Supplemental Information

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Supplemental Figures

Figure S1: Individual exemplar stimuli and physiological responses

(A) Twenty-five exemplars belonging to five categories used in this study.

(B) Average IFP responses to each of the exemplar objects (dark lines = Whole, light lines = Partial) for the electrode in **Figure 2**. The responses correspond to the objects shown in (A). The vertical bar shows the scale in microvolts; the horizontal bar shows the temporal scale and stimulus presentation time.

(C) IFP responses for exemplar objects for the electrode in **Figure 3**. The responses correspond to the color matched objects from (A).

Figure S2: Example physiological responses in the Gamma band

Responses in the 70-100 Hz (Gamma band) for an example electrode in the left Fusiform Gyrus (Main experiment). The amplitude is measured as power in the Gamma band normalized against the pre-stimulus baseline.

(A) Average response to Whole (left) and Partial (right) objects belonging to five different categories (animals, chairs, human faces, fruits, and vehicles, see color map on top). Shaded areas around each line indicate s.e.m. The gray rectangle denotes the image presentation time (150 ms). The total number of trials is indicated on the bottom right of each subplot.

(B) Average responses to each of the exemplar objects (dark lines = Whole, light lines = Partial).

(C) Raster of the neural responses for Whole (left) and Partial (right) objects for the category that elicited the strongest responses (human faces). Rows represent individual trials. Dashed lines separate responses to the 5 face exemplars. The color indicates the normalized power at each time point (bin size = 2 ms, see scale on top).

(D)-(F) Same as in **Figure 2D-F**.

Figure S3: Example physiological responses

Example responses from an electrode in the left Inferior Temporal Gyrus (Main experiment). The format and conventions are as in **Figure S2**, except the units reflect the

broadband field potential (μV) Note that the responses during the Partial condition in this example are consistent from trial to trial and still show a delay with respect to the Whole condition.

Figure S4: d' metric, matched amplitude, and matched decoding comparisons

(A) Comparison of d' for Partial versus Whole conditions for the n=30 electrodes described in the text. d' was computed for each electrode by comparing the best versus the worst category.

(B) Comparison of selectivity latency for Partial versus Whole conditions based on the d' metric. The latency for the d' metric was defined as the time when d' crossed a significance threshold. The threshold was set non-parametrically in the same manner as for the ANOVA and Decoding measures (Experimental Procedures). Shown here are the n=37 electrodes that were selective in both Whole and Partial trials, as measured with d'.

(C-D) Matched Amplitude Decoding**.** We compared the decoding performance and selectivity latency in the Whole and Partial conditions after matching the distribution of response amplitudes. For each electrode and category, the distribution of IFP amplitudes of partial object trials was matched to that of the whole object trials. Of the n=30 electrodes selective in both conditions, we matched the mean and standard deviation for each category to within 5% tolerance in n=29 electrodes. One electrode from the variant experiment did not have enough trials to perform this procedure. Even after matching the distribution of the IFP amplitudes between Whole and Partial conditions, the differences in decoding performance (C) and latencies (D) were preserved.

(E-G) Matched Decoding Performance. We compared the selectivity latency while controlling for decoding performance at 500ms. For each electrode and condition, we used only those trials that the decoder correctly classified at 500 ms to compute the decoding performance curve over time. This matches decoding performance at 100% in both conditions. (E-F) For the example electrodes in Figures 2 and 3. even after matching decoding performance at 500 ms, latencies were delayed in the Partial condition. The latency was defined as the point where 60% (E) and 67% (F) of those trials were correctly decoded (black dashed lines). The thresholds are different because the Main and Variant experiment have different chance levels (blue dashed lines). (G) Even after

matching the decoding performance at 500ms, the latency difference between Whole and Partial conditions was statistically significant (rank-sum test, $p < 10^{-7}$).

