FIELD ESSAY

Rational Rebels:
Overcoming the Free-Rider Problem

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Participation in organized violent collective action against a government carries significant penalties should one be apprehended. Further, because such actions generally pursue collective goods, the participants will receive that good (if the action is successful) regardless of whether they participate. The free-ride hypothesis suggests that rational people will forego participation in large "N" collective action, unless they receive side payments of some kind. Yet, large numbers of people have periodically engaged in the type of behavior the free-ride hypothesis suggests they would not. This essay examines the solutions to this apparent paradox that have been proposed in the literature and asks whether there has been any progress or cumulation of knowledge. Using Lakatosian criteria to evaluate this research program, the essay contends that there has indeed been progress. Further, I argue that future efforts should be invested in strategic models of collective action and that more empirical work needs to be done to flesh out the utility of recently proposed solutions.

To carry out a successful armed rebellion, a rebel group needs two kinds of resources: soldiers and weapons. The focus of this essay is the problem of attaining the former. Explaining why people are willing to become soldiers of the revolution is problematic for students of rebellion who adopt a rational choice framework to provide the micro-foundations of their theory because rational choice theory predicts free-riding when large groups of people desire a public good (Olson 1971). The recent publication of two collections of

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1 To simplify, I assume that rebel groups can obtain weapons from sponsor-states in a 1:1 ratio to the number of guerrillas they have mobilized.
essays and several articles and books focusing on the topic of rationality and large "N" rebellious collective action demonstrates that there is a growing interest in the question of why individuals choose to assume extraordinary risks and engage in large "N" collective action aimed at the disruption or replacement of a state or government. Considering that we have recently witnessed several outbreaks of both violent and non-violent popular challenges to states throughout the world, this increasing interest is not surprising. The carnage associated with these events leads one to ask the question: "Would I be willing to participate and assume those risks were I in that position?" The free-rider logic suggests that the more appropriate question in such a circumstance is: "Why take chances when I can free-ride on the actions of others?"

Given the diversity within the literature and the recent flurry of publications, it is useful to pause and take stock of what we understand about participation in large "N" collective action. In particular, we should ask whether the literature exhibits signs of progress and cumulation. I will show that there has been a marked shift away from non-strategic analyses toward strategic analyses of this question and that this shift has led scholars away from the "selective incentives" solution to the free-rider problem (discussed below) and toward what I label "contracts and conventions" solutions (e.g., assurance games) and "tipping phenomena." My case is built on the observation that of the twelve studies published between 1970 and 1987, nine advanced selective incentive solutions to the study of rational rebels compared to four papers that advanced contracts and convention solutions and zero that studied tipping phenomena. In comparison, of the twenty-one studies published between 1988 and 1994, twelve advanced contracts and conventions solutions, seven studies advanced selective incentives solutions, and five considered tipping phenomena. These solutions—along with an efficacy solution that has received less attention—are discussed in significant detail below.

It is important to evaluate the utility of this shift. Does it represent progress and a cumulation of knowledge—i.e., can we make a case that the contracts and conventions solution and/or tipping games are theoretically and empirically superior to the selective incentives solution? To answer this question we need to establish some criteria with which we can evaluate the utility of the solutions. I suggest three: first, I determine whether the solution is progressive or degenerative (Lakatos 1970); second, I consider the solution's ability to deliver us from the problem that Olson (1971) sought to address: the weakness of interest group theory which implies that groups whose interests are threatened will automatically mobilize (this is discussed in detail in the next section); third, I review the results of empirical studies of the solutions—to the extent that empirical studies do not exist or inadequately test the solution, I evaluate the extent to which the solutions are likely to work given what we know about large "N" rebellions.

Lakatos defines modifications to a research program as progressive when they either explain previously unexplained events or lead to new hypotheses which withstand falsification. Degenerative modifications employ ancillary assumptions to account for anomalous findings. In the extreme, degenerative modifications lead to tautology. Schrod (1985: 380) nicely summarizes the tautology charge that is often raised against the rational choice approach:

[the basic rational model defined by preferences and constraints is in many ways non-falsifiable, in the sense that preferences effectively provide infinite degrees of freedom and that for any behavior one can construct a set of preferences which will predict that behavior. ... . The ability to explain everything of course, explains nothing—the models are simply tautologies.]

Solutions that reduce to tautology will be rejected.


3 See Berejikian (1992); Chong (1991); Coleman (1990); DeNardo (1985); Finkel et al. (1989); Gupta (1990); Hechter (1987); Karkins and Petersen (1993); Mason (1984, 1989); Mason and Krane (1989); Lichbach (1994a, 1994b, 1995); Lindenberg (1989); Lofman (1992); Marwell and Oliver (1993); Muller and Opp (1986); Muller et al. (1991); Opp (1989, 1990, 1994); Opp and Gern (1993); Roemer (1985); White (1988); and Wickham-Jones (1992).

4 That is, collective action where a large number of people participate.

5 The numbers don't sum to 12 because the Muller and Opp team employ both selective incentives and contracts and conventions solutions in their work. Interestingly, they are the only scholars who do so. With respect to the temporal domain, the year 1970 is selected because of the publication of Leto and Wolf's book, which was the first rational choice application to the problem of rebellion. The year 1987 is selected as the cut-off because the White and Taylor papers initiate the shift toward contracts and conventions solutions in 1988. The years were selected to highlight the shift, but a different selection of years would not lead one to draw the inference that no shift has taken place. Finally, I should note that the contracts and conventions papers I am counting include Scott
One difficulty with applying the Lakatosian criterion of progressive versus degenerative modifications is that Olson did not explicitly lay out his assumptions. Hence, I specify below what those assumptions appear to be. Given that baseline, any modification that does not require us to make additional assumptions is considered neither progressive nor degenerative, unless it accounts for past predictions and yields new/better ones as well, in which case it is considered progressive. A modification that enables us to relax one of Olson’s assumptions is considered progressive as long as it leads to new/better predictions. A modification that requires ancillary assumptions is considered degenerative, even if it yields new/better predictions. In this study, I wish to place one additional constraint on the application of the Lakatosian criterion: the primary focus will be on the theory’s predictions with respect to free-riding. Narrowing the scope of the inquiry in this way is necessary given space constraints: the essay would become unwieldy if we had to compare every prediction about politics that the various solutions enable us to make.

Given those criteria, preference is given to progressive solutions that do not imply automatic mobilization and perform—or appear to be likely to perform—well empirically. The purpose of the essay, then, is to assess the state of efforts to employ rational choice theory to explain participation in large “N”-armed rebellion. I have developed a classification scheme to categorize the arguments into a simplified scheme which enables us to discuss them generically. In the body of the paper I make an effort to review briefly individual studies, but some sacrifice of specificity is made in the interest of generality. I have identified four solutions to the free-rider problem in this literature and labeled them as follows: Selective Incentives, which rests on three variants of selective incentives; Efficacy, which argues that people do not accurately estimate the impact their contribution will have on the outcome of collective action; Contracts and Conventions, which suggests that social organization enables groups to overcome the free-rider problem; and Tipping Phenomena, which suggests that groups of people’s choices are contingent upon how many others have joined the rebellion.

8 Further, Lichbach (1995) provides a comprehensive review of the rational actor research program with respect to rebellious collective action.

9 For other recent efforts to classify solutions and review this literature, see Lichbach (1994a) and Wickham-Jones (1992).

10 A brief comment on the scope of the essay may prove useful. While the free-rider problem is relevant to many large “N” collective actions, the essay focuses explicitly on the decision to engage in organized violent collective action against a state (referred to here as rebellion). Some of the work which has received attention in the literature that is not considered here includes the Minimal Contributing Set solution (van de Kragt et al.

Before proceeding, it will prove useful to discuss rational choice theory within the context of non-strategic versus strategic variants of the theory. I argue that a shift from non-strategic rational choice theory to strategic rational choice theory has led to a shift in the focus of solutions and to an increased interest in this type of analysis (twenty-three studies have been published in the past six years compared to twelve in the previous eighteen years). The distinction between these two types of theory is sketched in the following section. It is followed by four sections that discuss each of the solutions that have appeared in the literature. I conclude the article by summarizing the utility of each solution, contrasting the utility of non-strategic versus strategic use of rational choice theory, and drawing implications for further study.

