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Information, temporal pairing and temporal learning:
Implications for the neurobiology of memory

Prof. Randy Charles Gallistel

Rutgers Center for Cognitive Science,
Rutgers-The State University of New Jersey,
Piscataway, NJ

ABSTRACT OF THE TALK

Using Shannon's theory of information to quantify the information that a conditioned stimulus (CS) conveys regarding the timing of the next unconditioned stimulus (US) gives a parameter-free, quantitatively rigorous account of background conditioning, blocking, overshadowing and relative validity, while also giving for the first time an empirically valid specification and quantification of the notion of temporal pairing. These results strengthen the idea, dating back to the 1970s, that what drives the learning that occurs in paradigms designed to establish the laws of association formation is not temporal contiguity but rather the learning of the temporal intervals themselves. Learning those intervals is essential to extracting from a protocol the mutual information between two events. The learning that occurs should be conceptualized as the extraction of that mutual information, not the formation of a conductive connection.