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Environmental Expertise as Group Belonging

Environmental Sociology Meets Science and Technology Studies

Rolf Lidskog and Göran Sundqvist

Abstract: What is environmental expertise? The background to this question is that many scholars consider environmental expertise crucial for discovering, diagnosing, and solving environmental problems but do not discuss in any depth what constitutes expertise. By investigating the meaning and use of the concept of expertise in three general theories within environmental sociology—the treadmill of production, risk society, and ecological modernization—and findings from science and technology studies (STS), this article develops a sociological understanding of environmental expertise: what it is and how it is acquired. Environmental expertise is namely about group belonging and professional socialization around specialized skills; that is, it concerns both substantial competence and social recognition. The implications of this general view on expertise are then used to enrich theories in environmental sociology.

Keywords: ecological modernization, environmental expertise, environmental sociology, risk society, scientism, science and technology studies, treadmill of production

Most people would agree that environmental expertise is important in defining and handling environmental problems. Environmental policy is densely populated by scientific experts; national governments as well as international political organizations establish scientific bodies and expert panels with the explicit aim to provide a scientific basis for policy and to evaluate the impact of current policies. In their reporting on environmental issues, media turn to scientific experts for opinions on whether policy developments and international negotiations will succeed. When criticizing current societal developments and the lack of action, environmental organizations refer to science in order to justify further and more far-reaching action. Companies in different sectors use environmental expertise to develop cleaner technologies, as well as to improve their public image and strengthen their brands. Thus,

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hardly any claims about environmental action—whether they come from governments, environmental movements, or private companies—are made without reference to expert knowledge. This has resulted in an enormous increase in environmental experts meant to provide recommendations and advice for decision makers in policy, business, and environmental organizations. At the same time, remarkably few efforts are being made to explore what constitutes environmental expertise. This article aims to elaborate on what environmental expertise is and how it is acquired.

Underlying the current importance of expertise is the widespread view that environmental threats are increasingly complex and diffused in time and space and outside direct perception. Environmental consequences are often delayed in time and distributed in space, making scientific methods crucial for understanding environmental risks. Consequently, science is central to regulatory agencies' risk management as well as to individual action. In this situation, we are, as stressed by Ulrich Beck (1992) and Anthony Giddens (1990), heavily dependent on expert knowledge. This means that environmental problems are often understood as science-based in the sense that science both identifies and solves environmental problems. This is close to the notion of "scientism," which is based on "the ingrained assumption that scientific evidence is the only authority that can justify policy action" (Wynne 2010: 441). This view puts science at the center, as the fundamental source of epistemic authority and an obligatory point of passage for environmental discussion and policy making.

However, there is also an opposing line of thought claiming that environmental problems should be understood from the viewpoint of power. Even if science is important, according to this view, it has no autonomous role and often is reduced to one political weapon among others (Nelkin 1992). This we call "powerism." Based on the assumption that power explains environmental policy making, it implies that science has no power in itself (Aronowitz 1988). Many environmental issues are typically defined and described as science-driven and are based on a linear model in which "science speaks to power" (S. Beck 2011; Rapley and De Meyer 2014). In the issue of climate change, for example, scientism is easily detected: climate scientists discovered climate change, diagnosed it, drew attention to the problem, and convinced many policy makers not only to develop responses but also that these responses must be based on scientific evidence in order to be relevant and legitimate. In short, without climate science there would be no climate policy.

Moreover, we can recognize a degree of scientific reductionism in public climate discussions, implying that what really matters is to get the science right. A lack of science or too much scientific uncertainty will lead to political paralysis and inaction (Hulme 2009). This reductionism creates a dichotomy between believers and nonbelievers (Oreskes 2004), which implies that scientism in the field of climate change risks supporting its opposite, climate skepticism (Sarewitz 2011). Scientific reductionism of environmental problems often leads to decreased public engagement because of its marginalization of other ways of understanding environmental problems, not least value-based aspects and local meanings focusing on alternative solutions for societal development. The focus is solely on science, how certain the results are, and what results can be trusted and why.

