

Ways of Knowing: Implications for Public Policy

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Introduction

In the face of what seem to be insurmountable differences on one issue after another such as immigration, global climate change, homeland security, and health care, confidence in conventional categories for capturing what is at stake and processes for negotiating agreement are eroding. Analytical formulations fail to adequately comprehend the entirety of differences that divide opposing parties and strategies for forging agreements fall short. The purpose of this paper is to explore what is meant by “ways of knowing” and how ways of knowing can assist in identifying the roots of contemporary conflict and difficulties in designing public policy that can produce effective action.

We join numerous other scholars in moving beyond self interest as the fundamental motivator of political action, and beyond bounded rationality as the primary mode of reasoning. Ways of knowing is an inclusive and flexible concept that embraces many alternative formulations of political motivations and analysis styles. Advantages of this broadened conception include the possibility of more effective mechanisms for avoiding, transcending or bridging disagreements that threaten gridlock or that produce ineffective or damaging policies. To advance this argument, we first provide a practical description of what we mean by “ways of knowing,” as it might be applied to analysis of policy issues. We then explore the various attempts to understand the multiple dimensions in ways of knowing, drawing on a broad literature from philosophy, psychology, evolutionary theory, physics, cognitive psychology, and other fields.

The next sections of the paper illustrate with a variety of specific examples how ways of knowing adapt to new circumstances, diffuse to gain prominence, and blend with others to

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produce new ways of knowing and to offer explanations for cooperation and collaboration. We then turn to public policy analysis, how ways of knowing build upon the existing literature, and how this perspective can lead toward more cooperative policy and more effective action.

“Ways of Knowing” Public Policy Issues

A way of knowing is how one interprets the elements in a policy space and makes sense of the relationships among them. It is a narrative or story that holds all of the pieces together in a relatively coherent way. The elements include people, objects, ideas and relationships among them. This builds on Latour’s (2005) actor network theory (ANT) and the idea that things in a policy space have agency, just as humans do. For instance, the I-35W bridge that failed in summer of 2007 in Minneapolis exerted “agency” in that its collapse caused a series of physical and social events, and it galvanized social, economic, and political action locally and nationally. Physical objects and processes, such as climate, watersheds, scientific studies, airplanes and other “objects” are capable of “actions” either overtly as in the collapse of a bridge or “agency” in the sense of consequences that require human response and interpretation. Objects like microscopes and telescopes make available information that alters human perspectives.

A policy space is the collection of elements perceived to be associated with some policy issue or problem. Imagine a simple “uncluttered” policy space such as the one shown in Figure 1, which might be the elements a person associated with drug use, circa 1880, before the U.S. had banned any narcotics. The elements in this space include people who use drugs, producers, a few products that were considered “drugs” at the time (opium, Laudanum, and alcohol for example), clubs, recreation sites where drugs were used, rituals, and religious ceremonies. Some of the elements are blue – indicating positive value constructions; and others red, indicating a negative construction. Some are large suggesting greater prominence in the policy space. Some are located centrally and others at the periphery indicating their centrality to the perceived issue. It is important to note that non human things, like the drugs themselves are part of the policy space.

Figure 2 shows a cluttered policy space – more like the drug issue at the present time (although oversimplified) and contains many more elements. The policy space now contains several different kinds of drugs, distinctions among different kinds of users, scientific studies about the cause of drug use, health studies about the impact of drugs on health, prisons, treatment programs, federal, state, and local drug laws and enforcement policies, religious doctrines, recent events, rhetoric such as “the war on drugs” and so on. The issue space, as we envision it, has grown enormously because many more elements have become enrolled as relevant and some are greatly enlarged reflecting the growing salience of some elements associated with the issue. What figure 1 and 2 do not show (and is depicted in figure 3) are the networks of people, coalitions, actors, rules, ideas, rationales, causal linkages that are instrumental in issue expansion that cluttered the policy space.

For explanatory purposes, it is useful to begin at the level of the individual. Figure 3 introduces ways of knowing (the ovals) and shows how a hypothetical person might interpret this policy issue. The four ovals represent four different ways of knowing the issue that one person might have. Each way of knowing embraces some of the elements, but not others; and there is overlap among these. Some elements take on the same interpretation in two ways of knowing, whereas others have a different interpretation from one WOK to another. (This possibility is illustrated by having two of the elements duplicated but showing them in different colors in

Figure 3). If this is drug policy, for example, in the way of knowing on the left, drugs are viewed as a private choice and is relatively benign toward drug users and malevolent toward government enforcement. This might be the way of knowing the policy issue when thinking about the person's opposition to government control of personal freedoms. It might place at the center propositions approved by state voters permitting medicinal use of substances and federal interference with such laws. The second circle (from the left) is another lens the person may lay over these elements. In this one, he or she envisions one bright red (dangerous) element – perhaps crack cocaine as an addictive drug. This might be the way of knowing the person employs when considering the costs of drug abuse, the expenditure for health effects, increase in crime, and the ruined lives of addicts. The third, smaller oval on the diagonal might reflect the person's way of knowing when associating the drug issue with his or her own children and their vulnerability to drug pushers around the school. The fourth way of knowing also is benign (no red elements in it), but different. Perhaps this is the person's way of knowing the drug issue when reflecting on his/her own experience with marijuana, alcohol, and tobacco when growing up. A person actually holds all of these WOKs at one time, even though some have conflicting interpretations of a particular element. A "meta" WOK would be all of the ways of knowing that one person can entertain about a policy space, such as that shown in Figure 4. A person is always open to consolidation or replacement of ways of knowing within the "meta" WOK. From the point of view of the elements in the policy space, a meta WOK is all of the ways of knowing that can be imagined about it, such as that depicted in Figure 4.

If individuals can (and surely do) have multiple ways of knowing a single issue, then the ways of knowing the issue multiples exponentially when thinking of many people bringing their own way of knowing to the policy space. Figure 4 shows many possible ways of knowing. Because people are social and interact with one another, and because events happen that must be interpreted, certain ways of knowing attract many adherents and some elements must be common to most ways of knowing. One of the important research questions that this framework generates is the process through which some ways of knowing become widely shared, why some elements, variously interpreted, are common to many ways of knowing, and other elements are peripheral and marginalized.

There are several critical points that distinguish a way of knowing from similar concepts in other policy frameworks. First, even though a particular way of knowing an issue inscribes some elements and not others, it is a mistake to think of WOK as a static concept. A WOK, when applied to a policy issue, is fluid, and in fact easily changed into some other slightly different variant as new elements may be moving into or out of the space, or take on a changed image or prominence. A WOK is constantly being re-enacted in the human imagination and in human practice – a point we will return to later. When a new element such as a new drug, a new source of drugs, or a rash of drug-inspired crimes, or the like enters, the multiple ways of knowing all have to adapt to that new element by positioning it ("enrolling" as Latour calls it) or deciding that it is not relevant and letting it hang outside of their WOK. The attention issues of Baumgartner and Jones (1991) are relevant here as at one time people's attention may focus on some of these elements and at another time, their attention may shift elsewhere. A person's ways of knowing are far more fluid, flexible, elastic, than belief systems or self interest or the presumed dominance of institutional structures on human perceptions.

A WOK is not the same as interests. A way of knowing need not reflect a utilitarian logic or be motivated by self interest. While it is possible that some people sometimes view an issue this way, many others do not, and may impose very different lens upon issues that

emphasize such diverse influences as intuition, ethics, spiritual guidance, aesthetics and many others.

A way of knowing, as we use the concept, has to be focused on something, that is, an issue or a problem or an element within the policy space. A way of knowing cannot exist on issues that are not recognized. Further, a way of knowing is not a set of core beliefs or ideology from which a person deduces how to interpret a policy space (as is the assumption within the advocacy coalition framework). Instead, we posit that the issue space comes first, and a person first examines it “on the ground” for what it contains and what it means. Although true that what the space contains is influenced by the person’s repertoire of ways of knowing, the elements in the space may be impossible to ignore. In a sense the elements (people, objects, ideas and relationships) are “shouting out,” saying: “make sense of me.” Ways of knowing are the sense-making.

The framework we are developing does not apriori assume what patterns of relationships among which people and objects an analyst should look for within a policy / issue space. The analyst does not look for coalitions, or competition, or cooperation, or self interest, or public interest, or any other particular theme. A policy space is not assumed to contain competitive ways of knowing, nor is it assumed that the variety of perspectives are in cooperative relationships with one another. These are empirical issues. Some people and groups engaged in a shared WOK may be more open and collaborative and others more inclined to exclusion, but the possibility of each remains viable.

A way of knowing can be distinguished from knowledge in that it emphasizes the active dimension of knowing a problem or the way they are experienced, investigated, and acted upon (Feldman, Khadadian, Ingram and Schneider, 2006). People come to a way of knowing through many different pathways, through experience, through personal contacts, through opinion leaders, through media and other means that may make use of all human senses and social relationships.

Some ways of knowing are more visible and acceptable than others because they are associated with prestigious people and institutions or contain attractive technologies. One way of knowing an issue may emphasize a causal theory where people and things are tightly linked by some logical construct. But another WOK of the same issue may see these associations only loosely connected. All the elements in a WOK carry images, many of them value-laden and associated with approval or disapproval. A WOK on a particular issue may focus mainly on these value-laden images instead of causal theory. A way of knowing may be primarily a moral or value map in which people and things are given positive or negative social constructions and a position in society. Another WOK may rely mainly on aesthetics in which people and things are known through perceptions of beauty and changes in the way of knowing occur as creative techniques and talents emerge. Still another may rely primarily on a religious lens and interpret the elements in the policy space in accord with one or another religious doctrine.

A way of knowing may grant prominence to a core text or source of authority, and to a particular kind of language and discourse. Differences in WOKs among people and groups often may be traced to different sources of legitimacy such as science, religion, cultural stories, symbols and artifacts. The language of a way of knowing may reflect the language of a particular scientific or professional discipline, culture, religion or method or reasoning.

