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The Birth of Psychological Behaviorism

Behaviorism derived its unity from social and institutional sources; its intellectual and conceptual cohesion was correspondingly slight. Moreover, forms of behaviorism, usually unacknowledged and unnamed, pervaded American social science from its beginning. I will address four major motivating factors in the history of behaviorism: the search for practical applications, an unacknowledged yearning for philosophical respectability, the need to generate a specifically behaviorist body of theory, and a need to provide an empirical base in animal psychology.

The search for practical applications controlled American social science from its beginning, given that it originated directly from the Progressive reform movement.[1] Both the Progressives and their progeny, the American social scientists of the late nineteenth and early twentieth centuries, believed that science should serve the good of society, where good was defined primarily in terms of material comforts and success. They also believed that practice should shape theory and be the ultimate test of theory. By using, at first, the resources of the American Social Science Association and, from 1876 onward, the resources of new and reformed universities, the Progressives created a cadre of experts imbued with the ideals of American social pragmatism.[2] As mere social scientists, they could not lay claim to the power and prestige conferred by tradition. Instead, they depicted society as an arena exhibiting the interplay of objective social forces. Crucially, they treated persons as mere foci for the reception and projection of those forces. Because those forces bore equally on all, none were automatically privileged. But anybody who had the will and the talent could understand and, above all, manipulate American society. Social leadership then became the prerogative of a meritocracy, not an aris-

tocracy. Those tendencies appeared first in early American sociology, economics, and political science, so that is where my history of behaviorism will begin.

As in the case of the search for practical applications, the need for philosophical respectability first manifested itself outside psychology. A group of American philosophers, the New Realists, together with a like-minded trio (Frederick James Eugene Woodbridge, Edgar Arthur Singer, Jr., and Grace de Laguna), advanced overtly behaviorist doctrines very early in this century. These philosophers published in the *Journal of Philosophy, Psychology, and Scientific Method*. A perusal of the early volumes of the journal shows that several psychologists did likewise, while the New Realist group referred extensively to the psychological literature. Moreover, there are direct lines of descent between the New Realist group and the behaviorist movement. The philosophers Ralph Barton Perry and Singer both inspired and exerted a determinative influence on the thought of two behaviorists (Tolman and Guthrie respectively).

Direct intellectual ancestry, however, does not guarantee a direct influence on the creation and promulgation of inherited doctrines. The New Realists were publishing at the very time when psychology was trying to distance itself from philosophy. The first behaviorist theorists felt the need for philosophical expertise and saw the necessity for dealing with certain philosophical problems (the mind/body problem being the most prominent). But the expertise had to appear to be their own and to be used to solve purely psychological problems. So psychologists had to create a traditional body of knowledge. Because the creation of a tradition requires the passage of several decades, the mature products of two of our forces (the need for philosophical respectability and the need to create a purely psychological body of theory) did not appear until fairly recently in behaviorism's history. Moreover, the two needs also followed relatively independent courses in behaviorism's early years. As a result, an account of New Realist doctrine is a detour from our main story, albeit a necessary one.

A need to generate a discipline-specific body of theory was a vital driving force in all the American social sciences in their early years. That need was historically conditioned. The pragmatism endemic to Progressivism eventually produced a unique form of positivism. By the 1920s American positivism had emerged as behaviorism, which enjoyed a brief hegemony in economics, political science, and sociol-

ogy and was an influential force in psychology. In the 1930s behaviorism went into retreat, reemerging in psychology in the late 1940s as behavioral science, an empirically and theoretically based endeavor claiming both scientific status and the power to overcome social and personal dysfunctions. In the 1950s behavioral science became a complex hierarchy of theories, research techniques, training programs, and professional organizations. Operationism, the intellectual core of that hierarchy, was the creation of a small group of American psychologists, several of whom were behaviorists. So American behaviorism should be interpreted not as a set of positivist theories of action but as a programmatic attempt to achieve human betterment. Within behaviorism, the very first theories (Adolph Meyer's, Albert P. Weiss's, and J. R. Kantor's) were just that—pure theories. Because they lacked the life-giving link to the practical they were consigned to the margins of psychology's history almost as soon as they were written. They are, nevertheless, very much a part of that history and must be entered into the record.

Similar considerations apply to the need to create a body of empirical work derived from the animal laboratory. In that case, animal psychologists had to develop the practical expertise needed for working with their two chosen animals, the rat and the domestic pigeon. In the absence of a body of laboratory lore, the highly sophisticated work of the midcentury would have been impossible. The generation of a methodology, closely linked to increasingly complex and sophisticated statistical theory, was equally necessary, as was the generation of a theory ("learning theory") specifically designed as an avenue of expression for the laboratory work. The writings of Walter Samuel Hunter (1889–1954), the first behaviorist to base his theory explicitly on animal work, and of Zing-Yang Kuo (1898–1970), who was the first radical behaviorist to engage in animal work, had almost no influence on later behaviorism. Although Hunter was the first to teach a course on learning, his course material looked backward to German objectivism and to Thorndike. His only influence as an animal psychologist was to train some of those who were later to engage in work that resembled or laid the groundwork for the classical behaviorist work of the 1940s, 1950s, and 1960s. Kuo had a very brief career as an American psychologist (1918–23). Thereafter he lived much of his life in China, whose turbulent modern history ensured that he did little research.

Until the last third of the nineteenth century none of the modern social sciences were recognizable as independent disciplines.[3] Disciplinary differentiation began with the emergence of modern universities and colleges in the 1870s and 1880s. The appearance in the 1880s of people with doctoral degrees in their own field constituted a major advance. All these men believed that all science had to be empirically based, deriving that idea in part from the German universities in which they were trained and in part from the successes of evolutionary biology. The American proclivity for social utility manifested itself with varying strength in the various social sciences. The most influential of the new economists placed moral and social values at the center of their enterprise, and the socialists among them pressed for more state intervention. Reform tendencies were weakest in anthropology (since the discipline offered little opportunity for their manifestation), while the political scientists tended to be relatively conservative.

As the modern American university began to emerge, it became increasingly more feasible to take up the role of pure researcher. Men with a strong motive to find social uses for knowledge were attracted to those posts, ensuring that the work of their early graduates would be strongly infused with Progressivism. However, once the universities were established, institutional pressures within them exerted a moderating influence on reform ideals. In the universities, left-wing reformers and traditionalists had to meet and cooperate on a common middle ground. At the same time, university administrators were equally anxious to demonstrate the social utility of their new areas of study and not to give offense to those who were funding the enterprise. The form taken by American positivism ensured that the universities were socially cohesive and promoted their societal influence.

In the universities positivism provided a minimal, agreed set of standards for the conduct of research and teaching. It projected the reassuring image of groups of scholars pursuing objective, disinterested research and then offering their findings to society. It also provided a cloak beneath which value assumptions could operate unseen.

