

# Investigating the role of expertise in the predictive coding framework combining time resolved neural and behavioural evidence

## **ABSTRACT:**

### **Background**

Perception is derived from the combination of priors and sensorial input. While priors are broadly understood to reflect experience developed over one's lifetime, the role of perceptual expertise at the individual level has seldom been directly tested.

### **Aims**

We explored the extent to which predictive processing differs as a function of expertise across different domains, namely categorization, individuation (i.e. identity processing), and low-level processing (perceiving a face across different viewpoints). This was done at the individual level by taking advantage of varying individual expertise with faces.

### **Method**

Metrics associated with *Expectations* were analysed in reaction time data (behavioural tasks) and EEG recordings (neural tasks). Participants also completed independent measures of face and object expertise (CFMT+, CCMT).

### **Results**

Work package 1 reveals that early perception is shaped by face expectation, with decoding of expectation over posterior areas, occurring from 100ms. This decoding of objects of expertise (faces) had a direct link with behavioral facilitation effects of face expectation associated with face expertise. In work package 2, we show that effects of expectation go beyond simple categorization, into higher level processing, namely, identity processing, finding a significant relationship between face identity expectation and individual face expertise.

### **Conclusions**

We highlight the role of expertise on forming priors, providing support for the often-disregarded contribution of individual level variability. Future work will build on these findings to probe the role of expertise within the predictive coding framework in individuals displaying typical and atypical use of predictive cues.

### **Keywords**

Predictive coding, Expectation, Face processing, EEG, Decoding

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