REVIEW ESSAY

Why Did the East Germans Rebel?

SUSANNE LOHMANN

In June 1953, 500,000 citizens of the German Democratic Republic (GDR) participated in a mass revolt against the regime. Their protest was violently suppressed. Between 1953 and 1989, mass demonstrations were unheard of in the GDR. Then, in the fall of 1989, the citizens of Leipzig took to the streets. They demonstrated on thirteen consecutive Mondays, between September 25 and December 18. Turnout peaked at more than 300,000 on November 6. The Berlin Wall fell a few days later. On October 3, 1990, just one year after the first "Monday demonstration," the GDR ceased to exist when the five East German states acceded to the (West German) Federal Republic of Germany.

The East German protest raises one of the most difficult questions of social science: what drives people to participate in collective action? Karl-Dieter Opp, the premier German sociologist, considers this question together with Peter Voss, an East German pollster and public opinion specialist, and Christiane Gern, a West German researcher, in Origins of a Spontaneous Revolution: East Germany, 1989 (1995). Most accounts of the 1989 revolution in the GDR consist of thick description that can at best be classified as insightful journalism. The book by Opp, Voss, and Gern stands

Susanne Lohmann is an associate professor of political science at the University of California, Los Angeles.

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out because the authors take the "science" in social science seriously. Their account is based on a theory of rational action and a systematic analysis of survey data. Their exemplary work on the East German revolution belongs on the bookshelf of every serious scholar of collective action and of modern Germany. Having made a strong positive statement, I now turn to some problems I have with the theory, the data, and the literature review provided by the book.

Perception Biases and Collective Action

The theory of rational action in this book is largely based on Opp's earlier work (e.g., Opp 1989). The basic unit of analysis is the individual, who takes action if the benefits of participating in collective action exceed the costs. To explain how people overcome the free-rider problem of collective action, Opp, Voss, and Gern invoke the existence of a perception bias:

> the single individual within a large group has no influence on the provision of the public good at which the group aims. This may be true, but a single person's decision to take part in a demonstration does not depend on whether this person will really be influential, but rather on whether she or he perceives that her or his participation makes a difference. Empirical research has shown that there are many people who believe that their individual political action, whether voting or protesting, is influential. (Opp, Voss, and Gern 1995, 36)

The authors marshal survey data to demonstrate the empirical descriptiveness of the assumption that people believe their actions can affect the outcome of a collective enterprise. In November and December 1990, a representative sample of 1,300 citizens of Leipzig were surveyed about the events that occurred in the fall of 1989. The authors also interviewed 209 members of opposition groups and another 19 citizens of Leipzig. A large percentage of the survey respondents did indeed express the belief that their actions were politically influential.

Unfortunately, these data do not allow the authors to discriminate effectively between their perception-bias hypothesis and the null hypothesis that people's assessments are accurate.

Prisoner's Dilemma versus Voluntary and Costly Contributions to a Public Good

Mancur Olson (1965) argues that costly participation in a collective enterprise is subject to a free-rider problem. Misinterpreting Olson's contribution, many social scientists conceive of collective action as a prisoner's

dilemma problem, which yields a point prediction of zero participation (at least in a one-shot or finite-horizon setting). To "explain" why people nonetheless engage in collective action, scholars invoke altruism, social norms, social embeddedness, selective incentives, political leadership, psychological benefits of participation or costs of nonparticipation, and the like. Opp's theory invokes a perception bias.

Counter to conventional wisdom, many examples of collective action are more adequately modeled not as a prisoner's dilemma but as a game of voluntary and costly contributions to a public good. John Ledyard (1984) and Thomas Palfrey and Howard Rosenthal (1985) pioneered the game theory of voting; I developed the game theory of mass demonstrations (Lohmann 1993, 1994). Game-theoretic participation models provide rigorous underpinnings for Olson's insights, yielding positive turnout as an equilibrium prediction even when individuals are instrumentally self-interested and do not suffer from perception biases of any kind. In principle, the notion that people are instrumentally rational and self-interested is consistent with the observation that people engage in collective action. The real issue is not whether game theory can explain the fact of collective action. Instead, the paradigm is challenged by the turnout of huge numbers of people—thousands, and sometimes tens and hundreds of thousands, or even millions.

A Numerical Example

A simple model, which draws on Palfrey and Rosenthal (1988, 1991a, 1991b, 1994) and Lohmann (1995), serves to illustrate why Opp's theory is wrong. There are N individuals, indexed i = 1, . . . , N. The status quo regime is overturned in favor of an alternative regime if at least K out of N individuals participate in a revolt. The utility payoff under the status quo is normalized to zero, the utility payoff under the alternative regime to one. Individual i is privately informed about her cost of demonstrating, C_i, which is drawn from the uniform distribution defined over the interval [0,1]. (The model can be extended to allow for heterogeneity and private information about benefits.)

