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David Moshman

University of Nebraska-Lincoln, dmoshman1@unl.edu

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Reason, Reasons, and Reasoning: A Constructivist Account of Human Rationality

David Moshman

University Of Nebraska–Lincoln

Abstract

The concept of rationality has its roots in a historic philosophical conception of human beings as creatures of reason. To act on the basis of reason is to act on the basis of reasons, which in turn implies a process of reasoning. An objectivist conception of rationality sees its essence as lying in the use of reasoning processes that conform to appropriate logical norms. A subjectivist conception of rationality sees its essence in the subjective appeal to reasons. It is argued that neither approach alone is adequate. Rationality is best viewed as metasubjective objectivity. That is, the standards that embody rationality's objective component are not externally imposed rules that circumvent subjectivity. Rather, they are internally constructed via active reflection on one's subjectivity. Psychological evidence on the development of metasubjectivity is interpreted as consistent with the present approach. Implications for theory and research, and for educational and psychotherapeutic practice, are discussed.

For Plato, it was a question of personhood. Rationality was what distinguished people—creatures of reason—from all else in the universe.

What does it mean to be a creature of reason? At the very least, it means that one's thoughts and actions are not entirely random, arbitrary, reflexive, or conditioned. To the extent that reason rules, one's beliefs and behavior are not innately fixed, nor are they completely molded by experience, nor are they mechanically caused by some interaction of genetic and environmental factors. The beliefs and behavior of a rational agent must be explained, at least in part, on the basis of why it has chosen to believe and do what it believes and does. To be a creature of reason, in other words, is to think and act on the basis of reasons (Rescher, 1988; Siegel, 1988).

But to generate and apply reasons is to engage in a process of reasoning. Moreover, if my reasoning is inadequate, it may turn out that what I take to be reasons for my beliefs and behavior actually do not justify what I think and

do, An objectivist conception of rationality would stress that unless my reasons are good reasons—that is, unless they provide genuine justification—my appeal to them does not make me rational. Thus it is not enough, in the objectivist conception, that I have and act on the basis of (what I take to be) reasons. It is necessary to examine my reasoning and determine whether it conforms to objectively defensible norms of good reasoning.

In what follows I suggest that an objectivist conception of rationality underlies most psychological research and theory on human reasoning. I then propose an alternative subjectivist account and ultimately integrate the two perspectives to produce a view of rationality as a form of objectivity constructed via metacognitive reflection on, and developmental reconstruction of, one's subjectivity. The remainder of the paper then considers some relevant research and explores implications of the proposed view of rationality as metasubjective objectivity.

Rationality as Conformity to Objective Rules of Reasoning

In the hands of Aristotle, interest in human reason was transformed into a focus on human reasoning, which in turn was seen as a matter of formal deductive logic. Over the course of many centuries of elaboration and systematization, it was assumed that the study of logic was simultaneously the study of how people reason and of how they *should* reason. As late as the 19th century, the laws of logic were still taken to be the laws of thought (Boole, 1854).

With the rise of scientific psychology in the late 19th century, however, both psychologists and philosophers increasingly distinguished questions of what people do (the province of psychology) from questions of what they *ought* to do (the province of philosophy). From this perspective, then, philosophical logic is properly concerned with ideal rationality, the objectively justifiable logical norms to which the reasoning of an ideal rational being must conform. Whether and to what extent the actual reasoning of real people conformed to such norms was strictly irrelevant. Correspondingly, the role of psychologists was to study actual reasoning.

Psychologists have indeed studied reasoning for most of the present century. Central to this endeavor has been a long-standing tradition of research on deductive reasoning (Rips, 1990). In addition, the past several decades have seen an explosion of research on various sorts of informal, scientific, and probabilistic reasoning (e.g. Kuhn, 1991; Kuhn, Amsel, & O'Loughlin, 1988; Voss, Perkins, & Segal, 1991). Sharply distinguishing such work from philosophy, some psychologists have argued that "the task of psychologists is to understand the nature of inferential behaviour rather than to judge it as rational or irrational" (Evans, 1984, p. 462). It has even been suggested that psycholo-

gists should put to rest “the unfalsifiable and value-laden notion of irrationality” (Lanning, 1987, p. 116).