However, this strong focus on science and the presumed linear path from science to decision-making have not delivered the expected results (Lidskog and Sundqvist 2015). The global scientific consensus on climate change, thoroughly and continuously represented since 1990 by the Intergovernmental Panel on Climate Change (IPCC 2014: 7), has not led to reduced emissions of greenhouse gases. When discussing a lack of action, it is common to assume a power view, where special interests (not least corporate ones) rather than science are seen as the most important causal factors (Grundmann 2006). It is argued that climate science, especially the work performed by the IPCC, is hampered by policy makers (Wynne 2010). Science is "erring on the side of least drama" by being overly conservative in projections of impacts of climate change (Brysse et al. 2013). These conclusions are based on the assessment that science has lost its autonomy and thereby has become just one political tool among others. The science is empty at its core, since the production of scientific knowledge is from the beginning influenced by policy arguments and assessments. This is a situation of "Mode 2 production of knowledge," in which knowledge is produced in the context of application (Nowotny et al. 2003). Science is therefore no longer able to inform and surprise policy making or to "speak truth to power" (Haas and Stevens 2011). Instead, climate scientists adapt to the pressure from watchful governments and corporate interests; in other words, they deliver what policy makers expect and can digest.

Even so, this is not how most climate scientists, for example, at the IPCC, publicly present their results. On the contrary, the focus is on "pure" science: "This is what the science says," or, in the case of the IPCC, "This is what the global scientific consensus tells us about the climate situation." As mentioned earlier, this attitude risks generating a

skeptical counterreaction and leads to endless discussions of evidence, which become a proxy for important political discussions about what should be done and what kind of society we want (S. Beck 2011; see also Pielke 2007).

Hence, we find in social science studies on environmental problems a paradoxical emphasis on both science dependency and science dissolution, oscillating between opposing understandings of how scientific expertise works in society (Lidskog and Sundqvist 2018; Sundqvist et al. 2015). The tension between these views—of science holding power by virtue of its epistemic superiority, or of science as an instrument for other powerful interests—constitutes the point of departure for this article. More specifically, we will follow the opposing perspectives of scientism and powerism in the field of environmental sociology. As we show later, this opposition is rarely explicitly discussed, which has led to an unreflective view of science, exemplified by an unrecognized oscillation between opposing poles.

We first present how these two views can be identified in three major theories in environmental sociology: the treadmill of production, risk society, and ecological modernization. We conclude that these theories are not clear about either what expertise is or how to balance scientism and powerism. Therefore, we turn to science and technology studies (STS), a field specializing in studies on scientific expertise. Even here, though, we find a tension between perspectives related to scientism and to powerism. We then conclude with an attempt to combine these contradictory positions, claiming that expertise is about group belonging (power) arranged around specialized skills (science). Finally, we bring this integrated idea of expertise to environmental sociology, stressing in particular how a contextualized and actor-oriented view of expertise can contribute to environmental sociology's ambition to describe and explain societal change in relation to environmental problems. This contribution to the understanding of environmental expertise is then briefly summarized.

Scientific Expertise in Environmental Sociology

In order to discuss more substantially how expertise is understood among environmental sociologists, we begin by investigating how the role of science has been conceptualized in three central theories. Their discussions on the character and role of science (or more broadly, scientific expertise) and how they are related to scientism and powerism

provide a starting point for our conceptual development, which takes place later. Environmental sociology is a dynamic subdiscipline, involving different research traditions and approaches (Lidskog et al. 2015; Pellow and Nyseth Brehm 2013). Obviously, the three theories—the treadmill of production, risk society, and ecological modernization—do not cover the whole field of environmental sociology; they have been selected because they are among the most influential ones.

The Treadmill of Production

The theory of the treadmill of production (Gould et al. 2008; Schnaiberg 1977, 1980), which applies a political economy approach to the environment and social degradation, makes a central distinction between production science and impact science. Production science (basic as well as applied) is part of an institutional framework in which it serves as a means for increasing the production, distribution, and consumption of goods and services (the treadmill of production). Impact science is intended to develop knowledge about the human impacts on ecosystems. National and transnational economic actors, in accordance with the logic of continuous economic growth, control the economic and political structure of current capitalist societies, and science and technology are of central importance to producing and distributing goods in an increasingly efficient way. Impact science has a different opportunity structure, with less access to resources and power because of its message (the need to stop environmentally detrimental activities and to combat environmental problems), which often implies a slowing down of the treadmill of production.