**Non-Strategic Versus Strategic Theory**

Rational choice theory posits that an individual’s behavior reflects the highest ranked product of that individual’s preferences and her/his estimation of the probability of given outcomes. Two significantly different variants of the theory have developed, the first of which assumes that individuals make decisions without concerning themselves with the behavior of other people. This type of rational actor theory is non-strategic and is often referred to as subjective expected utility (SEU) theory. On the other hand, a different incarnation of the theory—game theory—assumes that the decision-maker takes into account what s/he believes is the most likely behavior of another—or several other—decision maker before selecting a course of action. As Ordeshook

1983; Rapoport 1988; and Dawes et al. 1986) which is contingent upon a “money-back guarantee” and thus is not relevant in cases of rebellious collective action (i.e., rebel leaders can not “repay” rebels their contributions should the rebellion fail). A fascinating and innovative study by Tong (1988, 1991) is not discussed because (1) several of the options Tong considers are not collective; 2) he argues that large “N” rebellions grow out of small “N” episodes of banditry and rebellion, but does not seek to explain that transformation (and, hence, large “N” rebellions); and (3) in the cases he examines, free-riding (i.e., starvation) is not an option. In addition, Bergekian’s (1992) paper, which advances a prospect theory solution to the free-rider problem in revolutions, is not reviewed because it is not a rational choice solution (but for a critical review see Moore 1994). Nor is Kurz’s (1992) psychologically based solution to free-rider problems in the 1989 European revolutions reviewed (but see Oberschall 1994: 90–91 for a critical review).

Roeder’s (1982) study is not included because he does not include a probability term in his decision calculus (the importance of such a term is elaborated below).

SEU theory is generally attributed to the so-called Austrian school of economics—circa the late 19th Century, and represented by economists like Walras (1954). Perhaps Marshall (1961) is most responsible for popularizing this approach in the United States.

12 Von Neumann and Morgenstern (1944) are credited with developing game theory, but Luce and Raiffa (1989) is generally considered the classic introduction. Morrow (1994) and Kreps (1990) are probably the best modern introductions.
(1986: xii) explains: 'game theory is simply the branch of the decision sciences that seeks to explain how people make decisions if their actions and fates depend on the actions of others.' Rational choice theories that take into account the interdependency among actors' decisions are strategic.

As will be discussed in the subsequent section, Olson (1971) introduced the free-rider thesis to political scientists and sociologists concerned with collective action. His is an SEU treatment of the problem and I contend that the initial focus on selective incentive solutions was driven by the fact that Olson opted to take an SEU approach. It will prove useful to briefly sketch a generic SEU model.

As defined by Simon (1983: 13) the SEU model has four principal components: 'a cardinal utility function, an exhaustive set of alternative strategies, a probability distribution of scenarios for the future associated with each strategy, and a policy of maximizing expected utility.' Thus, an actor faced with a decision must determine what value s/he attaches to all possible combinations of the future, what the set of alternative strategies are, the probabilities associated with the success and failure of each alternative strategy, and a manner in which to weigh that evidence once it has been gathered.

Let A denote the action; 'participate,' A' denote the action 'not participate.' Ux and Ux' denote the utility associated with, the provision of the good and the utility associated with the good not being obtained, respectively, and P(X|A) and P(X|A') denote the subjectively defined conditional probabilities that the decision-maker associates with good X being provided given A and A', respectively. This decision rule can be represented by equations 1 and 2:

\[
EU(A) = U_x \times P(X|A) + U_{x'} \times (1 - P(X|A))
\]

\[
EU(A') = U_{x'} \times P(X|A') + U_x \times (1 - P(X|A'))
\]

where the equation that yields the greater sum denotes the decision which should be adopted, i.e., A if EU(A) > EU(A'), A' if EU(A) < EU(A').

Game theory, on the other hand, assumes that actors have utility functions, a finite set of alternatives from which to choose, understand that the outcome is contingent on the behavior of the other player(s), and seek to maximize their utility (see Luce and Raiffa 1989: 12-34). Rather than employ equations, game theorists typically use an NxN table - 2x2 being the simplest and most common form - to illustrate the payoffs to the actors associated with each contingent outcome. Game theorists are interested in determining what the players will do given different pay-off structures (i.e., what strategy they will adopt). Many pay-off structures are used frequently enough that they have become standard in the literature and have been given names (e.g., prisoner's dilemma, chicken, assurance, etc.).

In brief, game theorists seek to determine whether a given game (i.e., pay-off structure) can explain social phenomena. With respect to armed rebellion, we know that people sometimes join rebels in large numbers and other times the rebels' calls for mobilization fall upon deaf ears. Hence, the challenge for any theory of armed rebellion is to specify the conditions under which people join versus those under which they don't join. Theories that suggest that people always do—or do not—join are unacceptable. The next section outlines Olson's free-rider argument.

The "Logic" of Collective Non-Action

Olson (1971) adopts an SEU approach to apply neoclassical public goods theory to the problem of groups of individuals acting in their collective interest. Although he does not explicitly discuss all of the assumptions he makes, it seems fair to argue that he invokes the following assumptions:

1. People can be modeled as if they have Von Neumann and Morgenstern utility functions.
2. People can accurately assess the impact that their contribution will have on the probability that the good will be provided.
3. People seek to maximize their expected utility.
4. Actors assume that their behavior does not impact the costs/benefits of fellow group members (ibid.: 44-45).
5. People's utility functions only include material goods (ibid.: 60-65).
6. Decision-makers are not strategic.

Where the assumptions are made explicit, I have noted the pages where they are discussed. Armed with these assumptions and definitions of public goods and selective incentives, he opens the book with the following assertion:

[It is not in fact the case that the idea that groups will act in their self-interest follows logically from the premise of rational and self-interested behavior,... unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests (ibid.: 1-2, emphasis original).]

Olson's insight exposed a problematic assumption made by many "group" theorists: that latent groups would rise up and collectively challenge those

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13 Dodging the issue of "the whole versus the sum of its parts," collective interest is defined here as the simple sum of each individual's utility.
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Corrections
In the June 1995 issue, there is an error in Will Moore's field essay, “Rational Rebels: Overcoming the Free-Rider Problem.” On page 422, the equations were incorrect as published. The correct equations are as follows:

\[ \begin{align*}
    EU(A) &= U_i \ast P(X|A) + U_e \ast (1 - P(X|A)) \\
    EU(A') &= U_i \ast P(X|A') + U_e \ast (1 - P(X|A'))
\end{align*} \]

The PRQ apologizes to the author for this error.
who threaten their collective interests. His argument is that when the latent group is composed of a large number of people, it would be rational for each of those people to withhold their contributions to the common good. This non-act has come to be known as free-riding.

A key to Olson's argument is the concept "collective good," which he defines as "any such good that, if any person \(X_i\) in a group \(X_1, \ldots, X_n\), consumes it, it cannot feasibly be withheld from the others in that group" (ibid: 14)\(^{14}\). Collective goods are contrasted with "selective incentives," which have the characteristic that they can be withheld from those individuals who do not participate in their production. Selective incentives can be positive (e.g., money), or negative (e.g., coercion).

Olson argues that it is logically inconsistent for large numbers of people to act together to obtain a collective good, even when each person recognizes that s/he will be better off if the collective good is provided. This is the free-rider problem. Stated simply, the costs of participating in efforts to obtain public goods outweigh the benefits of obtaining public goods. This is so because (1) the individual's participation (in large groups) will no: have a discernible impact upon the provision of the good, and (2) if the good is provided, because it is a collective good, every individual will enjoy its provision without necessarily having born the cost of providing it (ibid: 44). Therefore, it is irrational to "spend" personal resources on the pursuit of collective goods when a large number of people are required to produce optimal amounts of the good.\(^ {15}\)

\(^{14}\) Olson (ch. 1, fn. 21) points out that his definition rests on the concept of transitivity or "jointness of supply." Following Head (1962) he argues that for a good to be collective "it is not necessary that exclusion be technically impossible; it is only necessary that it be infeasible or uneconomic."

