



Synthesis, part of a Special Feature on [Nudging Evolution? Critical Exploration of the Potential and Limitations of the Concept of Institutional Fit for the Study and Adaptive Management of Social-Ecological Systems](#)

Public Participation and Institutional Fit: A Social–Psychological Perspective

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ABSTRACT. Public participation plays a role in the development and long-term maintenance of environmental institutions that are well-matched to local social–ecological conditions. However, the means by which public participation impacts such institutional fit remains unclear. We argue that one major reason for this lack of clarity is that analysts have not clearly outlined how humankind’s sense of agency, or self-determination, influences institutional outcomes. Moreover, the concept of institutional fit is ambiguous as to what constitutes a good fit and how such fit could be diagnosed or improved. This is especially true for “social fit,” or how well institutions match human expectations and local behavioral patterns. We develop an interdisciplinary framework based on principles of human agency and institutional analysis from social psychology to address these problems. Using the concept of “institutional acceptance” as an indicator of social fit, we show how analysts can define, diagnose, and improve social fit of participatory programs. We also show how such fit emerges and is sustained over time. This interdisciplinary perspective on fit and participation has important implications for participatory approaches to environmental management and the scientific study of institutional evolution.

Key Words: *autonomy-support; environmental management; institutional fit; procedural justice; psychology; public participation; self-determination; social acceptability; social–ecological systems; sustainable development*

INTRODUCTION

The concept of “institutional fit,” as introduced by Young (2002, 2008) and others (e.g., Berkes and Folke 2000, Ostrom 2007, Hagendorn 2008), has helped institutional analysts appreciate the complexity inherent in the human and biophysical systems that support society. It has also drawn vital attention to the importance of matching environmental institutions to the problems they intend to address. Environmental policies and human governance systems that do not properly address local circumstances may be incompatible with the situation, reducing their effectiveness or causing substantial harm to society and the natural environment (Ostrom et al. 2007). Public participation in environmental decision making can play an important role in the development and long-term maintenance of environmental institutions that are well-matched to local social–ecological conditions (e.g., Ostrom 1990, 2010). However, the means by which public participation impacts institutional fit remain unclear. Moreover, public participation remains highly contested as a tool for environmental management (Chess and Purcell 1999, Berkes 2003, Conley and Moote 2003, Irvin and Stansbury 2004, Turnhout et al. 2010).

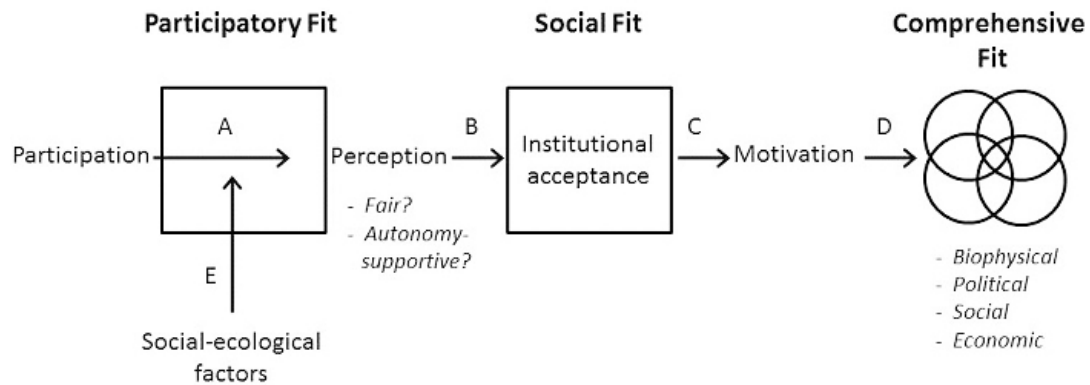
We argue that one major reason for this lack of clarity is that institutional analysts have not clearly outlined how humankind’s sense of agency, or self-determination, influences institutional outcomes (cf. DeCaro and Stokes 2008, Farrell and Thiel *in press*). In addition, the concept of

institutional fit is ambiguous with respect to what constitutes a good fit and how such fit could be diagnosed or deliberately improved (Folke et al. 2007, Galaz et al. 2008, Ekstrom and Young 2009, Davidson 2010, Cox 2012, Farrell and Thiel *in press*). This is especially true for “social fit,” or how well institutions align with human expectations and behavioral patterns (cf. Stankey and Shindler 2006, Wüstenhagen et al. 2007). The immense complexity of social–ecological systems further complicates the problem, making it difficult to isolate causal relationships or cumulate relevant observations for proper scientific inference (Ostrom 2005). Finding solutions for these problems would not only enhance the utility of the “fit” concept as an analytical tool; it would also help resolve some perennial problems surrounding the use of public participation in environmental management.

We develop an interdisciplinary framework based on principles of human agency and institutional analysis from social psychology to address these problems. Using the concept of “institutional acceptance,” that is, how much individuals endorse a system of governance, as an indicator of social fit, we show how researchers and practitioners can define, diagnose, and deliberately improve the social fit of participatory programs. We also show how such social fit contributes to the emergence and long-term maintenance of “fit” in the more comprehensive sense of the term, that is, biophysical, political, social, and economic fit. This framework provides a coherent social–psychological/

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Fig. 1. Behavioral process model linking participatory fit, social fit, and comprehensive fit.



behavioral account of institutional fit, with novel predictions for the scientific study of public participation and sustainable social–ecological systems.

We identify institutional acceptance as an especially important aspect of fit to understand, because of its centrality to the concept of human agency (Brehm and Brehm 1981, Ryan and Deci 2006), documented causal relationship with public participation and human motivation (Frey et al. 2004, Moller et al. 2006), and ease of measurement (Vallerand and Ratelle 2002:45–47). Hence, institutional acceptance has great potential as an explanatory concept in the study of social–ecological systems. The remainder of our work describes the relationship between institutional acceptance and sustainable social–ecological systems and embeds it in a richer analytical framework, to increase its diagnostic power.

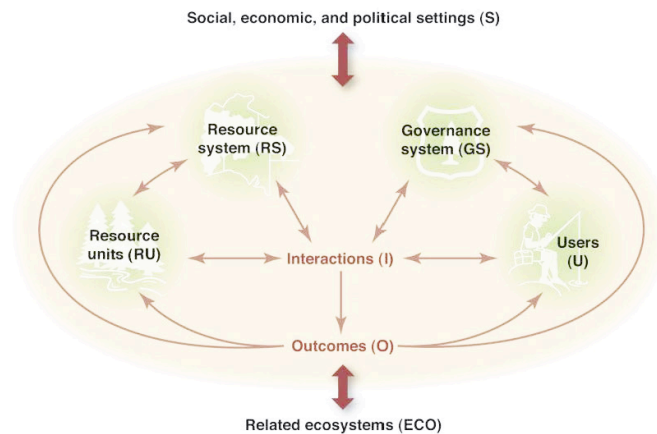
The basic framework is outlined in Fig. 1. When public participation in environmental decision making successfully satisfies people’s inherent psychological need for procedural justice and self-determination, this leads them to perceive an institution as fair and autonomy-supportive (link A) and promotes institutional acceptance (link B). Institutional acceptance indicates whether good social fit has emerged. However, such institutional acceptance also motivates local citizens (link C) to participate more fully in the design and implementation of better environmental institutions (link D). Thus, links A–D of our framework essentially explain how public participation and social fit influence institutional fit, in the more comprehensive sense of achieving a match to every dimension of the local social–ecological context.