Behaviorism took root early, prevailed for a long time, and was pervasive in American sociology. As early as 1897 the Columbia sociologist Franklin Henry Giddings (1855–1931) devised a scale of sympathy, postulating that sympathy would be closest among those sharing the same genetic makeup.[4] In 1909 he published a more sophisticated version of the scale, which had nine points, varying from native-born

of white parents, through various European "races," to orientals, "civilized dark," and finally, "uncivilized dark."[5] The position of a particular person on the scale was to be ascertained by an analysis of objective characteristics (the person's parentage, cultural origin, and skin color). Giddings did not say so, but the new scale could be construed as an expression of prejudice. He attempted to overcome that potential criticism by constructing each scale point out of his objective characteristics. Given that he expressed the values of his day with such fidelity, he did not realize that each of his characteristics was value-laden. He knew that his scale was a scale of ranks, not an equal-interval measure; he solved his problem by deploying implicit behaviorist principles while arguing that all barely detectable differences in degree of fellow-feeling or sympathy had to be equivalent. By "barely detectable" he meant "behaviorally equivalent." Thus, behavior became the only avenue whereby we could judge psychosocial attributes; private mental states, unseen mental causes, and the unconscious were all ruled out. By comparing the 1890 and 1900 censuses, Giddings demonstrated the social utility of his scale. He assigned various population groups to his scale points and proved (to his own satisfaction, at least) that Americans had become culturally more homogeneous during that decade.

All the features of the behaviorist enterprise existed in embryo in Giddings's scales. First, sympathy was defined in terms of measurable behavior. Second, Giddings made no appeal to feelings or other mental constructs; the behavior was directly correlated with supposed biological forces. Third, he made no presumptions about the causal connections between biology and psychology; the establishment of a functional relationship sufficed. Fourth, the desired conclusion was stipulated in advance; had Giddings not supported his hypothesis he would have assumed an error in technique, not an error in reasoning. Fifth, the connection with the dominant social concerns in the United States at that time is obvious.

Versions of behaviorism were to be found at the University of Chicago as well as at Columbia. Chicago graduate Edward Cary Hayes opened the door to behaviorism in 1904 by insisting that sociology limit itself to the study of phenomena (rather than to the states or conditions underlying phenomena) and to the study of functional relationships between antecedent and dependent variables. Such study would be effective only if one could quantify the variables in question.

In Hayes, then, we do not see just behaviorism but a particular behaviorist doctrine—that the pursuit of science is the pursuit of strictly functional relationships between objectively identifiable variables.

Hayes's position was taken further by his colleague Luther Lee Bernard. In 1919 Bernard published an article in which he advanced a position strikingly similar to that of Watson.[6] Behaviorism was to sweep away the mists of superstition that had clouded sociologists' gaze. Superstition comprised not just witchcraft or mysticism but all metaphysics. Bernard postulated a direct connection between activity in neural substrates and mental states or in sociological phenomena, while also insisting that the primary aim of the behavior scientist was to discover statistical regularities in observed behavior. Above all, no science of human behavior could be complete unless it resulted in prescriptions for social action.

Throughout the 1920s the University of Chicago dominated American sociology. The work of the Chicago sociologists demonstrates the formative and continuing role of Progressivism and the convergence of that heritage with a behaviorist positivism. The leading figures of the Chicago school, especially Robert E. Park (1864–1944) and Ernest Burgess (1886–1966), produced eclectically empirical and problem-driven—rather than theory-driven—work. At first sight, it seems Progressivism did not control the development of sociology at Chicago. For example, Martin Bulmer has argued that Park, Burgess, and their followers wished to study sociological phenomena purely objectively. In particular, he refers to the numerous occasions on which Park repudiated the work of the social survey movement, where the intent was to collect data that could then be presented in such a way as to engender ameliorative community action. However, there are substantive continuities between Progressivism and the beginnings of empirical sociology in America. More to the point, there were formal similarities between Progressive thought and the underlying features controlling the research practices of the Chicago school.

To take Park, journalism was his first profession, an early experience that exerted a continuing influence on his work as a sociologist. After abandoning journalism Park worked for Booker T. Washington for several years; during that period he put much time and effort into publicizing the atrocities committed in the Belgian Congo. While teaching at Chicago, Park collaborated with Charles Johnson of the Chicago Commission of Race Relations and was employed by the

Carnegie-funded Americanization study of 1918–19. Another Chicago faculty member, Ellsworth Faris, spent the first seven years of his working life as an African missionary. Finally, the Chicago school's characteristic work had its origins in the work of an early faculty member, Charles Richmond Henderson, who was more of a social worker than a sociologist and had close working contacts with various community agencies. After Henderson's resignation Burgess took over his courses.

With respect to both substance and form there are striking continuities between Progressivism and sociology. From the beginning, empirical work in sociology was supported by foundations such as the Laura Spelman Rockefeller Memorial. Bulmer argues that those controlling the research funds, especially Beardsley Ruml, were scrupulously careful to avoid demanding predetermined findings from their clients. Nevertheless, the foundations inherited from Progressivism a powerful meliorative impulse and, more important, a prior commitment to the solution of social problems via edicts from above rather than communal agreement from below. Such attitudes must have biased the choice of problem areas for grantees. Furthermore, the granting agencies had considerable impact on the very structure of American social science. As British sociologist Harold Laski commented,

> No university today is complete without its research institute; no foundation is worthy of the name unless its directors are anxiously scanning the horizon for suitable universities which can be endowed with such institutes. There are few universities where the movement is not away from discussion of principle to description and tabulation of fact. Everything is being turned into material for quantitative expression, since this best yields to cooperative effort.[7]

That emphasis on cooperative effort was closely linked with the instrumentalism fostered by the Progressives. The Progressives placed practice above theory and limited theory's role to the elucidation of predetermined problems. Within that scheme, science became a communal enterprise managed from above. The managers (thesis supervisors) collaborated with the workers (graduate students) in order to discover the most efficient ways of solving predetermined problems. Faris wrote that as a result of the Chicago school's work, sociology was defined as "*the pursuit of objective scientific knowledge concerning the nature of society and social organization, groups, and institu-*

tions, the nature and effects of processes of social interaction, and the effect of these forms and processes on the behavior of persons."[8] Faris was proposing a purely functional model, in which identifiable social variables controlled behavioral outputs. The same functional model was at work in Burgess's zonal hypothesis of the structure of cities.[9] According to this model, the newer cities of North America showed a characteristic pattern. Each had a downtown core of high-value commercial property. Surrounding the core was a "twilight" zone of low-cost hotels and housing, surrounding that a zone of better-quality blue-collar housing, and surrounding that the commuter suburbs. The Chicago school discovered that the social pathologies characteristic of twilight zones were a consequence of the living conditions forced on new arrivals. As soon as those people became moderately prosperous they moved out and their level of pathology dropped. The continuity with Progressivism is evident. We have a functionalist explanation of the primary data, while the school's conclusions have direct practical consequences.

We can see those same tendencies very clearly in the work of the economist Wesley Clair Mitchell, who was one of the behaviorists among the institutionalist school of American economists.[10] He showed his colleagues how economic theory should be transformed so that it could deal directly with statistical aggregates instead of making deductive inferences from the needs and feelings of fictional individuals. At the same time, the new knowledge was to be socially useful. Mitchell tried to discover the degree of relationship between empirically established variables. He wrote that the same trend was to be seen in psychology:

> Psychologists are moving rapidly toward an objective conception and a quantitative treatment of their problems. Their emphasis upon stimulus and response sequences, upon conditioned reflexes; their eager efforts to develop performance tests, their attempts to build up a technique of experiment, favor the spread of the conception that all of the social sciences have a common aim—the understanding of human behavior; a common method—the quantitative analysis of behavior records, and a common aspiration—to devise ways of experimenting upon behavior.[11]

Mitchell exhorted economists to change their style of work; the lonely scholar with his books was to be replaced by the grant-supported member of a research team analyzing public records. The necessity for

empirical manipulation of data meant a change in the conception of the conduct of empirical work. Empiricists in the social sciences could not derive their practices from the delicate physical manipulations employed by physical scientists. Instead, they had to content themselves with relatively coarse manipulations having discernible effects on aggregate behavior. Once again, there are strong analogies between Mitchell's proposed research practices and those of psychological behaviorists. Watson, for example, committed himself from his earliest research to the exploration of relatively crude relationships between globally conceived variables.

