

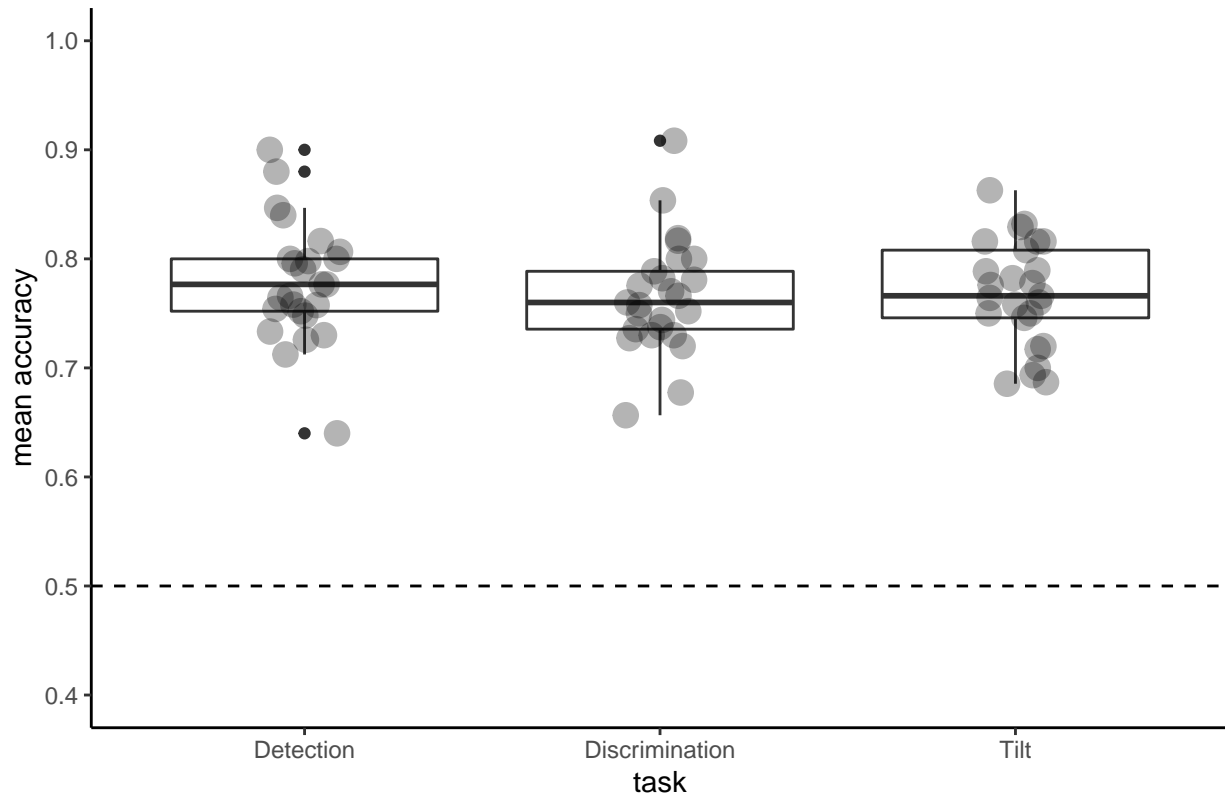
# Behavioural Analysis

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## 1. Performance across different tasks.

*Fig.1 Mean accuracy across three tasks*



### Mean performance for each task

Performance across the three tasks, detection (accuracy = 0.78,  $d' = 1.80$ ), discrimination (accuracy = 0.77,  $d' = 1.54$ ) and tilt recognition (accuracy = 0.77,  $d' = 1.96$ ) was similar. An one-way ANOVA failed to detect a significant difference between the accuracy of these three tasks ( $F = 0.47$ ,  $p = 0.63$ , ) and  $d'$  ( $F = 3.20$ ,  $p = 0.05$ ).