Figure S5: Eye-tracking data and analyses

(A) Data for one of the two subjects where we recorded eye movements simultaneously with the physiological data. Eye position for individual trials (black circles) in either the Whole (left) or Partial (right) condition, at t = 0 ms, t = 100 ms, and t = 200 ms from stimulus onset. The stimulus lasted 150 ms, and was approximately 5 degrees in size (gray box). The yellow circle represents 95% confidence across trials for the eye position. The radius of the confidence intervals was similar between Whole and Partial conditions. (B-D) We also conducted a separate psychophysics experiment on 20 healthy volunteers (8 male, 15 right-handed). These subjects completed the same two experiments (10 subjects, Main Experiment, 10 subjects, Variant experiment). Eye location was recorded using an infrared camera eye tracker (EyeLink, SR Research, Mississauga, Canada). The experiment consisted of 1,200 trials, and lasted approximately one hour. We did not record physiological data from these additional subjects. (B) Distribution of the time to first saccade, averaged over 22 subjects (2 subjects with concomitant physiology recordings, 20 psychophysics subjects) for the Whole (black) and Partial (gray) conditions. There was no significant difference between the distributions for the Whole and Partial conditions. Error bars denote s.e.m. (C) Average time to first saccade for each of the 12 subjects in the Main experiment (2 physiology subjects, 10 psychophysics subjects), as well as the group average (marked as *). Error bars denote s.e.m. (D) Average time to first saccade for each of the 10 psychophysics subjects in the Variant experiment, as well as the group average (marked as *). Error bars denote s.e.m.

Figure S6: Detailed summary of latency measurements

Summary of latency difference between Partial and Whole conditions for multiple combinations of experiments, frequency bands, and analyses methods (the relevant figure is indicated in parenthesis). Positive values mean increased latency in the Partial condition. Box plots represent the median and quartile across the selective electrodes.

The *n* indicates the number of electrodes, except for the Population Decoding, where the *n*=100 refers to the number of repetitions.

Supplementary Tables

Table S1. List of subjects

Description of the 18 subjects that participated in the neurophysiological recordings, number of electrodes, total number of trials, average percentage of object shown, performance (% correct) for Whole and Partial conditions**.**

Table S2. List of electrodes selective during both Whole and Partial conditions

Description of electrodes selective in both Whole and Partial conditions, including Talairach Coordinates. The latency value reported here is based on ANOVA (**Experimental Procedures**).

