

A Science of Adaptation: the transnational origins of the American functional behaviorism of the 20th century.

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ABSTRACT

This paper tells the story of the transnational origins of American behavioral psychology. It revisits a 1929 history of the American assimilation of German experimental psychology between 1875 and 1913. This is an example of the migration and synthesis of scientific ideas across international borders that resulted in an experimental psychology that investigated the mind in terms of the functions of the central nervous system that occasioned individual adaptation to the environment. This history of ideas addresses the question: Why did American psychology reject the pioneering German experimental psychology of consciousness to become a science of adaptation? Put in general terms, a uniquely American behavioral psychology of the 20th century resulted when individuals combined elements of psychophysics from Germany, evolutionary theory from England, and gastric physiology from Russia.

Una ciencia de la adaptación: los orígenes transnacionales del conductismo funcionalista americano del siglo XX.

RESUMEN

Este artículo cuenta la historia de los orígenes transnacionales de la psicología del comportamiento estadounidense. Revisa una historia de 1929 de la asimilación estadounidense de la psicología experimental alemana entre 1875 y 1913. Este es un ejemplo de la migración y síntesis de ideas científicas a través de fronteras internacionales que dieron como resultado una psicología experimental que investigó la mente en términos de las funciones del sistema nervioso central que ocasionó la adaptación individual al ambiente. Esta historia de las ideas aborda la pregunta: ¿Por qué la psicología estadounidense rechazó la pionera psicología experimental alemana de la conciencia para convertirse en una ciencia de la adaptación? Dicho en términos generales, una psicología conductual estadounidense única del siglo XX resultó cuando los individuos combinaron elementos de la psicofísica de Alemania, la teoría evolutiva de Inglaterra y la fisiología gástrica de Rusia.

Introduction

“... the historical approach to the understanding of scientific fact is what differentiates the scholar in science from the mere experimenter” (Boring, 1961, p. 3).

This paper is a transnational historiography, and for our purposes, transnational historiography means the following: “When scientific knowledge flows between different countries, the ideas that emerge in one particular national context adapt to the new local contexts of

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their hosts, with their particular cultural, social, political and scientific traditions” (Ruiz & Sánchez, 2020).

This paper revisits one interpretation of the American assimilation of experimental psychology between 1875 and 1913. The information was selectively taken from Edwin Boring’s (1886-1968) 1929 textbook, *A History Of Experimental Psychology*. When Boring was writing about these events in the 1920s, they were relatively recent history, forty years past. Boring knew people that played a role in the events, and in that sense, he was reporting on recent history. Analysis for this paper was achieved by considering those parts of Boring’s history of experimental psychology that suggested answers to the question: How was the experimental psychology that was imported from Germany assimilated in the United States of America?

This exercise in transnational historiography was undertaken to answer questions about the origins and the substance of American experimental psychology during the 20th century. To emphasize the importance of experimental psychology as a topic, I will cite Boring. “... the application of the experimental method to the problem of mind was the great outstanding event in the history of the study of mind (Boring, 1929, p. 659).

The founding of experimental psychology, the *new* scientific psychology, German experimental psychology, was credited to Wilhelm Wundt (1832-1920). In establishing psychology as a science, Wundt declared himself a psychologist, and in 1879 he dedicated a psychology laboratory in Leipzig, Germany. Several years before Wundt launched experimental psychology, in the fall of 1873, Ilya Fadeyevich Tsion (alias, Elias de Cyon) (1843-1912) delivered his “The Heart and the Brain” speech at the Medical-Surgical Academy in St. Petersburg, Russia.

Tsion had recently replaced Ivan Sechenov (1829-1905) as professor of physiology. Sechenov is famous today, and he was infamous then, for his speculation that the mental life might be the function of cerebral reflexes. A reflex psychology implied a materialistic interpretation of human nature, and the materialistic interpretation of mental processes by a prominent physiologist encouraged progressive ideas that threatened the traditional doctrine of the separation of body and mind.