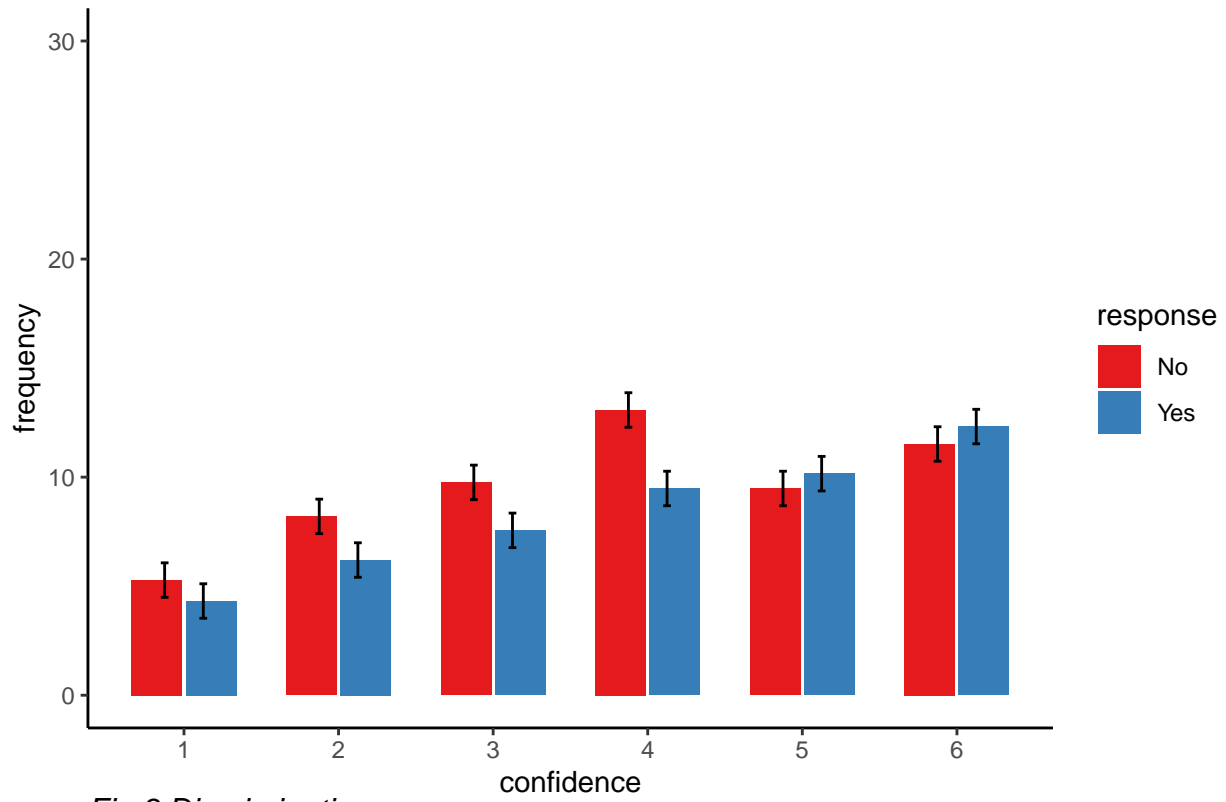
The probability of responding YES in detection was  $0.46 (\pm 0.07)$ , and was significantly different from 0.5 (ADD T TEST RESULTS). The probability of responding CLOCKWISE was  $0.51 (\pm 0.11)$  and was not significantly different from 0.5. For the tilt recognition task, the probability of responding TILTED was  $0.43 (\pm 0.07)$ .

Response time was faster for correct response (1st quartile = 866.66, median = 916.63, 3rd quartile = 951.57 milliseconds) than incorrect responses (1st quartile = 925.50, median = 1000.10, 3rd quartile = 1075.16 milliseconds). A one-way analysis of variance failed to detect a significant overall effect of responses type in

