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Introduction

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Whether described as modes of thought, mentalities, sensibilities, or cognitive styles, the possibility of pluralism in cognition continues to be an appealing, indeed obvious, and yet puzzling notion. The obviousness is indicated by the fact that the abstract sciences are not required to convince us that children are different from adults, men from women, scientists from policymakers, the schooled from the unschooled, and East from West. The puzzle arises from difficulties in understanding how the ultimate “psychic unity of mankind” can give rise to such human and cultural diversity.

The traditional answer to this question has been formulated in terms of the evolution of rationality. The history of mankind is the history of the formulation and testing of increasingly abstract yet increasingly precise models of the world and our place in it as formulated in our abstract sciences. That development depends on the discovery and application of logical principles for formulating and evaluating arguments. Human development, correspondingly, is seen as a matter of the growth of logical thinking, as in the work of Piaget, and the effects of schooling may be seen as a matter of the growth of critical thinking and disciplined, logically organized knowledge. Failures to achieve these Utopian ideals, whether across cultures or across individuals, were seen as products of primitive or underdeveloped powers of rationality.

The past three decades have been witness to a loss of faith in simple progress of any kind, let alone intelligence and rationality. Indeed, they have witnessed the rise of several new and plausible explanations for human and cultural differences in cognition. Greene (1994, p. 425) has alerted us to the dangers of the idea of a “single exclusive way of knowing.” Instead of simple progress in one dimension, cultural and cognitive differences may be characterized in terms of specialization designed to achieve particular goals. These specializations involve ways of experiencing, interpreting, and expressing our understanding of ourselves and the world. There may be as many modes of thought as there are specialized forms of discourse or genre. Talk and thought suited to one is not necessarily suited to some other. Science holds sway in dealing with the impersonal, objective world, politics with the social world, whereas fiction holds sway in the private, personal, or perspectival world. In allowing for such diversity, however, we create a new problem, that of deciding which modes of thought and discourse are privileged, that is, which mode or modes command our deepest respect, the right to state “the bottom line.” Science has, until recently, played just that role.
Even within the mode of thought that we think of as sharing a scientific mode of discourse, there are different domain-specific knowledge systems that adopt quite different types of causal explanations (Carey, this volume). The physical sciences appeal to mechanical or causal explanations – a matter of forces acting on objects. The biological sciences appeal to teleological or functional explanations: the purpose of the heart is to circulate the blood and that of the frontal lobes is to execute plans. The psychological sciences explain by appeal to intentional states such as thinking and wanting. Thus thinking in each domain may rely upon domain-specific knowledge organized around domain-specific causal principles rather than on more general logical or discourse ones.

A third possibility is that modes of thought reflect certain social and cultural systems somewhat in the way that Durkheim claimed that all thought was, at base, social. Although such claims have remained rather opaque, they seem to imply that cultural practices can determine to some extent how claims are justified and how causes are attributed. The social norms will determine which explanations are called into play and which, when internalized, will become ways of thinking about events. Ezrahi (this volume) makes just such a case for the social and political basis of appeal to deductive as opposed to empirical justification. Although one can become more and more sophisticated in thinking in any of these ways, no one way is intrinsically superior to the others.

At the same time as we are increasingly sensitive to diversity in modes of thinking, our simple faith in the growth and development of rationality, especially as represented by the strict sciences, has begun to wane. There is the collapse of faith in the value and authority of scientific knowledge (Ezrahi, 1990). Scientific advance is not to be denied, yet it is equally clear that science alone can no longer be claimed “to serve as common ground for adjudicating knowledge-claims” (Rorty, 1979, p. 317). The possibility of multiple perspectives on ourselves and the world, what some think of as “multiple realities,” requires that we recognize that our sciences have evolved in a particular cultural context and are addressed to particular goals. In addition, it requires a new respect for alternative modes of thought and the social and cultural contexts in which they have evolved.