The differentiation of psychological from philosophical concerns about reasoning, however, leaves open important questions about the adequacy of human reasoning and the possibility of improving it. Philosophy alone, were it to exclude all question of how people really think, could have nothing to say about actual human reasoning. Psychology alone, were it to eschew consideration of normative standards, could not evaluate the reasoning processes it discovered, much less justify any intervention to change them.

Fortunately, many philosophers interested in rationality have shown considerable interest in actual reasoning. Correspondingly, most psychological research on reasoning directly considers the relation of subjects’ reasoning to independent normative standards—formal logic, laws of probability, principles of reasoning and so forth (Kuhn, 1991; Kuhn et al., 1988; Markovits & Vachon, 1989; Moshman & Franks, 1986; Overton, 1990; Rips, 1990; Ward & Overton, 1990). In fact, many psychologists have directly addressed the implications of reasoning research for general questions about human rationality (Evans, 1989, 1991; Lopes, 1991) and many philosophers have joined wholeheartedly in the vigorous and continuing controversy over these issues (Stich, 1990). There thus exists a substantial literature that, without collapsing the important conceptual distinction between empirical and normative endeavors, attempts to address issues of human rationality by comparing empirically established processes of reasoning to relevant normative standards.

Such work is not sufficient to establish a comprehensive account of human rationality, however. Looking back beyond Aristotle to Plato, we must question the underlying assumption that rationality is simply a matter of conformity to objective rules of reasoning.

Rationality as a Subjective Appeal to Reasons

Imagine a rock rolling down a hill. How do we explain events of this sort? Typically we would appeal to specific external influences on the rock, such as its being pushed by a person and/or pulled by gravity. We would not suggest that the rock is attempting to achieve some goal. We would explain the movement of the rock on the basis of causal influences on the rock, not on the basis of the rock’s reasons for doing what it does.

It is important to note that the rock’s motions are not completely arbitrary, random or unpredictable. On the contrary, they conform precisely to the “laws” of physics. But this conformity to rigorous laws is not enough to justify an attribution of rationality. The rock has no purpose, nor even a point of view. There may be “reasons” for the rock’s movement in the sense

that an observer can explain its motion on the basis of physical causality, but the rock itself, having no subjective perspective, has no reasons, and thus no rationality.

Imagine now a computer programmed to process propositions in such a way as to derive new propositions from them. Suppose the programmed processes correspond precisely to logical norms such that the output from the computer always follows logically from the input. The computer cannot apply any inferential process that is not absolutely in conformity with appropriate nonnative standards. It has never reached—and will never reach—an unjustified conclusion.

How do we explain the computer's activities? At a purely physical level, we might conceivably provide a causal explanation just as we did in the case of the rock. Given the input, and given the physical state of the programmed computer, the laws of physics yield a sequence of events culminating in completely predictable output. There is no reason here for suggesting that the computer is any more rational than the rock.

At a more cognitive level of analysis, we might distinguish the computer's program from its hardware. Without denying that computers, like all physical entities, act in accord with the laws of physics, we might explain the computer's transformation of its input to its output on the basis of the processes it is programmed to perform. We might then suggest that there are good reasons for the computer's output, given that the output was generated from the input via logical processes.

But the computer, unless it has attained some level of genuine self-reflection, does not know it has reasons for its conclusions, or even that it has reached conclusions. It is simply generating output from input in accord with its program. It is only the programmer who knows that the programmed processes conform to logical standards and thus lead to justifiable conclusions. The computer does not even have beliefs, much less reasons for those beliefs. The beliefs and reasons are in the mind of the programmer. Lacking intention and perspective, the computer cannot be said to have reasons and thus cannot be considered a rational agent (Lehrer, 1990).