The Multiple Ways of Knowing

A great deal of research supports ways of knowing as plural, not singular, and demonstrates that understanding multiple possibilities is useful to social science and policy analysis. Scholars from philosophy to physics have sought to describe and categorize the different ways of knowing through which human beings attempt to make sense of reality. These approaches to ways of knowing are such a marked departure from those that dominate traditional political analysis that it is worth examining briefly how various disciplines have conceptualized this idea.

Foundational WOKs

Psychologists typically categorize ways of knowing into two to four categories. For example, Huitt (1998) says there are four ways “by which we can ascertain the truth of something.” –

- trust in the source (a person or core text, such as the Bible or Talmud or a scientific study);
- intuition or personal inspiration (“guided” to truth through insight)
- personal experience (direct experience)
- reason or thinking logically and critically about the first three.

Others (Salmon, 2007) divide ways of knowing into three categories: scientific (rational, experimental), phenomenological (intuitive, experiential) and spiritual (meditation / contemplation).

One of the most well-known portrayals describes ways of knowing in terms of “left” brain and “right” brain:

"You have two brains: a left and a right. Modern brain scientists now know that your left brain is your verbal and rational brain; it thinks serially and reduces its thoughts to numbers, letters and words... Your right brain is your nonverbal and intuitive brain; it thinks in patterns, or pictures, composed of ‘whole things,’ and does not comprehend reductions, either numbers, letters, or words." (Bergland 1985:1).

Psychological perspectives such as these typically assume that a person draws on all of these, even as he or she might favor one over the other. Ways of knowing are multiple.

There are even broader conceptualizations, such as those described by a “way of knowing” web site that is attempting to develop a metaphysical “theory of everything” <http://www.kheper.net/index.htm>. They posit eight ways of knowing: science (experimental), philosophy (abstract mind), rationalism (not accepting realities that are not immediately evident); religion (faith in divine revelation and social tradition), mysticism (experiences based on spiritual techniques), esotericism (intuitive speculation on cosmological world-views); occultism (using psycho-physical techniques to access hidden realities, gnosis (innate wisdom and understanding).

Piet Hut and Steven Tainer at the Princeton Program for Interdisciplinary Studies focus on two distinctive ways of knowing -- science and contemplation (see [Program for Interdisciplinary Studies](#).) and attempt to show that each includes the other. Traditionally, contemplation involved a master guiding a student through a decades long path, but Hut and Tainer argue that scientific progress depends on insights from contemplative thinking—

understood as reflection, thinking, meditation. Thus, they are searching for a way to reconcile science and contemplation.

What does it mean to really know something? Science has discovered an empirical and multi-generational way of obtaining verifiable knowledge in a limited domain of application. But what about areas traditionally assigned to ethics, and other topics not, or not yet, in the domain of what science studies? How do other ways of knowing relate to the way of science? Specifically, how do science and these other ways of knowing address questions of 'what is' in the most fundamental sense? How can we approach contemplative traditions that in essence go beyond socio-cultural frameworks and beliefs and also explicitly emphasize seeing, learning, and hence knowing (vs. mere sensations or experience of one sort or another)? What is the relevance of explorations in these areas for human concerns, values, and modern life? Hut and Tainer
<http://www.waysofknowing.net/> .

These ideas are especially relevant to the movement in science and technology studies to bring greater reflexivity into scientific practice for the purpose of directing science more specifically toward public interest and social justice goals. The logic is that if reflexivity (contemplation about the social justice and public interest impacts of the science) can be introduced further upstream in the scientific process, the goals of science will shift toward producing knowledge to serve public interest and social justice outcomes.

These topologies still are not all-encompassing as studies of indigenous populations suggest that their ways of knowing differ from western traditions because they are place-based and evolve over long periods of time in a relatively insular fashion handed down through oral traditions. (Center for Indigenous Knowledge (<http://www.cfiks.org/>)). Culture is key to the thinking of Aaron Wildavsky, who argued that preferred ways of life divided people into different solidarities—those who orient themselves in terms of hierarchy, entrepreneurship, egalitarianism, and fatalism. The grid/group framework advanced by Wildavsky and his associates was based on peoples' preferences of how strongly they believed group associations should be and whether power within groups should be widely dispersed or concentrated at the top (Thompson et al. 1997). It is not necessary to embrace the notion that there are only four basic ways of relating-- hierarchy, entrepreneurship, egalitarianism and fatalism-- in order to agree with Wildavsky that preferences about the ways in which people connect themselves to one another are powerful influences upon perceptions and ways of organizing reality. Some people's cluster of ways of knowing across a variety of policy spaces may indeed reflect a preference for one or another of these, but that is an empirical question.

Rationality and its Humanistic Alternatives

A way of knowing framework leads to considering multiple rationalities. The dominant paradigm for analyzing policy issues in the social sciences has been the narrow rationality paradigm, or its close cousin, bounded rationality. In viewing the policy space noted above in Figures 1 through 4, a rational analyst would focus on only a small number of elements – the problem, its scientifically-established causes, and possible solutions. Using a model of benefits, costs, and probabilities, several solutions would be compared and one accepted as being the best means to the desired ends. The requirements of rational thinking include full information,

accurate estimates of the probabilities that the benefits actually will be received and the costs actually incurred. Assuming that the possible benefits are the same in each possible solution, the utility of each outcome can be assessed and the one with the highest utility chosen. If the benefits or costs are not in the same units (that is, one solution might maximize safety from floods and the other might maximize economic development), then one also has to know what the comparative value of safety from floods is in relation to economic development. Bounded rationality has a similar logic, but the person is expected to stop when he or she reaches a solution that is satisfactory, and some versions of rationality embrace altruism as a possible goal or benefit. In any case, either of these forms of rationality dramatically restricts the policy space and blocks other ways of looking at a problem, as there is no formal role for any of the other WOKs. Figure 5 shows how an analysis that focuses on benefits and costs selects only a few elements in the policy space and blocks many others that could have been taken into account if other WOKs were considered legitimate.

Feminist theorists have provided considerable leadership to western academic traditions in attempting to describe and legitimate ways of knowing that differ from the rationality project and introduce the possibility of multiple rationalities. For example, Belenky (et al) argue that some learners are more connected or relational whereas others are analytical or separate. The first places knowledge within a context, often a personal one; the latter reasons separately. Learning methods that work best with connected knowers tend to be collaborative. Learning methods that work better with separate or objective learners are grounded in presentation of facts. From their research, they eventually developed five ways of knowing: silence (reliance on authority); received knowledge (listening to others) subjective knowledge (listening to oneself); procedural knowledge which is either connected or separate and an integrated mode of earning that integrates more than one of these.

New developments in cognitive psychology and evolutionary theory provide ideas on how scientific knowledge might be integrated with alternative forms that focus more on humanistic insights. A particularly innovative idea has been put forward by David Thacher (2007) in his framework for incorporating emotion and other humanistic frames into risk analysis. His basic point is that the “heuristic biases” especially the “availability” heuristic have been blamed for the poor record that most people have in accurately estimating the probability of an occurrence. The availability heuristic suggests that people overestimate the probability of something if it is more immediate, more vivid, more dramatic. Yet, the metric used by standard risk assessment is too narrow.

Thacher argues that cost benefit analysis and risk analysis systematically underestimate the value of the item itself. Thacher’s insight is that experts systematically misvalue things because they do not share the experiences of ordinary people. Thacher called this the “experiential gap” and contends that narrative understandings from stakeholders is needed to overcome the differences in experiences between policy makers and the people affected by the policy. The bottom line in Thacher’s argument is that intelligent governance needs to rely both on humanistic (imagery, experience, vicarious experience, empathic understanding) as well as rational/instrumental understanding.

Empathetic ways of knowing and their engagement in policy making is and should be important. Paul Slovic conducted a study that contrasted the amount of money raised by ads, one of which featured just one starving child in Africa and the other that showed the same starving child, but simultaneously presented data on the hundreds of thousands of other children just like her who were starving. There were more funds raised by the ad that just featured one little

starving girl with no information on how many more there might be. Calling this “numbed by numbers” Slovic attributes the finding to the “dance of affect and reason” in decision making. Empathic ways of knowing are important to deliberative democracy. Robert Goodin (2000) contends that the way to do deliberative democracy when it is not possible to have all people present in a conversation is to have them present in terms of “empathic imagination.” “We need to make them “imaginatively” present, he says (Goodin, 2000:83). The WOK framework fully embraces the possibility of an “empathic” way of knowing and humanistic reason in making sense of the elements in a policy space.

Communicative rationality – a concept increasingly found in the planning literature on collaboration – suggests that there is no way to reach an instrumentally rational decision in most policy situations due to the complexity of the situation and the multiplicity of values that people bring to it (Dryzek, 1990). Instead, communicative rationality emerges from discourse where people reason together to arrive at the best possible collective (public) decision. Habermas argues that groups should strive for the “ideal speech situation” in which all players are at the table, there is no power or status differentiation, and all have the information available to participate equally in the discussion. The decision that emerges is the one consistent with the best arguments – not the one that advantages the most powerful or the most prestigious. Communicative rationality is still another way of knowing the elements in a policy space, as it embraces the elements held within other ways of knowing; insures that all of these values are present in the discourse; and suggests a way of proceeding from problem to solution that is grounded in discourse and genuine attempts to reach the best collective solution, (Habermas 1975) and others who write of communicative rationality generally do not reference empathy or relational learning, but it may well be that these human characteristics are what makes communicative rationality possible.

A key issue in the study of rationality is the extent to which people conceptualize or take into account public interest as they interpret the elements in a policy space. This is a highly relevant issue for our framework, as people may adopt ways of knowing in which the narratives and linkages are made on the basis of self interest or more social and altruistic orientations, or some combination. Social science emphasis on competitive self interested behavior has long been buttressed, if not drawn from, evolutionary theory. For decades, most evolutionary theory contended that natural selection favors competition and self interested behavior. Thus, the tendency toward conflict, competition, and rational self interest found in the political and economic systems was thought to be “natural” and if not, therefore, “good” at least, immutable. Contemporary evolutionary theories, however, are challenging these ideas. Stewart (2000) contends that the direction of evolution is toward increasing cooperation between living organisms.