Empirical studies using this theory have found that developers and exploiters have capital to enroll expertise, whereas state regulators, focusing on impacts, have fewer resources, and many environmental groups have no possibility to hire expertise and therefore do not succeed in being heard (Gould et al. 1996). This means that production science overrules impact science, and decisions become biased. Political and economic powers conceal their agendas behind the assumed value neutrality of science. This results, however, in the fostering of production science and the marginalization of impact science, as well as environmental degradation.

The way to avoid this situation is to facilitate impact science and science developed and funded by less powerful actors. Research conducted by universities (funded by foundations and not companies), research produced by nonprofit organizations, and citizen science are

therefore of great importance. In a sociological understanding of expertise, it is central to stress the institutional embeddedness of science and to critically assess how nonscientific institutions and actors direct research, transforming it into mainly production science. As Kenneth Gould (2015: 145) puts it, "Scientists serve the interests of the institutions that employ them." The problem is thus not science per se but rather how it is used by interests, and the solution is to provide less powerful actors with resources to redirect research toward impact science, and to create effective feedback loops between scientific data, public awareness, and demands on policy makers for environmental protection (ibid.: 150). Obviously, the treadmill of production stresses the importance of the concept of power in understanding how science works in society.

Risk Society

With its emphasis on the environmental "bads" of industrial production and on the fact that the tension between wealth production and risk production has intensified and is becoming more visible, Ulrich Beck's (1992) theory of the risk society has great affinities with the treadmill of production. Beck connects current environmental problems (as well as other kinds of risks, such as those associated with financial markets and terrorism; see U. Beck 2009) to how central institutions of industrial society operate in what he calls "simple modernity." In simple modernity, problem-solving relies on a scientific and instrumental approach in which uncertainty, complexity, and ambivalence are handled through the use of instrumental rationality. This approach depends on the view that it is possible to reach universal and objective knowledge, and to control reality based on this knowledge. Problem-solving is specific and straightforward; the goal is to maximize the control of social and economic development.

"Reflexive modernity" holds that the simple-modernity approach to problem-solving inevitably leads to unintended and negative consequences. Science and technology have created false trust; the dogma of scientific certainty and technological infallibility have produced a widespread belief in the possibility to control all kinds of risks, that is, a "symbolic detoxification policy" in which risk consciousness has been prevented from emerging (U. Beck 1995: 8). When side effects multiply, and traditional instrumental approaches are decreasingly seen as relevant for handling them, a reflexive turn emerges. In this reflexive modernity, scientific expertise is given a new role. Its capacity to deliver

objective truth, determine risks, and suggest ways to control risks is questioned. Reflexive modernization means an end of "true-false positivism" in which science has the exclusive right to judge what should be seen as a risk. In Ulrich Beck's (1994: 29) words, "People must say farewell to the notion that administrations and experts always know exactly, or at least better, what is right and good for everyone." Instead, a reflexive scientization is emerging in which science itself is deconstructed by means of science. Science is thereby both internally and externally contested; experts frequently disagree, and this is now recognized by the wider society. Claims about the universal legitimacy and applicability of science are increasingly disputed. Taken together, this demonopolization of science results in a world consisting of multiple and competing epistemic authorities. Almost every public issue involves a heterogeneous supply of scientific statements; this in turn creates an open space for public contestation of science in which citizens scrutinize science and develop counter-expertise (U. Beck 1995: 124).

This leads to a situation characterized by a plurality of rationalities and knowledges. It does not, however, imply that the role of experts is becoming less important. Ulrich Beck believes that a reflexive science, broadly disseminated in society and used by social movements and civic networks, can serve to democratize society: "Only a strong, competent public sphere, 'armed' with scientific arguments is capable of separating the scientific wheat from the chaff" (2009: 44). Thus, even if Beck forcefully argues for science to become more reflexive and to develop relations that are more equal to other knowledge forms, he still pins his hopes on (a renewed) science. The opportunity to emancipate social practice from science arises *through* science. This is a form of scientization of the protests against science, and involves a plea for reflexive science (U. Beck 1992: 155–182).