Consider now the following account of an 8-month-old baby:

Laurent . . . uses my hand as an intermediate to make me resume the activities which interest him. For example, I tap my cheek with my left middle finger, then I drum on my eyeglasses (he laughs). Afterward I put my hand halfway between his eyes and my face. He looks at my glasses, then at my hands, and ends by gently pushing my hand toward my face. (Piaget, 1963, p. 224)

Why did Laurent push Piaget's hand? Apparently, because he wanted Piaget to resume his amusing behavior. Of course, a complete psychological account would need to go further than this. It is enough for our purposes, how-

ever, to note that Laurent is a purposeful, subjective agent, intentionally initiating an action in order to achieve his objectives. This is not to deny that a baby is a physical object with a genetic and environmental history. Its behavior is no doubt consistent with any applicable “laws” of physics, biology, and psychology. But Laurent nevertheless has one of the key characteristics of a rational agent, a characteristic that was lacking in the rock and the computer: he has reasons for what he does.

It would be too quick, however, to conclude that babies are rational and computers are not. The conformity of the above-discussed computer to objectively defensible norms does suggest an aspect of rationality that a computer (without knowing it) may have and that a baby (notwithstanding its conscious desires and purposeful actions) may lack. We are, I think, rightly hesitant to attribute full rationality to either. The key point is that the concept of rationality, in its historic and typical uses, seems to include both subjective and objective elements (Bickhard, 1991). Rationality involves having a subjective perspective, including intentions and reasons, and acting in accord with objectively defensible norms, including logic.

The inadequacy of the objectivist and subjectivist conceptions of rationality suggests the need for an alternative. One might wonder whether we need a concept of rationality at all. But to deny rationality would be to claim that we never really have reason for believing anything. On pain of self-contradiction, one cannot maintain that there is adequate reason for such a claim. We may therefore assume the existence of rationality and seek a more adequate account of its nature.

Rationality as Metasubjective Objectivity

I have presented two conceptions of rationality, respectively labeled “objectivist” and “subjectivist,” and argued that neither is adequate to capture our intuitive sense of what it means to be a rational agent. Rather than dispense with the concept of rationality, however, I propose that we can define it in a way that not only is meaningful but also will assist us in conceptualizing the relationship of objectivity and subjectivity. In the present section, I develop and examine a conception of rationality as a form of objectivity that emerges from a reflective reconstruction of one’s subjectivity.

Subjectivity, Objectivity and Rationality

There is a natural inclination to construe subjectivity as a realm of idiosyncratic perceptions, feelings, interpretations and commitments that need not and cannot be justified. Correspondingly, objectivity is viewed as the realm of facts, logic and rigorous justification. Given such conceptions, it is natural to

see a fundamental opposition between subjectivity and objectivity and to associate rationality with the latter (Moshman & Lukin, 1989).

But subjectivity need not be construed as a realm of idiosyncratic ideas and feelings. Rather, it may be seen as a property of cognitive actions (reasoning, remembering, perceiving, etc.) that take place, as they must, from some point of view (Nagel, 1986). Objectivity, on this view, is not a realm of absolute truth and rigorous logic distinct from the realm of subjectivity. Rather, subjectivity and objectivity are complementary poles of the relationship of knowing (Piaget, 1985). Given that knowing always takes place from some point of view, one's knowledge is always a function of one's viewpoint and thus unavoidably subjective. To the extent that knowledge is constrained by a reality distinct from the knower, however, it is also a function of that reality and thus, to that extent, objective.

When I see the *Star Trek* mug on my desk, for example, my seeing is subjective in that what I perceive is a function of my sensory organs, my concept of a "mug," my knowledge of *Star Trek*, etc. My perception is simultaneously objective, however, to the extent that what I perceive (a *Star Trek* mug rather than, say, an armadillo) is a function of a reality distinct from my perspective. Knowing, in other words, is a joint function of perspective and reality, and thus simultaneously subjective and objective.

