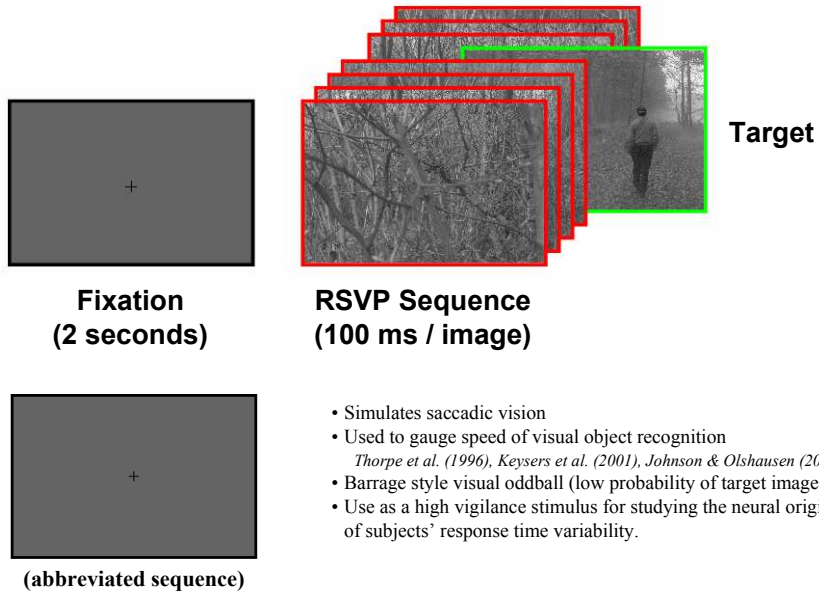
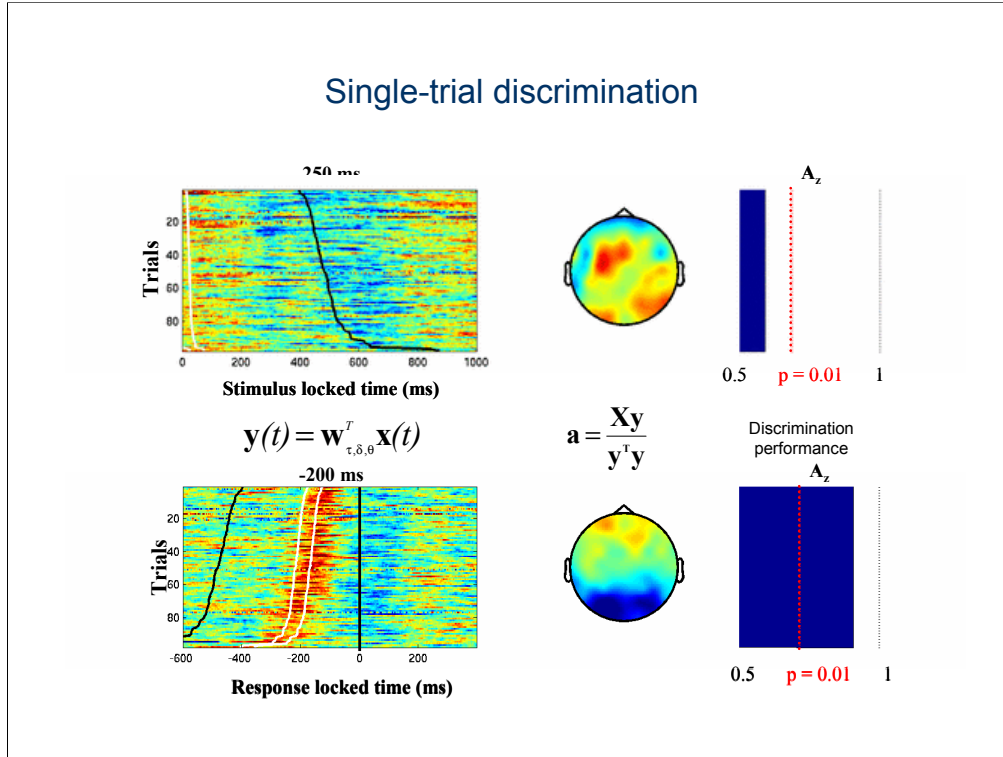