Figure S1

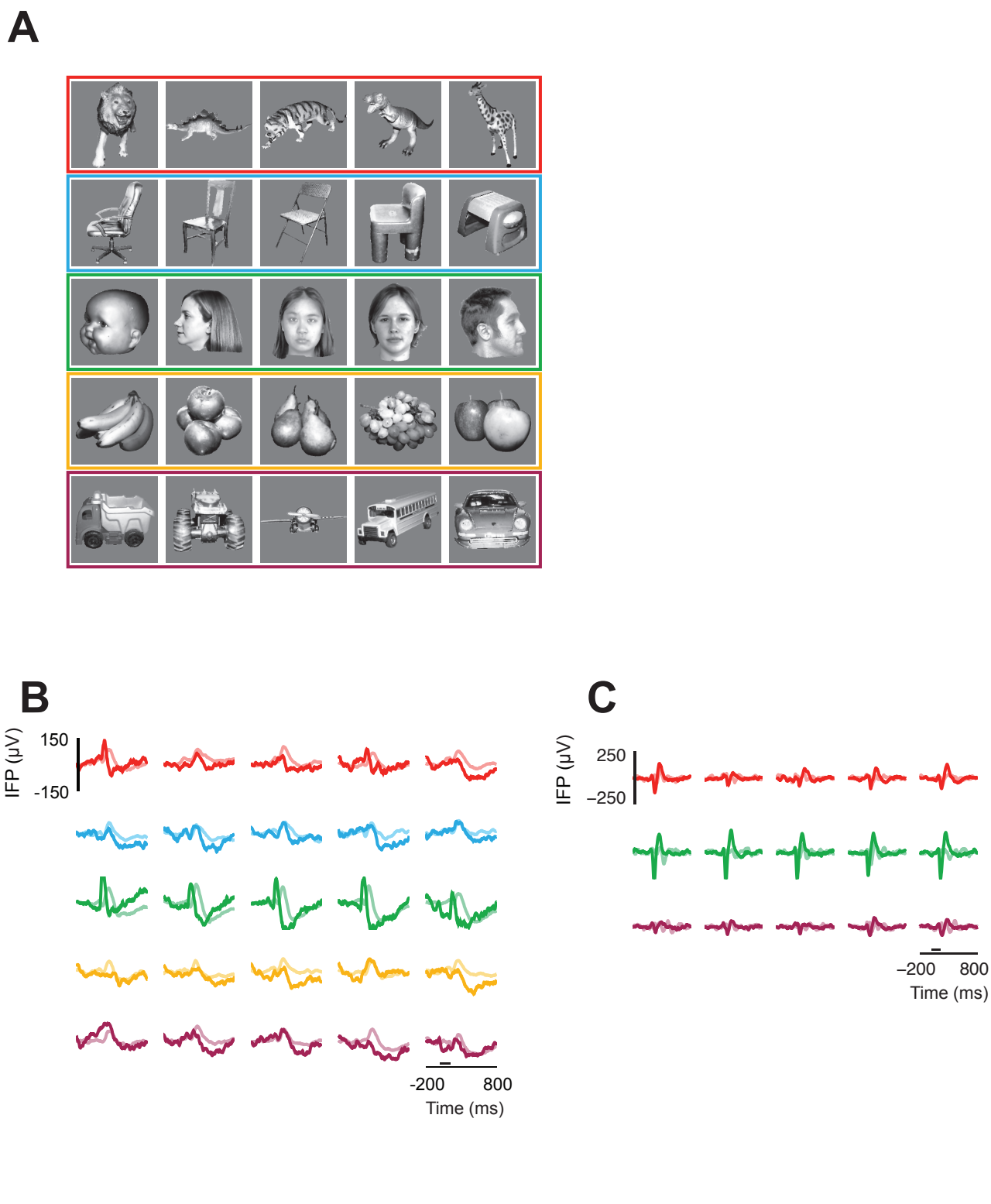


Figure S2

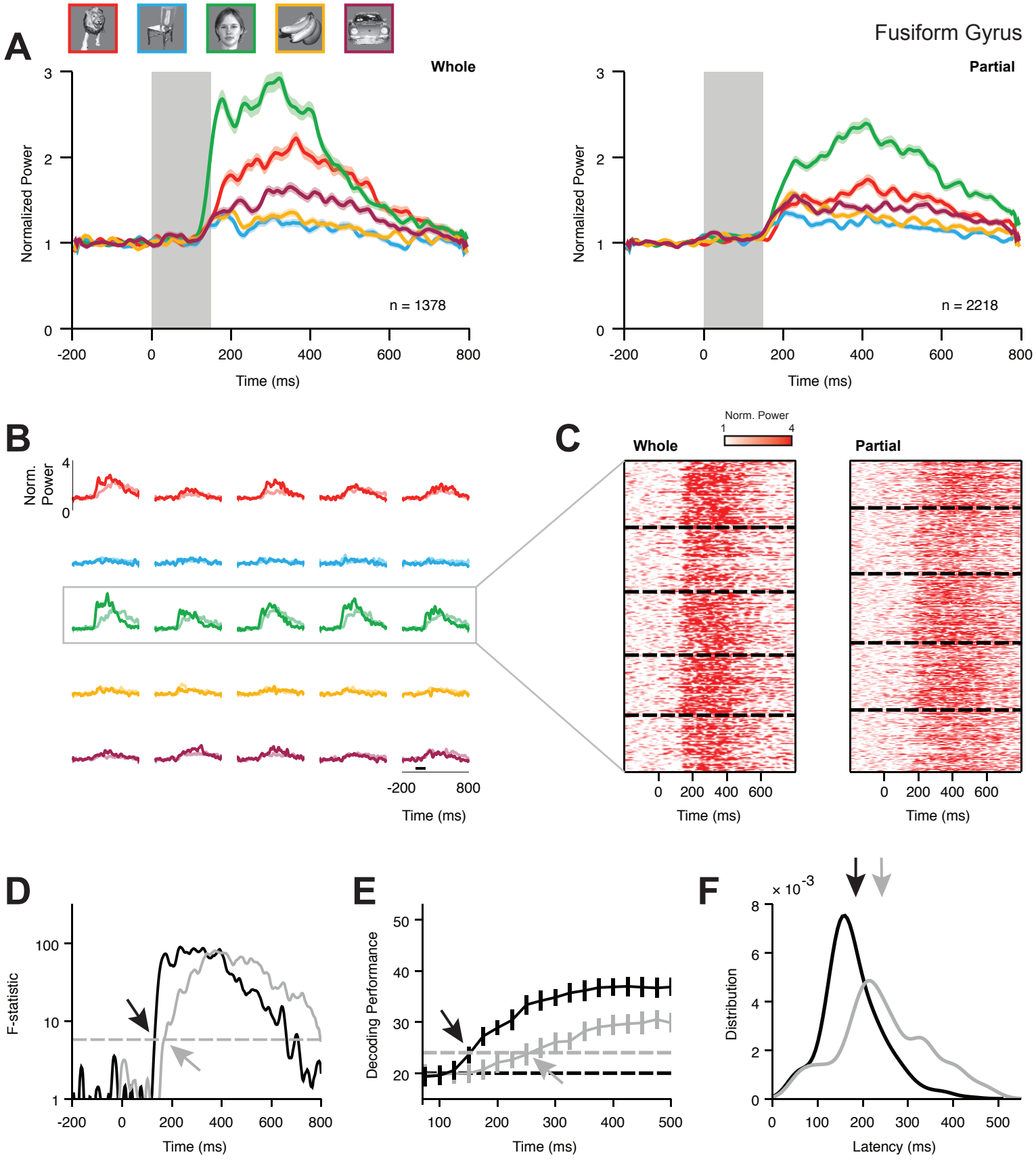

A
Fusiform Gyrus
Whole
Partial
Normalized Power
n = 1378
n = 2218
Time (ms)
B
Norm. Power
C
Norm. Power
Whole
Partial
Time (ms)
D
F-statistic
Time (ms)
E
Decoding Performance
Time (ms)
F
× 10-3
Distribution
Latency (ms)

