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# Participatory Analysis, Democracy, and Technological Decision Making

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*Scientific and technological policy issues are not and should not be exempt from the norms of democratic governance. This article examines two major theories of democracy, analyzes their commonalities and differences, and derives criteria for evaluating various forms of public participation in policymaking. The author argues for a new category of participation, participatory analysis, that includes forms of participation that satisfy democratic criteria and emphasizes the importance of learning among participants. Different types of participatory analysis may be best suited to different kinds of policy problems.*

Highly technical policy decisions need not be exceptions to democratic practice. Although some authors may still decry public or political interference in such issues, public participation—official or otherwise—has become the de facto norm in numerous issues: siting nuclear power plants, setting allowable levels for workplace or ambient airborne toxic chemicals, and deciding where and how to dispose of hazardous waste, to name a few.<sup>1</sup> Thus, for a wide variety of reasons, participation is unlikely to stop or even decline significantly.<sup>2</sup>

Nor should it, according to normative democratic theory. The rationales for a purely technocratic treatment of technical policy issues have been critiqued from a wide variety of perspectives (Tribe 1973; Nelkin 1975; Laird 1990; Lakoff 1977; MacCrae 1981; Sclove 1983). The social and economic importance of these issues create a normative requirement that they be subject to democratic scrutiny. Various scholars have argued that ordinary citizens both have a stake in the outcomes of such policy-making and have important views and insights to contribute to it (Holman and Dutton 1978; Krimsky 1984).

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The means and methods of policy processes vary enormously, however. They, in turn, have different impacts on the substantive outcomes of the policies and their democratic character. Furthermore, not all participation is equally democratic. To evaluate participatory activities, we require a better conceptual understanding of the relationship between democratic theory and technological policy-making.

In an article in this journal, Fiorino (1990) begins to develop this relationship. He establishes a set of normative democratic criteria by which we can judge to what extent and in what way a specific participatory mechanism makes a policy process more democratic. This approach to evaluating participation holds the promise of several important benefits in the analysis of technical policy processes. The first of these benefits is the recognition that not all forms of participation are equally democratic, and thus not all are of equal importance in setting policy.

Second, and more important, Fiorino (1990) makes it clear that democracy is a multidimensional concept. Many earlier analyses have depicted a more or less linear trade-off between the technical competence of policy processes and the extent of their democratization (Rossini and Porter 1984; Kemeny 1980). Democracy was seen as a homogeneous good, and any amount of any type of participation gave you more of it. Thus the issue reduced to striking the proper balance in this linear trade-off, a task seeming to require wisdom but not very amenable to analysis. There seems to be no reasoned way to analyze the trade-offs to improve the results. Fiorino's arguments make it clear that depicting the issue as such a straightforward trade-off both fails to understand the complexity of the issue and blinds the analyst to the many interesting variations that are available to democratize the policy process.

In this article, I seek two fundamental goals. The first is to develop further the normative democratic criteria that could be used to evaluate participatory mechanisms. This development requires adding a second theory of democracy and its accompanying criteria for normative evaluation and arguing for a somewhat different interpretation of the theory that Fiorino (1990) uses. The second task is to put forward a new category of activity for analyzing public participation programs aimed at scientific and technological issues, called here *participatory analysis*. The analysis of democratic theories below emphasizes, inter alia, the importance of learning to participants in policy issues. This emphasis on learning leads me to suggest that, for any participatory program to receive a favorable normative evaluation, it must be part of the category of participatory analysis. Organizing our analyses of such programs around this category leads to several interesting insights about participation in such issues, as discussed below. Justifying these claims requires, first, a discussion of democratic theory.

## Democratic Theory and Normative Evaluations

Fiorino (1990) derives his democratic criteria from a particular theory of democracy, that of direct participation (p. 228). I will discuss his interpretation and use of that theory in detail below. However, it is worth including a different school of thought in these analyses, that is, pluralism. Pluralism (also called polyarchy or interest group liberalism) is the mainstream theory of democracy in American political science.<sup>3</sup> Moreover, much of the literature of direct participation begins with a critique of liberalism, of which pluralism is a variant (Pateman 1970; Barber 1984). Because of its status as the dominant general theory of democracy in American political science and because of its critical relationship with direct participation theory, pluralism should also be used as a source of democratic criteria. Put very briefly, pluralism is a theory of democracy based on the actions of organized voluntary interest groups. Citizens are assumed to join and support groups to further their interests, and democratic governance is the free and successful functioning of these groups and their interaction with each other and with the government. Direct participation, in contrast, is premised on the notion that democratic governance includes the full participation of individuals as individuals in setting policy. Comparing the commonalities as well as the differences in the theories and their respective criteria will give us a deeper and broader view of what it means to declare some form of participation to be democratic.