“As evolution proceeds, living things will increasingly coordinate their action for the benefit of the group rather than acting only in their own individual interests. Cooperators will inherit the earth, and eventually the universe. (Stewart, 2000:9)

Robert Wright (2000) in *Nonzero* similarly argues that evolution has favored species and societies that are able to design nonzero games and able to replace zero sum games with nonzero ones.

Other research recognizes the important role that identity and image have in decisions, and the effect upon empathy of seeing some people as the “other”. People, especially in foreign

policy issues, are prone to exaggerating their side's strength and degree of control over events. At the same time they overstate the evil intentions of adversaries, they assume that their adversaries will understand the peaceful intentions of their own behavior. These studies show that both sides tend to be overly optimistic of their likelihood of winning and that they also systematically disvalue offers made by the other side, compared to how they valued the offer when they thought it had been made by their own side. (Kahneman and Renshon, 2007:36). Our own previous work (Ingram and Schneider, 2005) emphasizes how important social constructions of the "other" as deserving and entitled or undeserving and deviant is to policymaking. Sabatier (1985) has identified this type of result in numerous environmental conflicts and has named it the "devil shift."

In addition to these foundational ways of knowing and the many versions of rationality, there are several other prominent categories found in the policy literature or applicable to public policy. Some of these emphasize the distinction between local knowledge and general (scientific or theoretical) knowledge (Yanow, 2004). Stone (2002) writes of two primary ways of viewing society: as a market (with individualism, self interest, competition) or as a polity (with community, public interest, cooperation). Environmentalists propose two ways of looking at the planet – as something to be sustained or as something to be exploited. There is a long tradition of categorizing human needs in terms of such things as subsistence, protection, affection, understanding, participation, and identity (Max-Neef, 2001). In a ways of knowing framework, there are multiple categories that may be relevant.

How do WOKs diffuse, change and gain prominence?

Ways of knowing expand, change, and are diffused throughout a population and culture through a process of "enrollment" in which new elements in the policy space become adopted into a way of knowing and reconciled with other elements, or perhaps even prompt an entirely new way. As a result, the original way of knowing has been changed, even if only slightly through the enrollment of another element. As different people and groups become aware of a way of knowing that they might not have considered before, they seldom import it exactly as it was but instead reinterpret meaning of the elements in the policy space to suit particular contexts and their pre existing predilections. They also take up ways of knowing that are inconsistent with one another. Many people compartmentalize their ways of knowing, and perspectives on one issue are often a poor predictor of the way of knowing about other issues. Additions to existing ways of knowing or the development of a new way of knowing can be galvanized through new technology that promotes changes in perspectives (telescopes, microscopes, DNA analysis and the like). Ways of knowing can fall into disuse as people, ideas, and things in them become antiquated or discredited. For instance, whole systems of racial classification based on kinds of racial combinations, and variations in quantum blood lines fell into disfavor as many kinds of discrimination became unacceptable and unconstitutional, although DNA analysis has revived interest among people about ancestral origins.

Plasticity, flexibility and change in ways of knowing imply a constant readjustment. While some ways of knowing may be guided by self interest that change through narrow calculations of gains and losses, other ways of knowing embrace the complexity of forces including physical objects that may shape the directions of knowing. While belief systems and ideologies dividing people may be deeply embedded and change rarely and marginally, it is possible for groups and individuals holding such strongly anchored beliefs about some issues, to also enroll in other ways of knowing related to other issues that are subject to alternations that

facilitate coming to agreement with others irrespective of ideological differences. Moreover, it is possible to uncouple ideas and objects from a way of knowing and adopt others. Such change can occur through experience and interaction or discourse.

To focus on ways of knowing means a shift in attention away from research aiming to identify the constants that have the strongest predictive power, such as parties, ideologies and core values. It also means moving beyond an understanding of processes like path dependence / punctuated equilibrium that mainly emphasizes either stability or sudden and disruptive change. The analytical focus shifts to the emergence of new ways of knowing or new ways to bridge pre existing ways of knowing. Rather than constants, the analysis instead looks for irregularities and variations that previously may have been marginalized as noise.

Ways of knowing embrace both stability and change. While ways of knowing become imbedded in institutions, even the most stable ways of knowing undergo processes of defection and enrollment. Groups, people, and even objects attach or detach from a way of knowing an issue area depending upon a number of factors, many of which have been thoroughly explored in the policy literature. As Baumgartner and Jones (1993) observe, one of the fruitful conditions for change occur when existing ways of knowing fall short of adequately explaining or acting on some problem. Another productive focus for change comes when elements, that is people, ideas, objects and other elements, in several ways of knowing overlap and is shared by different ways of knowing (Feldman, et al, 2006). This sharing occurs even when elements held in common are perceived in very different terms.

Cooperative / Collaborative WOKs

Looking at policy issues from a way of knowing perspective opens up new ideas about how cooperation and collaboration can occur. A useful illustration is the issue of waste management. One perspective, which might be called the “garbage removal” way, sees the issue mainly in terms of waste receptacles, haulers, land fills, incinerators and perhaps many other people and things. The ‘waste reuse’ way of knowing involves many of the same elements, but some that are viewed as solutions in the disposal way (i.e. land fills and incinerators) are viewed as problems that need to be largely replaced by recycling centers and processors for reuse. By themselves, each of these different ways of knowing encounters problems that lead to openness to change. Landfills run out of space and generate pollution problems as do incinerators. Similarly, while in principle the ‘waste reuse’ way of knowing would eliminate landfills and incinerators, the greater part of refuse simply can not yet be turned into anything useful at anything approaching a reasonable cost. While the larger story of the process by which both ways of knowing have come to co-exist and even to share many elements is too long and complex to be pursued here, it is accurate to conclude that waste management issues are approached through a shifting blend of these differing ways of knowing, and that the field continues to shift as new technologies develop to reduce packaging, reduce costs of recycling, and design more recyclable products. Adherence to just one or the other narrow ways of knowing can be expected to wax and wane as new problems are recognized, such as the disposal problem of water bottles and plastic bags. Crucial to the situation, however, is that the various ways of knowing the issue contain common elements and enough trust of others in the domain that cooperative possibilities exist.

At this point it is useful to return to the same policy space depicted in figure 6 and to observe the way in which one way of knowing, that is depicted in the vertical oval second from

the left, can overcome divisions and allow for meaningful action rather than deadlock (see Figure 6). Consider the case of urban rivers. The dominant ways of knowing this issue are flood management, ecological restoration, and economic development (Wessells 2004; see also Lejano and Wessells 2006, Wessells 2007). These are illustrated in Figure 6 by the circles. Urban rivers, the bright large stars, are a shared element across these three ways of knowing, but with very different images (portrayed by their different colors) that lead to divergent perspectives on possible solutions. Urban rivers have been plagued by capture by one perspective or deadlock between different perspectives. Most flood managers know urban streams as flood hazards threatening to people and property, and have concentrated on physical solutions to runaway waters and propose control through channelizing streams and building levees. Ecological sustainability, a critical voice long ignored, know streams as part of nature, and floods as a natural process essential to ecology for restoring nutrients to streams, refreshing riparian habitat and recharging ground water aquifers. Economic development officials know rivers as a desirable adjacency for new real estate investments, providing recreational amenities, aesthetic benefits, and proximity to nature within the city. Watershed parks, depicted in the vertical oval, include elements from all the other ways of knowing without disturbing associations with many elements that other ways of knowing separately include. This inclusiveness is a strength that allows the watershed park way of knowing to lead to meaningful action despite continued divisions.

Collaborative governance of watershed parks engages each of these ways of knowing by transforming floodplain parcels into sites to serve multiple uses. While flood protection remains an important aspect of plans, land left vacant of structures to accommodate seasonally swollen rivers that perform ecological services, also are designed to include walking trails and bike paths as well as water based recreation. At the same time they provide new economic development opportunities, as what previously were little more than open sewers become attractive amenities. As with the waste management example, each perspective got something they couldn't have otherwise. Flood managers got to manage floods; flood plains were turned into natural systems with trails and bike paths and water based recreation; and the river and floodplain became sites for economic development possibilities around recreation. Some of the elements for one WOK were problems for another, so the potential for cooperation was excellent, provided that each WOK could engage in empathic thinking and see or allow others to see the issue in more than one perspective.

The introduction of a new element in a policy space can also become a vehicle for collaboration among different ways of knowing. Figure 6 is illustrative again, but in this case the large star is prisons. In Colonial days, regardless of ways of knowing crime, there were few options for treating criminals: corporeal punishment, banishment, execution, or victim revenge on the offender. Prisons – which are both a new technology and a new policy design-- had been introduced in England and were being explored in the New World. Prisons opened up the possibility for cooperation among the various WOK to incorporate the new element – prisons – into the policy space and to support and embrace this new technology or to reject it. For those involved in issues of governance in which budgets and maintaining order are major concerns, prisons were a way to make money (through prison labor) and stop crime at the same time. Others saw the issue as a matter of business and saw treatment of criminals as a commercial opportunity; money could be made by using prison labor and then selling the products. Builders and construction contractors saw the brick and mortar opportunity of prisons, and in this case is the vertical oval that ignores many of the other elements associated with the usual ways of

knowing crime. Humanitarians, who differed from others in not adopting a utilitarian way of knowing, saw the issue in empathic and religious terms. Criminals were understood as unfortunates who could be reformed through prison and solitary confinement, as that would give them time to reflect and think on what they had done. Prisons, in ANT terms, became “enrolled” that is, accepted, into four very different ways of knowing crime issues in Colonial America. The principle here again was that something which was a problem for everyone (people who broke the law), could become an opportunity for government, commerce, builders and humanitarians.