Figure S3

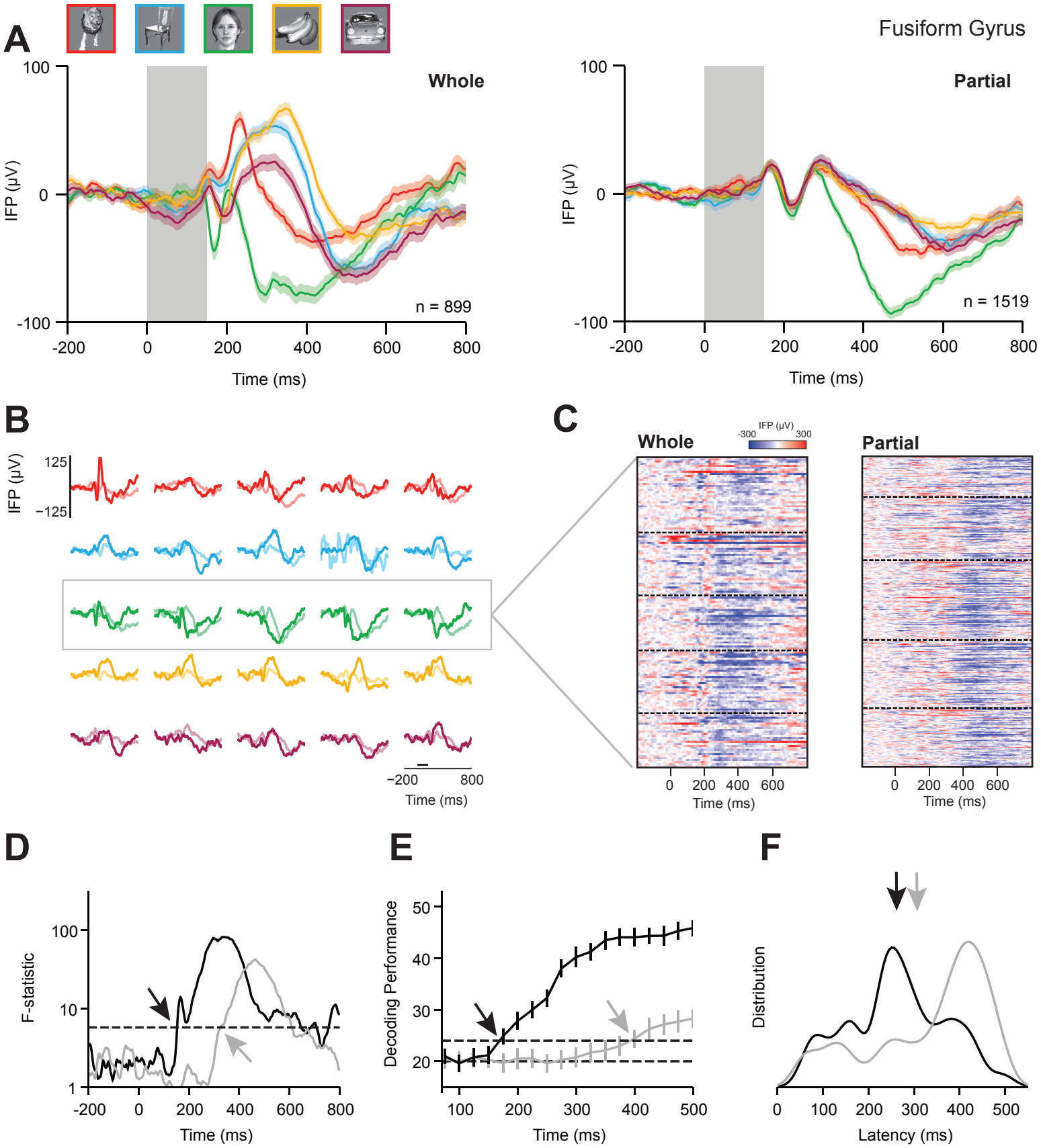

A
Fusiform Gyrus
Whole
Partial
IFP (μV)
100
0
-100
n = 899
n = 1519
-200
0
200
400
600
800
Time (ms)
B
IFP (μV)
125
−125
−200
800
Time (ms)
C
Whole
Partial
IFP (μV)
-300
300
0
200
400
600
Time (ms)
D
F-statistic
100
10
1
Time (ms)
E
Decoding Performance
50
40
30
20
100
200
300
400
500
Time (ms)
F
Distribution
0
100
200
300
400
500
Latency (ms)