Following the successes of physiology in the nineteenth century, many people believed that science was on the threshold of a scientific psychology that could answer age old intractable philosophical and political problems. Those who represented the conservative authority of church and state, perceived this as an assault on the doctrine that mind was a unique substance, the spiritual soul, and free will. Religious belief was an unquestionably important part of national identity, and traditionally religious authority was the source of knowledge, but the reality of industrializing Europe dictated that nations had to modernize. The unavoidable modernization processes demanded science, which challenged the traditional authorities as the only source of knowledge. Science included medical science, and with medical science came physiology. As physiology developed as a science, the boundary between brain and mind became blurred. It was only a matter of time before a scientist of vital processes would shift the focus of investigation from physiology to psychology.

In his ‘heart and brain’ speech, Tsion said that popular authors portrayed the science of physiology as the destroyer of public

morality. Tsion used the connection between the heart and the brain to illustrate the achievements of physiology and to emphasize the limitations of science. The heart was unquestionably influenced by emotional states. The emotions of love, jealousy, fear, grief, joy, and anger produced different heart rates, which could be detected, recorded, and displayed by the cardiograph (Todes, 2014).

However, Tsion said that there were limits to science. People who were seeking easy answers to philosophical and political problems had to realize that the discovery of the thought processes was impossible. Tsion said that the believers in a mechanistic psychology should stop wasting their time in the pursuit of illusions and look for solace in the life-improving questions that science could answer. He did concede, “Perhaps in the distant future physiologists might discover the mechanics of cerebral processes” (Todes, 2014, p. 55).

It is among the ironies of history that Tsion’s student was Ivan Pavlov (1849-1936). Pavlov’s application of physiological methods to discover cerebral processes would play an important role in the transnational history of psychology, but in 1873 much had to occur before Pavlov was relevant in American psychology. It would take twenty-five years before Pavlov discovered the conditioned reflex and forty years before John Watson founded behaviorism. The story of the American assimilation of experimental psychology begins in the 1870s. A review of Boring’s 1929 interpretation of the history of the assimilation follows.

Boring’s Question

The new experimental psychology that originated in Germany was enthusiastically received in America. After it was introduced in 1870s, psychology laboratories began appearing in American universities; however, the fundamentals and assumptions underlying German experimental psychology were soon challenged. As a result of the assimilation processes, Boring believed that by 1910 German psychology was replaced by a characteristic American psychology. In his 1961 autobiography, Boring commented that while writing his 1950 revision of *The History of Experimental Psychology*, “I had also solved to my own satisfaction the question of why American psychology, while attempting to copy German introspective psychology in the late nineteenth century, nevertheless went functional. That matter had troubled me in 1929” (Boring, 1961, p. 69).

What does functional mean?

Psychology borrowed the concept of function from 19th century physiology. Physiology is the science of life, and science proceeds by analysis. Analysis proceeds by reducing its subject to the essential elements. The elements of vital biological processes are structures. Anatomy is the science of structure, the dissected parts. In the 19th century, the trend in physiology was to dissect and isolate the vital organs in order to study their functions. In 1866 Carl Ludwig (1816-1895) successfully removed a heart from a frog and submerged it in a nutrient enriched fluid where he connected the heart to a circulation system for experiments. Dissection and isolation was the trend, but

it was not universally accepted as the ideal method. The antithesis to dissection was a holistic approach to physiology.

To truly observe an organ's function there was no realistic possibility of controlling for confounding variables after dissection. The animal was dead, and the organ of interest was reduced to a lifeless structure removed from its vital context. The ideal way to research a vital organ function was in its natural state, connected to and interacting with the other organs. This demanded new experimental methods. Vivisection was transformed from a method of dissection and observation into a method for experimenting on live animals in a laboratory. As the possibility of a holistic physiological science developed, the investigation of organ functions became tied to the newly developed experimental methods.

The holistic approach was associated foremost with Claude Bernard (1813-1878) in Paris, who instructed Tsion, who took Bernard's theory and methods to St. Petersburg where he mentored the young Pavlov. Pavlov adapted this holistic orientation and the new experimental methods to discover the conditioned reflex, which was mediated in the brain (Clark, 2022a). To understand the history of the American assimilation of experimental psychology, it is important to understand the 19th century meaning of function.

