

## Conceptual Issues and Critical Debates in Psychology Week 20 Reductionism, holism and human action

For some links to supplementary reading and a pdf version of this handout go to <http://www.brown.uk.com/teaching/conceptualissues/freewill.htm> or <http://www.brown.uk.com> and browse through to the teaching resources.

Much of what we call modern science is a historical enterprise that dates from the 16th and 17th centuries. In the renaissance and early modern period many key thinkers laid the foundations. Francis Bacon, Rene Descartes, John Locke, Galileo Galilei, Sir Isaac Newton, Robert Boyle to name only the most usual of the usual suspects. The work of these thinkers and investigators contributed to the development of a way of producing knowledge that was astonishing in its ability to explain the natural world.

Merchant, in her book *The Death of Nature* (1980), argues that the development of modern science was accompanied by a change in the metaphors used to make sense of nature. According to Merchant modern science took Mother Nature and turned her into a machine and that this mechanistic worldview allowed for new ways to see order in the complexities of nature, fostering an attitude of control and domination toward both women and the natural world (Fehr, 2004).

A good deal of scientific inquiry hinges on the notion of 'reductionism'. Reductionism involves the view that phenomena, processes and things in the universe are arranged hierarchically, and that causation is best understood at the lowest levels of this hierarchy. Reductionism involves explaining wholes in terms of the operations of their parts; hence, a reductionist scientific method focuses on describing and understanding a phenomenon in terms of its parts (Fehr, 2004, p. 137).

Reductionist views may be described in terms of whether they are 'strong' or 'weak'. depending on the level of organization to which phenomena are ultimately to be reduced. 'Strong' reductionism supposes that there is a fundamental level at which entities are real and where causation happens. A strong reductionist explanation would rest on this level. For example explaining conscious experiences in terms of nerve cells firing is a 'reductionist'. It is assumed that there is a level of phenomena – perhaps cells, molecules, atoms or even subatomic particles on which explanations rest, and where methodologies should focus. In the biological sciences, strong reductionism might contend that phenomena should be explained or 'reduced' to their physiochemical constituents. Weak reductionism assumes that causation, explanation, and methodology should focus on the parts of wholes but does not necessarily insist that these parts be the simplest or smallest entities possible (Fehr, 2004).

### Classical Reductionism

'Classical reductionism' comes from Carnap's (1938) idea of 'the unity of laws'. This is a notion that it is desirable to construct a homogeneous system of laws for the whole of science in which the laws of one scientific discipline are derivable from those of another (Barendregt and van Rappar, 2004). Later, Oppenheim and Putnam (1958) built upon this idea and formulated the concept of the 'unity of science as a working hypothesis' in terms of the 'micro-reduction of theories'. Micro-reduction is the reduction of *higher-level* theories (such as psychological theories) to *lower-level* theories (such as theories in neuroscience). Oppenheim and Putnam employed a concept of reduction according to which a higher-level theory (the theory to be reduced [TR] ) is reduced if a lower-level theory (the more basic theory [TB]) explains the same or more phenomena and is at least as systematized. A disadvantage of this concept of reduction is that it describes only the relation between TB and the empirical claims of TR. A more interesting notion of theory reduction, however, would obtain a direct relation between TB and TR (Schaffner, 1967).

### Reductionism in practice: Genetics, politics freedom and human values

Rose, (1999, p. 871)

To judge from headlines in daily newspapers, or the titles of academic papers in major scientific journals, the issues of a decade ago have been settled. Vulgar sociobiology may be out, but what I have called

“neurogenetic determinism” is strongly entrenched. There are genes available to account for every aspect of our lives, from personal success to existential despair: genes for health and illness, genes for criminality, violence, and “abnormal” sexual orientation – even for “compulsive shopping.” And genes too to explain, as ever, the social inequalities that divide our lives along lines of class, gender, race, ethnicity; and where there are genes, genetic and pharmacological engineering hold hopes for salvation that social engineering and politics have abandoned’.

Indeed ‘claims go far beyond this, arguing that “human nature” was fixed in the stone age and that there has not been evolutionary time subsequently to modulate these universals, such as women’s having more orgasms when mating with men wearing rolex watches or men preference for sex with women who have optimal hip-waist ratios’ (Rose, 2009).

‘The psy-shaped space that inhabits the human being is losing its depth, that depth that once had to be mined and interpreted. The psyche is becoming flattened out and mapped onto the corporeal space of the brain itself...’ (Novas and Rose, 2000: 508).