Figure S4

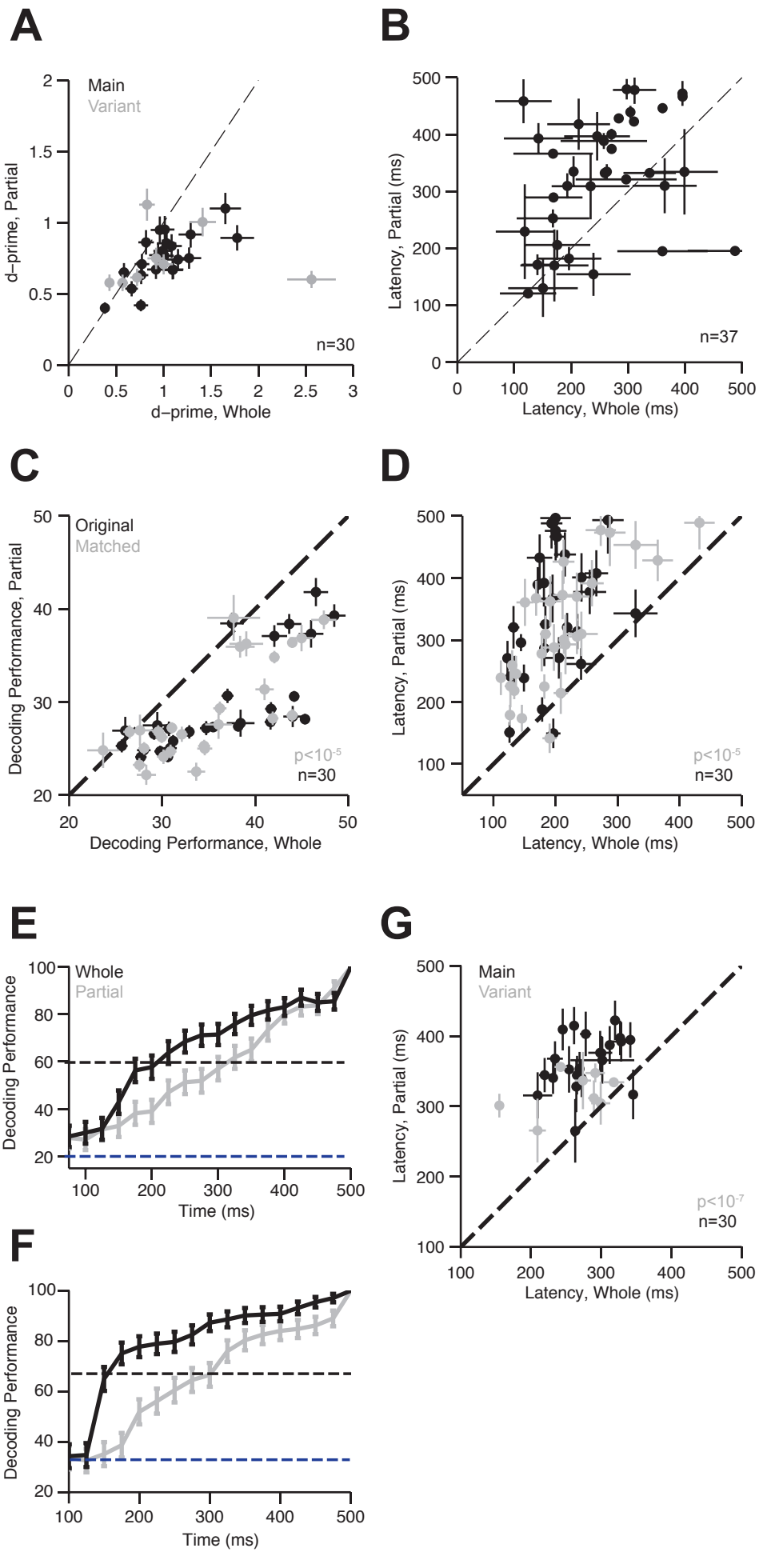

A
Main
Variant
d−prime, Partial
d−prime, Whole
n=30
B
Latency, Partial (ms)
Latency, Whole (ms)
n=37
C
Original
Matched
Decoding Performance, Partial
Decoding Performance, Whole
p<10-5
n=30
D
Latency, Partial (ms)
Latency, Whole (ms)
p<10-5
n=30
E
Whole
Partial
Decoding Performance
Time (ms)
F
Decoding Performance
Time (ms)
G
Main
Variant
Latency, Partial (ms)
Latency, Whole (ms)
p<10-7
n=30

