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The Fadeout Effect

The winner of a decades-old debate about what scientists call the fadeout effect — one of the most persistent research mysteries in intelligence and psychological development — may finally have been decided.

Following a meta-analysis of experimental methods to determine whether or not the benefits of early interactions designed to raise intelligence remain over time, UC Santa Barbara postdoctoral researcher John Protzko found that the positive effects on intelligence actually diminish after a particular intervention ends. Protzko's study marks the first quantitative analysis of the fadeout effect across nearly every known intervention that has attempted to improve early intelligence.

The findings, which appear in the journal Intelligence, have important implications for the long-term benefits of programs such as Head Start, a federal initiative that promotes school readiness of children under 5 from low-income families through education, health, social and other services.

"Many theories of cognitive development and the relationship between the environment and intelligence are not able to account for the fadeout effect," said Protzko, who is a member of the META (Memory, Emotion, Thought, Awareness) Lab in the Department of Psychological & Brain Sciences. "Reciprocal interaction models, for example, put forward that no such fading would occur. It turns out that when you raise children's intelligence, they may not go out and select into new, more cognitively demanding environments. Other traits may be driving what environments children select into."

The 44 randomized controlled trials that Protzko analyzed for the study included a total of 7,584 young children. He found that those in the experimental groups lost their IQ gains, rather than the control group catching up. According to Protzko, this provides a clear demonstration that intelligence fades over time.

“That actually tells us a lot about the role of the environment in the development of intelligence,” Protzko said. “It shows that intelligence is reactionary. While providing interventions will raise intelligence, once they’re over, intelligence reacts by adapting to the new, lesser demands.

“If you take kids and put them in a Head Start program, for example, then they’ll be smarter and their academic achievement will be better,” Protzko added. “But when you take that away and put them back in with everybody else, they’re going to adapt to that new system. It doesn’t work in any permanent sort of way.”

Protzko is careful to reiterate that his work in no way posits that early interventions are doomed to fail or that they are of no value. “This paper doesn’t argue that intelligence cannot be raised,” he said. “Instead, it urges that a critical assumption long held — that increases to intelligence are permanent — be questioned and rejected. I believe it is still a good thing to intervene and try to change the trajectory for these children.”

All of the studies included in the analysis were done on young children, Protzko noted. “To know if the fadeout effect is applicable to other demographics like adolescents, young adults or the elderly, there would need to be a push toward long-term follow-up — two, three, four, five years, maybe even longer — for these groups as well,” he concluded.

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