Ecological Modernization

In contrast to the theories of the treadmill of production and risk society, the theory of ecological modernization stresses that modernity is characterized not only by growing ecological degradation and crises but also by environmental reforms (Buttel 2003; Mol and Spaargaren 1993). Social, cultural, and political shifts have taken place—originally in Northern Europe, but increasingly in other parts of the world—whereby industrial societies have responded to environmental problems and taken measures to counteract them. With the help of scientific research, new (low-impact) technologies, changed regulatory

frameworks, and growing environmental consciousness, societies have begun to ecologically modernize themselves, replacing reactive, end-of-pipe solutions with preventive and proactive measures (Mol 1996). Not only policies but also practices have changed, and environmental performance has been boosted in many areas, such as air pollution and CFC emissions. Ecological rationality is slowly catching up with economic rationality, leading to institutional innovations and gradual structural changes in which economic growth no longer necessarily leads to ecological disruption (Mol 2010).

Ecological modernization stresses the importance of environmental reforms and structural changes of a creeping character. No clear distinction is made between industrial society and risk society, so a more positive evaluation of current environmental policies and practices could be made, namely that continued modernization of capitalism and industrialism can lead to eco-efficiency and environmental reforms (even if industries and nation-states sometimes block environmental improvements). In this sense, we find a similarity with Ulrich Beck's reflexive modernity, where modernity begins to reflect and act on its own consequences. However, reflexive modernization is not a future goal, as Beck argues, but an existing reality.

In its early stages, ecological modernization had a rather unreflective belief in science and technology, seeing it as a provider of not only truth but also emancipatory power. This is close to technological determinism, the belief that technological development in itself brings social change and environmental reforms. Over time, a more reflexive understanding has been developed, in which science is no longer seen as consisting of undisputed facts and its application as automatically leading to sustainable futures (Mol et al. 2014; Spaargaren 2000). A distinction is now made between large-scale technologies and softer or alternative technologies, and there is interest in empirically exploring the role of science and technology in environmental change. This is because globalization and reflexive modernization have challenged the institutions of science and technology (Mol and Spaargaren 2000). These institutions, however, are still pivotal for bringing environmental reforms, not through technological fixes but by making society more ecologically rational, that is, through the institutionalization of environmental concerns. Science and technology have an important, not to say essential, role to play as progressive forces in the development of ecological rationality (Buttel 2000; Mol and Spaargaren 2000).

Balancing Scientism and Powerism

As seen earlier, science plays an important role in the three theories. They all assume the importance of science in handling current environmental problems but also in creating societal transformations on a macro level. They also associate science with power (both empirically and normatively), though in different ways. Having contributed to environmental degradation and unsustainable development, science and technology are part of the problem but also part of the solution.

The treadmill of production considers science a potentially fundamental factor for policy actions, in relation to both industrial production and environmental protection. However, science means different things in relation to production and impacts, which implies that a power perspective is needed to understand how science is directed for societal development. The treadmill of production combines scientism and powerism without questioning the distinction between them. The key point deals with how science is enrolled and directed in relation to the interests of production (focusing on economic growth) or wider societal concerns (focusing on environmental impacts).

The risk society takes a more complex view of science. It states that, in simple modernity, science is seen as a provider of truth and certainty, but also that this is a false view produced by political and economic interests to legitimate current risk-generating activities. This implies that we find scientism in simple modernity, but that it is gradually becoming obsolete because pf societal changes that are leading to reflexive science, in which contingency and uncertainty are stressed. However, science has power in itself, for instance, through the emancipatory role that Ulrich Beck ascribes to it in reflexive modernity.

Ecological modernization means to recognize the environmental consequences (externalities) of modernity and the possibility of transforming them into internalities. The theory is based on a positive assessment of the feasibility of this transformation, and, for this, science is of great importance. Ecological modernization shows that with the help of science and technology, a societal transformation can occur. Compared with the two other theories, this transformation takes place gradually, and no new form of science is needed to make it possible. Subordinated to an ecological rationality, science and technology will continue to be pivotal for modernization processes, though no longer only to increase economic growth but also to develop environmental reforms, low-impact technologies, and green innovations.

All three theories are combinations of scientism and powerism. They recognize externalities and possible ways to transform them into internalities (making context into content), which is done with the help of science. The treadmill of production wants more impact science, risk society more reflexive science, and ecological modernization more science directed toward green goals. What we find problematic in all three theories is their programmatic (almost mechanistic) understanding of societal transformation, in which science plays a crucial role. The basic distinctions (production vs. impact science, simple vs. reflexive modernization, economic vs. ecological rationalization) underpinning these three theories do not explain how scientific expertise is made or how scientific experts act. They all presume that science is an important actor in a societal transformation, and the theories of risk society and ecological modernization seem to state that this transformation occurs almost automatically.