However, our framework also argues that, to effectively create a sense of self-determination and procedural justice among participating citizens, such public participation must be properly matched to the local social–ecological context and align with local definitions of “participation.” That is, there must be a good “participatory fit.” People’s subjective

definitions of participation may be influenced by many factors, such as cultural norms of decision-making control; race, class, and gender; the nature and saliency of the environmental problem; and political upheaval or natural disasters (link A×E, Fig. 1). To help institutional analysts identify these factors and account for their effects, we integrate our framework with Ostrom’s (2009) social–ecological system framework (Fig. 2). We also outline general procedures for diagnosing participatory fit. Each component of our framework is not only grounded in empirical research; it is also supported by validated measures, allowing analysts to falsify or add to the existing framework to study public participation and institutional fit with greater scientific precision.

We begin our analysis of public participation and institutional fit by explaining where conventional theories of institutional fit (e.g., Young 2002) integrate with our framework. We then reframe the overarching problem of fit in terms of underlying human behaviors and psychological processes, so we can train our focus on human agency’s role in institutional fit. We subsequently describe the components of our framework and the problems they address in greater detail. We explain how institutional acceptance can serve as a good indicator of social fit, and then outline how social fit influences human motivation. The psychology of public participation is then described, so readers can understand how it influences social fit and human motivation. We also identify factors that may impact participatory fit. We illustrate how to apply our framework to diagnose participatory fit or determine how various local social–ecological factors influence fit more generally. Finally, we point out the implications of our framework for contemporary research on public participation. Most significantly, we discuss why evaluations of public participation must account for participatory fit or misfit before attempting to draw broad, sweeping conclusions about the utility of public participation as a tool for sustainable management of social–ecological systems.

Fig. 2. Social–ecological system (SES) framework (Ostrom 2009).



Social, economic, and political settings (S)
 S1 Economic development. S2 Demographic trends. S3 Political stability.
 S4 Government resource policies. S5 Market incentives. S6 Media organization.

| <i>Resource systems (RS)</i> | | <i>Governance systems (GS)</i> | |
|---|--|--------------------------------|---|
| RS1 | Sector (e.g., water, forests, pasture, fish) | GS1 | Government organizations |
| RS2 | Clarity of system boundaries | GS2 | Nongovernment organizations |
| RS3 | Size of resource system | GS3 | Network structure |
| RS4 | Human-constructed facilities | GS4 | Property-rights systems |
| RS5 | Productivity of system* | GS5 | Operational rules |
| RS6 | Equilibrium properties | GS6 | Collective-choice rules* |
| RS7 | Predictability of system dynamics* | GS7 | Constitutional rules |
| RS8 | Storage characteristics | GS8 | Monitoring and sanctioning processes |
| RS9 | Location | | |
| <i>Resource units (RU)</i> | | <i>Users (U)</i> | |
| RU1 | Resource unit mobility * | U1 | Number of users* |
| RU2 | Growth or replacement rate | U2 | Socioeconomic attributes of users |
| RU3 | Interaction among resource units | U3 | History of use |
| RU4 | Economic value | U4 | Location |
| RU5 | Number of units | U5 | Leadership/entrepreneurship* |
| RU6 | Distinctive markings | U6 | Norms/social capital |
| RU7 | Spatial & temporal distribution | U7 | Knowledge of SES/mental models* |
| | | U8 | Importance of resource |
| | | U9 | Technology used |
| <i>Interactions (I) → Outcomes (O)</i> | | | |
| I1 | Harvesting levels of diverse users | O1 | Social performance measures (e.g., efficiency, equity, accountability, sustainability) |
| I2 | Information sharing among users | O2 | Ecological performance measures (e.g., overharvested, resilience, biodiversity, sustainability) |
| I3 | Deliberation processes | O3 | Externalities to other SESs |
| I4 | Conflicts among users | | |
| I5 | Investment activities | | |
| I6 | Lobbying activities | | |
| I7 | Self-organizing activities | | |
| I8 | Networking activities | | |
| <i>Related ecosystems (ECO)</i> | | | |
| ECO1 Climate patterns. ECO2 Pollution patterns. ECO3 Flows into and out of focal SES. | | | |

*Subset of variables found to be associated with self-organization.

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INSTITUTIONAL FIT

When thinking about institutional fit, analysts typically focus on the problem as a whole. They see environmental problems as emerging from a complex network of interacting actors; social, political, economic, and biophysical factors; and human governance systems (Young 2002, 2008, Ostrom 2007). Further, to be effective, environmental institutions must be well-matched to the unique constellation of circumstances found in each situation. For example, all common-pool natural resource dilemmas pit individual self-interest against the common good (Hardin 1968). However, individual cases differ by such characteristics as resource sector (e.g., forest or ocean), cultural context, and number of actors involved (Ostrom 1990, 2009). A good solution would address these characteristics.

This way of thinking about institutional fit echoes the main premise behind the concept of “sustainable social–ecological systems” (Anderies et al. 2004, Folke et al. 2005). In this perspective, society is seen as a network of human governance systems, actor clusters, and resource systems, all situated in a broader social, political, and economic context (e.g., Fig. 2; Ostrom 2009). Sustainable social–ecological systems balance or harmonize each of these subsystems within a particular situation, yielding robust institutions that make sense economically, socially, environmentally, and so forth (e.g., Munasinghe 2009). In other words, sustainable solutions have good social fit, economic fit, environmental fit, etc., each of which can be quite complex in itself (cf. Ekstrom and Young 2009, Cox 2012).

Depicting institutional fit as a configural problem helps analysts see the scope of the problem they face when designing sensible environmental solutions. It also highlights important dimensions to consider when analyzing social–ecological systems. In our framework, we refer to this conceptualization of fit as the “comprehensive problem of fit” (Fig. 1). In fact, comprehensive fit is often the ultimate goal of sustainable design (e.g., Munasinghe 2009). However, as a guiding concept, “comprehensive fit” does little to help us see how individual citizens, with a sense of human agency and self-determination, influence institutional fit. For that, we need to look more closely at human cognition and behavior.

FIT AS A BEHAVIORAL PROBLEM

Environmental problems are, in many ways, behavioral problems. Humans create or exacerbate many of the conditions leading to environmental crisis; they overharvest, disobey environmental policy, litter and pollute, transform landscapes destroying entire ecosystems, and fail to adapt to changing environmental circumstances (Jacobson and McDuff 1998, Oskamp 2000). Acknowledging this focuses one’s attention not only to the biophysical side of environmental problems, but also to behavioral change (Steg and Vlek 2009). It is important to address the problem-solving process that

surrounds humanity’s search for sensible environmental solutions (Ostrom 1990, Folke et al. 2005, Shivakumar 2005). In fact, according to Young (2008:20), the comprehensive problem of fit is not just about finding good environmental solutions; it is about finding rule systems, decision-making procedures, and ways of promoting routine practices for responsible environmental behavior that, in addition to being suited for the situation, are relatively self-sustaining and easily adapted to accommodate changing circumstances. This sort of adaptive management is quite complex from a behavioral standpoint, and it often takes an enormous investment of time and effort on the part of many actors.

Consider a case study by Lewis (1995). Lewis was part of a 2-yr participatory land-management project undertaken within Zambia’s ADMAD program. The project’s goal was to help leaders and community members of several game-management areas map their natural resources, usage patterns, and development projects before engaging in more focused environmental planning. Lewis’s team trained local scouts in proper data-collection methods and established survey teams. Afterward, the communities used the maps to discuss their land-use patterns. Many identified the important social–ecological dynamics behind their local environmental problems. For example, one community identified and eliminated several private fishing camps, where illegal fishing activities by outsiders were causing food-security problems and disrupting ecotourism. They discovered that government enforcement in their area was lax, so they also began to monitor their waterways themselves. They brought this problem to the attention of local wildlife agencies and eventually gained the official support of the Zambian Fisheries Department.

