

Neural Correlates of Types of Feedback and Reward: Individual differences in achievement goals

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INTRODUCTION

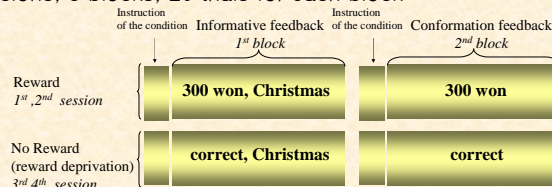
- ❖ Achievement goal orientation (Mastery goal orientation)
 - values learning process itself
 - seeks challenges and show high persistence under negative feedback in learning
 - employs deeper cognitive strategies, focuses on mastery through strategy and effort
- ❖ Objectives
 - To investigate the neural mechanism regarding informative feedback when reward is deprived
 - Hypothesis 1. informative feedback will have a rewarding effects on learning even in the absence of the reward
 - To delineate how people with mastery goal orientation react to deprived reward when informative feedback is given and what strategies they adopt
 - Hypothesis 2. Mastery goal oriented learners will engage certain strategies

METHODS

- ❖ subjects
 - 30 healthy right-handed volunteers (15 males, 15 females) Mean age = 22.5yrs (SD = 2.2)
- ❖ Task
 - Similarity judgment task: inferring similarities among three Korean words and deciding whether they have commonalities or not
- ❖ Experimental Design
 - Event-related fMRI Design
 - Events
 - Conflict: infer and choose to answer correct response, cognitive conflict takes places
 - Expectation: expect reward or feedback, or both
 - Feedback: receive feedback
 - Conditions
 - NR_E: No reward with Explanation (Informative feedback)
 - NR_NE: No reward without Explanation (Confirmation feedback)

Design sequences

- 4 sessions, 8 blocks, 20 trials for each block



Scan parameters

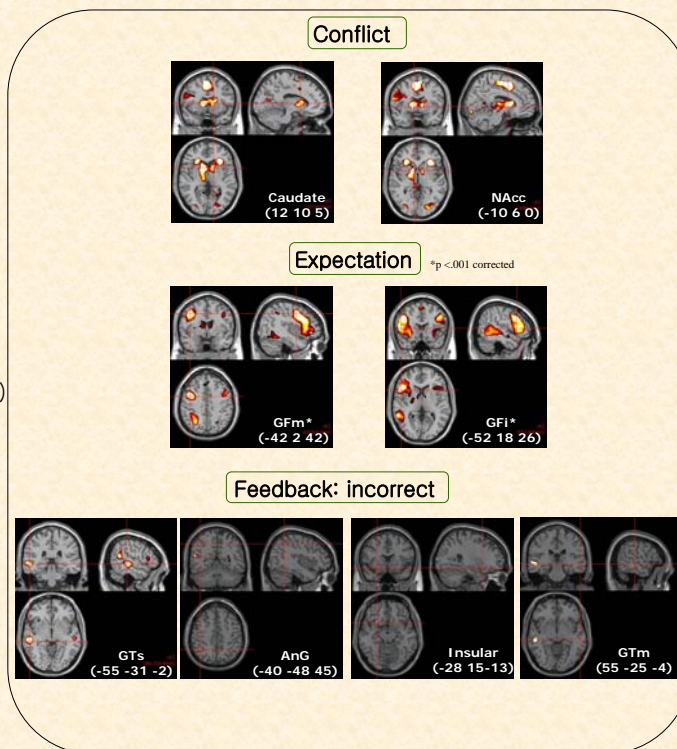
- 3T, Siemens. TR = 2000, TE = 35, flip angle = 90, 22 slices were acquired

SPM 5 Analysis: using random effect model

- One-sample t-tests (p < .001 uncorrected, k=10)
- Regression with mastery goal orientation (p < .001 uncorrected, k=10)

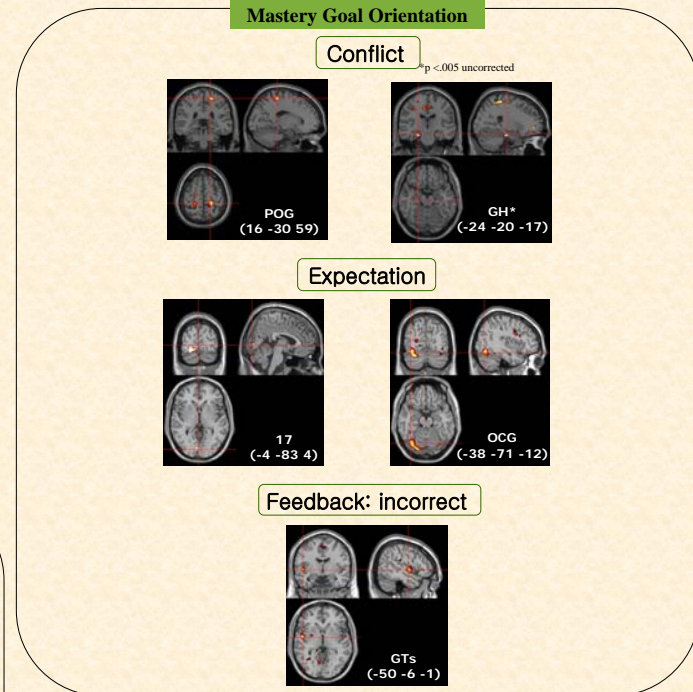
RESULTS (imaging data)

One sample t-tests (NR_E – NR_NE)



Regression analysis (NR_E – NR_NE)

Positive Correlation with Mastery Goal Orientation



CONCLUSIONS

- ❖ The effects of informative feedback even when the reward is taken away seems to be positive in learning process
 - Informative feedback plays an rewarding role during conflict phase (Caudate, NACC)
 - learners continues to engage in semantic process while expecting informative feedback (GFi), and social perception (GFi,GFm)
 - Even when they receive negative feedback, if informative feedback is given, semantic, language comprehension (AnG, GTm) as well as motivation and reward process (Insular) takes place.
- ❖ Learners with mastery goal orientation tends to use semantic long-term memory (GH) during conflict phase, visualize the similarities during expectation phase (OCG), and use theory of mind to infer what others might have answered (STS) when their answer is incorrect.