From the 1920s onward, behaviorism emerged as a strong force in American political science. "The new science of politics," spearheaded by Charles C. Merriam of Chicago, dominated the discipline.[12] In 1921 Merriam wrote an article very similar to Watson's "behaviorist manifesto" in that he exhorted his colleagues to use new methods but eschewed any mention of theory:

> For our purposes it is not necessary or possible to read the future of social or political science. It is sufficient to say that we may definitely and measurably advance the comprehensiveness and accuracy of our observation of political phenomena, and that the processes of social and political control may be found to be much more susceptible to human adaptation and reorganization than they are now.[13]

Merriam presaged psychology's future ethos. He upheld industry and commerce as models for the conduct of research in political science, claiming that the individual scholar was much less efficient than a team of people using a common method. He also claimed that no real scientific political science was possible until standardized methods of record keeping had been developed. The methods were to be those of science. Merriam compared statistics to the telescope or microscope and claimed that statistics could be used to uncover hitherto concealed facts.[14] He also urged political scientists to pay attention to psychology (predictably, the only psychologist he named was the empiricist Edward Lee Thorndike). According to Merriam, "We seem to stand on the verge of definite measurement of elusive elements in human nature hitherto evading understanding and control by scientific methods."[15]

In the 1920s some psychologists showed a reciprocal interest in political science. For example, Floyd Allport asserted that political sci-

ence was the study of behavior: "government itself is behavior. Conceived as a structure, or an institution, it is behavior of a different sort from those more obvious and spectacular processes mentioned above: it consists of deeper, more stable, and more generalized attitudes. But it is, none the less, behavior."[16] Exhibiting a Progressive-inspired distrust of participatory democracy, he used the results of intelligence tests to argue that reliance on public opinion was reliance on mediocrity. He proposed no solutions, but claimed that psychologists had presented political scientists with a serious dilemma.[17]

The culmination of the "new science of politics" movement came with the publication of a distinguished and original body of work by people such as Harold D. Lasswell, Harold F. Gosnell, and Quincy Wright from 1927 onward.[18] The distinctive feature of the research was the innovative use of data-gathering and statistical techniques. The new science of politics movement reached its peak in the 1920s and then declined; there is an intriguing similarity to the course of the behaviorist impulse traveling through psychology.

Behaviorist doctrines exerted a powerful influence on American philosophy. Indeed, in that it was a constitutive force among the first group of truly professional American philosophers, the New Realists, one can say that its role in the discipline was foundational. New Realism was a progenitor of psychological behaviorism both because it gave a distinct philosophical expression to certain elements of Progressive thought and because the New Realists advanced ideas that were either behaviorist or allied to behaviorism. It is particularly noteworthy that all the members of the group believed that insofar as it was possible, philosophers and natural scientists should be guided by the same principles.

The New Realists (Edwin Bissell Holt [1873–1946], Ralph Barton Perry [1876–1957], William Pepperell Montague [1873–1953], Walter Taylor Marvin [1872–1944], Walter Boughton Pitkin [1878–1953], and Edward Gleason Spaulding [1873–1940]) were a group of American philosophers who propounded a theory of mind that was objectivist and, in almost every respect, physicalist.[19] The three leading members of the school (Holt, Perry, and Montague) all had doctorates from Harvard and were heavily influenced by William James. Holt and Perry both taught at Harvard (Holt from 1901 to 1918 and Perry for his entire career). Like their mentor, the New Realists were pragmatists. Like James again, they were opposed to the form of

philosophical idealism that dominated American philosophy in the late nineteenth and early twentieth centuries; among the New Realists, Perry and Montague led the attack on that doctrine. Holt, the most sophisticated philosopher of the group, converted James's solution to the mind/body problem (neutral monism) into a sophisticated and wide-ranging theory.

The New Realists and their allies played a crucial but seldom acknowledged role in the creation of behaviorism. For one thing, they had a direct influence; because Tolman studied under Perry and Holt at Harvard, he was the only neobehaviorist who believed that the "object of knowledge" must be stated as a proposition. He derived his treatment of purpose, which crucially differentiated his theory from Watson's and Hull's, directly from Perry. But indirect and pervasive influences were, I believe, more important. What we see in the writings of so many early twentieth century American philosophers is a physical treatment of sensations, the abolition of the self as a causal agent with a special status in the natural world, and a treatment of the study of mind as a study of functional relationships between those physical attributes of natural objects of crucial importance to living creatures. All those characteristics played a vital formative role in the creation of behaviorism. The New Realists and those philosophers who shared their views advanced them all on a purely speculative basis in the absence of any empirical research. Since the behaviorists and the New Realists also shared the same goal of applying the exacting standards of the physical sciences to their respective disciplines, both groups had a sympathetic interest in each other's writings.

The members of the school set out their principles in a jointly authored article in the *Journal of Philosophy, Psychology, and Scientific Method*.[20] They believed in the joint solution of agreed sets of problems, they maintained that problems should be approached analytically, they affirmed both existential realism (a belief in the existence of physical objects) and subsistential realism (a belief in the existence of at least some essences and universals), and they were anti-representationist (that is, they were opposed to what we take to be the most distinctive doctrines of Locke, Berkeley, and Kant). We should not study minds or persons, they believed; we should restrict ourselves to the study of the mode of relationships between what are commonly treated as mental "contents" and physical occurrences. Like James and the members of the Chicago school of psychology, they were func-

tionalists. So Perry, for example, saw no differences between psychology and physiology in terms of content; instead, he saw psychologists as dealing with adjustments of whole organisms, whereas physiologists studied the role of organs within living beings.[21] In the same vein, Perry advanced a behavioral theory of cognition, assigning all mental contents, whether overt or covert, to the category *response*.[22]

In a brief account of New Realism, such as this, it is best to concentrate on Holt, since he expressed the group's views most fully.[23] Furthermore, for much of his career Holt worked as a psychologist (he ran the psychological laboratory at Harvard for several years). He defined a consciousness as an entity comprising all the objects of which that consciousness was aware.[24] The term *consciousness*, then, was simply a way of categorizing a collection of objects. Holt treated behavior as the only observable psychological category, and believed that behavior was always organized in order to achieve purposes. Therefore, the study of mind consisted of attempts to discover the functional relationships between behaviors, on the one hand, and the objects toward which behavior was directed, on the other. In his theory, consciousness became the living relationship between living beings and the particular elements in the physical world toward which their actions were directed. Those relationships then became the objects of consciousness. To describe purpose was to describe the objects of which behavior was a constant function.[25] Purpose or volition, however, was not mere behavior but a set of dispositions to behave. Although dispositions were always ultimately directed toward physical objects, they could not be reduced to physical activity. The psychical world infused the physical because all psychical activity was purposive. But talk or thought about the mental always had to find expression via physical objects. Again, we have to remember that the ultimate constituents of physical objects and of the universe as a whole were akin to those of logic, so that Holt's universe had a distinctly mental or conceptual character.