Proponents of participatory approaches to environmental management sometimes portray participation as a panacea (Adams and Hulme 2001:18–23, Berkes 2007:15189, Ostrom et al. 2007). However, it is clear from Lewis (1995) that well-tailored solutions are not a simple consequence of citizen presence during environmental decision making. Citizens may have valuable local social–ecological knowledge that could inform a well-tailored environmental solution. However, they must be willing to share that knowledge. They also have to consider all relevant dimensions of the problem when searching for a solution, typically over an extended period of time (Stringer et al. 2006, von Korff et al. 2010). Finally, to successfully implement their solution, they often have to learn new skills, while navigating considerable social uncertainty, interpersonal conflict, and myriad other logistical challenges (Dietz et al. 2003, Folke et al. 2005, Lauber et al. 2011).

This example also illustrates that sustainable social–ecological systems depend to a large extent on “intrinsically motivated behaviors” that are freely endorsed and voluntarily pursued. Protected areas are usually too expansive for a centralized government to effectively and affordably police

(Dietz et al. 2003). Therefore, citizens often have to monitor their own communities (Ostrom 1990), while taking it upon themselves to follow best environmental practices (DeCaro and Stokes 2008). In fact, many environmentally responsible behaviors, such as energy conservation or responsible harvesting, share this critical psychological feature of self-regulation and enforcement, because they are relatively private or imperfectly enforceable (Sutinen and Kuperan 1999, Pelletier 2002, Young 2008:22).

Thus, our behavioral analysis of institutional fit emphasizes a fundamental problem. Citizens can facilitate effective environmental management by providing human capital, such as local social–ecological knowledge and labor, and by enacting environmentally responsible behaviors. However, they must be sufficiently motivated to do so. Hence, analysts must understand human motivation to understand the origins of comprehensive fit and promote sustainable social–ecological systems more generally. This means that they also need to identify and eliminate any motivational barriers citizens face when participating in environmental management (McKenzie-Mohr 2000, Poteete et al. 2010a). We represent this link between comprehensive fit and human motivation or behavior as “motivation” in our process model (link D, Fig. 1).

It is important to be clear about what motivates citizens to contribute to sustainable social–ecological systems because, without such clarity, analysts will not be able to distinguish institutional failures that arise because of poor fit from more fundamental causes, such as insufficient motivation or behavioral noncompliance. We address this problem next, introducing the concept of “institutional acceptance” as an important aspect of both social fit and human motivation.

SOCIAL FIT AND HUMAN MOTIVATION

Our behavioral analysis of institutional fit highlights how important it is to motivate citizens to address the comprehensive problem of fit and achieve sustainable social–ecological systems. Many theorists argue that legitimate governance promotes intrinsically motivated behavior and, therefore, may be part of the solution for effective environmental management (e.g., Nielson 2003, DeCaro and Stokes 2008). For instance, according to Young (2008:21–22),

What is needed, for best results, are sets of rights, rules, and decision-making procedures that are not only accepted by those subject to them as proper or legitimate in principle but that also become sufficiently embedded or entrenched that key players participate in the resulting practices without thinking about the pros and cons of doing so each time they act....

Our framework builds on this idea of “behavioral entrenchment” and “accepting rights, rules, and decision-

making procedures as proper or legitimate” to develop the concept of “institutional acceptance” as a formal indicator of social fit and motivational force (link C, Fig. 1).

Social fit

The basic idea behind the concept of “social fit” is that different rules and decision-making procedures do a more or less better job of matching human expectations and local behavioral patterns. This idea is similar to that of “social sustainability” posited in most theories of sustainable social–ecological systems (e.g., Munisinghe 2009). It is also similar to the idea of “social acceptability,” which refers to citizens’ endorsement of a particular political system, environmental policy, or technology (Stankey and Shindler 2006, Wüstenhagen et al. 2007). In fact, we believe this sentiment of “endorsement” is what Young (2008:21–22) alludes to when he says environmental institutions must be accepted as proper or legitimate.

Our framework builds on this notion of “endorsement” to formalize institutional acceptance as an indicator of social fit. Specifically, “institutional acceptance” refers to the extent to which individuals endorse a set of rights, rules, and decision-making procedures. When individuals wholeheartedly endorse or accept something, this indicates that it aligns with, or matches, their goals and desires (Sheldon and Elliot 1998, Ryan and Deci 2006). This is the sense in which institutional acceptance embodies social fit (cf. Brehm and Brehm 1981). In fact, we cannot envision a more direct expression of social misfit than if individuals reject an institution outright, as has been witnessed throughout history in the evolution of society’s political systems (e.g., American Revolution, Arab Spring) and basic social institutions (e.g., desegregation).

Policy makers and practitioners seem to appreciate this point intuitively. They often seek citizen approval when proposing environmental policy, even if only in name (Stankey and Shindler 2006); they sometimes treat stakeholder “satisfaction” as a criterion for program success (e.g., Mehta and Heinen 2001; cf. Dalton 2005); or they use measures of satisfaction or approval to guide program design (e.g., Chase et al. 2004, Allan et al. 2008). Institutional analysts that have realized the connection between institutional acceptance and social fit seem to do so somewhat tacitly. For example, Stankey and Shindler (2006) identify several cases where technologically sound environmental solutions failed because they were unappealing or culturally repulsive. However, the authors did not indicate how to measure or improve social fit. In addition, McComas et al. (2011) describe cases in which local residents disrupted, or seized substantial control over, university-led conservation projects, primarily because they felt unjustly excluded during the planning process (e.g., Cairns 2005). There are many other similar cases where citizens thwarted so-called “not-in-my-backyard!” (NIMBY) projects that involved controversial siting decisions, such as attempting to place nuclear power plants near residential areas and scenic

landscapes (Frey et al. 2004, Wüstenhagen et al. 2007). In short, we believe the concept of institutional acceptance has great potential as an indicator of social fit but needs additional refinement to be fully incorporated in formal analyses.

Intrinsic motivation

One area that needs more attention is how social fit influences human motivation and behavior. To address this problem we turn to a prominent motivational framework from social psychology called “self-determination theory” (Deci and Ryan 1985, 2000). Doing so helps clarify the motivational link between our concept of institutional acceptance and Young’s (2008:21–22) notion of “behavioral entrenchment.”

Specifically, according to self-determination theory, behavioral entrenchment and institutional acceptance are intimately related to one another (Deci and Ryan 1985:113–147). Institutional acceptance is part of the developmental process whereby individuals adopt the social norms and institutions of their society by incorporating them into their self-identity, much like a religious belief can become part of one’s core sense of self (Schafer 1968). When a norm or institution is sufficiently “internalized,” that is, wholeheartedly accepted, it becomes part of one’s self-identity and is synonymous with one’s freewill (Ryan and Deci 2003, 2006). That is, with sufficient internalization, society’s behavioral prescriptions perfectly align with one’s own desires (Krapp 2002:415). This alignment between the goals, that is, institutions, of society and one’s own goals, that is, institutional acceptance, creates intrinsic motivation (Sheldon and Elliot 1999).

Because they originate from deep within one’s cherished sense of self, intrinsically motivated behaviors tend to be self-sustaining, extremely energetic, and robust to challenge (Deci and Ryan 2000, Hidi and Renninger 2006:115). In fact, intrinsic motivation has been linked to improved performance in a variety of activity domains (Deci and Ryan 2002, 2008), including environmental responsibility (Dwyer et al. 1993, De Young 2000, Séguin et al. 1998, Pelletier 2002) and policy compliance (Tyler 1990, Kerr et al. 1997, Sutinen and Kuperan 1999, Cantor and Terle 2010). This is especially critical in contexts like environmental management, where regulatory monitoring and enforcement is costly and imperfect (e.g., Thibault and Blaney 2001, Ryan et al. 2003; cf. Pelletier 2002, DeCaro and Stokes 2008). In contrast, extrinsically motivated behaviors, which are not very central to one’s core values or deep sense of self, tend to be strategically focused; for example, enacted mainly to avoid punishment or receive a reward (Deci and Ryan 1985, 2000). Because of this, they are not as voluntary or self-sustaining as intrinsically motivated behaviors, and they tend to cease when external (re) enforcement ceases (Deci et al. 1999, Cardenas et al. 2000, Frey and Jegen 2001, Bowles 2008).

