

The static Symmetrical Outcome-Revaluation Task

Version used in:

Brinkhof, L. P., Ridderinkhof, K. R., van de Vijver, I., Murre, J. M., Krugers, H. J., & de Wit, S. (2022). Psychological coping and behavioral adjustment among older adults in times of COVID-19: Exploring the protective role of working memory and habit propensity. *Journal of adult development, 29*(3), 240-254.

This outcome-revaluation paradigm consisted of a training phase, a test phase, and a baseline test. Throughout the task, participants were presented with a picture of a road running from the left to the right side of the screen. In the center they saw a square, surrounded by a few houses and trees (see Figure T1).

Training phase

On each trial of the training phase, a fruit truck with a colored symbol on the side appeared in the centre of the square, accompanied by a vendor (stimulus; see Figure T1A). The symbol or 'logo' indicated which type of fruit (outcome) could be obtained from that truck. To collect the fruit that the van was carrying, participants had to press the space bar (response). Participants were supposed to only collect valuable fruits. After 800 ms the vendor disappeared, signalling the end of the response window. Following a delay of 200 ms, the outcome fruit was presented above the truck for 700 ms. Trials were separated by a 1000-1500 ms ITI.

The task featured eight trucks, each with a different logo on the side. Four of the trucks always appeared in the odd and four in the even blocks of the training. The four outcome fruits featured in all blocks. Associations between trucks and outcome fruits were fixed, with each fruit being related to two specific trucks, one in the odd and one in the even blocks. In each block, two fruits were valuable (go condition) and two were not (no-go condition). Of the four outcomes fruits, two fruits were always valuable in the odd, and the other two in the even blocks. Thus, participants always had to press for the same trucks because they always contained the valuable fruits, which should lead to a direct S-R association between the truck and the response being formed, while they never had to press for the other trucks.

Before each block, the two valuable fruits were shown inside a green box and the nonvaluable fruits inside a red box for four sec. Next, the participant was presented with all four fruits and had to indicate using the mouse which two had to be collected. If the response was incorrect, the presentation and check were repeated. During the blocks, collecting a valuable fruit resulted in the gain of 1 point, collecting a nonvaluable fruit in the loss of 1 point. Importantly, however, participants did not receive immediate performance feedback but had to assess the accuracy of their (non-)response themselves using their knowledge of the current values of the fruits. Only after each block, the numbers of correct button presses, correct non-responses, and late responses, as well as the total number of points collected so far were presented on screen for 5 sec.

During the training, in each block all four trucks were presented four times, twice in the first and twice in the second half. Trial order was randomized per eight trials. The distribution of trucks and fruits over blocks and conditions was randomized over participants. The training phase consisted of 32 blocks (16 odd, 16 even), in which all eight trucks were presented 64 times in total. After every 8 blocks, participants could take a self-paced break of maximally 30 sec.

Test phase

During the test phase, the same procedure preceded each block and participants were still supposed to only collect the valuable fruits by pressing for the associated trucks. However, during the trials the outcome fruits were now replaced with a general picture of a fruit bag, so participants had to rely on their previously learned associations between trucks and fruits (see Figure T1B). Each block now featured all eight trucks. Crucially, in each block a new combination of outcome fruits was valuable, which was never the same as during training. Because specific truck-fruit combinations were always (non)valuable during training, the combination of the training values and the new values in the test resulted in two truck-fruit combinations being still valuable, two being devalued, two being upvalued, and two being still nonvaluable in each block. The performance difference between combinations for which the trained behavior still had to be performed (still valuable, still nonvaluable) and the combinations for which this behavior had to be adjusted (devalued, upvalued) can be considered a measure of habit tendency.

The test phase consisted of four blocks. All trucks were again presented four times per block, twice in each half, and trials were now randomized per 16. The collection of a valuable and a nonvaluable fruit still resulted in the respective gain and loss of 1 point and no immediate performance feedback was presented. Again, response accuracy was presented between blocks.

