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Harlow, Harry

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Without Abstract

Basic Biographical Information

Born Harry Frederick Israel in Fairfield, Iowa (1905–1981), and a member of the Methodist church, he was persuaded by one or more of his Stanford University professors to change his last name to avoid the anti-Semitic bias that plagued hiring in universities during the 1930s (Suomi and Leroy *1982*). Beginning his college education at Reed College, Harlow transferred to Stanford University where he earned the B.A. (1927) and Ph.D. degrees (1930). In 1930, he accepted a position at the University of Wisconsin where he remained until retirement in 1974. Thwarted initially in his effort to be a comparative psychologist studying rats, owing to the University closing the rat laboratory, Harlow soon turned to studying monkeys at the local zoo and soon thereafter converted a house near the campus to be a primate learning laboratory. Later he converted a former cheese factory into a large primate breeding and research facility.

Other positions held by Harlow included being a Carnegie Fellow in Anthropology at Columbia University and serving as Chief of Human Resources Research for the US Army during the Korean War. Among many forms of recognition and honors, Harlow became a member of the National Academy of Science (1951). And he received the National Medal of Science (1967). He led the Division of Anthropology and Psychology of the National Research Council (1952–1955). He received the American Psychological Association's (APA) Distinguished Scientific Contribution Award (1960), and he served as President of APA in 1957–1958 (Anonymous *1960*). Harlow supervised 36 Ph.D. students, many of whom had distinguished careers within research areas for which Harlow was known. Perhaps his most distinguished student, Abraham Maslow, took a different career direction; however, Harlow's influence was clearly present in Maslow's development of his famous hierarchy of needs.

Major Accomplishments/Contributions

Harlow is best remembered for his research in learning set formation (LSF) and developmental psychobiology. The former was the focus of his research during the early and larger portion of his career, but both overlapped considerably as the latter focus grew out of his pioneering methods associated with primate husbandry. The developmental research included studies of attachment and love formation as well as familial relationships in rhesus monkeys. In recent times that research has come under severe criticism for its alleged cruelty associated with rearing infant monkeys in isolation and via artificial surrogate mothering devices that offered different degrees of contact comfort. Nevertheless, many aspects of social development were investigated that could never have been studied systematically using human infants as subjects.

Arguably, Harlow's most enduring theoretical legacy will be associated with learning set formation (LSF) and that will be emphasized here. Using his well-known Wisconsin General Testing Apparatus, designed to prevent inadvertent experimenter cues to the subject regarding correct choices among discriminanda, Harlow began studies in the 1930s–1940s that led to his ground-breaking presentation and publication on LSF in 1949. Harlow characterized LSF as "learning to learn," a conceptualization for which he is usually credited with but which he was ably preceded (e.g., Gregory Bateson in a detailed explication in 1942 and Robert M. Yerkes in a lesser explication in 1943). To Harlow's credit, he showed how LSF could be measured, whereas Bateson though it was experimentally difficult if not impossible to demonstrate. Harlow used different procedures, but the prototypical one involved presenting a series of two-object discrimination problems. After six trials, a new pair of objects was introduced, etc., until the subject showed LSF or seemed to be doomed to failure. Evidence for LSF involved learning what has been verbalized as a "win-stay, lose-shift" solution. The correct object for the six trials was chosen randomly before trial 1; thus, each subject's first trial choice occurs by chance. If the subject "wins" (food reward) on trial 1, the optimal solution to gain the most rewards is to "stay" with that object for the remaining five trials; if it "loses" on trial 1, the optimal solution is to "shift" to the other object for the remaining five trials. When subjects become near-perfect on trial 2 and subsequent trials, it is concluded that LSF has occurred.

A significant contribution was Harlow's theory that LSF depended on what he termed "error factor theory" (Harlow *1959*). He meant that the animal must learn to eliminate response strategies that do not work (e.g., basing its choices on cues that prove to be irrelevant such as position preferences, color preferences, size preferences, etc.). LSF has been characterized variously as involving "concept learning," "hypothesis learning," "rule learning," etc., but Thomas (*in press*) has offered a cautionary view of such. Harlow (*1959*) also wrote, "all concepts such as triangularity, middle-sizedness, redness, number, and smoothness evolve only from LS formation" and that "insightful learning through LS formation is a generalized principle … [that] … appears in … oddity learning …" (p. 510). Thomas and colleagues have shown that LSF and oddity concept learning can be differentiated within the same experiment, so the relationship between LSF and oddity concept learning remains unresolved. The theoretical issues

pertaining to LSF and conceptualization are sufficiently important that further research might prove to be invaluable.

See Also

Behaviorism

Comparative Psychology

Evolutionary Psychology

Klüver, H.

Maslow, A. H.

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