Perhaps one of the clearest explanations of function was expressed by Robert Woodworth (1869-1962). Woodworth was a student of William James during the 1890s, and he was present while the assimilation of German psychology was occurring. Woodworth's biographical information speaks to his credibility as a witness. To paraphrase Woodworth (1948, p. 28-29): The word function has three meanings. Two meanings of function are related, and this contributes to confusion. On one hand function means the usefulness, or the value, of an organ. Take the stomach for example: Question: What is the function of the stomach? Answer: Its usefulness for the individual is the digestion of food. On the other hand, you can ask how does the stomach function? Meaning, how does it function in terms of the causes and effects that process food. And there is also a third meaning of function that was borrowed from mathematics: X is a function of Y. In this instance digestion was a function of chemical processes and time.

In this context, the flow of gastric juices into the stomach were measured and recorded. Rendered mathematically, digestion then appeared on a graph, the function appeared as a line rising and falling on the X - Y axis. When graphing dynamic functions was new, the never-before seen dynamic motions of vital glands appeared in hand. Physiology progressed, many early psychologists were first physiologists.

These three meanings of function represent three questions: "what?" "how?" "why?" Often the word function was used by the same author for different intended referents in the same article. Sometimes the word implied all three meanings in the same sentence. Function was a source of confusion; however, it was important because as a concept, it could assimilate information beyond the anatomy.

American Functional Psychology as described by Boring in 1929

To begin, the essence of clarity is contrast, and for the sake of clarity it is worthwhile thinking of functional psychology as it compared

to and contrasted with Wundt's experimental psychology. Wundt's approach was understandable. Science is analytic, and when social consensus understood mind to be synonymous with consciousness, it made sense that experimental psychology would proceed by the analysis of consciousness into its simplest elements. For Boring, Wundt's psychology was experimental, introspective, systematic, elementalistic, and associationistic (Boring, 1929, p. 580). The research goal of this experimental psychology was to find the laws regulating the sensations, in the normal human mind, using the experimental method of introspection. Functionalism was a reaction to Wundt's system of experimental psychology.

Boring said that George Trumbull Ladd (1842-1921) was a functional psychologist (Boring, 1929, p. 513). In the 1880s, Ladd taught psychophysics at Yale University in New Haven, Connecticut. In 1887, he published an influential textbook, *Elements of Physiological Psychology*. It was based on Wundt's psychology. Then in 1894, Ladd published another textbook, *Psychology, Descriptive and Explanatory*. Boring found Ladd's revision of psychology original and systematic.

Ladd understood the mind in terms of its usefulness. The function of consciousness was twofold; as well as passively receiving contents, it was an active processes, and the use-function of consciousness was to solve problems. Psychologically, this meant that consciousness was the activity of an individual; physiologically, this tied consciousness to a body. And when consciousness was tied to the individual, it was possible to explain consciousness in a Darwinian evolutionary context. With its adaptive usefulness, mind had a purpose, and by including purpose, Ladd's psychology became teleological. For Boring, teleology was an important characteristic of American psychology. In addition, Ladd's biological point of view made psychology practical, and Boring's meaning of practical was, "American psychology was practical, for it dealt with life, the adaptive value of the mind for the organism against its environment - an approach to psychology that would not have been possible but for Darwin" (Boring, 1929, p. 657-58).

As Boring (1929) summarized Ladd's psychology: "You have a person (the self, the organism) with a mind (content) acting (function) to adapt him to his environment (biology) in the ways for which his mind is fitted (teleology)" (p. 513). Boring said, "They are all in Ladd at the level of theoretical systematization. The history of American psychology is little more than their working-out in reality" (Boring, 1929, p. 514).

The word function denotes physiology and vital processes, and to the initiated, function connotes yet another meaning, it means science. A functional psychology is the science of vital dynamic processes, mental and physical. By way of analogy, a functional gastric physiology addresses the usefulness of the stomach and the causal explanation of digestion, which is a process evolved to its perfection by evolutionary adaptation to the environment. In functional psychology, adaptation was a dynamic process whereby the individual responds to the environment in terms of adjusting to changes and challenges. To avoid ambiguity and misunderstandings going forward: The expressions 'functional psychology,' 'the psychology of adaptation,' and 'the psychology of adjustment'... these expressions were often used indiscriminately by different authors to mean the same thing. A functional psychology is the science of adaptation.

