

History of Psychology

Session 5: Behaviorism

Rui Mata, Center for Cognitive and Decision Sciences
October 7, 2024

Session information

Sessions take place Mondays, 8.15-9.45, Chemie, Organische, Grosser Hörsaal OC.

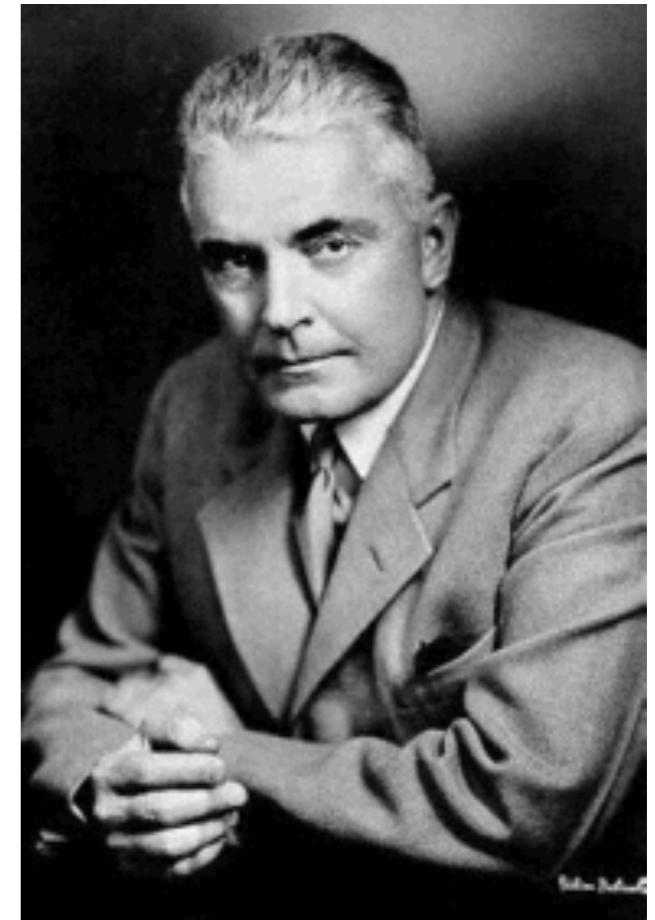
#	Date	Topic	Instructor	Slides	Reading
1	23.09.2024	Session 1: Introduction	Tisdall	pdf	<u>Ball (2012)</u>
2	30.09.2024	Session 2: Pre-psychology	Mata	pdf	<u>Markie & Folescu (2023)</u>
3	7.10.2024	Session 3: The birth of psychology	Mata	pdf	<u>Brysbaert & Rastle (2009)</u>
4	14.10.2024	Session 4: Psychoanalysis	Mata		
5	21.10.2024	Session 5: Behaviorism	Mata		
6	28.10.2024	Session 6: Gestalt psychology	Mata		
7	4.11.2024	Session 7: Cognitive psychology	Mata		
8	11.11.2024	Session 8: Psychology today	Tisdall		
9	18.11.2024	Session 9: Psychotherapy research	Tisdall		
10	25.11.2024	Session 10: Psychological testing	Tisdall		
11	2.12.2024	Session 11: Decision science	Tisdall		
12	9.12.2024	Session 12: What kind of science is psychology?	Mata		
13	16.12.2024	Exam (Bernoullianum, Grosser Hörsaal 148)			

Learning Objectives for Today

- Identify key researchers and ideas espoused by the behaviorist school in psychology
- Distinguish the origins and main principles of classic and operant conditioning
- Discuss impact and reach in both theoretical and applied psychology

Behaviorism: Watson

- 1878 Birth
 - Troubled youth (arrested twice)
- Studies Philosophy
 - studied under John Dewey (functionalist)
- 1902 Doctoral Degree (24-years of age) on *Animal Education: An Experimental Study on the Psychical Development of the White Rat, Correlated with the Growth of its Nervous System*
- 1908 Professor of Psychology at Johns Hopkins University, Baltimore
- 1910 Editor of Psychological Review (after James Baldwin)
- 1915 President of the APA
- Psychodiagnostics during the First World War
- 1920 Divorce and firing from Johns Hopkins Uni. due to affair with Rosalie Rayner (a graduate student, cf. Watson & Rayner, 1920)
- until 1945 work in advertisement
- 1958 Death



John B. Watson
(1878-1958)

Behaviorism

PSYCHOLOGY AS THE BEHAVIORIST VIEWS IT

BY JOHN B. WATSON

The Johns Hopkins University

Psychology as the behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods, nor is the scientific value of its data dependent upon the readiness with which they lend themselves to interpretation in terms of consciousness. The behaviorist, in his efforts to get a unitary scheme of animal response, recognizes no dividing line between man and brute. The behavior of man, with all of its refinement and complexity, forms only a part of the behaviorist's total scheme of investigation.

Behaviorism: Theses and Methods

SUMMARY

1. Human psychology has failed to make good its claim as a natural science. Due to a mistaken notion that its fields of facts are conscious phenomena and that introspection is the only direct method of ascertaining these facts, it has enmeshed itself in a series of speculative questions which, while fundamental to its present tenets, are not open to experimental treatment. In the pursuit of answers to these questions, it has become further and further divorced from contact with problems which vitally concern human interest.

2. Psychology, as the behaviorist views it, is a purely objective, experimental branch of natural science which needs introspection as little as do the sciences of chemistry and physics. It is granted that the behavior of animals can be investigated without appeal to consciousness. Heretofore the viewpoint has been that such data have value only in so far as they can be interpreted by analogy in terms of consciousness. The position is taken here that the behavior of man and the behavior of animals must be considered on the same plane; as being equally essential to a general understanding of behavior. It can dispense with consciousness in a psychological sense. The separate observation of 'states of consciousness' is, on this assumption, no more a part of the task of the psychologist than of the physicist. We might call this the return to a non-reflective and naïve use of consciousness. In this sense consciousness may be said to be the instrument or tool with which all scientists work. Whether or not the tool is properly used at present by scientists is a problem for philosophy and not for psychology.

3. From the viewpoint here suggested the facts on the behavior of amoebæ have value in and for themselves without reference to the behavior of man. In biology studies on race differentiation and inheritance in amoebæ form a separate division of study which must be evaluated in terms of the laws found there. The conclusions so reached may not hold in any other form. Regardless of the possible lack of generality, such studies must be made if evolution as a whole is ever to be regulated and controlled. Similarly the laws of behavior in amoebæ, the range of responses, and the determination of effective stimuli, of habit formation, persistency of habits, interference and reinforcement of habits, must be determined and evaluated in and for themselves, regardless of their generality, or of their bearing upon such laws in other forms, if the phenomena of behavior are ever to be brought within the sphere of scientific control.

4. This suggested elimination of states of consciousness as proper objects of investigation in themselves will remove the barrier from psychology which exists between it and the other sciences. The findings of psychology become the functional correlates of structure and lend themselves to explanation in physico-chemical terms.

5. Psychology as behavior will, after all, have to neglect but few of the really essential problems with which psychology as an introspective science now concerns itself. In all probability even this residue of problems may be phrased in such a way that refined methods in behavior (which certainly must come) will lead to their solution.

“Watson’s behaviourism was a very understandable reaction, and it had some methodological advantages—like so many theories which deny what they cannot explain. As a philosophical thesis it was clearly wrong, even though irrefutable.”

Pooper, K. (1992/2002). Unended quest. Routdledge: NY.