For example, Ulrich Beck posits a societal transformation occurring as a consequence of industrially produced risks, such as nuclear and chemical contamination. Skepticism toward science leads to reflexive scientization, that is, to scientific questioning of "the inherent foundations and external consequences of science itself" (1992: 155). But how does this happen? What experts are doing what, and why? How are these changes within science occurring? How is scientific authority becoming "demonopolized," and where are the alternative interpretations and findings, questioning a monolithic "neutral" science, coming from (ibid.: 183–236)? We argue that these processes occur not spontaneously but rather in particular situations where experts and expert groups play an active role.

Even if there are important societal trends or transformations taking place in society, we always need to understand how these processes occur in practice, and we should not assume there is only one inevitable direction for such processes to take. There are multidirectional possibilities, there are conflicts between groups, and there are no strict boundaries between different kinds of expertise. Therefore, we need to deepen our understanding of such processes by focusing on expertise as actors, as is actually done in the field of STS.

Expertise in Science and Technology Studies (STS)

STS is a research area that studies the role of science in society, including the basic question of how to understand the nature of expertise.

Therefore, when environmental sociology or other environmental social sciences explore the role of environmental expertise, it is crucial to use findings from this field. However, and in parallel to what we discuss in this article, there is an ongoing debate within STS about whether expertise is best understood by focusing on social attributions (how expertise gets its status as expertise) or on cognitive content (the real expertise possessed by experts or expert groups) (Collins and Evans 2002, 2017; Collins et al. 2010; Epstein 2011; Fischer 2011; Jasanoff 2003; Sundqvist 2014; Wynne 2003). Irrespective of positions, this debate encompasses an understanding of expertise that navigates between the views of scientism and powerism while explicitly criticizing both for being naive. As we will show later, STS scholars have in fact often been trapped by this conflict when handling the discussion, which is framed as an issue of understanding expertise as relational or substantive.

The Relational View: Expertise as Attribution

The dominant view of expertise in STS is that based on attributions, that is, the view that expertise is what actors define and assess as expertise (Eyal 2013; Irwin and Michael 2003; Latour 1987). This position, often labeled the "relational view," stresses the social content of expertise. Social position, authority, and status are what distinguish an expert from a nonexpert. Becoming an expert and maintaining expert knowledge are the outcomes of social negotiations and boundary work among involved actors. The expert community is an important player in this game, but so are people and groups from outside the expert community who may not attribute expert authority to a particular person, group, or organization. The credibility of beliefs (of whatever kind) is determined by the social networks that sustain them.

This nonessentialist understanding of expertise is similar to what we call powerism. However, STS researchers often indirectly give support to the opposite view: scientism. The important role of science is explained by the power delegated to small groups of experts. Thus, STS scholars often agree with scientism that environmental issues are defined as scientific issues, and scientific experts are attributed power and authority; in other words, the handling of environmental problems is delegated to experts. Contrary to the view of scientism, however, STS scholars explain this situation as arising not because of the power of science itself but because of power given to science. This means that scientism is seen as correct, not essentially but in an empirically contingent way (Latour 1987, 1993).

For STS scholars, scientism is often empirically true in the sense that scientific experts play an important role in society, not least in relation to the discovery and regulation of environmental problems. However, to explain this situation, they turn to powerism, where all that counts are actors and actions. It is important, however, to note that the power of expertise always must be empirically investigated. As Sheila Jasanoff (1990: 17, 244) puts it, when discussing what she calls the technocratic versus the democratic approach in environmental regulation, technocrats are right when they say publics and politicians agree that (peer-reviewed) science should be the foundation of environmental regulation, but democrats are right when they say science alone cannot be a stable foundation for environmental regulation, since science must always be interpreted and supported, as well as carried forward, by interest groups (be they scientific groups, industrial organizations, or environmental activist groups), who make their own judgments about what knowledge we should rely on. From the viewpoint of "expertise as attribution," science could be of great importance, but power is what explains the role given to science in any given context.