With a prerequisite understanding of the ambiguous terms, I turn to Boring's 1929 interpretation of the history of the assimilation of experimental psychology in America.

How did functionalism happen in America?

To restate the theme: In his 1961 autobiography, Boring said that while writing his 1929 history of experimental psychology he was troubled by the question of why American psychology went functional (Boring, 1961, p. 69).

Boring said, "It seemed that America had adapted the new psychology from Germany and that its deviation from the type were due rather to the idiosyncrasies of individuals than to any national trend" (Boring, 1929, p. 538).

William James (1842-1910)

Proceeding with the first of Boring's idiosyncratic individuals: William James (1842-1910) pioneered experimental psychology in America. Paraphrasing Boring (1929), James entered the Lawrence Scientific School of Harvard at 19. He entered the Harvard medical school when he was 21. When he was 23, James accompanied the famous scientist Louis Agassiz on an expedition to the Amazon. He went to Germany for a year and a half. He received his medical degree from Harvard in 1869. In 1872 James was appointed instructor of physiology at Harvard College.

At Harvard University in 1875-76, James introduced experimental psychology to American students. He used Herbert Spencer's (1820-1903) book, *The Principles of Psychology*, and James included an informal psychological laboratory for demonstration experiments. In 1878 James contracted to write what became his own version of the principles of psychology. In 1889, he was made professor of psychology. In 1890 James published his version of *The Principles of Psychology*. As James defined it, "Psychology is the Science of Mental Life, both of its phenomena and their conditions" (James, 1890, p. 1). It is noteworthy that on page 6, James said that few had contributed more to psychology than Spencer did by taking into account the fact that minds inhabit environments, which act on the minds, which in turn react. Spencer understood mental life and physical life in terms of continual adaptation to the environment. On page 106, James noted, "Mr. Spencer ...tries... to show how new actions may arise in the nervous systems and form new reflex arcs..." James said that he would take any journey into nerve-physiology that he thought instructive. When James died in 1910, he left a lasting influence on American psychology (Boring, 1929, p. 497-98).

Boring gave 3 reasons for James's lasting influence on American psychology. Foremost, James's personality: James was a gifted and persuasive writer. In Boring's opinion, someone else could have said the same things, and it would have come to nothing. The second reason for James lasting influence on American psychology was in the way that revolutions worked; James disrupted the prevailing consensus. James opposed the elementalism of German psychology, and he offered an acceptable alternative to understanding the mind.

The third reason for James's lasting influence was, his alternative understanding of mind included the possibilities for a new psychology (Boring, 1929, p. 498).

James's reaction to Wundt's experimental psychology appeared most clearly in his now famous 'stream of consciousness.' James believed in the analytic method of science; however, he believed that Wundt mistook experimental artifacts for substantive elements. With a metaphor, James proposed that the most elementary thing about consciousness was, it was analogous to a continually flowing stream of water. There were other essential characteristics of consciousness: Every thought belonged to someone. Consciousness was forever changing. Every state of consciousness was a function of the entire psycho-physical totality. Consciousness was experienced as a continuous self. Consciousness was also selective, and the principle of selection was the relevance for the individual.

Boring noted one problem with James's vision for a scientific psychology, James gave no suggestions for experimental research, and a scientific psychology needed its experiment. James could criticize Wundt, but Wundt had an experiment, and that qualified his psychology a science. In 1890, the fate of American functionalism as an experimental science was in Russia with Pavlov. Despite the lack of the necessary experiment, Boring saw in James what would become the central characteristic of American psychology. Consciousness was treated as a physiologist would investigate an organ's vital motions; its function, its usefulness, and its ultimate explanation was in the psycho-physical economy of the organism. The principle use of the mental organ to the organism was survival in changing circumstances. James recognized the nervous system, the organism, and the environment in which the organism lived (Boring, 1929, p. 501). The movement towards a functional psychology began with James.