Behaviorism: Methods

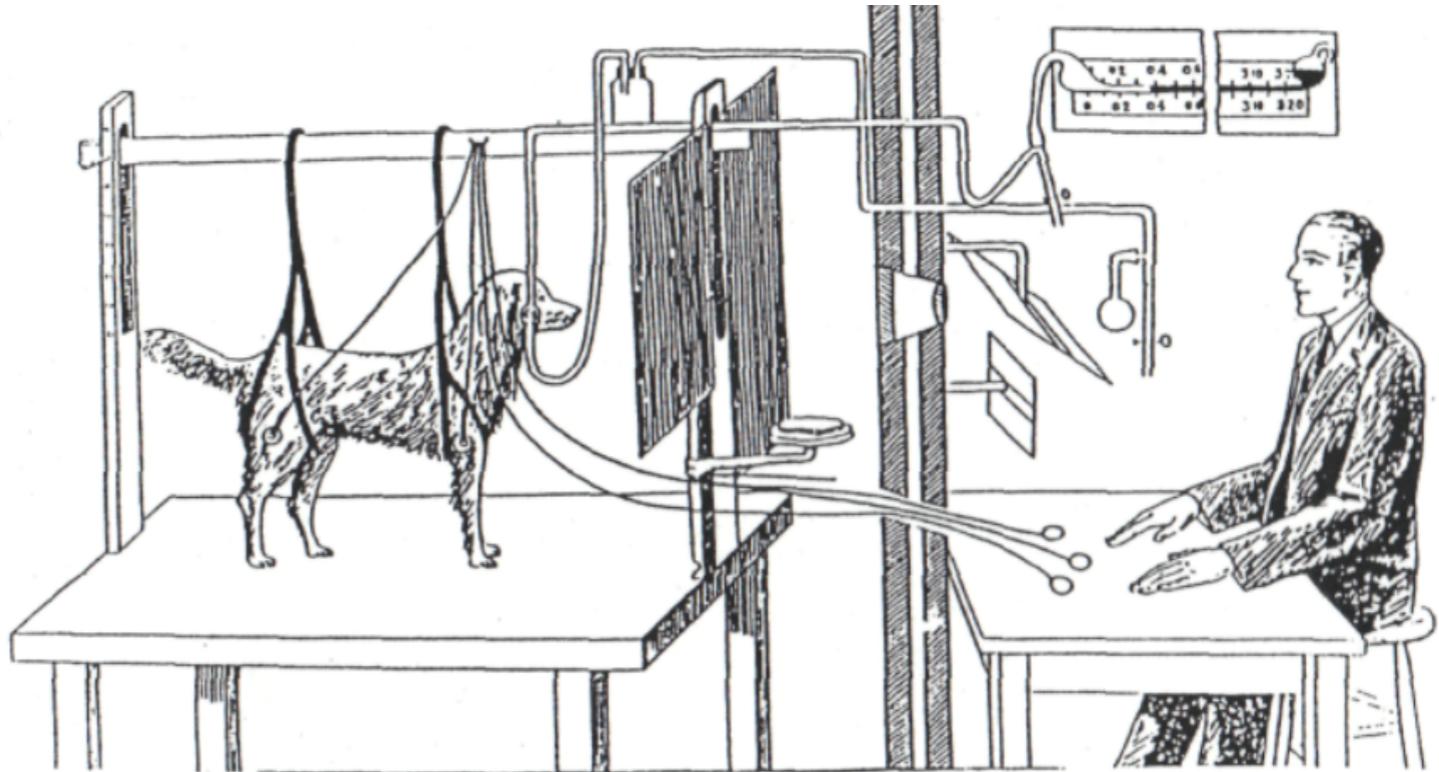


Figure 3. Sketch of Pavlov's later apparatus as it appeared in his published lectures (1928)

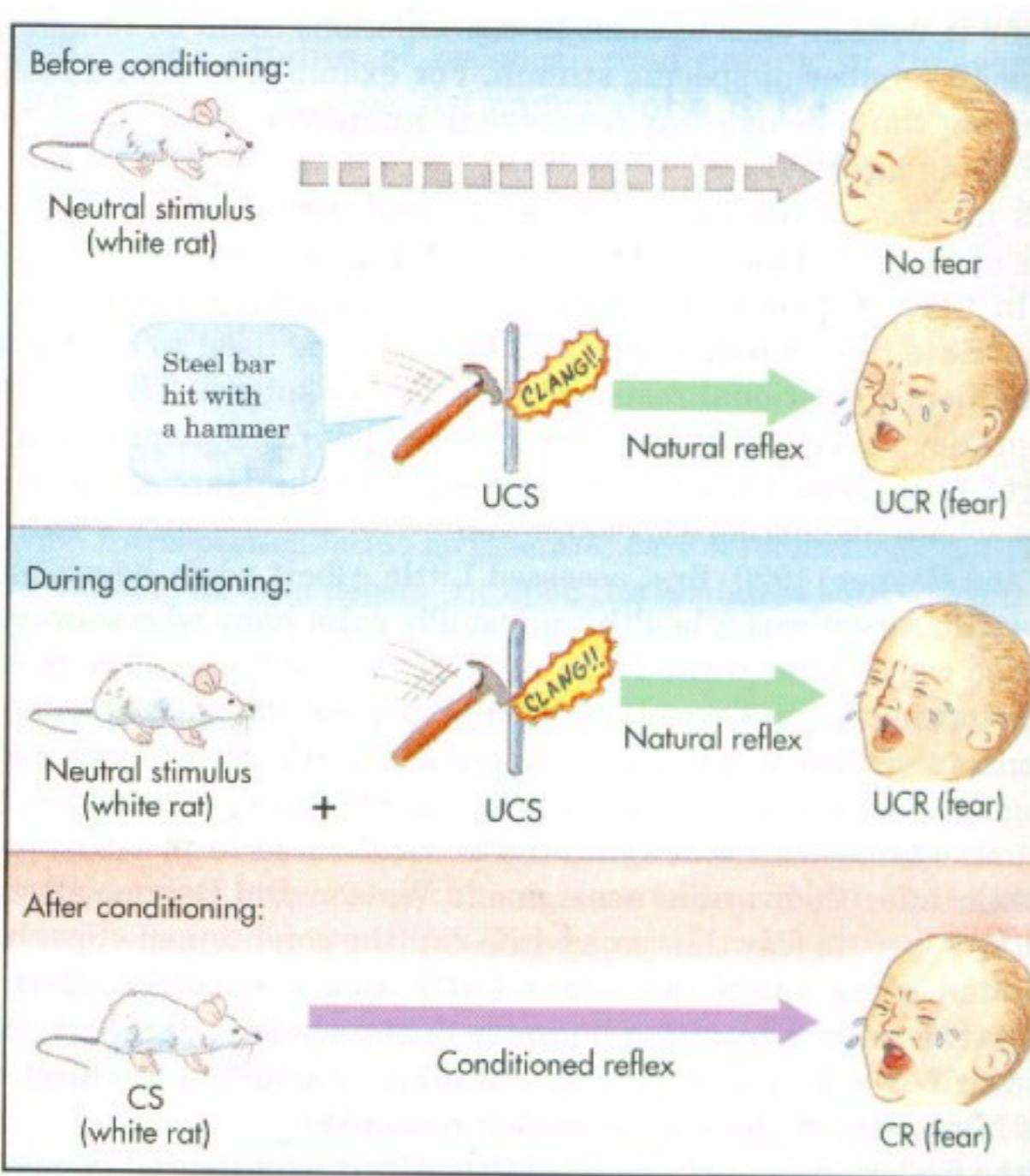
Classical conditioning occurs when a conditioned stimulus (CS) which was previously neutral is paired with an unconditioned stimulus (US) that has some valence/value. In the canonical Pavlovian experiment, the conditioned stimulus is a neutral stimulus (e.g., the sound of a tuning fork), the unconditioned stimulus is biologically potent (e.g., the taste of food) and the unconditioned response (UR) to the unconditioned stimulus is an unlearned reflex response (e.g., salivation). Yerkes and Morgulis (1909) introduced Ivan Pavlov's experiments on "conditioned reflex" to the English-speaking community, after he had won the Nobel prize in Medicine "in recognition of his work on the physiology of digestion, through which knowledge on vital aspects of the subject has been transformed and enlarged"

Historical Footage from John Watson's “Little Albert” Experiment

Watson, J. B., & Rayner, R. (1920). Conditioned emotional reactions.
Journal of Experimental Psychology, 3(1), 1-14.

<https://www.youtube.com/watch?v=9hBfnXACsOI>

Behaviorism: Methods



- Case study (single participant, Albert, 9-11 months)
- Method
 - **Pavlovian** (classical) conditioning: neutral stimulus (e.g., white rat) gains negative connotation through association with loud noise (unconditioned stimulus), and this later generalises to different stimuli (e.g., white beard)

Watson, J. B., & Rayner, R. (1920). Conditioned emotional reactions. *Journal of Experimental Psychology*, 3(1), 1-14.

