# Supplementary File 1a: Corresponding Null-Hypothesis Testing Results

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| Result (Figure) | Null-Hypothesis Test | P-Value (Both monkeys) | P-Value (Monkey A) | P-Value (Monkey C) |
|  | | | | |
| Pupil diameter (2B) | *t-*test (unpaired) |  |  |  |
|  | | | | |
| Microsaccades (2D) | *X2-*test |  |  |  |
|  | | | | |
| Decoding performance [narrow-spiking] (3A) | *t-*test (unpaired)  Bonferoni Corrected for 3 comparisons, | Superficial: | Superficial: | Superficial: |
| Input: | Input: | Input: |
| Deep: | Deep: | Deep: |
| Decoding performance [broad-spiking] (3B) | *t-*test (unpaired)  Bonferoni Corrected for 3 comparisons, | Superficial: | Superficial: | Superficial: |
| Input: | Input: | Input: |
| Deep: 2.755037e-35 | Deep: | Deep: |
|  | | | | |
| Target-evoked firing rate [single and multi-units] (3E) | *t-*test (paired)  Bonferoni Corrected for 3 comparisons, | Superficial: | Superficial: | Superficial: |
| Input: | Input: | Input: |
| Deep: | Deep: | Deep: |
| Target-evoked firing rate [broad-spiking] (3F) | *t-*test (paired)  Bonferoni Corrected for 3 comparisons, | Superficial: | Superficial: | Superficial: |
| Input: | Input: | Input: |
| Deep: | Deep: | Deep: |
| Target-evoked firing rate [narrow-spiking] (3F) | *t-*test (paired)  Bonferoni Corrected for 3 comparisons, | Superficial: | Superficial: | Superficial: |
| Input: | Input: | Input: |
| Deep: | Deep: | Deep: |
|  | | | | |
| Fano Factor modulation index [broad] (4B) | *t-*test (unpaired)  Bonferoni Corrected for 3 comparisons, | Superficial: | Superficial: | Superficial: |
| Input: | Input: | Input: |
| Deep: | Deep: | Deep: |
| Fano factor modulation index [narrow] (S4) | *t-*test (unpaired)  Bonferoni Corrected for 3 comparisons, | Superficial: | Superficial: | Superficial: |
| Input: | Input: | Input: |
| Deep: | Deep: | Deep: |
|  | | | | |
| Deep layer PPC (5B) | *t-*test (paired)  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: | 30-80 Hz: | 30-80 Hz: |
| CCA [pre-stimulus, S = superficial, I = input, D = deep] (6C, left) | *t-test (paired)*  Bonferoni Corrected for 3 comparisons, | I to S: | I to S: | I to S: |
| I to D: | I to D: | I to D: |
| S to D: | S to D: | S to D: |
| CCA [stimulus, S = superficial, I = input, D = deep] (6C, right) | *t-test (paired)*  Bonferoni Corrected for 3 comparisons, | I to S: | I to S: | I to S: |
| I to D: | I to D: | I to D: |
| S to D: | S to D: | S to D: |
|  | | | | |
| SSC modulation index [superficial-input] (7B, top) | *t-*test  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: | 30-80 Hz: | 30-80 Hz: |
| SSC modulation index [superficial-deep] (7B, middle) | *t-*test  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: | 30-80 Hz: | 30-80 Hz: |
| SSC modulation index [input-deep] (7B, bottom) | *t-*test  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: | 30-80 Hz: | 30-80 Hz: |
| SSC modulation index [superficial-input] (7D, top) | *t-*test  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: | 30-80 Hz: | 30-80 Hz: |
| SSC modulation index [superficial-deep] (7D, middle) | *t-*test  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: | 30-80 Hz: | 30-80 Hz: |
| SSC modulation index [input-deep] (7D, bottom) | *t-*test  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: | 30-80 Hz: | 30-80 Hz: |
|  | | | | |
| Superficial layer PPC (5-supplement 1B) | *t-*test (paired)  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: \* | 30-80 Hz: | 30-80 Hz: |
|  | | | | |
| Input layer PPC (5-supplement 1C) | *t-*test (paired)  Bonferoni Corrected for 3 comparisons, | 3-12 Hz: | 3-12 Hz: | 3-12 Hz: |
| 15-25 Hz: | 15-25 Hz: | 15-25 Hz: |
| 30-80 Hz: | 30-80 Hz: | 30-80 Hz: |

\* Although this p-value is significant, the PPC in both conditions is below 0, indicating there is no phase-locking in either condition (Vinck et al., 2010).

# Supplementary File 1b: GLM Coefficient Values

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| Variable (Z-Scored) | Estimated Coefficient | P-Value |
| Pupil Diameter | 0.11754 |  |
| Pretarget Microsaccades | -1.3116 |  |
| Target Superficial FR | 0.22414 |  |
| Target Input FR | 0.3276 |  |
| Target Deep FR | 0.11399 |  |

# Supplementary File 1c: GLM Summary

|  |  |
| --- | --- |
|  | Value |
| Degrees of Freedom | 303 |
| Deviance (Full model) | 362.8493 |
| Deviance (Excluding microsaccades) | 426.5172 |
| Chi2-statistic (Full model) vs. constant model | 65.5 |
| Chi2-statistic (Full model) vs. constant model p-value |  |