1 History, science, and psychology

In 1877, James Ward and John Venn petitioned the University of Cambridge in England to have experimental psychology introduced as an academic discipline. The University Senate refused to do so on the grounds that it would "insult religion by putting the soul on a pair of scales" (Hearnshaw, 1989, p. 125). In a 1907 paper published in *American Medicine*, Dr. Duncan Macdougall of Haverhill, Massachusetts, described his attempt to put the soul on a scale (Macdougall, 1907). He persuaded six dying patients to spend their last hours in a special bed that rested on a platform beam scale. By comparing the weight of the individual (plus bed) before and immediately after death, Macdougall estimated the weight of the human soul to be about "three-fourths of an ounce." He repeated this experiment with fifteen dying dogs, who manifested no weight loss upon expiration, confirming the popular belief that animals have no soul (Roach, 2003).

From the dawn of recorded civilization, humans have not only speculated about the nature and causes of mind and behavior, but have also employed their ingenuity to test these speculations. In the seventh century BCE, the Egyptian king Psamtik I supposed that children with no opportunity to learn a language from other people would spontaneously develop the natural and universal language of humankind, which he presumed to be Egyptian (Hunt, 1994). He tested this hypothesis by having one of his subjects seclude a number of infants and observe which language they first spoke; he was disappointed to learn that they did not speak Egyptian. As the centuries progressed, critical thinkers continued to speculate about the nature and causes of mind and behavior and to subject their theories to empirical test. The process was accelerated by the scientific revolution in Europe in the sixteenth and seventeenth centuries and by the development of experimental physiology and evolutionary theory in the nineteenth century, which promoted the growth of the institutional science of psychology in the late nineteenth and twentieth centuries. The story of this progression, development, and growth is the history of psychology.

Historiography of psychology

Contemporary historiography, the theory and methodology of history, recognizes a variety of approaches to the history of disciplines such as psychology.

Internal and external history

Traditional histories of psychology, such as Edwin G. Boring's (1886–1968) classic *A History of Experimental Psychology* (1929), have tended to be internal histories, largely devoted to the development of psychological theories and methods within the discipline. Such histories are written generally by "insiders," that is, by psychologists themselves, and are thus sometimes characterized as "house histories" (Woodward, 1987). In contrast, more recent histories have tended to be external histories, which aim to account for the development of psychological science in terms of social, economic, political, and cultural conditions that promoted certain forms of psychological theory and practice and constrained others (Buss, 1975; Furumoto, 1989; Jansz and van Drunen, 2004; Pickren and Rutherford, 2010). Some of these histories have also been written by "outsiders," that is, by science journalists or professional historians rather than psychologists (Hunt, 1994; Smith, 1997, 2013), although this remains relatively rare.

Of course, few histories of psychology adopt an exclusively internal or external approach, and the appropriate historical focus ought to be determined by the historian's judgment about whether internal or external factors played a more influential role during any significant period (cf., Boakes, 1984, pp. xiii–xiv). For example, the different internal intellectual traditions of Great Britain and Germany probably best explain the differences between British associationist psychology and the German holistic psychology of Wilhelm Wundt (1832–1920) and the Gestalt psychologists. In contrast, external factors such as the pragmatic and utilitarian orientation of turn-of-the-century America clearly play a major role in accounting for the development of functionalist and behaviorist psychology in America in the early decades of the twentieth century. Yet this can scarcely be the whole story, as institutional psychology also became increasingly applied in Germany and France at around the same time.

Zeitgeist and great man history

Histories of psychology also differ in how much influence they attribute to major psychologists, or great men, as opposed to the zeitgeist, or "spirit of the times" (Boring, 1929). Again, how much attention ought to be paid to

either factor ought to be determined by the historian's judgment about the respective influence of these factors during any historical period. While Wundt deserves credit for founding the first experimental laboratory at the University of Leipzig in 1879, it may be reasonably claimed that psychology would have developed in Germany in much the same way that it did if Wundt had never lived (as it did, in fact, independently of Wundt). On the other hand, although behaviorism no doubt would have developed in America even if John B. Watson (1878–1958) had never lived (as it also did, in fact, independently of Watson), it likely would not have taken the specific form that it did in the 1920s.