### *Commonalities*

Pluralism and direct participation have some important features in common.<sup>4</sup> First, both theories require, for a properly functioning democracy, that citizens participate in shaping policies in ways that go beyond merely voting for officials and leaving the rest to elite politics and the administrative state. The form of the participation differs (see below), but both theories reject a view of democracy that sees it as nothing more than a procedure for choosing a government in which elites compete for mass electoral support (see Schumpeter 1975 [1942], 296-73). The experience of the collapse of the Weimar Republic, which had carefully crafted formal democratic mechanisms, left a deep impression on post-World War II theorists, convincing them that such institutions were not a sufficient condition to ensure democratic governance (Cobb and Elder 1972, 2-3). Both theories do, of course, assume the needs for these formal institutions—for example, free elections, universal suffrage, formal equality—as necessary background conditions for democracy (Dahl 1956, 2-3; Dahl 1961, 3-4; Dahl 1967, 7-8; Pateman 1970, chaps. 1 and 2).

Second, both theories require that participation be meaningful in two senses: first, that it enables citizens better to understand their interests and how they might affect decisions that have an impact upon their interests, and, second, that it enables citizens to have some sort of substantive influence over actual policy outcomes. For pluralists, the essential feature of democratic politics is the competition between autonomous interest groups as they try to promote the interests of their members. Indeed, for some pluralists, government should be little more than referee and broker (Truman 1951, 49-50). In any event, a properly functioning pluralist democracy is one in which leaders must be responsive to the wishes of a broad segment of the population because of the "continuous political competition" of a large number of autonomous groups (Dahl 1956, 132 and 137-38). For groups to represent their members' interests, the groups must be knowledgeable about the interests at hand and have some influence over policymakers. Otherwise, there is no reason for policymakers to be responsive.

For direct participation theorists, the requirements of knowledge and influence are, if anything, stronger. A central tenet for this theory is that individual citizens should have the opportunity for actual decision making in policies that affect them (Pateman 1970, 87; Barber 1984; Arnstein 1971, 70-72). Clearly, for them to realize these goals, they must be knowledgeable about issues and policies. It is also not enough simply to be able to influence decisions. Meaningful participation in this view requires real decision power because only such power can realize the goals that the theory argues are desirable.<sup>5</sup>

### *Differences*

There are also some important differences between the theories. Three major ones concern us here. First, pluralists are concerned with the actions of groups, whereas direct participationists are concerned with individuals.<sup>6</sup> For pluralists, groups are voluntary organizations that people join and support to further their interests. Through collective action, people can promote their interests much more effectively than they could as individuals. Because the groups are voluntary, people can join and withdraw as they choose, and they can belong to as many different groups as they see fit.<sup>7</sup> Pluralist democracies can function properly only if groups can function properly.

On the other hand, direct participation insists on the empowerment of the individual. This requirement has serious implications for what counts as participation. It is not enough to join an organization or to give it money. People must participate directly as individuals.

Second, the theories differ on what they emphasize. The emphasis in pluralism is on outcomes, on how benefits and burdens are distributed

throughout society. In contrast, direct participation has two emphases, outcomes and the educational and psychological effects that the participatory activity has on the participants. This difference arises out of a deep divergence in how the theories view persons and the effects of political activity on them. These differences give rise to distinct evaluative criteria derived from each theory and so deserve some explication here.

Pluralists assume a linear model of group formation and political activity. People simply have interests, and only they themselves know best what those interests are and how to rank them. The interests and rankings may vary from person to person. For example, some people may oppose the siting of an incinerator in their town because they fear pollution, aesthetic harm, or increased truck traffic on their streets. Other people in the same town may welcome the facility because, to them, the increased tax revenues are more important than the environmental or aesthetic risks. To promote their interests, people join in group activity, perhaps joining a multitude of groups if they have various and diverse interests. They are successful if the group's activities results in political or policy decisions favorable to them. The collective decisions are the result of the pulling and hauling of a large number of diverse groups, what Dahl (1956) would call polyarchy. The central issue here is that people's desires and interests are assumed to be given exogenously to the political process and to remain constant throughout. Interests and desires are treated as being in an unchanging black box. Pluralists understand that the contents of the box can come from a wide variety of sources: family, friends, socioeconomic status, critical life experiences, or historical context, to name a few. Still, whatever the source, interests are only inputs into the policy process.

Direct participation theory, in contrast, places a strong emphasis on the effects of participation on those who engage in it. Truly democratic participation changes the outlooks and attitudes of participants. It makes people more aware of the linkages between public and private interests, helps them develop a sense of justice, and is a critical part of the process of developing a sense of community (Pateman 1970, 24-25; Barber 1984, 155). Interests are not seen as unchanging black boxes; they are affected, sometimes profoundly, by the experience of participation. Democratic processes should engender in people longer time horizons and broader scope in thinking about what their interests are. In short, democracy enables people to become fully developed citizens.