Midgley (1998) asks, how would one translate “money” or “justice” into chemical or even biological terms?

“Physical determinism . . . was a *day-dream of omniscience* which seemed to become more real with every advance of physics until it became an apparently inescapable nightmare.” (Popper, 1972, p. 87)

As Rose puts it, “far from being determined, or needing to invoke some non-material concept of free will to help us escape the determinist trap, it is in the nature of living systems to be radically indeterminate, to continually construct their – our – own futures, albeit in circumstances not of our own choosing” (p. 7).

Miller (1999, p. 901)

‘I recently studied the evidence on the genetics of schizophrenia and was shocked by the naivete of molecular genetic studies of schizophrenia. . . . Probably the genetic aspects of the disorder are relatively rare combinations of many individual genes, all of which are common, and in themselves probably quite benign. In molecular psychiatric genetics, however, the goal is usually to find “the gene” or “genes of major influence.” This search, on which vast resources have been lavished, seems to assume that schizophrenia is a clearly defined category, so that it can be defined genetically in terms of one or a very few genetic factors. This betrays gross ignorance – both of the large body of evidence about schizophrenia favouring a dimensional rather than a categorical definition for the disorder, and of the traditional psychiatric genetics. Its implicit assumption “one gene – one psychological characteristic” or “one gene – one diagnosis” seems very similar to the underlying assumption of phrenology, and is not much more sophisticated conceptually.’

This work certainly fits well into Rose’s critique of reductionism and determinism.

Rose, (1999 p. 885):

‘Reductionist ideology not only hinders biologists from thinking adequately about the phenomena we wish to understand, it has two important social consequences: it serves to relocate social problems to the individual, thus “blaming the victim” rather than exploring the societal roots and determinants of a phenomenon; and second, it diverts attention and funding from the social to the molecular’.

‘Scientists sometimes search for the genetic basis of social phenomena such as homosexuality, race and intelligence as if such phenomena were bare scientific facts devoid of any cultural origins (Wolpe, 1997, pp. 213–215). As a result of geneticization, the gene is being reified by our culture in ways that are profoundly altering our view of human life itself. The gene is not only reified, but it is made to be the most important element of who we are. This is the process of genetic reductionism. It cannot help but alter the way we view disease and hence diagnostics’ (Stempsey, 2006, 195-196).

Garza and Smith (2009: 530) 'the brain (or any physical object) is merely one part among many comprising the holistic human being, and to attempt to ascribe properties of the latter to the former is illogical. . . . Even in the case of psychotically florid symptoms, the person with schizophrenia does not experience or report what his or her brain is doing. Rather, the person with schizophrenia experiences him- or herself and his or her symptoms as a person—not as a part but as a whole'.

Another example comes from a positron emission tomography (PET) study of intelligence (Duncan et al. 2000) in which they were attempting to locate the basis for intelligence in the frontal lobes based on evidence from the PET data. However, Sternberg (2000) maintained that the authors' basis for the claim could not rest in their empirical evidence (i.e. the PET data), because the authors "fail[ed] to show anything more than a correlational relationship" (p. 401). Instead, Duncan et al. (2000) demonstrated a correlational relationship between frontal lobe metabolic activity and intelligence, rather than a causal relationship between intelligence and the frontal lobe activity. Sternberg (2000) went on "The mental-atlas approach taken by Duncan et al. (dating back to the time of the phrenologist Gall) implies that the understanding of intelligence depends upon finding the locus or loci of intelligence in the human brain"(p. 401). Hence, Duncan et al.'s pre-investigatory assumptions regarding materialism surpassed the methodological limitations of the study, and the authors jumped to conclusions about the physical basis of intelligence.

### **Holism**

Holism refers to the idea that the properties of a system cannot be reduced, determined or explained by looking at the sum of its components alone. The term was first used in the social sciences by Emile Durkheim who used the concept of holism to oppose the fact that society was a simple collection of individuals. The idea was popularized in evolutionary theory by Jan Smuts in his 1926 book, *Holism and Evolution*, Smuts defined holism as 'The tendency in nature to form wholes that are greater than the sum of the parts through creative evolution'.

As Blanchard (2006) puts it, in the social sciences, holism carries a predominantly sociocultural connotation, and refers to how people, institutions, symbols, and behavioural patterns are interrelated. In anthropology, for example, Haviland (1997) argues that anthropologists must relate the social, political, economic, and religious, parts of society, without placing undue emphasis on one part at the expense of others.