DNA analysis shows still another route to cooperation. As it became scientifically possible to test for DNA, and became established that each person’s DNA is unique, this analysis came to be used by defense attorneys to exonerate persons on death row. Attorneys general across almost all states – most of them strong supporters of the death penalty – realized the devastating effect that executing a person later found innocent by DNA testing would have on their ability to justify the death penalty. Many converted this “problem” into an “opportunity” by proactively offering to conduct DNA testing for everyone on death row for whom DNA evidence was still retained. In this case, a new technology – DNA -- disrupted established ways of knowing and produced agreement between fiercely competing perspectives on the importance of (at least) testing everyone on death row.

How are new WOKs developed?

The ways of knowing framework is progressive and inclusive in that it recognizes that most people, most of the time, can bring a wide range of perspectives to bear on a particular policy issue. When new elements are introduced, old ways of knowing may give rise to completely new ones through reframing so that the policy space contains different participants, ideas and objects.

Consider the example of drug policy a decade ago when the dominant way of knowing was criminalization of suppliers and users, only ineffectively countered by the legalization way of knowing that approached drugs as if they were no different than smoking, alcohol and other legal substances. These different ways of knowing were widely divergent, and even on elements where they overlapped, such as drug users, the differences in perceptions were large. In dominant way of knowing, users were criminals who could be punished and discouraged from breaking the law through incarceration. Alternatively, the social problems perspective viewed drug addicts as social unfortunates whose plight was reflective of broader social ills. When new elements were introduced into the policy space – including the spiraling cost of incarcerating drug users and the emergence of effective treatment programs, an entirely new way of knowing was engaged. In this perspective, drug users became patients whose ills could be cured through the knowledge of medical professionals who drew upon different disciplinary expertise and medical organizations including hospitals, treatment centers, and insurance carriers. Alcohol underwent a very similar transition from prohibition and its criminalization through contemporary acceptance of its use with punishment reserved only for consequences that themselves are violations of the law or that seriously threaten others (e.g., DUI laws).

Leverage points for Bridging Ways of Knowing

Leverage points for changes in ways of knowing a policy issue may come in processes, actions, organizations, technologies or policy designs. However accomplished, the test of

whether different ways of knowing successfully collaborate or a new way of knowing emerges depends upon the progress of enrollment and the extent to which networks are becoming more fluid, inclusive, open, and engaging.

Observers, particularly those using network analyses, stress the ways in which partnerships are forged between different levels of government and public and private actors in contemporary complex policy making and implementation. What the ways of knowing framework offers to this line of scholarship is a theoretical grounding that helps explain when and why collaborations work or fail. Inclusiveness comes to mean not just the addition of previously under represented groups but the addition to the policy space of people, groups, ideas and objects. These demand the attention of different ways of knowing whereby each way has to adapt to the new elements. A way of knowing framework stresses that the elements in a policy space can be viewed as an opportunity for cooperation and that our analysis should not assume competition and self interest as the only WOK that participants are able to envision.

Ways of knowing provide additional insights as to why and when collaborative exercises and actions lead to broader levels of agreement. Collaborative exercises and action include such things as workshops, visioning, charettes, mediation, service learning, consensus conferences, and other strategies to bring together contending parties in face to face situations where discourse, interaction, and common experience take place. To the extent that such actions provide for shared experiential knowledge, the ways of knowing the issue should begin to embrace (enroll) the same elements even though some may be interpreted differently. As we have already noted, this may itself lead to cooperation if an element that is a problem for one WOK is an opportunity for another. Shared experiences also may diffuse distrust, anger, and hatred that stemmed from perceived transgressions of the past. Relation-building is a critical component of most collaborative exercises.

Theorists interested in the relationship of knowledge and science policy see the emergence of a boundary organization as critical to the collaboration process (Guston, 2001). A boundary organization is a new venue introduced into the policy space. Boundary organizations range from quasi-formal task forces that exist for a period of time and then dissipate to much more formal government-sponsored organizations intended to bring together multiple perspectives. Much of the collaborative management exercises noted above occur within a temporary or long-standing boundary organization. A key issue in the boundary organization literature is whether the job of boundary organizations is to provide a place for “boundary work” that allows science, for instance, to keep its separate integrity while at the same time engaging public policy actors (Guston, 2001). Alternatively, others believe that the purpose of a boundary organization is to blur boundaries and create new ways of knowing. From the perspective of the ways of knowing framework, boundary maintenance – where each attempts to maintain its own way of knowing – not only inhibits diffusion and enrollment that allows a way of knowing to become more inclusive – but actually produces divisiveness. Consider Figure 3 again, but this time suppose that the four ways of knowing belong to two different organizations. The two ovals on the left are ways of knowing within one of the organizations and the two ovals on the right are ways of knowing found within the other organization. There are a significant number of shared elements. Figure 7 illustrates what may happen if a boundary organization produces a situation where each of the two groups attempts to do maintenance or strengthen itself at the expense of the other. The box represents the boundary organization, and the circles show the two groups, one on the left and one on the right. Prior to the formation of the boundary organization, each of these groups had several ways of knowing an issue, such as that depicted in

Figure 3, but the introduction of the boundary organization (figure 7) pushed each into its own sphere, eliminating all of the shared elements and producing less opportunity for collaboration. In contrast, figure 8 illustrates how a boundary organization that operates through collaborative and inclusive management could encourage a new way of knowing (the vertical oval in the center) that introduces new elements (“boundary objects”) into the policy space and refocuses attention away from the elements unique to each of the original ways of knowing. With the introduction of one new “threat” (the large red star) and several other positively viewed elements, a new way of knowing acceptable to both organizations is becoming possible.

The kinds of boundary organizations that are most likely to facilitate collaboration among different ways of knowing and the emergence of new, more inclusive ways of knowing are often referred to as ‘knowledge to action’ networks (Cash and Buizer, 2005). In the tradition of cooperative extension, knowledge to action networks connect scientific information and products to users in the field, but users communicate what kinds of information they need and are often involved in the collection of data and the testing of products (Paelke and Sarewitz.). Regional Integrated Science Assessments or (RISAs) involve climate change scientists with forecasting skills to practitioners in a variety of sectors including water resources and forest fire prevention. While apart from the networks the RISAs encompass, agency officials in sectoral organizations might resist information coming from outside their organizations, the frequent two way exchanges that occur builds trusting relationships and that allow for uptake of collaboratively produced information (McNie,Paelke and Sarewitz, 2007).

A similar example of effective boundary organization can be found in a social policy area – juvenile justice-- where a federal policy design offered the opportunity for creation of boundary organizations from which a new way of knowing juvenile crime emerged (Schneider, 2007). The federal office of juvenile justice and delinquency prevention in the 1970s and 1980s offered grants to local communities that would introduce the use of restitution and community service into the mix of options available. The key, however, was that all of the local agencies had to sign off on the grant -- police, prosecutors, juvenile justice judges, administrators, probation officers, local treatment-oriented non profits. Each of these traditionally viewed juvenile crime either from a “treatment” perspective (a medical model in which the youth were viewed as “sick” and needed to be “treated” through counseling), or a punishment model (youth make bad choices and need to be punished for it). Each saw basically the same elements in a policy space but with very different causal linkages and images: juveniles, parent(s), schools, victims, future crimes, police, prosecutors, non-profit diversion programs, probation officers, juvenile prisons, transfer to adult court, studies about the effectiveness and ineffectiveness of various approaches, issues of race.

Once the restitution and community service programs were in place and operated for a period of time, a new WOK emerged that transcended the punishment vs. treatment dichotomy and introduced the ideas of restorative justice that engaged new players and old ones in different ways. Businesses, and non profits, largely excluded in any meaningful role before (except as victims of juvenile crime) became sites for restitution and community service. Victims began participating in voluntary victim/offender mediation programs through which they reached mutual agreement on sanctions; probation officers became job readiness counselors rather than curfew monitors. Restorative justice, as a WOK the juvenile crime issue, emerged gradually as a result of the continued experience with actual cases as participants realized that the practice of restitution and community service restored both victim and offender to the larger community.

Collaborative action may result in the creation of boundary objects (such as the grant proposal just mentioned). Once the grant was funded, the project itself became a boundary object and continued to engage the participation of groups around a shared project. Boundary objects are physical objects that are jointly produced by people and groups with different perspectives. A ways of knowing framework helps to understand that these objects will lead to fruitful collaboration when they serve multiple ways of knowing and lead to shared language, experience, trust, and empathy (Susan Leigh Star 1989).

Ways of Knowing and Other Public Policy Frameworks

With the exception of our work with Feldman and Khadmanian (Feldman, et al, 2006) most theories of policy have not considered ways of knowing as a relevant concept. The WOK framework, however, has many antecedents in the policy literature leading logically to many of the tenets espoused here. The relationship of WOK to previous policy theory may be especially helpful to policy scholars and is pursued briefly in this section.

The Advocacy Coalition Framework developed by Sabatier and colleagues (ACF) uses beliefs as the key organizing concept that ties people together into policy networks focused on particular policy issues. For these writers, beliefs relate to fields or issue areas and vary from bedrock core beliefs that are difficult to change to peripheral beliefs that are more flexible and can be altered by such things as new findings in science. Deep core beliefs contain basic ideas about human nature, a hierarchy of values, the proper role of government and markets, and other fundamental ideas. At the next level are policy core beliefs that are applications of the deep core to particular issue areas. Peripheral beliefs deal with specifics of the policy area that are more negotiable. For the ACF scholars, beliefs tie people together across a whole variety of different levels and organizations into advocacy coalitions. ACF is based mainly in bounded rationality and the pursuit of self interest through competition among coalitions. (Sabatier and Weible, 2007: 194).

