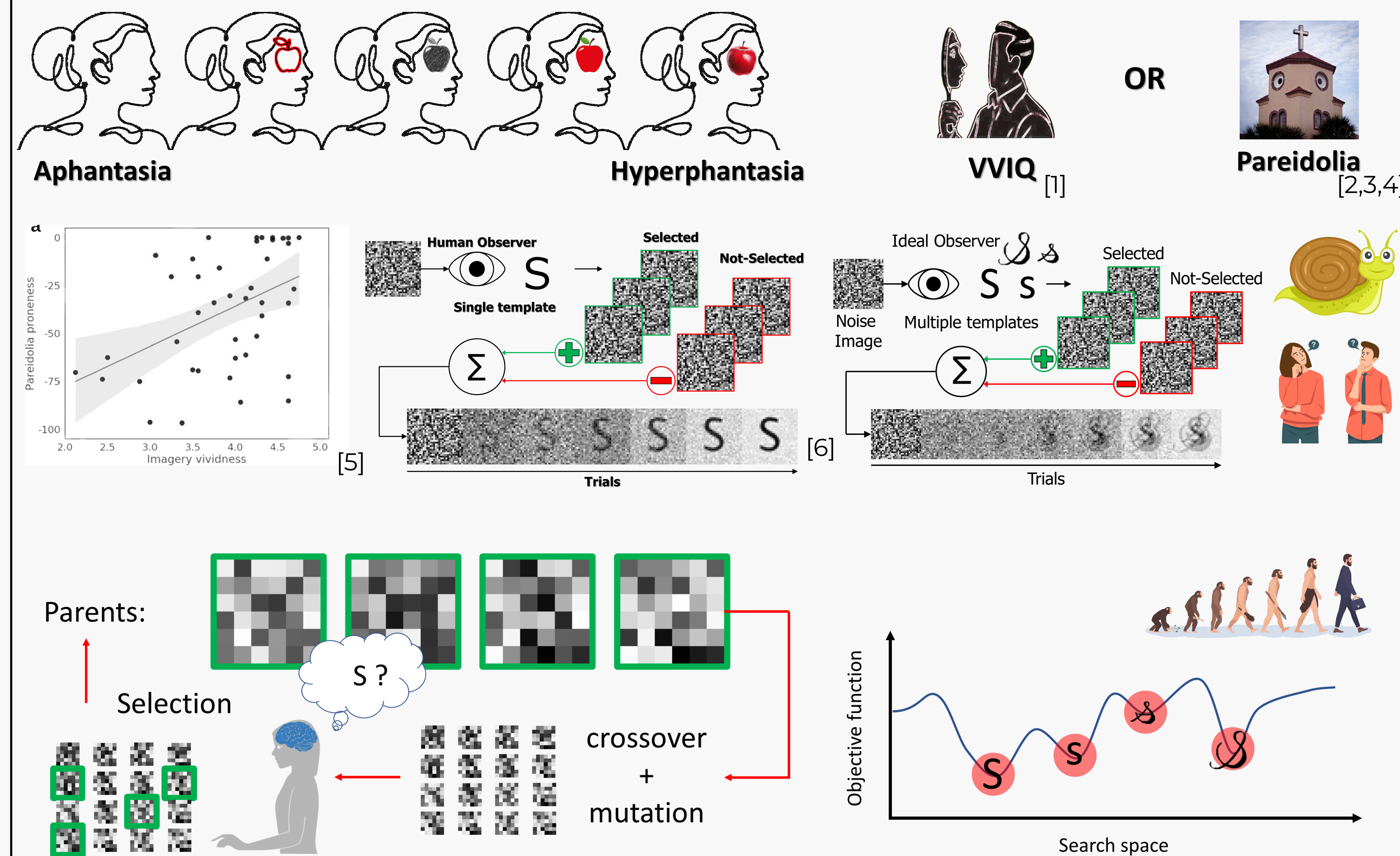


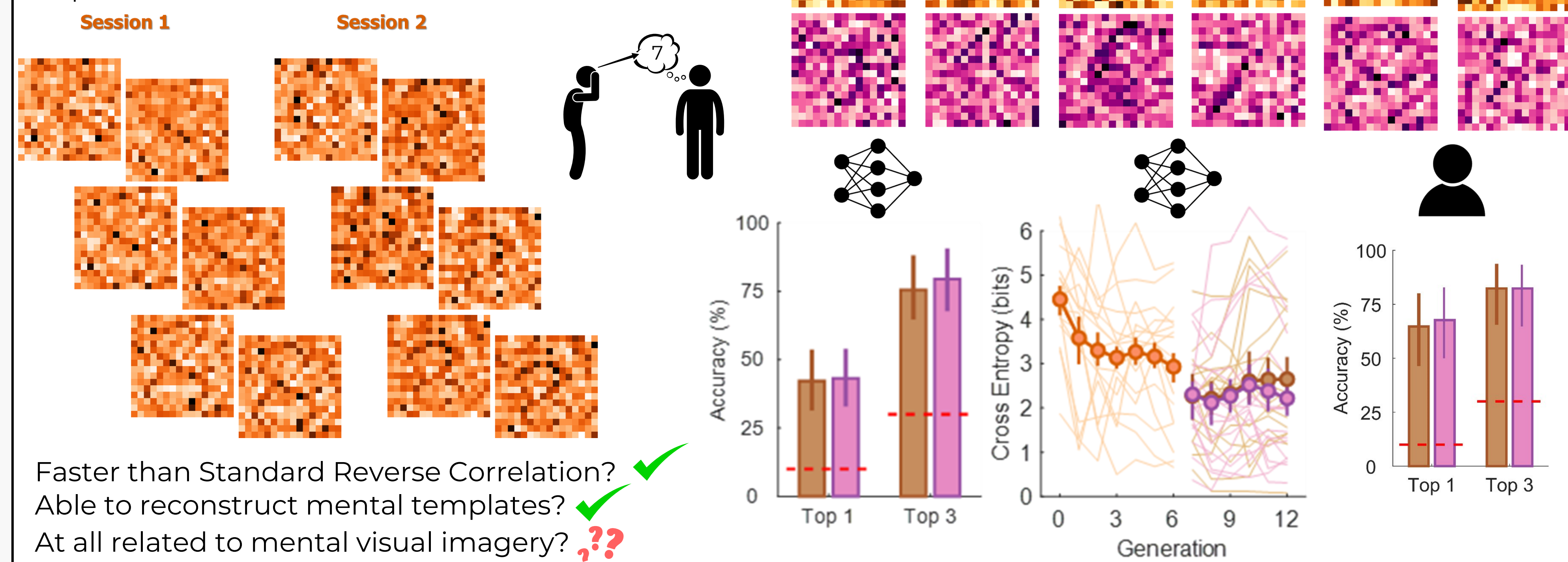
Decoding Mental Images: Combining Pareidolia, Genetic Algorithms, and Deep Learning for Objectively Quantifying Mental Imagery

Background Aphantasia, the inability to form voluntary mental images, has primarily been assessed through self-report methods. This study explores objective assessment techniques by developing a pareidolic-visual task using genetic algorithm-based reverse correlation to