The importance of these effects is central. Walker (1966) argues that they are more important than the actual political or policy outcome of any specific controversy (p. 288). All direct participation theorists agree that the lack of these effects renders a political system undemocratic and a priori less

desirable than one that includes them. If perfectly just decisions are handed down by a benevolent monarch or even a wise legislature, that system would be inferior to participatory democracy. Policy outcomes are also of concern, but they share the stage with educative effects.

In the third area of difference, pluralism posits the need for certain social preconditions for the democratic system to function properly. Formal legal structures and political institutions are not sufficient to ensure a democratic society. Dahl (1956) argues that there must exist consensus on the norms of pluralism, social training in those norms, and a substantial degree of agreement on the acceptable range of policy alternatives (pp. 76-77). Absent these, a pluralist system could become tyrannical or unmanageably fractious (Dahl 1956, 82-83 and 132-35). In contrast, direct participation theorists argue that a democratic system is part of what creates the necessary conditions for democracy to be successful. It is precisely the act of participating that, as described above, develops in people a sense of the common good to complement private interests. Pluralism claims that a democratic polity requires, in some sense, a democratic society; direct participation claims, in part, that it creates one. This last difference between the theories reemphasizes the crucial importance for direct participation of the possible educative effects of politics.

### Democratic Criteria

From the foregoing discussion of democratic theories, we can derive sets of normative criteria for each and compare their commonalities and differences.

#### *Pluralism*

Because a key feature of pluralist democracy is the political competition of interest groups, a policy process that improves that competition by making it broader or deeper improves pluralism. I will consider a better-functioning system preferable to a worse one. Therefore, these criteria are normative; they enable us to evaluate the desirability of a situation.<sup>8</sup> There are four pluralist criteria relevant to this analysis.

*1. Numbers of groups.* Because political competition among groups is the central feature of pluralism, a participation mechanism is desirable (improves pluralism) if it brings more groups into a policy process than were there before. The participation mechanism may even serve as a catalyst for the organization of new groups relevant to the policy issue at hand, which is also a positive development.

2. *Opportunity for learning.* As argued above, participation must be informed to be effective. In the case of pluralism, we are concerned with group learning, which can come about in a variety of ways, including acquiring expert personnel. A participatory mechanism is evaluated positively if it provides some means for group learning.

3. *Access to officials.* In order that groups be able to represent their members' interests, they must also have some form of access to relevant officials. Obviously, there are different degrees of access, but, to satisfy this criterion, it must be more or less direct. Access can be made either broader or deeper to satisfy this criterion.

4. *Means of coercion.* Groups must have some influence over officials, which in this theory implies some means of coercion. No group should have absolute power, and not all groups are equally powerful (Dahl 1982, 207-9). Neither, however, should groups be without any coercive influence. They cannot represent the interests of their members if all they can do is make insignificant noise. They must be able to impose some cost on an official if they feel he has ignored their concerns. This is not to say that any specific group must always (or ever) get its way. Officials may simply choose to take the heat, but there must be a real cost involved (Dahl 1956, 145). Thus, by this criterion, participation improves pluralism if it gives groups some leverage over officials that can be manifested in any number of ways.

### *Direct Participation*

Four criteria likewise follow from direct participation theory as discussed above.

1. *Numbers of individuals.* This theory requires people to participate as individuals. The purpose of participation is both to influence decisions and to educate citizens. The greater the percentage of citizens to whom that applies, the better. A mechanism that brings more people into the process as individuals, as amateurs, in Fiorino's (1990, 229) words, gets a positive evaluation.

2. *Improved understanding.* Like pluralism, this theory insists that participation must be meaningful. Part of that requirement is that citizens be educated about the issues at hand and what they can do to influence policy decisions (Pateman 1970, 68-69). In part, this criterion means that relevant information be provided to citizens, but information is not enough. Inundat-



ing people with mountains of raw data is not a democratic exercise. Rather, citizens must be given information and analysis that are genuinely educative. Citizen *understanding* must improve. There are a variety of ways that this education could occur, but any mechanism that obfuscates an issue further gets a negative rating on this measure.

3. *Resources for participation.* Effective participation in this theory is unlikely to occur if large resource inequalities exist among participants.<sup>9</sup> Participatory mechanisms may provide resources in a variety of ways, both direct and indirect. They can provide funds for salaries or consultants, subsidize research, or disseminate existing information, to name a few. The point is that participation programs, although they cannot single-handedly reverse serious social inequality, must make some effort at blunting the effects of that inequality.