We believe this internalization process, and intrinsic motivation, is what Young (2008:21–22) alludes to when he says rules and procedures must become “sufficiently embedded or entrenched” that individuals do them without thinking about the pros and cons each time. This is the sense in which we think social fit, implying institutional acceptance, is vital to the emergence and long-term maintenance of comprehensive fit (link C, Fig. 1). In fact, research indicates that institutional acceptance promotes organizational trust, willingness to pool information, decreased absenteeism, and cooperative behavior (Greenberg 1990, DeCremer and Tyler 2005, Terwel et al. 2010). Each of these positive effects could help smooth institutional processes and facilitate positive institutional outcomes. We do not expect everyone to be intrinsically motivated. Inevitably, some external enforcement, that is, extrinsic motivation, will be needed (Ostrom 1990, 2010, Sutinen and Kuperan 1999). The idea is to keep citizens actively engaged in the fit problem-solving process, while avoiding unnecessary opposition and extrinsic motivation whenever possible.

In short, our analysis of social fit and human motivation stresses the importance of garnering citizen support when trying to solve the comprehensive problem of fit. However, this poses another important problem: how do we promote institutional acceptance? We address this problem next, focusing on public participation’s role in shaping perceptions of institutional acceptance. One critical point to emerge from this discussion is that public participation will only be effective in promoting acceptance when certain psychological criteria are met and there is a good match to the local social–ecological context.

PUBLIC PARTICIPATION

Many theorists and practitioners believe public participation in environmental decision making plays a critical role in the formation of institutional acceptance and intrinsic motivation (see Adams and Hulme 2001, Conley and Moote 2003, Stringer et al. 2006 for discussion). However, the psychological processes involved are not always clear (DeCaro and Stokes 2008). We believe this lack of clarity about the psychology of participation is a primary source of “participatory misfit,” that is, a situation where the type of public participation that is used is inappropriate for a particular group of stakeholders in a particular local social–ecological context. It is important to resolve such participatory misfit before it adversely affects people’s motivation and performance.

To address these issues, we first describe how public participation influences institutional acceptance (links A–B, Fig. 1). With this information in place, we can then better anticipate when there is likely to be a good participatory fit (link A×E, Fig. 1).

Basic psychological processes of participation

Generally speaking, when individuals feel they have been adequately included in relevant institutional decision-making procedures (link A, Fig. 1), their perceptions of institutional legitimacy and their institutional acceptance increase (link B, Fig. 1; Brehm and Brehm 1981, Gibson 1989, Greenburg 1990, Tyler 1990, 1998, Moller et al. 2006). As a result, they are more likely to adopt such institutions as their own, that is, internalize them, and become behaviorally entrenched, in the sense of having heightened intrinsic motivation (link C, Fig. 1; Sheldon and Elliot 1998, Deci and Ryan 2000, 2002). Individuals may also be more tolerant of unfavorable policies and decision outcomes when they feel they were given proper voice/choice during the decision-making process that led to those policies or outcomes (Tyler 1988, 1990, Frey et al. 2004). The primary psychological mechanism responsible for these positive outcomes seems to be that adequate inclusion in human governance—which we are intentionally leaving ambiguous at this point—satisfies people’s fundamental need for self-determination and procedural social justice (Deci and Ryan 1985, 2000, 2002, Greenberg 1990, Tyler 1990, 1998).

Before moving forward with this idea, it is important to clarify some key points. First, according to self-determination theory, “self-determination” is a subjective psychological feeling that one has sufficient liberty to pursue important goals in ways that align with one’s most deeply held beliefs and cultural values (Sheldon et al. 2004, Ryan and Deci 2006). Hence, self-determination does not mean having control per se, but wholeheartedly endorsing whatever one is doing, or being asked to do. The “need for procedural social justice” is closely related to the need for social belonging, which refers to humankind’s innate desire for meaningful connection with others, being valued by society, and otherwise treated with respect and dignity (Tyler 1988, Baumeister and Leary 1995, Tyler 1998). Second, needs are considered “fundamental” when they influence all imaginable aspects of human cognition and behavior (Baumeister and Leary 1995) and are vital to optimal human well-being and performance in all cultures (Deci and Ryan 1985, 2000, Leotti et al. 2010). Fundamental needs play a central role in human agency by energizing behavior, guiding decisions, and shaping perceptions of the institutions in which people live (Bandura 1982, Little et al. 2002). Hence, institutions can be very influential on human behavior insofar as they support or thwart fundamental needs (Frey et al. 2004, Moller et al. 2006). In fact, within self-determination theory, the participatory aspects of human governance systems, for example, collective-choice procedures, are regarded as the primary nutrients of psychological needs (e.g., Patall et al. 2008; cf. Deci and Ryan 1987, 2000, van Prooijen 2009).

Institutional arrangements that satisfy people’s fundamental needs for self-determination or procedural social justice are

called “autonomy-supportive” or “procedurally fair” (link A, Fig. 1). Such institutions tend to promote institutional acceptance, because individuals are more likely to internalize norms and institutions in social contexts that satisfy their needs (link B, Fig. 1). This causal linkage can be verified using conventional measures of self-determination or procedural justice (see Table 1).

For example, McComas et al. (2011) used the measures of procedural justice shown in Table 1 to explain the public’s support for various carbon emission-reduction plans that were being proposed by Cornell University. Citizens who felt that authority figures at Cornell University treated them fairly during previous negotiations about environmental policy were more supportive of the newly proposed plans. Moreover, this effect held even when other important factors, such as the perceived effectiveness of the plans and the respondent’s political affiliation, were statistically controlled.

Lafon et al. (2004) demonstrated similar effects in a case study that provided more control over how citizens participated. The study took place in Virginia, where the public was becoming increasingly concerned about human-wildlife conflict involving black bear (*Ursus americanus*). During the study, the Department of Game and Inland Fisheries (VDGIF) gave citizens the opportunity to participate in the management of black bear in one of two ways. They could either participate in an educational program through the mail, or join a citizen advisory board with the VDGIF. To investigate the influence of participation on institutional acceptance, Lafon et al. measured perceptions of procedural justice and institutional acceptance both before and after citizens participated in the program. Regardless of how they were involved, citizens felt more procedural justice after participating, and those perceptions positively predicted their support for the VDGIF. However, those who joined the advisory board felt the highest levels of procedural justice and were the most supportive. They also showed the most significant attitude change. Before joining the advisory board, many of these individuals wanted the VDGIF to use lethal methods to control the bear; after participating, more supported the nonlethal methods previously advocated by the VDGIF (see also Lauber and Knuth 1999, Calvacanti et al. 2009).