Woodbridge, Singer, and de Laguna held philosophical positions even closer to behaviorism and more extreme than the New Realists'.[26] Frederick James Eugene Woodbridge (1867–1940), who had a Ph.D. from Berlin and who taught at the University of Minnesota from 1894 to 1902 and at Columbia (where he was Montague's department head) from 1902 until his retirement in 1937, was a naturalist and a realist, by which he meant that life, mind, and conscious-

ness were situated in bodies, even though mind, once it had reached a certain stage of development, might come to control certain occurrences, while consciousness was a mere spectator of natural events.[27] Moreover, he shared with the New Realists a tendency to place method above theory. As early as 1904 he was construing consciousness as a mode of maintaining relationships between objects, not some sort of receptacle containing representations.[28] Montague commented that for Woodbridge, sensation was merely a physical event: "It was the first case of acute behaviorism that I had seen, and the first, I believe, that existed. To believe in the outer world was indeed very good, but to purchase that belief at the cost of denying the inner world was too high a price even for realism."[29] Woodbridge refused to treat sensations as the fundamental material of the mind. He claimed that there were acts of sensing, but that from the standpoint of the perceiver there was no fixed, substantive reality associated with each act of sensing. Objects, then, were in consciousness in the same way that objects were in space. When we situated an object in space we merely specified its relationship to other objects.

Edgar Arthur Singer, Jr. (1873–1954) completed his Ph.D. at the University of Pennsylvania in 1894; the title of his thesis was "The Composite Nature of Consciousness." In a series of articles published between 1911 and 1917, he equated consciousness with behavior.[30] We believed in consciousness, he claimed, because one set of behaviors led us to expect others. Singer was advancing a sophisticated form of methodological behaviorism in which he called on his readers to classify and predict actions, not try to uncover the causes for actions within putative agents. He also advanced a form of physicalism in which he located certain functional consistencies in the nervous systems of living creatures; those consistencies tended to lead, statistically, to the preservation of groups. Behavior, then, could not be under the control of creatures who initiated and fulfilled purposive sequences of acts, but resulted from forces operating at a group level. In that scenario, individuals did little more than contribute to the error variance. Correspondingly, the role of the experimenter was not to uncover causal factors within agents but to study relationships between variables.

Although Stevenson Smith and Edwin Guthrie called Singer a founder of psychological behaviorism, he repudiated the role.[31] For one thing, he classified the psychological behaviorists as "mecha-

nists," and wrote that "all the categories of life and mind are to my understanding of them *teleological*."[32] For another, Singer, in common with so many American philosophers of his day, was an essayist rather than a philosopher in the modern sense (that is, someone who states definite doctrines clearly and succinctly and who, above all, carefully considers the implications of those doctrines). As a result, Singer's works are diffuse and a trifle thin. Nevertheless, although he did no experimental work himself, he very clearly enunciated the core of the basic principles that were to underlie the research of the behaviorists and neobehaviorists. Given that he was not an original thinker, his writings show us that those ideas were diffused widely through the American intellectual community long before they were put into practice in experimental psychology.

Grace Mead Andrus de Laguna (1878–1978) (known almost all her life as Grace de Laguna) was strongly influenced by Singer in her early career. She was well acquainted with the work of the psychological behaviorists like Watson and Albert P. Weiss, and they knew her work as well (for example, Tolman cited her). In the mid-1920s, following her publication of a book on language, she abandoned behaviorism.

Her behaviorist affinities emerged strongly in her treatment of perception. She claimed that we had no empirical justification for giving red-, green-, or other "centers" a causal role in color perception. Instead, we had to say that the ability to attend to color patches was dependent on a complex set of sensory and motor connections. Much later, the only person to develop a behaviorist theory of perception, James G. Taylor, built on that foundation.[33]

In a review of the second edition of Margaret Floy Washburn's *Animal Mind*, de Laguna displayed her prescience even more strikingly.[34] She outlined what amounted to an operational approach to research in psychology. She treated the study of sense data as the study of the conditions required to produce prespecified verbal responses (e.g., "red" when people are presented with certain types of paper under certain conditions of illumination). She wrote,

> *The phenomena thus investigated become in effect functions of the factors constituting the standardized conditions of the experiment.* It must not be suggested, however, that this means the identification of psychological research with either physical or biological science. The psychological standardization of the conditions of experiment is almost never equivalent to a

> physical or mechanical standardization of them. What may constitute a wide variation in methods mechanically considered, may well fall within the limits of psychological constancy for the particular experiment in hand. Nor is this determined by an unchecked introspection that a given variation does not "look" or "feel" different, but by further experiments which act as mutual checks. In short, one of the most important tasks of the psychologist is the determination of what constitutes the standardization in typical cases.[35]

Implicitly she was asking Washburn to treat psychology as a set of methodological practices, not as a body of substantive doctrines.

De Laguna was also philosophically far ahead of her psychological contemporaries in that she was the first to advance the intersubjectivity argument. She wrote, "it is an essential condition of scientific investigation of any phenomenon that observations made by one individual must be verifiable by others. Otherwise indeed a phenomena [*sic*] is not even identifiable."[36] She did not deny that, when someone looked at a color patch or when someone was in pain, there were private events. The question at issue was, rather, the scientific investigation of those private events. We could not deny experiences, and we knew their nature from verbal descriptions. So, she wrote, "The real scientific observer in the psychological experiment is not the O but the E of the experiment. The series of introspections is a series of responses given by the O under the conditions of the experiment, and observed and interpreted by the E."[37] Long before the enunciation of the principles of the psychological experiment by Woodworth and others in the 1930s, de Laguna was articulating the essential basis of those principles.

De Laguna exhorted behaviorists to abandon speculation in favor of research: "The future of behaviorist psychology will depend on the success with which it treats the specific phenomena of consciousness. To rest its case on the general theoretical advantages, important though they may be, of defining consciousness in terms of behavior, would be to forego the chief claim of any theory to scientific recognition: methodological fruitfulness."[38] Behaviorism, she wrote, had at that point promised much and achieved little. In particular, the central areas of psychology (sensation, perception, and volition) had been left untouched. In part, that was a legacy from behaviorism's origins in comparative psychology and philosophy.

With respect to behaviorism's history, two features of de Laguna's work are noteworthy. First, her positivism was entirely homegrown, a direct offshoot of Singer's (and of the New Realist position in general); in that respect it resembled Tolman's, Hull's, and Skinner's. It was also pervasively rooted in the pragmatism and commitment to social utility so characteristic of American intellectual life in the early twentieth century. Second, de Laguna's methodological principles were elaborated in an empirical vacuum but were very fully elaborated nonetheless. Her work therefore asks us to interpret behaviorism as an enterprise in which laboratory data were constructed in order to lend support to a preestablished philosophical position.

From its beginning American psychology was dominated by an eclectic objectivism and a nascent scientism. Given behaviorism's commitment to objectivism and scientism, when behaviorist positions made their first tentative appearance, American psychologists welcomed them not because they were novel or because they held out the promise of undoing the errors of the past, but because they were familiar. Psychological behaviorism, if it originated anywhere within the discipline, had its beginnings in the inchoate views of the nature of psychology as a discipline that were commonplace in the 1900s.