\(^{15}\) It is important to note that Olson's "size principle" does not in fact follow from his analysis and does not hold for all types of public goods (see Taylor 1987: 8-13 and Marwell and Oliver 1993: 38-41). However, Olson's conclusions about group-size and free-riding do hold for a specific type of public good, and a successful rebellion is that type of good. To see this consider that all people who live in a given state will be subject to the new policies in a case where a rebellion is successful. As such, no people can be excluded from consuming the good if it is produced (indeed, everyone must consume it, whether they want to or not). Further, any given person's consumption of the good will not have an impact on anyone else's consumption of the good. Thus, successful rebellion is non-excludable and exhibits pure jointness of supply. In addition, one person's consumption does not decrease any other person's benefits derived from their consumption of the good. This quality is labeled non-rivalness. Goods that are purely jointly supplied and exhibit non-rivalness are called pure public goods. Finally, successful rebellion can only be produced in a single unit (i.e., a rebellion either succeeds or fails). As such, it is a single step good with respect to its production. These distinctions are important

Formally, Olson contended that individuals calculate the costs and benefits of two alternative uses of their resources—contribution and non-contribution—by comparing the expected utility across those alternatives. The following equations specify the decision:

\[
EU(C) = U_{OC} \cdot P(G|C) + U_{PG} \cdot (1-P(G|C)) - U_{OC} 
\]

\[
EU(C') = U_{PG} \cdot P(G'|C') + U_{OC} \cdot (1-P(G'|C')) 
\]

where \(C\) denotes contribution to the collective action, \(C'\) denotes non-contribution, \(U_{OC}\) is the utility associated with the public good, and \(U_{OC}\)\(^{16}\) is the opportunity cost associated with the expenditure of the individual's resources (i.e., the foregone income one could obtain by employing those resources in alternative ways). Contribution entails opportunity costs while non-contribution entails no opportunity costs as evidenced by the absence of \(U_{OC}\) term in equation four. In addition, in large groups the probability of obtaining the public good is not affected by the individual's contribution (i.e., as \(N \rightarrow \infty\), \(P(G|C) \approx P(G'|C')\)). Thus, because \(P(G|C) \approx P(G'|C')\), and there are always opportunity costs associated with contribution, the expected utility of non-contribution will always be greater than the expected utility of contribution (i.e., \(EU(C') > EU(C)\)); contributing to the pursuit of the collective good would yield less utility than non-contribution. Although he intends it as a claim for large \(N\) collective action in pursuit of any public good, Olson (1971: 129) nicely summarizes the theoretical challenge for explaining large \(N\) collective action in pursuit of single step, pure public goods: any such theory

because different assumptions about excludability, jointness of supply and the production function lead to rather different implications regarding the applicability of the free-rider problem and various solutions (for useful discussions, see Taylor 1987: 5-7 and Marwell and Oliver; 1993: 38-101). What, if any, relationship exists between group size and free-riding for pure public, single step goods? I contend that Olson's conclusions quoted above (from 1971: 1-2, 44) hold for these goods. The argument hinges on the specification of the \(P\) term in equations 1 and 2 in the text. Since successful rebellion is a single step good, its production rests on the mobilization of a critical threshold of people \(N\). Hence, any single individual's impact on the provision of the good—given the homogeneity of resources assumed in note 1—will be \(1/N\). If we assume that people can accurately assess this situation, then \(P = 1/N\). Thus, as \(N\) increases, \(P\) decreases. Olson's free-rider thesis hinges on the following condition: "no single individual's contribution makes a perceptible difference to the group as a whole" (1971: 44). Given this specification of \(P\) the size principle follows: as \(N\) increases in size, the impact of \(P\) becomes imperceptible, and people free-ride. Since successful rebellions require a large \(N\), they are subject to the free-rider problem.

\(^{16}\) The full opportunity cost term is \(U_{PG} \cdot P(O|C) - U_{OC} \cdot (1-P(O|C))\) for equation 3 and \(U_{OC} \cdot P(O|C') - U_{PG} \cdot (1-P(O|C'))\) for equation 4. However, by definition, \(P(O|C) = 1\) and \(P(O|C') = 0\), allowing us to simplify the notation by dropping the probability terms associated with opportunity cost.
must show why the individual member of the large, latent group will voluntarily support the group goal when his support will not in any case be decisive in seeing that the group goal is achieved, and when he would be as likely to get the benefits from the attainment of that goal whether he had worked for its attainment or not [emphasis original].

The issue addressed in this article is whether the Olson model—or modifications of it—can be used to explain individual participation in armed rebellion.

Selective Incentives

Olson was the first to propose a solution to the apparent paradox he described. His solution is the addition of selective incentives: valued goods that only those who participate will receive. Thus, groups such as unions provide their members with goods which they can receive only if they are union members.

In equations 3 and 4 the individual makes her or his decision in isolation: the only actions taken are the actions taken by the individual. However, Olson argues that when a group is able to provide selective incentives, the calculus changes: the individual must now calculate the costs and benefits associated with those selective incentives in her or his calculation of expected utility. The following equations represent this modification:

\[ EU(C) = U_{rC} + (1-P)(U_{C} + U_{CG}) - U_{oc} + U_{sa} \]  
\[ EU(C') = U_{rC'} + (1-P)(U_{C'} + U_{CG}) - U_{oc} + U_{sc} \]

where \( U_{sa} \) represents the benefits (e.g., union wages) the individual alone obtains from contribution and \( U_{sc} \) represents the costs (e.g., unemployment) the individual alone bears as a result of non-contribution. In this scenario, the opportunity costs of contribution can be overridden by the provision of positive selective incentives (SB). Further, the group can punish non-contributors, thereby raising the cost (or lowering the benefit) of non-contribution (SC).

By introducing the group and its provision of positive and selective incentives, Olson allows the benefits of non-action to become less than the costs of action, in which case the individual will contribute.

Thus, when organizations are able to offer potential members selective incentives they will be able to mobilize a large number of people. A variety of scholars have pursued this solution within the context of explaining large "N" rebellion. I have identified three specific sub-groups. Tullock (1971), Silver (1974), the Muller and Opp team (1986; Finkel, Muller and Opp 1989; Muller, Dietz and Finkel 1991; Opp 1989, 1990, 1994; and Opp and Gern 1993), Chong (1991) and Gibson (1991) are willing to employ varying degrees of "social" incentives in their models. The distinction is important because reliance on "economic" incentives as opposed to "social" incentives places significantly different resource requirements on rebel groups: economic incentives are expensive to produce whereas social incentives are produced primarily through social interaction and are, thus, inexpensive to produce. I consider each type of selective incentive in turn.

Leites and Wolf (1970) have all employed Olson's original selective incentives solution to demonstrate that rebel groups can overcome the free-rider problem and challenge the state. They focus on economic and social selective incentives. Another group of selective incentives solutions seek to rework the standard way in which certain terms have been accounted in this literature. To be more specific, they contend that costs are in fact benefits (Hirschman 1982; Margolis 1982) or that public goods are treated by individuals as if they were private goods (Mason 1984). Finally, DeNardo (1985) and Mason (1989; Mason and Krane 1989) have argued that randomly targeted state terror can create a selective incentive to join a rebellion. Each of these variants on Olson's selective incentives solution is reviewed in turn.

Economic and Social Selective Incentives

I begin by distinguishing "economic" from "social" selective incentives (this is equivalent to Taylor's 1988b distinction between thick and thin versions of rationality). By "economic" incentives I mean material goods, while "social" incentives include emotional and psychological goods such as friendship, camaraderie, etc. It is important to emphasize that "social" incentives do not necessarily (and do not here) imply altruism, which is discussed in the following sub-section.

Olson (1971: 60–65) restricts his analysis to "economic" incentives for two reasons: first, "social" incentives will only apply in small "N" groups where face-to-face contact is possible, and second, the existence of "social" incentives is impossible to verify empirically. Others, including Tullock (1971), Silver (1974), the Muller and Opp team (1986; Finkel, Muller and Opp 1989; Muller, Dietz and Finkel 1991; Opp 1989, 1990, 1994; and Opp and Gern 1993), Chong (1991) and Gibson (1991) are willing to employ varying degrees of "social" incentives in their models. The distinction is important because reliance on "economic" incentives as opposed to "social" incentives places significantly different resource requirements on rebel groups: economic incentives are expensive to produce whereas social incentives are produced primarily through social interaction and are, thus, inexpensive to produce. I consider each type of selective incentive in turn.

Leites and Wolf (1970) were the first to employ an SEU approach to the question of participation in armed rebellion. They adopt an economic selective incentives solution to the free-rider problem, as do Tullock (1971) and Silver (1974), who also adopt an SEU approach. The major difference is that while Leites and Wolf focus on negative selective incentives (i.e., the ability of

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17 Again, the probability terms associated with SB and SC in equations 5 and 6 are either 0 or 1. Thus, we can simplify the notation by dropping them. For an elaboration, see footnote 16.

18 Olson details his position in footnote 17, page 60.
the rebels and the state to punish non-contributors), Tullock and Silver focus on positive selective incentives (i.e., the promise of future governmental posts). 19

Is this a useful solution? Because it is Olson's solution it is not a modification and thus is neither progressive nor degenerative. Further, it does not return us to an interest group model where nobody free-rides; guerrilla organizations that are able to either coerce or entice participation will be successful, those that lack sufficient resources/mobilization skills will fail. Unfortunately, however, none of these models have been confronted with systematically gathered evidence. Hence, we are left to speculate about the likely outcome of such an investigation.

I contend that both of these economic incentives solutions are likely to perform poorly if confronted with systematically gathered and analyzed evidence. The lack of attention accorded the coercion solution is almost certainly due to the fact that, while the coercion strategy is undoubtedly employed in actual cases (e.g., see Magaia 1988; Kriger 1992), it is difficult to believe that it would be a sufficient strategy for mobilizing all of the individuals who are required to threaten a modern state (Muller and Opp 1986: 472). Alternatively, the Tullock and Silver "economic" incentive is problematic because while rebel leaders can reasonably be modeled as responding to the expected utility of becoming the next Postmaster General, the common foot soldier would be foolish to harbor such ideas, and we are trying to account for the latter's participation, not that of the leadership.