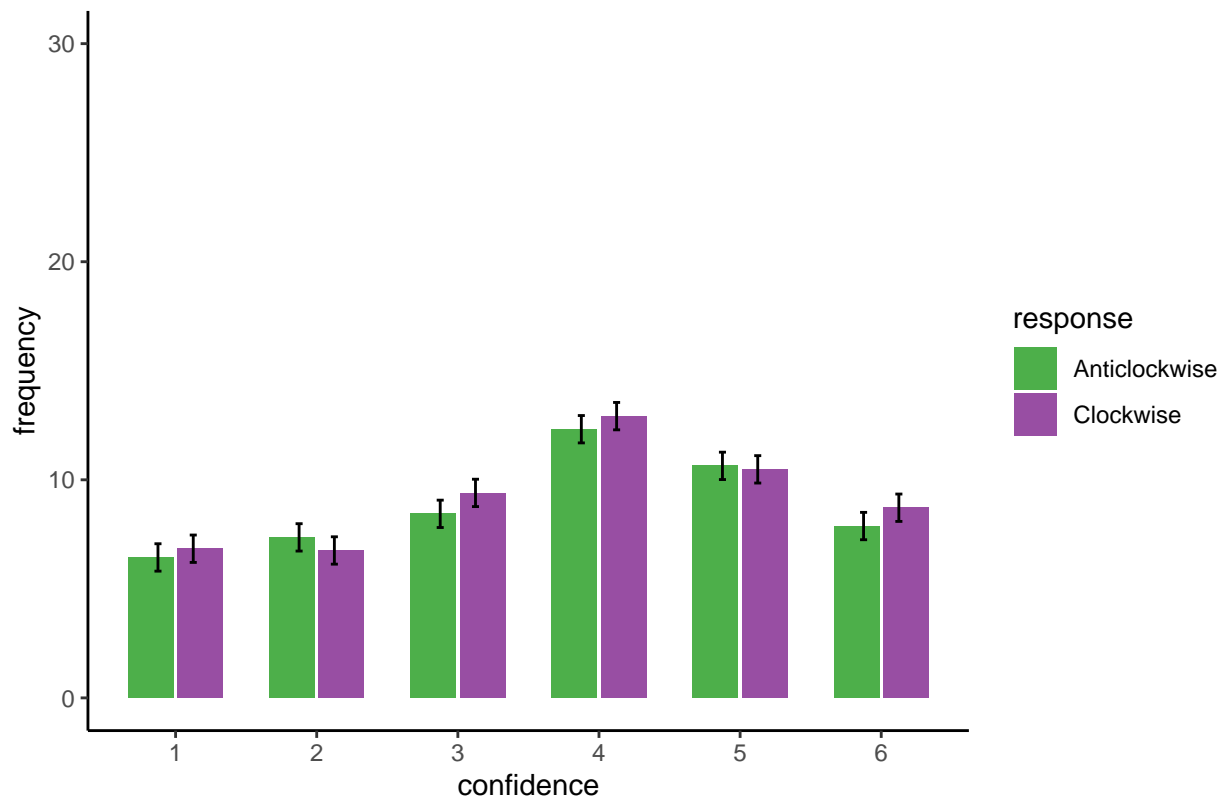
detection (YES vs. NO,  $t=0.44$   $p=0.66$  ), discrimination (CLOCKWISE vs. ANTICLOCKWISE,  $t=0.82$ ,  $p=0.41$ ) and tilt recognition (VERTICAL vs. TILTED,  $t=-1.69$ ,  $p=0.09$ ) on response time.