Can I increase my objectivity? To the extent that I become aware of the various ways my perspective determines what I see, I can compensate for that and form a more objective conception of what is really there. Recognizing that my perception is influenced by my cognitive structures, for example, I may conclude that what is really on my mug is a set of colored patterns; I interpret them as a *Star Trek* scenario in part because of (what I now see as) the specific configuration of colors and patterns but also (I now realize) because of the salience of *Star Trek* in my cognitorium. Thus my knowledge about my subjective perspective enables me to understand why I see what I see the way I do and to construct a more objective conception of what is really there.

But are there really colored patterns on my mug? Further analysis may lead me to determine that what is *really* there is a configuration of atoms that reflect light waves in such a way as to cause my visual system to register certain colors and patterns. But even this more objective conception reflects the theories I am using to comprehend my relationship with reality; those theories, however well supported, are subjective perspectives themselves. Thus my continuing self-reflections never permit me to transcend subjectivity but nevertheless may allow increasing objectivity (Piaget, 1985). If we define the reflective analysis and reconstruction of one's subjectivity as *metasubjectivity*, we can then define rationality as *metasubjective objectivity*.

It is important to emphasize that psychological reflection takes place in the course of transactions with one's environment. From an external point of

view, the object of reflection is not pure subjectivity but a subject-object (or subject-subject) relationship. The construction of that “external” (metasubjective) point of view enables explicit understanding and reconstruction of the previously implicit subject-object relationship. My (metasubjective) knowledge about my visual system, for example, enables me better to understand the nature of the environment that interacts with that system to yield the experience of a Star Trek scenario.

Thus reflection on the subject is simultaneously the construction of the object (Piaget, 1985). Rationality—the co-construction of metasubjectivity and objectivity—is intrinsic to the process of reflection. As Thomas Nagel put it:

To acquire a more objective understanding of some aspect of life or the world, we step back from our initial view of it and form a new conception which has that new and its relation to the world as its object. In other words, we place ourselves in the world that is to be understood. The old view then comes to be regarded as an appearance, more subjective than the new new, and correctable or confirmable by reference to it. The process can be repeated, yielding a still more objective conception. (1986, p. 4)

The Development of Metasubjective Objectivity

An important implication of the present conception is that rationality can only be understood developmentally. That is, no set of ideas or system of logic can be taken as defining rationality (Bickhard, 1991). We are rational to the extent that our most fundamental conceptions and modes of reasoning enable greater objectivity than did their predecessors. Rationality resides in the developmental process whereby our subjectivity becomes an object of reflection, thereby allowing the construction of a more objective metasubjectivity. Specific facts and rules may be learned, but rationality is an intrinsically developmental phenomenon (Beilin, 1992; Bickhard, 1991; Campbell & Bickhard, 1986; Moshman & Lukin, 1989). As Nagel put it:

We can add to our knowledge of the world by accumulating information at a given level—by extensive observation from one standpoint. But we can raise our understanding to a new level only if we examine that relation between the world and ourselves which is responsible for our prior understanding, and form a new conception that includes a more detached understanding of ourselves, of the world, and of the interaction between them. (1986, p. 5)

Why do we engage in such metasubjective reflection? The inherent subjectivity of knowing insures that people will frequently disagree with each other’s perceptions, interpretations and conclusions. Moreover, the multiple perspectives a given individual can bring to bear on a complex situation routinely create internal contradictions as well. Such disputes and discrepancies

can only be accounted for and addressed by becoming aware of the differences in perspective that generate them. Thus disequilibrium provides the motivation for metasubjective reflection (Piaget, 1985).

One may still wonder why such reflection enhances objectivity. Reflection on and reconstruction of one's subjectivity is, after all, a subjective process—that is, it takes place from the subject's point of view. It may allow one to transcend a particular subjective perspective but it does not allow one to escape subjectivity per se and move into a distinct realm of objectivity. One might, then, expect metasubjectivity to lead toward increasing idiosyncrasy and ever further from any sort of objectivity.

