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REFLECTION SCIENCES™

MEASURE WHAT MATTERS!

One Treat Now…? Or Two Later…?

The Marshmallow Test is conceivably one of the most prominent developmental research studies on delay of gratification. In the late 1960s to early 70s, American Psychologist and Stanford University Professor, Dr. Walter Mischel, and his team sat children down at a table and placed a marshmallow (or other treat chosen by the child) in front of them. The researchers offered the children two options: a smaller reward (one marshmallow) now or a larger reward (two marshmallows) later if they waited. The researchers then left the room, leaving the child alone with the marshmallows.

As expected, some children popped the treat in their mouth as soon as the researcher left. Some were able to wait for a small amount of time before caving in. Others were able to hold out for periods of up to fifteen minutes for the researcher to return so they could have the larger reward.

This ability to have greater self-control, to resist temptation and delay immediate gratification in pursuit of a more valuable reward or a long-term goal – in other words, executive function (EF) skills – is predictive of a number of developmental outcomes, including peer relations, health, social-emotional coping skills, wealth, public safety (i.e. criminal convictions), social responsibility, academic competence, and career achievement.

Cohort Effects on Delay of Gratification

Do you wonder whether children in today's world would fare as well as children did in the original "Marshmallow Test" of the late 1960s? The common belief is that children *now* would be unable to wait as long as they did back in the day, preferring the immediate reward. The idea is that many children now have access to a range of technologies that may serve as instant entertainment, thus acting as immediate gratification. Some would argue that technology might make it harder for children to remain focused on less immediately rewarding, or "dull" tasks like homework or chores.

On the other hand, with new technology comes new ways of thinking. It could be the case that children growing up in this faster-paced world have more opportunity to exercise attention-control skills, contributing to increases in reasoning and symbolic thinking, which have been found to correlate with gains in IQ. Additionally, children now have greater access to high-quality preschool education than they did fifty years ago.

To investigate these issues, Dr. Stephanie Carlson, Reflection Sciences, Inc. Co-founder and Chief Science Officer, and her colleagues analyzed delay of gratification data collected in the 1960s, the 1980s, and the first decade of the 2000s.

The Results

Contrary to the widely held belief that children in today's world have less self-control than those who grew up in the 1960s or 1980s, results showed that children are becoming more successful at delaying gratification on the Marshmallow Test – the 2000s children were able to wait on average two minutes longer than children from the 1960s and one minute longer than those in the 1980s.

How can this be?

Researchers first ruled out the possibility that these effects were due to methodology, setting,

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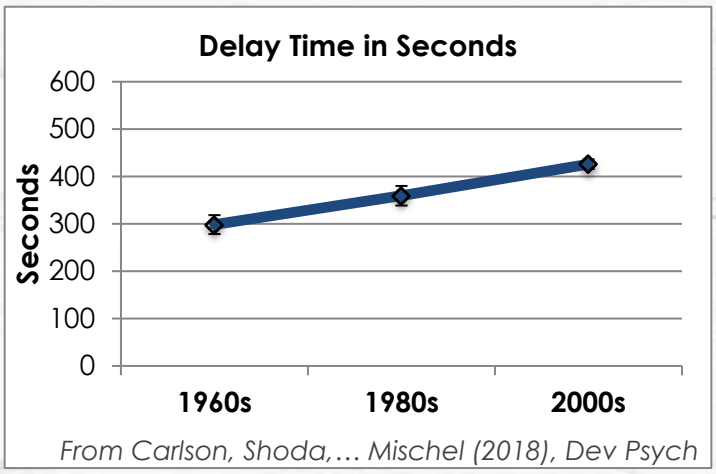
geography, sampling variation, age, or sex of the children. They next considered the following possibilities:

First, consider general intelligence. Coined the "Flynn Effect," scores on IQ tests for children and adults have increased an average of 3 points each decade from 1909 to 2013. It may be possible that gains in IQ are correlated with gains seen in delay of gratification, resulting in longer wait times.

Next, focus on EF abilities. EF is the key set of neurocognitive skills required for impulse control in children. In recent years, increases in public awareness of EF skills have made their way into schools, TV programs, books, parenting, and even policy. Similarly to delay of gratification, EF skills are proven to predict school readiness, academic achievement, social functioning, as well as mental and physical health. This shift in attention to cultivating EF skills in children may also contribute to gains in delay of gratification.



From Carlson, Shoda,… Mischel (2018), Dev Psych

Though further research is needed, experts speculate that improvements in abstract thought, reasoning, and social awareness of EF skills in schools, media, and parenting, along with increases in preschool enrollment, may have been the driving force in generational improvements in wait time and delay of gratification.

Dr. Carlson talking about this study on "Mom Enough"

Language Development and Executive Function

Language and executive function skills are both critical to a child's development. But did you know they are related to each other in important ways? Language development and executive function (EF) skills have a reciprocal relationship, meaning each relies on the other for optimal growth. EF skills represent a set of cognitive processes that underlie self-control of thoughts, feelings, and behaviors. They are important predictors of school success.

Learning a Second Language May Help Children's EF

Research suggests that EF develops more rapidly in children who are bilingual compared to those who are monolingual. Why might bilingual children have this cognitive benefit? One explanation is that bilingual children need to simultaneously activate both languages in the brain. This dual-language processing requires them to direct their attention to the target language.

Therefore, bilingualism might help "train" EF skills as they are repeatedly recruited for language selection. For example, when a child who is speaking in Spanish with her parents sees an English-speaking friend from school, she will need to shift to her other language, suppressing the response in *Spanish* in order to greet her friend in *English*.

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Since this enhanced selective attention and cognitive flexibility requires repeated practice, the length of time that people spend using two or more languages also matters. For example, one study showed that native Spanish-English bilingual preschoolers outperformed their English-only speaking peers on EF measures, while English speakers enrolled in Spanish immersion kindergarten performed in between the other two groups. Studies also suggest that the bilingual advantage becomes more apparent as children grow older and obtain more practice in language control. Thus, the effect of bilingualism on EF may grow stronger as children gain practice in managing both languages.

Speaking to Children to Scaffold Their EF

How can parental language input support children's executive processing skills? One proven strategy is for parents to talk about explicit conceptual links between objects, people, activities, or functions. For example, parents can relate the current play activity to a previous experience. When picking up a toy screwdriver, the parent can say, "This is a screwdriver. It is used for putting screws in and taking them out. You saw one in our toolbox last week." Parents can also help link specific objects with general categories: "Let's check out all these different tools in this toolbox. A screwdriver, a hammer, and a wrench."

Aside from explicitly describing the links between activities and objects, parents can also explain the cause and effect of an activity. For example, when playing with toy cars on race tracks, parents can explain to the child, "This car was faster compared to the other one because it raced on the shorter track." Parents can also help associate feelings and emotion with the cause, such as, "Your little sister is upset because you took the doll out of her hand."

Research shows that this kind of language input during the early years may have long-lasting effects. Parental verbal scaffolding at 3 years of age is associated with children's problem solving and language skills at 4 years of age, as well as later EF skills at age 6. It is possible that this type of verbal guidance can provide children with useful *language models* about how to express complex relations. When children use these models in their self-directed speech (i.e., when children talk to themselves), they may be better able to form concepts, understand rules, make plans and control their own behavior in problem-solving activities.

Language Development: Key Takeaways

Learning a second language may help children's EF skills when they practice selecting and switching between two language systems.

Parental language that provides explicit conceptual links between objects, activities, or functions also may help improve children's EF skills.

Developing EF skills can help children think critically about misleading or incorrect information through communicative interactions.