The topic of cultural differences in modes of thought was addressed explicitly in the volume from which this volume takes its name published a quarter century ago and edited by anthropologists Robin Horton and Ruth Finnegan (1973). For the writers of that volume, a central question was how to reconcile traditional with modern conceptions of science, religion, and social organization. Comparisons were difficult if not impossible because the very notions science and religion are particular cultural products not universal activities shared by vastly different cultures. Gellner summarized much of the debate by arguing that Western science was a kind of specialization or bureaucratization in which the conceptual tools became more refined to serve more specific purposes, but in so doing, these specialized tools became less useful for anything else. In the West, scientific concepts have become remarkably successful for a narrow range of purposes, but they have lost, in
the process, their usefulness for ordering or organizing our social interests and goals. The concepts developed in traditional cultures, Gellner pointed out, are much more all-purpose; concepts such as “the wise man” combine the virtues of truth and goodness, whereas in Western ones, the social roles of scientist and clergyman, like the conceptual roles of facts and values, are carefully distinguished. So, too, error and sin may be either conflated or distinguished depending on the cultures involved. The ways in which these social conditions relate to cognitive structures and epistemological assumptions have remained, to say the least, unclear.

While comparisons across historical or cultural boundaries make differences more obvious, differences in the ways people construe, represent, and interpret the world, themselves, and others are equally important within a culture. Scientific thinking, one kind of thinking well, has to find its place within these patterns of construal. This is, of course, not to disparage scientific thinking but to understand it and, through understanding, promote it in the contexts where it is appropriate. The schools provide the most important of those contexts. Indeed, belief in the possibility and value of systematic scientific thought coincides with history of education in the West. The cognitive and cultural significance of a scientific mode of thought warrants much of the educational effort in both developed and developing countries. Its significance is seen both in the traditional focus on teaching academic disciplines and in more recent concerns with fostering critical thinking.

From both epistemological and educational perspectives, then, scientific thinking has come to be seen as merely one mode of thought, a Modernist or paradigmatic mode, which may be contrasted with an alternative Postmodern or narrative mode of thought. The latter puts a new emphasis on the more local, domain-specific contextualized knowledge, which is interpretive in nature and socially or collaboratively constructed. While educational institutions from preschools to universities have argued for the superiority of the Modernist or paradigmatic mode and devoted their resources to its achievement, work in a variety of fields has begun to show the validity, or at least the productivity, of the Postmodern assumptions about knowledge and its formation. Knowledge, on this latter view, is largely a matter of inventing plausible and defensible stories. Scientific thinking and scientific discovery, far from being the product of private genius, occurs within a socially shared paradigm, often through collaborative activities. Critics of Postmodernism see it, in part, as a throwback to Premodern sensitivities, the mode of thought that preceded the rise of the scientific, paradigmatic tradition.

One way of threading a path through these alternatives is as stages in the discourse as one moves from hunch and intuition to fully fledged theory development. Latour and Woolgar (1979) demonstrated how discourse shifts from the personal narrative talk of the laboratory to the logical objective talk of the published paper. According to those authors, the scientists they studied at the Salk Institute appeared to attempt to transform their statements, which began as expressions of speculations, inferences, and conjecture, into statements that could stand as autonomous representations of nature. In the reading of such published papers, experts appear to reverse this scheme, attempting to recover
the unexpressed hunches and assumptions of the narrative underlying the published version (Geisler, 1994). Whatever the case, we have begun to recognize the great diversity in both the content and forms of thought, and the time has come to sort out the relations among them and the conditions necessary for their development.