Baseline test

The baseline test was identical to the test phase, except that per block two trucks with different logos (stimuli) rather than two outcome fruits were devalued. This phase was included to verify that participants were able to flexibly adjust previously trained response behavior when this change did not depend on outcome values. Participants were now supposed to respond to the trucks that were still valuable and withhold responding for the trucks that were devalued, while ignoring the related outcome fruits. Each block again featured eight trucks. The combination of the trucks that (1) contained valuable outcome fruits and required a response during training, and (2) the trucks that were valuable and required a response during the baseline test, resulted in two trucks requiring a response during both training and baseline test (for consistency also called 'still valuable'), two trucks that required a response during training but no longer during the baseline test ('devalued'), two that did not require a response during training but did so during the baseline test ('upvalued'), and two that did not require a response in either phase ('still nonvaluable'). In this phase, pressing for a valuable truck resulted in the gain of 1 point and pressing for a nonvaluable truck in the loss of 1 point.

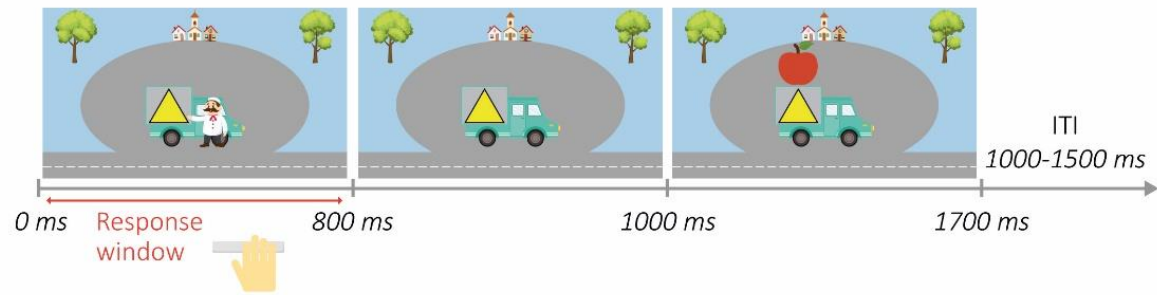
Other elements of the task

Before starting the real task, participants receive extensive instructions and practiced the training (two blocks) and test phase (one block) with task-irrelevant trucks and fruits. They were also informed that the participant per age group that gained the most points would receive two cinema vouchers.

After the training phase, the explicit knowledge of the truck-fruit associations was assessed. Each truck was shown in combination with all fruits. The participant has to select which fruit was sold by that truck, and indicate his/her confidence in the judgement on a color bar ranging from red ('very uncertain') to green ('very certain').

After finishing the task, participants filled out a questionnaire about strategy use during the task, and whether they focused more on the fruits or trucks and on pressing or not pressing.

A. TRAINING PHASE



B. TEST PHASE

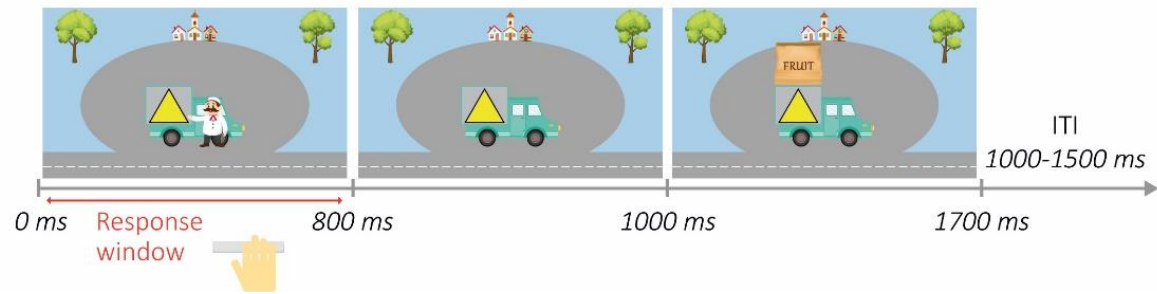


Figure T1. Example trials in the (A) training phase and (B) test phase of the static Symmetrical Outcome-Revaluation Task (ITI = inter-trial interval).