4. *Delegating authority.* In this theory, participants must actually have some authority to make or, in Fiorino's (1990) words, codetermine, decisions. It is not enough simply to be heard or have input (Pateman 1970, 71). This criterion does *not* require some utopian level of citizen decision making. Obviously, all citizens cannot participate in all decisions (Barber 1984, 151). Nonetheless, citizens must participate frequently and in substantive ways. On the assumption that we have not yet exceeded the normatively desirable level of participation, this criterion assumes that more is better. Specifically, more people should be involved in processes that actually involve the exercise of some authority.

## Comparison

### *Commonalities*

The criteria derived from both theories share some important common points. First, both are concerned with the quality of participation. Participation is not democratic if it is either manipulative co-optation or mob rule. Participation must be informed, and both theories are concerned that participants be provided the means to improve their understanding of the issues. The details of how such education might take place varies between theories and among issues, but it is crucial to both theories. Participation must also involve real influence over outcomes. Again, the details vary, but neither theory countenances hollow participation in which citizens merely make noise in some political ritual.

Second, both theories are concerned with broadening participation. As mentioned above, the theories do not require all citizens to take part in all decisions. But both hold that participation should be the norm, not the exception. Neither theory gives us a way to calculate an optimal level of participation, but that level is clearly higher than current practice.

### *Differences*

The differences in criteria reflect differences in the two theories from which they are derived. First, the pluralist criteria concern groups, whereas direct participation criteria concern individual citizens participating, as Fiorino (1990) puts it, as amateurs. For pluralists, it is groups that must enjoy quality participation, and they may do so in a highly professionalized way, hiring scientists and lawyers to make their case for them. Individuals' experiences of participation may be nothing more than paying dues, which is fine as long as the group adequately represents their interests. The direct participation theory's emphasis on individuals requires, on the other hand, that individual citizens themselves directly experience meaningful participation.

Second, the theories have different concerns with the quality of participation because their fundamental goals are different. Pluralists seek high quality to ensure that a group's interests are an important factor in policy outcomes. Participation is a means to that end, and any participatory mechanism that achieves the end is judged to be adequate. Direct participationists, on the other hand, seek high-quality participation as an end in itself because of the positive educational and psychological effects that it has on participants. It is not enough that individuals' interests are taken into account in making decisions. Indeed, high-quality participation in which some people lose can be considered a success by this standard.

### *Quality Minimums*

These two sets of criteria are concerned with both the breadth and the depth of participation, that is, with the numbers of people involved and the quality of their participation. Direct participation theory, however, imposes stronger requirements on the process than pluralism does regarding quality. For the former theory, if a participation program does not have some minimal level of quality, then it fails the normative test, regardless of its breadth. Participation is an end in itself because the educative and psychological effects of participation are at least as important as the policy outcomes themselves. These effects constitute good participation, that is, they are integral parts of any activity that deserves that label. The quality of partici-

pation, its depth, comes first; there must be some minimal quality for the activity to have *any* benefit at all. In short, you cannot trade off breadth for depth *unless* you ensure that quality stays at or above a minimally acceptable level.<sup>10</sup>

The depth requirement does not require utopian levels of perfection. Pateman (1976) has argued that participation that is a good deal less than perfect has had positive effects on the participants (pp. 24-25). Therefore, one can trade away some amount of depth for other goods because citizens will still get educative benefits from imperfect participation. But there is some floor beneath which quality must not sink. Pluralist theory also requires a quality minimum, but for different reasons. For pluralists, quality is purely instrumental for representing effectively the interests of those involved.

### **Participatory Mechanisms Revisited**

Using the revised and expanded set of criteria, we can reevaluate some of the participatory mechanisms discussed by Fiorino (1990). Of course, actual participation programs are complex and contingent activities and need to be evaluated individually and in detail. One strength of the normative criteria presented here is that they can be applied also at the microlevel of detail. The purpose of this more general analysis, however, is to understand better some of the important theoretical implications of different mechanisms of participation. Two in particular, negotiated rule making and citizen review boards, are evaluated differently by the two theories. Analyzing specific mechanisms better enable us to see how the theories treat some critical issues, including some of the particular difficulties of participation in science and technology policy issues. The advantages of a new category of participation mechanisms, participatory analysis, will then be introduced as a means of organizing future discussions.

#### *Negotiated Rule Making*

In general, negotiated rule-making consists of a regulatory agency convening a negotiating committee to try to come to a consensus over some quite specific regulation. The agency itself is one of the parties represented in the committee. If done properly, the committee has representatives from all stakeholder groups. The agency commits in advance to accept the consensus decision, if one emerges, as a preliminary regulation (Susskind and McMahon 1985).

