

The role of tokens in intertemporal choice in capuchins, children and adults

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In the delay choice task (also known as intertemporal choice task) subjects choose between a smaller immediate option and a larger delayed option. This paradigm is frequently used to assess self-control, interpreting a preference for the larger delayed option as manifesting willingness to wait. However, the same preference might instead indicate an impulsive response based on quantity, in which the subject fails to inhibit the prepotent tendency to take the larger amount of reward, regardless of any consideration of delay. To disentangle this issue, we compared the performance of 10 capuchin monkeys, 101 preschool children, and 88 adult humans in a delay choice task with food, low-symbolic tokens (objects that can be exchanged with food and have a one-to-one correspondence with food items), and high-symbolic tokens (objects that can be exchanged with food and have a one-to-many correspondence with food items). Previous findings show that inhibiting prepotent responses for quantity is easier when the problem is framed in a symbolic context. Here, we aimed to test two hypotheses: (i) *Inhibition failure*: if choices for the delayed reward are due to a failure at inhibiting the prepotent response for the larger quantity, then high-symbolic stimuli should reduce the preference for the delayed reward, whereas low-symbolic stimuli should have no effect; (ii) *Delay tolerance*: if choices for the delayed reward reflect willingness to wait, then symbolic stimuli should moderate the appetitive response to the immediate option and thus increase the preference for the delayed reward, with high symbolic stimuli having a greater impact than low symbolic ones. Our findings fit the *Inhibition failure* hypothesis, since capuchins, children and – with some limitations – adult humans chose the larger delayed option more when presented with food than when presented with high-symbolic tokens. Thus, preferring the larger delayed option in the delay choice task seems to result from an impulsive preference for quantity, rather than from a sustained delay tolerance. This invites caution in considering the delay choice task a reliable measure of self-control.

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