Fortuitously, the date of the first seemingly behaviorist statement in psychology, by James McKeen Cattell in an address given at the World's Fair at St. Louis in 1904, is the same as the first overt behaviorist statement in American philosophy:

> I can only say that psychology is what the psychologist is interested in qua psychologist. . . . I am not convinced that psychology should be limited to the study of consciousness as such . . . I admire . . . the ever-increasing acuteness of introspective analysis . . . but the positive scientific results are small in quantity when compared with the objective experimental work accomplished in the past fifty years. There is no conflict between introspective analysis and objective experiment—on the contrary, they should and do continually cooperate. But the rather widespread notion that there is no psychology apart from introspection is refuted by the brute argument of accomplished fact. It seems to me that most of the research work that has been done by me or in my laboratory is nearly as independent of introspection as work in physics or in zoology. . . . I see no reason why the application of systematized knowledge to the control of human nature may not in the course of the present century accomplish results commensurate

> with the nineteenth century applications of physical science to the material world.[39]

As department head at Columbia, Cattell certainly favored and supported what one might call brashly mechanist forms of objectivism such as Edward Lee Thorndike's. At the same time, he did not make psychology the exclusive preserve of the behaviorist; he reserved some role for the introspectionist.

William McDougall, later to be a vocal opponent of behaviorism, was the first psychologist to use the term *behavior* when defining psychology. In words reminiscent of those Watson was to publish five years later, he wrote that "The insistence upon introspection as the one method of the science [of psychology] tended to prolong the predominance of this narrow and paralyzing view of the scope of the science."[40] McDougall went on to write that "psychologists must cease to be content with the sterile and narrow conception of their science as the science of consciousness, and must boldly assert its claim to be the positive science of the mind in all its aspects and modes of functioning or . . . the positive science of conduct or behavior."[41] Although that passage, taken in isolation, might suggest that McDougall had preempted Watson, we cannot classify McDougall as a behaviorist. His repudiation of introspection was part of his repudiation of hedonism, associationism, utilitarianism, and individualism (so that he was distancing himself from an intellectual tradition that is fully compatible with behaviorism's) and was designed to set the stage for an examination of the forces underlying conduct.

Walter Bowers Pillsbury (1872–1960), although a student of the arch-introspectionist Edward Bradford Titchener, nevertheless defined psychology as the scientific study of behavior.[42] Like Cattell, Pillsbury wished to match his definition of psychology to what he took to be the new science's actual achievements and its potential for enhancing social and psychological efficiency. In the preface of his *Essentials of Psychology* he wrote, "The point of view [in this book] is on the whole functional; more attention is given to what mind does than to what it is. With this goes an emphasis upon the outward manifestations of consciousness and upon the behavior of others to the subordination of the individual consciousness."[43] Like Cattell, Pillsbury believed that consciousness should still be studied. It was a subject of intrinsic interest to us, and he believed that complex actions

could be understood only by an appeal to consciousness. Nevertheless he wrote that "At the present stage in the development of psychology, it seems best to subordinate consciousness to behavior. Behavior is to be studied through the consciousness of the individual and by external observation."[44] Thus when Pillsbury wrote that "Psychology may be most satisfactorily defined as the science of human behavior," we should not treat him as a proto-behaviorist even if, for the sake of enhancing psychology's appeal to the practically minded, he was enunciating behaviorist-seeming principles.[45]

The first coherent and wide-ranging behaviorist theory to appear in American psychology was American in form in that its inspiration lay in objectivism. Substantively, however, it did not have an American origin. Its proponent, Max Meyer, earned his doctorate under the German objectivist Carl Stumpf at Berlin.[46] Meyer's chief interests lay in hearing and musical acoustics. His objectivism was born in 1896, when he heard "two Russians" expound the doctrine at the International Congress of Psychology at Munich.[47] In formulating his behaviorism, Meyer drew on his European mentors Stumpf, Hermann Ebbinghaus, and the linguist Lazarus Geiger.[48] According to the historian of psychology Erwin Esper,

> In a letter of June, 1966, Meyer wrote, "In Tonpsychologie Stumpf was a 'behaviorist' without knowing himself this fact, obvious to me now." And in a letter two years earlier Meyer had said that when he arrived in America, "I was then already a behaviorist, although I did not know the English language had such a word. When a subject said, 'That noise must be . . .' I told him not to 'introspect' but to do something, to sing."[49]

In 1900 Meyer was appointed to the University of Missouri and appears to have developed his behaviorist theories partly in an attempt to acculturate himself shortly after he arrived in America. He wrote, "I had to teach psychology to college students. I conceived of psychology as the science of learning; I conceived of learning as conductivity change . . . somewhere in the nervous system."[50] Meyer first formally stated his views in his book *The Fundamental Laws of Human Behavior*, published in 1911, two years before Watson's "behaviorist manifesto."[51] There, he advanced a strict contiguity view of habit formation, claiming that habits had their origin in the nervous system, whose role was simply to make connections between stimuli and responses.

The fullest exposition of Meyer's behaviorism is to be found in his book *The Psychology of the Other One*.[52] Here he abandoned his neurological underpinnings and gave a fairly straightforward exposition of his principles. But they remained the same. The most noteworthy aspect of Meyer's 1921 book was his treatment of language: "The speech functions here described are habits in no essential manner different from other habits. [To assume that they constitute a separate class and to give them] such names as memory, or reasoning power, or thought . . . has little to commend it from the psychologist's point of view."[53] Having treated language as nothing other than a set of habits, Meyer proceeded to claim that the relevant habits had a motor basis. At first language acquisition was a passive process. For example, the child learned that the word "food" was associated with the muscular and glandular changes correlated with hunger and eating. Later, children began to imitate words in conjunction with actions. A vital aspect there was the inevitable self-stimulation (the children received both auditory and muscular feedback from their own vocalizations). The feedback provided a constant link between sets of functionally equivalent but physically diverse events and allowed the child to generalize on the basis of specific behavioral instances. Eventually, actions associated with speech attenuated to undetectable events in nerve and muscle. Those minute events formed the basis for the abstractions we called meanings.

Meyer's major methodological doctrine, according to Esper, was that psychology was to deal only with objective data and only with behavior of social interest. For several reasons, Meyer found almost no audience for his views. In his earliest publications he insisted on deriving all his psychological constructs from hypothetical neural models, a mode of exposition that was foreign to his American readers. In addition, he made no concessions to those readers. Furthermore, especially in his later journal articles, he played the role of the European sophisticate who scorned the intellectual laxity of Americans. When we add that he did not balance his criticisms with any real attempt to enlarge his audience (feeling, one assumes, that his books provided him with the only forum he needed for expressing his views) it is no wonder that he was little read and soon forgotten.

Meyer had one successor, Albert Paul Weiss. Weiss trained, both as a graduate and undergraduate, at the University of Missouri, completing his Ph.D. in 1916. He spent the rest of his career at the Uni-

versity of Ohio. His first publications were in education and in audition. Otherwise, all his efforts were devoted to formulating a comprehensive theory of behaviorism. Weiss died aged 52 after a serious illness.

Weiss's reputation was overshadowed by Watson's and, indeed, his peers seemed to treat him as a spokesman for his better-known colleague.[54] Weiss's treatment of *behavior* was as comprehensive as Watson's; the concept embraced all phenomena from the smallest muscle twitch to all the actions and symbolic processes required to write books, while also extending outwards from the tiniest possible individual acts to the furthest reaches of society. Weiss went beyond Watson, however, in that he treated the difference between physical and mental or between physical and symbolic as a mere scientific convention.