## 2. Confidence distributions

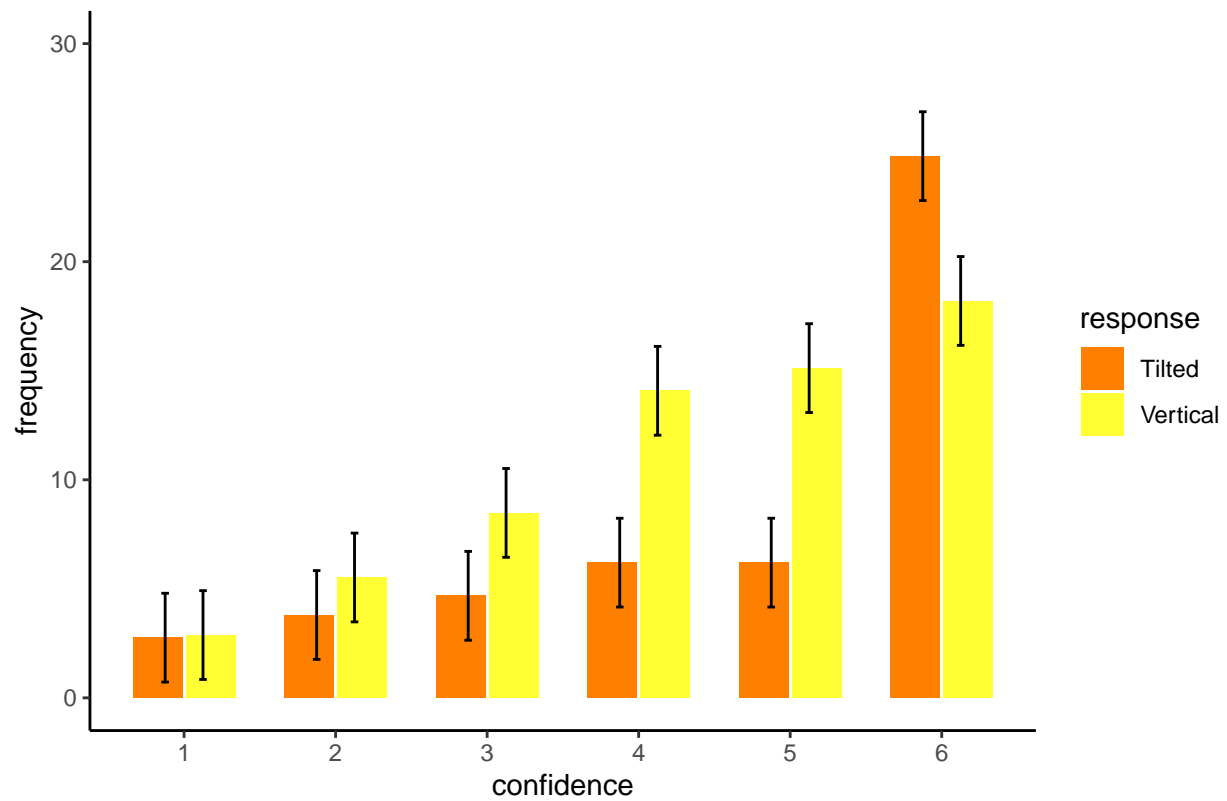
*Fig.2 Detection*



*Fig.3 Discrimination*



*Fig.4 Tilt recognition*



Within detection, a significant difference in mean confidence was observed between YES (target present) and NO (target absent) responses (see Fig.4 above), such that participants are more confident in their YES responses ( $t=-3.27$ ,  $p = 0.00$ ) and a statistical significance was also observed in the tilt recognition task between TILTED and Vertical response ( $t=-6.23$ ,  $p = 0.00$ ).

