

Investigating the Effects of Reward and Threat on Social Learning

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Background

Affective and social cues become increasingly important during adolescence (defined as age 10-24 years)¹.

It has been suggested that adolescence constitutes a period of sensitivity for affective and social *learning*².

However, previous studies have not addressed how adolescents learn under conditions of social reward and social threat in the same paradigm.

This study will investigate learning of faces paired with high and low intensities of positive (rewarding) and negative (threatening) social feedback.

Hypotheses

H1: Face learning will be modulated by feedback intensity.

H2: Those who are more sensitive to reward and to threat will show stronger learning.

We will also explore differences in learning between the social reward and social threat conditions.

Methods

Participants - 100 (behavioural pilot), 80 (MRI)
aged 18-24 years

Social Learning Task -

Learning Phase:

Participants receive social feedback (on previously submitted photos) as comments from other ‘participants’ along with the commenter’s ‘profile picture’.

In reality, all comments will be created by the research team and will be the same for all participants.

Participants will rate their emotions in response to these comments (Self-Assessment Manikin - SAM).

Test Phase:

Participants undergo a surprise memory test.

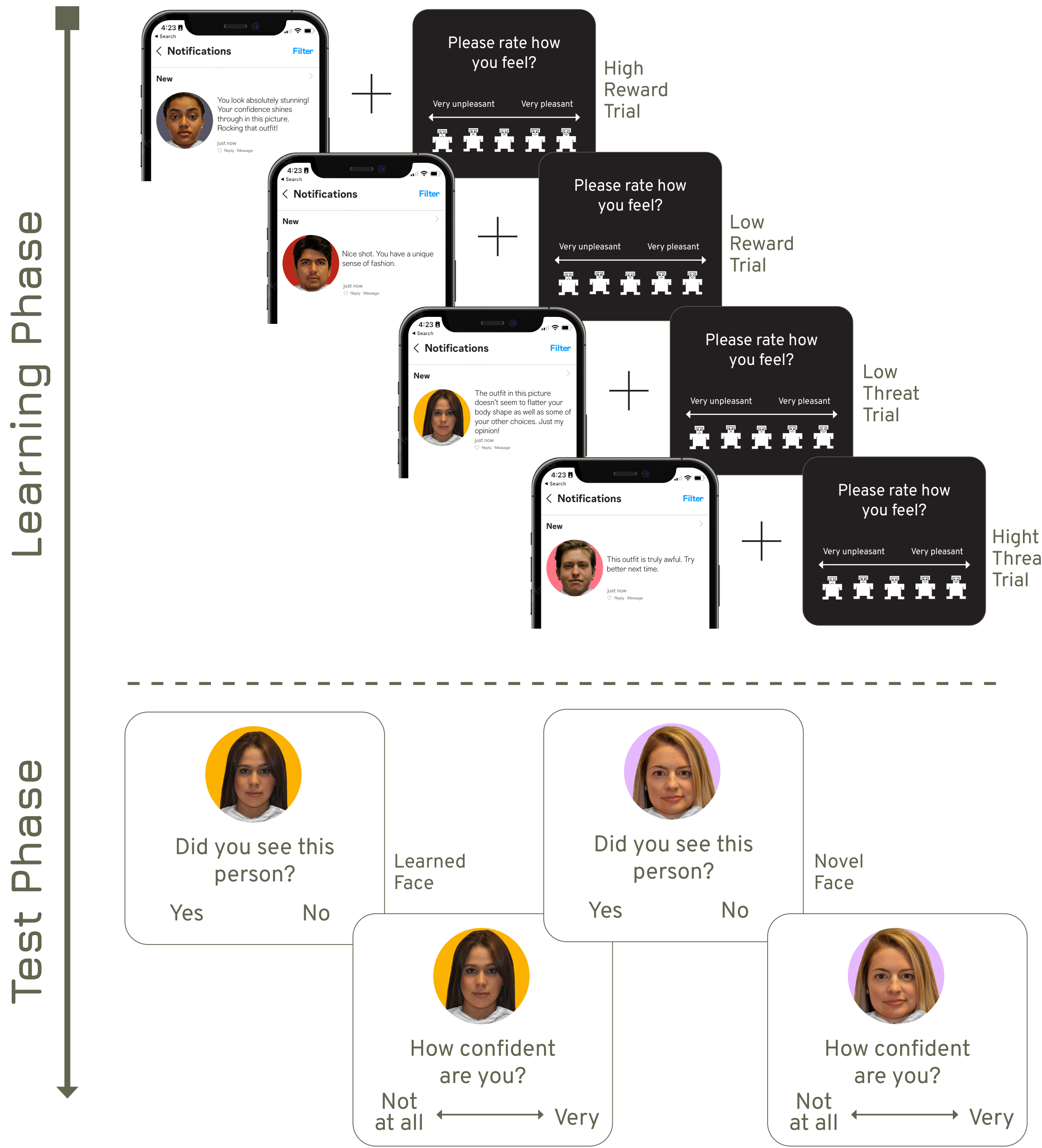
They will be shown previously seen and novel faces. Participants will rate whether or not they recognize the face and will provide their confidence in their response.

We will collect behavioural and functional magnetic resonance imaging (fMRI) data during the learning and test phase.

Design

Social Learning Task

Valence	Reward	Threat
Intensity		
High	High Reward	High Threat
Low	Low Reward	Low Threat



Analysis Plan

As a behavioural measure of learning we will calculate the overall accuracy ($[\text{Hits} + \text{Correct Rejections}] / [\text{Hits} + \text{Correct Rejections} + \text{False Alarms} + \text{Misses}]$), sensitivity ($\text{Hits} / [\text{Hits} + \text{Misses}]$) and specificity ($\text{Correct Rejections} / [\text{Correct Rejections} + \text{False Alarms}]$).

We will use multivariate pattern analysis to decode learned from unlearned faces³ and use decoding accuracy as a neural measure of learning.

We will investigate whether behavioural and neural measures of learning vary depending on the level of reward/threat.