Sometimes a major historical development is a product of both a significant individual and the spirit of the times, of someone being the right person in the right place at the right time. Ivan Pavlov (1849–1936) is famous for his "discovery" of what is now known as classical conditioning. He demonstrated that the salivatory reflex of dogs and other animals could be conditioned to the presentation of a neutral stimulus when it is regularly paired with food. Yet this form of learning was identified centuries earlier. For example, it was described by the Edinburgh physician Robert Whytt (1714–1766), who cited conditioned salivation (to the smell of a lemon) as an illustration. Edwin B. Twitmyer (1873–1943), an early pioneer of speech pathology, discovered that the patellar (knee-jerk) reflex could be classically conditioned and made it the subject of his doctoral dissertation at the University of Pennsylvania. When he completed his thesis, *A Study of the Knee Jerk*, in 1902, he arranged to have it published privately, but it attracted little attention. Twitmyer recognized the significance of this form of conditioned learning and delivered a paper on his research at the 1904 meeting of the APA, but it fell on deaf ears.

It was only as a result of Pavlov's investigations that this form of learning was adopted as an explanatory paradigm by behaviorist psychologists. Pavlov had the scientific prestige, having won the Nobel Prize in physiology for his work on digestion. His investigations were based upon rigorously controlled experiments conducted by a team of researchers at a scientific institute, at a time when rigorous experimentation was treated as the distinctive mark of genuinely scientific psychology. Pavlov's work became known in translation to American psychologists at precisely the time when they were developing explanations of animal and human behavior in terms of correlations between observable stimuli and responses (Logan, 2002).

Presentist and contextualist history

Historians also distinguish between what has been called presentist history of psychology, sometimes known as "Whig" history, in which

the history of psychology is represented as approaching and approximating (idealized) contemporary theory and practice, and contextualist history, sometimes known as "historicism," in which each historical episode or epoch is explicated neutrally in its own terms (Stocking, 1965). Presentist approaches have long been popular and generally represent the history of psychology as a long evolution from primitive theories about immaterial souls or spirits to the modern scientific endeavor. Yet although it is certainly true that many early theorists believed in immaterial souls or spirits, it does a great injustice to pioneers such as Hippocrates (*c*. 460–377 BCE) and René Descartes (1596–1650) to represent early theorists as primitive thinkers.

The Greek physician Hippocrates rejected traditional accounts of epilepsy in terms of spirit possession and advanced his own account in terms of brain damage and dysfunction. Descartes did maintain that the mind is an immaterial substance, but he also proposed the first systematic reflex theory of animal and (some) human behavior.

Although the general movement from early speculative to later empirically based forms of psychology certainly marked an intellectual advance, the development of scientific psychology did not proceed in as smooth or linear a fashion as is normally supposed. Indeed, one may reasonably maintain that at certain critical periods, including the twentieth century, the science of psychology regressed.

On the other hand, there are serious problems associated with contextual approaches that profess to adopt a completely neutral attitude to the history of psychology. It is certainly appropriate, for example, to try to explain why behaviorism appealed to many American psychologists in the 1920s; to try to explain why, given their intellectual and social institutional background, it was reasonable for many psychologists to adopt behaviorism in the 1920s. However, it is doubtful that one can determine the significance of this important episode in the history of psychology without some working conception of the nature and potential of psychological science, and thus of whether the behaviorist period represented an advance or regression in the general development of psychological theory and practice.

