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Communities of Knowledge

Introduction

In previous work I have analyzed the process in which an individual models the world, and I have used George Kelly's (1955) concept of the personal construct system underlying man's epistemological activities to present the individual as a personal scientist. I have operationalized part of Kelly's theory through computer programs that elicit personal constructs interactively (Shaw, 1980, 1982) and analyzed the construct structures in a variety of ways (Gaines & Shaw, 1981). Logical models of construct systems (Shaw & Gaines, 1979, 1980) have also been proposed that relate them to Zadeh's (1976) fuzzy semantics and to the structures of fuzzy (Zadeh, 1978) and generalized (Gaines, 1979) database systems.

In epistemological terms Kelly's constructs form the source system at the base of Klir's (1976) epistemological hierarchy, essentially the domain of discourse (Gaines, 1977, p. 165) for the description of observations of the world. Kelly emphasizes the personal nature of the source system for individuals and hence, in Klir's terminology, of the data system presenting actual observations of the world and of the generative and structure systems above it in which these observations are modeled. This is in contrast to conventional epistemological systems that suppose that some impersonal universality at all these levels is a hallmark of knowledge.

Thus, a key problem for a conventionalist epistemology such as that proposed by Kelly and developed by Shaw and Gaines is to explain the way in which people do come to have common constructs and are able to communicate with one another. From a positivist point of view there should be only one epistemological hierarchy. When we accept the liberalization of this to a plurality of such hierarchies, we allow for the real-world phenomena of different points of view and different worlds of knowledge. However, we then have the actual communality of much of our knowledge, language, and modeling systems to explain. If we accept the concept of man as a personal scientist, then we also have to explain how a world of knowledge can arise in which individuals can reach agreement of a common view of the world or on cooperative programs of action.

This paper outlines a model of how individuals form communities and how communities form individuals, which integrates Kelly's systemic epistemology with the system theoretic approach of Klir's hierarchy of knowledge and its psychological interpretation by Shaw and Gaines (1981). It also links Kelly's work with Spencer Brown's (1969) calculus of distinctions; Gordon Pask's (1975) concept of psychological individuals; William Gray's (1979) emotional-cognitive structure theory for understanding the formation of communities; Kurt Wolff's (1976) concept of surrendering to a community to catch its essence; and Karl Popper's (1968) ideas of world 3s, or communities of knowledge.

The Knowledge Hierarchy

Kelly (1955) emphasizes the epistemological role of personal constructs in predicting and controlling the world and their ontological status as personal conjectures rather than as reality-derived absolutes: "Constructs are used for predictions of things to come, and the world keeps rolling on and revealing these predictions to be either correct or misleading. This fact provides the basis for the revision of constructs and, eventually, of whole construct systems" (p. 14). This capability to revise construct systems in light of experience and the pluralism of possible construct systems was the basis of Kelly's constructive alternativism — we are not necessarily bound by our construct systems but can revise them to see the same problem from a new viewpoint.

At a fundamental level we can see Kelly's constructive alternativism as being based on the primitive operation that Spencer Brown calls making a distinction. Brown (1969) commences his seminal work *Laws of Form* by noting that. . . . "a universe comes into being when a space is severed or taken apart. The act is itself already remembered, even if unconsciously, as our first attempt to distinguish different things in a world where, in the first place, the boundaries can be drawn anywhere we please. At this stage the universe cannot be distinguished from how we act upon it, and the world may seem like shifting sand beneath our feet" (p. v). Thus, for both Kelly and Brown, all models at higher levels are fundamentally dependent on the distinctions made—the constructs used—at the source level of Klir's (1976) epistemological hierarchy.

The epistemological role of the construct system is shown in figure 3.1 where Klir's hierarchy, rephrased in psychological terms (Shaw & Gaines, 1981), is embedded in the personal scientist cycle:

events ⟶ modeling ⟶ prediction / decision / action ⟶ events

In this figure the lowest level shows the constructs or the distinctions made in interacting with the world. The next higher level is one of the experiences of events that happen to us and that we make happen, in terms of the distinctions already made. Levels above these are hypotheses, which are rationalizations of experience, analogies between these rationalizations, and transcendencies. Interaction with the world is, therefore, mediated through the construct system to produce experience which is modeled through the higher levels leading to predictions, decisions, and actions again mediated through the construct system.