The discussion takes on a particular urgency in the theory and practice of education, which tends to oscillate between social concerns with mastery of a fixed curriculum and humane concerns with the mental lives of children, the debate surrounding the child-centered movement. The child-centered movement began with the assumption that children brought to school the basic intuitions on which formal schooling and advanced education could be built. But a clear line was drawn between the practical knowledge acquired in nonschool contexts and the theoretical knowledge that was the focus of the school, the latter being primarily concerned with “the world on paper” (Laurillard, 1993; Olson, 1994). In some more current formulations of the child-centered movement, children are assumed to possess the very cognitions and cognitive processes that earlier child-centered educators thought could be acquired only by systematic study. Children, by these Postmodern lights, are assumed to be already competent theory formulators and inference makers and to be equipped by nature with the very concepts educators have traditionally thought it their duty to impart. They are thought to be natural learners, meaning makers, and knowledge constructors. The role of the school, the authorities, is to keep out of the way and allow children to get on with their collaborative world making; the job of the school is to provide “materials and encouragement” as Gardner has ironically put it in another context (1990, p. x). By minimizing the differences between the cognitions of preschool children and their more educated siblings, such Postmodernist educational theorists come into direct conflict with the more traditional assumptions about the importance of acquiring the cultural stock of knowledge and “learning to think” in advanced, indeed culturally mandated, forms.

Fortunately, these general and pervasive concerns take a more precise form in the examination of alternative modes of thought that have begun to appear in many fields of study including history, anthropology, psychology, as well as education. These disciplinary perspectives serve as a means of organizing the chapters in this volume. The challenge in each of these fields is to acknowledge the gains marked by increasingly specialized modes of thought while at the same time acknowledging the possibility, indeed the necessity, of pluralism in our thinking about thinking.

The history of thought

Geoffrey Lloyd (1990, this volume) examined in detail the conceptual changes involved in the development in classical Greece of the scientific view of the world, a view that persists, indeed predominates, to this day. He contrasts this scientific view with that in traditional societies and with that in another highly literate society, ancient China. He finds that the Greeks were
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unique in their search for demonstrative proofs, conclusions that could be justified by appeal to explicitly stated premises that could be treated as axiomatic, that is, as self-evident. This mode of thought yielded important results in such domains as mathematics and astronomy but was also applied even to topics such as medicine, which defy simple proof. On this view, scientific thinking in the West is a mode of thought with a particular and distinctive cultural history, although Lloyd is quick to point out that there are other kinds of scientific thinking besides those that happened to originate in Greece.

Stanley Tambiah (1990, this volume) examines the hegemony on rationality held since the seventeenth century by the Modernist or scientific mode of thought. More traditional forms of thought came to be seen as occult, magical, or “enchanted.” Tambiah does not deny the importance or the cultural specificity of Western science, but he argues that science is premised on but one of the many cultural functions of language. Language is used not only to represent, the Saussurean mode, but also to participate, the Herder/ Bakhtin mode. He shows how the reliance on these modes varies from culture to culture, period to period, and context to context, a variability that allows “multiple orientations to the world.”

Brian Stock (1983, this volume) examines the historical evolution of the Western notion of the independent self in the writings of Augustine, Petrarch, and Descartes, contrasting that with the notion of the interdependent self more characteristic of Eastern traditions. He suggests that the Western notion of the self, which views behavior as a manifestation of inner intentional states and sees the self as cut off from both society and nature, is the precondition for the evolution of modern scientific thought. On this view, then, not only is scientific thought distinctive, it is premised on equally distinctive representations of the self.

Ian Hacking (1975, this volume) examined the shifts in meaning that common terms underwent in the formation of modern scientific cultures. In this volume he focuses on the changing conception of human nature that followed on the adoption into popular thought of statistical, normal distributions. Only in the midnineteenth century did the concept of “normal” people arise. We take for granted the validity of such a concept as a normal child without recognizing the cultural assumption of such a description. Hacking spells these out in some detail. Again, this constitutes a distinctive, historically developed mode of thought attendant with its uses and misuses.