Conceptual history of psychology

While historians of psychology have vexed over these historiographic matters, they have tended to neglect another project. This is the identification of significant conceptual continuities and discontinuities in the history of psychological theory and practice, such as the conceptual continuity between Hume's account of causality and theories of classical and

operant conditioning, or between the "modern investigation of thinking" of the early twentieth century Würzburg school and contemporary cognitive psychology; or the conceptual discontinuity between Darwinism and the forms of early twentieth century functionalist and behaviorist psychology generally supposed to be founded upon it, or between "liberalized" neobehaviorist theories and those of contemporary cognitive psychology sometimes supposed to have "evolved" from them. Without some grasp of these continuities and discontinuities, any explanatory history of psychology is theoretically blind. In the conceptual history of psychology that follows, I focus on these continuities and discontinuities, offering explanations of thematic developments based upon contemporary scholarship.

History of psychology as an academic discipline

The history of psychology is still in its infancy as an academic discipline. Although the first histories of psychology were written in the early decades of the twentieth century (Baldwin, 1913; Brett, 1912–1921), the history of psychology became established as a subdiscipline of psychology only in the 1960s, with the founding of the *Journal of the History of the Behavioral Sciences* in 1965 and the establishment of the Division of the History of Psychology of the APA that same year. Cheiron: The International Society for the History of the Behavioral and Social Sciences was formed in 1969; the National Science Foundation (NSF) Summer Institute that led to its formation was held at the University of New Hampshire in 1968, where the first PhD program in the history of psychology was instituted. Consequently, the historical accounts in this work should be recognized as partial and tentative, and relative to the level of analysis. Deeper levels of analysis may reveal richer conceptual strands, and readers are encouraged to pursue them.

While the early history of psychology ranges over the Mediterranean, the Middle East, and Europe, and nineteenth-century history focuses upon developments in Britain, France, and Germany, the twentieth-century history of psychology is very much the history of American psychology. Although institutional scientific psychology originated in Germany at the end of the nineteenth century, by the beginning of the twentieth century, American psychology came to dominate other national psychologies in terms of the number of psychologists, institutions offering degrees, books, journals, and student populations. It maintained its dominance throughout the twentieth century (Brandt, 1970; Koch, 1992; Pawlik and Y'dewalle, 1996; Rosenzweig, 1984, 1992, 1999; Sexton and Hogan, 1992), especially after the Second World War, when it

effectively "colonized" the national psychologies of many European states (van Strein, 1997) and Japan. It retains its dominance in the twenty-first century.

Science and psychology

One of the distinctive features of early scientific psychology and later forms of academic psychology is the degree to which they were shaped by prevalent conceptions about the nature of science. Psychology, perhaps more than any other discipline, self-consciously modeled itself upon successful sciences such as physics, chemistry, and biology. Consequently, many contemporary psychologists embrace a number of principles that are of questionable relevance to psychological science. To illustrate this important point, it is useful to distinguish between those principles that are generally agreed to be essential features of empirical science (as opposed to formal sciences such as logic and pure mathematics) and those principles the relevance of which is an open question.

Objectivity

It is generally recognized that a minimal condition of an intellectual discipline constituting a science is that the propositions it offers are objective, that is, if their truth or falsity is determined by independent facts. Thus, the propositions that bodies of different weight fall with equal acceleration and that electrons have a negative electric charge are objective because they are true if, and only if, bodies of different weight do fall with equal acceleration and electrons do have a negative electric charge (and false otherwise). Analogously, the propositions that the patellar reflex can be classically conditioned and that humans employ prototypes in category formation are objective because they are true if, and only if, the patellar reflex can be classically conditioned and humans do employ prototypes in category formation (and false otherwise).

The objectivity of scientific propositions should be distinguished from the objectivity of the judgments of scientists about the best theories in any domain (the best theories of molecular bonding, neural transmission, or human aggression, for example). Such judgments are objective if they are unbiased, and subjective if they are biased by individual or collective preferences or by social, political, or religious interests in the advocacy of certain theories (for example, that the earth is the center of the universe, that evolution is progressive, or that there are racial and gender differences in intelligence).