Behaviorism: Methods

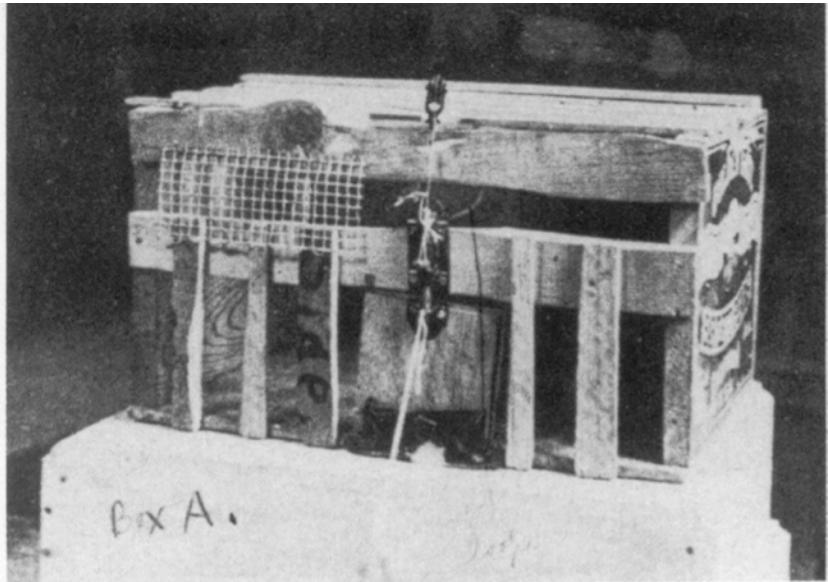
(b) Equal primacy of fear, love and possibly rage. While in general the results of our experiment offer no particular points of conflict with Freudian concepts, one fact out of harmony with them should be emphasized. According to proper Freudians sex (or in our terminology, love) is the principal emotion in which conditioned responses arise which later limit and distort personality. We wish to take sharp issue with this view on the basis of the experimental evidence we have gathered. Fear is as primal a factor as love in influencing personality. Fear does not gather its potency in any derived manner from love. It belongs to the original and inherited nature of man. Probably the same may be true of rage although at present we are not so sure of this.

The Freudians twenty years from now, unless their hypotheses change, when they come to analyze Albert's fear of a seal skin coat—assuming that he comes to analysis at that age—will probably tease from him the recital of a dream which upon their analysis will show that Albert at three years of age attempted to play with the pubic hair of the mother and was scolded violently for it. (We are by no means denying that this might in some other case condition it). If the analyst has sufficiently prepared Albert to accept such a dream when found as an explanation of his avoiding tendencies, and if the analyst has the authority and personality to put it over, Albert may be fully convinced that the dream was a true revealer of the factors which brought about the fear.

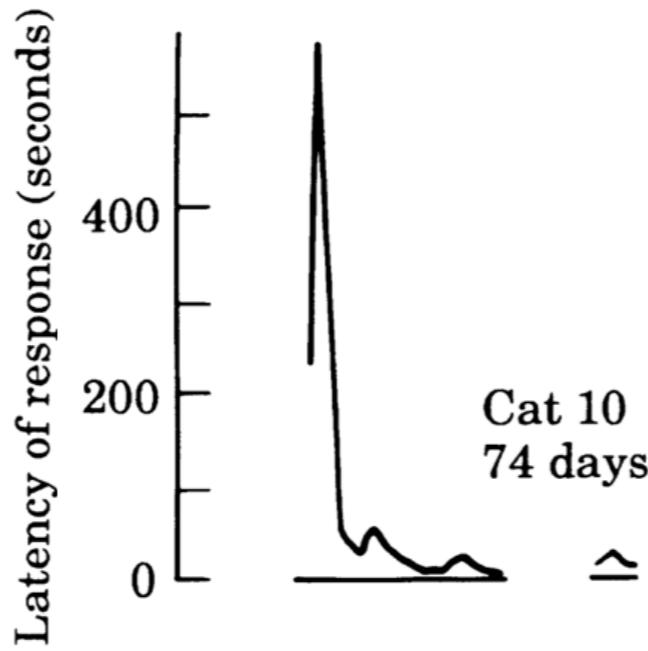
It is probable that many of the phobias in psychopathology are true conditioned emotional reactions either of the direct or the transferred type. One may possibly have to believe that such persistence of early conditioned responses will be found only in persons who are constitutionally inferior. Our argument is meant to be constructive. Emotional disturbances in adults cannot be traced back to sex alone. They must be retraced along at least three collateral lines—to conditioned and transferred responses set up in infancy and early youth in all three of the fundamental human emotions.

Watson, J. B., & Rayner, R. (1920). Conditioned emotional reactions.
Journal of Experimental Psychology, 3(1), 1-14.

Behaviorism: Methods



One of the four puzzle boxes used by Thorndike in the research for his doctoral thesis. From Boakes (1984).



Law of effect

Edward Thorndike, american psychologist conducted research on animal learning using puzzle boxes, that is, apparatuses in which trapped animals could press or pull levers to escape. In 1905, Thorndike proposed the law of effect that states that “responses that produce a satisfying effect in a particular situation become more likely to occur again in that situation, and responses that produce a discomforting effect become less likely to occur again in that situation.”

https://en.wikipedia.org/wiki/Law_of_effect

The Schools: Networking Psychological Review

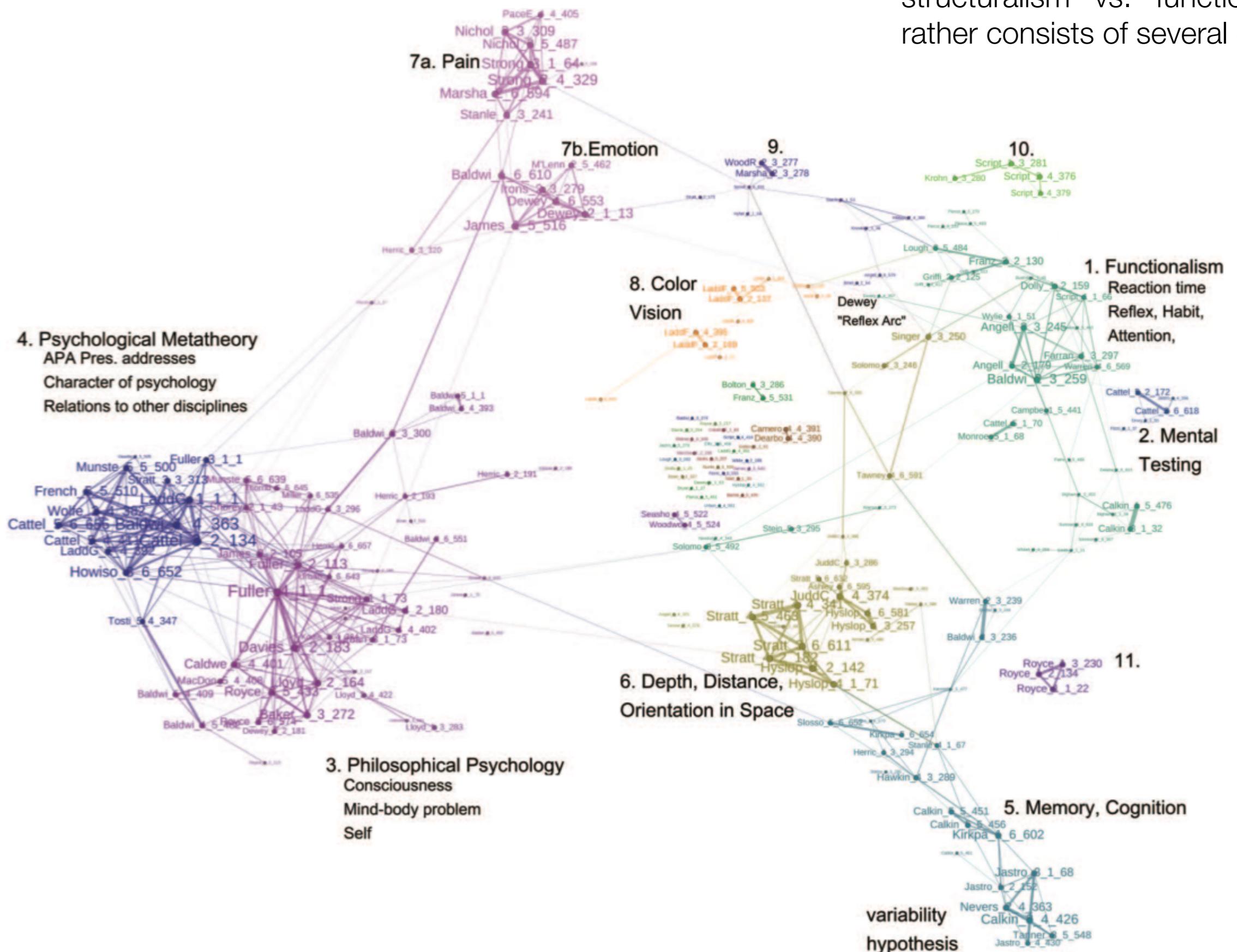
“This study investigated the intellectual structure of early American psychology by generating 3 networks that collectively included every substantive article published in Psychological Review during the 15-year period from the journal’s start in 1894 until 1908. The networks were laid out so that articles with strongly correlated vocabularies were positioned close to each other spatially. Then, we identified distinct research communities by locating and interpreting article clusters within the networks. We found that, from the first 5-year time block to the second, psychological specialties rapidly differentiated themselves from each other. Between the second and third 5-year time blocks, however, the number of specialties shrunk. We discuss the degree to which this shift may have been attributable either to a change in the journal’s editorship in 1904, or to a broader crisis of confidence, beginning that same year, in the use of “consciousness” as the discipline’s defining concept.”