The Substantive View: Expertise as Competence

During the past decade, the relational view of expertise has been criticized from within the STS community, especially by Harry Collins and Robert Evans, who have set themselves the task of going beyond a theory based on attributions while trying to develop a substantive view of expertise in order to sort out what kinds of knowledge are suitable for solving what kinds of problems:

> Like it or not, those who study knowledge are experts in the nature of knowledge. If we [STS scholars] refuse to acknowledge any role other than criticism—if we are willing only to level down and never to build, explain or evaluate the structure of the vertical dimension of epistemology—we are evading a responsibility that only we can fulfil. (Collins and Evans 2007: 140)

According to this project, STS scholars should not hesitate to answer the following question: "What is the appropriate ratio of science to non-science in a decision?" (ibid.: 134). This is about supporting better decision-making by sorting out what constitutes knowledge and who possesses it, that is, by using the vertical dimension of epistemology to go beyond the flat landscape of attributions. To accept and use this dimension means to assume a political-technical divide, as well as an expert-lay divide. The consequences of these divides should be

accepted; we must decide what constitutes knowledge and who possesses it, because the alternative would be a nightmare of technological populism (Collins et al. 2010).

This "substantive view" stresses the epistemic content of expertise; expertise concerns individual or collective competence. It is knowledge and competence that distinguish an expert from a nonexpert. Knowledge is understood as something acquired through extensive training and practice. The locus of expertise is a "community of expert practitioners" (Collins 1992: 159). This means that expertise should not be confused with the acquisition of expert status; expertise is related not to what people and groups believe and perceive but to the competences possessed by the expert community and its individual members.

According to Collins and Evans (2002, 2007), a prerequisite for assessing if an issue as knowledge-based is that it is possible to identify a "core set" (i.e., a group) of experts who are the most knowledgeable persons in the field. In addition, there must be consensus within the knowledge community that this core set exists and is recognized as a core of expertise. Without a core set, it is impossible to regard the issue as the responsibility of experts. However, if there is such a core set, issues may legitimately be delegated to these experts.

Collins and Evans's approach is a way to tackle the tension between scientism and powerism. By making a systematic categorization of expertise, they differentiate between expert qualities and identify different forms of expertise. They thereby make it possible to judge and distinguish who has "real expertise" (based on possession of knowledge). When expertise is defined and identified, areas of responsibility can be decided on and distributed between different groups of experts—as can areas and issues that should not be delegated to experts but instead should be taken care of by the democratic political system. This latter task is of great importance, since there is always a risk that experts will try to decide on issues about which they lack competence. Since most environmental problems are of a complex character, and local and experience-based knowledge is therefore often of great importance in both questioning and enriching (modifying) certified expert knowledge (Collins and Evans 2002: 250, 267; see also Funtowicz and Ravetz 1993), it is often hard to define and discern which forms of scientific competence can contribute to any given issue. That is, it is difficult to identify which core sets are needed or conclude that the needed competence is lacking. But this is exactly what Collins and Evans ask us to do: to sort out the character of the issue at hand and decide what kind of expertise (if any) is relevant for handling the issue.

Expertise as Socialized Skills

The debate between a relational and substantive view raises important issues about what constitutes expertise. The differences between these two views of expertise are summarized in Table 1. It is important to note that it is not necessary to interpret this as an either-or situation. There are good reasons to define expertise as the competent performance of specific practices within the domains of specific cultures (Collins and Pinch 1998). But expertise also needs to be recognized, called on, or at least acknowledged by other actors. This means that expertise is about both competences and performances in a wider process of interactions, including all actors assessing the knowledge at stake (be they peers or outsiders). Thus, expertise is achieved by carving out and controlling a particular knowledge area, developing real and substantive expertise, and then asserting one's authority as the provider of relevant knowledge for problem-solving within this area, that is, by developing a relational authority for the real expertise (Lidskog et al. 2010). Unfortunately, current discussions of what expertise is and how to assess it are often shaped by an unproductive situation of trench warfare, and the STS community has difficulty transcending the oscillation between opposite poles (Collins et al. 2017; Jasanoff 2017: 278; see also Jasanoff 2003; Wynne 2003).