Although, again unlike Watson, Weiss said that behaviorism had to address metaphysical issues, his treatment of philosophy was equally cavalier. He reduced metaphysics to philology and to an analysis of the linguistic habits of those classified as philosophers, dismissing philosophers' concepts as mere fictions. By equating philosophy with metaphysics and by focusing on philosophers' linguistic habits, Weiss preempted the logical positivists in their dismissive characterization of metaphysics as nonsense.

Weiss was asserting that the relevant philosophical issues had been decided and all that had to be done was to arrive at a consensus on terminology. He further asserted that there was no need to use the term "conscious" and that it was up to the mentalists to define it. Indeed, Weiss assigned the problem of consciousness to the margins of psychology: "The success of behavior methods will not depend on how they treat the problem of consciousness; they will succeed or fail according as they do or do not further the general welfare of society."[55]

Consciousness, in order to be known, had to be expressed in action of some sort. He then went on to take a physicalistic approach to the description of action reminiscent of logical positivism. He asked his readers to imagine a situation in which someone introspects and an observer reports the actions of the introspecter. Weiss chose to couch those reports in what amounted to a data language. He focused on the act of writing, claiming that, in recording the events to which both were exposed, the observer and the introspecter would make the same

muscular movements. That is, he did not assume that the introspecter was reporting private or inner events (he made the distinction between public and private social, not biological, and he gave a higher epistemological status to physically based than to subjectively based information).

Weiss went beyond Watson in his attempt to demonstrate that behaviorism was monistic in that it could offer a materialist account for all phenomena. To illustrate his behaviorism's epistemological approach he used the continuum from "mere awareness" of an apple to reporting the presence of an actual apple. In awareness, physical stimuli had to be present, but because there were no sense receptors in the brain we could not detect the sources of stimulation. In the latter case we could record the sources of stimulation. Weiss's position allowed him to dispose of any need to consider possible causal relations between the mental and the physical, since the only real domain was the physical.[56] In contemporary terms, Weiss was both an analytic and a radical behaviorist, since he believed that all "mental talk" could be translated, without loss of meaning, into a physical language, while he also claimed that private or implicit aspects of behavior were all derived from a history of physical transactions with the world.

To a contemporary reader, Weiss's refusal to consider the possible role of nonobservable events in the central nervous system in the control of behavior is a strange feature of his physicalism. Weiss believed we could not have a full processing of stimulation in the absence of movement or of the possibility of movement. Using the metaphor of the brain as a telephone exchange allowed Weiss to treat the brain purely as a physico-chemical mechanism so that, when discussing the neurophysiology of behavior, he did not have to introduce a new hierarchy of concepts.

Weiss admitted that behaviorism's seeming description of language solely in terms of the muscular movements required to produce speech or writing made it susceptible to criticism. To overcome that deficiency, he analyzed language as a system of signs designed to communicate meaning and focused on the various acts whereby meaning was communicated, ignoring the precise muscular movements necessary for the production of those acts. No behaviorist other than Skinner was to take that approach.[57] Moreover, both Skinner and Weiss advanced philosophies of language; neither proposed research strategies designed to support their claims.

Weiss's treatment of language was reminiscent of Skinner's not merely in terms of its working stance. In a detailed account of a child's acquisition of the word "orange," Weiss claimed that the word was acquired because of the desirable consequences of using it, so that his explanation resembled Skinner's account of the acquisition of the class of words he calls "mands." There was even a hint that Weiss foreshadowed Skinner's autoclitics in that he claimed that children could learn to insert single words into sentences by imitating their parents' utterances.

Unlike all other behaviorists, including Skinner, Weiss characterized language in terms of its structure. He discussed what Charles F. Hockett called "key properties" of language: for example, any language consists of an infinite, ordered response output; languages make it possible to exchange communications over large spatial and temporal distances; in language, a small energy input into a stimulus can trigger a much larger response output.[58]

When he wrote about thinking, Weiss provided a much more wide-ranging and robust blueprint for behaviorist research and theory than was to be found in the work of his successors. He asked us to define thought in terms of its social consequences: "If thinking is defined according to the biosocial character of the responses that are the solution to the problem stimulus, two thoughts are similar when the solution responses meet similar biosocial requirements."[59] He also wrote, "Thinking is a form of behavior, standardized and conventionalized, and typified by a particular problem stimulus and a solution response. The same forces are operative in thinking as in any other form of behavior."[60] Weiss's strikingly incisive analysis of thinking invites comparison with Wittgenstein's. In that respect, within behaviorism he had no peer. Indeed, it is difficult to think of any contemporary psychologist who had thought about the problem so deeply.

Turning to the social realm, Weiss said that social status was directly established by the overt reaction and, like the stimulus, had a biophysical and an individual-social aspect. Introducing the two aspects allowed him to discuss the issue of the differing significance of actions that are physically identical (his example was signing a check as opposed to signing an I.O.U.). Social status itself was produced by specific and efficiency factors. The former specify one's social role, the latter one's status or power. He then broke down the efficiency factor into variables, claiming that an individual could be defined in terms of

his or her relative ranking on all relevant variables. In a footnote he explicated that point:

> Much of the criticism that has been directed against mental testing arises from the failure to see that mental tests are actually social tests; that the mental test score actually gives the individual's social status in the specific activity that is being tested. Mental age, fundamentally, means social age. The criticism that "mental testers do not know what they are testing" merely means that no scientific classification has been developed for normal adult individuals which is based on the overt reactions characteristic of a given group . . . the difficulty with the definition of intelligence means that at present it is impossible to separate the social from the neural factor in the analysis of the overt reaction.[61]

In that passage Weiss showed a remarkably acute understanding of the role mental testing was to play in America from the 1920s to the 1960s. He recognized that the testers were committed to working within the confines of a given set of power and status relationships and that their task was to predict effective working roles for individuals in society.

A Theoretical Basis of Human Behavior was the greatest and most comprehensive achievement of the behaviorism of the 1920s. Weiss explicated behaviorist principles fully, especially in the two key areas of language and thought. He also gave careful consideration to criticisms of behaviorism. Compared to Watson's *Behaviorism*, his is a much more thorough and scholarly book. But he is a sadly neglected figure whose ideas are seldom discussed.

Three reasons can be advanced for that neglect. One is Weiss's early death, which was preceded by several years of incapacitating illness. Furthermore, his death came at a low point in behaviorism's fortunes. The second is his personality. Weiss was a modest, rather retiring man who did little to publicize his ideas. Here, he sharply contrasts with Watson. In particular, Weiss made no attempt to popularize his views. But perhaps the major reason for the neglect of Weiss lay in what was seen as his extreme reductionism. A coyness about reductionism (as in Hull's case) or a successful circuit of what psychologists saw as an epistemological morass (as in Skinner's case) was an essential route to success.

Even though Jacob Robert Kantor continued publishing until 1984 and even though the school he founded (interbehavioral psychology)

has many living adherents, I have decided to include an account of his theory in this chapter.[62] Like the other psychological behaviorists who first published in the 1920s, Kantor did not develop a research-oriented theory. Thus he stood apart from the neobehaviorists, despite the similarities between his theory and Skinner's. Besides refusing to create a research-oriented theory, Kantor rejected operationism and did not accept the reality of the concept of *learning*, even if he had intellectual (but not institutional) affiliations with functionalism.

Kantor created his mature theory very early in his career. He resembled his behaviorist confreres because its inspiration was negative rather than positive. He was an anti-mentalist, argued against both mind/body and brain/body dualism, and assigned instincts a fleeting role in the psychological economy. He also resembled the other behaviorists in his acceptance of Watson's aspirations to create an overarching theory of behavior, but he could not accept Watson's means of realizing them. In particular, by taking an antimechanist stance Kantor rapidly distanced himself from Watson.

