

The effect of semantic relatedness on associative asymmetry in memory

Vencislav Popov

Carnegie Mellon University, Pittsburgh, Pennsylvania, United States

Qiong Zhang

Carnegie Mellon University, Pittsburgh, Pennsylvania, United States

Griffin Koch

University of Pittsburgh, Pittsburgh, Pennsylvania, United States

Regina Calloway

University of Pittsburgh, Pittsburgh, Pennsylvania, United States

Marc Coutanche

University of Pittsburgh, Pittsburgh, Pennsylvania, United States

Abstract

We provide new evidence concerning two views of episodic associations: The independent associations hypothesis (IAH) posits that associations are unidirectional and separately modifiable links (A-B; B-A); the associative symmetry hypothesis (ASH) considers the association to be a holistic conjunction of A and B representations. While existing literature focuses on tests that compare the correlation of forward and backward associations and favors ASH over IAH, we provide the first direct evidence of IAH by showing that forward and backward associations are separately modifiable for semantically related pairs. In two experiments, participants studied 30 semantically unrelated and 30 semantically related pairs intermixed in a single list, and then performed a series of up to eight cued-recall test cycles. All pairs were tested in each cycle, and the testing direction (A-? or B-?) alternated between cycles. Consistent with prior research, unrelated pairs exhibited associative symmetry: accuracy and response times improved gradually on each test, suggesting that testing in both directions strengthened the same association. In contrast, semantically related pairs exhibited a stair-like pattern, where performance did not change from odd to even tests when the test direction changed; it only improved between tests of the same direction. We conclude that episodic associations can have either a holistic representation (ASH) or separate directional representations (IAH), depending on the semantic relatedness of their constituent items.