An equilibrium in this game consists of a "cutpoint" decision rule: if individual i's cost lies below a threshold $\hat{C}$, she participates in the revolt; otherwise she abstains. Expecting all other individuals to follow this rule, each individual calculates the probability that her action is decisive as being equal to the probability that $K-1$ out of $N-1$ individuals draw costs below the threshold $\hat{C}$. This probability corresponds to the binomial

probability that $N-1$ Bernoulli trials result in $K-1$ successes when the probability of a success is equal to $\hat{C}$,

$$b\,(K-1;\,N-1,\,\hat{C}) \equiv \frac{(N-1)!}{(K-1)!\,(N-K)!}\,\hat{C}^{K-1}\,(1-\hat{C})^{N-K}.$$

To close the model, I need to provide an expression for the critical threshold. Individual i strictly prefers to participate in the revolt if the probability that she is decisive for a change in regime, $b\,(K-1;\,N-1,\,\hat{C})$, multiplied by the benefits of a change in regime, one, are strictly greater than her cost C_i. Conversely, she strictly prefers to abstain if $b\,(K-1;\,N-1,\,\hat{C})$ is smaller than her cost C_i. Consider a hypothetical individual whose cost is such that the individual is exactly indifferent between acting and abstaining. Her indifference condition,

$$b\,(K-1;\,N-1,\,\hat{C}) = \hat{C}\ , \qquad (1)$$

defines the threshold $\hat{C}$. (I cannot provide an explicit solution for the threshold $\hat{C}$ as a function of the parameters N and K, but later I will calculate some numerical examples.)

Next, I modify equation (1) by introducing a perception bias ε, resulting in equation (2):

$$b\,(K-1;\,N-1,\,\hat{C})\,\varepsilon = \hat{C}\ . \qquad (2)$$

For ε = 1, equations (1) and (2) coincide; this is the special case where individuals assess their probability of being decisive accurately. Individuals underestimate this probability if ε < 1. Opp's claim that individuals overestimate this probability corresponds to ε > 1.

Using the program Mathematica, I calculate the cutpoints $\hat{C}$ that solve equation (2) for N = 10, K = 3, and $\varepsilon \in$ {0.9, 0.99, 0.999, 1, 1.001, 1.01, 1.1}. Table 1 documents the results. A given perception bias ε gives rise to three equilibria: one equilibrium with a zero cutpoint ($\hat{C}_1$), one with a strictly positive but low cutpoint ($\hat{C}_2$), and one with a strictly positive and high cutpoint ($\hat{C}_3$). In interpreting table 1, it is useful to keep in mind that $\hat{C}$ is not only the cutpoint of the individuals' decision rule; $\hat{C}$ is also equal to the ex ante probability that a given individual participates in the revolt, as well as the probability that this individual's action is decisive.

This numerical example demonstrates that Opp's theory is wrong on

Table 1

Perception Bias	Collective Action Cutpoint		
ε	$\hat{C}_1$	$\hat{C}_2$	$\hat{C}_3$
0.900	0	0.04154	0.26412
0.990	0	0.03636	0.28016
0.999	0	0.03592	0.28162
1.000	0	0.03587	0.28179
1.001	0	0.03582	0.28195
1.010	0	0.03539	0.28339
1.100	0	0.03162	0.29670

two counts. First, Opp suggests that for $\varepsilon = 1$ we get a zero turnout equilibrium, while for $\varepsilon > 1$ we get an equilibrium with strictly positive turnout. But table 1 shows that there is nothing special about the case of $\varepsilon > 1$. The probability that a given individual participates in the revolt is zero in one equilibrium and strictly positive in two equilibria, for $\varepsilon > 1$, $\varepsilon = 1$, and $\varepsilon < 1$. Second, Opp suggests that the individuals' incentives to participate increase as we move from no perception bias ($\varepsilon = 1$) to a positive perception bias ($\varepsilon > 1$). His claim is consistent with the comparative statics for the high cutpoint equilibrium (the cutpoint $\hat{C}_3$ increases as ε increases), but it is inconsistent with the comparative statics for the low cutpoint equilibrium (the cutpoint $\hat{C}_2$ decreases as ε increases) and the zero cutpoint equilibrium (the cutpoint $\hat{C}_1$ remains constant as ε increases).