Kantor was also distinctive in rejecting some of the constitutive tenets of the behaviorist school. For him, physics was not the master or model science; instead, he espoused a scientific pluralism, a pluralism that he applied to psychology as a whole (he claimed that certain concepts and data-gathering techniques were unique to psychology) and within psychology (he claimed that the various areas within psychology had fundamentally distinct features). He did not believe that psychologists could make predictions, and he did not believe that standard models of causation applied in psychology.[63]

There were powerful positive elements in Kantor's thought. Following Watson, he believed that the explanations for adaptive actions lay in a close study of their ontogenesis. In his very first writings Kantor recognized that developing adequate explanations for smoothly and unthinkingly generated human adaptive actions was a crucial problem for any psychological theory.[64] He believed passionately, like all the other behaviorists, that explanations appealing to mind, consciousness, or instinct were not explanations at all. His antimechanism and his distrust of the possibility of prediction led him to develop the concept of the interbehavioral field. The components of any given interbehavioral field were the organism, the stimulus, the media (or medium) of contact, the setting factors, and the reactional biography.[65] Kantor's treatment of the organism did not differ from that of

the other behaviorists (he saw the organism as a set of dispositions or response functions).[66] He treated the stimulus, however, very differently. For him, stimuli were simply occasions for reaction and fluently emerged from past actions. For example, presenting a blue flower to human beings elicited an infinite range of reactions, all of which were controlled both by past experience of flowers and by cultural expectations regarding them.[67] Thus, past experience with flowers (some of which was collective, that is, symbolically mediated), constituted the stimulus. Stimuli, then, could not be physical; physical objects and events were mere occasions or settings for actions and could not cause actions.

Kantor used the concept of medium of contact to emphasize the distance between his and all other psychological theories. A medium of contact, he wrote, "is certainly *not* a stimulus in the sense of energy 'mediating' mental qualities by its effect on the brain."[68] Media of contact, such as light or sound, then, were necessary but not sufficient conditions for psychological events. Because he was not a dualist, Kantor did not believe that physical events were registered and interpreted by either the brain or the mind.

Kantor's treatment of media of contact allows us to understand his theory of meaning. Both dualists and materialists would say that events can be meaningful in themselves. For example, a red patch is meaningful merely by being perceived and thereby incorporated into the perceiver's experience. Kantor, however, saw the matter quite differently. First, for him meaning arose from the domain circumambient to an event (as when a child in a dimly lit room sees a teddy bear as a terrifying monster). Second, he believed it was wrong to say that an event could derive its meaning from outside its ontological domain (so that mental states could not be reduced to neurological events).[69]

The complex and varied antecedent and concurrent events in which a specific individual interaction of stimulus and response is embedded were, according to Kantor, setting factors. Other theorists organized them and assigned a causative role to subsets of them under such generic terms as "intervening variable" and "hypothetical construct."[70] Kantor's treatment of setting factors demonstrates how, as in the case of reinforcement, he relegated what was central to neobehaviorism to the periphery of his theory.[71]

Kantor's treatment of responses was very similar to his treatment of stimuli. That is, like Skinner, he did not believe that responses could

be characterized solely or even largely by their physical form.[72] Instead, a response was the expression of a complex concatenation of circumstances. It was also the avenue down which psychologists had to travel in order to understand behavior. For example, weeping could have complex origins (anger, sorrow, frustration, etc.). There were also individual differences in the threshold for weeping. Even the various types of weeping showed complex differences (for example, a bout of sorrowful weeping might have various subcomponents such as love, misery, or rage at lost opportunities; some sorrows provoked weeping, others did not).

The reactional biography comprised constituent events distant in both time and space from any given action. Verplanck comments, "The reactional biography can be understood as everything that ever happened to the individual and everything the individual ever did. It delineates the behavior repertory of the individual."[73] The components of the field reacted with one another in highly complex ways. To explicate the interbehavioral field, I will take the example of the contrasting effects of malnourishment and adequate nourishment in infancy on intellectual development. If malnourishment is sufficiently severe, brain growth is retarded, with a consequent effect on intellectual growth (that is, we apply a linear causal model in deriving our explanation). Kantor would then ask us to consider the effects of normal nourishment. We could not attribute normal intellectual functioning to normal brain growth resulting from adequate levels of nourishment. Instead, according to Kantor, the well-nourished child made contact with its environment on a very broad front. Those contacts were not merely passively recorded. Instead, they formed the basis for further reactions, which themselves constituted a basis for differing reactions.

Even if we take a reaction as simple as sneezing, the sneeze of an infant is quite different from that of a forty-year-old. The infant's sneeze is a simple reflex response and has no further consequences; the adult's might be the portent of an annual spring allergy attack and will result in a visit to the drug store, besides eliciting gloomy thoughts about future red, sore eyes, lassitude, and so forth. Furthermore, the reactional biography included cultural components. A middle-class English sneeze might elicit scornful looks, whereas a German sneeze elicits a good-natured "Gesundheit."

Because Kantor did not believe that his theory could find expression in research or have practical applications, he concerned himself almost exclusively with metatheoretical issues. That is, he tried to establish a secure framework within which to develop a comprehensive behaviorist psychology. Kantor's diffuse writing style constitutes an additional problem for those not already convinced of interbehaviorism's value. To make his difficulties worse, Kantor consistently took on the role of a critic rather than that of an expositor of some distinctive theory; he exacerbated his difficulties in this respect by criticizing behaviorism as freely as he criticized other theories.

Although Kantor did create a school of psychology and did inspire a surprisingly large group of followers, he could not, given his theory's form, inspire a group of research-oriented acolytes. Skinner was far more successful in that respect. Because Skinner's and Kantor's theories were so similar, Kantor, if he lives on at all, lives in Skinner's shadow. Neobehaviorist theories contained explicit research-oriented components, so that adherents were given clear guidelines allowing them to generate findings consistent with their chosen theory.

I can illustrate my point by contrasting Skinner's and Kantor's treatment of reinforcement. For Skinner, reinforcement referred to a class of events designed to control the rate of emission of responses. By specifying the means of measuring and controlling the rates of emission of responses and correlating those rates with the rate of delivery of reinforcement, Skinner could show his followers how to generate an infinite set of research techniques. Kantor almost dismissed reinforcement, treating it as a conceptual device that permitted the neobehaviorists to generate distinctive theories.

Finally, I think we can say that Kantor developed his theory at a time when it would be seen merely as a recondite variant of a psychological doctrine, competing in an ideological war both with its fellows in the behaviorist camp and with enemy theories outside. The key development in behavioral science was the creation of new research technologies in the 1930s. The conjunction of learning theory, operationalism, and research designs based on analysis of variance, combined with an enunciation of the relevant principles in the language of the logical positivists, ensured research productivity for gen-

erations of graduate students. Theories deprived of those essential nutrients, Kantor's among them, withered on the vine.[74]

Just as Kantor looked back to the theoretical behaviorisms of the 1920s, so Walter Samuel Hunter looked forward to the research-driven neobehaviorisms of the 1930s and 1940s. Hunter enunciated the behaviorist creed, but did not formulate a distinctive version of it. His one theoretical term, anthroponomy (his name for the science of psychology), was designed to act as a warning sign (banning mentalists), and so did no more than affirm all behaviorists' distrust of the mind and all allied concepts.[75] By the same token, his major innovation was programmatic rather than substantive. Hunter designed the very first course in learning to be given in psychology, thereby setting up the warp for the neobehaviorist tapestry.