This technique gets a good score on all the pluralist criteria. By actively seeking out concerned stakeholders, more groups are brought into the policy

process. The groups' abilities to understand the issues are enhanced by both the process of negotiating itself and the resources made available to the negotiating committees to allow them to conduct additional studies (Susskind and McMahon 1985, 142-50). Because the negotiation includes agency officials, groups automatically have access to them. And because the agency agrees to accept consensus decisions of the group as preliminary regulations, the groups clearly have some leverage over officials.

Direct participationists have a much less positive evaluation of this technique, primarily because, as Fiorino (1990) notes, people do not participate in it as individual citizens. The parties to negotiations are only organized groups, which typically send their leading members as representatives. Even individuals who are members of participating groups cannot take part directly, unless they happen to be chosen to represent the group. Unorganized individuals simply have no place in this mechanism; breadth among ordinary citizens is effectively zero.

For those who do participate, on the other hand, depth is extraordinary. There is substantial education for those involved, as the process gives them the time and means to learn about the issue. The process provides them directly with significant resources to aid their participation and they have direct authority at least to shape preliminary regulations. This depth raises the question whether the process provides the educative and psychological benefits of direct participation to the group representatives, that is, does it help them to develop into citizens with a sense of public as well as private interests? If so, then this mechanism could be quite highly evaluated by direct participationists, except for its exclusion of unorganized ordinary citizens. Another disadvantage from the viewpoint of direct participation is that parties to the negotiation are supposed to act as representatives for the interests of their group. This role may inhibit participants' ability to function as fully autonomous individuals and develop their sense of a public interest.

Proponents of negotiated rule making claim it works only for a limited, albeit quite important, subset of technical policy issues. They assume that this mechanism will not work for issues that involve deep value conflicts among the contending parties.<sup>11</sup> Alternative mechanisms based on direct participation may be more effective with these politically difficult issues. Because a basic purpose of direct participation is precisely to engage people in discourse that enables them to transcend their private interests and to develop as morally autonomous agents, then a mechanism geared to such criteria may make more progress with such divisive issues. Moreover, negotiated rule making is burdened with stringent operational requirements, such as the need for consensus and operating under strict deadlines (Susskind and McMahon 1985, 157). Other mechanisms with more emphasis on

procedural effects and less on policy outcomes may therefore be more suited to less tractable problems. In short, the more difficult the issue, the deeper the participation needs to be.

Negotiated rule making seems an archetypal pluralist participation mechanism, as reflected by the very positive normative evaluation that pluralist criteria give to it. It also embodies pluralist notions of representation. The organizers of the negotiations, often an outside group hired by the agency (Susskind and McMahon 1985), are charged with the task of identifying and bringing into the process all *stakeholder groups*. The choice of words is instructive. Like pluralists, advocates of this process treat the question who has a stake as unproblematic and assume that people who care about the issue will express that concern by joining or forming a group. Proper representation is then achieved when all groups who wish to be part of the process are invited to do so. Interests are transformed into policy via the channel of negotiations among organized interests, and the process acquires moral approbation when the group representation is thorough and negotiations are conducted in such a way as to even out resource inequalities among the groups.

### *Citizen Review Panels*

Citizen review panels can come in a variety of forms.<sup>12</sup> Direct participation ranks them quite highly, whereas pluralism does less so, the opposite of the case with negotiated rule making. They involve individual citizens, chosen in any of several ways. Because they do not involve groups directly, they seem to be weak on the pluralist breadth criterion. However, the very existence of a citizen review panel can be a focus of activities aimed at mobilizing groups interested in the issues.

The main virtue of these panels, from the direct participation point of view, is the depth and quality of participation. Brooks (1984, 48) has argued that such panels represent one of the few participation mechanisms through which participants can take the time to become truly conversant with highly technical issues. Depending on the specific case, the panels can have real power in decision making, such as the Cambridge Experimental Review Board (Nelkin 1984, 32). This board recommended guidelines that were in fact adopted for regulating recombinant DNA research in the city of Cambridge, Massachusetts. Obviously, whether or not panels have this much power is a contingent matter, but one that clearly improves their normative evaluation. Powerful panels fulfill all of the direct participation criteria. New people are brought into the policy process simply in their capacity as individual citizens. They have the opportunity to improve substantially their understanding of the issue at hand. Depending on the way the process is run,

they are given resources to help them participate. Finally, in cases like the Cambridge Experimental Review Board, real authority is delegated to them.

Thus citizen review panels are archetypally direct participation mechanisms. They are the institutional embodiment of those norms. Individual interests are channeled into public policy, mediated by a process that helps educate those interests, and, one hopes, tempered with a growing sense of the public interest.