Metasubjective reflection may indeed create confusion, uncertainty and emotional trauma (Chandler, Boyes, & Ball, 1990). In making implicit aspects of our knowing explicit, however, it has the potential to generate a reconstructed subjectivity that encompasses and transcends the lower-order perspective on which it reflects (Campbell & Bickhard, 1986). The better I understand my own contribution to a given epistemic transaction, the better my inference about the contribution of reality and the greater my ability to reconstruct my subjectivity so as to be less distorting of what I now take reality (including myself) to be.

To the extent that the resulting metasubjectivity represents an increase in objectivity, it may resolve the disequilibrium that originally motivated self-reflection (Piaget, 1985). More objective metasubjectivities are thereby more likely than others to persist and, eventually, become a fundamental part of the individual (Bickhard, 1991). To the extent that they do, it is because their superiority to what they replace is recognized by the individual. Thus their normative status corresponds to their motivational force.

Development of Metasubjective Objectivity: Empirical Evidence

Having proposed and discussed a conception of rationality as metasubjective objectivity, I now turn to the relation of this conception to empirical research. I first consider evidence relating to the prevalence and developmental course of metasubjectivity and then turn to the more complex question of whether objectivity emerges via metasubjectivity.

Development of Metasubjectivity

On the basis of the present perspective, one would expect metasubjectivity to be characteristic of human cognition and to show a robust developmental course. Available data are fully consistent with these expectations. Research spanning a variety of topics, methodologies and theoretical perspec-

tives shows substantial metasubjectivity in children as well as adults and dramatic developmental progress toward qualitatively greater awareness of one's knowledge, perspectives and inferential processes.

Such development begins very early. Even during the preschool years, children show increasing awareness of their own subjectivity and increasing understanding of the role of subjectivity in perception, knowledge and reasoning (Astington, Harris, & Olson, 1988; Flavell, Green, & Flavell, 1990; Moshman, 1990a; Pillow, 1988). This is revealed, for example, in children's increasing ability to identify the sources of their beliefs (O'Neill & Gopnik, 1991), to recognize the possibility of generating knowledge via inference (Sodian & Wimmer, 1987), to appreciate the influence of prior knowledge on belief (Perner & Davies, 1991), and to distinguish their own perspectives from those of others and from reality itself (Flavell, 1992).

The development of metasubjectivity continues for many more years. Much of later development involves increasingly explicit conceptions about the nature and use of theories, logic, and reasoning. As children move into and through adolescence, for example, most increasingly understand the distinction between hypotheses and evidence (Kuhn, 1989; Kuhn et al., 1988), the non-empirical nature of tautologies and contradictions (Osherson & Markman, 1975; Russell & Haworth, 1987), and the validity of arguments as distinct from the empirical truth of their component propositions (Moshman & Franks, 1986). Over the course of adolescence and adulthood, many individuals show increasingly sophisticated and explicit conceptions regarding the nature and justification of knowledge (Chandler et al., 1990; Kitchener, King, Wood, & Davison, 1989; Kuhn, 1991, chap. 7). Although questions remain regarding the nature of various metasubjective competencies and the ages at which they typically develop (Chandler et al., 1990; Sodian, Zaitchik, & Carey, 1991), the existence of a strong developmental trend toward increasing metasubjectivity is not seriously disputed,

Metasubjectivity and Objectivity

The more difficult question is whether and how metasubjectivity contributes to objectivity and whether the development of metasubjectivity is thereby central to the development of rationality. With respect to preschool children, initial ability to distinguish objective reality from mere appearance occurs about the same time as ability to understand the subjective basis for appearances and is widely assumed to be closely associated with such metasubjectivity (Astington et al., 1988; Flavell, 1992). Whether further development of metasubjectivity entails increasingly objective reasoning, however, is less clear.

With respect to metatheoretical awareness, for example, does reflection on the distinction between theories and evidence yield the sort of hypothesis-

testing strategies that provide a more objective view of reality? There is indeed evidence for a developmental progression from testing hypotheses by seeking supporting evidence to testing them by systematically seeking disconfirming evidence (Overton, 1990; Ward & Overton, 1990). The latter strategy represents a gain in objectivity in that it is more likely to show the falsity of a hypothesis (given that it is indeed false). The age range of this developmental trend corresponds roughly to the age range in which metatheoretical awareness is developing (Kuhn, 1989; Kuhn et al., 1988).