Figure S5

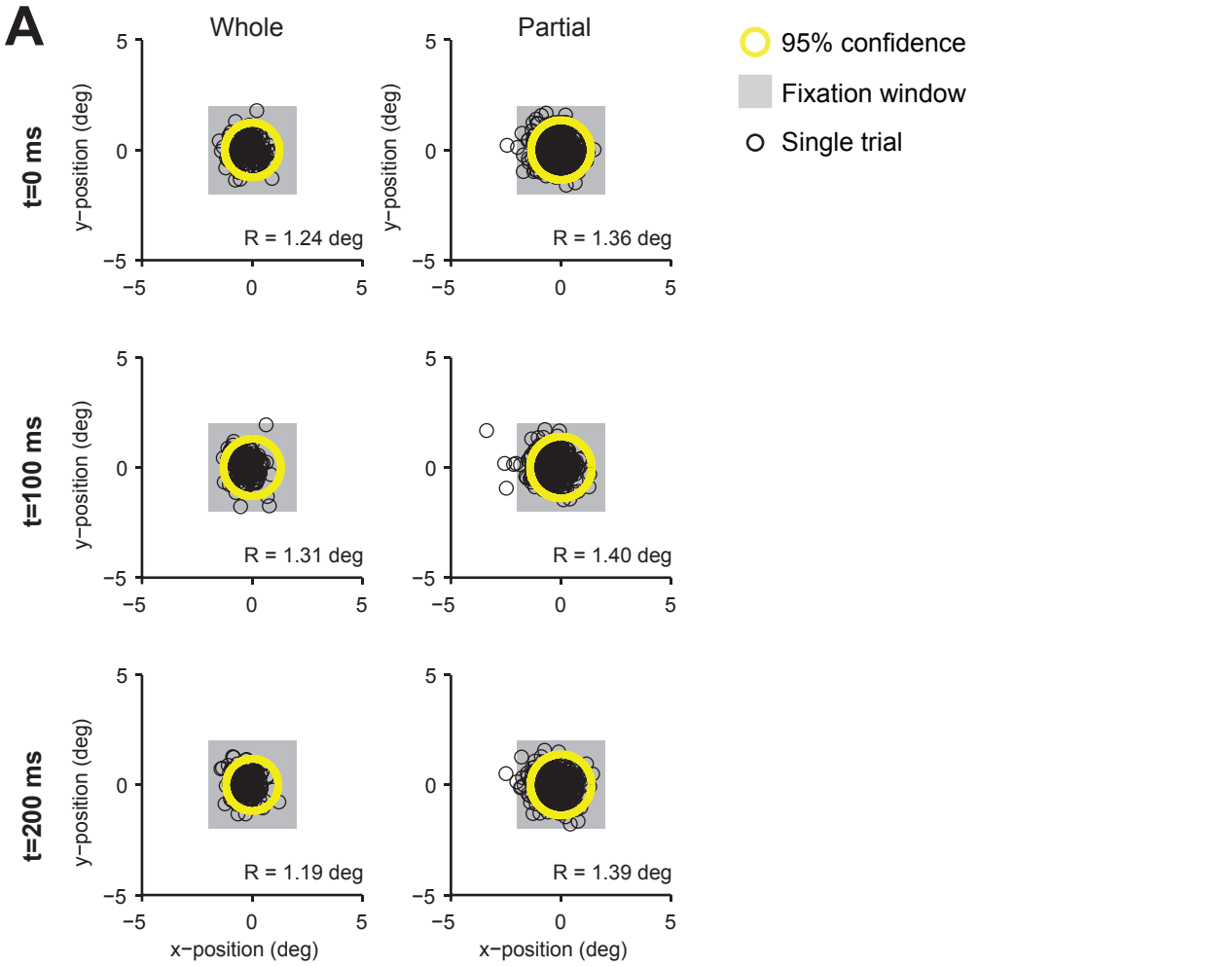
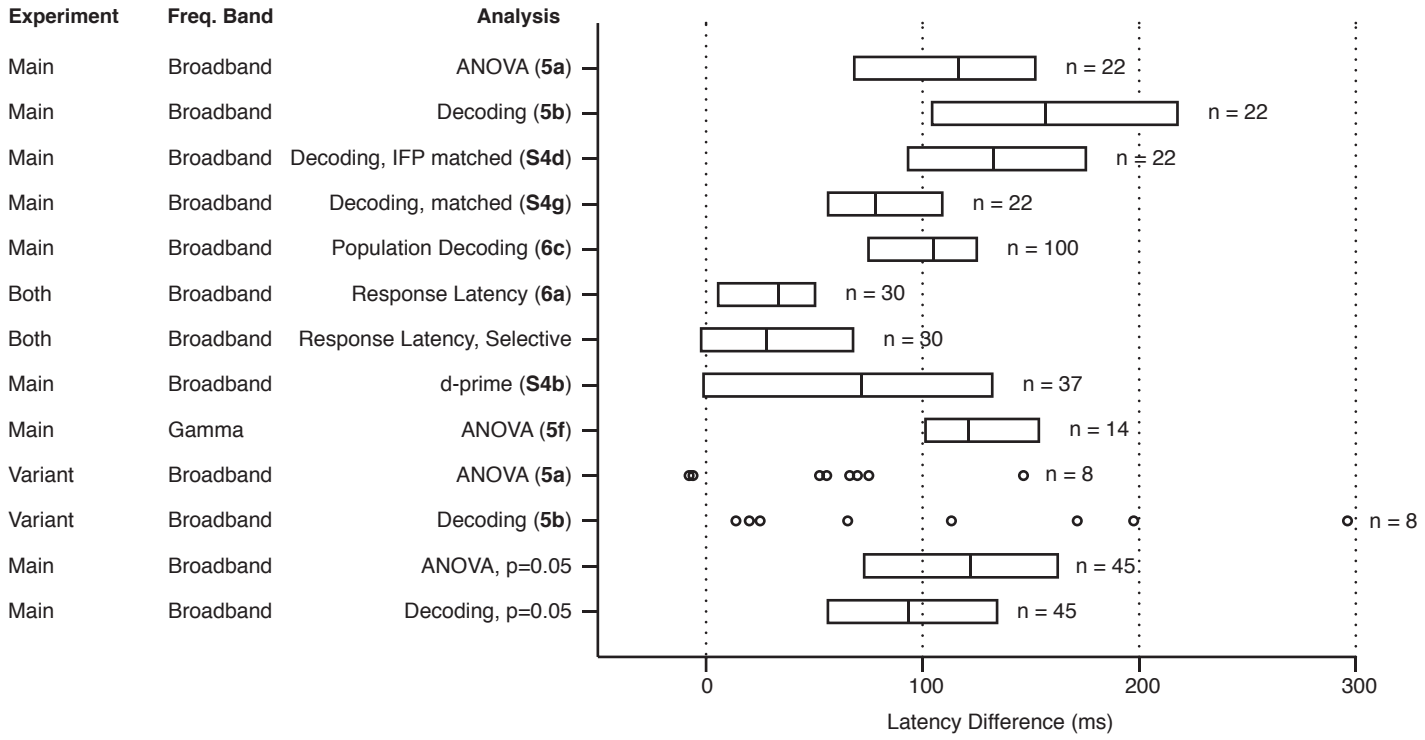