These case studies illustrate the role public participation can play in society’s search for environmental institutions that are comprehensively well matched to the problems they intend to address. In particular, participatory approaches to environmental management present an opportunity to increase institutional acceptance (Lawrence et al. 1997, Smith and McDonough 2001). However, this psychological perspective on what constitutes “participation” raises another critical point: that opportunity must be properly utilized. That is, the institutional arrangements that are used must create a sense of self-determination or procedural justice among participants to

Table 1. Sample psychological measures.

| Measure | Source |
|--|--------------------------|
| I. Self-determination | |
| The [institutional arrangement] made me feel: | |
| ...free to be who I am. | La Guardia et al. 2000 |
| ...controlled and pressured to act certain ways. | La Guardia et al. 2000 |
| ...as if I have some choice about what to do. | Ryan 1982 |
| ...as if my choices/actions can reflect my true interests and values. | Sheldon et al. 2001 |
| ...free to act in ways that express my true self. | Sheldon et al. 2001 |
| II. Procedural justice | |
| Colquitt 2001† | |
| Procedural | |
| The following items refer to the decision-making procedures used to arrive at the [policy, practice, decision]. To what extent: | |
| ...have you been able to express your views and feelings during those procedures? | Thibault and Walker 1975 |
| ...have those procedures upheld ethical and moral standards? | Leventhal 1980 |
| ...have you been able to appeal the resulting [policy, practice, decision]? | Leventhal 1980 |
| ...have those procedures been applied consistently/free of bias? | Leventhal 1980 |
| Interpersonal | |
| The following items refer to the [authority figure/organization who enacted the decision-making procedure or institutional arrangement]. To what extent did it: | |
| ...treat you in a polite manner? | Bies and Moag 1986 |
| ...treat you with dignity/respect? | Bies and Moag 1986 |
| ...refrain from improper remarks or comments? | Bies and Moag 1986 |
| Informational | |
| The following items refer to the [authority figure/organization who enacted the decision-making procedure or institutional arrangement]. To what extent did it: | |
| ...provide you with accurate information about [the situation/its activities]? | McComas et al. 2011 |
| ...quickly communicate information in a timely manner? | Shapiro et al. 1994 |
| ...provide honest explanations for its activities? | Bies and Moag 1986 |
| III. Institutional acceptance and intrinsic motivation | |
| Self-determination theory | |
| People follow [rules/policies/practices/goals] to different extents and for different reasons. Please indicate how well each of the following reasons describes you. I strive for this [rule/goal] the way I do, because:‡ | |
| ...this [rule/goal] matches with my personal values. | Soenens et al. 2009 |
| ...this [rule/goal] is an expression of my personal values. | Soenens et al. 2009 |
| ...I really believe that it is an important [rule/goal] to have. | Sheldon and Elliot 1998 |
| ...I endorse the [rule/goal] freely and value it wholeheartedly. | Sheldon and Elliot 1998 |
| ...I would feel ashamed or guilty if I did not strive for it. | Sheldon and Elliot 1998 |
| ...otherwise, I would feel bad about myself. | Soenens et al. 2009 |
| ...I do not want to disappoint [authority figure/person(s)]. | Soenens et al. 2009 |
| ...someone wants me to do it, or thinks I ought to do it. | Sheldon and Elliot 1998 |
| ...I feel pressured to do it. | Soenens et al. 2009 |
| ...I am afraid I will lose [some incentive/privilege/right]. | Soenens et al. 2009 |
| ...I get some kind of reward, praise, or approval for doing so. | Sheldon and Elliot 1998 |
| ...I would be punished if I did not. | Soenens et al. 2009 |
| Social justice research | |
| I approve of the [rule/policy/practice/goal]. | Allen and Meyer 1990 |
| I support the [rule/policy/practice/goal]. | Allen and Meyer 1990 |
| I am satisfied with the rule/policy/practice/goal]. | Allen and Meyer 1990 |

Note: These measures are often used to assess the subjective quality of participatory institutional arrangements and their motivational outcomes (e.g., institutional acceptance), within self-determination theory and social justice research. See the original sources for a complete list of items and their alternative forms. Measures must be adapted for use in specific activity domains and cultural contexts (see Vallerand and Ratelle 2002:45–47, Rudy et al. 2007).

†Adapted by permission.

‡Highly internal reasons for acting (e.g., first 3 items) indicate higher levels of acceptance and intrinsic motivation; highly external reasons for acting (e.g., next 5 items) indicate lower levels of acceptance and intrinsic motivation.

enhance feelings of institutional legitimacy and, thereby, promote institutional acceptance. Hence, from a psychological standpoint, the main challenge of participatory fit is determining the types of public participation that will be perceived as autonomy-supportive and procedurally fair by specific stakeholder groups in particular local social–ecological contexts (e.g., Clayton and Opatow 2003a).

Participatory fit

Conventional accounts of public participation generally overlook this problem of participatory fit. They tend to evaluate participation solely in terms of objective criteria, such as the number and diversity of stakeholders involved, or the extent of their involvement in actual institutional decision making. Moreover, they often assume that more decision-making control is synonymous with self-determination or procedural justice. For example, according to Arnstein's (1969) classic "ladder of citizen participation," forms of citizen involvement such as attitude surveys, public hearings, and educational pamphlets are not genuinely participatory, because they do not provide enough direct citizen control. In Arnstein's taxonomy, self-governance, majority representation on policy boards, and other types of shared decision-making arrangements qualify as genuine participation (see also International Association for Public Participation 2007).

These kinds of taxonomies help analysts identify obvious attempts at stakeholder manipulation. They also rightly point out that different institutional arrangements promote self-determination or procedural justice to different degrees. Moreover, it may be true that forms of public participation like self-governance, that (usually) give citizens more direct decision-making control, tend to be perceived as more autonomy-supportive or procedurally fair, on average (cf. Andrade and Rhodes 2012). However, from a psychological standpoint, high levels of involvement and decision-making control do not necessarily translate into a genuine sense of participation among participants, or reliably predict human motivation and behavior.

Consider the following case study by Hunt and Haider (2001), which is particularly interesting for two reasons. First, they did this study in response to a case study by Lauber and Knuth (1999), which found that self-reported levels of perceived procedural justice predicted acceptance of a wildlife agency's decision to abandon a controversial moose repopulation initiative in New York State. Hunt and Haider (2001) thought it ought to be possible to skip the subjective measures of procedural justice and use each citizen's actual level of involvement to predict their institutional acceptance. Second, they cited Arnstein's (1969) ladder of participation to justify this approach, predicting that higher levels of involvement would yield higher levels of institutional acceptance. To test these predictions, Hunt and Haider (2001) interviewed 324 tourist-site operators about their involvement in Ontario's

Forest Management Planning Program (FMPP). Actual levels of involvement varied from none to helping draft the forest management plan as a member of a citizen advisory board. Critically, participants that were the most involved were the least satisfied with the citizen advisory board, its decision-making procedures, and its policies. Hunt and Haider ultimately concluded that unidentified social–ecological factors may have been responsible, and subjective assessments of procedural justice should be used to adequately solve the problem.

This example illustrates just how misleading it can be to rely solely on external features of public participation to identify appropriate forms of participation. First, taxonomies of public participation usually overlook how a particular type of public participation was implemented. However, implementation can have a substantial impact on subjective perceptions. For instance, self-governance could feel nonparticipatory if decisions are made in an inconsistent, biased, or disrespectful manner (DeCaro and Stokes 2008, Clement 2010; cf. Colquitt 2001). Second, public participation can take on far more forms than the handful of simplified categories normally recognized by conventional taxonomies (Ostrom 2005). We need more precision to match participatory institutional arrangements to specific stakeholder groups and local social–ecological contexts. In short, we need a way to anticipate or identify the types of institutional arrangements individuals will perceive as autonomy-supportive and procedurally fair.

Social–ecological context

Social–ecological systems are immensely complex. Many factors could therefore influence people's subjective perceptions of self-determination and procedural justice (link $A \times E$, Fig. 1). Here, we demonstrate how to use Ostrom's (2009) social–ecological system framework (cf. Anderies et al. 2004) to identify potentially important factors.