What of the "social" selective incentives solution? Tullock (1971), Silver (1974), the Muller and Opp team (1986; Finkel, Muller and Opp 1989; Muller, Dietz and Finkel 1991; Opp 1989, 1990, 1994; Opp and Gern 1993). Chong (1991) and Gibson (1991) also employ "social" incentives in their models. Tullock and Silver include a "psychic income" term in their analysis, while the Muller and Opp team and Gibson consider the "entertainment value" of rebellion, the utility derived from conforming to group norms, and the associational benefits of collective action in general. Chong argues that social incentives are needed to account for participation by the rank and file and that leaders are motivated by an interest in preserving their reputations. To begin, these are ancillary assumptions. Olson (1971: 62) was clear on the issue: "social pressure and social incentives operate only . . . in the groups so small that the members can have face-to-face contact with one another." Thus, to the extent that rebellion is a large "N" phenomenon, social incentives are excluded by Olson on theoretical grounds (i.e., they require face-to-face contact, which is not feasible in large "N" collective action). As a consequence, adding social incentives to the mix is a degenerative solution (i.e., it increases the theory's degrees of freedom). Is it tautological? Olson expressed this concern as another reason for rejecting social incentives, but by specifying operational definitions of these concepts, the Muller and Opp team and Gibson place a priori constraints on the concept and evade the tautology charge. 20

The second criterion asks whether the solution avoids the problem of always predicting collective action in defense of interests. The social benefits solution implies that all group members will contribute when their interests are threatened—nothing in the argument made by the Muller and Opp team/Gibson enables us to distinguish those group members who will respond to these incentives from those groups members who will not. Hence, the solution is not only degenerative, but it returns us to the theoretical juncture that Olson sought to cross.

Finally, unlike many of the solutions reviewed in this article this solution has been subjected to rigorous empirical falsification. The Muller and Opp team use data drawn from New York, Hamburg, Schwandorf, Frankfurt, West Germany, Peru, and Berlin to test this solution, and Gibson replicates the 1986 model using her own data. 21 Using slightly different models, different sampling techniques, and surveys conducted at different points in time, these studies generally fail to produce statistically significant parameter estimates for the social affiliation and fun variables they are interested in. For example, Muller and Opp (1986) report that their "fun" (i.e., entertainment value), "utility from conforming to social norms," and "expected social affiliation utility" variables have no impact on protest behavior. Further, Finkel, Muller and Opp (1989: 898) report that "[f]or the illegal protest equations . . . the collective rationality models receive little support," Gibson (1991) reports that neither the fun nor social affiliation variables have an impact on participation in the Sanctuary Movement, but the importance of meeting relevant others' expectations was significant. Muller, Dietz, and Finkel (1991: 1276-77) find that the following variables have a significant impact on the product of people's "past participation in illegal protest" and "stated willingness to participate in future illegal protest": "expectations of others," "group encouragement," and "meet like-minded people". Similarly, Opp (1994: 124) reports that "expected rewards from reference persons," "group encouragement," and "support from critical

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19 Both Tullock and Silver employ a mixture of the solutions to the free-rider problem; the additional components of their models are discussed below.

20 Gibson tests the Muller and Opp (1986) model using survey evidence she collected regarding the Sanctuary Movement in the United States.

21 The Muller and Weede (1990, 1994) studies are not part of this research effort as they are macro level studies whereas the Muller and Opp team conduct survey research to examine individuals' attitudes toward rebellion.
friends" all have a significant and positive impact on dissident activity among Berliners prior to the fall of the Berlin Wall. However, he also reports that of these variables, only "support from critical friends" had an impact on self-reported participation in the protest demonstrations that precipitated the Wall's collapse. In sum, then, they fail to find any support for the impact of an "entertainment value" variable. They find support for the importance of conforming to social norms in the 1991 study only. However, the studies consistently find support for the "expectations of others" social affiliation variable.

Yet, that is not the only evidence one can bring to bear on the social incentives solution. Lichbach (1994b) reviews scholarship on peasant collective action and draws the conclusion that there is in fact plenty of evidence that both economic and social selective incentives are crucial to peasant mobilization. Unfortunately, Lichbach's evidence is anecdotal; he cites the claims of scholars who have not made a systematic effort to collect or analyze evidence concerning peasants' motivations. However, systematically gathered evidence from a study of the Zimbabwean peasantry (Kriger 1992) supports the social selective incentives solution and also lends qualified support to the Leites and Wolf thesis. Through interviews, Kriger shows that those who either joined the Zimbabwean guerrillas or provided support for them were primarily motivated by a desire to enhance their status over local hierarchies: women with respect to men, teenagers with respect to adults and, to a lesser extent, lower class (or totem) families with respect to more status privileged families. When asked, Kriger's subjects explain that they joined or supported the guerrillas for personal gain: the motivation was local. Further, Kriger indicates that coercion cowed those who benefited from the social hierarchy in rural Zimbabwe. Unfortunately, this is the only work of its kind, and we do not know to what extent these findings can be generalized. It does suggest, however, that not everyone can be mobilized by positive economic incentives, and thus that a successful guerrilla group will need to target its incentives, and that it may be fruitful to do so across local social, political, and economic hierarchies, and to enforce the compliance of those who do not benefit with coercion.

What are we to make of the social selective incentives solution? Several studies of the Muller and Opp model have found some empirical support for the solution and the Kriger study also provides empirical evidence supporting the importance of social selective incentives. Yet, the solution founders on the other two criteria. Thus, decisions about whether to pursue this type of solution will rest on the relative salience of the three criteria to individual researchers. As I show below, a better explanation (i.e., better with respect to the three criteria) that makes use of similar concepts is available (see the discussion of Coleman 1990).

The difficulties outlined here indicate that Olson's original selective incentives solution to the Free-rider problem in cases of large "N" rebellion is, at best, a partial solution. The economic incentives solution was rejected on the ground that while it is neither degenerative nor produces automatic mobilization, it was found wanting with respect to its expected empirical utility. However, there are no systematic empirical studies of this type of solution, and the Kriger study does suggest that negative economic sanctions are important as a partial explanation, so that conclusion is speculative pending further investigation. Social incentives, on the other hand, were found wanting with respect to the first two criteria although they found support in survey research. As a consequence, I contend that while we should not discard selective incentives, we need to invest theoretical energy elsewhere.

Costs Are Selective Incentives

A second selective incentives solution to the free-rider problem has received attention in the literature. Presented differently by several scholars, the basic idea of this approach is to deny that people treat public goods as if they are public, or to deny that participation in collective action is costly. Hirschman (1982), Margolis (1982), and Mason (1984) adopt this type of solution to the free-rider problem. Hirschman's thesis is that people's utility functions oscillate through cycles where they pursue their private affairs to the exclusion of public concerns, and then flip and do the opposite. During a public cycle, people desire public change so much that they place a high enough value on participation in pursuit of the good that, regardless of the impact their participation has on the probability that the good will be realized, they will participate.

This solution is degenerative: rather than consistently employ a rational choice model, Hirschman argues that it works during some periods but during other periods, a different--and weakly specified--altruistic model explains people's behavior. His model relaxes the assumption that people can accurately assess probabilities, but only during "public cycles." Given that Hirschman provides us with no a priori explanation for when public cycles occur that would allow us to test the model, it is tautological. As a consequence, it is rejected.

Margolis (1982) also suggests that we incorporate altruism in rational models of collective choice. This solution is also degenerative because it eliminates the distinction between public goods and selective incentives, making all goods selective (or private). Olson's analysis relies on the concept of public goods and eliminating that concept makes it impossible to produce a free-rider problem unless we assume there are two distinct populations of people: altruists and rational egoists. Altruists would not distinguish public
goods from private goods and rational egoists would. Adopting such a view would lead one to conclude, for example, that there were fewer altruists in China than in El Salvador and that there were fewer altruists in Liberia in the 1980s than in the early 1990s.

Finally, the third solution of this type is presented by Mason (1984). Building on Frohlich and Oppenheimer (1970) and Chamberlin (1974), Mason maintains that applications of SEU theory to collective racial violence can explain neither (1) how riots begin (e.g., how the free-rider problem is initially overcome) nor (2) why rioters would damage property and attack law enforcement officers, because these applications have too greatly discounted the impact of public goods (PG) in individuals’ utility functions. To address these deficiencies, he incorporates public goods into his model by arguing that some public goods (e.g., a decrease in racial discrimination) are in fact private goods.22 The difficulty with Mason’s approach is that he jettisons the classic definition of a public good (i.e., the transitivity issue) by maintaining that if one enjoys the good, then one’s enjoyment is selective even though one’s enjoyment of a societal reduction in discrimination will not inhibit the next person’s ability to enjoy that good.23

This type of solution is degenerative. Further, it returns us to the type of group theory that Olson was reacting against: according to this solution, groups with an interest in these goods will form, mobilize and produce the good. Empirically, then, the thesis is as problematic as “orthodox theories of pressure groups.”