reconstruct mental templates of digits and letters, exploiting the potential link between pareidolia and aphantasia.



Experiment 1

Can genetic algorithm-based reverse correlation successfully reconstruct mental templates of digits, and are these reconstructions classifiable by both humans and deep neural networks?

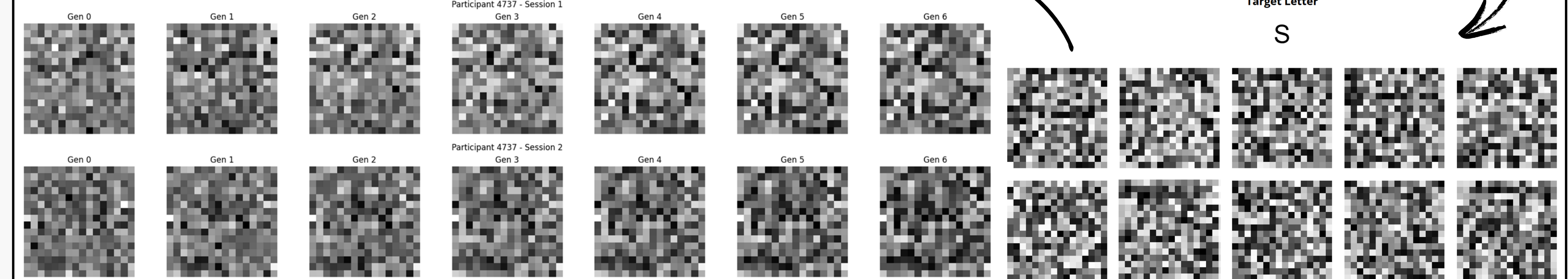


Faster than Standard Reverse Correlation?
Able to reconstruct mental templates?
At all related to mental visual imagery?