John Dewey (1859-1952)

Boring's next idiosyncratic individual that contributed to the functional assimilation of German experimental psychology was John Dewey. Boring credited Dewey with an important role in the birth of American functionalism (Boring, 1929, p. 502). Dewey provided the organizing principles. Dewey was a philosopher, and in 1886 he wrote a philosopher's textbook for the new German psychology emphasizing the underlying assumptions (Boring, 1929, p. 539). In 1896 Dewey published *The Reflex Arc Concept in Psychology*.

Boring (1929), "The first important paper in the establishment of this functional psychology was Dewey's criticism of "the reflex concept in psychology," an article that appeared in 1897" (p. 540). The reflex arc was a neurological function, an unconscious movement made by an organism in response to its environment: for example, the eye-blink or the knee-jerk. Analyzed down to its basic anatomy, the elements were the sensory neurons and motor neurons; they shared a function that was mediated in the nervous system outside of consciousness. This function was understood, and referred to, in terms of a stimulus and its response. Dewey borrowed the physiologist's reflex concept, and he repurposed it for psychology. In Dewey's proposed theory, the reflex was the essential psychological element.

Dewey offered American psychology reflexes and the resulting coordinations (In 1896, Pavlov's discovery of the conditioned reflex was still 6 years in the future). Dewey's reflex led to larger coordinated actions. Where one reflex ended, another began. For example, walking was a total act that could be broken up artificially into a succession of synchronized reflex arcs (Boring, 1929, p. 540-41). Psychological processes organized the coordinations. Stimulus became the identifiable phase of activity that occurred when the behavior was being formed; response was a phase in the reaction to the environment that initiated the behavior. Dewey's stimulus and the response took their meaning from the purposefulness of the behavior. Boring noted, if purposeful behavior was the key to identifying the psychological processes, then Dewey's psychology was the study of the psycho-physical organism.

Plainly stated, Dewey's psychology was adaptation. Dewey recognized the biological function, the coordinated behavior was adaptation, and the integrated act was explained teleologically. "Functional psychology is the study of the psychophysical organism in use" (Boring, 1929, p. 541). Boring's response to Dewey's theory was, "Darwin's theory of survival and of adaptation was the greatest practical theory of living that has ever been promulgated. A psychology that is biological in the Darwinian sense is inevitably practical" (Boring, 1929, p. 541). When Boring emphasized 'practical,' he was revealing American values at work in the assimilation.

James R. Angell (1869-1949)

Next among Boring's idiosyncratic individuals who contributed significantly to a uniquely American psychology was James R. Angell (1869 - 1949). Angell's presidential address to the American Psychological Association in 1906 was titled *The Province of Functional Psychology*. Boring said that this was Angell's clearest expression of functional psychology (Boring, 1929, p. 543). Angell made three claims for functionalism: First, functional psychology was the psychology of mental operations. Where Wundt's structuralism divided and separated the questions of 'what?' and 'how?' and 'why?,' functionalism answered all three questions under one rubric: The complete description of a series of events sufficed as the equivalent to a statement of causes and the appropriate ends. Secondly, Angell claimed functional psychology was all about the fundamental value of consciousness, and the fundamental usefulness of consciousness was to mediate between the environment and the vital needs of the organism. The function of consciousness was to facilitate adjustment to novel circumstances. And thirdly, functionalism included psychophysics. Functional psychology was the psychology of the total mind-body organism (Boring, 1929, p. 543-44). These three aspects were interdependent.

Conclusion to Section 1

William James began the movement towards an American functional psychology. In Boring's opinion, the existence of that movement was the reason why Dewey could persuasively argue

for a psychology that was understood in terms of reflexes. Angell founded the school of functional psychology. Boring said that: "New movements are always in part protests; protests are merely negative in form, but they may also possess the positive value of dispensing freedom" (Boring, 1929, p. 544).

Once again Woodworth (1948) provided a clear explanation, "A psychology that attempts to give an accurate and systematic answer to the question "What do men do?" And then go on to the questions, "How do they do it?" And "Why do they do it?" Is called a functional psychology" (p. 13).