Ostrom (2009) views local social–ecological contexts, or "action situations" (Ostrom 2005), as the product of numerous interacting systems, for example, governance and resource systems, situated within a local ecosystem and particular social, economic, or political setting (Fig. 2). Different types of public participation are represented by different types of "collective-choice rules" (GS6). We first explore how different characteristics of particular stakeholder groups, or "users" (Fig. 2), might influence preferences for collective-choice rules; then we explore characteristics of resources systems. We then discuss characteristics of complex systems themselves, such as dynamic fluctuation in political or environmental conditions.

Because of the current state of knowledge on this subject, we cannot identify every potentially important factor, or anticipate their precise implications in all cases. Rather, our goal is to illustrate a general methodology that analysts can use to pursue their own questions about participatory fit.

Hence, treat the following as working hypotheses; later, we outline procedures for evaluating and improving participatory fit.

Cultural worldview (U6)

A potentially important factor to distinguish among individuals in different social–ecological settings (Triandis 1994, Holfstede 2001) is whether they have a collectivistic or individualistic worldview (U6, Fig. 2). Cross-cultural studies find that individuals from different cultural backgrounds value procedural justice and self-determination, but use different types of institutional arrangements to satisfy their needs (Lind et al. 1997, Chirkov et al. 2003, Sheldon et al. 2004, Rudy et al. 2007). Individuals from collectivistic societies, for example, Japan, tend to conceptualize themselves as interdependent, emphasize collective goals over individual goals, and prefer more indirect relational forms of social influence, such as deferral to a trusted authority figure or family member. Individuals from individualistic societies, for example, the United States, tend to prefer more direct forms of decision-making control and emphasize individual goals.

For example, in one experiment, Iyengar and Lepper (1999) let Asian–American and European–American elementary school students choose an activity for themselves or have one chosen for them by their mother. Asian–American elementary school students performed the activity best when their mothers chose, whereas European–American students did their best when they made the decision themselves (cf. Bao and Lam 2008). Brockner et al. (2001) found similar results when investigating employee reactions to (hypothetical) managers. United States employees felt less procedural justice and institutional acceptance than their Chinese counterparts when a manager ignored their opinion during an important decision. Thus, in collectivistic settings, relational forms of institutional decision making may be more acceptable (i.e., procedurally fair and autonomy-supportive) than relatively independent forms of decision making, like individual choice.

Class and gender (U2, U6)

When individuals from different positions within society must co-govern, social stratification can yield divergent perspectives about who may participate and how. Substantial social disparity, for example, on the basis of gender or socioeconomic status (U2, Fig. 2), can degrade valuable social capital (U6, Fig. 2), increasing institutional transaction costs and adversely affecting institutional effectiveness (Ahn et al. 2003; cf. Weber et al. 2004, Hogg and Reid 2006).

Consider a case study by Ray and Bhattacharya (2011). They examined the effects of India's social caste system on citizens' perceptions of forest-management regime legitimacy, citizen-regime information sharing, rule compliance, and deforestation. Communities with the highest levels of social caste stratification (i.e., the most caste divisions) performed

the worst, on every measure. High-caste members generally do not want to share decision-making authority with low-caste members. Therefore, high-caste members may feel that comanagement with low-caste members is unjust, or contrary to their sense of self-determination; low-caste members, in contrast, likely want more decision-making control (cf. Blader and Chen 2011). Discrepant viewpoints like these could easily increase institutional transaction costs and undermine a community's ability to self-organize (Ray and Bhattacharya 2011). For instance, Cardenas (2003) reports a field experiment, in which socioeconomic stratification (U2) seemed to have created similar coordination problems (cf. Kanbur 1992).

Gender roles also influence preferences for procedural justice and self-determination (Agarwal 2010, Diekman and Schneider 2010). For example, Enserink et al. (2007) examined the institutional arrangements that four societies used to implement the European Union's Water Framework Directive. They found that societies that more rigidly adhered to the "traditional masculine work role model of male achievement, control, and power" (e.g., United Kingdom) tended to use centralized forms of environmental decision making to the exclusion of community-based approaches. In contrast, societies that placed less emphasis on masculinity (for example, Netherlands) used more collaborative, decentralized types of arrangements.

Resource system characteristics (RS, RU)

Ostrom (1990, 2009) identified several characteristics of resource systems (e.g., fish stocks) and their units (i.e., fish) as especially important to the sustainability of environmental regimes, because of their influence on basic human perception (Fig. 2). Resources systems that are large in size (RS3) or have many units (e.g., fish; RU5); that have unclear geographical boundaries (RS2), unpredictable system dynamics (e.g., birth rates; RS7), or highly mobile units (RU1) that lack distinct identifiers (RU5) can make it very difficult to obtain accurate ecological information (Anderies et al. 2004). Under conditions of extreme uncertainty, some citizens may wish to defer the authority (responsibility) of decision making to others, and they may desire "informational justice," or transparent governance (Table 1), more than direct decision-making control (e.g., Mohai 1985, Jenny et al. 2006). In fact, individuals may avoid public participation altogether when it poses significant social or economic risk, seems especially effortful or time consuming, or offers few perceived benefits (Burger 1989, Poteete et al. 2010b).

Resource system characteristics can also create different social dilemmas among relevant actors, making it difficult to share information or trust one another (Ostrom 1990, 2007). In some situations, a third-party mediator (e.g., public court) may be perceived as the best way to coordinate the disparate actors (e.g., Susskind and Weinstein 1980; cf. Walkerden 2005).

Finally, the resource sector (RS1) may also influence preferences for participation. Environmental projects in different resource sectors often have different ecological footprints. For example, Wüstenhagen et al. (2007:2684) suggest that wind-power generators require more siting decisions and encounter more intense public opposition than nuclear power plants, because they are more numerous and usually placed in more visible locations (e.g., coastlines). Contrast this with technologies like private household solar-power generators connected to the public power grid, which require direct and continuous maintenance from individual homeowners. These likely pose a different set of concerns for public participation than those encountered with public works like a nuclear power plant (Sauter and Watson 2007).

Complex systems (S, ECO)

Another important dimension to consider is the dynamic nature of social–ecological systems. Political systems, markets, ecosystems, and participatory processes themselves are in constant flux (Ostrom 2005:255-288, Folke 2006). When these aspects of the local social–ecological context change, norms of control/participation may also change.

For example, political transformations (S3, Fig. 2) like the Arab Spring revolutions challenge a society's basic institutional norms and transform people's fundamental beliefs about political freedom (e.g., Borovsky and Yahia 2012). Unexpected natural disasters (ECO1), poor environmental planning, and harsh economic downturns (S1) test the resilience of existing institutions, placing local social–ecological systems in crises and potentially catalyzing institutional change (Folke et al. 2005). Citizens may seek “strong” autocratic leaders during severe and urgent crisis or, alternatively, rally around democratic ideals (Perrin 2005). Finally, people's goals for participation may change as a particular project progresses, because different aspects of the problem come to the fore, and new actors enter the situation (Howard 2010, von Korff et al. 2010).

PROCEDURES TO DIAGNOSE PARTICIPATORY FIT

With the help of Ostrom's (2009) social–ecological system (SES) framework, we have identified some social–ecological factors that may influence people's subjective definitions of “participation.” However, the literature provides relatively little empirical guidance to help us match specific types of public participation to specific problems. This is largely because applications of self-determination theory and research on procedural justice are relatively new in the environmental domain. Because of its novelty, most such research has focused on introducing the basic concepts (e.g., Lawrence et al. 1997), reconfirming the general dimensions of procedural justice and autonomy–support within the environmental domain (e.g., Smith and McDonough 2001, Gross 2007, Tuler and Webler 1999, DeCaro and Stokes 2008), and demonstrating intrinsic

motivation's role in sustainable environmentally responsible behavior (De Young 2000, Pelletier 2002).

