

Simulation of learning word associations by three mathematical learning theories

A free associative response is the first word a person comes up with after hearing another word, the so called associative stimulus. The associative response, which is most frequently given to a stimulus word, is called its primary response.

It should be shown that word associations are the results of associative learning. This has been done on the basis of three well-known mathematical learning theories the stimulus sampling theory of Estes, the rate estimation theory of Gallistel and the theory of Rescorla & Wagner. For each of these three theories an algorithm has been developed and implemented, which computes the strengths of the associative relatedness between words on the basis of the frequencies of their co-occurrences in large, machine readable texts. Co-occurrences have been determined with the so-called window technique.

The computer simulations could predict approximately the same number of primary responses, which are produced by human participants. The simulations of the learning algorithm derived from the stimulus sampling theory gave somewhat better results.