ACF assumptions about how people interpret a policy or issue space differs significantly from our assumptions in WOK. ACF assumes people reason deductively from core beliefs to the policy core and then to peripheral beliefs about policy details. ACF assumes bounded rationality and that the people in the coalitions are intended to be rational in their pursuit of their own interests. WOK begins inductively with the elements in the policy space that are available to be enrolled into a way of knowing. People hold multiple ways of making sense out of the policy space. There probably are multiple core beliefs that might be used as a person seeks to make sense of the elements but we do not expect deductive reasoning. ACF assumes that the “inner world of individuals... explain[s] individual action. (Schlager, 2007:301). We assume that the elements in the policy space – characteristics of the situation itself – offer multiple possibilities for action. Importantly, WOK embraces the objects in the policy space – technologies, buildings, rivers, scientific studies – and grants these a much more prominent role than does ACF.

ACF has a more difficult time explaining cooperation than competition, and generally situates its explanations in theories of self interest and bounded rationality. Groups may come together because the status quo is unthinkable, or because the fear of failure and defeat (by an opponent) is so great that cooperation offers the only possible chance of winning. Importantly, the ACF contends that for collaboration to be successful, the issues have to be primarily empirical rather than normative, as the latter do not lend themselves to negotiated agreements. The WOK framework envisions many other bases for collaboration—shared elements in the

policy space, for example. A WOK framework, simply by inductively identifying all of the ways of knowing that might be imagined, given the elements in the policy space, opens the opportunity for participants to see the elements through the eyes of another. Cooperation can emerge from common experiences that have been created through collaborative management or policy designs. Cooperation may emerge from “empathic imagination” or “empathic thinking,” that has been created through the introduction of humanistic elements such as stories and narratives. New rationales and new ideas of how the elements might be interpreted and related to one another can emerge when people are better able to experience – even if vicariously – the situation as others may experience it. Basically, ACF assumes a situation as in Figure 7 with entrenched coalitions sharing almost no elements. WOK envisions Figure 4 or 6 and explains how these are transformed into a situation such as Figure 7, but also how a new WOK (figure 8) might emerge.

Institutional Analysis and Development is a long line of research generated by Elinor Ostrom and her colleagues, and provides another advancement beyond traditional public choice that informs WOK (Ostrom, 1990; Ostrom et al, 1992). This work challenges the fundamental public choice contention that people are unable to come together in cooperative ways that will protect common pool resources. The logic in the “tragedy of the commons” is such that self interest combined with rational calculation will lead eventually to the destruction of common pool resources. The policy implication drawn by many economists and public choice scholars is that common pool resources must be privatized and subject to market dynamics, or governed by external authorities (“leviathan”) who impose autocratic rules to insure sustainability. The conclusion, deduced from rational choice theory, is that self-interested people, working democratically, will destroy the commons instead of protecting it. Instead, Ostrom, et al, contend, that actual empirical field research shows hundreds of examples of people who have come together through self organizing mechanisms to design rules that enable them to protect fisheries, water, forests, and other common pool resources. Although much of this work has been in providing definitions and prescriptions for analysis, the findings offer important empirical challenges to the traditional assumptions about self interested behavior and difficulties or impossibility of self governance.

We share with IAD an importance on the situation – called the action arena—and that people reason from that situation. IAD however still posits a narrow model of bounded rationality in which individuals seek to improve their own welfare and settle for a “satisfactory” situation. People search for better solutions, but these are “better” for themselves. In-so-far as there is pursuit of a collective or public interest, it is through the norms of reciprocity or long-term self interest. They “intend” to be rational, but the complexity of the situation and the uncertainty means that they engage in a great deal of trial and error learning (Schlager, 2007:300). Our framework, as noted above, assumes people are able to engage in empathic reasoning and that humans desire to belong and to contribute to the public good just as much as they desire to compete and pursue only their own interests. We posit that multiple rationalities are available. In situations of collaboration where people come face to face with one another and engage in shared cooperative experiences, they come to recognize alternative ways of knowing and to respect these, as well as respect those who hold them. Cooperation is likely not just because it is a long term self interest, but because people genuinely want to work together to produce a better collective outcomes.

Social construction theorists add still another dimension to understanding the ways in which people orient themselves about issues. They have elevated the importance of symbolic

and communicative dimensions of motivations and perspectives. Murray Edelman (1988) along with other scholars have noted that public ideas about issues are framed and manipulated in emotional terms that appeal to patriotism, fears, celebrity and other shared images that are often disconnected to any instrumental or cause and effect relationships. Public attitudes contain a strong moral and emotional element as people develop very strong opinions about the appropriate distribution of benefits and burdens. People and groups are socially constructed as “deserving” (e.g., “good,” “hard-working” “moral”) or undeserving (e.g., “greedy,” “dangerous” “immoral”) and public preferences are for policies that provide good things to good people and bad things to deviants (Schneider and Ingram, 1993, 1997, 2005) In particular, the social construction of deservedness and stigma is an important perceptual screen through which people see many issues such as immigration and crime.

What stands out from the application of social construction theory to public policy is that many decision making contexts in the United States and other parts of the world have become “degenerative” such that divisive and negative social constructions drive the direction of public policy. The devastating result of this, even in democracies, is that those who are treated the worst by policy are the least likely to recognize their own interests or to mobilize to challenge the status quo. Thus, policies continue in ways that are dysfunctional, ineffective, and unfair – a path dependent process – due not just to power but because of the images and emotional attachment people have to their way of thinking about others. It is not just interests, power, and competition that drives policy – images of deservedness and undeservedness gain virtual consensus allegiance that thwarts competition and marginalizes some to the point that they cannot compete or challenge.

A WOK approach embraces these ideas but goes beyond them. In a policy or issue space, the social constructions of elements-- objects, people, and ideas --are critical components of sense-making. A policy space that appears degenerative in one WOK may actually share some elements with another WOK that is grounded in professional and scientific thinking. It is possible that still another WOK might enroll some elements of the first two but also embrace ideas from discourse. Through collaborative management and other techniques that build upon relationships, shared experiences, and empathic thinking, it may be possible to introduce new WOK into even the most degenerative policy situations.

What Ways of Knowing Contributes to Policy Analysis

So far much of the writing about ways of knowing have informed science studies (Star, 1989) or inclusive governance (Feldman, et al, 2006) but so far scant literature exists in public policy. Among the foundational aims of public policy analysis is better public policy, including very importantly policy able to attract sufficient support to be adopted and implemented. The ways of knowing framework provides a means to re-examine a number of issues related to policy deadlock and failure to resolve important public policy problems.

Policy Theories as Barriers to Collaboration: In his presidential address to the American Political Science Association (1997) Ted Lowi strongly criticized the subfield of public policy and contended that we become what we study. While he was especially critical of the rationality project of the policy sciences that marginalizes politics, and rational choice that denigrates government, he sent a larger message. The frameworks we teach students and through which we perform research can blind us to possibilities. The excessive focus upon narrow self interest as a political motivator has hampered our identification and legitimation of other kinds of political

appeals. The notion that coalitions among groups can occur only when it is impossible to win otherwise and only when mutual interests are satisfied ignores the flexibility with which ways of knowing can adjust to and incorporate new elements.

Policy theories evolving from pluralism have elevated conflict as a necessary ingredient of democratic policy making. For instance, Ted Lowi (1964), we believe in error, lauds regulatory policy that engenders sharp disagreements that mobilize otherwise marginal actors in politics as beneficial to democracy. While conflict may elevate salience, the ways of knowing framework suggests that there are side effects to conflict that are quite damaging to collaboration. Conflict means that different ways focus on the unshared elements that are most remote from their network of knowing. Conflict involves are hardening of boundaries so that differences are emphasized more than common elements.

Institutionalization within policy space, that is the establishment of governmental and non governmental agencies with fixed missions, professionalized skills, and structures of accountability has been treat by policy theory as the necessary apex of policy development within an issue space. Punctuated equilibrium theory tends to portray policy monopolies are normal, and advocacy coalition theory sees coalitions as fixed even as they transcend organizational boundaries. Ways of knowing handles institutions as regularized patterns of interaction that are stabilized only to the extent that the relationships that under gird them are constantly reworked. Further, ways of knowing stresses the likelihood of reinterpretation in the course of reworking.

Ideas of organizational learning and adaptation are identified as important to governance. Yet, they are under theorized in the literature, or, as our discussion of advocacy coalitions indicate, considered as possible only on the margins. Ways of knowing, in contrast, shifts the focus to how and why elements are enrolled. The WOK framework recognizes the challenge that the constantly shifting world of material and physical objects with their own agency impose upon humans. It identifies strength not with stability by instead with flexibility and inclusiveness.

Ways of Knowing and Re examining What We Know: The WOK framework invites the policy analyst to look again at elements and characteristics of public policies generally thought to be associated with policy failure. Technological solutions to policy problems frequently have been characterized as undemocratic (Schneider and Ingram, 1997, Fischer 1990). Critics say that technological systems are neither inclusive in their production processes nor their delivery systems. Technologies usually emerge from expert dominated processes that exclude ordinary people. Automatic, built-in operations rather than incentive, disincentive and other ways to modify human behavior and elicit human cooperation deliver results. Further, critics say that reliance on technological solutions encourages investment in science and the elevation of expertise at the expense of other kinds of investments. For example, focus on hydrogen cars may detract attention from reducing the number of miles driven. Similarly, Deborah Stone (1993) has argued that diagnostic technologies, such as medical imaging equipment, detracts attention from underlying structural issues that lead to inequities. Social problems become individual ailments as evidence is sought through diagnostic tools of variance from some normal mean. For instance, the creation of the diagnostic category of rape crisis syndrome focuses upon effects in individuals, not the overall power inequities in society that make victimization of women possible. The result is that individuals diagnosed with the syndrome are treated as patients and the collective action and work toward social and political change is not the focus of attention.

