have bothered Hobbes, I suspect we find this alternative distasteful. Hobbesian social contract theories attract attention because they seek to justify obedience to political authorities by grounding it in the rational acts of rational agents, not fear of the sword. If considerations of intergroup dynamics in the state of nature lead us to suspect that the only feasible way out is through commonwealth by acquisition, then the Hobbesian account of political obligation is in need of repair.

My intent in this paper has not been to use results from social psychology to argue against Hobbesian social contract theories. Rather, my point is twofold. First, in order for a Hobbesian account of political obligation to be successful, it must not omit relevant features of the strategic problem faced in the state of nature, e.g., groups. Second, when we include intergroup dynamics in our conception of the strategic problem faced in the state of nature, it seems that the only plausible process by which we may leave the state of nature is through commonwealth by acquisition. Insofar as we do not believe commonwealth by acquisition provides an appropriate ground of political obligation, those who favor a Hobbesian account of

political obligation need to explain how individuals in the state of nature can overcome the psychological and strategic obstacles outlined above to achieve commonwealth by institution. This I leave an open problem.

NOTES

¹ Notice that this definition fails to classify as a social dilemma many situations which, intuitively, have the hallmarks of one. Often a public good is obtainable only if a certain minimal number of individuals cooperate. For example, public television requires community members to donate a certain amount of money each year. Clearly, not everyone needs to contribute money to keep public television alive, as long as those who do contribute give the necessary amount of money. Dawes's definition denies such cases the label "social dilemma."

² Here and elsewhere, references to *Leviathan* are given by chapter and paragraph.

³ A two-person assurance game has the form

B

A	s_1	s_2	
s_1	1,1	4,2	where the numbers in the matrix stand for the <i>ordinal</i> preferences of each player and s_1 and s_2 denote the possible strategies.
s_2	2,4	3,3	

⁴ Given a particular group, "the ingroup" simply refers to those people belonging to the group, whereas "the outgroup" refers to all people not belonging to the group (who may or may not belong to a single group). Although this assumption applies to small and large groups equally, it has little bearing for small groups where, presumably, all group members are relatives or close friends.

⁵ That is, whether each individual makes his own choice in the dilemma or this is a single choice made by the entire group. In the latter case, it is assumed that the group choice is arrived at by means of deliberation among group members.

⁶ Dilemmas in which the group is the final recipient of benefits and the bearer of costs, as in 1 or 2, can, for example, be found in cases of competition between businesses or corporations. Here, the individuals constituting the group do not directly benefit from the choice to cooperate or defect. All costs and benefits are conferred to the group as an abstract entity, which then may or may not be distributed among the individuals constituting the group.

⁷ All of the boys came from white, Protestant, middle-income families, reducing the possibility of implicit ethnic or class tensions skewing the results.

⁸ In the 1954 study the two groups were separated from the first day of the camp, so they were not given as much of a chance to make mutual friendships before group formation. One may wonder whether the process of making and breaking friendships provided a needed precondition for the existence of excessive intergroup antipathy. To my knowledge, no experiments testing this have been performed.

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