Reduced Reward-Related Neural Activity Associates with Decreased Gratification Delay

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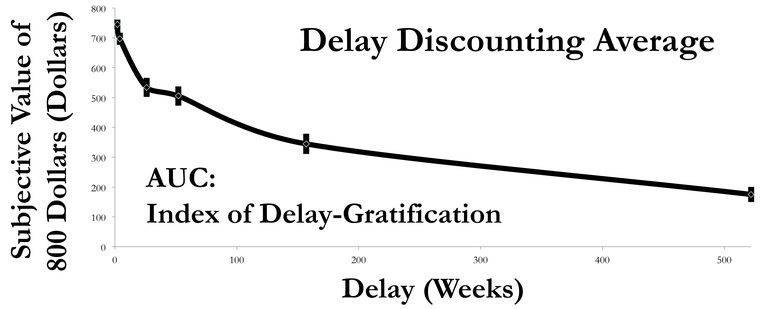
Background

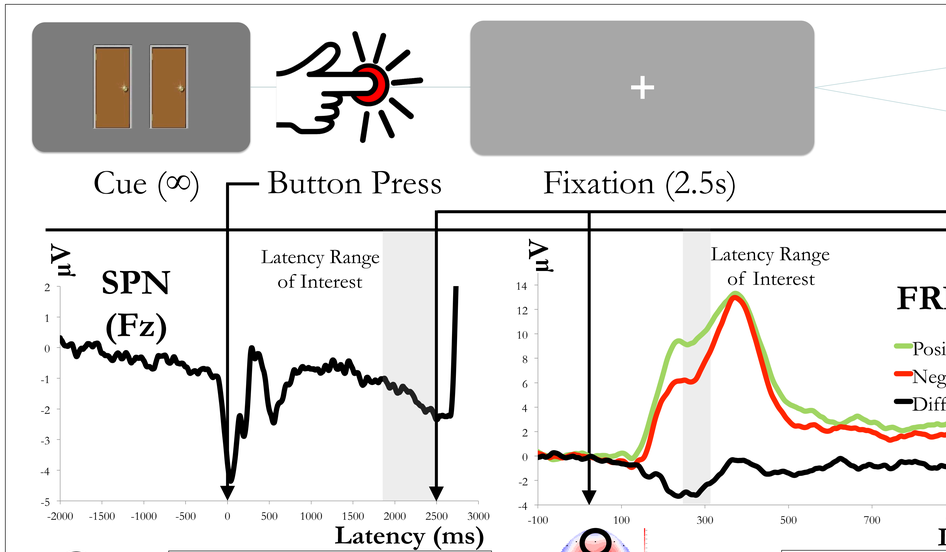
- **Gratification Delay** is the willingness to put off receiving a reward in order to receive a greater reward at a later point in time. It is presently operationalized by the **Delay Discounting Task**
- The method of **Event Related Potentials (ERP)** is the study of microtimed electrical activity before or after a event/stimulus, recorded via electroencephalography (EEG)
- **Feedback Anticipation** is cognition preceding an expected feedback stimulus. It is indexed by the **Stimulus Preceding Negativity (SPN)**
- **Feedback Reaction** is cognition following feedback stimulus. Two components of this reaction were investigated:
  - **Reward Prediction Error** occurs when things are going worse than expected. It is indexed by the Feedback Related Negativity **(FRN)**
  - **Feedback Motivational Significance** is the relevance of feedback to current goals. It is indexed by the **Feedback P3**

Study Objective: To investigate the relationship between individual differences in **Gratification Delay** and anticipatory/ reactionary **Feedback-Related Cognition**

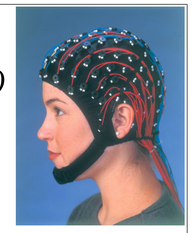
Delay Discounting: Behavioral Data



Gambling Task: Event Related Potentials (ERP)



n=34
Avg. Age: 23.089
_M, _F



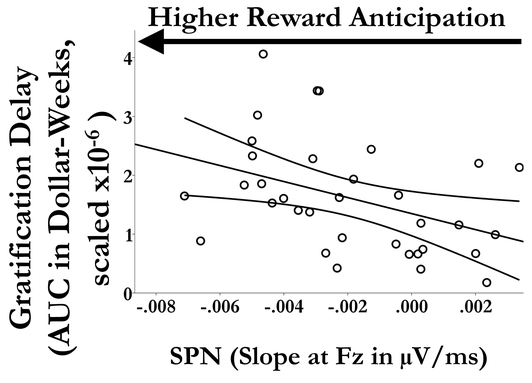
Stimulus Preceding Negativity Grand Avg.; **More negative slope indicates higher reward-anticipation**

FRN Grand Avg.; **Larger difference between peaks indicates higher neural RPE**

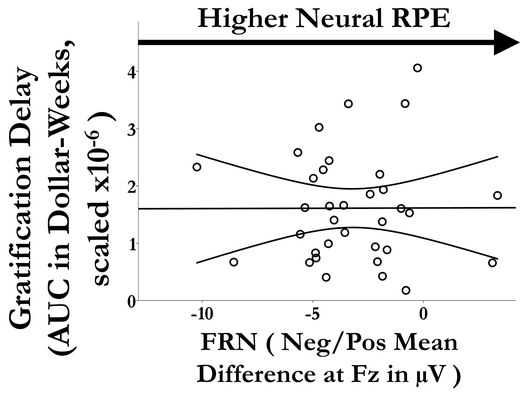
P3 Grand Avg.; **Larger difference between peaks indicates higher motivational significance of feedback**

Relationships between ERP and Delay Discounting

SPN Predicts Gratification Delay r(32)=-0.401 p=0.019



FRN Does Not Predict Gratification Delay r(32)=0.00309 p=0.986



P3 Predicts Gratification Delay r(32)=0.367 p=0.032