Psychological Individuals

Klir's hierarchy gives a system theoretic framework for personal construct systems. However, it also provides a framework for social construct systems if we realize that an individual's hierarchy may be seen as a cross section through a cultural hierarchy. This is put more concretely by Pask (1975, p. 302) who introduces the notion of a P-Individual or psychologically characterized individual in contradis-

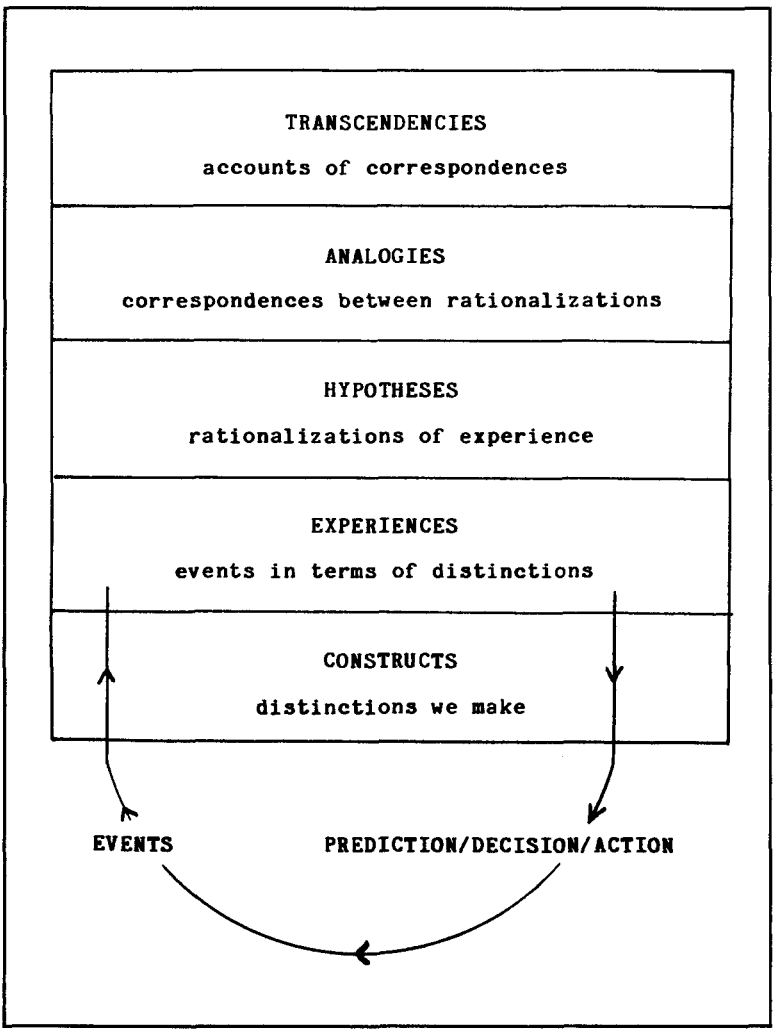

Figure 3.1. Epistemological hierarchy

tinction to that of an M-Individual or mechanically characterized individual. He notes that an M-Individual is characterized as "a human being (or his brain) as a biologically self-replicating system"; whereas, "a P-Individual . . . has many of the properties ascribed by anthropologists to a role, in society or industry, for example. A P-Individual

is also a procedure and, as such, is run or executed in some M-Individual, qua processor." He also notes that while an M-Individual may support many P-Individuals (i.e., a person may play many roles), it is also possible that a P-Individual may be distributed over many M-Individuals (i.e., a social unit may require the interplay of several persons).

The concept of P-Individuals as cross sections of epistemological hierarchies interfaced to the world through personal constructs gives a coherent systemic framework for the relationships between individuals and worlds and for the ways in which individuals form social groupings, and societies form individuals.

Figure 3.2 shows John as a person with a number of roles. He has formed P-Individuals as a husband, a sales vice-president of his company, a backpacker, and a fisherman. Are these roles just descriptive or can we give them deeper systemic significance? Personal construct psychology gives us a basis for this. The personal scientist (Shaw, 1980), or process which is John as a husband, uses operators to make construct-forming distinctions. They are distinctions about perception, about models, about values, about action. With the formation of these constructs, a P-Individual comes into being. John uses constructs when he is in the role of husband that are different from those

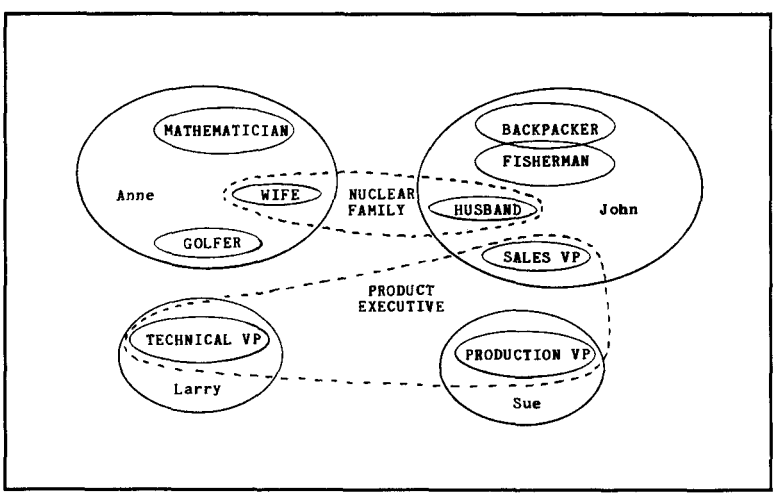

Figure 3.2. P-Individuals formed by groups

he uses in the role of fisherman, but some of the constructs he uses in the role of fisherman are also used in the role of backpacker, and we show this as overlapping P-Individuals.

