Relational and Contextual Reasoning: A Symposium on Helmut Reich's Book Developing the Horizons of the Mind

HELMUT REICH'S PROPOSAL

by John R. Albright

Abstract. A form of logic called relational and contextual reasoning is put forward as an improvement over other, more familiar types of logic. Developmental ideas are used to show how maturity ordinarily leads people away from binary (true/false) logic to systems of reasoning that are more subtle and better suited to making decisions in the face of ambiguity.

Keywords: antinomy; dualism; duality; fuzzy logic; human development; logic; paradox; quantum logic.

Helmut Reich has presented a book whose purpose is to explain a system of logic that offers advantages over the more familiar form, which we shall call binary logic. We have all encountered binary logic in the form of the syllogism, already known to the ancient Greeks. We chafed under the restrictions of binary logic when we were schoolchildren and had to take a true-false test. Inevitably some of the items on the test were ambiguous, and we had to figure out which criteria could save us from making a choice that would be marked wrong by the teacher. Reich has presented a logical system called "relational and contextual reasoning," which—in his view—offers advantages over other systems.

John R. Albright is Professor of Physics at Purdue University Calumet, Hammond, IN 46323-2094. A version of this essay was presented at the forty-ninth annual conference of the Institute on Religion in an Age of Science, Star Island, New Hampshire, 27 July–3 August 2002.

[*Zygon*, vol. 38, no. 2 (June 2003).]
 ISSN 0591-2385

Reich is well aware that binary logic is often quite useful. For example, computers are nearly all based on Boolean algebra, a form of binary logic. This arrangement works so well that none of us would be happy to give it up. In attacking binary logic, Reich is not attacking computers. Rather he is attacking the dualistic habit of forcing a choice instead of looking for additional possibilities.

Dualism and Duality

The habit of explaining the world on the basis of choosing between two options is very old. Traces of it may be found in nearly every culture, and it is tempting to speculate that the bilateral symmetry that we humans share with nearly all mammals is conducive to such thought patterns as "on the one hand . . . but on the other hand. . . ." But the incidence of dualism is not equally strong in all cultures. It seems that the earliest systematic religion to be built on the good/evil dualism is the Zoroastrianism of the ancient Persians. According to Zoroaster, the principle of Good (*Ormuzd*) and the principle of Evil (*Ahriman*) are in conflict within our world. This dualistic idea was imparted to the Jews following their Babylonian experience, leading to the concept of struggle between God and Satan. This form of dualism was in turn adopted by Christianity, and it certainly survives in the popular religion of our time, along with other dualisms. James Russell Lowell expressed basic dualism in widely familiar lines that are probably used more for the musical value of the customary Welsh tune than for the debatable dualistic theology of the somewhat gender-laden words:

> Once to every man and nation
> Comes the moment to decide,
> In the strife of truth with falsehood,
> For the good or evil side;
> Some great cause, God's new messiah,
> Offering each the bloom or blight,
> And the choice goes by forever
> 'Twixt that darkness and that light.

Reich is interested less in the dualisms mentioned so far than in dualities, by which we mean things that look like binary choices but are not. He considers such rich topics as the nature-versus-nurture controversy, in which one side claims that the innate nature or heredity of a person is predominant and the other side assigns primacy to environmental influences. It is clear enough that a measure of each goes into the makeup of a human personality.

As a physicist, Reich is well aware of the wave/particle duality that preoccupied physics for the early part of the twentieth century. Physics and

philosophy of the nineteenth century could not conceive of an arrangement that could have wave and particle properties at the same time. Quantum mechanics provided a structure that can handle both aspects of light, electrons, or whatever, so there is no longer any need to answer the question "Is the electron a particle or a wave?" because it is both.

Reich also alludes to the science/religion duality and the recognition that it is neither necessary nor desirable to force a choice between the two. In addition to these three, one can add five more dualities for which the usual binary choices are entirely too simplistic. The first of these is from the area of education, in which phonics and look-say techniques of reading have had their respective proponents. The best way to see how important both methods are is to try to learn a language that uses an unfamiliar alphabet. Without phonics you will be unable to pronounce a new word that you see in print. Without look-say you will never be able to read fluently. Stasis versus kinesis is another fertile area of duality. A third is the struggle between holism and reductionism. A fourth is less widely recognized: the virtues of global theories as opposed to local theories. And finally, there is the long-standing duality of determinism and chance.

