

Methods

Task

Subjects performed a visual search task to find a letter “T” in “L”s and received different feedbacks that were either dependent on/independent of their performance. (Fig.2)

Stimuli

Visual Search: 144 pictures (alphabets “L” and “T” arranged randomly in an 8 x 6 grid: Half of the trials included the “T” as a target. (Fig.2)

Feedbacks: Face icons in different three colors associated with varying conditions of verbal feedback. (Fig.2)

Procedure

Participants performed 144 trials of visual search tasks in three fMRI sessions and received feedback after each trial. There were three feedback conditions (Sincere feedback, Flattery, and Control). In Sincere feedback condition, mean response time in the previous session/practice phase was utilized as a criterion to modify feedbacks. In Flattery condition, participants were always given the same praising feedback. A string of “X”s was given in Control condition . (Table 1)

After all sessions, subjects answered two questions on each of the three face icons that asked how much sincerity/ flattery they felt with the feedbacks (see Questionnaire below).

The IRB committee of Tohoku University approved the above procedure.

Questionnaire (asked repeatedly for the three conditions)

(8-point Likert scale: strongly disagree 1 – 8 strongly agree)

- Q1; “Did the feedbacks depend on your performance?” (feedbacks’ perceived reliability)
- Q2; “Did you feel flattered when this face gave you feedbacks?” (perceived flattery)

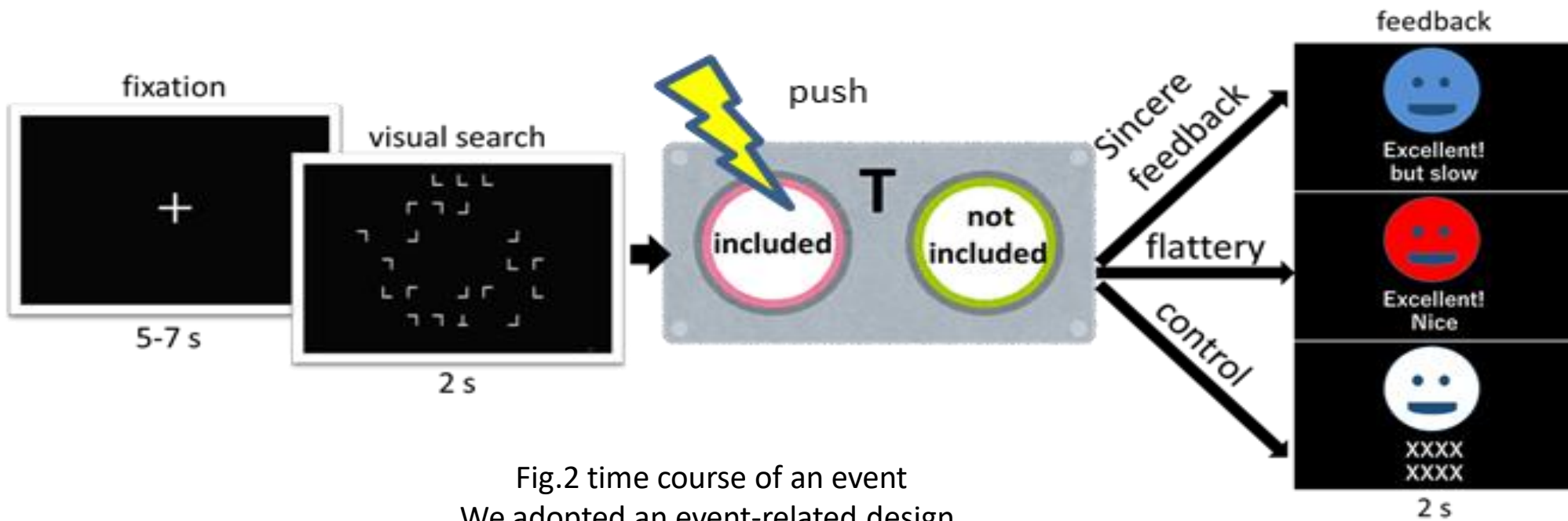


Fig.2 time course of an event
We adopted an event-related design.

Table.1 Verbal feedbacks given in the three conditions (Sincere feedback/Flattery/Control)

Performance	Sincere feedback (based on the performance)	Flattery (NOT based on the performance)	Control
Fast (RT < mean RT in the previous session)	"Excellent! Nice!"	"Excellent! Nice!"	"XXXXXXXXXX"
Slow (RT > mean RT in the previous session)	"Excellent! But slow."		
False answer	"Incorrect."		
No answer (time up)	"Time up"		

Participants

31 students in Tohoku University (11 females). Mean age:21.2.

All subjects gave informed consent before their participation.

Analysis

Region of interest (ROI) analyses were carried out. The ROIs were determined by a large-scale meta analysis of the neuroimaging studies that reported reward-related neural activities. (Fig.1 ; Liu et al., 2011). We examined the activation difference between conditions in these ROIs, as well as the across-participant correlations between the activation of the ROIs and the scores from the questionnaire.

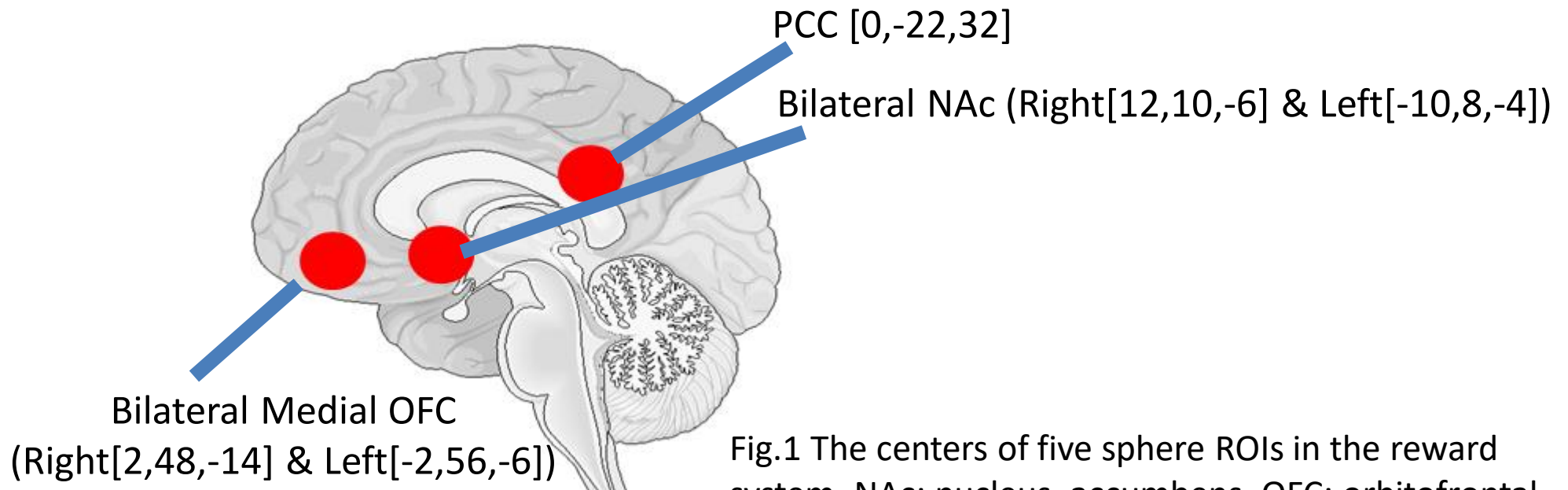


Fig.1 The centers of five sphere ROIs in the reward system. NAc: nucleus accumbens, OFC: orbitofrontal cortices, PCC: posterior cingulate cortex.