To summarize, these solutions suggest that Olson left some components out of his pay-off matrix when positing his initial solution. However, these solutions are degenerative. Further, they return us to orthodox theories of pressure groups that anticipate that all groups will mobilize and produce collective goods when it is in their interest to do so. On those grounds, these solutions are rejected.

**Random State Terror as a Selective Incentive**

The third variant on the selective incentives theme is one that is especially relevant to the case of rebellion. Concentrating on state repression, DeNardo (1985), Mason (1989), and Mason and Krane (1989) claim that state repression can make free-riding an expensive proposition. The argument is that when a state indiscriminately represses its subjects, there is a cost associated with not joining the rebel group. DeNardo (1985: 193) states:

[...] conspiratorial tactics such as terrorism and guerrilla war often increase the probability of suffering repression for people who are not active in the movement. In these instances a better model [for the costs of repression] might be C(R)∗((P[Part]−P[Part])) where [C(R) is the cost of repression and] P[Part] is the probability of suffering repression for people who do not participate. When repression becomes indiscriminate, the two probability terms approach equality and the deterrent effect of repression is negated.

Unfortunately, DeNardo relegated this insight to a footnote and does not develop it further.

Mason (1989) and Mason and Krane (1989) begin with the seemingly self-contradictory hypothesis that repression both prohibits and stimulates collective violence against the state.24 They propose that both of these processes can be shown to hold by employing an SEU model: when the government employs repression and offers selective incentives (i.e., goods that only government supporters may consume), then repression will be effective. However, when the government is unable to offer a sufficient level of selective incentives, it loses its legitimacy and repression will stimulate individuals to join the rebel movement by withholding their taxes from the government and contributing them to the rebels instead. Mason and Krane (1989: 176) argue that “what is required to convert normally risk-averse peasants into revolutionary soldiers is a high level of indiscriminately targeted repressive violence.” When the state only punishes those who support the rebellion, the probability of state repression is zero for state supporters, while the probability of repression for rebels is some positive value. However, when the state employs repression indiscriminately, the two probability terms become equivalent and positive.

Because it employs Olson’s initial solution, this variant is neither progressive nor degenerative. However, it stumbles because while it demonstrates that indiscriminate repression equates the probabilities of being the victim of repression regardless of whether an individual supports the state or the rebels, it is unable to produce contingent mobilization: even with indiscriminate repression, the actor is indifferent between rebelling and not rebelling. Further, using the Mason specification, while the state is able to exclude those who do not support it from consuming government supplied selective incentives, the

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22 The distinction rests on the degree of non-rivalness that a good possesses: exclusive goods are those in which one individual’s consumption of the good limits another individual’s, and inclusive goods are those in which one individual’s consumption has no impact on any other individual’s ability to enjoy that good. See Mason (1984: 1054) and Chamberlin (1974).

23 Roemer (1985) has a similar solution to free-riding in his study.

24 For other solutions to this apparent contradiction, see Lichbach (1987) and Gupta et al (1993).
rebels can not exclude government supporters from enjoying the fruits of the rebellion. Thus the theory needs to be modified to include a \( U_\text{rel} \cdot P(\text{PC}) \) term. With that modification, the non-elites will never be better off joining the rebellion, regardless of the type of repression, and while they may withhold taxes from the government, they will not contribute to the rebel movement. This modification rules out mobilization.

By specifying the role that state behavior plays in the decision calculus of the populace, DeNardo (1985), Mason (1989), and Mason and Krane (1989) make an important contribution to solving the free-rider problem in rebellious situations. However, their analyses only demonstrate that the actor will be indifferent to the choice between rebelling and not rebelling, perhaps implying that people will try to escape the situation by less risky means than picking up a weapon. Further, the equivalence of the two options is negated by the fact that neither author includes an opportunity cost term in their rebellion equations. The inclusion of an opportunity cost term is one of Olson's insights: there are opportunity costs to taking action while not taking action does not entail such costs. When an opportunity cost is added to the rebellion equations, the individual is no longer indifferent and will choose not to rebel.

In summary, what can one say about the proposed selective incentives solutions? First, none of them are wholly satisfactory. Those that were not degenerative failed to produce contingent mobilization or were questioned on empirical grounds. The others were not only degenerative, but also anticipate automatic mobilization among aggrieved populations. Finally, the most promising solution turns out to be at best a partial solution that will only apply in some cases (i.e., cases with randomized repression): while people are likely to withdraw their support from the state in these situations, they do not have sufficient incentive to skip the free-ride and join the rebels, especially if we assume that migration is an option. The burgeoning number of refugees on the planet suggests that migration is an oft-exercised option.25 Thus, while they move us in the direction of a solution to the free-rider problem, they do not quite get us there. I conclude the discussion by noting that each of these authors adopted a non-strategic, SEU approach. I review the solutions provided by a strategic approach below, but first I examine the efficacy solution.

**Efficacy**

The second approach to solving the free-rider problem contradicts one of Olson's assumptions: that people perceive that their contribution to the collective good has a negligible impact upon the probability that the good will be realized i.e., as \( N \to \infty \), \( P(\text{PG}|A) \approx P(\text{PG}|A') \). It is, in this sense, degenerative. The general proposition shared by those who stress this solution is that individuals may miscalculate (or are manipulated by leaders so that they miscalculate) the impact that their contribution makes on the provision of the collective good: they may believe they are efficacious. To quote Moe (1980: 32): "[the efficacious individual can have a rational incentive to contribute whether or not his efficacy is justified by the objective context]." He suggests that leaders can manipulate "the facts" and convince people that their contribution will have an impact on the provision of the collective good. It is useful to recall that Olson reaches his conclusion by implicitly assuming that individuals know how many people have contributed to the good, and can accurately calculate probabilities based on that information. The research of Tversky (1967), Tversky and Kahneman (1974, 1987), Kahneman and Tversky (1979), the Muller and Opp team (1986; Finkel, Muller and Opp 1989; Muller, Dietz and Finkel 1991; Opp 1989, 1990, 1994; Opp and Gem 1993), and Gibson (1991)—as well as the classroom experience of many high-school mathematics teachers—casts significant doubt on the validity of the assumption that people can accurately assess probabilities. Thus, Popkin (1979, 1988) has been able to pose a solution to Olson's dilemma by examining the role efficacy plays in the decision to join a collective movement, and although the solution is degenerative, it may make sense to jettison Olson's model in favor of a similar, but modified, SEU approach.

Popkin (1979: 257) contends that the perfect information and calculation assumption noted by Simon (1983) inaccurately reflects people's ability to assess the impact they are likely to have on the provision of a collective good, \( P(\text{PG}|A) \): [If] a large overall goal can be broken down into many small independent pieces, all of which are necessary, then the free-rider problem can be overcome ... Olson's tidy formulation, therefore, can be expanded from a situation where collective goods are financed solely from funds raised by leaders through selective incentives to situations where collective goods are financed by convincing persons that each member's contributions will have a perceptible effect.

Essentially, this becomes a leadership solution: leaders need to divide the group's goal into several necessary components. Then they can show their potential members that each member's contribution is necessary to achieve the small objective, which in turn is necessary to achieve the larger objective. Thus, rebel leaders who can convince free-riding rebels that their contribu-

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3 Zolberg et al. (1989: 229) cite a United States Council of Refugees estimate of

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30,000,000 displaced persons circa 1987. The number of guerrillas is not within an order of magnitude of that figure, which is consistent with my argument.
tions are necessary (i.e., that their contributions will have an impact on the provision of the collective good), will be able to mobilize large numbers of people. Drawing empirical support from the Vietnamese case, he argues that the Viet Minh were able to convince peasants that their effort was required, and that those peasants who joined the rebels were behaving rationally. The key to this solution is to change the problem from one of having to mobilize a large number of people for a general task to several problems, each of which only requires a small number of people, so that the free-rider dilemma does not exist. One might argue that Popkin's efficacy solution boils down to Olson's (1971: 62-63) federal solution: small "N" groups don't have free-rider problems—primarily because of the different probability term, but in part because of social incentives and the ability to enforce contracts, as discussed below. However, Popkin's emphasis on "convincing persons that their contribution will have a perceptible effect" implies otherwise.