A
Whole
Partial
95% confidence
Fixation window
Single trial
t=0 ms
t=100 ms
t=200 ms
y−position (deg)
x−position (deg)
R = 1.24 deg
R = 1.36 deg
R = 1.31 deg
R = 1.40 deg
R = 1.19 deg
R = 1.39 deg
B
Whole
Partial
CDF
Time to first saccade (ms)
C
Main Experiment
Time to first saccade (ms)
Subject
7 12 A B C D E F G H I J *
D
Variant Experiment
Time to first saccade (ms)
Subject
K L M N O P Q R S T *

Figure S6


Experiment
Freq. Band
Analysis
Main Broadband ANOVA (5a)
Main Broadband Decoding (5b)
Main Broadband Decoding, IFP matched (S4d)
Main Broadband Decoding, matched (S4g)
Main Broadband Population Decoding (6c)
Both Broadband Response Latency (6a)
Both Broadband Response Latency, Selective
Main Broadband d-prime (S4b)
Main Gamma ANOVA (5f)
Variant Broadband ANOVA (5a)
Variant Broadband Decoding (5b)
Main Broadband ANOVA, p=0.05
Main Broadband Decoding, p=0.05
n = 22
n = 22
n = 22
n = 22
n = 100
n = 30
n = 30
n = 37
n = 14
n = 8
n = 8
n = 45
n = 45
0
100
200
300
Latency Difference (ms)