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Replicable Effects of Dynamic Difficulty Adjustment in Child Cognitive Training

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Abstract:

For the past 15 years, we have used the web-based cognitive assessment and training platform *Mate Marote* with children aged 4 to 8. An initial school-based study in Navarra, Spain, showed that a dynamic difficulty progression model effectively enhanced attention. A second study, conducted again in the same school, evaluated a revised version of this progression designed to overcome its limitations. In the present work, we compare both models. Both approaches adapt to the player's initial level; however, the original model slows progression after reaching a balance point, whereas the revised model continuously adjusts task difficulty. We hypothesized improvements in executive functions from pretest to posttest, with greater gains under the revised model. Results showed attentional improvements in both groups, while only the revised model produced additional gains in logical reasoning, cognitive flexibility, and working memory. These findings were replicated with a local school sample in Tandil, Buenos Aires, Argentina.