Green, C. D., Feinerer, I., & Burman, J. T. (2015). Searching for the structure of early American psychology: Networking Psychological Review, 1894–1908. *History of Psychology*, 18(1), 15–31. <http://doi.org/10.1037/a0038406>

This study continues a previous investigation of the intellectual structure of early American psychology by presenting and analyzing 3 networks that collectively include every substantive article published in Psychological Review during the 15-year period from 1909 to 1923. (...) We found that the Psychological Review was in some turmoil during this period compared with its first 15 years attributable, first, to Baldwin’s unexpected departure in 1910; second, to the pressures placed on the discipline by United States entry into World War I; and, third, to the emergence of specialty psychology journals catering to research communities that had once published in the Review. The journal emerged from these challenges, however, with a better-defined mission: to serve as the chief repository of theoretical psychology in the United States.

Green, C. D., Feinerer, I., & Burman, J. T. (2015). Searching for the structure of early American psychology: Networking Psychological Review, 1909–1923. *History of Psychology*, 18(2), 196–204. <http://doi.org/10.1037/a0039013>

Psychological Review: 1894-1898



the network does not seem to convey a simple opposition of structuralism vs. functionalism but rather consists of several clusters

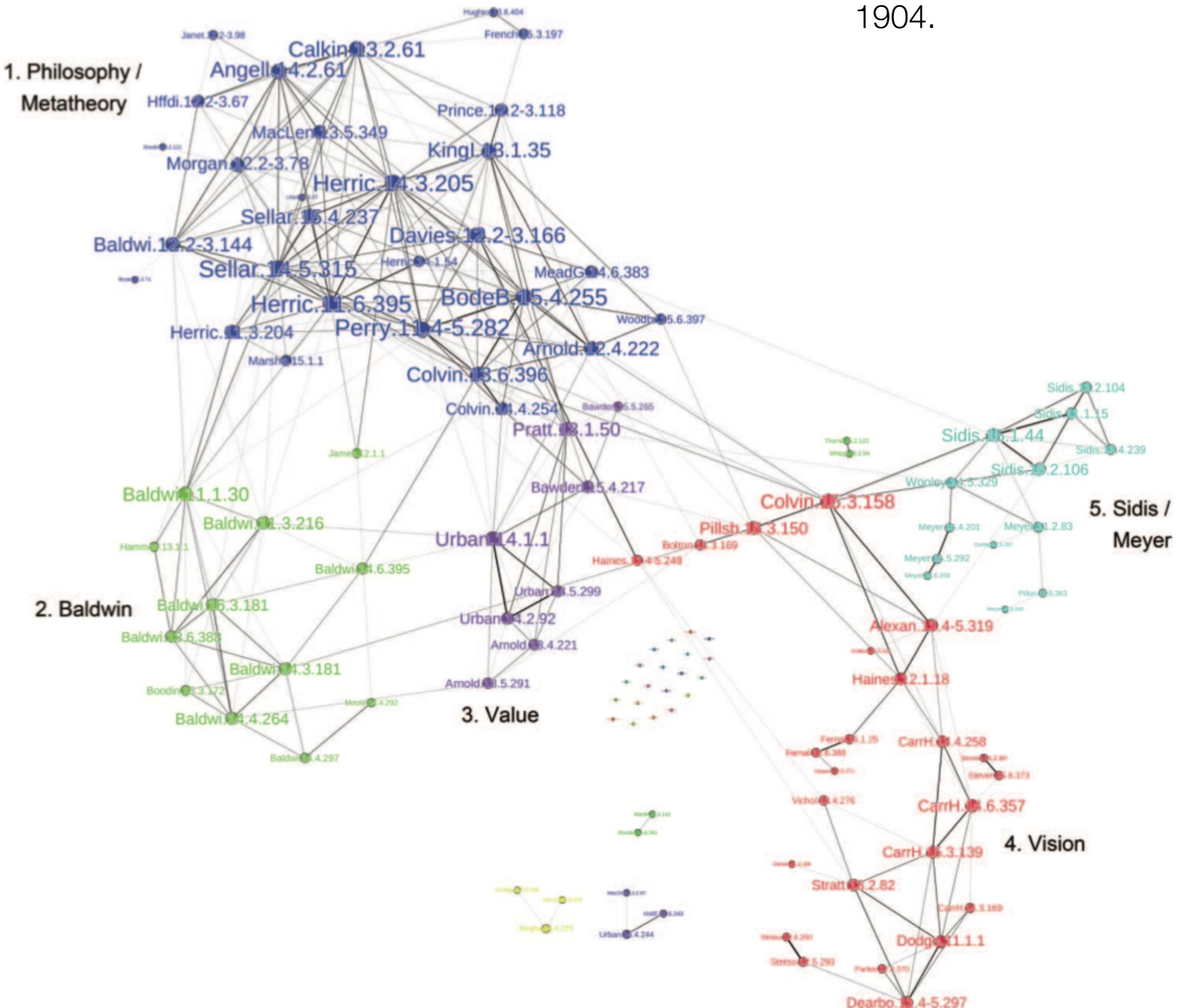
Psychological Review: 1899-1903

more clusters - psych develops!



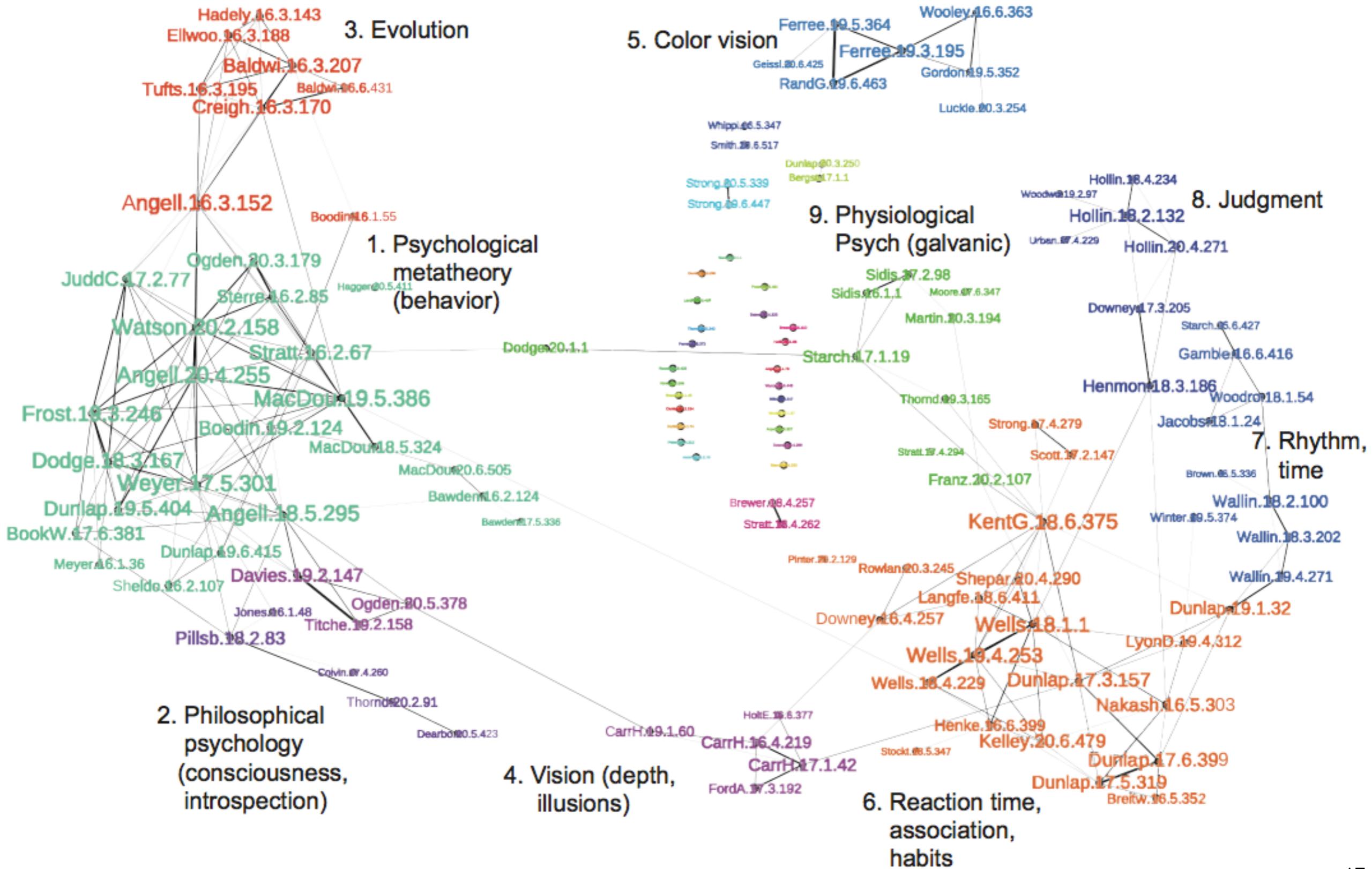
Psychological Review: 1904-1908

The Baldwin show... Cattell sells his share of Psych Rev to Baldwin in 1904.



