

Teleology

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Philosophical Concept

Teleology is the study of purposes, goals, ends and functions. Intrinsic or immanent teleology is concerned with cases of aiming or striving towards goals; extrinsic teleology covers cases where an object, event or characteristic serves a function for something.

Teleological explanations attempt to explain X by saying that X exists or occurs for the sake of Y. Since the question ‘For what purpose...?’ may be construed either intrinsically or extrinsically, such explanations split into two broad types: those that cite goals of an agent, and those that cite functions.

The history of Western philosophy and science has been characterized by major debates about the logic, legitimacy and proper domains of these types of explanation. They still raise problems in contemporary biology and psychology. The modern debates have progressed considerably from the earlier ones, although continuities do exist.

1. Goals

Aristotle’s views about the domain of striving that is present in nature were challenged during the Renaissance. Aristotle held that goals were ‘final causes’, that inanimate things seek natural places or states which are proper to their kind, and that growth and development in living things is directed towards the attainment of maturity.

The term ‘final cause’ misled some commentators, who assumed that a final cause is an efficient cause that comes after its effect. This could not have been Aristotle’s view. Aristotle believed that trees grow leaves in order to protect their fruit (Physics: 199a 26–9), but he recognized that the fruit is not always successfully protected. If birds eat the fruit, and hence the final cause fails to come about, this fact in no way undermines the teleological explanation. If he had meant that fruit-protection was an efficient cause working backwards in time, the failure to come about would undercut the efficient causal explanation. A final cause, for Aristotle, is a ‘that for the sake of which’ (see Aristotle §9).

Still, there were other objections to his explaining the movements of inorganic bodies by ascribing goals to them. Francis Bacon, Galileo and Newton eschewed such explanations on the grounds that they were entirely speculative and otiose. First, the alleged striving could not be

identified independently of the changes that actually occurred to the body, nor could its goal be identified – the hypothesis was untestable. Second, the hypothesis was unnecessary, at least in the fields of mechanics and dynamics, since a complete explanation could be provided in terms of antecedent causes and the laws of motion. As Bacon (1623 III: ch. 5) put it, ‘Inquiry into final causes is sterile, and, like a virgin consecrated to God, produces nothing’.

Modern science does not sanction the ascription of goals or strivings to inanimate objects, except possibly to such artefacts as guided missiles, autonomous robots, and mechanical searching devices, which were first designed in the 1940s. But here the goal-talk is perhaps only ‘as if’ (Woodfield 1976: ch. 11).

In the life sciences, however, it is accepted that human beings and animals *do* strive after goals. The conviction that we are intentional agents is central to our self-image and to society. Moreover, animal and human goals can be identified in advance of the behaviour that they explain. The hypothesis that an animal is striving for food, for example, can be tested experimentally. So it is not true that goal-explanations are *in principle* vacuous. Whether plants strive is, perhaps, unclear. Although we speak as if they did (‘The flower turned in order to face the sun’ and so on), such locutions may be merely a hangover from an Aristotelian tradition. They survive because we find them picturesque or convenient. In late-twentieth-century biology, vitalistic teleological theories of growth and development are not thought to be respectable, even though such processes cannot quite be explained in wholly physico-chemical terms (see Vitalism).

Are goal-explanations restricted, then, to the domain of intentional behaviour performed by intelligent organisms? The central case is surely that of the animate agent, conscious of what it wants, sensitive to information about its environment and able to represent alternative plans to itself. If goals always involve desires, beliefs and other mental states, then intrinsic teleological explanations are a species of mentalistic explanation. The main problem that arises next is to provide a satisfactory account of intentionality (see Intentionality).

Several philosophers in the twentieth century have tried to make room for a distinctive form of goal-explanation which is not necessarily mentalistic (Braithwaite 1953; Nagel 1961; Taylor 1964; Wright 1976). Such theories may be viewed as broadly Aristotelian in the sense that they locate striving in activity which exhibits a distinctive pattern or causal structure.

2. Functions

Aristotle maintained that if an item *X* is a part of a system *S* in which *X* performs a characteristic activity that benefits *S*, then *X* exists and acts for the sake of *S*. *S* might be a living organism or something bigger, such as a bee-colony, an ecosystem or even the world as a whole. The fact that *X* serves a function for *S* is supposed to explain why *X* is present in *S*. Aristotle’s doctrine

was naturalistic in the sense that it did not postulate a supernatural designer, but it was not wholly naturalistic, since it employed the notion of *benefiting*. The main problem with extrinsic teleological explanations in biology is to see precisely how they work.