### 3.Type 1 ROC curves

Fig.5 Type 1 ROC Detection

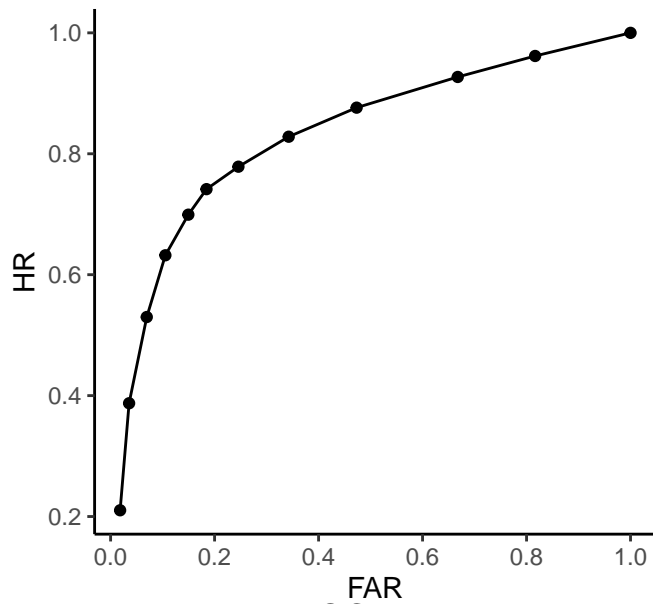


Fig.6 Type 1 ROC Discrimination

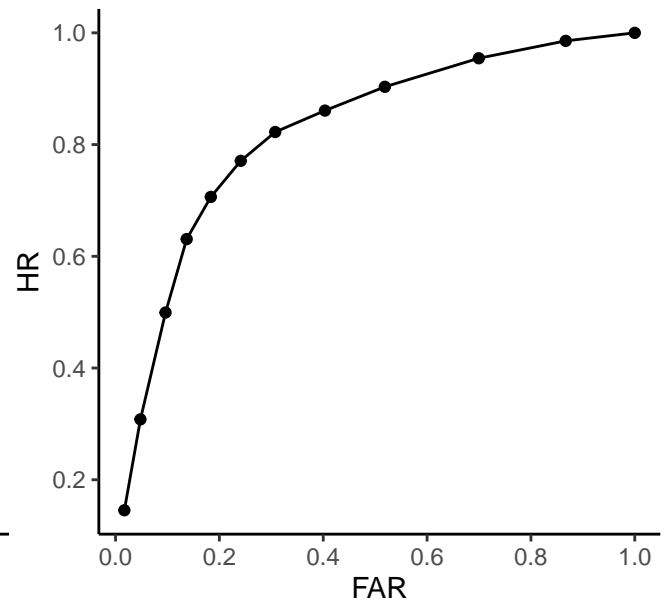
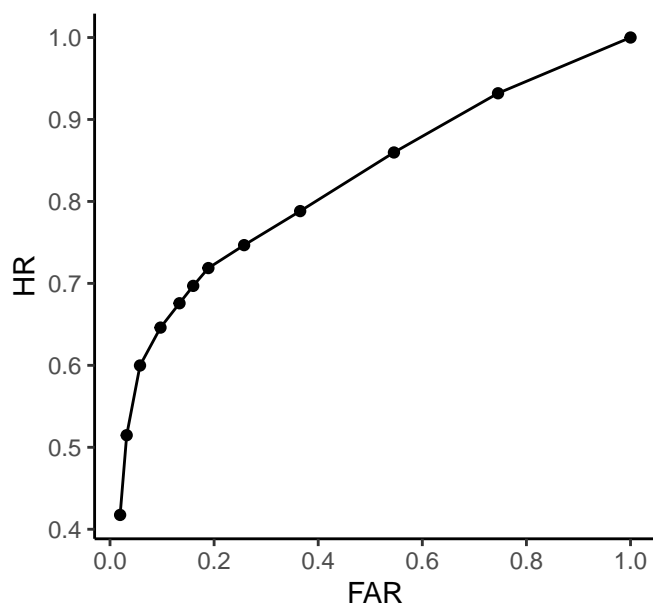
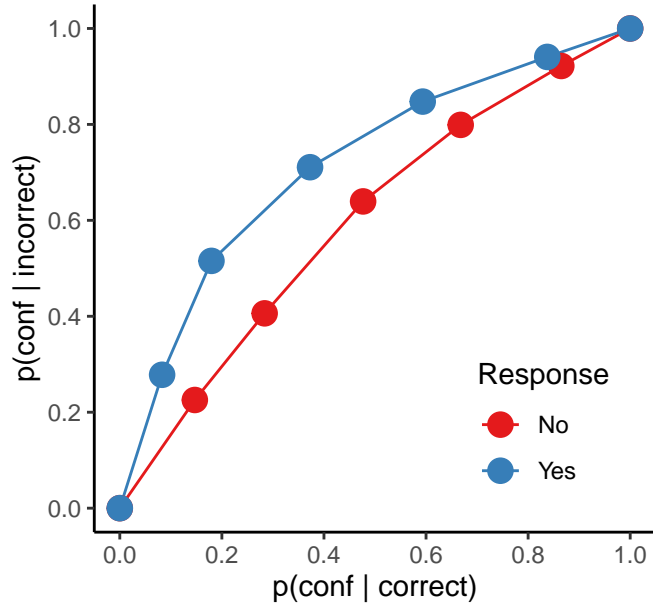