Our conclusion is that the relational and substantive views could fruitfully be combined. Expertise is about social relations, but it is also about specific competences. Specialized knowledge is real; it is something that some people have and others lack. But this competence is acquired through socialization and training, which take place in partic-

Table 1 ■ Overview of the Relational and Substantive Views of Expertise

	Relational view	**Substantive view**
Expertise	An attribution to a collective (outcome of negotiations)	A property of a collective (specialized knowledge)
Basis	Social relations (labeling)	Appropriated skills (knowledge)
Problem	Recognition of expert status	Possession of expert ability
Critique	Not related to the epistemic	Not related to the social

ular social contexts and within specialized groups. Only within certain contexts and as part of a particular group can this specialist competence be acquired. Hence, the criterion for assessing who has expertise is a sociological criterion of group belonging; this criterion, however, is not in opposition to specialized knowledge but is rather a prerequisite for it. In this sense, group belonging precedes knowledge production in the sense that it is what makes knowledge production possible.

Becoming an expert implies acquiring expert knowledge, and this always takes place within a community of specialists. Knowledge and skills are acquired by being part of a specialist subculture with its apparatus for socialization. This means that the membership (the social relation) per se is not important, but the practices performed by and within a specialist community are. Simultaneously, membership is decisive because it is a necessary condition for acquiring skills and competences. To be a skilled scientist, you need to be part of a research group (such as in a laboratory), rather like how you need to be part of a football team to become a good player.

However, it is important to note that the boundaries between insiders and outsiders are not always sharp; socialization is the key, which means having long experience of practices performed within collective

Table 2 ■ Overview of Three Views of Expertise

	Relational view	**Substantive view**	**Group belonging**
Expertise	An attribution to a collective (outcome of negotiations)	A property of a collective (specialized knowledge)	Skillful practices
Basis	Social relations (labeling)	Appropriated skills (knowledge)	Socialization into an expert group (thereby appropriating skillful practices)
Problem	Recognition of expert status	Possession of expert ability	Discerning groups that perform skillful practices
Critique	Not related to the epistemic	Not related to the social	Newly synthesized view, not yet criticized

communities. In Table 2, we present our proposed synthesis of the relational and substantive views, which we call "expertise as group belonging." According to this view, skills and knowledge (expertise) are always developed in relation to and conditioned by specialized communities. Even if STS has nothing specific to say about environmental expertise, its general understanding of expertise is of great relevance to anyone trying to understand the role of science in identifying and responding to environmental problems. Next, we give some examples of steps in this direction, showing how environmental sociology can be enriched by an STS-influenced understanding of expertise as having to do with group belonging.

Analysis: Environmental Sociology Meets STS

In the discussion of environmental sociology, we have seen that all three theories seem to assume a macro-sociological transformation concerning the changing role of science, including a differentiated view of science. In this section, we sort out some important differences between environmental sociology and STS. In this effort, we focus on three different contributions from STS, concerning an understanding of expertise that can enrich environmental sociology theories.

First, theoretical work on science and expertise within STS does not presuppose or distinguish in advance between different kinds of scientific knowledge. In contrast to the dichotomized views in environmental sociology, STS forcefully argues that any analysis based on sharp and programmatic distinctions will conceal what actually takes place in practice. A closer empirical look will always reveal many tensions, negotiations, and conflicts about how science should be used and developed in relation to other actors and possible users, and that these are handled by groups of experts. Obviously, actors and knowledge (expertise as group belonging) can be of different kinds, but an analysis should not begin from fixed and assumed macro categories, such as production and impact science, or simple and reflexive modernity. Instead, the object of analysis should be how differences between actors and knowledges are developed and manifest themselves in practice. Distinctions can of course arise as the result of an analysis, but should never be the starting point (Latour 1987).

As stressed earlier, different kinds of knowledge and science have to do with group belonging. It is easy to imagine groups of experts who develop knowledge in close connection to industries with the aim of

increasing production, just as it is easy to imagine other groups that take part in regulation processes and therefore focus on impacts and how to manage trade-offs between economic goals and environmental consequences. But, in STS, these are empirical questions to study in practice, not assumptions to be made in advance about general macro-sociological trends or a specific quality of science. In addition, we should always be sensitive to the existence of hybrid groups of different kinds and the relationships between certified and uncertified experts and expertise. To conclude, if different kinds of science exist, they are the result of group socialization, actors' strategies, and structural conditions. This initial STS contribution could be viewed as supporting a relational view of knowledge, but it also includes the fact that expert groups in the making always possess (specialized) knowledge, which supports the process of group formation. This means that knowledge and group identities are coproduced.