Yaron Ezrari (1990, this volume) examines the alternative means of thinking about and justifying the exercise of political power. He contrasts the “civic epistemology” of feudal societies, in which political authority was marked by the adorned, opaque, symbolic spectacle of monarchy, with that of democratic societies, in which the exercise of political power is based on the transparency of political forms and the right of every individual to see and know what is going on. He suggests that the privileging of either the deductive or the empirical mode of reasoning depends upon its use in achieving a balance between individual freedom and the social order. The current and increasing suspicion that processes are not as visible and comprehensible
and open to everyone as they purport to be may be part of a more general loss of faith in the positivism of the seventeenth century and, hence, the appeal of Postmodernism.

The anthropology of thought

Although Jerome Bruner (1986, this volume) was among the first cognitive psychologists to distinguish narrative from paradigmatic modes of thought and to examine the development of these modes in the thinking of young children, in this volume he places these differences in a more general theory of the universal aspects of making meaning in any cultural context. He proposes that there are four basic frameworks that people use in making sense of themselves and their world. The intersubjective mode allows the recognition that intentional states are shared with others. The agentive mode allows the recognition of doings rather than happenings in themselves and others. The deontic mode captures the network of norms and obligations that make up the social world. The epistemic mode governs the knowledge and understanding produced by representing the world linguistically as facts, analogies, and theories. These modes are universal and provide the common basis on which cultural and cognitive diversity is built.

Carol Feldman (1991, this volume) identifies modes of thought with modes or genres of discourse, different forms of language for different cultural and cognitive purposes. Adopting von Wright’s distinction between Aristotelian and Galilean modes of explanation, the former by appeal to intentional causation, the latter to mechanical causation, Feldman raises the question as to the most appropriate means for examining intentionality in life and literature where behavior is better seen as chosen rather than as caused. Feldman addresses this intentionality through literary genres, modes of discourse embodied in texts and cognized by readers, which serve as basic modes of thinking. Genres provide frameworks in which plots are interpreted even if genre selection is often not conscious. Feldman reports a series of studies that show that subtle clues may invite a reader to take a text as, say, autobiography rather than fiction and, hence, to employ quite different interpretive stances even if modern critics see them as closely related.

Keith Oatley (this volume) examines the nature of inference and emotion in narrative and paradigmatic contexts. The narrative mode results from the application of a set of mental models that underwrite planful action to the project of recognizing the plans and goals of others. This not only makes narrative comprehensible but it allows the evocation of emotion by identification with the experiences of others in fictional contexts. By contrast, reading in the paradigmatic tradition lacks the possibility of identification and the corresponding emotion. Both narrative and scientific or paradigmatic thinking involve the three types of inference that Peirce described as inductive, deductive, and abductive. What characterizes the patterns of inference making in writerly readings of literature and in participation in science is that these modes are essentially social and have been selected and passed on in particular cultural institutions, often through education. These require people to
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take different roles and to use the different forms of inference as parts of a coordinated whole.

David Olson (1994, this volume) makes an argument for the possibility of a literate mentality, a kind of mentality premised on attention to the form as opposed to the meaning-intentions expressed through the language. Literal meaning, he argues, is a by-product of such a formal orientation to language as is the possibility of strict deduction and logical proof. Such knowledge is essentially metalinguistic. But once acquired as a kind of discipline on the use and understanding of language, it is equally applicable to thinking about nature and the self. The result can be either a kind of pedantic strictness or a more analytic, disciplined mode of thought of broad applicability across more specialized cognitive domains.

Cameron Shelley and Paul Thagard (this volume) examine one mode of thought, mythological thinking, which is usually regarded as incompatible with scientific thought, and show how it, like science, is based on analogy. Analogy is a rational process that is based on mappings between the symbolic domain, the source, and the to-be-understood domain, the target. While analogy is at the base of strict induction – boy is to girl as man is to woman – in mythology the network of parallels is complex and polysemous. Shelley and Thagard examine psychoanalytic, structuralist, and functionist theories as well as their own theory of analogy as explanations of mythological thought. In so doing they show that thought, even the most mystical and occult, is based on a smaller set of perhaps universal mental operations.