Functionalism by another name: Behaviorism

Boring said that in 1910 American psychologists included some structuralists and some functionalists, but most of the American psychologists were neither. Then in 1913 John B. Watson (1878-1958) founded behaviorism, and after that there were only behaviorists.

In 1913 Watson published *Psychology as a Behaviorist Views It*, and with that, he "... 'founded' behaviorism. Watson crystalized the growing demand for an objective psychology, and presently furnished a name for it" (Boring, 1929, p. 582). In extending his animal research methods to humans, Watson's goal was to drive consciousness and introspection out of psychology (Boring, 1929, p. 583). For his efforts, in 1915 Watson was enthusiastically elected the president of the American Psychological Association

Boring's opinion of Watson was not celebratory. As far as Boring was concerned, Watson merely provided the name for the inevitable. As Boring saw it, everything was in place and ready for behaviorism; behaviorism existed because of historical pressure; behaviorism came into being because it met the immediate practical needs of American psychology (Boring, 1929, p. 581). In Watson, Boring saw extravagant claims and an incompetent philosopher who left psychology without a satisfactory epistemology (Boring, 1929, p. 494). However, Boring did see assimilative powers in behaviorism that served the development of American experimental psychology.

The simplest statement that can be made about behaviorism is, it rejected introspection. It rejected the traditional elements of psychology associated with consciousness: sensations, images, and feelings (Boring, 1929, p. 580-81).

It accepted the reflex arc, and it assimilated the psychology of associationism under the name of the conditioned reflex (Boring, 1929, p. 580-81). Boring believed that Pavlov and Vladimir M. Bekhterev (1857-1927) contributed to making behaviorism a science. "It is these two men jointly who gave psychology the conditioned reflex.... There is no doubt that both these Russians did much to make behaviorism appear plausible when it appeared" (Boring, 1929, p. 582).

The conditioned reflex was discovered by Pavlov in 1902. Pavlov described his research method, "In the course of a detailed investigation into the activities of the digestive glands I started to record all the external stimuli falling on the animal at the time its reflex reaction was manifested... at the same time recording all changes in the reaction of this animal" (Pavlov, 1927, p. 6). Pavlov's method had a distinguished pedigree and a heritage of impressive research on a number of astoundingly complex neural-organ relationships. Pavlov

synthesized influences from the leading physiologists of his day, and he improved them while supervising hundreds of experiments (Clark, 2022a). Pavlov's method was easy to teach and easy for the student to remember. The humorist Mark Twain said, "Never pick a fight with people who buy ink by the barrel." During the 20th century Americans bought ink by the barrel and printed psychology books by the truck load. Pavlov's method was widely distributed.

Pavlov investigated digestion; the stomach gland secreted gastric fluids, and he investigated the vital motions of the gland by measuring its secretions. Digestion included the role of the saliva, which proved to be mediated by cerebral processes. In this research, vital glandular movements resulted from an incomprehensible complex physiology that originated in who knows what processes in the brain. This was physiology, not anatomy, and Pavlov was committed to experimenting with live animals functioning as normal as possible. This complexity was made manageable for doing science with the assimilation of the reflex theory of physiology and Pavlov's method of experimenting. By extending the method to psychology, observed motions, behavior, could be understood as resulting from functions of the central nervous system, the brain, which organized a coordinated response to the environment's demands. Experiments could be formulated, inferences about laws and regularities could be made, and predictions could be tested. It served all definitions of function, usefulness, cause and effect, and it offered the bonus quantitative analysis of the relationships. It was systematic. Experimental psychology was possible without regards to consciousness. As Boring (1929) put it, "Pavlov discovered and developed the conditioned reflex..., and thus made possible an objective psychology of animals or human beings which could take account of problems in which association had earlier been an effective concept" (p. 44-45).

In 1919, Watson published *Psychology*, a textbook for behaviorism. Watson avoided reference to the conventional topics of psychology like attention and will. Watson also avoided using the words sensation and perception; for sensation and perception he substituted the discriminatory response. Watson avoided reference to associations; he used their equivalent, the conditioned reflex. With sarcasm, Boring said that what Watson accomplished in his textbook was to show that the older psychology could be rewritten without new research by simply eliminating some things and substituting new words for others (Boring, 1929, p. 583).