We address this problem here; our goal is to outline general procedures that institutional analysts can use to diagnose participatory fit (see Table 2). These procedures use measures of institutional acceptance as an indicator of social fit. This is important, because in order for scientific knowledge about participatory fit to cumulate, researchers must be able to compare different cases (or experiments) across different social–ecological conditions (Ostrom 2005, Janssen et al. 2010). Moreover, they must have a common evaluative scale to do so (Ekstrom and Young 2009). Ostrom's (2009) SES framework assists with the former issue; institutional acceptance addresses the latter.

In an ideal application of our framework (see Table 2), researchers would first use Ostrom's SES framework to identify critical factors that may influence subjective definitions of public participation, and then use measures of self-determination/procedural justice (see Table 1) to confirm their effects on subjective perceptions of participation. They would also measure institutional acceptance (Table 1), and then record the motivational and behavioral outcomes. Such an approach would allow researchers to evaluate each of the pathways proposed in our framework (see Fig. 1). It would also allow them to more precisely investigate their own questions about how various factors disrupt, or modify, these pathways. Finally, the framework is broad enough to support action research, seeking to tailor public participation to specific applications.

Demonstration

A case study by Chase et al. (2002) shows the clearest example of how we would envision such an approach in practice, although it is somewhat incomplete because they did not measure perceived self-determination, procedural justice, or intrinsic motivation. Their approach complements several recent practical guides that discuss how to design participatory programs in an adaptive manner (e.g., Stringer et al. 2006, Berkes 2007, Allan et al. 2008, von Korff et al. 2010) or analyze social–ecological systems from a behavioral standpoint (e.g., Fairweather and Davidson 1986, Ostrom 2005, Steg and Vlek 2008).

Chase et al. (2002) initiated their study in response to growing public controversy concerning an overpopulation of deer and elk near two rural communities in different regions of the United States: Cayuga Heights, New York and Evergreen, Colorado. They wanted to identify the best type of public participation for each community. Before starting the study, they carefully researched and selected these two case sites to equate the local social–ecological problem on as many dimensions as possible (e.g., same general environmental problem, wildlife agencies equally receptive to public involvement). Afterward, they conducted preliminary

Table 2. General procedures for diagnosing participatory fit.

| Procedure | Description |
|--------------------------------|--|
| (1) Problem identification | If it is a case study, explore the sites and individuals involved (e.g., with surveys, interviews, archival/literature review) to develop an initial understanding of issues and factors which may be pertinent to one's research question/project goal. |
| (2) Narrowing project focus | Set and/or reframe original goals; consider selecting field sites or designing lab/field experiments to isolate the effect of specific factors. For example, if your research question is how cultural worldview (e.g., collectivism versus individualism) impacts definitions of procedural fairness, select field sites/projects in different cultural contexts; equate the sites on as many non-central factors as possible (e.g., socioeconomic status of citizens), unless these are additional interest variables. |
| (3) Preliminary assessment | Conduct preliminary research asking for citizen attitudes (e.g., about the environmental problem and/or policy); present different potential options for public participation and assess perceptions of self-determination/procedural justice, institutional acceptance, etc. for each option; measure any potentially important moderating factors (e.g., cultural worldview, socioeconomic status) to investigate their relative importance. |
| (3a) Analysis | For 1-time research (e.g., a lab or field experiment) that examines the impact of various factors on public participation, institutional fit, and environmental outcomes, data collection would end at this step. |
| (4) Preliminary implementation | If it is a policy/project/experiment you are implementing (rather than observation of an existing process), and it is possible to do so, implement it a small scale, or in only a few of the total project sites, to mitigate unforeseen problems and collect data for early assessment and adjustments. |
| (5) Adaptive follow-through | Using the measures of self-determination, procedural justice, and institutional acceptance (and with knowledge of citizens' attitudes and any potentially important factors), select modes of participation deemed most acceptable to stakeholders. Consider using multiple forms of participation to satisfy and support more stakeholders. Repeat steps 1–5 as needed throughout the life of the project. |

interviews with several local citizens and wildlife managers from state or regional government. They did this to identify specific social–ecological factors that might influence subjective perceptions of participation in the two locations (see “problem identification and narrowing project focus,” Table 2). They used this information to create a more focused questionnaire measuring public attitudes about deer and elk, and various options for controlling their growth (e.g., hunting, educational programs). The questionnaire also assessed citizen preferences for public participation. It asked participants about general categories of public participation, like those described by Arnstein (1969), and specific aspects thereof, such as “Who should make the final decision, citizen majority vote or state wildlife agency?” (see “preliminary assessment,” Table 2). Approximately 400 citizens participated in the study in each location.

Two interesting findings emerged. First, citizens preferred different forms of participation depending on where they lived. Overall, citizens of Evergreen, Colorado preferred more passive forms of participation. Most (53%) thought that their state wildlife agency should make the final decision about how to manage the deer and elk, compared to just 24% in Cayuga

Heights, New York. They were not very supportive of a “comanagerial approach” either, even though it would have given them some control over the decision making and implementation process (12% and 35% respectively). Finally, they were not very interested in holding a citizen majority vote to decide what to do (17% and 31% respectively).

Second, there was substantial divergence in opinion among individual members of the same community. For example, in Evergreen, Colorado, most respondents preferred passive forms of participation. However, a sizeable group preferred more direct control. Specifically, 29% favored an “inquisitive approach” involving only attitude surveys and public hearings, 19% favored a “passive receptive approach” where the wildlife agency would not actively seek public input but would listen to it if brought to their attention, and 36% favored a “transactional approach” that would allow them to influence important decisions without having to take full control, for example, citizen representation on a policy advisory board.

Because of the diversity in responses, Chase et al. (2002) concluded that local wildlife agencies should offer a range of opportunities for the public to participate in its environmental management (see “adaptive follow-through,” Table 2). The

need for multiple modes of participation in a single situation is rarely acknowledged by conventional taxonomies of public participation. Those that do acknowledge it often still rely exclusively on external criteria (check lists) to determine the match (e.g., Connor 1988). It may be more productive to supplement these with assessments of institutional acceptance (social fit) and autonomy—support and procedural justice (cf. Lawrence and Deagen 2001, Smith and McDonough 2001). Doing so would provide more stringent criteria for evaluating participatory fit. Moreover, by assessing intermediate causes, it would also make it easier to falsify claims about how and when public participation promotes positive outcomes.

For instance, Chase et al.'s (2002) results coincide with two critical factors from Ostrom's (2009) SES framework: importance of the environmental resource to affected citizens (U8, Fig. 2) and socioeconomic status (U2). These may have influenced subjective definitions of "participation." Despite similar levels of human–wildlife conflict, more residents of Cayuga Heights, New York felt the deer and elk were a nuisance (34%, compared with 1% in Evergreen, Colorado) and wanted them removed (81%, compared with 30% in Evergreen). Residents of Cayuga Heights were also more affluent; their average household income was \$75–\$100,000 (compared with \$50–\$75,000 in Evergreen). Hence, Cayuga Heights residents' more pronounced concern about overpopulation, and stronger dislike of elk and deer, may explain why they were more supportive of taking matters into their own hands (cf. Mohai 1985, Opatow 1993). These preferences may have been driven by different lifestyle choices associated with higher socioeconomic status, for example, how different stakeholder groups use their land, or other unmeasured factors, such as different wilderness norms in Colorado than in New York (Clayton and Opatow 2003b). In fact, we suspect that these (or other) factors influenced people's perceptions of procedural justice and self-determination. In Cayuga Heights, residents wanted more direct control over program design and implementation, so they probably would have perceived exclusive reliance on passive forms of public participation as unfair and unsupportive. In Evergreen, residents favored more passive forms of participation, so they might have responded less harshly to exclusive reliance on it.