The development and education of thought

Susan Carey (1985, this volume) argues that the knowledge that children acquire in the course of schooling is built upon a set of ontological preconceptions that children bring to their experience. Children are innately, and hence universally, predisposed, she suggests, to acquire such domain-specific knowledge as that of animals (including people), number, and mechanics. The predispositions come in the form of implicit causal frameworks or “theories” that even infants use to organize their experience, seeing physical events in terms of mechanical causes, behavioral ones in terms of intentions, and biological ones in terms of functions. Yet because these frameworks can change, genuine cultural and conceptual differences are possible, and many depend upon education for their development.

Scott Atran (1990, this volume) examines thinking across very different cultures in one specific domain, namely, biology. Biological classifications are remarkably universal as Atran shows in his comparison of Mayan folk taxonomies with American ones, a universality that leads Atran to hypothesize a cognitive living-domain module as part of the innate cognitive architecture of all human beings. Yet culture does have a role as he points out. As the number of known species increased – as they did during the age of discovery (and record keeping, one may add) – higher-order classifications such as “families” were introduced, which led to the reorganization or the abandonment of lower-order classes. Trees, for example, while ecologically
“natural,” were abandoned by Linnaeus as “philosophically lubricious.” Science education, Atran discovered, had little effect on folk taxonomies; basic modes of thought, he suggests, are universal.

Deanna Kuhn (1991, this volume) suggests that scientific reasoning is far from universal. Her research attempts to specify the relation between everyday thinking and the more educated scientific thinking called for by the school. The conceptual hurdle is primarily epistemological, coming to see thinking as argument and argument as consisting of relations between theory and evidence. Even high school students tend to simply “pocket” evidence when it is compatible with their causal theories and ignore it otherwise. Only the most sophisticated thinkers competently distinguish claims from evidence and use the latter to assess the validity of the former. Science education can play a critical role, she suggests, in the development of this somewhat specialized mode of thought, a mode, once acquired, that may be applied to everyday thinking as well.

Myron Tuman (1992, this volume) examines the recent concern in educational contexts with collaborative thinking. The emphasis on “process” and on “networking,” he points out, has replaced the traditional emphasis on teacher authority and on the personal acquisition of “objective” knowledge. He suggests, like Ezrahi, that the newer emphasis reflects a loss of confidence in the solutions of the past and in the scientific modes of thought that gave rise to them. But the appeal of critical Postmodern modes of thought that displace the authority of the society, including the teacher, carries important risks. Tuman adopts Gorz’s notion that science, criticism, and art are creative arenas of human expression, “areas of cultural life governed by rules determined and enforced outside one’s immediate social group.” Tuman describes access to these realms of human experience as forms of literacy, for they present the possibility of escaping the limits of one’s more immediate socially constructed world. Building on G. H. Mead’s writings on the self, Tuman argues that education must allow for both the social formation of the individual consciousness, the “me,” but also for the individual as an agent of change, the “I.” Social constructionism, with its emphasis on consensus and cooperation, may put at risk some of our other cherished values, namely, personal autonomy and scientific thought. Tuman offers an important corrective to what may otherwise become a tyrannical fad.

PURPOSE OF THE VOLUME
This volume is designed to serve four broad purposes. The first is to advance our understanding of thought by bringing together the work of scholars who, in their own work, have found it useful to distinguish alternative modes of thought whether in historical, anthropological, psychological, or educational contexts. Bringing together these perspectives allows us to establish the importance of the concept of modes of thought, the defining features of these alternative modes, their utility for various purposes, and conditions under which such modes develop.

Second, the chapters in this volume address the universality of these modes of thought to allow us to see more clearly the stamp put upon cog-
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nition by the biases and predispositions of human beings as knowers and by
the social organization of which they are a part. The chapters show that
thought in all cultures and all stages of development does share some funda-
damental features: Bruner’s list included intentionality, agency, deontic, and
epistemic properties; others appealed to forms of inference, to domain-
specific foundational theories, and to simulation and analogy as basic prop-
erties of all thought.