Fig.7 Type 1 ROC Tilt Recognition

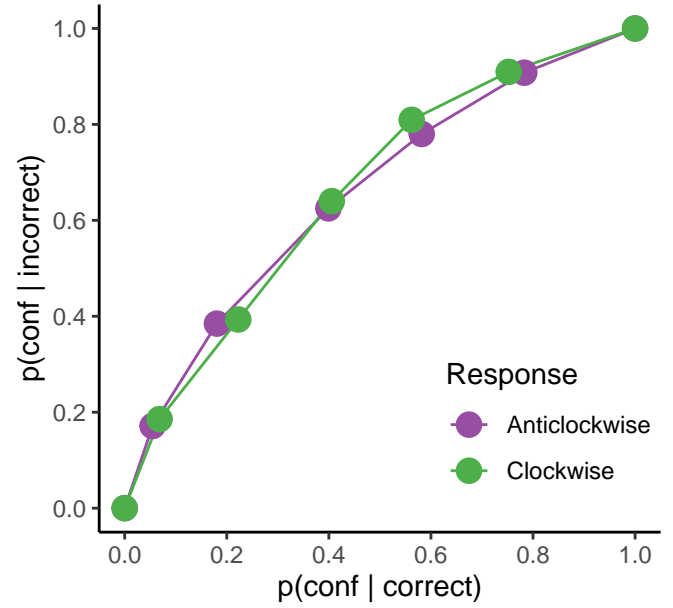


#### 4.Type 2 ROC curves

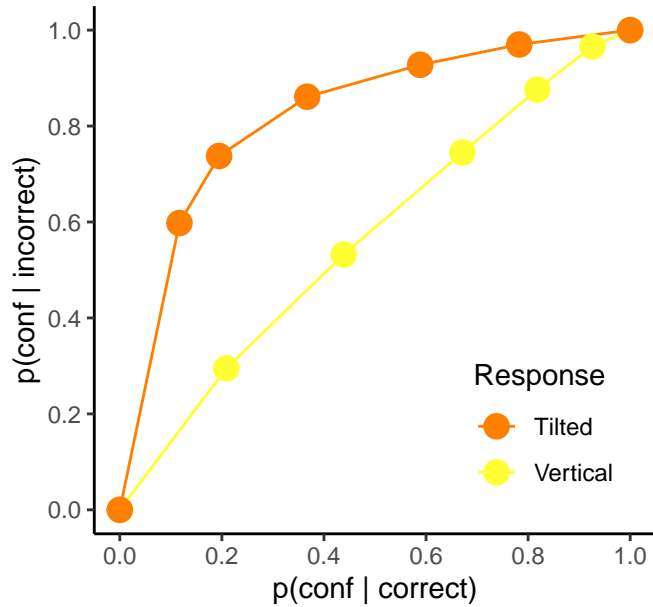
*Fig.8 Type 2 ROC Detection*



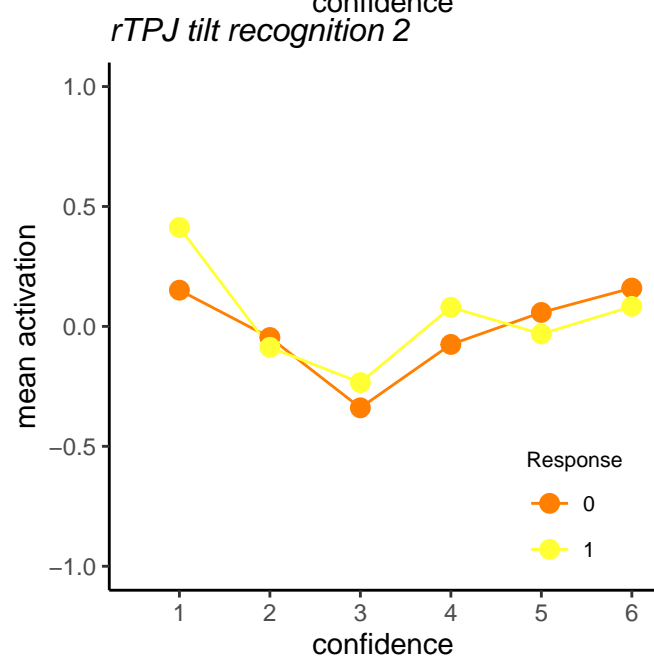
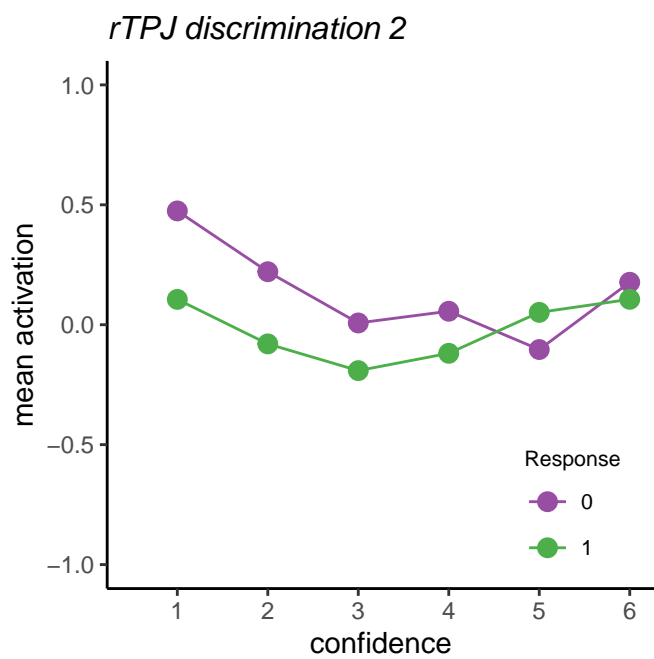
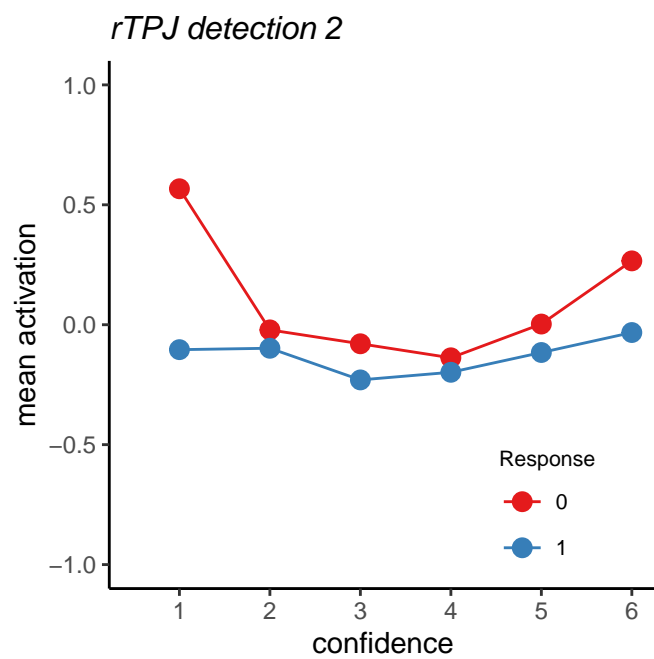
*Fig.9 Type 2 ROC Discrimination*



*Fig.10 Type 2 ROC Tilt*



Metacognitive sensitivity, which is quantified as the area under Type 2 ROC curve, is significantly higher for Yes (0.600131148953721) than No (0.722386152855667) response.



## Citation

(Denison et al. 2018)(Mazor, Friston, and Fleming 2020)

## Reference

Denison, Rachel N., William T. Adler, Marisa Carrasco, and Wei Ji Ma. 2018. “Humans Incorporate Attention-Dependent Uncertainty into Perceptual Decisions and Confidence.” *Proceedings of the National Academy of Sciences of the United States of America* 115 (43): 11090–5. <https://doi.org/10.1073/pnas.1717720115>.

Mazor, Matan, Karl J Friston, and Stephen M Fleming. 2020. “Distinct Neural Contributions to Metacognition for Detecting, but Not Discriminating Visual Stimuli.” Edited by Thorsten Kahnt, Joshua I Gold, and Michael Graziano. *eLife* 9 (April). eLife Sciences Publications, Ltd: e53900. <https://doi.org/10.7554/eLife.53900>.