Unfortunately the efficacy solution based on poor estimates of the probability term is degenerative: it is an empirically based revision of the theory. Popkin's application of the efficacy solution does, however, satisfy the second criterion in that it helps explain that while rebellions do occur, they are rare phenomena. It suggests that people will have an incentive to free-ride, except when leaders are able to create supra-village organizations by first mobilizing many small village-level groups with local projects to each individual's contribution is needed. Only those groups whose leaders are able to "frame the problem" in a particular manner will be able to overcome the free-rider problem and mobilize large numbers of people. Empirically, Popkin's case studies support his argument, and it receives further support from the studies conducted by the Muller and Opp team and Gibson.

Finally, Popkin's (1979) thesis implies the importance of social networks for overcoming the free-rider problem, an idea which is explicitly developed by the next group of authors and Popkin himself (1988).

Contracts and Convention
Hardin (1982) borrows the enlightenment idea of a social contract and, suggesting that social groups are penetrated by contracts or conventions which bind them to the social unit, maintains that these contracts and conventions can be used to overcome the free-rider problem. Contracts and Convention solutions rely on the all-or-none proposition (i.e., not one person contributes unless everyone who would be needed to provide the good contributes). As noted in the introduction, these scholars adopt a strategic modeling approach (however, not all of them employ game theory as a tool). In other words, they contend that the individual's decision will be conditioned by the behavior of others. Their argument is distinct from the social incentives solution discussed above in that the argument hinges on the presence of contracts and/or conventions that guarantee that others will participate, not that they derive utility from social interaction. I have identified four variants of this type of solution: the assurance game; leadership provides assurance; group norms provide assurance; and collective rationality. Each is reviewed in turn.

The Assurance Game
Several scholars have explicitly or implicitly employed game theory to model an individual's decision to contribute to the provision of a collective good. While the "prisoner's dilemma" game is sometimes used to study these problems, a group of scholars have suggested that the "assurance game" is more appropriate for modeling collective action in pursuit of public goods generally and rebellion in particular.

The assurance game is a game theory structure with the pay-offs exhibited in Figure 1 (Taylor 1987: 38). It can be contrasted with the prisoner's dilemma which has the pay-offs shown in Figure 2 (ibid.: 35). The single play prisoner's dilemma game has a dominant strategy for both players which is an equilibrium: free-riding. As a consequence, it has often been used to study collective action in pursuit of public goods, but Taylor and Ward (1982) contend that the prisoner's dilemma is an appropriate game only for modeling some situations where people seek to collectively produce a public good. More specifically, they explain that the prisoner's dilemma misrepresents the pay-offs for "lumpy" goods: "If, in the 2 x 2 game, a single individual's contribution is insufficient to provide any public good, or provides only very little of it, then each player will prefer D(effect) if the other player prefers D(effect), but may prefer to contribute if the other contributes too (ibid.: 353). The mutual Defect outcome in game theory describes a free-rider situation, but a mutual Contribution outcome solves the free-rider problem. Further, Taylor (1987) shows that the mutual cooperation result is upheld in n-player iterated assurance games as well as some chicken and prisoner's dilemma games.

The assurance game solution has also been advanced by Chong (1991) and Goldstone (1994). Goldstone combines his assurance game with the group norms solution—discussed below—when he argues that "an assurance game payoff structure arises for collective action whenever a norm of doing one's fair share pervades a group" (ibid.: 143). Note the implication Goldstone draws: "there is no need to ask how revolutionary or protest groups overcome the free-rider problem... group action is so pervasive in ordinary society that the free-rider problem is solved by adopting norms that allow the members of identifiable, knowledge-sharing groups to achieve effective group

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26 Taylor and Ward study chicken games.
action" (ibid.: 148–49). Chong (1991: 118) notes the same implication, but is thus pessimistic about the assurance game solution because those payoffs would only exist under conditions where a social structure had been created that produces the group norms: "although the nature of the game facing potential activists has changed from a prisoner’s dilemma to an assurance game, we still have a serious collective action problem, albeit of a different kind." The problem is that while everyone is willing to contribute if a certain number of others contribute, they are likely to stand around waiting for someone else to move first and never get off the ground unless they can be assured that they will not be one of a handful of contributors. Chong contends that this social structure or norm-providing institution is itself a public good and—as a consequence—subject to free-riding. Hence, the assurance game solution solves one public good problem only to encounter another.

How should we evaluate the assurance game solution? First, it is progressive; it can be argued that the assurance game relaxes the restrictive assumption that people are not strategic, and doing so solves the free-rider problem. Unfortunately, however, it cannot explain free-riding—in the Goldstone account—or simply pushes the problem back to another free-rider problem—according to the Chong account. Either way, this transgresses the second criterion. Further, the solution’s empirical utility is undermined by the fact that it produces only one outcome—collective action or free-riding, depending on which account of the solution one reads. However, as we shall see in the following sub-section, several scholars who did not use game theory suggested that leadership is important if we model decision-makers as if they were strategic. Both Taylor and Chong use that insight to try to circumvent the difficulties of the assurance game solution.
Leadership, Monitoring, Sanctioning, and Assurance

Building on Breton and Breton (1969) and Salisbury (1969), Frohlich et al. (1971) argue that when leaders are able to ensure that all of the individuals will contribute, the free-rider problem disappears (i.e., individual i's contribution is obtained because the leader can guarantee the contribution of the other group members if and only if that individual contributes). The thrust of the thesis is that entrepreneurial leaders enter an exchange relationship with each group member where they provide a mechanism that guarantees the other individual's contributions in return for that member's contribution.

Taylor (1987: 25) contends that political entrepreneurs can remove a collective action problem by attempting to change people's beliefs about the behavior of others. In particular, he emphasizes the importance of providing a monitoring and sanctioning system which can be used to ensure each rebel of the cooperation of her/his compatriots. He contends that conditional cooperation "requires amongst other things that the conditional cooperators have information about others' behavior. The required monitoring can be done by the political entrepreneur" (ibid.: 25). In addition, he makes note of the role entrepreneurs can play in changing people's beliefs about the impact of their contribution on the provision of the collective good (i.e., Polkin's efficacy solution). Unfortunately, the question that arises for rational choice theorists is, "Why would leaders be willing to pay the costs of creating such an institution?" Breton and Breton, Salisbury, and Frohlich et al. maintain that the benefits of leadership outweigh the costs, but many scholars are not willing to assume that this is so. Addressing this issue, Taylor (1987: 110) concludes that leaders will be altruists.

Following Taylor, Chong (1991) also identifies altruistic leaders as the variable that solves the second free-rider problem created in the assurance game (i.e., the creation of a monitoring and sanctioning system): "A group of highly motivated individuals—purists, zealots, moralists, Kantians, what have you—will have to provide the leadership required to convince others that large-scale coordination will be a profitable activity." The sanctioning and monitoring system is thus provided by "purists, zealots, moralists and Kantians": political entrepreneurs—who have behavior is inconsistent with the self-interested, rational "masses"—respond to community pressure—give their occupational or social standing—to provide assurance that others will participate. Chong (1991: 46) takes this route because he is concerned that the sanctioning system that leaders provide is itself a collective good, and is thus subject to free-rider problems. Hence, only altruists would be willing to provide it.

The utility of the leadership solution hinges on whether one accepts the contention that the selective incentives leaders receive outweigh the costs of providing a monitoring and sanctioning system. If one accepts this, then the leadership solution is not degenerative; using the structure of the theory it shows that people will contribute if they know others will contribute and that they can be identified as shirkers if they do not. Nor does this solution lead to the automatic mobilization problem: we have no reason to assume that the political knowledge and skills required to implement this solution are distributed evenly across the leadership of the various rebel groups that populate the globe, so we have no reason to believe that all groups whose interests are threatened will successfully implement this solution to the free-rider problem. Unfortunately, however, there are no empirical studies of this solution that examine rebel behavior. Popkin's study of Vietnam suggests that leaders had a significant impact with respect to efficacy, and the Leites and Wolf study suggests that rebels use coercion against non-contributors (i.e., establish monitoring systems). Their contention is supported by evidence from eyewitness accounts and human rights reports (e.g., Hayslip 1989). Thus, this solution shares something in common with the economic selective incentives solution, but it expands on it in a significant way. That expansion is not so much the addition of leaders, which is assumed in the Olson solution, but the shift from a non-strategic approach to a strategic approach where the behavior of others is important. Thus, the Leites and Wolf solution—which was rejected above—is incomplete, but when coupled with a strategic approach, it becomes complete and appears to be more promising.

Is it reasonable to assume that rebel leaders' selective incentives outweigh their costs? Ultimately, this is an empirical question. Yet, in the absence of evidence, it seems to me prudent to side with Taylor and Chong and reject such a contention with one caveat. People who hold positions of political authority in a community manage the monitoring and sanctioning systems to which Taylor refers. Hence, the assumption seems reasonable in cases where local or regional officials lead a rebellion against a national state. In other cases, however, we are left to assume that leaders must be altruists.