Inconclusive Evidence

Standard game-theoretic models like the one developed here predict that an individual action is decisive with strictly positive probability. Thus, survey results indicating that people believe their actions make a difference are qualitatively consistent with game theory. Specifically, such survey results do not allow us to decide, one way or the other, whether people's assessments of their political influence are accurate. It is possible, of course, that the quantitative predictions of game theory err greatly; that is, people may well overestimate the probability that their actions are decisive. But the theory

and evidence presented by Opp, Voss, and Gern do not allow us to discriminate between the perception-bias hypothesis and the null hypothesis. The heterogeneity in people's assessments that shows up in the authors' data is in fact inconsistent with the standard game-theoretic model, in which people's beliefs are homogeneous, but it is consistent with richer models that allow for informational heterogeneity (e.g., Lohmann 1993, 1994). The authors did not formulate their survey questions in a way that would allow us to discriminate between the two hypotheses: in their view, any evidence indicating that individuals believe they are politically influential necessarily supports the perception-bias hypothesis. In contrast, Palfrey and Rosenthal's (1991a, 1991b, 1994) laboratory experiments are designed to discriminate between the possibilities that people's voluntary and costly contributions to a public good are driven by perception biases and various other factors (altruism, learning, cheap talk, repeated play).

Survey Responses versus Costly Collective Action

Palfrey and Rosenthal's empirical specification is more powerful than that of Opp, Voss, and Gern for another reason. Palfrey and Rosenthal's inferences are drawn from people's costly actions in the laboratory, whereas Opp, Voss, and Gern's conclusions are based on people's responses to survey questions, which do not provide rewards or penalties that would create incentives to respond truthfully or accurately. We know that people's responses to survey questions are unstable over time and vary quite sensitively with question wording and order. Who knows what is going on in people's heads when they are asked how they perceived their personal chances to change the political and economic situation in the GDR by taking various actions, or when they are asked about the extent to which they agree with the statement "I thought: If I take part in demonstrations and similar actions now, I personally can make a difference"? At the time of the survey, the respondents already knew that the mass protests they had been involved in were hugely successful in bringing about political change on a revolutionary scale. Do we honestly believe that if the revolution had been unsuccessful and we had asked them those same questions, they would have answered in the same way? The potential for hindsight bias is mind-boggling.

Evolutionary Underpinnings of Perception Biases

Opp's theory, which simply assumes the existence of a perception bias to explain collective action, is too facile. Although people may be less than fully rational, it is likely that they systematically overestimate their political influence in certain situations and underestimate their influence in others. To take seriously the idea that collective action is driven by perception

biases, we must go beyond simply assuming that such biases exist.

One possible path we might take is to make use of the emerging literature on evolutionary game theory and evolutionary psychology (Waldman 1994; Cosmides and Tooby 1992), which suggests that perception biases may arise as a result of evolutionary selection effects. We could examine an evolutionary environment in which many successive generations of people play a game involving voluntary and costly contributions to a public good. In this setting, there is a high payoff to a group of individuals that overcomes the free-rider problem of collective action, but within that group the individuals who contribute to the public good get a relatively lower payoff. The probability that a given type "survives" into the next generation is positively related to his or her payoff. We can think of an individual's perception bias as being his or her "type." That is, different types have different beliefs about the probability that their contributions are decisive: they over- and underestimate this probability to different degrees. Without further analysis, it is not obvious that the type who overestimates the probability that his or her contribution is decisive will emerge as the dominant type in this evolutionary game; nor is it obvious whether, on average across types, people will have a tendency to overestimate the probability of being decisive.

Newer Literature

Opp, Voss, and Gern's book was originally published in Germany (Opp, Voss, and Gern, 1993), two years before the University of Michigan Press published the English language translation. The 1995 edition was not updated, except for a handful of references. It builds primarily on the pre-1991 literature on collective action and East Germany, containing a handful of references dated 1992 and 1993 and one reference dated 1994. As a consequence, the book does not make use of the immense amount of scholarship about the East German revolution that has accumulated over the last few years. Our understanding of the German Democratic Republic, the East German revolution, and postunification East Germany has developed enormously since 1991, and for this reason it is crucial for readers to date the secondary materials they consult. A scholar seeking to become acquainted with the state-of-the-art research on East Germany cannot rely on Opp, Voss, and Gern, though their book is an excellent starting point for scholarship in this area.

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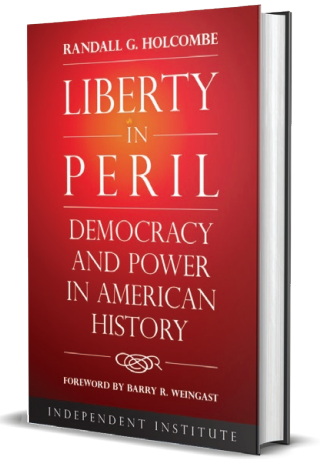

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