Similarly, coordinating developmental trends across studies, one can make a case that greater awareness of one's deductive processes yields increasingly consistent logical reasoning. The increasing metalogical awareness of argument form over the course of adolescence (Moshman & Franks, 1986), for example, may be associated with increasing ability to reason objectively with contrary-to-fact propositions (Markovits & Vachon, 1989). Although even young children often make correct inferences, the developmental trend toward systematic deductive reasoning is plausibly understood as emerging from successive levels of metalogical reflection (Moshman, 1990a).

These data do admit of alternative interpretations, however. More convincing support for the present view might come from studies in which the same individuals are assessed with respect to both metasubjectivity and objective reasoning. Such research is unfortunately rare. There is, however, a recent study by Kuhn (1991) in which 160 adolescents and adults were assessed with respect to (a) their conceptions about the nature of knowledge and (b) various aspects of skill in argumentation. Consistent with the present account, those individuals with the most sophisticated conceptions about the justifiability of knowledge—who saw theories as uncertain and yet subject to rational evaluation—were more likely than the others to be able to provide counterarguments with respect to their theories and to generate alternative theories (Kuhn, 1991, chap. 7). Even this evidence, however, does not show that the more objective reasoning resulted from construction of the higher level of metasubjective awareness.

Conclusion

Available evidence thus shows strong developmental trends with respect to many varieties of metasubjectivity. Direct evidence that such metasubjectivity contributes to objectivity is sparse. It seems unlikely, however, that metasubjectivity would be so pervasive and develop so vigorously if it served no purpose. This suggests the need for further research more directly examining metasubjectivity as a basis for objectivity.

Implications and Conclusions

I have argued for a constructivist conception of rationality. Rationality, in this conception, is in part an objective matter involving the conformity of reasoning to philosophically defensible standards. Rationality is also, in part, a subjective matter involving purposeful action on the basis of personal reasons. Psychological evidence shows that reflection on one's subjectivity is a normal aspect of human cognition and development beginning in early childhood. Reflection on subjectivity is itself a subjective process, but this does not mean that it moves the individual further from the constraints of rules and reality. On the contrary, metasubjectivity may involve systematic reconstruction of reasoning so as to better coordinate subjectivity and objectivity. The resulting developmental progression toward metasubjective objectivity, it is suggested, constitutes rationality. This conception of human reason has important implications for theory, research and practice.

Theoretical Implications

Any general theory of cognition must explicate human rationality. To do so, it must be able to address both subjective and objective considerations in a way that makes it possible to relate these (Bickhard, 1991; Campbell & Bickhard, 1986; Moshman & Lukin, 1989).

Piaget's theory in its traditional versions (e.g. as presented in Flavell, 1963) proposed a succession of developmental stages, each characterized by a distinct logical structure demonstrably more adequate than the structure of the previous stage. If one construes rationality in purely objective terms, such a theory can be taken to posit progressive levels of rationality.

In his later work, however, Piaget increasingly emphasized the developmental role of reflective abstraction, involving an active process of metacognitive reflection on and reconstruction of one's knowing from the emerging perspective of a higher level of knowing (Campbell & Bickhard, 1986). Moreover, Piaget viewed development as an ongoing renegotiation of the relation between subjectivity and objectivity, with objectivity constructed via a process of metasubjective reflection (Piaget, 1985). The present account, then, without being committed to the specifics of Piaget's stages, is clearly Piagetian in a broad sense. It suggests that Piaget's later work is fundamental to the study of human reasoning and rationality—arguably a new theory (Beilin, 1992).