Even supposing that it is a 'fact' that *X* does good to a bigger system *S*, that fact alone is insufficient to account for *X*'s existence. Some additional premise or principle seems to be required. For example, if nature had been designed and created by a benevolent and omnipotent God, the existence of *X* in *S* would be explicable in terms of God's wishes, beliefs and creative acts. This form of functional explanation has a familiar logic: we use such explanations when giving the reasoning that leads human beings to design and produce useful artefacts. By supplementing the explanation in this way, we present extrinsic teleology as being derivative upon the intrinsic teleology of the designer (see God, arguments for the existence of §4). This solution is unsatisfactory, however, since neither biologists nor laypeople feel that the validity of 'natural function' explanations is dependent upon any theological assumptions. Either the explanations have some other form, then, or they are not genuine explanations at all.

In 1859, Darwin's theory of evolution by natural selection showed how harmonious systems could have arisen naturally, without the need for a designer. Darwin's theory explains the existence of *X* in *S* as the outcome of a gradual process. Ancestors of *S* who possessed parts similar to *X* survived and reproduced more successfully than their relatives who lacked parts similar to *X*, and these ancestors reproduced true to form (their offspring had organs like *X*, including *S* who has *X*).

Darwin made the designer-hypothesis redundant. Was his theory anti-teleological? Darwin took it as a datum that biological parts and characteristics which have survived the selection process are normally useful for their owners; his theory asserted that they persisted *because* they were useful. This looks like a vindication of Aristotelian extrinsic teleology. Upon further reflection, however, it hardly amounts to a ringing endorsement since Darwin's theory can be stated without employing the term 'function' or any teleological language at all (see Darwin, C.R.; *Evolution*, theory of).

Contemporary philosophers separate into two camps on the question of the logic of functional explanations in biology. The 'naturalistic revisionists' *redefine* the concept of function in terms of the causal-historical Darwinian selection hypothesis. They keep the old teleological language but sanitize it (Wright 1976; Millikan 1984). The other camp consists of 'semantic conservationists' who maintain that natural functionality cannot be *defined* in terms of Darwin's theory (Woodfield 1976). On the latter view, talk of natural functions is committed to assumptions about benefit and harmony and goodness that are extraneous to science and probably perspective-dependent. This view implies that functional explanations are still potentially problematic.

It is possible to maintain that functional explanations of undesigned phenomena have some scientific merit even if they are not wholly objective. Kant (1790) argues that the attribution of natural functions to organs is heuristic: it helps to systematize our knowledge of organisms and generates further ‘how?’ questions. Kant’s sophisticated defence does not license the unbridled attribution of good consequences to everything in nature – a tendency ridiculed earlier by Voltaire (1758) (see Kant, I. §13).

In the 1980s, naturalistic revisionists, notably Millikan (1984), began to exploit the Darwinian account of functionality as a tool for solving the problem of intentionality. The key insight is that desires, intentions and other mental states with intentional contents can themselves be seen as biologically adaptive states or as the products of mechanisms that are adaptive. The hope is to provide a naturalistic reduction of intentionality. This ambitious research-programme would make extrinsic teleology more fundamental than intrinsic teleology.

After more than two millennia of debates since Aristotle, teleology continues to provoke lively controversy among analytic philosophers.

References and further reading

Aristotle (c. mid 4th century) *Physica*, trans. R.P. Hardie and R.K. Gaye in *The Works of Aristotle*, ed. W.D. Ross and J.A. Smith, vol. 2, Oxford: Oxford University Press, 1930.
(The classic account of teleology.)

Bacon, F. (1623) *De Augmentis Scientiarum*, in *Works of Sir Francis Bacon*, vol. 7, London: W. Baynes & Son, 1824.

(Renaissance classic, emphasizing observation and induction as the royal route to knowledge.)

Braithwaite, R.B. (1953) *Scientific Explanation*, Cambridge: Cambridge University Press.
(Textbook in analytic philosophy of science, still rewarding after nearly half a century.)

Darwin, C. (1859) *The Origin of Species*, London: John Murray.

(Classic. The source of modern evolutionary theory.)

Kant, I. (1790) *Critique of Teleological Judgement*, trans. J.C. Meredith, Oxford: Oxford University Press, 1928.

(Complement to Kant’s *Critiques of Pure Reason* and *Practical Reason*.)

Millikan, R. (1984) *Language, Thought, and Other Biological Categories*, Cambridge, MA: MIT Press.

(Original defence of a biological theory of representation.)

Nagel, E. (1961) *The Structure of Science*, London: Routledge & Kegan Paul.

(Logical empiricist textbook in the philosophy of science.)

Taylor, C. (1964) *The Explanation of Behaviour*, London: Routledge & Kegan Paul.

(Defines a kind of non-mentalistic explanation that has a distinctive teleological form.)

Voltaire, F.-M. de (1758) *Candide*, trans. J. Butt, Harmondsworth: Penguin, 1947.
(Satire directed against unthinking optimism.)

Woodfield, A. (1976) *Teleology*, Cambridge: Cambridge University Press.
(Monograph defending a unified analysis of teleological language.)

Wright, L. (1976) *Teleological Explanations*, Berkeley, CA: University of California Press.
(Monograph arguing that such explanations are a special kind of causal explanation.)

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