Appendix leaders as altruists who provide a monitoring system is a degenerative solution. However, it does not suffer from the automatic mobilization and, as discussed above, holds some promise to resist falsification. Hence, it is similar to the efficacy solution: not to be preferred (on the grounds that it is degenerative), but better than anything else we have encountered thus far. Further, it is quite consistent with the efficacy solution which raises the prospect of developing a synthetic solution. Before drawing conclusions, however, one other variant of the contracts and conventions solution remains to be considered.
Group Norms Provide Assurance

Whereas the leadership solution focuses on the provision of a monitoring and sanctioning system, some scholars contend that norms, in effect, can serve this purpose. For example, Fireman and Gamson (1979) discuss the importance of normative pressure and solidarity for solving the free-rider problem, and in their research on collective action, Marwell and Oliver (1993) discuss the impact that different types of contracts have on the mobilization process in large groups. Hechter (1987), White (1988), Coleman (1990), Goldstone (1994), and Oberschall (1994) have argued that groups provide solidarity which helps them provide an internal solution to the free-rider problem.

James Scott (1976) was the first to outline explicitly the importance of group norms for overcoming the free-rider problem in a rebellion.27 Scott's thesis is that peasant decision making is driven by a desire to minimize risk which leads to the establishment of a village level social convention that prohibits successful peasants from allowing those who are less successful to starve. When government policies prevent peasant villages from practicing this form of "risk insurance", the common threat to the convention binds the village together and enables it to overcome the free-rider problem by employing sanctions (e.g., ostracism) against those who do not contribute. An important thing to note is that with a functioning risk insurance system, the peasants have already overcome the free-rider problem (i.e., they have created a monitoring and sanctioning system).

Two issues come to mind when considering Scott's analysis. The first is that the free-rider problem does not exist in small groups where each individual's contribution has a perceptible impact on the good's provision and non-contribution can easily be monitored, and thereby punished. It is plausible that many peasant villages fit this category. To that extent, because collective action is a village-level phenomena, Scott's "solution" is not a solution. Second, and similarly, Scott's analysis suggests that peasant rebellions are not a large "N" problem: each village responds separately to the threat posed by the state; there is no supra-village coordination. Indeed, in a more recent article Scott (1987) contends that organizations do not mobilize large groups of peasants; rather, mobilization takes place without organization. To the extent that this is true, large "N" peasant uprisings must be driven by changes in structural conditions which commonly affect all peasant villages which participate in the collective protest.

Surprisingly, the Scott analysis is rather similar to that posed by Popkin: the key to overcoming the free-rider problem is to make mobilization a small "N," rather than a large "N," proposition.28 The main distinction is that Scott suggests that peasant villages have a built-in mechanism that enables them to overcome the free-rider problem, whereas Popkin suggests that the solution to the free-rider problem is contingent upon effective leadership.

Taylor (1988b) explores the connection between Scott's and Popkin's work, contending that Scott's thesis suffers because it lacks supra-village organization and leadership, whereas Popkin's theory suffers from a lack of appreciation of the salience of social networks.29 He argues that rational choice explanations of the decision to join in rebellions must focus on the fact that groups that have the intention of militarily challenging the state must utilize indigenous social networks (i.e., communities) to mobilize people at the local level. In this manner, the free-rider problem can be overcome because the communities can monitor, and thus ensure, participation.

Again, we see an effort being made to synthesize leadership with community ties. Scott's analysis is not a solution—because it accounts for local uprisings only—and appears to be incapable of explaining national rebellions. However, Taylor's synthesis is a solution. Leaders take advantage of the community norms to mobilize local villages and then build a national organization that links the local leaders. The solution is similar to Olson's federal solution, but it is distinct because of its emphasis on norms which significantly reduce the costs associated with constructing monitoring systems.

Here we see signs of cumulation. First, we had non-strategic analyses that emphasized economic and social selective incentives. Popkin contributed the argument that leaders could manipulate efficacy, and then the strategic analyses arrived emphasizing the importance of other players. Assurance games showed that free-riding can be overcome, but completely eliminated it unless we added the presence of leaders as an important variable. Yet, these leaders had to be modeled as altruists if we were to expect them to provide the monitoring system. The argument about norms significantly reduces the pressure on the leaders to construct sanctioning systems. To the extent that they can capture pre-existing sanctioning systems, new ones need not be constructed. Sociologists are more quick to make this connection than political scientists, and it is precisely this connection that makes Goldstone (1994) comfortable with the implications he draws about assurance games and the

27 It should be noted that Scott does not consider himself a rational choice theorist nor does he discuss Olson's work on the free-rider problem as motivating his study. Nevertheless, he is interested in explaining participation in rebellions, and his work is thus germane to conflict scholars interested in the free-rider problem.

28 This is surprising given the friction that is generally believed to exist between these two works.

29 It is interesting to note that Popkin modifies his position somewhat in his essay in the Taylor book.
elimination of the free-rider problem. In fact, of course, the problem is not eliminated: leaders need to be able to penetrate these systems of social norms and put themselves in a position to invoke them. This argument is well summarized by Coleman (1990).

One of the many issues Coleman addresses in his book is the topic of this essay: "How can a single theory both account for both free-riding and large "N" participation?" He refers to these outcomes as the rationality of free-riding and the rationality of zeal, respectively. By the rationality of zeal Coleman means situations where one expects free-riding behavior, but people participate in large numbers and with enthusiasm. He then asks, "How can these two rationalities be made consistent in a way that will allow prediction as to when one or the other will prevail?" (ibid.: 275). His answer is, roughly, that each individual may find it to be in her/his interest to contribute to the production of a participatory norm or to engage in sanctioning (rewarding) inappropriate (appropriate) behavior.

To be more specific, Coleman contends that zeal emerges in situations where groups successfully provide closure to social networks. To illustrate the argument, Coleman considers three different figures showing the potential network relations among three actors: in the first panel, none of the actors interact socially or professionally with the others; in the second panel, two of the actors interact, but the third is left out; in the third panel, all three actors interact. Coleman suggests that these different network structures account for the distinction between free-riding and zeal: when there is no network connecting the actors, then they have no ability to influence one another's behavior and thus they face a free-rider problem because each individual will calculate her/his impact on the production of the collective good, and in large groups when one factors in opportunity costs, it is not rational to contribute. However, when the members of the group are linked by a social network, then they can produce norms or sanctioning systems as long as the costs to the sub-set needed to produce the norms or sanctioning system are outweighed by the benefit produced. Since social networks reduce the costs of creating these norms and systems, zeal is often produced in situations where a group that is linked by a social network faces a collective action problem. In chapter 18, Coleman explicitly applies the model to revolution. He asks, "How can the free-rider problem be overcome in this situation where the impact of an individual's contribution is tiny?" and answers:

If the costs or benefits one experiences from others in the immediate vicinity is [sic] important and if those others have vested legitimacy in the revolutionaries, then participation in support of the revolt will elicit the rewards. Thus, if there is homogeneity of individuals' orientation to the revolt within groups showing extensive internal communication, zealous action that is collectively self-sustaining can arise (1990: 494).

Coleman's version of the contracts and conventions solution is progressive and it does not founder on the second criterion. Further, with respect to rebellions, the account implies that they are exceedingly difficult to organize except where social networks connect a specific subset of the population such as an ethnic or religious group: appeals to a class or anticolonial appeals to nationalism will likely fall on deaf ears except in situations where leaders can effectively capture pre-existing social networks (perhaps the liberation theology movement in Latin American Catholic churches can be profitably studied in this manner). Finally, the analysis is quite consistent with Tilly's (1978) emphasis on the importance of networks. For these reasons, although we have no empirical analyses of Coleman's account, it appears promising that the solution would withstand falsification.

**Tipping Phenomena**

The final type of solution that has been proposed—tipping phenomena—is also a strategic solution. Schelling (1985) introduces the theoretical argument of a tipping game, but does not discuss rebellions. Chong (1991), Karklins and Petersen (1993) and Goldstone (1994) each discuss tipping games in their work, and Lohmann applies informational cascades—an economic model that can describe a tipping phenomenon—to the study of rebellion. These studies contend that coalitions of groups make rebellions and focus on how those coalitions form, although the logic of the argument can be applied to group formation (see Schelling). The Goldstone paper is superior to the Chong and Karklins and Petersen treatments, so the essay focuses on that paper before discussing Lohmann's work.