Psychological Review: 1909-1913

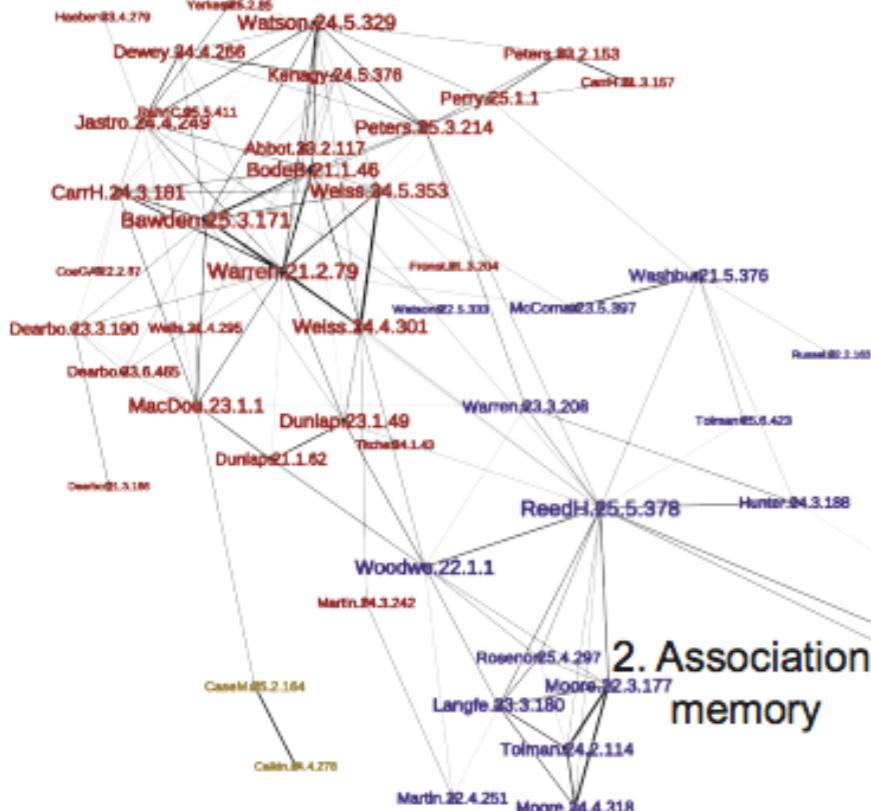
Baldwin is arrested at a brothel in 1908 and leaves the USA, John Watson becomes sole editor in 1910.



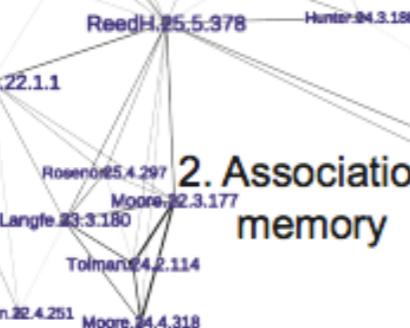
Psychological Review: 1914-1918

Watson's behaviorism progressively takes over Psych Review (and psychology!)

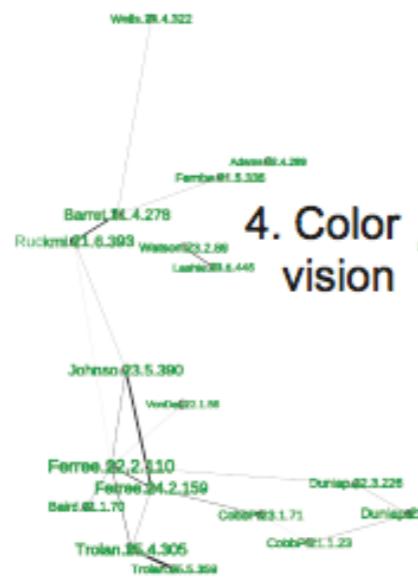
1. Metatheory (behaviorism)



2. Association, memory



4. Color vision



Johns (23, 5, 380)

Verde (20, 1, 18)

Ferree (22, 2, 310)

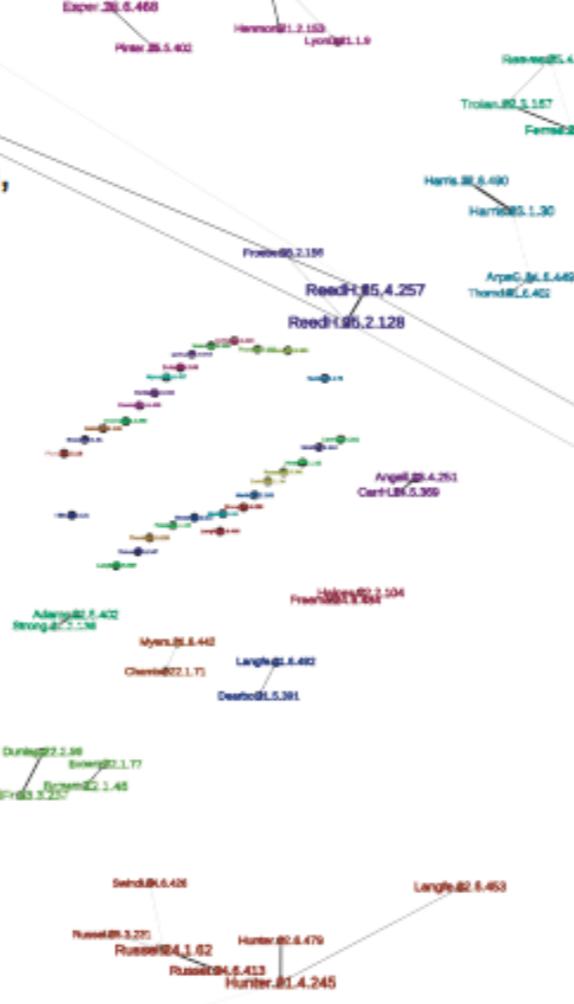
Ferree (24, 2, 159)

Baird (21, 1, 70)

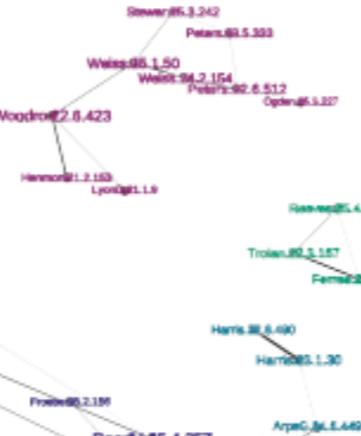
Trolan (25, 4, 305)

Trolan (25, 5, 394)

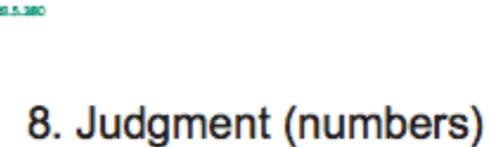
5. Neuropsych?