Causal explanation

Of course, the requirement of propositional objectivity does not distinguish the propositions of scientific disciplines from those of everyday life or religion. Another essential requirement of a scientific discipline is causal explanation: the propositions of scientific disciplines advance causal explanations of how certain events, regularities, or structures are generated or produced. Thus, biologists explain patterns of embryonic development in terms of genetic programing, and psychologists explain systematic errors in probabilistic reasoning in terms of cognitive heuristics.

Causal explanations of classes of events, regularities, or structures cite factors that are held to be conditions for their generation. To causally explain rusting in terms of oxidation is to claim that the presence of oxygen is an (enabling) condition for rusting; to causally explain learning in terms of reinforcement is to claim that reinforcement is a (sufficient) condition for learning. Causal explanations are often couched in terms of functional relations between variables, when one variable is held to increase or decrease with another; thus, the increased volume of a gas (at constant pressure) is held to be causally explained in terms of increased temperature, and increased levels of "destructive obedience" are held to be causally explained in terms of the increased proximity of commanding authorities (Milgram, 1974).

Empirical evaluation

Of course, everyday folk also offer causal explanations of events, regularities, and structures, so an appeal to causal explanation is insufficient to distinguish scientific physics and psychology from so-called "folk physics" and "folk psychology." What does distinguish most folk descriptions and explanations from scientific ones is that the latter are subject to empirical evaluation. Scientific descriptions and explanations are tested either directly by observation or, in the case of theoretical descriptions and explanations about unobservables such as electrons or repressed desires, indirectly via their observational implications. This condition goes a long way to account for the fact that scientific disciplines are also generally held to be objective in the sense that the judgments of scientists are unbiased. Systematic methods of empirical evaluation, including experimentation, are held to enable scientists to adjudicate between alternative causal explanations independently of personal, social, political, or religious biases. Thus, properly scientific judgments are held to be adjudicated (ideally) by empirical data, in conjunction with other theoretical desiderata such as simplicity, fertility, and the like.

While these three conditions clearly seem necessary for any scientific discipline, it may be doubted whether they are sufficient. However, it is not important for present purposes to provide a complete definition of science. What is important is to distinguish essential features of science from a set of principles that are associated frequently with science but cannot be considered essential to it. Many psychologists adopted these principles, which embody assumptions about the subject matter and scope of explanations in science, because they were associated with early exemplars of successful physical science, even though it is an open question whether they are appropriate for psychological science. One of the aims of this work is to document how psychologists came to adopt these principles.

Atomism

One of the principles associated with science is atomism, which holds that the entities that form the subject matter of scientific disciplines can be individuated and exist independently of other entities to which they may be related. That is, they can be theoretically described without making reference to other entities and can exist in the absence of (or in isolation from) other entities. This principle holds for elements such as carbon, which can be described theoretically in terms of its composition, structure, and properties without citing any other elements or their properties. Carbon could, in principle, exist even if no other element existed, and samples of carbon can be isolated from other elements to which they may be related (causally or spatially).

However, this principle does not hold for entities such as quarks (the constituents of protons, neutrons, and electrons) or parts of electromagnetic fields, which appear to be relational in nature; they can be individuated and exist only in relation to other entities. Individual quarks or parts of electromagnetic fields can be described theoretically only by reference to other quarks or parts of electromagnetic fields, and individual quarks or parts of electromagnetic fields cannot be isolated from other quarks or parts of electromagnetic fields. For this reason, sciences such as physics have abandoned the principle of atomism.

Many psychologists have assumed that psychological states and behavior are atomistic in nature, that psychological states and behavior can be described theoretically and experimentally isolated independently of their relation to other psychological states and behavior. The notable exception was the Gestalt psychologists, who maintained that the elements of perception and cognition are determined by their relational position within psychological configurations. However, it may reasonably be

doubted whether the principle of atomism holds for certain psychological states and behavior. Cognitive states such as representations of word meaning would seem to be relational in nature, as they presuppose a network of representations of complementary and contrasting word meanings. Analogously, certain forms of social behavior, such as serving on a jury or engaging in altruistic or aggressive behavior, seem to be relational in nature, as they presuppose an institutional context and relationship to other persons. However, it ought to be stressed that the question of whether psychological states and behavior are atomistic or relational in nature (or the degree to which they are atomistic or relational) is an open question. The point is only that there is nothing unscientific about supposing that some psychological states and behavior are not atomistic in nature.