Watson's behaviorism was a psychology of 'stimulus and response,' because they were observable, and they denoted the concrete physiology of the nervous system. Behaviorism was grounded in the reflex, patterns of reflex arcs, and coordinations of reflexes. In practice, it was the psychology of conditioned reflexes. Mind was absorbed into physiology. The mind, previously consciousness, became unseen and unknowable vital functions of brain neurology that appeared objectively to the researcher as motions of the body, behavior, and behavior was purposeful in so far as it was in the service of survival. Watson wanted a connection with the science of physiology, but he also wanted a psychology. His solution was to demote physiology to the mere study of organs and to define psychology as the study of the total individual (Boring, 1929, 584-85).

Behaviorism was originally launched as a precise objective science, but Watson's inept formulation for behaviorism contained

the seeds of its disillusion. As time passed behaviorism's ingrained powers of assimilation tended to erode the original purposes of objectivity (Boring, 1929, p. 586). For example: Watson included the introspectionist's verbal report among the accepted observable responses for research. When Watson included the verbal report, he assimilated into behaviorism the results of experiments on sensation and perception. These results came from the original psycho-physical methods of introspection that Watson was adamantly opposed to. With sarcasm, Boring described Watson's cunning sleight-of-hand. The traditional protocol of the introspection experiments was a series of events: First, the stimulus was shown to the observer, for instance, a red light ... then a red sensation appeared in observer's consciousness ... next came the observer's verbal report, "red." Stated plainly, the observer saw red and said so. For the Wundtian introspectionist, reporting red was as reliable as any other scientific observation. What Watson did was, he shifted the focus from the observer's self report to the experimenter's point of view to make it acceptable for behaviorism. As Boring pointed out, there was no difference in the chain of events (Boring, 1929, p. 585-86).

In Boring's opinion, behaviorism was not very different from any other psychology. As a systematic body of knowledge, it addressed the same problems and identified many of the same facts. It was different than Angell's functionalism because it excluded consciousness, but it retained the principle of adaptation. Adaptation answered the 'why?' question, and that gave America psychology meaning. In 1929, Boring correctly predicted that behaviorism would leave its mark on history (Boring, 1929, p. 587).

General Conclusion

Boring's history of the assimilation of experimental psychology in America, illuminated the international dynamic at work in the evolution of ideas critical for scientific progress, and so demonstrated a transnational approach to historiography. In terms of a gross generalization about the dynamic forces of interest to transhistorical studies, for example regarding cultural values: The Germans were patient and all about 'science for the sake of science,' and the Americans were anxious for results. The Americans emphasized the practical and applied benefits of science. As expressed by James in his *The Principles of Psychology*: "This (German) method taxes patience to the utmost, and could hardly have arisen in a country whose natives could be bored. ... Wundt obviously cannot;" (James, 1890, Vol. 1, pp.192-193).

What is a fitting summary? Wundt's experimental psychology was first received with enthusiasm, and the American assimilated version eventually emerged as the functional approach that became widely known as behaviorism, which begs for a definition. What does the word behaviorism mean? In 1929 Boring said, "He (Watson) was philosophically inept, and behaviorism came into existence without a constitution. Ever since, the behaviorists have been trying to formulate a satisfactory epistemological constitution and thus to explain themselves" (Boring, 1929, p. 494).

Various attempts to define behaviorism have failed (Clark, 2007). Several well known learning theorists were suggested as representative

behaviorists, but they disagreed among themselves. Between them several classes of behaviorism were suggested: extreme, strict, radical, and purposive. The attempt to find consistency failed. There was an attempt to find consensus in the literature. Was behaviorism functionalism? Was it a rhetorical position to imply the status of a natural science? Was it mechanistic? Materialism? Determinism? Logical positivism? The search for a clear and distinct definition of behaviorism in the literature failed. Zuriff (1985) surveyed behaviorism from 1910 to 1985 in the attempt to build an internally consistent definition around conceptual issues. His effort suffered from chronological anomalies. Mills (1998) said that explanations of behaviorism varied so much that some scholars would believe that there were no common features. In his final analysis, Boring said that the important assumptions and philosophy of American functional psychology did not require much elaboration because it was the theory of evolution. The theory of evolution produced the psychology that dealt with the adaptive value of the mind for the organism against its environment (Boring, 1929, p. 657-58). In this case, if a clear and distinct definition has eluded psychology, then familiarity with its history offers the clearest meaningful understanding.