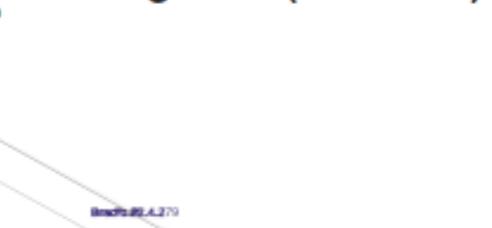
6. Sound, music



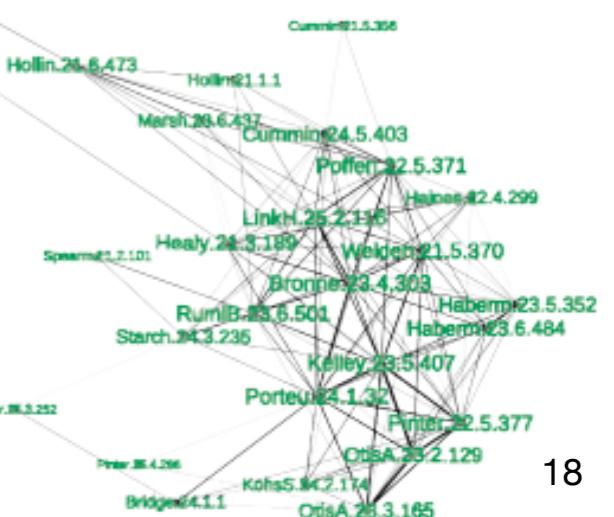
7. Pupillary dilation



8. Judgment (numbers)

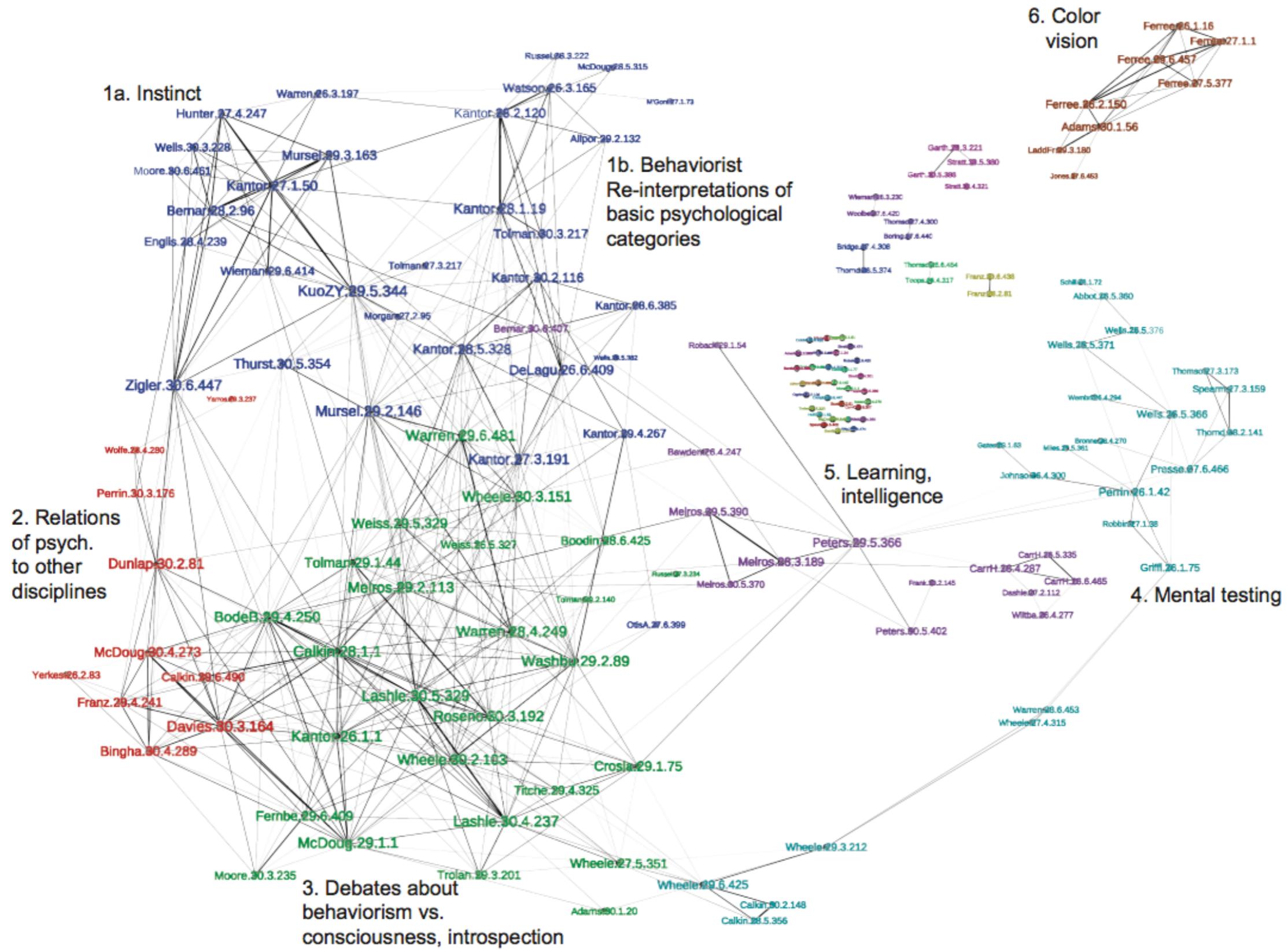


3. Mental Testing



Psychological Review: 1919-1923

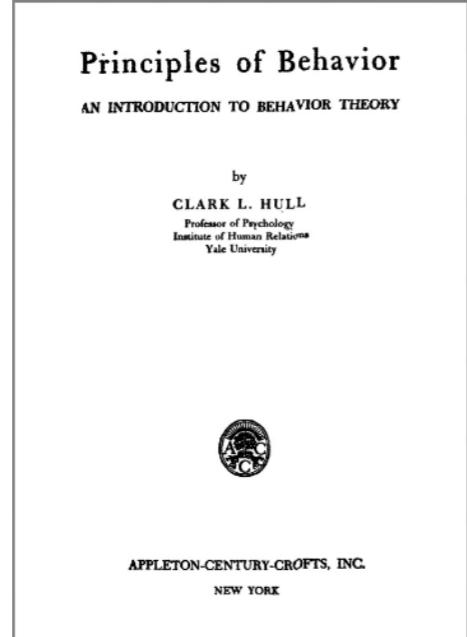
Watson's behaviorism still on the rise while Psych Rev becomes the “chief repository of theoretical psychology”



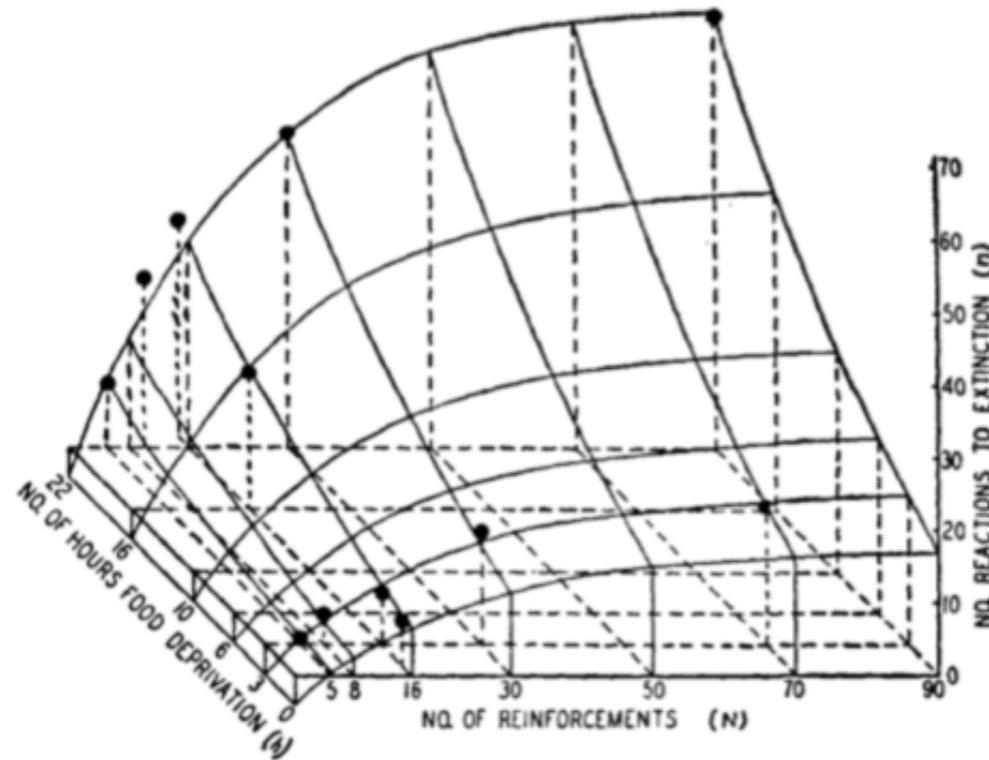
Behaviorism: Clark Hull



Clark Hull
(1884-1952)



1943



The goal of “*Principles of behavior*” was quantification and formalisation of experimental results that became ever more multi-factorial; this spirit is embodied in one of the formulas that Hull proposed to characterise behavioural responses:

$$sE_R = sH_R \times D \times V \times K$$

sE_R : excitatory potential (likelihood that the organism would produce response r to stimulus s)

sH_R : habit strength (derived from previous conditioning trials),

D: is drive strength (determined by, e.g., hours of deprivation of food, water, etc.)