Universality of causal explanation

Another principle associated with science is the universality of causal explanation, sometimes known as the singularity of causality. According to this principle, the same causal explanation applies to each and every instance of a class of events, regularities, or structures. This seems to be true of rusting, superconductivity, and biological death, which appear to have only one kind of cause. However, it is not obviously true of physical motions, which may be caused by either gravitational or electromagnetic (or strong or weak nuclear) forces, or of some cancers, which may be caused by either genetic or environmental factors.

Nevertheless, from the time of Isaac Newton (1642–1727) to the present day, psychologists have regularly insisted that universality is the measure of the scientific adequacy of psychological explanation (Kimble, 1995; Shepard, 1987, 1995); many have assumed that there is one, and only one, causal explanation of aggression, depression, or learning, for example. However, it may reasonably be supposed that some psychological states and behaviors have more than one cause. It does not appear unscientific or absurd to suppose, for example, that some aggressive behaviors are products of motives of revenge, whereas others are caused by the presence of "violent stimuli" such as weapons (Berkowitz and Le Page, 1968), and others by overexcitation of the lateral hypothalamus (brought on by drugs or diet). It does not appear unscientific to suppose that some forms of depression are the product of genetic predisposition and others a function of environmental pressures. Again, it should be stressed that it is an open question whether aggression or depression do have more than one cause, and late twentieth and early twenty-first century psychologists do seem more willing than their

predecessors to embrace multiple causal explanatory accounts of human psychology and behavior. Yet again, the point is that there is nothing unscientific about supposing that they do.

Ontological Invariance

A closely related principle is ontological invariance in space and time. According to this principle, the kinds of entities that constitute the subject matter of scientific disciplines can be re-identified in all regions of space and time. This principle appears to hold for fundamental physical particles and forces, which we believe to have been around for all time (or at least since the big bang) and to be found in all regions of space, and possibly also for many chemical elements and compounds. However, it does not appear to hold for organic life forms, some of which are later evolutionary developments and some of which are not found in many regions of space (for example, on planets too hot or too cold to sustain them). Thus, while fundamental branches of physics and chemistry embrace this principle, sciences such as biology do not, as species and viruses transform themselves (and become extinct) in historical time and are not to be found in all regions of the earth (far less the universe).

Once again, the point is not to prejudge open questions, but to note that there is nothing unscientific about supposing that certain entities are not invariant in space and time. Consequently, there is nothing unscientific about supposing that certain psychological states and behaviors are not invariant in cultural space and historical time. For example, it appears that the behavioral practice of couvade, in which husbands empathetically simulate the birth pangs of their wives, may be unique to a small number of Amazonian tribes. The emotion of amae, a kind of "fawning" dependency, may be distinctively Japanese (Doi, 1973), and the pathological emotion of accidie, a debilitating form of disgusted boredom, may have been restricted to medieval times (Altschule, 1965).

Yet although natural scientists have been prepared to abandon the principle of ontological invariance, psychologists have been strangely reluctant to do so. Indeed, many contemporary psychologists oppose the notion that psychological explanation may vary cross-culturally and transhistorically because the psychologies of different cultural and historical communities may be distinct. The suggestion that there might be "indigenous psychologies" localized to specific cultural or historical communities (Heelas and Lock, 1981; Moghaddam, 1987) has met with a vigorous critical response from psychologists (Kimble, 1989; Spence, 1987; Staats, 1983), many of whom have insisted that any form of psychology that implies the cultural or historical restriction of psychological explanation is unscientific.