Information-processing theories generally emphasize the precise specification and modeling of real-time unconscious mental processes. To the extent that such processes correspond to logical standards, they may be rational in a purely objective sense. With respect to the present conception of rationality,

however, persons using such processes to manipulate mental representations are no more rational than computers engaged in comparable processing. The increasing focus of information-processing theorists on metacognitive and executive processes represents a step in the right direction. To the extent that metacognition merely illuminates, monitors or directs cognitive processes without actively transforming them, however, it is a much weaker mechanism than Piaget's reflective abstraction.

What information-processing theories need in order to fully address issues of human rationality, in my view, are stronger mechanisms of self-reflection capable of transforming understanding (Moshman, in press; for an attempt to provide such a mechanism, see Klahr, 1984). Only with such mechanisms will information-processing theories be able to account for the sort of metasubjectivity that research reviewed earlier has shown to develop and that the present theory posits as central to rationality. The same can be said with respect to neo-Piagetian theories of the sort discussed in Case (1992).

Implications for Research

Rationality is generally not seen as a distinct topic for psychological research. The literature typically deemed most relevant to rationality is the work on reasoning. But the application of the reasoning literature to issues of rationality typically consists of comparing actual reasoning processes with logical norms, an approach that only gets at the objective aspect of rationality.

There are, happily, a substantial number of studies concerning the development of conceptions *about* mind, perception, representation, knowledge, logic, reasoning and so forth. Such work appears to be yielding an increasingly cohesive literature on the emergence of metasubjectivity. That literature may be at least as important as the reasoning literature to understanding human rationality.

What is still lacking is an integration of these two literatures. Research on rationality must address more directly the relation of metasubjectivity to objective reasoning. Such research, especially at higher levels of development, will be complicated by the fact that the standard of objectivity is itself a function of the scientist's perspective, and thus a matter of legitimate dispute. Nevertheless, an integrated program of research on metasubjectivity and reasoning may help address fundamental questions raised earlier about the relation of objectivity to metasubjectivity, about the emergence of higher logics from higher levels of reflection. Such an integration might eventually yield a systematic body of psychological research on human rationality.

Implications for Practice

Finally, the present conception of rationality has significant implications for enhancing human rationality. Most educators agree that the improvement of thinking should be a major goal of education (Siegel, 1988). The most systematic current efforts aimed at improving the thinking of students tend to involve relatively direct inculcation of specific thinking skills (Adams, 1989; Baron & Sternberg, 1987). Good patterns of thinking, if well learned and applied, may indeed help students reach better conclusions and reject unfounded ideas, just as a better program may cause a computer to produce better output. To the extent that the student lacks reflective understanding of and intentional control over his or her thinking skills, however, the student is no more rational than the computer (cf. Kuhn, 1991; Lehrer, 1990). Only to the extent that educational programs engage students in active reflection on and reconstruction of their own thinking are they fully enhancing rationality (Moshman, 1990b, 1994).

Similar considerations apply with respect to psychotherapy. Many theorists and practitioners believe that psychological problems are often due to irrational ideas and patterns of thought and can be relieved by eliminating such ideas and thought patterns (Beck, 1976; Ellis, 1977). But if we construe rationality as emerging from metasubjectivity, it is not enough simply to reprogram clients. Rather, the psychotherapist must assist them in reflecting on their own thought processes so that changes in those processes will emerge out of such self-reflection (Moshman & Hoover, 1989).

Conclusion

With respect to educational and psychotherapeutic practice, then, as for theory and research, a concern for good reasoning is appropriate. But rationality is served only when objective reasoning grows out of the subjective quest for reasons. It is our metasubjective objectivity that makes us creatures of reason.

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David Moshman is Professor of Educational Psychology at the University of Nebraska–Lincoln, where he teaches courses in developmental psychology. His research addresses theoretical issues concerning the nature, development, and promotion of reasoning and rationality, including related work on intellectual freedom and its relation to intellectual development. He is the author of *Children, Education, and the First Amendment: A Psycholegal Analysis* (University of Nebraska Press, 1989). Address: Educational Psychology, University of Nebraska–Lincoln, Lincoln, NE 68588-0641, USA.