Representation in this mechanism is at best less formal and thorough. However, direct participation mechanisms are often assumed to exist as complements to representative institutions, so representation is given less consideration in the theory. The point is that, by increasing direct participation opportunities, a larger segment of the polity will not only influence policy but also develop in their capacities as public citizens. When they do so, they represent more than their individual interests.

Nonetheless, some degree of representation can be achieved. Citizens can be chosen from a community that is directly affected by the policy in question. The panels could be made up of people occupying informal leadership roles in the community or randomly chosen from the community (Sclove 1982).

### **Participatory Analysis: Technical Learning in Public Participation**

Both democratic theories presented here require learning as a requirement of genuinely democratic participation. A commonplace observation about participation in technically intensive issues is that a lack of knowledge will inhibit effective participation (e.g., Brooks 1984). The crucial role of knowledge in both of these perspectives leads me to suggest that the learning process is central to participation in scientific and technological policy issues. Therefore, any mechanism that will constitute effective participation in these issues must be a form of what I call *participatory analysis*, a broad category of participatory mechanisms that also needs to satisfy the other criteria of the democratic theories.

Participatory analysis requires a specific kind of learning process while people or groups are engaged in participation. In this view, it is not enough that participants simply acquire new facts. They must begin, at some level, to be able to analyze the problem at hand. At the simplest level, this means understanding the differing interpretations that one can draw from the facts and trying to think of ways to choose among those interpretations. At a more sophisticated level, it means beginning to learn how and when to challenge

the validity of the asserted facts, where new data would be useful, and how the kinds of policy questions being asked influence the type of data they seek. Perhaps more important, analyzing a problem means being able to challenge the formulation of the problem itself, that is, for people to decide for themselves what the most important questions are.

Participatory analysis can subsume the different forms of participation that correspond to the different democratic theories. Its strength is that it takes advantage of the commonalities between the theories and emphasizes the learning criterion, a *sine qua non* for science and technology issues. Within this category, negotiated rule making can be seen as a pluralist form of participatory analysis and citizen review panels as a direct participation form. There are no doubt other mechanisms in each category as well. I will now examine some of the structural features of participatory analysis to see how the various mechanisms within it could deal with some of the traditional problems of participation in science and technology issues.

### *Experts and Participation*

Technical policy issues always involve specialized, often esoteric, knowledge. Such knowledge is the domain of experts. The democratic underpinnings of participatory analysis delineate some of the outlines of the necessary relationship between participants and experts. A full elaboration of that relationship requires a very long discussion (see Fischer 1990, for such an analysis). My point here is to indicate how concerns for making participation democratic influence the relationship. First, participants must structure their relationships to experts in such a way as to avoid losing their democratic prerogatives. Experts may possess valuable information and are often accorded privileged, although not dominant, status in technical policy-making (Fischer 1990; Laird 1990). Nonetheless, it is important that participants avoid being taken in or co-opted by expert opinion.

Second, participants need to learn from experts but also to understand that experts often disagree with each other and that their advice is usually a complex mixture of facts and values (Gilpin 1968; Tribe 1972; Hoos 1979; Brooks 1984). Finally, the normative bases of participatory analysis require that participants learn in the process, that is, probe and analyze an issue. Thus it is important that they retain for themselves the analytical prerogatives of determining what questions to ask and how to ask them. They should not simply acquire information from experts. It is not merely a question of experts' being in a subordinate position ("on tap, not on top"). Rather, participants should understand the mixed nature of expert advice and utilize it as part of their efforts to form their own views on the issue under consideration.<sup>13</sup>

Accordingly, participants must not be too deferential to experts in general. Not only must they avoid being taken in by any individual expert, they must learn about the limits of expertise. Although public confidence in all elites has declined, polls show that Americans still hold physicians and scientists in higher regard than other elites (Lipset and Schneider 1983, 48-49; National Science Board 1985, 300). However, there is evidence that simply exposing citizens to the fact of expert disagreement reduces citizen deference to them (Nelkin 1975, 48) and that general deference to experts is in decline (Laird 1989).

### *Technological Choices and Substantive Politics*

Both democratic theories emphasize learning because citizens cannot pursue their interests via choosing policies unless they know what consequences their choices entail. Uninformed choice is not a democratic exercise. The polyvalent nature of technologies, their ability to influence many parts of life in addition to that part at which they are targeted (Sclove 1987), means that informed democratic choice about such matters requires learning about the complex and important consequences of scientific and technological choices for the polity and society in which we live (Winner 1986). This requirement does not mean that all people need to become philosophers. Many of the ways in which scientific technologies become manifested as "forms of life" (Winner 1986, 11) are concrete and clear to the people living with them (Sclove 1987). Indeed, some studies have argued that ordinary citizens experience these multifaceted impacts most directly and so are a prime source of information about them (Holman and Dutton 1978; Krinsky 1984). The education that needs to take place is helping people make the linkages between issues in their lives and scientific or technological policy choices.

