

# Why delaying gratification is smart

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If you had a choice between receiving \$1,000 right now or \$4,000 ten years from now, which would you pick? Psychologists use the term "delay discounting" to describe our inability to resist the temptation of a smaller immediate reward in lieu of receiving a larger reward at a later date. Discounting future rewards too much is a form of impulsivity, and an important way in which we can neglect to exert self-control.

Previous research suggests that higher intelligence is related to better self-control, but the reasons for this link are unknown. Psychologists Noah A. Shamosh and Jeremy R. Gray, from Yale University, and their colleagues, were interested in testing the idea that certain brain regions supporting short-term memory play a critical role in this relationship.

"It has been known for some time that intelligence and self-control are related, but we didn't know why. Our study implicates the function of a specific brain structure, the anterior prefrontal cortex, which is one of the last brain structures to fully mature," said Dr. Shamosh.

In this study, 103 healthy adults were presented with a delay discounting task to assess self-control: a series of hypothetical choices where they had to choose between two financial rewards, a smaller one which they would receive immediately or another, larger reward which would be received at a later time. The participants then underwent a variety of tests of intelligence and short term memory. On another day, subjects' brain activity was measured using fMRI, while they performed additional short-term memory tasks.

The results show that participants with the greatest activation in the brain region known as the anterior prefrontal cortex also scored the highest on intelligence tests and exhibited the best self-control during the financial reward test. This was the only brain region to show this relation. The results appear in the September issue of *Psychological Science*, a journal of the Association for

Psychological Science.

Previous studies have shown that the anterior prefrontal cortex plays a role in integrating a variety of information. The authors suggest that greater activity in the anterior prefrontal cortex helps people not only to manage complex problems, resulting in higher intelligence, but also aids in dealing with simultaneous goals, leading to better self-control.

Knowledge of the neural mechanisms underlying the relationship between short term memory, intelligence and delay discounting may result in improved techniques of increasing self-control. This is particularly applicable in regulating behavior related to gambling and substance abuse. "Understanding the factors that support better self-control is relevant to a host of important behaviors, ranging from saving for retirement to maintaining physical and mental health," the authors conclude.

Source: Association for Psychological Science

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