Contemporary defenders of holism in relation to social phenomena believe that there are irreducible laws about social phenomena. Philosophers of social science, such as Bhaskar (1979) and Manicas (1987), believe that casual processes throughout nature are stratified. In this view there are irreducible laws which cannot meaningfully be reformulated in terms of lower level phenomena. This is believed to be true in the case of social phenomena, but also at other levels of organization, such as psychology, physiology, biology, and chemistry. They believe that theories in social science must mention unobservable theoretical entities, such as social structure, because much of what we observe in social behaviour cannot meaningfully be reduced to the activity of brains, nerve cells or molecules. As 'realists', they believe that those entities exist in some way that is not reducible to the individuals and their behavior. Holism (or nonreductionism) is sometimes described as the opposite of reductionism, although proponents of scientific reductionism state that it is better regarded as the opposite of what Dennett (1995) calls 'greedy reductionism'.

As Quine (1953) observed, claims about the world are confirmed not individually, but only in conjunction with theories of which they are a part. And typically, one cannot come to understand scientific claims without understanding a significant chunk of the theory of which they are a part.

Yet the major problem with holism is that it threatens to make generalization in psychology virtually impossible. If the content of any state depends on all others, it would be extremely unlikely that any two believers would ever share a state with the same content

## References

- Barendregt, M. and van Rappard, J.F.H. (2004) Reductionism Revisited: On the Role of Reduction in Psychology, *Theory and Psychology*, 14 (4): 453–474
- Blanchard, S. (2006) Obscurantist Holism Versus Clear-Cut Analysis: Will Anthropology Obviate the Biology-Culture Divide?, *Dialectical Anthropology*, 30: 1–25.
- Carnap, R. (1938) Logical foundations of the unity of science. In O. Neurath (Ed.), *International encyclopedia of unified science* (Vol. 1, pp. 42–62). Chicago, IL: University of Chicago Press.
- Dennett, D. (1995) *Darwin's Dangerous Idea: Evolution and the Meanings of Life* New York: Simon and Schuster.
- Duncan, J., Seitz, R.J., Kolodny, J., Bor, D., Herzog, H. & Ahmed, A. (2000) A neural basis for general intelligence. *Science*, 289, 457–460.
- Fehr, C (2004) Feminism and Science: Mechanism Without Reductionism1 *National Women's Studies Association Journal* 16. (1), 137 -156.
- Garza, G. & Smith, A.F. (2009) Beyond Neurobiological Reductionism: Recovering the Intentional and Expressive Body, *Theory and Psychology*, 19 (4): 519–544.
- Haviland, W. (1997) *Anthropology*, 8th edn Orlando: Harcourt Brace & Company.
- Merchant, C. (1980) *The Death of Nature: Women Ecology and the Scientific Revolution*. San Francisco: Harper and Row.
- Midgley, M. (1998) One world, but a big one. In: Rose, S. (Ed.) *Brains to consciousness? Essays on the new sciences of the mind*, ed. S. Rose. Allen Lane.
- Miller, R. (1999) Biological Determinism versus the concept of a person, *Behavioural and Brain Sciences*, 22, 901- 902
- Novas, C. and Rose, N. (2000) Genetic Risk and the Birth of the Somatic Individual. *Economy and Society*, 29, (4): 483–513.
- Oppenheim, P., & Putnam, H. (1958) Unity of science as a working hypothesis. In H. Feigl, M. Scriven, & G. Maxwell (Eds.), *Concepts, theories, and the mind–body problem* Minneapolis: University of Minnesota Press (pp. 3–36).
- Quine, W.V.O. (1953) *From a Logical Point of View*. Cambridge, Mass.: Harvard University Press.
- Popper, K. (1972) *Objective knowledge, an evolutionary approach*. Oxford: Oxford University Press.
- Rose, S. (1999) *Precis of 'Lifelines: Biology freedom determinism*, *Behavioural and Brain Sciences*, 22, 871-921.
- Rose, S. (2009) Evolutionary psychology goes too far  
<http://www.guardian.co.uk/commentisfree/belief/2009/feb/11/evolution-charles-darwin> (accessed 22/2/2009)
- Schaffner, K.F. (1967). Approaches to reduction. *Philosophy of Science*, 36, 280–290.
- Smuts, J.C. (1926) *Holism and Evolution*, London: MacMillan.
- Stempsey, W.E. (2006) The Geneticization of Diagnostics, Medicine, Health Care and Philosophy, 9:193–200.
- Sternberg, R.J. (2000) The holy grail of general intelligence. *Science*, 289, 399–401.