### **Conclusion**

As the above arguments make clear, we can no longer be satisfied by simple descriptions of trade-offs between efficacy and democracy. Not all participation is democratic, and although we certainly face trade-offs in making science and technology policy more democratic, those trade-offs are more complicated and subtle than we have thought.

As mentioned above, the evaluation of technical policy processes must begin at the level of detailed, individual cases. The broader analysis of mechanisms here and in Fiorino's (1990) article are only crude guides; they



help the analyst understand what to look for. Mechanisms may fare worse or better than suggested here, and it is instructive to know why.<sup>14</sup>

Both the convergences and the differences between direct participation and pluralist theories utilized here are instructive. The convergences are substantial. Both theories evaluate participation in terms of breadth and depth. Both theories require that participants improve their understanding of the issues involved for a process to rate highly. Likewise, both theories require that some sort of real power over outcomes be shared by participants.

The differences are also instructive. Besides the obvious focus on groups versus individuals, the two theories differ in the way they regard the importance of quality in participation. For pluralists, quality is a means to an end, a way of ensuring that the interests of the competing groups are taken as a substantial factor in the final policy outcome. For direct participation theory, on the other hand, quality is both a means and an end in itself, and the two are interrelated. Quality is a means for giving citizens real power in policy-making. In the process of giving such power, it also provides the educational and psychological benefits described above. Regardless of the outcome, high-quality participation is therefore judged to be a good in itself.

I have argued that the subset of participation mechanisms best suited to science and technology issues that will most likely receive a positive normative evaluation from one of the theories can be grouped together into a category called participatory analysis. There are variations within that category, but all these mechanisms must share an emphasis on empowering participants by improving their ability to understand and analyze an issue. By naming this category participatory *analysis*, I do not wish to imply that it is or can be some apolitical, objective method of setting policy. To the contrary, policy-making is always a political activity, and participatory analysis is no exception.<sup>15</sup> I ground the category, in part, in its desirability from a normative democratic point of view, an explicitly political basis.

Participatory analysis is a way of structuring the politics of policy-making that has many political advantages. Not least is the opportunity to open up the discourse about the range of possibilities open to us in science and technology policy. Discussion about who we are, what we want, and how we might get it are fundamental to any democratic discourse. Analysis and understanding of scientific and technological opportunity and constraint are fundamental to rational policy-making and democratic understanding. Participatory analysis opens up the possibility of linking these two goals. Instead of letting competing interests simply slug it out over the final details of a narrow problem, the concept of participatory analysis allows, indeed requires, a much broader scope to the activity, including problem definition and framing. Simply broadening the terms of policy debates will not be an

easy task, so accustomed are we to language and concepts that close off such discussions.

The different forms of participatory analysis, with their different normative bases, suggest some possible linkages between the normative, substantive, and instrumental aspects of participation. Substantive evaluation judges how the participation affects the technical quality of the resulting policy. Instrumental evaluation considers how participation affects the political legitimacy of the final outcome.<sup>16</sup> I suggest that policy issues with particularly difficult substantive problems may respond best to a pluralist version of participatory analysis. Issues that have particularly vexing instrumental problems require a direct participation form. Obviously, knowing whether these linkages are accurate requires much further study. Nonetheless, the differing theories behind the forms suggest reasons why the linkages are at least worth more empirical study; and some case studies lend tentative support to the idea (e.g., Greenwood 1984).

Pluralist participatory analysis is based on the idea of group representation. The purpose is to bring together all organized interest groups who can reasonably stake a claim to being affected parties. The very existence of organized groups indicates some awareness and knowledge of an issue on their part. By pooling financial resources, groups can begin collecting information and developing expertise on an issue before they are made a part of the policy process. When they are brought together in some process, they already possess substantial knowledge of the issue and are poised to learn more quickly. Therefore, a reasonable hypothesis is that pluralist mechanisms can make the most rapid progress on substantive mastering of an issue.

Direct participation theory puts a greater emphasis on the development of participants as public citizens. Participatory analysis of this sort should therefore be best at helping people transcend narrow individualistic views of their own interests and working through some deep political differences. If direct participation theory is correct, people who have been involved in such a process are more likely to accept an outcome that is different from one based on their narrow interests. The legitimacy of the final outcome is likely to be greater than in the absence of direct participation, making these mechanisms best suited for issues with severe instrumental problems.