A ways of knowing approach to policy analysis suggests a more nuanced view of technology. Physical objects are recognized as part of the policy space which a way of knowing interprets. Further, technologies have agency in the sense that they create relationships with other objects in the space; they alter established causal linkages; they may compete with social processes that are intended to produce the same result. They bring to the foreground other elements that previously may have not been recognized as relevant. In evaluating technologies, it is important to know what aspects of delivery systems are prepackaged into the technology itself, and what depends upon relationships that must be built to accomplish delivery. Vaccines, for example, prepackage all of the steps and processes that will lead to immunity. The person does not have to avoid swimming pools or eat healthy diets to be protected from polio, for example. The implementation process is relatively simple with detailed instructions on what is to be done, to whom, when, with what, and how. Inoculation is usually carried out by a professional who may have only fairly narrow training and is delivered to a person who (usually) appears voluntarily. Vaccines are usually highly effective and reliable, and as a consequence, do not require complicated monitoring. Vaccination, as a technological fix, is easy to disseminate and can fit into many different ways of knowing. It is possible to continue to believe in folk cures or alternative medicine and to see inoculation as an extra form of protection, especially as it does not require participation in elaborate rituals that would threaten the practices of other ways of knowing, including the mass consumption of “health store products”. Different ways of knowing adopt the technology, perhaps modifying it to fit their own perspectives, but the technology works across a wide variety of ways of knowing. There are consequences of the portability of vaccines from the scientific and medical way of knowing through which they were created to other ways of knowing that persist. For instance, alternative medicine ways of knowing are suspicious of traditional medicine and open to the introduction of a new element, like the rise of autism, as evidence that the DPT vaccine has serious side effects traditional medicine refuses to recognize.

In contrast to vaccinations, some technological innovations get captured by one way of knowing that is at significant odds with another. Take for example, some genetically modified organisms (GMOs) such as those producing genetically modified potatoes that are arguably superior in some ways, including pest resistance that would reduce the need for pesticides and could significantly reduce hunger in many parts of the world. It would seem logical for farmers everywhere who embrace plant breeding as a means to improve crops to accept GMOs as part of their way of knowing farming. The agribusinesses that develop such products, however, embed the technology in a web of other elements that require much more adjustment on the part of the farmer. To use GMOs effectively they must purchase and use of fertilizers, herbicides, and farming methods that are viewed positively by agribusiness but negatively by organic farmers, environmentalists, and others intent on reducing damage to the planet (Pollan, 1996). The early enrollment and capture of GMOs by a dominant and controversial way of knowing has turned them into a bone of contention so that the technology is shunned by policy makers in Europe and the organic agricultural movement everywhere. As a result this technological innovation, intended to be automatic and simple to implement, has become an object that exacerbated conflict rather than cooperation.

The ways of knowing framework is helpful in examining how other technologies have generated opposition rather than facilitated cooperation. Ways of knowing directs attention to the people and groups associated with a technology. Nuclear generation of electricity was initially adopted as a solution for many problems associated with other energy production including air

pollution of coal fired electrical generation and the environmental damages caused by hydropower. Nuclear energy generation, however, embodied its own complex way of knowing that privileged specialists and spawned the development of networks between government agencies and nuclear energy industries that were exclusive and closed to outside scrutiny (Baumgartner and Jones, 1991). The previously existing networks associated with nuclear power and defense involved secrecy and insularity that carried over into peaceful uses of the atom. This network showed little interest and less ability in enrolling new adherents. The pre-existing perception of nuclear power as dangerous carried over into suspicions about nuclear accidents and the disposal of nuclear wastes. As a consequence, the advance of nuclear electrical energy generation has been slow even as global warming would seem to present an increasingly favorable context for solutions that do not use fossil fuels nor generate greenhouse gasses.

Ways of Knowing framework invites policy scholars to revisit old doctrines with new insights. Consider the Wildavsky dictum that simple policies with short implementation chains with the fewest veto points and the least amount of discretion to lower level agents in implementation chains are less likely to fail (Pressman and Wildavsky, 1973) Viewed from the perspective of the ways of knowing framework, complex policies with tools that appeal to different kinds of motivations are more likely to attract collaboration. In his cultural work, Wildavsky himself saw the weakness of any particular solidarity alone. Each perspective is dependent on other perspectives and carries within itself the seeds of its own destruction. Individualism would lead to chaos without hierarchy to enforce such rules as contracts. Hierarchy would be stagnant without the creative forces of individualism. Individualism would be undermined by inequality and distrust without egalitarianism. Egalitarianism would be stifling and threatening to liberty without individualism, and incompetent to solve problems without hierarchy. These scholars have argued that clumsy solutions, that are solutions that rely on perspectives of conflicting solidarities, provide the best solutions to a complex world. (Verweij and Thompson, 2006).

The ways of knowing framework allows policy analysts to move the insight of the clumsy solutions scholars to another level, and to consider policy designs that purposefully engage multiple ways of knowing. In a cluttered policy space where there are many ways of knowing that are contending with one another (see Figure 7), strategies of collaborative governance might include the production of boundary-spanning objects. By building relationships and working on common projects, it is possible that a new way of emerging will emerge from practice, as was shown in the juvenile justice example previously. Lines that originally hardened through boundary-maintenance work may begin to blur as the new way of knowing provides an attractive and more persuasive rationale. Figure 7 shows several new boundary-spanning elements in the policy space, including one large red star (perhaps a new “threat”) that displaces the previous “threat” and several positively-viewed elements (perhaps scientific studies that both sides embrace, demonstration projects that engages all of them in continuing working to solve problems).

Water resources policy in the U. S provides a good example. Since the progressive era, water agencies at the federal and state levels have engaged expert driven ways of knowing reflecting understandings of hydrologists and engineers. In the environmental era of the 1970’s, environmentalists asserted other ways of knowing, some based on different kind of expertise, such as ecology but also embracing symbolic knowledge and moral and spiritual ways of knowing. During the Reagan era, another way of knowing gained ascendance, that of economic reasoning based on the principles of self interest as they affected water rights holders and

institutions like agencies. The use of economic incentives and water markets associated with this way of knowing were inserted into policy designs already reflecting previous ways of knowing. Even more recently, experiential knowledge of residents in individual watersheds who are directly familiar with ways in which water is used for recreation, wildlife habitat, domestic supply, as a carrier of wastes, and other purposes, is being recognized. Watershed programs that are inclusive in terms of participants and perspectives provide forums for discussion and local action.

Complex, multifaceted water policies with many, often conflicting goals and a mix of policy tools that contain quite different behavioral assumptions about the motivations of water users have become the norm. While such designs are very different from what any way of knowing might prefer (that is from the perspectives of grass roots organizers, technical experts, adherents to market logic or others) such complicated designs do reduce conflict. They also lessen the damage that a single way of knowing might cause if policy were designed with its insights alone. Less appears to happen in water policy than during the big dam era in the early part of the last century when huge construction projects were built. Contemporary complex policy designs that allow many voices to have standing and open discourse among different ways of knowing prevents large irreversible errors that previously have been made.

Conclusion

Developments in research and practice suggest that the frameworks dominant in public policy analysis need to be revised. Many are based on overly simple and unitary notions of the motivations of individuals and groups who are supposed to follow the dictates of self interest. Yet, a great deal of physical and social science research suggests that human motivations are much more complex, that moral, aesthetic, intuitive, inspirational, empathetic, and other influences have important roles, and that an individual may have several ways of knowing a policy issue or problem. In developing our ideas we draw on a broad literature from philosophy, psychology, evolutionary theory, physics, cognitive psychology, and other fields. We also show how the ways of knowing framework suggested here builds on previous public policy theories such as advocacy coalitions, institutional analysis and development and social constructions of target groups.

Most contemporary policy analysis frameworks also fail to capture the experience of practitioners engaged in collaborative decision making who are able to bring together successfully people who tend to see the issue at stake in very different and conflicting terms. Further, they are not helpful in suggesting ideas, tools, practices, and strategies that could be employed within a policy area torn by conflict to overcome barriers to cooperation. The approach we develop concentrates on the mobility and inclusiveness of networks as people, objects and ideas become incorporated into ways of knowing.

We have introduced ways of knowing as an inclusive and flexible concept that allows for many varied ways of viewing an issue or problem. Through a series of examples and diagrams we show how multiple ways of knowing may be present in a policy space, and how, depending upon the kinds of linkages involved, shared elements among different ways of knowing can become vehicles for collaboration. Alternatively, we also show how the boundaries between different ways of knowing can become fixed, and closed to cooperation. While previous policy analysis frameworks explain very well deadlock, conflict, and failure to cooperate, the ways of knowing framework excels at explaining collaboration and how cooperation might be achieved.

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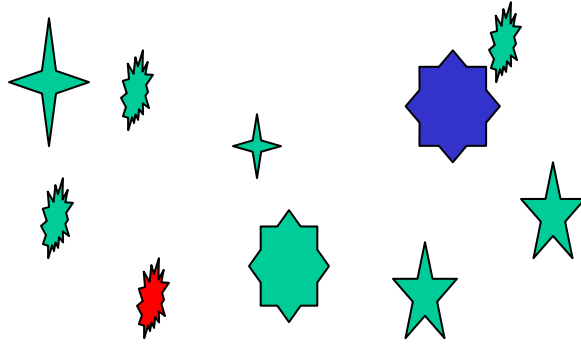


Figure 1. Uncluttered policy space (drugs), circa 1880.

The space contains people who use drugs, several types of drugs (including alcohol and tobacco), producers, rituals, clubs, recreational use, mental health use.