Alternative Logical Schemes

Helmut Reich is much too subtle to claim that binary logic is bad (or wrong) and his own method of relational and contextual reasoning (RCR) is good (right). Any such statement would immediately hand over supremacy to binary logic. It is characteristic of Reich's style that he examines the situation and identifies other options, such as dialectical reasoning, Piaget's reasoning (Piaget 1967), fuzzy logic (McNeill and Freiberger 1993), and quantum logic (Reich 2002, chap. 5). After examining each of these, he concludes that they are inferior to RCR. The last two are relatively new and have become quite fashionable, so it would be well to say a little more about them. Fuzzy logic arose as an attempt to do the sort of thing that Reich is trying to do, namely, have a structure that will help the user to make decisions that must be made in the absence of definite information. Fuzzy logic provides a type of calculus of probabilities so that rational use can be made of data that are inconclusive or inadequate. Quantum logic is based on the fact that wave functions (or, more generally, vectors in Hilbert space) are additive; probabilities are formed from the absolute squares of wave functions, and so they are not in general additive. The theoretical framework exists for using quantum devices to exploit this unusual logic (Milburn 1998); the theory is not controversial, but so far no one has been able to design hardware that can take advantage of the unique power of quantum logic (Deutsch 1997, chap. 9).

Methodology of RCR

Reich has refined his logical procedures by way of long experience, including many interviews with subjects to see how real people attack ambiguous problems that have what appear to be mutually exclusive answers. He has studied the developmental aspects of problem solving by using people of varying ages. His results allow certain generalizations on the development of insight. Performance can be analyzed into five levels (Reich 2002, 132), as one can illustrate for the case of a phenomenon with two competing explanations, *A* and *B*.

1. Only one is correct, either *A* or *B*.
2. After looking at other aspects, it is less simple: maybe *A* and some of *B*.
3. At a deeper level, all aspects are needed, both *A* and *B*.
4. The relation and context are recognized.
5. A synopsis and a theoretical structure are presented.

A further refinement of methodology, which is of great use to anyone who wants to understand and use RCR, is a sort of eightfold way by which one can achieve the deepened insights that are so desirable.

1. One must clarify the explanandum, the situation to be explained.
2. Next one lists all the relevant explanations, and
3. Checks to make certain that they are really relevant.
4. The context must be established.
5. Links are to be established among the various explanations.
6. One next explores the extent of the explanatory power of these linked explanations.
7. A synopsis or a theory is prepared.
8. Finally, one needs to explain any shifts in meaning that have arisen.

Applications to Religion

Reich's approach is intended to achieve its full value when it is applied to problems that are not totally clear. Religion and theology offer this kind of situation. Some of the other logical systems will not be at their best in this type of discussion. For example, Piaget specifically excluded religion from his form of logic on the grounds that religion is not logical. Fuzzy logic and quantum logic would be difficult to use because they emphasize a more quantitative type of input than religious problems can ordinarily provide.

Instead of excluding religious topics, Reich exults in the way that the power of RCR shows to advantage in treating various paradoxical antino-

mies of theology (Reich 2002, 80). He discusses the classic question of the nature of Jesus of Nazareth: Was he human or divine? The nature of the Trinity is another problem that caused great turmoil in the early centuries of Christianity, and which Reich handles. A more modern example is the question of God's action in a world governed by natural law: Does God act, and if so, what form does that action take? This question has been investigated in great detail by the participants in the Vatican Conferences entitled Scientific Perspectives on Divine Action.

Future work in this direction—using RCR to explicate theological concepts that appear to be opposites but are more subtly connected than that—could explore such issues as law versus gospel, grace versus justice, predestination versus free will, or top-down versus bottom-up reasoning. The last of these is an issue for science as well as for religion. It will be interesting to see how Reich's style of logic can be applied to such questions.

For any new approach to analysis and evaluation of ideas, the test of quality is primarily one of fruitfulness. It is evident that Reich's system passes the test, because it is applicable to a much larger array of problems than those that he treats explicitly in his book. He has laid the foundations for a whole new intellectual industry.

References

Deutsch, David. 1997. *The Fabric of Reality: The Science of Parallel Universes—and Its Implications*. New York: Penguin.

McNeill, Daniel, and Paul Freiberger. 1993. *Fuzzy Logic: The Revolutionary Computer Technology That Is Changing Our World*. New York: Touchstone.

Milburn, Gerard. 1998. *The Feynman Processor*. Reading, Mass.: Helix Books.

Piaget, Jean. 1967. *Logique et connaissance scientifique*. Vol. 22 of *l'Encyclopédie de la Pléiade*. Dijon, France: Éditions Gallimard.

Reich, K. Helmut. 2002. *Developing the Horizons of the Mind: Relational and Contextual Reasoning and the Resolution of Cognitive Conflicts*. Cambridge: Cambridge Univ. Press.