

The Marshmallow Task

Laurel A. Brabson, M.S.

Hannah M. Coffey, B.A.

Mary Margaret Ruckle, B.S.

Cheryl B. McNeil, Ph.D.

West Virginia University

To study the human systems of self-control during delayed gratification, Dr. Walter Mischel and colleagues developed what became the famous Marshmallow Test, published in *Science* in 1989. This study became a frontrunner in the field of psychology, laying the foundation for future studies in impulse control. Dr. Mischel was born in 1930 in Vienna, Austria. He was a professor at the University of Colorado, Harvard University, and Stanford University where he originally conducted the Marshmallow Test. Dr. Mischel currently holds a professorship at Columbia University.

Prior to Mischel's work, studies investigating delayed reinforcement and impulse control had been conducted almost exclusively using animal models. The few studies that examined impulse control in humans included children of at least six years of age because it was thought that younger children had not yet developed the capacity to wait for a reward. However, no research at the time had investigated the hypothesis that younger children could not delay gratification – it was merely an untested assumption. Mischel's study filled this void in the

literature by including preschool-aged children from a daycare center affiliated with Stanford University.

The marshmallow test began with children between the ages of three and five sitting at a table with a single marshmallow in front of them. The children were informed that the experimenter had to leave the room for a few moments, and that they had two choices: a) eat the marshmallow immediately, or b) wait for the experimenter to return and receive an additional marshmallow. While this may seem like an easy choice, results indicated that it was not easy for many children. Strategies for delaying gratification in three and four-year-old children were significantly less effective than strategies used by children over four years of age. Children four years and under seemed unable to resist interacting with the marshmallow directly, often staring intently at it, smelling it, or touching it. Older children, however, were more likely to distract themselves from the temptation by looking away from the marshmallow and verbally reminding themselves of the larger reward. Differences in strategies and success were also observed between children of the same age, findings which became of interest to researchers after the initial study.

The marshmallow test has become well known for several reasons. Perhaps the most important contribution was that it was the first study to demonstrate self-control and delayed gratification in children. These experiments gave developmental researchers an important glimpse into when self-control abilities begin developing in humans. In addition to providing a developmental timeline, the marshmallow test led researchers to observe differences between children of the same age, raising a few questions for future research.

First, researchers asked whether a child's performance on the task has any long-term implications for future outcomes. Indeed, research has shown that early performance on the

marshmallow test is positively associated with later successful outcomes such as SAT scores and educational achievement. Conversely, poor self-control as demonstrated through early performance on the marshmallow test is associated with poor coping skills in later life, which has been associated with increased risk of drug use.

Second, it is important to understand why differences exist in children of the same age and if these differences should be of concern. Mischel suggests that children's results should not immediately raise concerns, as one who fails at this task is not destined to have limited self-control in adulthood. However, he does suggest that these children may benefit from games and teaching modules which promote executive functioning. Executive functioning refers to the attentional and cognitive capacities needed to effectively enact goal-directed and future-oriented strategies. Self-control is one component of executive functioning and relates to a child's ability to focus on and complete a task without becoming distracted. Increasing executive functioning in children improves their later ability to delay gratification.

At first glance, an experimental procedure involving children eating marshmallows may not seem particularly compelling or impactful. However, this experimental paradigm resulted in valuable findings and important new research questions. The marshmallow studies helped to progress diverse fields including human development, sociology, addiction studies, and neuropsychology.

Further Reading:

Casey, B. J., Somerville, L. H., Gotlib, I. H., Ayduk, O., Franklin, N. T., Askren, M. K.,...Shoda, Y. (2011). Behavioral and neural correlates of delay of gratification 40 years later. *Proceedings of the National Academy of Sciences, 108*, 14998-15003.

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Mischel, W., & Ebbesen, E. B. (1970). Attention in delay of gratification. *Journal of Personality and Social Psychology*, 16, 329–337. doi: 10.1037/h0029815

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