V: stimulus intensity dynamism (some stimuli will have greater influences than others)

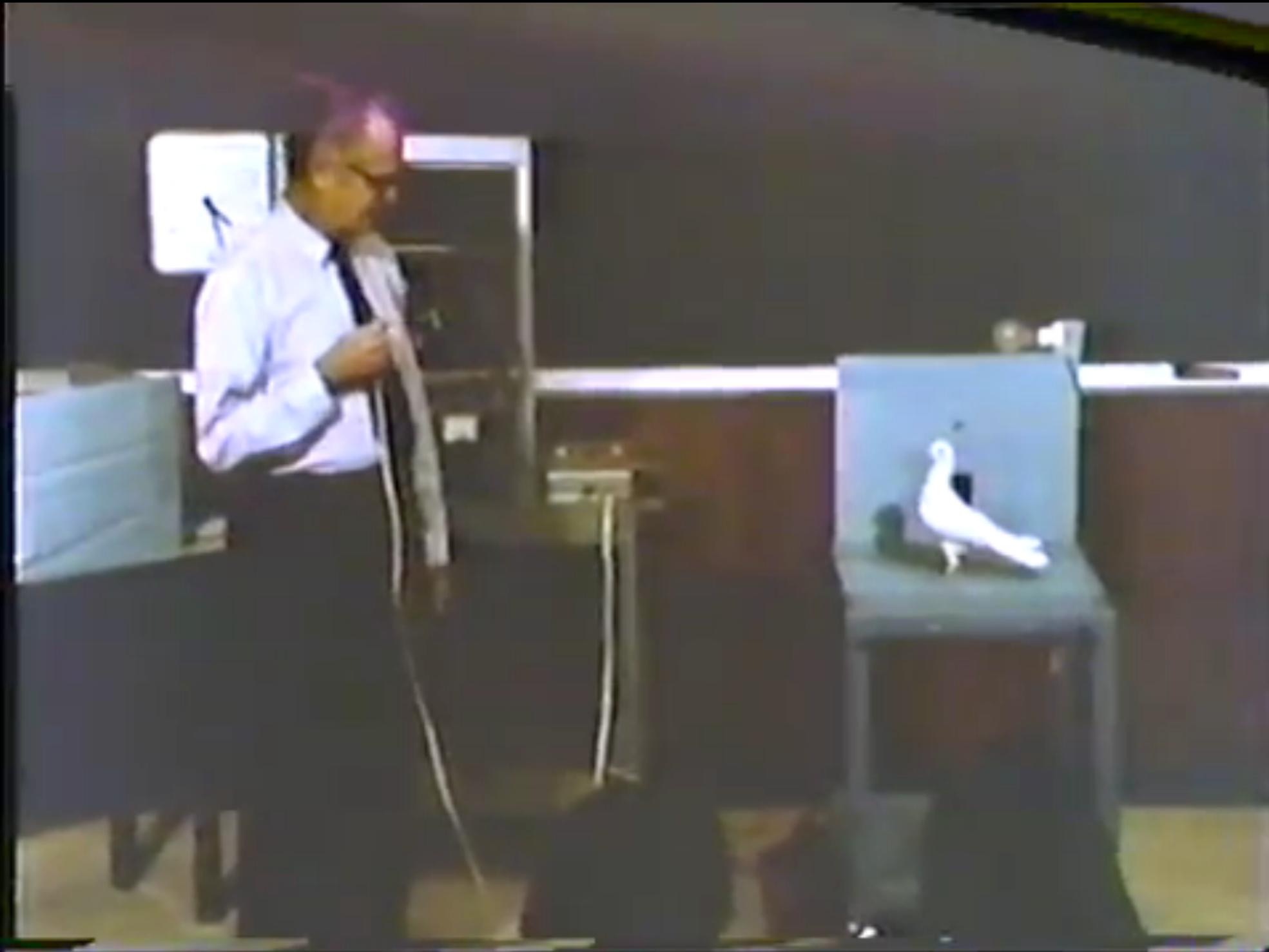
K: incentive (how appealing the result of the action is).

Behaviorism: Skinner

- 1904 Birth
- 1928 Studies Psychology (Harvard University, Boston)
- 1931 Dissertation from Harvard University, *The concept of reflex in the description of behaviour*
- 1936 Professor of Psychology at the University of Minnesota
- 1946 Chair of the Psychology Dept. at Indiana University
- 1948 Professor of Psychology at Harvard University
- 1974 Retirement
- 1990 Death



Burrhus Frederic Skinner
(1904-1990)



<https://www.youtube.com/watch?v=DeEBq2bhIZw>

Behaviorism: Theses/Principles

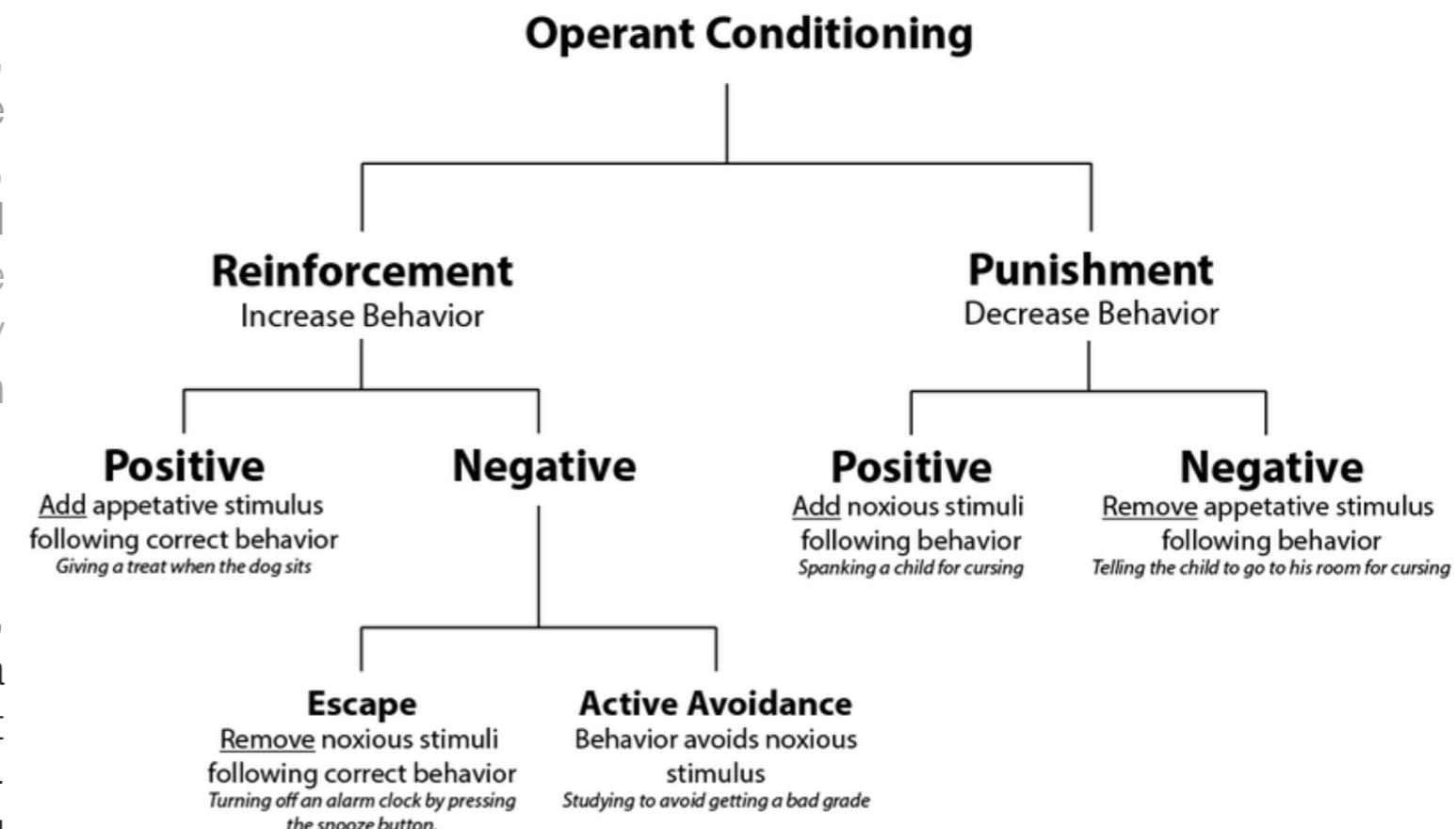
Behaviorism and the study of classic and operant conditioning dominated the analysis of animal and human behaviour for a large period of the 20th century...