Rapid Serial Visual Presentation (RSVP) Task

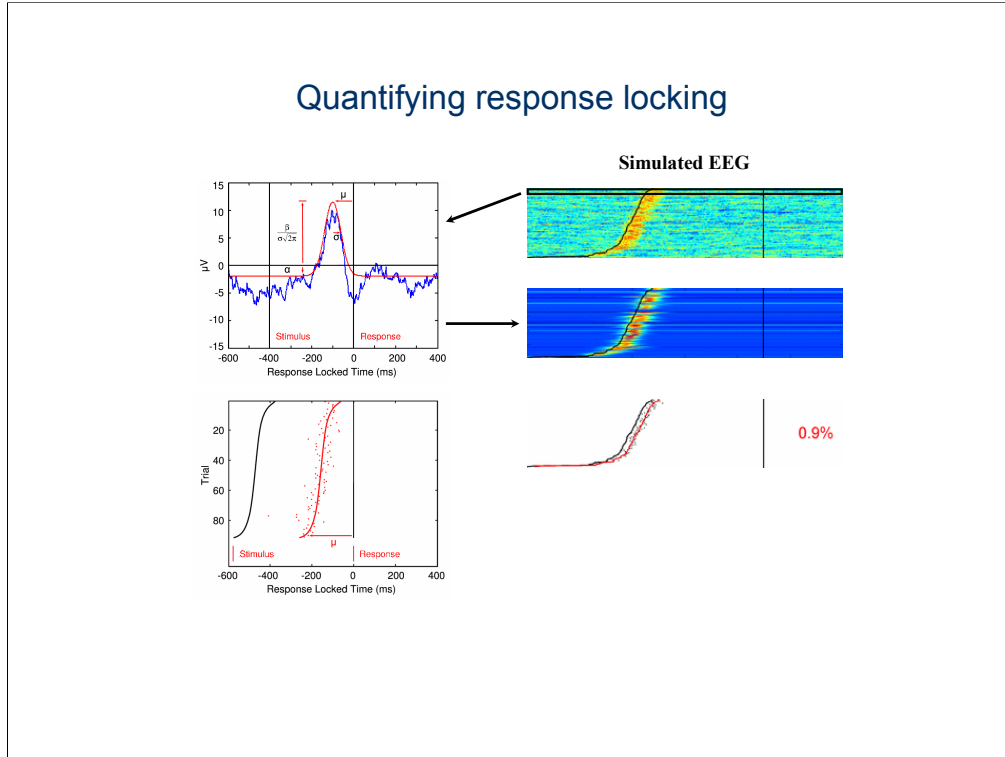


Example Rapid Serial Visual Presentation (RSVP) trial. A fixation cross lasting two seconds is followed by a sequence of 50 images. Each sequence has a 50% probability of containing one target image. This target can only appear within the middle 30 images to ensure that a one second image buffer precedes and follows the target.

