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The Encoding Specificity Principle in a Stressful Motor Sequence Learning Context

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PURPOSE: The Encoding Specificity (ES) Principle by Thompson and Tulving (1970), describes the notion that learner should practice a to-be-learned skill under conditions similar to those in which the skill is to be later performed. While the basic premise of ES seems reasonable, it does not seem to be a guiding force when it comes to building practice regimens. Many practice sessions are conducted under circumstances of relatively low stress. If ES is broadly applicable accurate, one would imagine that such a discrepancy between practice and performance conditions would be counterproductive compared to instances in which the conditions were comparable. In this investigation, we will seek to explore this possibility. We specifically hypothesize that individuals who practice a novel skill under congruent conditions (both practice and performance conditions were conducted under similarly stressful conditions) compared to those individuals who practiced under incongruent conditions (practice and performance conditions were conducted under dissimilarly stressful conditions). **METHODS:** On Day 1 of this two-day study, after completing a block of familiarization trials, participants were asked to complete ten practice blocks of a motor sequence learning task using a standard computer keyboard, the ninth block of which contained a random sequence. On Day 2, participants returned for a posttest and to complete another random sequence block. On both days, self-report data was also gathered to assess the quality of the manipulation. All participants provided informed consent. **RESULTS:** Contrary to our hypothesis, no significant difference was seen between groups in terms of task performance during the posttest ($t(45)=-0.764$, NS [one-tailed]). Furthermore, and also counter to expectation, we observed that the congruent group did not display greater performance improvement from Day 1 to Day 2 relative to the incongruent group ($t(45)=-1.95$, NS [one-tailed]). Indeed, in opposition to ES, the incongruent group displayed marginally greater performance enhancements from Day 1 to Day 2 (16712 ± 5042) than the congruent group (13611 ± 5829 ; $t=-1.95$, $p=0.057$ [two-tailed]). **CONCLUSIONS:** Our hypothesis was not supported, and our findings are indicative of results counter to the predictions of the ES principle. **SIGNIFICANCE/NOVELTY:** These unexpected results may point to a limitation in the generalizability of ES to stressful contexts. Indeed, the effects of stress during learning and performance may provide unique effects which overshadow and/or contradict any potential benefit derived from ES. Further work is needed to examine the interrelationships between these variables.

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