Finally, the mechanisms available for participation are by no means limited to those listed here. There are others, such as the European experiments described in Nichols (1979). For example, in the Netherlands, the government set up Science Shop experiments at the universities, where university staff mediated between university researchers and groups who needed research done, such as unions and environmental groups. This experiment provided a way for previously unrepresented groups to influence R&D

policy (Nichols 1979, 102). Sclove's ideas (1982) about interpretative panels made up of ordinary citizens and focused on technical policy issues deserve empirical trial and scrutiny. We have only scratched the surface of the variety and scope of possible mechanisms. Fiorino (1990) is quite correct to argue that the normative demands of democracy do not allow us to exclude scientific and technological issues from arguments for improved citizen participation. As a stronger contention, Sclove (1987) has argued persuasively that normative considerations of democracy require us to include such issues. The opportunities for democratic fulfillment are as many as they are compelling.

## Notes

1. For an example of an argument for insulating technical issues from politics, see Kemeny (1980). For a more sophisticated argument about the importance of experts, which also acknowledges the need for public participation, see Brooks (1984). For various examples of public participation, see Nelkin (1984), O'Hare, Bacow, and Sanderson (1983), Lakoff (1977), and Nichols (1979).

2. Some participation is mandated by law (Nelkin 1984; Langton 1978). The broad political conditions that give rise to so much unofficial participation also show no signs of changing (Laird 1989). Note that I am discussing participation as activities outside or in addition to ordinary representative government. The effects of science and technology policy issues on the democratic character of those institutions is a shamefully neglected area of study.

3. The claim that pluralism represents the mainstream is not based on the idea that a majority of political scientists embrace it, although that may be true. Rather, it is the mainstream theory because it is the most deeply compatible with the broad epistemological goals of post-World War II American political science, namely, building a positivist, behaviorist theory of politics. See Lindblom (1982), Manley (1983, 370), Lowi (1967, 13-15), and Somit and Tannenhaus (1964, 21).

4. There are, of course, several variants of both theories (e.g., Dahl 1966). Nonetheless, there are salient core features to both schools. I will draw on the principal works of major writers in both fields, cited in detail below.

5. See Pateman (1970) or Sclove (1983, 49-50). To sum up a rather complex argument, democratic practice must be such that it enables people to achieve broader ends in addition to obtaining favorable outcomes on specific policy issues. Those broader ends include freedom and moral and political equality. Democracy is not up to the task unless it includes real decision-making power.

6. The focus on interest groups goes back to Bentley's work of 80 years ago. See Manley (1983) for a historical discussion. Dahl's (1982) conception of groups is quite broad and includes political parties. However, for the most part, by *interest group* pluralists mean bodies that are not official government groups. For the focus on the individual, see Pateman (1970) or Barber (1984).

7. For a general description, see Truman (1951). Some critics of pluralism have accused pluralists of going one step further and assuming that all interests in society are therefore adequately represented. Dahl (1982) has vigorously and persuasively denied this charge. He and others recognize the importance of inequalities of resources (see also Lindblom 1983, 385).

8. Drawing normative conclusions from pluralism can be contentious because pluralists have argued that the theory is empirical, an attempt to explain how things are, not how they ought to be (Dahl 1966, 298-99). Dahl (1982, Appendix) argues persuasively that several normative claims have been attributed to pluralism that he has never made. Nonetheless, normative criteria can be drawn from pluralist theory. In brief, note simply that theorists see pluralism as a means to an end, which is political equality. Pluralist societies are merely a means to that end and quite imperfect means at that (see e.g., Dahl [1979, 132] or [1982, 11]). Given that the end is desirable and that pluralism is a means, however imperfect, to it, it follows that participatory policy processes that make pluralism function better are therefore normatively desirable.

9. Such inequalities pose several different kinds of problems, in terms of the ability both to affect policy outcomes and to avoid suffering any penalty for participating. See Pateman (1970, 43), Pateman (1976, 16-17), Arnstein (1971, 71), and Cohen and Rogers (1983, 60-67).

10. For a more extended discussion of why some features of political life cannot be traded off for others, see Rawls (1971, 150-51) or Tribe (1972, 25-29).

11. See Susskind and McMahon (1985, 152). There may be other features as well that disqualify certain policy issues as good candidates for negotiations. It is not worth a lengthy digression here to discuss them. See Susskind and McMahon (1985, esp. 152-60).

12. For both empirical examples and theoretical arguments, see Nelkin (1984), Nichols (1979), and Sclove (1983).

13. For a much more extended discussion of these issues, see Fischer (1990).

14. For a detailed case of a participation program that fared worse than one might have expected, see Laird (1990). Susskind and McMahon (1985) describe two cases in which negotiated rule making did better than theory suggested.

15. See Stone (1988) for a detailed elaboration of this thesis.

16. See Fiorino (1990, 227-28). For an example of substantive evaluation of a policy and its relation to the policy process, see Greenwood (1984).

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