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Associationism

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Synonyms

Association psychology; Association theory

Definition

"Associationism" can refer to a well-defined historical tradition or, more controversially, to a range of approaches influenced by the former. The historical tradition, developed from the seventeenth to the nineteenth century mainly by British philosophers, appealed to the association of mental contents with one another to explain the nature of human thought and knowledge. Current forms of associationism assume that complex psychological units are built from simpler elements on the basis of experience and through a process ("association") that is both general across domains and structure-independent. This process is typically sensitive to coincidences, correlations, or statistical dependencies among events, and the psychological units formed on its basis come to reflect such dependencies.

Theoretical Background

The philosophical tradition of associationism can be traced back to Aristotle, but it developed mainly from the seventeenth to the nineteenth century through the effort of scholars, most of them English, interested in the origins and nature of human knowledge (Warren 1921). Important exponents of associationism include, in historical order, Thomas Hobbes (1588–1679), David Hartley (1705–1757), Étienne Bonnot de Condillac (1715–1780), James Mill (1773–1836), Thomas Brown (1778–1820), John Stuart Mill (1806–1873), Alexander Bain (1818–1903), and Herbert Spencer (1820–1903). Associationism also can be found in the philosophical works of John Locke (1632–1704), George Berkeley (1685–1753), and David Hume (1711–1776), reflecting its dual importance for psychology and epistemology. The associationist philosophers relied on the introspective method and the phenomenological investigation of thought sequences to uncover the psychological principles that might underlie the latter. Most of these philosophers also speculated on the nature of the physiological machinery that made association possible. All invoked associative principles (not necessarily under that name) through which complex mental contents could be produced out of simpler ones.

Beyond this shared commitment, associationist philosophers differed among themselves in ways that anticipate current debates in behavioral and cognitive sciences. Important differences concerned the scope of the associative process. Did it apply to rational thought, for example, or only to haphazard mental sequences forged out of coincidences? Did the associative process account for all of psychological structure, or should it be supplemented by faculties responsible for the organization of mental contents? Other differences concerned the nature of the elements being associated. Could they include sensory presentations, feelings, or motor elements, as well as mental contents? Could volition and motor control be built on associative principles? The modes of association, simultaneous versus successive, were also the subject of controversy. Some associationists admitted simultaneous association as a genuine process so as to account for perceptual organization (with different visual components, for example, combined into a single scene), but others emphasized the successive associations necessary to produce trains of thought. The principles of similarity and contrast were debated, with some associationists attempting to reduce contrast to a combination of identical elements paired with different associates. Another important debate opposed "mechanical" to "chemical" conceptions of association (Warren 1921). Did the components of a complex thought preserve their identity through the association process, or did they merge so as to produce a mental configuration irreducible to its antecedents?

Associationism strongly influenced experimental psychology at the end of the nineteenth century and the beginning of the twentieth century. Research aimed at associationist principles involved the investigation of

Norbert Seel (ed.), *Encyclopedia of the Sciences of Learning*, DOI 10.1007/978-1-4419-1428-6,

memory and the effect of practice on behavior, the measure of reaction times in the production of verbal associates, and the use of verbal association in the study of individual differences, development, intelligence, and psychopathology. Warren (1921) also mentions the "conditioned reflex" as a case of "motor association" and suggests that "the conditioned reflex belongs to the present and future of association psychology" (p. 257).

Applying the label of "associationism" to any theory formulated after the early twentieth century, however, faces a serious conceptual problem. In the twentieth century, the emergence of behaviorism shifted the methodological ground of psychology from introspection to behavioral evidence (Brunswik 1952), and the information-processing theories formulated after the establishment of behaviorism often appealed to representational constructs that may not be accessible to consciousness. Thus, contemporary psychological theories typically do not involve the association of conscious contents with one another. The associationist label can retain its usefulness only if a definition of "associationism" can be provided that is broad enough to cover widely different perspectives but not so broad as to exclude nothing.

Anderson and Bower (1973) have risen to the challenge and proposed a definition of "associationism" in terms of four basic assumptions (p. 10):

- Psychological units are connected by experience.
- Complex units can be reduced to a limited stock of primitive units.
- These primitive units consist of sensations.
- Units combine through simple additive rules.

Although this characterization of associationism as relying on elementary sensations may be adequate to mentalistic psychology, it fails to capture the associationism (if any) of behavioral psychology, the basic units of which are certainly not sensory experiences. Following on Anderson and Bower's proposal, therefore, Fodor (1983) has defended a broad definition of "associationism" that is better designed to cover "the classical mentalist or the more recent learning-theoretic variety" (p. 27) of associationist psychology. According to Fodor, associationism entails:

- A set of basic elements out of which more complex structures are built
- A relation of association defined over these elements and structures
- Principles of association whereby experience determines which structures are built
- Theoretical parameters of the associative relation and its terms

Fodor explicitly admits behavioral as well as mental elements in his definition of "associationism," so the latter does cover the full range of approaches that may be reasonably called associationist. His definition accommodates the philosophical tradition of associationism (in which mental contents are associated with one another) as well as current connectionist models of cognition (in which the links between nodes are strengthened on the basis of experience) and behavioral forms of associationism in which the conditional probabilities between stimuli and operant actions change through reinforcement.