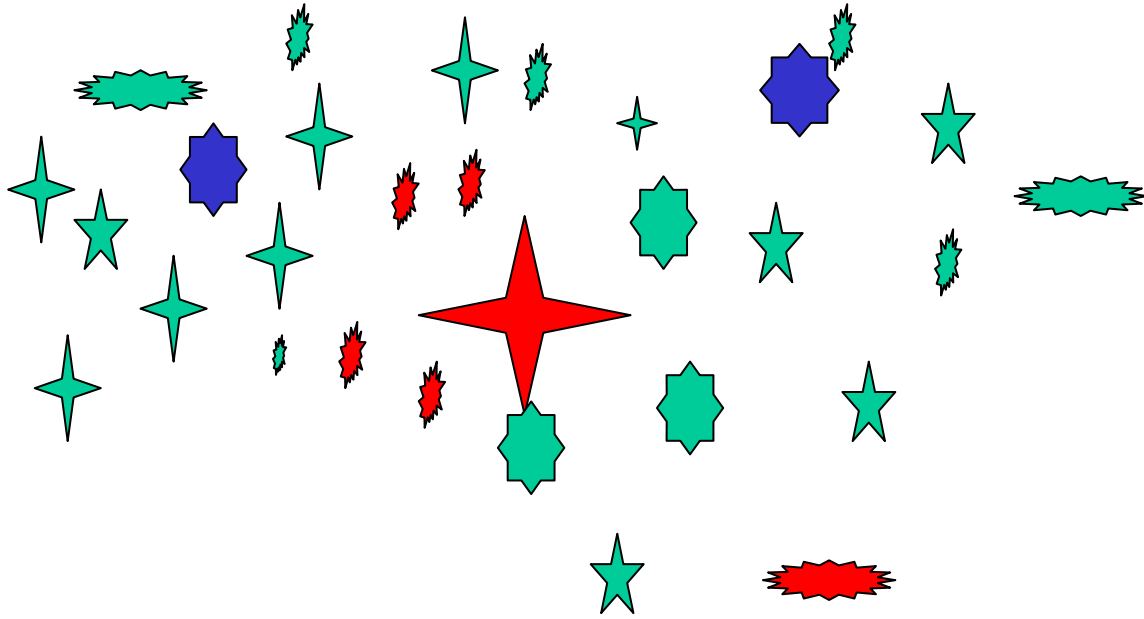


Figure 2. Cluttered Policy Space (Drugs).

The space includes many different kinds of drugs, several distinctions as to drug users and producers, effects of drugs, causes of drug use, mental health, recreation, “war on drugs,” federal, state, and local drug policies and local enforcement policy, scientific studies about effects of drugs and reasons for drug use; prisons, probation, drug treatment programs, and so on.

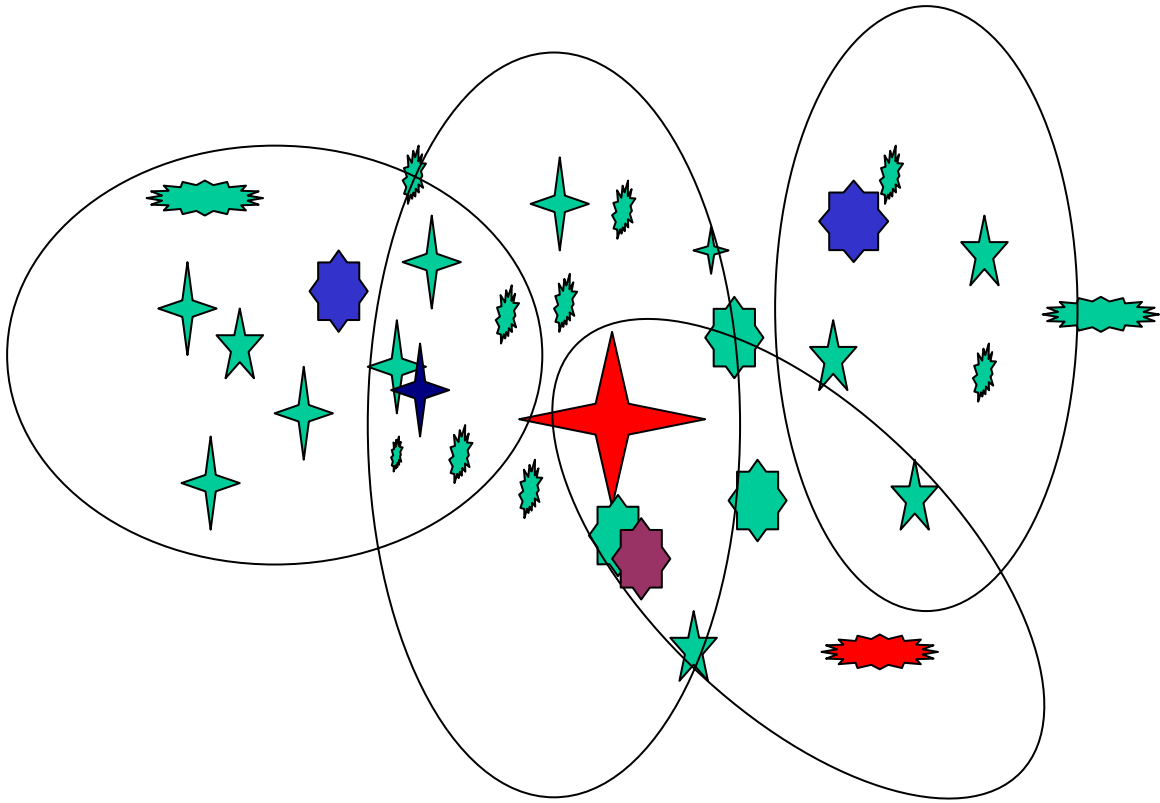


Figure 3. Multiple ways *one person might have* of knowing a policy space (drugs).

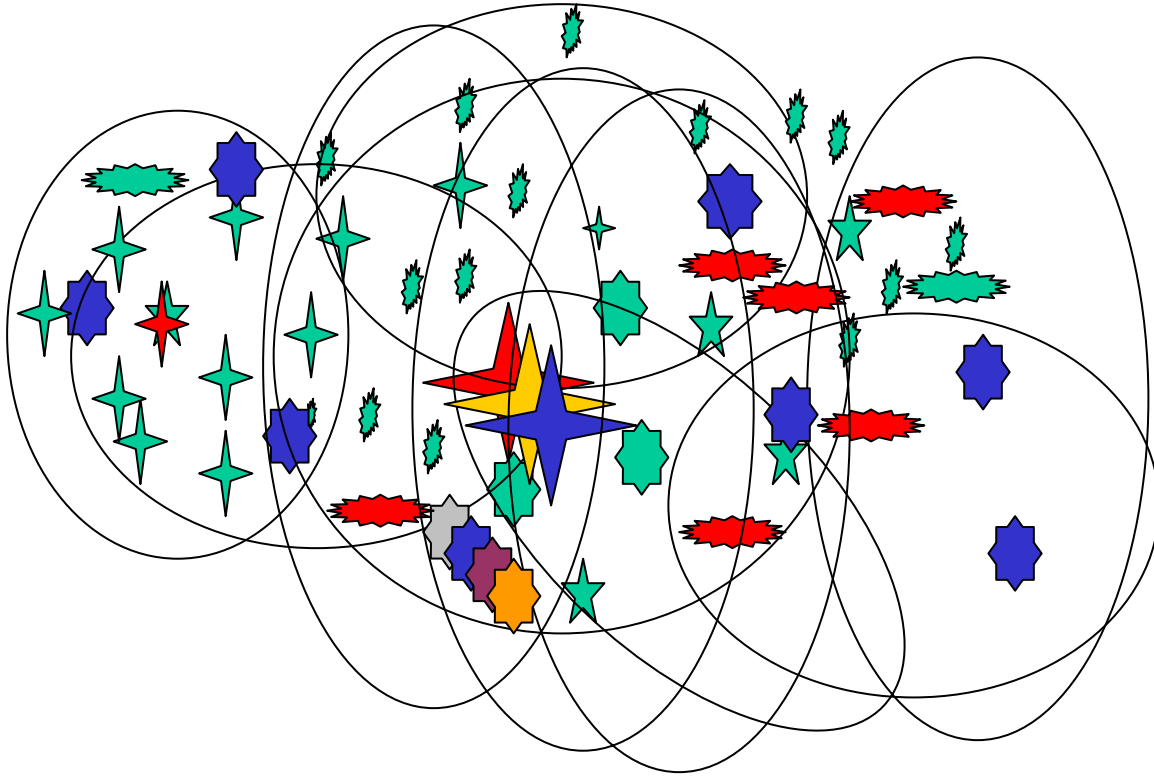


Figure 4. A cluttered policy space (people, ideas, objects) that offers multiple possibilities for ways of knowing. Ways of knowing are represented by a circle. Some of the elements are enrolled in several different ways of knowing; others belong mainly to only one. Some elements are interpreted very differently by the different ways of knowing in which they are enrolled.