Hunter converted to behaviorism in 1922.[76] His contribution to the doctrine was based exclusively on his research on the delayed reaction.[77] In that work, Hunter showed conclusively that raccoons, monkeys, and children could all respond adequately to an internal cue. He inferred that all those species shared the same type of intellectual capacity (all could form symbolic representations of the world). He wrote,

> By applying the term "ideas" to those cues, I mean that they are similar to the memory idea of human experience so far as *function* and *mechanism* are concerned. They are the residual effects of sensory stimuli which are retained and which may be subsequently re-excited. The revival, moreover, is selective and adaptive to the solution of a particular problem, and when aroused they function successfully as a necessary substitute for a definite component of the objective stimulus aspect of the problem.[78]

In order to arrive at a comprehensive theory, Hunter, like his behaviorist peers, assumed that consciousness and language were coterminous—that is, first, whatever we are conscious of is linguistically expressible, at least in principle, and, second, consciousness was nothing other than a mass of verbalizations. By implication, symbolism had a purely functional role: symbols or rules were nothing other than surrogates for full-blown responses. Hunter's position implied that symbolic processes, even though they were entirely derived from experience, were different from all other psychological processes.

In his psychology as a whole Hunter obeyed the behaviorist imperatives. The term "anthroponomy" issued a promissory note to treat the human condition comprehensively. However, he did not redeem those promises himself. Hunter wrote,

> Anthroponomy is the science of behavior of the human organism as a whole. The problems of this science necessarily cover a wide range. Some are shared with the related sciences of sociology, physiology, neurology, physics, chemistry and mathematics, while other problems are studied little if at all outside of anthroponomy. These latter problems concern the characteristics which most specifically define human nature, *viz.,* the learning and use of new forms of response, language behavior, and social behavior, which latter we call the behavior of inter-stimulation and response.[79]

Hunter was the first to define the science of psychology as the study of the acquisition and deployment of habits. Such a definition was implicit in Watson's approach, because he placed the acquisition of habits in center stage, but we do not find formal statements of the role of conditioning or learning in Watson's writings. Hunter was prescient in another respect. It would seem that he derived his formulation of his version of behaviorism from his research, and his work on the delayed reaction provided the paradigm. His behaviorism thus appeared to have an inductive origin, in that respect resembling Skinner's and Tolman's.

Hunter's theory, as expressed in his textbook *Human Behavior*, was rather disappointing.[80] He presented the standard functionalist fare. He treated society as a collection of individuals whose role was to adapt to the situations in which they found themselves. He divided anthroponomy's subject matter into four areas—comparative psychology, the application of psychological tests, abnormal psychology, and social psychology. Despite his opposition to Watson in his most distinctive research, Hunter molded his psychology into a Watsonian form. Psychology was derived from and based its scientific respectability on biology and the physical sciences in general. Its current justification lay in the applied area. Its future lay with proposals to cure society's ills; crucially, those ills resided in failures of individual adjustment. Using ontogenetic techniques derived from comparative psychology and modes of assessment developed by mental testers,

psychologists were to act as social technocrats. Hunter's creed is fully expressed in the following passage:

> The sum total of overt and concealed, implicit, behavior which makes up the daily life of the individual constitutes his total personality. These forms of behavior are what they are in virtue of the thousand and one incidents through which the individual has passed since infancy. Undoubtedly if we had a complete and detailed description of the individual's equipment at birth and an equally satisfactory record of the modifications of his responses since that time, we would be in a position to give a satisfactory explanation of his adult personality.[81]

There we have Watson without the bombast. Hunter had firmly grasped the essence of Watson's message. Each of us is the sum total of all the habits we have acquired since our birth. Moreover, all those habits were acquired under conditions that are in principle fully specifiable, and all have consequences that, again in principle, can be completely stated in terms of observable actions.

If asked to name the ultimate behaviorist, most psychologists who know their history would say Watson or Skinner. The palm must, however, be awarded to Zing-Yang Kuo.[82] From 1924 onward, Kuo elaborated an anti-instinct stance into the most extreme version of behaviorism in the history of thought. Astoundingly, heredity was not a psychological problem for him because the existence of heredity could be neither proved nor disproved in the laboratory. He wrote, "Any controversy in psychology must be capable of promoting experimental researches so that the issue can be settled in the laboratory, or it must at least have some particular value for laboratory procedure."[83] Kuo continued,

> I shall define psychology as *the science which deals with the physiology of bodily mechanisms involved in the organismic adjustment to environment with special emphasis on the functional aspect of the adjustment*. (By functional aspect, I mean the effect, or result, or adjustment-value—positive, negative or indifferent—of a response which establishes a new functional relation of the ongoing organism to its environment, social or otherwise.)[84]

Unlike Watson, but like Weiss, Kuo was calling for the creation of a new, physiologically based science of behavior.[85] There could be no compromise with the existing discipline because to compromise was

to incorporate psychology's fetid metaphysical past into the growing discipline.

Kuo wished to dismiss purpose from psychology altogether, producing behaviorism's *ne plus ultra*: "The basic principles that have been employed to explain the behavior of a stone should be sufficient to explain human behavior. The behaviorist need not assume an inner motive in the case of human behavior any more than the physicist needs to assume spiritual influence in the case of stone movement."[86] Belief in the directive function of drive, he asserted, implied belief in some spiritual agency. He denied any difference between anticipatory and consummatory reactions, saying that all reactions were to be explained in terms of the operation of current stimulation. Once again he expressed himself in extreme terms: "the organism—animal as well as man—is always a passive machine acting in one direction or another as a result of predominance of chemical or physical forces in the environment."[87]

Even if one says that Kuo caricatured the substance of behaviorism, one has to say that he showed a precise grasp of the nature of experimental method as it was portrayed by both the behaviorists and the functionalists. He wrote,

> the experimenter starts out his experiment with a preconceived end, and when the animal has reached a certain end (*note that this is not the animal's own end*) its ceaseless movements are brought to an end; *e.g.,* when the animal has gone through the correct path and has reached the food box and taken food, the experimenter immediately interrupts its activities and brings it back to the entrance of the maze again. Indeed, if there is any "purpose" in animal experimentation, that purpose belongs to the experimenter.[88]

Kuo believed that the rejection of purpose had to imply the rejection of trial-and-error learning. If one assumed that every movement was passive and enforced by the environment, there was no need to posit trial and error. He reverted to his point that, in any experiment, the animal was totally under the experimenter's control. Further, the abolishment of instinct implied abolishing trial and error because trial and error, traditionally, was opposed to instinct, mirroring the distinction between unlearned and learned reactions. But, with unusual humility, Kuo admitted, "in spite of more than a quarter of a century of animal

experimentation we still know very little about the effectiveness of controlling animal behavior."[89]

Just as Kuo typified behaviorism in his portrayal of experimental method, he emulated the behaviorists' cavalier dismissal of any consideration of the central nervous system.[90] Ironically, Lashley, later to be a founding father of the "cognitive revolution" that thrust behaviorism into the shadows, was the only American psychologist to respond favorably to Kuo.[91] Kuo himself took up an academic post in China and ceased to play a role in the behaviorist movement.