Jenny et al. (2006) lend some support to this idea. They correlated perceptions of procedural justice with rule compliance in the context of a shared solar-power system in Santa Maria, Cuba. As the community's sole energy source, the system was prone to frequent outages. The community devised simple rules to mitigate the problem, for example, unplugging refrigerators from 6 pm–10 pm. However, such rules are only effective when people comply. In this study, perceptions of procedural justice positively predicted compliance. However, the aspect of procedural justice that mattered was informational (i.e., transparent governance), not

decision-making control, or being involved in the actual rule design (see Table 1 for distinction). Interviews revealed that many citizens explicitly endorsed letting the mayor design and enforce the rules, because they trusted his judgment. He was a trained electrician and well liked public leader with several yrs of experience working with the community. Local leadership (U5, Fig. 2) can greatly influence a community's ability to manage a resource system (Ostrom 2003). In this case, pre-existing trust in the mayor's judgment and technical ability evidently influenced the type of public participation citizens deemed fair (Tyler and DeGoey 1995, Burke et al. 2007). This is also another example where an institutional arrangement deemed "nonparticipatory" by conventional taxonomies (e.g., Arnstein 1969) actually is seen as procedurally fair, under the right conditions.

IMPLICATIONS AND FUTURE DIRECTIONS

We began our work by raising three closely related questions about institutional fit and public participation. First, what role, if any, does public participation play in the development and long-term maintenance of environmental institutions that are well-matched to local social–ecological conditions? Second, how does humankind's sense of agency, or self-determination, play a role in this? Third, how do we define a good fit and measure it, especially with regard to "social fit," that is, how well institutions match human expectations and behavioral patterns? Finding answers to these questions would not only enhance the utility of the "fit" concept as a tool for institutional analysis; but it would also clarify several important issues surrounding the use of public participation to promote sustainable social–ecological systems.

We approached these problems from the vantage of social fit. We identified institutional acceptance, that is, how much individuals endorse a system of governance, as a particularly important aspect of fit to understand, because of its centrality to the concept of freewill, documented relationship with public participation and intrinsic motivation, and potential for measurement. Specifically, when public participation adequately supports a sense of procedural justice and self-determination among participants, it promotes institutional acceptance; thus explaining how good social fit emerges (links A–B, Fig. 1). Institutional acceptance, in turn, promotes behavioral entrenchment and intrinsic motivation, for example, to share one's local social–ecological knowledge and voluntarily comply with environmental policies; thus explaining the role that public participation and human agency play in the emergence and long-term sustainability of comprehensive fit (links C–D).

However, to adequately promote a sense of procedural justice and self-determination, public participation must be properly matched to the local social–ecological context. Otherwise, it may be perceived as inappropriate, thereby alienating and demotivating citizens. Cultural norms of decision-making

control; class and gender; nature and saliency of the environmental problem; political upheaval and natural disasters, and many other factors may all influence people's subjective definitions of "participation" (link A×E, Fig. 1). Therefore, it is important to verify the subjective quality of an institutional arrangement to properly anticipate its motivational and behavioral consequences. Our framework helps investigators do this by outlining general procedures for diagnosing participatory fit (Table 2). Moreover, each component of our framework is measurable, so analysts can falsify or add to existing theory with more precision than before (Table 1).

For example, in a recent cross-cultural field experiment, Vollan (2008) found that residents of Karas, Namibia, where there is a long history of successful self-governance and strong norms of trust and reciprocity, successfully managed a shared resource when they voted on rules and could not use economic sanctions to enforce them. In contrast, residents of Namaqualand, South Africa, where self-organization is limited and norms of trust and reciprocity are relatively weak, only benefited from voting when the rules were also backed by economic sanctions. Vollan attributed these results to cultural differences in subjective definitions of self-determination, hypothesizing that Namaqualand residents were best empowered by rules backed with economic enforcement, whereas this undermined definitions of self-determination among Karas citizens. These results fit nicely within our framework when one realizes that economic sanctioning procedures (GS8, Fig. 2) and norms (U6) are social-ecological factors that may moderate participatory processes. Our framework can accommodate any number of such moderating factors and alternative research questions. Moreover, Vollan did not measure perceptions of self-determination or institutional acceptance to confirm his interpretation of the data; hence, our framework also helps researchers measure these intermediate psychological processes, so they can draw stronger inferences about the causes of observed behavior.

Our framework also has important implications for the conceptualization of "public participation" within institutional analysis. One of the most debated questions in environmental management is whether public participation is a necessary condition for good environmental outcomes (Chess and Purcell 1999, Conley and Moote 2003). Public participation became a privileged solution in recent decades, with its proponents often espousing a mantra of "community-based conservation" without questioning its real effects (see Adams and Hulme 2001:18, Berkes 2007, Ostrom et al. 2007 for discussion). Others identify public participation as a critical factor for the successful management of common-pool natural resources—for example, Ostrom's (1990, 2010) seminal design principle that "most individuals affected by a policy regime can participate in modifying it," yet argue it should not

be used in every situation (e.g., Ostrom et al. 2007). How do we reconcile this?

We believe it is imperative to distinguish between public participation and the subjective psychological experience of "participation." Whereas public participation (i.e., actual public involvement) may not be essential for good environmental outcomes in all cases, a sense of procedural fairness and self-determination among those affected by environmental policy might be (Tyler 1990, DeCaro and Stokes 2008). The latter may arise from many institutional forms, including informational pamphlets (e.g., Chase et al. 2002) and legitimized central governance (e.g., Jenny et al. 2006). Analysts must be careful to consider the psychological environment when they evaluate outcomes of public participation, because apparent failures of participation may arise from participatory misfit, rather an inherent fault of "participation" itself.

This raises a related concern about the type of public participation that is best. We advocate a nuanced perspective on this question. Social-ecological systems are immensely complex and dynamic, leading to variation in stakeholder beliefs, preferences, and goals that may influence subjective definitions of participation. Therefore, the best approach may be one that employs multiple modes of citizen engagement, phases of evaluation, and adaptive tailoring as the process unfolds (cf. Walkerden 2005, Stringer et al. 2006).

Our focus on institutional acceptance as an indicator of social fit is meant to complement, not replace, other accounts of institutional fit. First, factors other than public participation can influence institutional acceptance; these should be investigated in future research. For example, consistently unfavorable outcomes, or grossly inequitable shares of the burdens associated with environmental management could decrease institutional acceptance (Van den Bos et al. 1997, Howard 2010). Sometimes, the policy outcome is more important to citizens than the fairness of the decision process (e.g., Besley 2010). Moreover, people are motivated by more than just institutional acceptance (e.g., Jenny et al. 2006). Our framework helps researchers investigate these situations more systematically. Second, what citizens find acceptable will not always be best for the environment. Therefore, good environmental management must incorporate multiple perspectives on institutional fit (e.g., environmental and economic fit; Munasinghe 2009). We chose to focus on public participation and social fit to emphasize the often overlooked point that sustainable social-ecological systems are as much about sustaining an engaged and supportive citizenry as they are about creating and maintaining smart environmental or technological solutions.

CONCLUSION

Institutional analysts face considerable challenge trying to determine how public participation and institutional fit relate

to one another and the environment. Social–ecological systems are immensely complex; individual and cultural preferences for political participation and social justice introduce a layer of subjectivity to environmental science; and influential concepts like “social fit” or “self-determination” are difficult to quantify. Our framework helps analysts address these challenges by providing a coherent psychosocial account of public participation and institutional fit.

Responses to this article can be read online at:
<http://www.ecologyandsociety.org/issues/responses.php/5837>

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