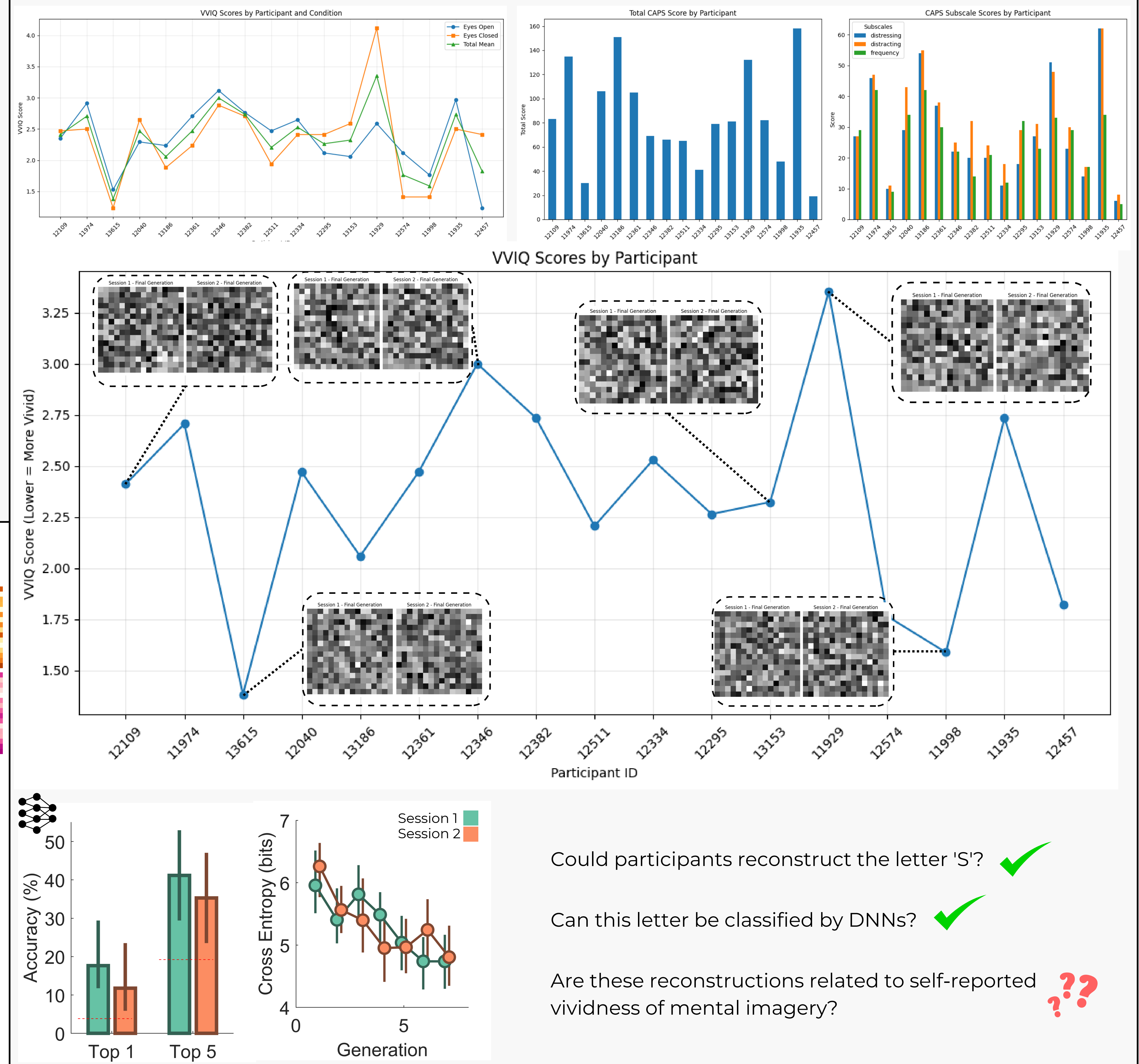
Experiment 2

Building upon Exp1's findings that GA reverse correlation can reconstruct mental templates, Exp2 aims to disentangle the relationship between reconstructions and mental visual imagery. By enforcing a single template and providing a target example, we investigate whether self-report markers of mental imagery predict reconstruction quality.

Generational Classification Images



Results



Could participants reconstruct the letter 'S'?
Can this letter be classified by DNNs?
Are these reconstructions related to self-reported vividness of mental imagery?