Classical conditioning

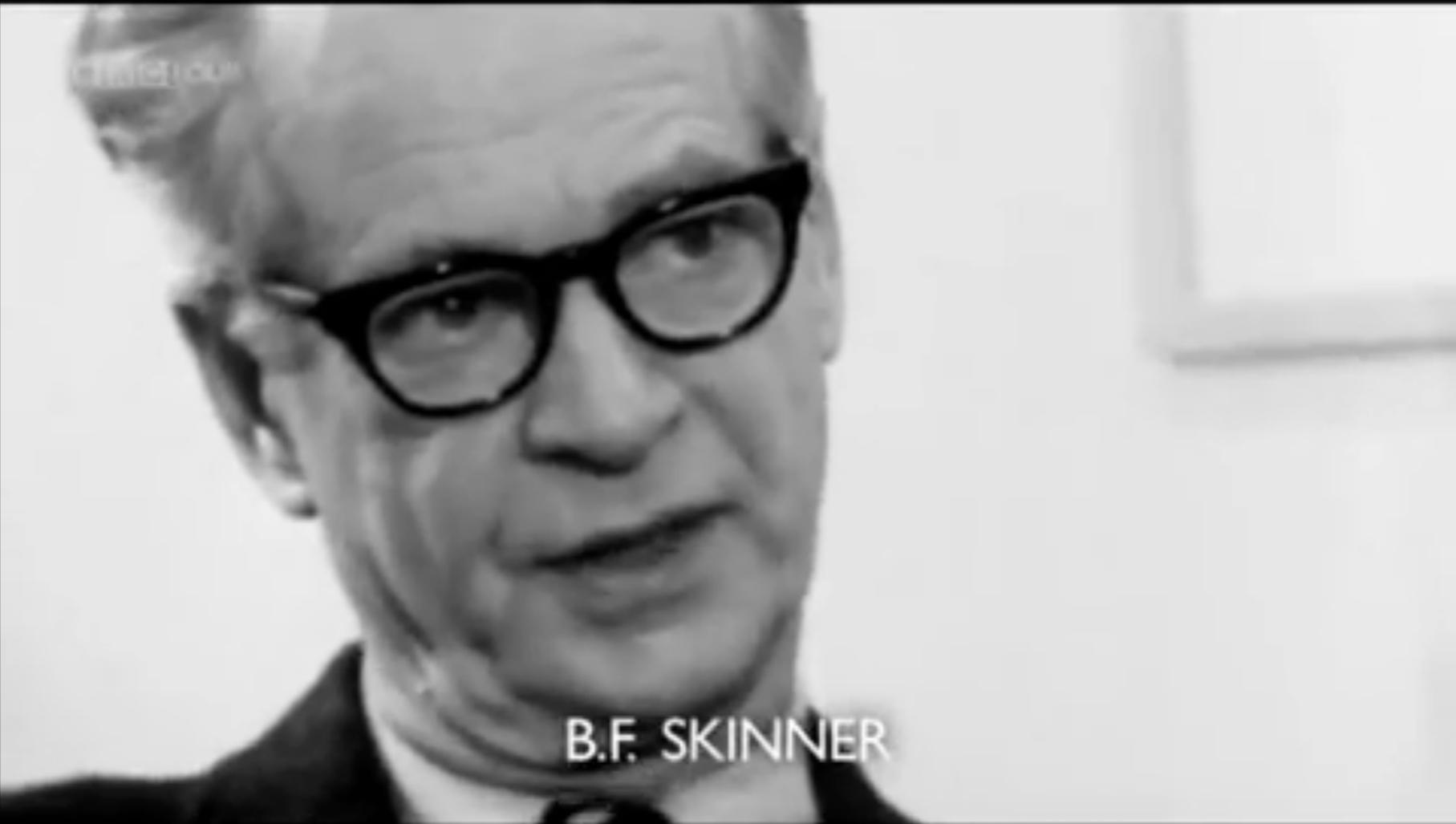
A learning process in which an existing (e.g., innate) response to a potent stimulus comes to be elicited in response to a previously neutral stimulus, achieved by repeated pairings of the neutral stimulus with the potent stimulus. For example, the dog will salivate to a bell that has been repeatedly paired with feeding in the past - think of **Ivan Pavlov's** dog!

Operant conditioning

Learning process in which behavior is sensitive to, or controlled by its consequences. For example, a dog will learn to do a trick if it gets a treat afterwards, or not to sit on the couch if punished - think of **Edward Thorndike's** puzzle boxes and **B.F. Skinner's** tokens!

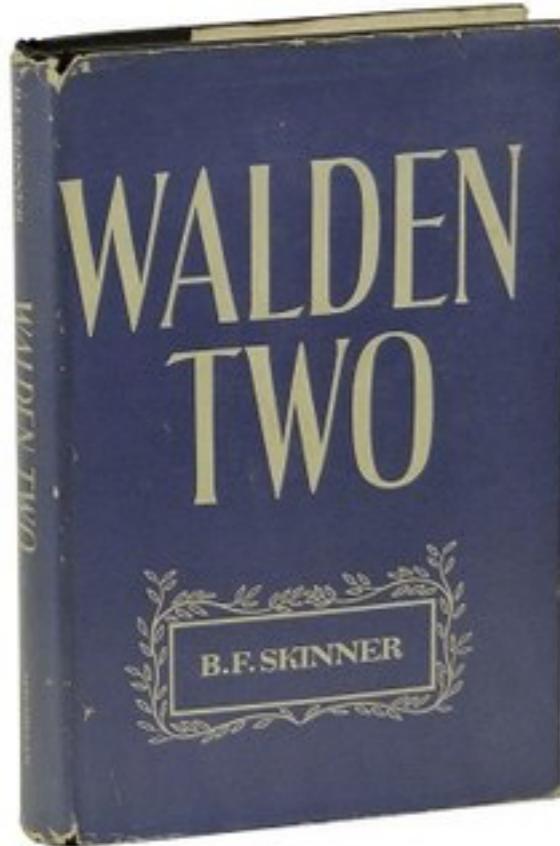


Behaviorism: Impact



<https://www.youtube.com/watch?v=T-d6jypCsUw>

Behaviorism: Impact



1948

A novel in which Skinner suggests how principles of behaviorism can be used to shape societies, using as an example the fictive small and self-sufficient community, Walden Two (a reference to Henry Thoreau's *Walden*, 1854).

Behaviorism: Impact

Historians' and Chairpersons' Rankings of the Importance of All-Time and Contemporary Psychologists

Historians ^a			Chairpersons ^b		
Rank	Individual	Rank points	Rank	Individual	Rank points
All-time rankings					
1	Wundt, W.	189	1	Skinner, B. F.	508
2	James, W.	167	2	Freud, S.	459
3	Freud, S.	156	3	James, W.	372
4	Watson, J.	108	4	Piaget, J.	237
5	Pavlov, I.	79	5	Hall, G. S.	216
6	Ebbinghaus, H.	69	6	Wundt, W.	203
7	Piaget, J.	51	7	Rogers, C.	192
8	Skinner, B. F.	46	8	Watson, J.	188
9	Binet, A.	46	9	Pavlov, I.	152
10	Fechner, G.	46	10	Thorndike, E. L.	124

Korn, J. H., Davis, R., & Davis, S. F. (1991). Historians' and chairpersons' judgments of eminence among psychologists. *American Psychologist*, 46(7), 789–792. doi: 10.1037/0003-066X.46.7.789

Behaviorism: Fall



<https://www.youtube.com/watch?v=T-d6jypCsUw>

Summary

- **Behaviorism:** rejection of consciousness as the object of psychology; focus on learning as opposed to instinct as the source of adaptation; rejection of introspection (even under experimental control) as acceptable methodology, instead focus on observable outcomes (behavior); emphasis on experimental control and methodological rigour
- **Watson:** focus on classical conditioning; little Albert as a marketing tool for classical conditioning and against psychoanalysis
- **Hull:** focus on quantification and a mathematical description of learning that includes multiple factors, spanning states of the organism (drive), stimuli characteristics, and reinforcement history
- **Skinner:** focus on operant conditioning; comparison of reinforcement and punishment, ends favouring the former; effort to establish behaviourism as a comprehensive theory of behaviour; interest in applications, ranging from animal applications (killer pigeons) to societal design (token economies; *Walden II*)
- **Impact:** spread and impact of behaviourism was enormous; behaviourists took over outlets (e.g., *Psychological Review*), associations (e.g., APA), and departments (e.g., Harvard)