Third, the chapters in this volume indicate the openness of cognition to
cultural specializations of a quite radical sort. These may take the form of
domain-specific conceptual systems, of specialized genres of language, of a
specialized epistemology, of a scientific mode of language and thought, of a
culturally specific form of theoretical thinking, or even of a particular literate
form of thinking, all of which have developed in particular cultural contexts
to serve particular purposes. Perhaps even more important are the differences
between the hierarchical societies with their bias toward deductive modes of
thought and egalitarian societies with their bias toward empirical modes,
whether these are played out in the larger society, as Ezrahi noted, or within
the school, as Tuman has noted. While thinking is indeed universal, the form
it takes is quite different, depending on external cultural factors as well as
considerations that are internal to the conceptual system itself. While the
human mind may be limited in the kinds of entities and relations it can detect
and entertain, individuals and cultures have been extraordinarily inventive in
developing systems and structures that simultaneously position the thinker
within the social order and advance mastery of the physical and social world.
In this view we are not so far from that expressed in the earlier volume on
modes of thought: knowledge in any individual and in any society is both
cognitive and social, it makes the world comprehensible and at the same time
allows us to form agreements with our fellows. As the chapters in this volume
indicate, culture is the product of this inventiveness.

A fourth purpose of this volume is more pragmatic and is concerned with
the role that education plays in the development of specialized modes of
thought. Educational reform in much of North America has put a new em-
phasis on the importance of the ability to think critically, the form of para-
digmatic thinking produced by education in general and science education in
particular. At the same time educational policy has shifted from an emphasis
on the acquisition of formal, paradigmatic knowledge to an emphasis on
cooperative, collaborative learning in a more narrative mode. How are these
two seemingly contradictory goals – truth and consensus – to be reconciled,
let alone achieved, in the school? The problem has some urgency for edu-
cators with responsibility for the design and evaluation of curricula that pro-
mote a broad range of modes of thought at the same time accommodating
unprecedented cultural diversity. To see these goals clearly is the first step
to making some progress toward achieving them.

Of course, there remain many open questions: Can particular modes of
thought be used to explain cultural differences or vice versa? Which is the
cart and which is the horse? Do modes of thought have a history in Western
culture? How do modes of thought relate to modes of discourse? Are devel-
opment. Psychologists to continue to explain development in terms of increasingly abstract formal systems, a view we attribute to Piaget, or is development to be seen as the elaboration of domain-specific forms of knowledge? Is development to be seen in terms of personal and private cognitive restructurings or rather in the development of increasingly elaborated and contextualized, cooperatively constructed mental models? Will cognitive models of the mind have to incorporate not one but perhaps several modes if they are to be at all adequate to representing the mind? And perhaps most important of all, how do we recognize excellence among all this diversity?

More practical questions include: Should psychologists and educators “listen” for such different conceptual orientations and modify their approaches accordingly? In contexts of teaching and learning, is the traditional focus on formal modes of thought to be allowed to maintain its ascendancy? As educational practice increasingly turns toward dialogue and cooperative learning with its emphasis on shared knowledge and cooperation, is something of the older emphasis on truth and logic lost? Is critical thinking, the matter of an individual’s deciding what to believe, compatible with collaborative, cooperative, and consensual thinking? How is such thinking to be encouraged or developed? How is it to be evaluated?

The chapters in this volume are a product of a workshop that was planned to take advantage of the presence in Toronto of Geoffrey Lloyd, Master of Darwin College, University of Cambridge, who delivered the paper published in this volume as the Stubbs Lecture at University College, University of Toronto, on the final day of the workshop. We are indebted to the Social Science and Humanities Research Council of Canada, the Metropolitan Toronto School Board, the Spencer Foundation, and University College and its principal, Lynd Ferguson, for their support.

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