Second, in environmental sociology, there is a hope for a societal shift, and this is sometimes understood as a consequence of an internal and predetermined development. The theories of risk society and ecological modernization argue that we are moving toward a more reflexive society, in which ecological consequences of human action (not least industrial processes) are acknowledged and acted on. The theory of treadmill production, however, explicitly focuses on power conflicts and is therefore less naive about societal change. Its focus on power conflicts is in line with STS scholars' interest in actors and their strategies, which are seen as the main cause of a shift from one societal situation (or configuration) to another. The development of new organizations, new interests, and new roles for scientists and experts—and, accordingly, new and different kinds of science—is not taking place spontaneously or automatically but needs to be seen as a process that should be analyzed in detail, especially when it comes to what role science plays in such shifts. For STS scholars, science is about possessing knowledge in relation to group belonging. Analyses of the role of science in societal change should be able to address both these aspects simultaneously, that is, study them as coproduced.

Third, an emphasis on processes and practices does not necessarily imply a micro-sociological focus. At first glance, STS seems to be mainly interested in micro-sociological analysis (in the sense of actor-oriented research concerning how particular actors develop strategies and interact, including how knowledge skills are performed and used), whereas environmental sociology seems to be mainly interested in macro-sociological and structural analysis of societal transformations. A closer ex-

amination, however, reveals a much more complex picture. STS focuses on processes, practices, and actions and is therefore a vital alternative to any approach that assumes a static view of society (irrespective of whether it concerns particular situations or society at large). But environmental sociology is also interested in actors, the difference being that the theories of environmental sociology elaborate their analyses around the difference between two different types of societies.

STS scholars see this as an unnecessary assumption that risks concealing what is of sociological interest. Instead, all social transformation is connected to actors, including not only groups but also institutions—as is clearly shown in Jasanoff's (2005) studies on policy cultures, which she calls "civic epistemologies"—which differ between nations. These differences are connected to specific national legislation and styles of regulation, including the interaction between the state and civil society, that is, scientific experts, bureaucrats, politicians, and NGOs. But when studying these macro and meso structures, as well as the role of science in relation to specific (environmental) issues, STS always focuses on how groups of experts navigate and perform their competences in a particular social context. This implies interaction with other groups concerning both knowledge content and actor strategies, and can include conflicts, negotiations, adaptation, and change. In addition, it implies performativity, leading to changes in legislation, regulation, and policy cultures.

Thus, STS ideas about expertise—who possesses it, what it can do, and what relations and interactions connect it to other competences, actors, and fields—should always be emphasized when studying societal transformations and the importance of scientific expertise in modern societies. These general ideas about the prominence of science that we find in environmental sociology can, with the help of STS, be fleshed out with specific contents and ideas for empirical research.

Conclusions: Expertise as Recognized Competence

To summarize, whereas theories of environmental sociology focus mainly on societal transformation, and ascribe a prominent (and programmatic) role to science in this transformation, STS is instead interested in the role of expertise in particular situations and for particular issues. By including knowledge from STS, environmental sociology can avoid having either a naive belief in what science can do, close to scientism, or the opposite view, which reduces science to merely serving

social interests (powerism). By focusing on processes that shape expertise and how expertise shapes group belonging, we open up the role of scientific expertise for empirical investigation.

This should not be interpreted as a call for environmental sociology to uncritically appropriate ideas from STS. As shown earlier, STS also has remnants of a polarized and unproductive conflict between scientism and powerism. When stressing an interpretation of expertise as the possession of knowledge and skills in relation to group belonging, a sharp distinction between these poles becomes an unnecessary assumption and risks obscuring the crucial role of expertise. Instead, the task becomes empirically to explore how environmental experts act and with what kinds of knowledge, as well as how they interact with other groups in society and in relation to wider policy cultures and societal interests.

Expertise is about both competence and performance; it is about substantive knowledge, broad recognition, and social relations. This means that expertise concerns specialist competence, but this competence is achieved through socialization and appropriation within particular groups and contexts, and needs to be recognized and affirmed by others. An implication of this view is that the role of environmental expertise cannot be programmatically stated in general theories of social transformations. Instead, there is a need for actor-oriented, empirical research that focuses on how actors navigate in particular contexts and what implications this has for social transformation and social reproduction. It further means that environmental expertise cannot be reduced to either scientism or powerism. Therefore, we propose a synthesis that transcends this polarized conflict, which we call expertise as group belonging, implying socialization in skillful practices.

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