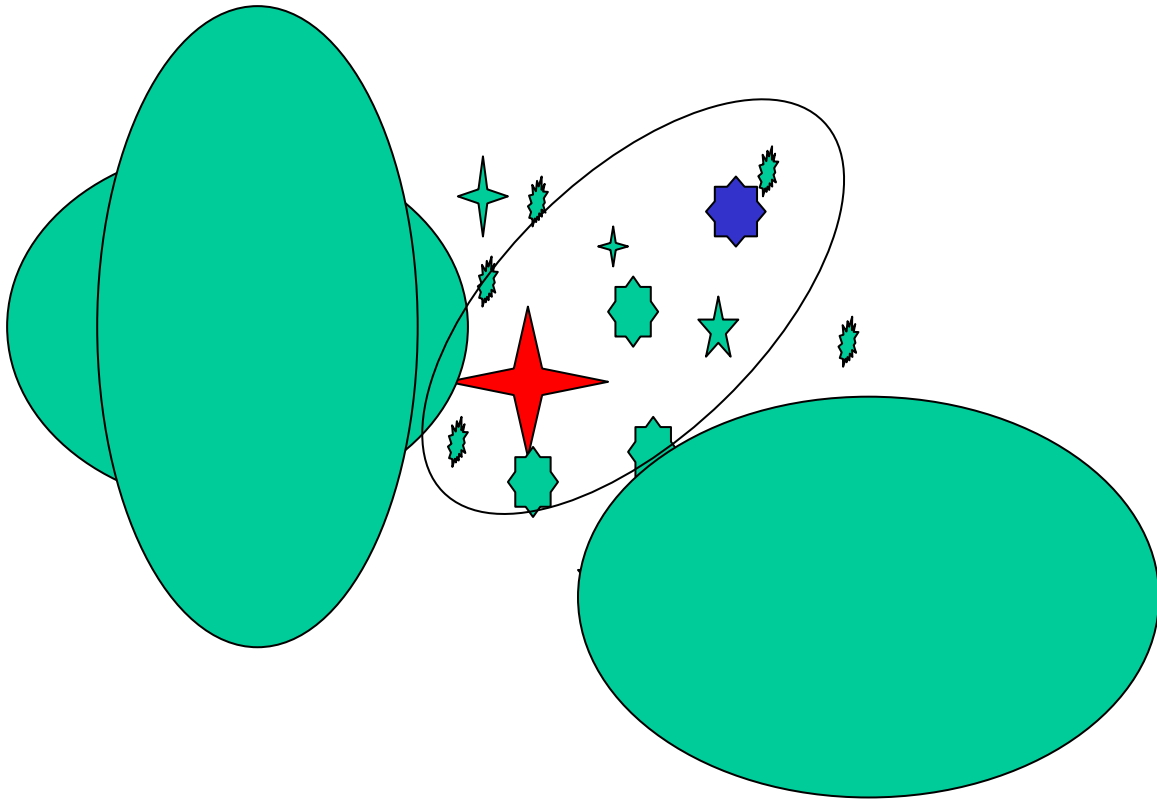


Figure 5. Example of how benefit / cost analysis (rational / bounded rationality) blocks other ways of knowing an issue (such as drugs).

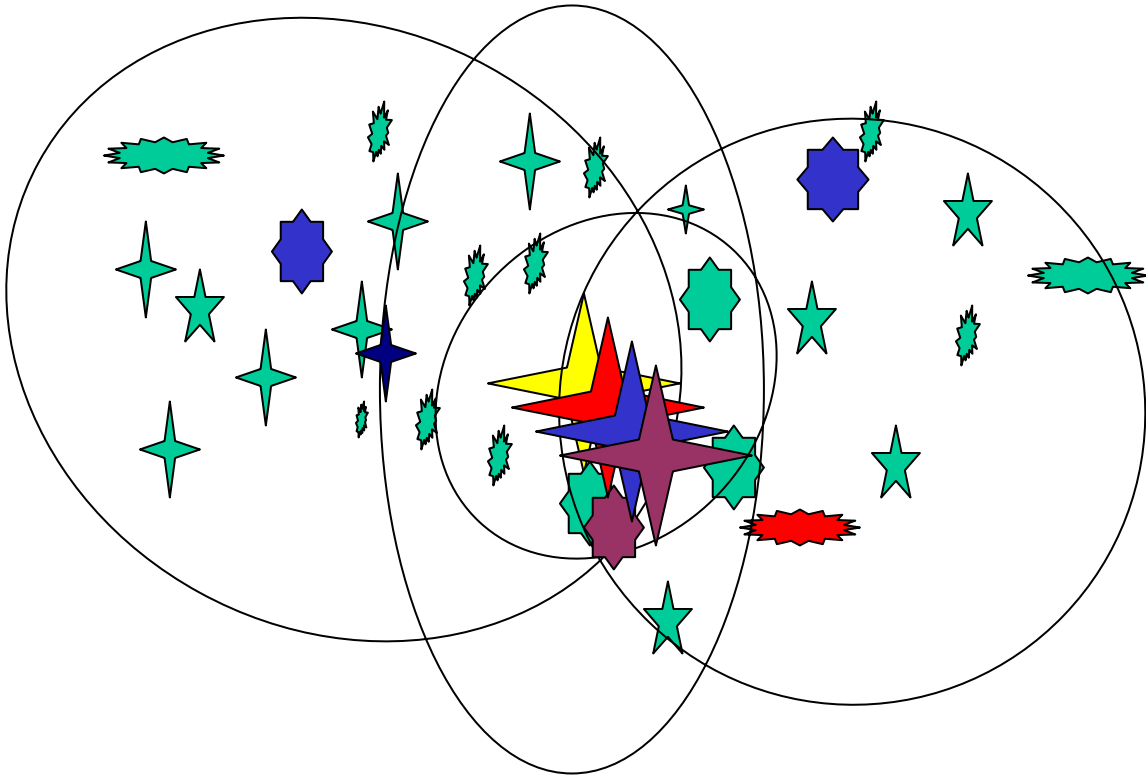


Figure 6. Multiple ways of knowing a policy space with a dominant element that is interpreted differently in each way.

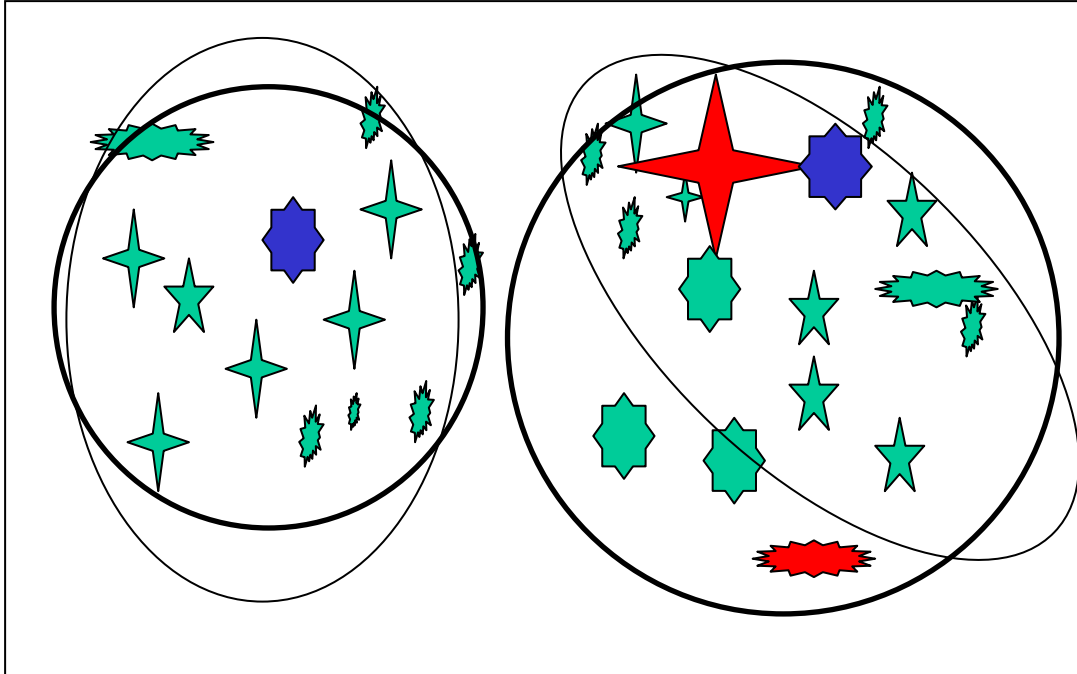


Figure 7. Two groups, within a boundary organization (the box) where each attempts to do “boundary work” and protect its integrity vis a vis the other. Compare with Figure 4.

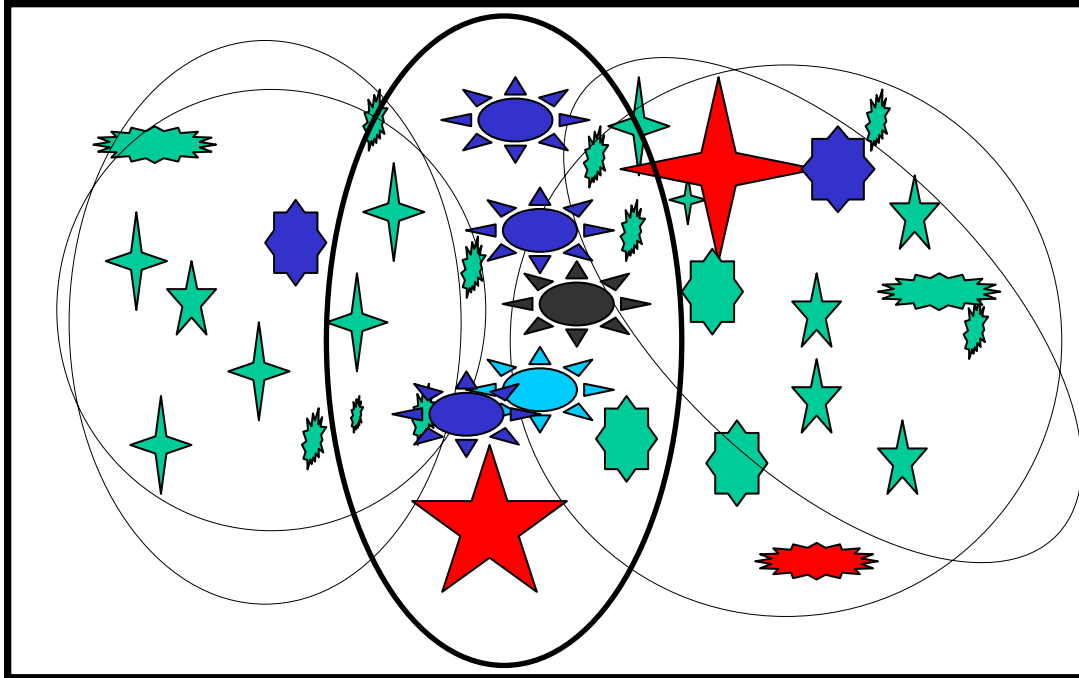


Figure 8. This boundary organization (the box) has, through the use of newly introduced boundary objects (the middle circle), begun to blur the lines between the two previously competing groups by refocusing attention on new elements, new “threats” (the new bright red star), and has created a new way of knowing to bring meaning to the policy issue without privileging either of the original groups. Compare to Figure 6.