At this point, I anticipate that some readers will want a sample of the author's thoughts, as well as the opportunity to weigh Boring's work in the context of his historiographical methods and any biographical experiences that may have influenced his interpretations. I will attempt to address a few of the anticipated questions. As I followed the events Boring chose to explain the origins of the American functional psychology, I was left with the impression that the adapted name of the outcome, behaviorism, was either an accident or perhaps a rhetorical flourish that happened to symbolize a general situation with a rich and complex history. I will repeat from the introduction, "... the historical approach to the understanding of scientific fact is what differentiates the scholar in science from the mere experimenter" (Boring, 1961, p. 3). When working with Boring's chosen events to tell the origins of American functionalism, I was left with a deeper understanding, and respect, for the profound investigative power of the physiological method adapted by psychologists. In the future it will be interesting to consider more terms that may have resulted from the synthesis of other conflicts.

With regards to Boring's historiography, he was interested in the progressive stages of science that led to modern experimental psychology. He believed that the history of science was the history of ideas, that ideas come from Individual minds, and that mind was the domain of psychologists, which meant that he considered himself a privileged researcher in the history of science. Boring's basic approach might be expressed as a psychological informed history of the progress of scientific ideas (Clark, 2022b).

In terms of judging Boring by the accuracy of his facts and validity of his interpretations for this paper, he believed in the thesis-antithesis progress of history. He would expect criticism, and he would expect that those who find fault with his flawed work can expect to be treated likewise as history unfolds.

Was Boring an experimentalist? He cultivated the persona of a scientist, which can be interpreted as an experimentalist, but compared to Pavlov, he pursued no focused laboratory research program. In his writing, his expressed passions and aspirations were

divided between administration, both at the university level and the national level. He devoted his free time to writing history and writing about psychology.

Boring's relationship with Titchener raises questions about possible biases in his history of psychology. Boring idolized Titchener for his integrity, as a scientist, for his erudition as a scholar, and for his work ethic. Titchener was Boring's role model. Was Boring a Titchenerian structuralist? Although he undoubtedly understood psychophysics, soon after receiving his Phd, Boring joined those psychologists who developed and evaluated the army testing program of WWI. This expanded Boring's psychological sensibilities. He had great respect for the testing psychologists. In the early 1920s Boring received a brain injury in a car wreck, and his experience with amnesia contributed to his rejection of introspection. By the 1930s, Boring no longer believed in the model of consciousness underlying introspective structuralism. He also promoted personality psychology at Harvard, perhaps in the service of his own historical interests.

Was Boring naive regarding Wundt's psychology? Boring could read German, he was well aware of the scope of Wundt's interests. Titchener also had interests beyond the laboratory that Boring was well aware of. It is unlikely that he would confuse the two.

Boring frequently described American psychology as practical. Was this a reference to pragmatism? In 1929 Boring was a psychologist in a philosophy department, and dependent upon philosophers for his funding. His goal was to rescue psychology from philosophy. As a sensitive administrator, I do not expect the Boring of 1929 to state a position on philosophy, epistemology or otherwise. In general, psychology was still struggling to divorce itself from philosophy. I suggest that Boring's use of the word practical meant 'not-philosophy.'

To return to the transnational history theme in closing: This exercise in transnational historiography outlined the evolution of ideas that had a profound influence in 20th century psychology. Boring's history suggested that a uniquely American 20th century psychology was an amalgamation that evolved from many unacknowledged, and even unknowable international sources, but in general terms American functionalism resulted from a mixture of the new experimental psychology from Germany, and Darwinian concepts from England, and gastric physiology from Russia. The migration of these ideas and their synthesis during the assimilation resulted in an experimental science of psychology that investigated vital processes mediated in the central nervous system, in living beings, in their relation to the environment, while at the same time respecting individual capacities.

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