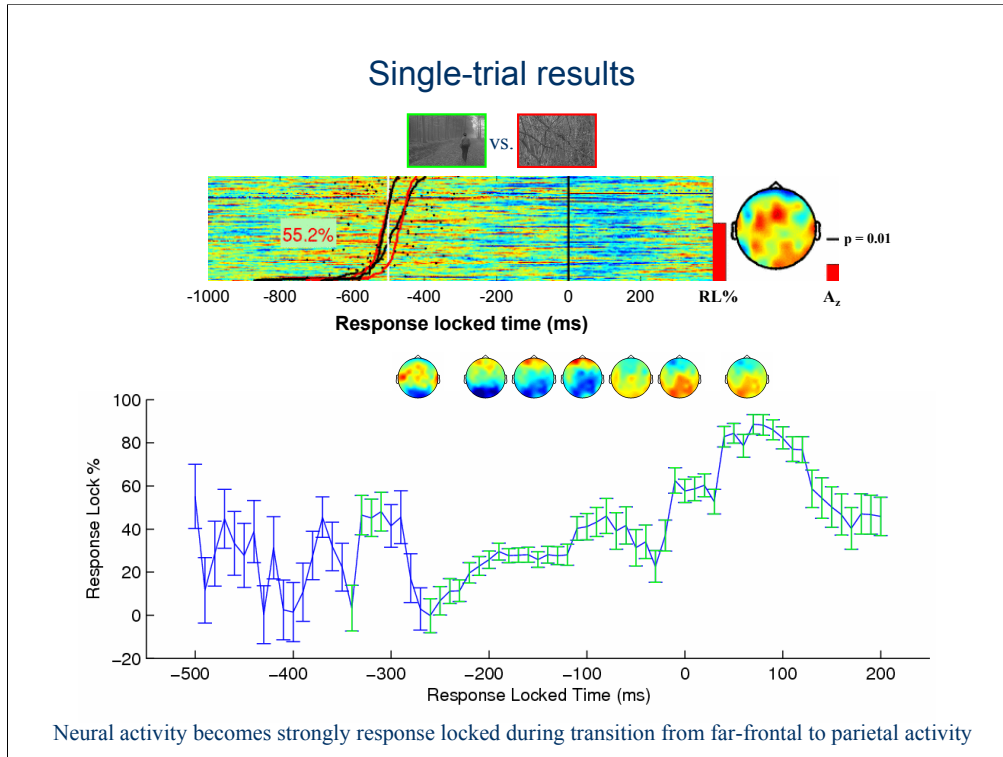


Discriminating component activity shows the difference between target and non-target trials. Stimulus locked (top) and response locked (bottom) component activity \mathbf{y} for subject 2. The activity is color coded (positive activity is red, negative activity is blue). Trials are sorted by response time and aligned vertically so that stimulus or button release time is at 0 ms for stimulus or response locked panels respectively (vertical black line). The black "S"-shaped curve indicates the response or stimulus for stimulus or response locked plots respectively. Each row shows the activity extracted for a window of $\delta = 50$ ms duration. The beginning and end of this window is displayed with two white curves. The profile of this window is derived by scaling response times across trials. The degree of scaling was determined by searching (by varying θ for the scaled training window yielding maximum discrimination performance). Moving the window by varying τ enables discriminating activity for various latencies to be extracted. A representation of the topology of the extracted activity is shown to the right (dorsal view). The color code indicates (red) positive correlation of the sensor readings with the extracted activity and (blue) negative correlation. These scalp plots can be thought of as a coupling of the discriminating activity with the sensors, reflecting the proximity and orientation of the discriminating activity. The A_z value shown as a bar graph indicates the significance of the discriminating activity. The red dotted line corresponds to $p = 0.01$.

Quantifying response locking



Single-trial fit applied to simulated EEG data designed to become progressively more response locked between stimulus onset and response time. For simplicity, each trial is fit to a gaussian profile that is parameterized by its height, width, delay, and baseline offset. Stimulus onset time (black sigmoid) is fit to peak latencies (μ) to quantify degree of component response locking across trials (red sigmoid).



Neural activity becomes strongly response locked during transition from far-frontal to parietal activity. The animation shows the evolution of discriminating activity as the training window (outlined with red sigmoids) is translated (increasing τ). Note the profile of the training window is determined by finding θ that yields maximum discrimination performance, quantified as A_z . The translating black line is the projection of stimulus times onto peak latencies (μ). Bars shown on either side of the scalp plot indicate degree of response locking of the component (RL%) and discrimination performance (A_z). These bars change from red to green if the A_z is significant ($p < 0.01$).