At the same time, Fodor's (1983) definition is not so general as to be vacuous. An important point, left implicit in the 1983 definition but later emphasized by Fodor and Pylyshyn (1988), is that not any relation or structure-building process among psychological components qualifies as association. To qualify as the latter, the process that builds more complex units out of simpler ones must proceed on the basis of experience (expressed as contiguity, correlation, or statistical dependency) and *regardless of the structure of the components being related*. The issue with associationism, therefore, is not whether psychological states are structured. All parties in the debate agree on this score. The issue is rather whether the processes that build complex psychological states are structure-sensitive or not. The claim that they are not is characteristic of associationism.

In current behavioral theories, for example, reinforcement depends on the temporal correlation between responding and its consequences and operates regardless of the organization of the action being reinforced. Whether the latter consists of a simple response or a complex hierarchy of interlocked actions is irrelevant to the reinforcement process (although the speed with which conditioning takes place may depend on the duration of the reinforced unit and other temporal parameters). Similarly, the strength of the links in a connectionist network is modified by statistical and temporal relations among activation values regardless of the internal structure (if any) of the connected nodes and of what they are supposed to represent. And in the philosophical tradition of associationism, mental contents are associated by experience regardless of their intrinsic organization.

By contrast, in the theory of mind as a physical symbol system, the *computational* (not associative) operations that produce new states out of previous ones are sensitive to the structure of these states (Fodor and Pylyshyn 1988). Thus, when a desktop computer prints "17" in response to "13 + 4" and "35" in response to "31 + 4," what is printed does not depend on a history of association between inputs and output – a history which, under different

circumstances, might just as well have linked "31 + 4" to "17" and "13 + 4" to "35." Rather, the printed output depends on a sequence of built-in operations such that structural differences in the input ("13 + 4" versus "31 + 4") lead to structural differences in the output ("17" versus "35") through different intermediate steps. Such structure-dependent operations are characteristic of the computational theory of mind and other approaches to cognition that oppose associationism (Fodor 1983).

Associationism and the computational theory of mind, however, do not exhaust all theoretical possibilities. The analysis of development in ecological psychology, for example, qualifies neither as computational nor as associationist, since the principles it proposes operate neither according to associative principles nor on the basis of internal representations. Neither are associationism and representational systems mutually exclusive, since representational models may combine aspects that are structure-independent (as when objects are linked to a cognitive map regardless of their composition) with others that are structure-sensitive (as when combining two paths into a novel one). Furthermore, authors may disagree on whether a model is or is not strictly associative, depending on what they stipulate to be the defining features of "associationism" (besides the broad notion of a building process indifferent to the structures that it relates). The label of "associationism," although useful in pinpointing shared issues, should not obscure the variety and richness of the theoretical views to which it has been applied.

Important Scientific Research and Open Questions

Associationism in a broad sense assumes principles of development or psychological change that are structure-independent. A set of associative relations defined over a collection of components, however, is itself a form of organization. According to associationism, the latter organization has been derived from experience. The main question with respect to associationism, therefore, is the question of the origins of psychological structure; in particular, the extent to which psychological structure can be attributed to regularities in experience, and the extent to which other sources of organization must be postulated. In the case of syntax acquisition, for example, the issue may concern how much of a child's linguistic organization derives from statistical regularities in the child's input.

There is no guarantee that this sort of question has a unified answer across domains or even phenomena within the same psychological domain. Associationism may well fail in some cases while applying to others. The basic phenomena of Pavlovian conditioning, for instance, seem to call for explanations with associationist aspects. (The researchers who attribute conditional responding to the formation of cognitive maps may want to deny this, but their denial would simply reflect a narrower definition of "associationism" than the one adopted here.) As formal models developed in the field of conditioning are extended to cover features of human perception, memory, and language, the limits of associationist explanations in psychology should become clearer.

In many cases, a successful associationist account of the data may require relations among elements, as well as the elements themselves, to be subject to association. If the structure-building operation proceeds regardless of the nature of the relations involved, then the resulting models will remain within the province of associationism as we defined it (although they may fail to qualify on a narrower definition). The most difficult cases for any associationist account involve cognitive phenomena in which structure is paramount: in particular, inference and reasoning through language-like processes. Whether such phenomena can be accommodated within a broadly associationist framework may depend on the development of more powerful theoretical formalisms.

Cross-References

► Associative Learning
► Connectionism
► Statistical Learning

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