Figure 3.2 also includes some of John's associates. Anne is John's wife. She is also a mathematician and a golfer. Larry is the technical vice-president in John's company, and Sue is the production vice-president. Sometimes John is acting with his wife or colleagues as one P-Individual, and this is shown by a dashed line. It will have constructs that are shared among participants and others that arise from only one of them. For example, John and Anne form a nuclear family (Shorter, 1975). This is a P-Individual that has legal rights, specific behavior, concepts, and language which are not those of either part but are made up of both. The product executive of the company (O'Shaughnessy, 1976) is a P-Individual who has authority, responsibility, behavior, and language which is unique to the entity and not that of any one of its participants.

The Formation of Communities

It is fairly straightforward to analyze the operations of P-Individuals once they exist. Psychology and sociology have a solid systemic foundation in terms of the theory of personal constructs and the calculus of distinctions (Gaines & Shaw, 1981). However this leaves open the generic question of how such unities form. William Gray (1979) gives insight into this by pointing out the essential emotional component of system formation. He introduces his notion of system-forming precursors as part of his emotional-cognitive structure theory for understanding creative thought processes. He puts forward the view that emotions are integrating devices for the formation of thoughts and coding devices for memory. He notes that system formation occurs when precursors are brought together; activators initiate emergence of an organizing focus preventing entry to a community. He uses the term *lock-out* when blockers prevent entry to a community, which may lead to *break-in;* and he uses the term *lock-in* when withdrawal from a community is prevented, which may lead to *break-out*.

Wolff's (1976) book about experience and inquiry has much in it that is relevant to the formation of communities of knowledge and the

ways in which individuals enter into them. In particular his basic model of surrender to a situation so that one may catch the essence of it—of becoming through surrender someone different to catch hold of something different—gives a valuable insight into the nature of the processes involved in adopting construct systems in order to enter a community. Using Wolff's terminology, we surrender ourselves to a particular role and become a physicist, a mathematician, a manager, a father, for example, and it is the analysis of our construal of the world in the specific role that we are attempting to catch.

Wolff's (1976) model of surrender is most clearly presented in his discussion of the nature of the mathematician: "From the standpoint of the world of everyday life, the mathematician, as we often put it, lives in the 'world of mathematics,' dealing with 'nonreal' elements, notably numbers, whose relation to 'real' things, to 'reality,' is not part of his concern. Analogously for the logician. What makes our subject-object approach to this attitude misleading is the fact that the subject, the student of mathematics or logic—his or her individuality, including motives and attitudes—is irrelevant for our understanding; the only thing that counts is the pursuit, with its results and questions." (pp. 162–163). He makes the key point that not only does the real world, the object, disappear to be replaced by the world of mathematics, but also that in entering into this world the person doing mathematics, the subject, also disappears to be replaced by a new entity, the mathematician.

Gray's notion of system formation with its necessary precursors and heavy emotional content is a useful representation of Wolff's surrender which is itself a highly emotionally charged word for what would conventionally be characterized as the learning process. For example, Anne is learning to be a mathematician and hence must surrender to the world of mathematics. As she is learning, she is locked out from the world of mathematics and prevented from catching it. However, she is locked into the world of the family since withdrawal from surrender to this world is prevented.

Karl Popper reifies the notion of such a world, which so far has played only a descriptive role as the inferred culture binding together people into a social unity, and terms it a *world 3*. He introduces his 3 worlds model in his autobiography (Popper in Schilpp, 1974, p. 143) by quoting Bolzano's notion of truths in themselves in contradistinc-

tion to "those thought processes by which a man may . . . grasp truths," proposing that "thoughts in the sense of contents or statements in themselves and thoughts in the sense of thought processes belong to two entirely different 'worlds'" and making the threefold distinction, "If we call the world of 'things'—of physical objects—the first world and the world of subjective experience the second world we may call the world of statements in themselves the third world (. . . world 3)."