After developing the group-norms argument discussed above, Goldstone (1994: 149) contends that the question should shift from an analysis of participation to an analysis of efficacy. To address the efficacy problem, Goldstone develops a tipping game model on top of his assurance solution to help explain revolutionary collective action. Citing Lindenberg (1989), he argues that large numbers of groups do not take action in pursuit of a universal collective good like successful rebellion, but instead pursue specific interests that may be limited to that particular group, and often do so as a defensive response to new claims by other groups (the latter contention is consistent with Tilly 1978). Hence, revolutions are not produced by a single group mobilizing a
nation, but rather by coalitions of groups seeking different—if complimentary—goals. He assumes that the probability of group success (P) is a function of state strength, elite cohesion and the number of people that the group can mobilize. He then assumes that the group leaders will identify a threshold value, \( P^* \), such that if \( P > P^* \), the leaders will mobilize the group to rebel. Thus, at times when state strength declines, as in a political crisis, the probability of success will go up for all groups, increasing the number of groups for which \( P > P^* \). Thus we would expect that the distribution of group protest and success over time would not be uniform, but lumpy, as protest actions and successes cluster around those periods of state vulnerability” (Goldstone 1994: 150). He further assumes that leaders’ estimates of \( P \) will rise when other groups join the protest. Arbitrarily assigning values to his variables for illustrative purposes, Goldstone describes the tipping effect in the following way: “This specification gives one group acting alone only a 2% probability of success, five groups acting together a 50% chance of success, and 10 groups (or more) acting together a near 100% chance of success... What we find is a very large “tipping effect” which takes the form of an assurance game among groups” (ibid.: 152–53). From the tipping game analysis Goldstone concludes that ties across groups are critical to the construction of revolutionary coalitions.

This solution is appealing in part because—like DeNardo and Mason—it adds the state as an important actor. Further, it brings the structural analyses of Skocpol (1979) and Goldstone (1991) into the analysis. That is, Goldstone's \( P \) variable is causally linked to the perceived strength of the state, and structural theories of revolution specify a number of structural variables that influence state strength. Political entrepreneurs monitor the state and take action when they perceive that doing so will be in their interest. Further, this solution is progressive not only because it is strategic, but because it yields additional hypotheses beyond solving the free-rider problem (e.g., the strength of ties across groups will co-vary positively with the number of people who join a rebellion). In addition, the solution does not lead to the problem of automatic mobilization and thus satisfies the second criterion. While we do not have significant empirical evidence, the Skocpol and Goldstone studies find that state strength—particularly significant declines in state strength—is influenced by structural factors. Hence, there is some cause to be optimistic about the performance of this solution in an empirical analysis.

Lastly, Lohmann (1992) develops a similar model by applying the work on informational cascades to the study of revolution and revolt. The argument is similar to the tipping game in that different actors have different preferences for rebellion, but shifts in the number of people who are supporting the rebellion have an impact on the preferences of others. She begins by pointing out that Ledyard (1984) has shown that, even in large groups pursuing single-step goods, the probability that a given individual's participation is decisive is strictly positive as long as the population has a finite size. She assumes that preferences are heterogenous but correlated across the population, that information about regime policies and behavior is imperfect and dispersed unevenly throughout the population, and that the incumbent regime manipulates access to information to keep people poorly informed. Thus, when individuals publicly observe protest behavior, they use it to update their preferences. The most interesting case for Lohmann (1992:11) is one where “the status quo regime might be supported by a sufficient number of imperfectly informed people, although it would collapse if some of the dispersed information were to become publicly known.” This situation is ripe for an informational cascade where protest behavior signals others about regime behavior and they update their beliefs such that they withdraw their support from the regime and join the protest.

To account for how this process overcomes the free-rider problem, Lohmann distinguishes expected from actual protest turnout. That is, she contends that every individual anticipates that there will be a certain number of people who are going to protest the regime regardless of what it does. Thus, only when the number of actual protestors exceeds the expected number of protestors will the information regarding the number of protestors signal that the individual should update her/his preferences about the regime. Since expectations are distributed heterogeneously through the population, people will respond differently to a given level of absolute protest (i.e., some will update, others will not). More specifically, Lohmann separates the population into four groups: anti-status quo extremists, activist moderates, rationally apathetic moderates and pro-status quo extremists. The extremists do not update their preferences, but the moderates will, given a sufficient gap between expected and actual protest turnout. Actual protest turnout is determined by the distribution of negative experiences among the activist moderates: people will protest when they have bad experiences with the regime because their information set will suggest that the regime should be replaced. Assuming that positive and negative experiences are distributed randomly throughout the population at any given point in time, and that the activist moderates are a relatively small group, it follows that the number of activist moderates with negative experiences will vary substantially. Thus, Lohmann concludes that there is a significant stochastic element to her model as the distribution of negative experiences among the activist moderates (i.e., the initial conditions) greatly influence the outcome of the model.

Lohmann's extension of the informational cascades theory to rebellion is degenerative in that she adds several assumptions. Nevertheless, the theory is
able to account for both free-riding and rebellious collective action—thus satisfying the second criterion—but also generates new hypotheses (e.g., the probability of large "N" rebellion is a function of the distribution of preferences, expectations, and experiences throughout the population). Further, like Goldstone, she makes state behavior relevant through the medium of people's experiences with the state. Perhaps the most appealing aspect of the Lohmann account is its parsimony. Alternatively, some scholars may find the synthetic possibilities outlined above vis-à-vis the other solutions more attractive. In any case, the informational cascades theory has not yet been confronted with evidence, nor do we have much high quality information about the distribution of experiences and preferences in large populations. Perhaps there are survey data available that would give us empirical leverage, but I find it difficult to muster any prior expectations about this theory's empirical performance.

**OVERCOMING THE FREE-RIDER PROBLEM**

I have argued that a marked shift in the literature from non-strategic to strategic analyses of the free-rider problem has led rational choice sympathetic conflict scholars to shift their attention from selective incentive solutions to contracts and conventions and tipping phenomena solutions. I further characterized this shift as representing some cumulative in the literature, and thus wish to exult its virtues. In addition, I tried to point out areas where I think we can profitably synthesize solutions and also passed judgment on efforts I contend are better abandoned. The criteria used to pass judgment were (1) whether the solution was progressive or degenerative; (2) whether it could account for both free-riding and mobilization; and (3) whether it performed well (or was judged likely to perform well) empirically. In this section I summarize those judgments and create a priority list for future theoretical efforts.

The initial attempts to use rational choice explanations to account for participation in rebellions followed Olson's lead and employed SEU theory, aiming their attention at selective incentives. I have argued that both the economic and social selective incentives solutions are at best partial solutions. The economic selective incentives solution runs afoul of the third criterion while the social selective incentives runs afoul of the first and second. The arguments that rational choice models misrepresent benefits as costs were also rejected: they run afoul of all three criteria. The third type of selective incentives solution—which focuses on state terror—was found to be promising because of its emphasis on the state, but failed to perform well with respect to the second criterion. We are thus left with the conclusion that SEU theories that focus on selective incentives are unlikely to yield useful rational choice theories of participation in large "N" rebellion unless used in conjunction with other solutions.

The second type of solution that was reviewed was Popkin's efficacy solution. Like the first group, his is an SEU theory. Although it performs poorly with respect to the first criterion, it performs well with respect to the second and third. Theories that perform well on all three criteria are to be preferred, but this solution was judged to be an improvement over the selective incentives efforts and further played a role in generating better strategic theories.

The contracts and conventions solutions are strategic, though only some of the authors employ game theory. The assurance game solution founndered with respect to criteria two and three, although a combination of leadership and assurance games is an improvement even though it is degenerative. The group norms variant—as elaborated by Scott and Coleman—serves to bring together norms, leadership, and assurance games, and performs well on all three criteria. Perhaps it should not be surprising then, that most of the recent work on this question has focused on a contracts and conventions solution.

Finally, I also reviewed some strategic studies that took account of tipping phenomena. The tipping games suggest that mobilization might be profitably studied by focusing on coordination between groups while Lohmann's cascade model suggests that protest behavior can serve as a cue to bayesian updating that will lead to rebellion in societies with certain distributions of expectations toward protest behavior. I found that Goldstone's use of the tipping game performs well on all three criteria—although I differed with his characterization of free-riding as a non-issue—and that Lohmann's cascade model performs well on the second criterion, but I was unable to pass judgment on the third criterion.

Taken as a whole, then, the forecast is rather encouraging for rational choice models of participation in large "N" rebellion. That said, the biggest shortcoming of this literature is the relative dearth of falsification efforts. With the significant exception of the Muller and Opp team, there have been too few attempts to systematically confront these theories with evidence. To the extent that one relies on survey data to test these arguments directly, one faces formidable obstacles (i.e., rebels and loyalists are notoriously difficult to interview). However, Lichbach (1995) has done a masterful job of demonstrating that rational choice theories of rebellion yield literally dozens of testable hypotheses that do not require survey research to falsify. Empirical work, then, is what is required to continue to push this research program forward. In fact, the relative dearth of empirical work makes the progress and cumulative of the past twenty-odd years all the more impressive. The view from here, then, is that the rational choice research program has a healthy future in conflict studies.


