Social rejection can be highly distressing and can play a role in developing psychopathology. Knowing how social rejection processing occurs in the brain is important for understanding and treating its consequences. However, brain activity associated with social rejection processing has not yet been identified; possibly caused by time-restricted analyses. The current study examines the neural activity for social rejection feedback processing with traditional and time-specific analyses.

**Background**

Prior neuroimaging work on social evaluation:
- The anterior cingulate cortex (ACC) is differentially involved in the processing of social evaluative feedback.
- Dorsal ACC (dACC) for incongruent feedback (incongruent > congruent); Ventral ACC (vACC) for positive feedback (acceptance > rejection).
- Brain areas are found to be activated for expected negative feedback (vPFC, subcallosal cortex, caudate, putamen, midfrontal gyrus for expected rejection > unexpected acceptance), yet no increased activity for (unexpected) negative feedback has been found so far.
- In contrast, many studies have found activity in a 'social pain network' after social exclusion (cyberball). It is puzzling that this has not been found for social rejection.
- Typically, neural activity after social rejection is modelled using the canonical HRF (cHRF) function within 2.2 sec after feedback presentation. This method precludes from finding effects that occur at later stages during feedback processing.
- Neural social rejection feedback processing can possibly occur with a delay. This might be captured with time-resolved analysis.

**Hypothesis:**
- Delayed fMRI signal change of social rejection feedback processing after the traditional 2.2 sec could be captured by Finite Impulse Response (FIR) modelling by placing less constraints on shape and timing of the BOLD response.

**Method**

**Social Judgment Paradigm:**
- Social rejection or acceptance feedback, expected or unexpected.
- Participants: N = 53; ages 8-25; 47% male.

**Re-analysis of Gunther Moor et al. (2010)**
- cHRF.
- FIR in 4 time bins.

**Whole-brain:**
- Delayed neural activity might occur in areas previously unassociated to social pain.
- ROI's: (a-priori/selected; Fig 5)
  - 'Social pain network' as template: dACC, AI & vPFC.
  - Added vACC, as it might be a part of the 'social pain network'.

**Results**

**Whole-brain:**
- for unexpected social rejection feedback (p < .001, 10 contiguous voxels)
  - cHRF: (Fig A)
  - vPFC activity.
  - FIR: (Figs B-D)
- Activity in delayed time bins 2-4.

**ROI's:**
- No activity in the 'social pain network' associated with social rejection feedback.
- vPFC: Immediate (cHRF; Fig A) and delayed (FIR 4; Fig B) increase for incongruent feedback.
- vACC: Delayed recovery to baseline for social rejection (Fig 6).

**Conclusion & Discussion**

**cHRF results showed vPFC activity (whole-brain) for unexpected social rejection feedback, but this might be caused by incongruence.**

**FIR results showed additional activity (whole-brain) in regions not found using cHRF modelling, identifying delayed neural responses.**

**Brain regions typically implicated in the 'social pain network' (ROIs studied here) were not significantly activated during the processing of social rejection feedback.**
- Could be caused by differences between paradigms and/or neural activity associated with social rejection vs. exclusion.

**Additional ROI results:**
- The vPFC was sensitive to incongruent social feedback.
- The vACC showed a delayed recovery to baseline activity after rejection feedback.

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