

Methods Description for OpenfMRI Dataset 002

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A subset of this dataset was included as timepoint #1 in the test-retest study by Aron et al. (2006)

1 Subjects

Seventeen right-handed healthy English-speaking subjects are included in the dataset (XXX males; age range XXX-XXX). All subjects gave informed consent according to a UCLA Institutional Review Board protocol.

2 Behavioral tasks

Subjects participated in two types of feedback-driven classification learning: PROB and DET (“pure blocks”), and then entered “mixed blocks” (event-related) (Figure 1a).

In each pure block, subjects performed 10 cycles consisting of 5 consecutive trials of feedback-driven classification learning followed by 3 consecutive trials of a baseline task (requiring a button press on each trial, always to the same stimulus, see below). Half the subjects were trained on two pure blocks PROB, followed by two pure blocks of DET; the other half of subjects had the reverse order. For PROB and DET, subjects were asked to imagine they were in a foreign city (Prague or Budapest) and had to predict the weather on the basis of a set of cards (Knowlton et al., 1996; Poldrack et al., 2001).

On each trial, one to three (out of 4 potential) cards were presented: giving 14 potential different combinations [in fact there were 13 due to an error in coding]. The location of the cards was random, and the subject was told as much. Each of the 13 combinations constituted a stimulus and the subject had to indicate whether the outcome would be sun (left button press) or rain (right button press). The probability with which each stimulus was associated with rain is shown in Figure 2. Frequencies were chosen in such a way that the cue-outcome associations (i.e. the associations between each particular card and the rain outcome) were 0.18, 0.37, 0.59 and 0.82 for PROB and 0.21, 0.38, 0.58 and 0.78 for DET (i.e. these associations were matched as well as possible across tasks). Critically, however,

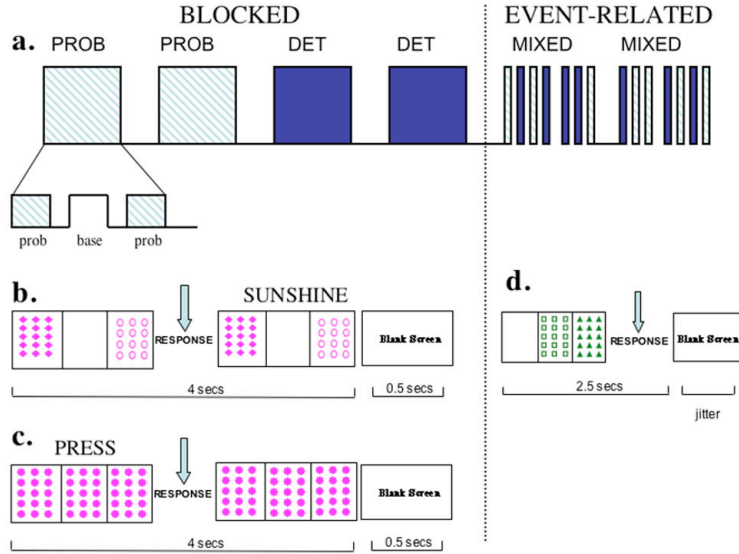


Figure 1: Task schematic

the stimuli (consisting of single cards and combinations of cards) were differentially related to outcomes (Figure 2).

In the pure blocks, stimulus presentation lasted for 4 secs, within which time the subject responded with a left button press for sun or a right button press for rain. As soon as the subject responded, feedback (the word rain or sunshine) was presented along with the stimulus (the default was that feedback presentation lasted for one second) (Figure 1b). There was a 0.5 sec second interstimulus-interval. Baseline trials consisted of a novel stimulus at all three card positions for 4 secs, along with the instruction press. The subject was instructed to always press the right button on baseline trials. As soon as the button was pressed, the word press disappeared (Figure 1c).

In each mixed block, there were 100 stimuli (50 PROB and 50 DET). Stimulus presentation was 2.5 secs, there was no feedback and interstimulus interval was randomly sampled from an exponential function with mean 2 secs, min 0.5 secs and max 5 secs (Figure 1d).

3 MRI data acquisition

A 3 T Siemens Allegra MRI scanner was used to acquire 180 functional T2*-weighted echoplanar images (EPI) (4 mm slice thickness, 33 slices, TR = 2 s, TE = 30 ms, flip angle = 90-, matrix 64 X 64, field of view 200 mm). Stimulus presentation and timing of all stimuli and response events were achieved using MATLAB (<http://www.mathworks.com>) and the Psychtoolbox (<http://www.psychtoolbox.org>). Additionally, a matched-band- width High-

PROB

card1	card2	card3	card4	stim	freq	rain	p(rain)
1	0	0	0	1	7	1	0.14
0	1	0	0	2	7	1	0.14
0	0	1	0	3	7	5	0.71
0	0	0	1	4	7	4	0.57
1	1	0	0	5	8	0	0.00
1	0	1	0	6	12	11	0.92
1	0	0	1	7	1	1	1.00
0	1	1	0	8	7	1	0.14
0	1	0	1	9	1	1	1.00
0	0	1	1	10	19	18	0.95
1	1	1	0	11	19	6	0.29
1	0	1	1	12	2	1	0.50
1	1	0	1	13	3	2	0.67

DET

card1	card2	card3	card4	stim	freq	rain	p(rain)
1	0	0	0	1	8	8	1
0	1	0	0	2	8	0	0
0	0	1	0	3	8	0	0
0	0	0	1	4	8	8	1
1	1	0	0	5	10	0	0
1	0	1	0	6	4	4	1
1	0	0	1	7	11	11	1
0	1	1	0	8	5	0	0
0	1	0	1	9	4	0	0
0	0	1	1	10	12	12	1
1	1	1	0	11	6	0	0
1	0	1	1	12	7	0	0
1	1	0	1	13	9	9	1

Figure 2: Stimulus probabilities

Resolution scan (same slice prescription as EPI) and MPRAGE were acquired for each subject for registration purposes. The MPRAGE had parameters: TR = 2.3, TE = 2.1, FOV = 256, matrix = 192 X 192, sagittal plane, slice thickness = 1 mm, 160 slices.

References

- Aron, A. R., Gluck, M. A., and Poldrack, R. A. (2006). Long-term test-retest reliability of functional mri in a classification learning task. *Neuroimage*, 29(3):1000–6.
- Knowlton, B. J., Mangels, J. A., and Squire, L. R. (1996). A neostriatal habit learning system in humans. *Science*, 273(5280):1399–402.
- Poldrack, R. A., Clark, J., Paré-Blagoev, E. J., Shohamy, D., Creso Moyano, J., Myers, C., and Gluck, M. A. (2001). Interactive memory systems in the human brain. *Nature*, 414(6863):546–50.