This notion of a world 3 is a useful representation of Wolff's object that we catch particularly when we note its distinct ontological status: "I regard the third world as being essentially the product of the human mind. It is we who create third-world objects. That these objects have their own inherent or autonomous laws which create unintended and unforeseeable consequences is only one instance (although a very interesting one) of a more general rule, the rule that all our actions have such consequences" (Popper in Schilpp, 1974, p. 148).

It is possible to synthesize these different approaches into a single framework (Shaw & Gaines, 1981), and figure 3.3 shows this synthesis for John's example. Here is John with his P-Individuals of husband, sales vice-president, fisherman, and backpacker, and Anne with her P-Individuals of golfer, wife, and mathematician. Anne enters into the world of mathematics (Wilder, 1981); Anne and John enter into the world of the family (Reiss, 1981); John, Sue, and Larry enter into the world of the corporation (Deal & Kennedy, 1982). These worlds are independent of the particular individuals but are influenced by the individuals.

Figure 3.3 shows the sales vice-president and the production vice-president as having overlapping construct systems (shown by the areas inside the dotted lines) but the sales vice-president and technical vice-president as having no overlap although they enter into the same world. Shaw (1980) notes that each P-Individual may have his or her own system of personal constructs, and Kelly (1955) redefines emotions in terms of reactions to changes, or threatened changes, in core constructs. We thus have a model of a P-Individual within a particular person using a particular construct system by which to surrender himself or herself to a particular world 3 in order to catch its essence. This model of coherent intellectual processes, each with its own individuality, each using its own construct system to enter into an ab-

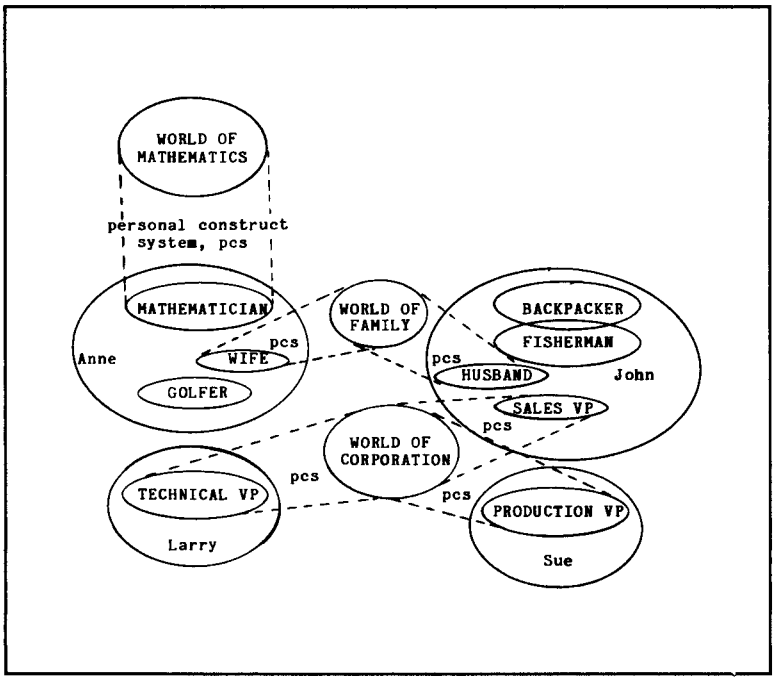

Figure 3.3. Individuals surrendering to worlds through personal construct systems

stract world that has its own reality, provides a cogent picture of the rationale behind, and the conflicts involved in, the interaction between our personal semantic spaces and our communal ones. It goes beyond any simple concepts of role playing by providing the basis for formal models of the mechanisms whereby P-Individuals can enter into an abstract world. Kelly's constructive alternativism provides a model for the extreme relativism of our conception of a world. However, its conventionalism needs counterbalancing by Popper's emphasis on the ontological independence of that world in itself.

Conclusions

This paper has sketched theoretical foundations for integrating the conventionalist model of personal knowledge proposed by Kelly and

developed by Shaw and Gaines with the normative model of knowledge structures in Popper's theory of 3 worlds. It gives the beginnings of an account of how personal scientists interact with the real world and with one another to form communities of knowledge. It has shown how the interplay between these two epistemologies leads to the formation of Pask's P-Individuals who in Wolff's terminology surrender themselves to world 3 in order to catch its essence and links this to Gray's emotional-cognitive theory of the system-forming precursors to construct formation. Thus it gives a systemic model of a range of phenomena which correspond at different levels of the organizational hierarchy to a role, a team, a group, a society, or a civilization. The interplay among P-Individuals at different levels gives a model of the interaction between such an individual and his or her social environment—how they mutually mold one another. Considering the dynamics of this interplay links Kelly's work with that of the system theorist Klir, the cybernetician Pask, the logician Brown, the psychiatrist Gray, the sociologist Wolff, and the philosopher Popper.

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