Listening to the Architecture: ACT-R, Associative Learning, and the Fan-Effect

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Abstract: It is common to simplify models within a given architecture, but those abstractions must not ignore what the architecture demands or recommends. Failing to do so can result in unworkable assumptions when applied to other data. The ACT-R accounts of the fan-effect provide illustrative examples. Each of the following assumptions is at odds with the architecture, undermining the utility of their respective models. Ignoring the study phase and base-level learning masks ACT-R's prediction that high-fan chunks will require more rehearsals and consequentially have higher activations than their faster/more accurate low-fan counterparts. Similarly, the decision process for foils assumes they are based on recall-to-reject or biased guess strategies, even though ACT-R's retrieval dynamics predict a benefit for high-fan chunks with those strategies. These, and other, assumptions need to be reconsidered as modelers move from a priori associative strengths to ones that are actually learned.