Supplemental Information: Knowing When Not to Swing: EEG Evidence that Embodied Cognitive Processes Underlie Baseball Batter Expertise

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	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9
Correct Go	239	200	243	191	200	209	214	223	233
Correct NoGo	77	83	106	73	70	74	101	104	114
Incorrect NoGo	75	60	63	55	83	84	53	59	49
Incorrect Go	15	13	14	8	30	17	26	20	21
Total	406	356	426	327	383	384	394	406	417

SI Table 1. Each expert subject's experimental condition trial count and their sum after trial rejection.

	Novice 1	Novice 2	Novice 3	Novice 4	Novice 5	Novice 6	Novice 7	Novice 8	Novice 9	Novice 10
Correct Go	229	187	206	183	211	206	163	165	216	185
Correct NoGo	64	84	106	114	119	91	71	87	76	82
Incorrect NoGo	100	71	50	36	57	84	85	78	90	82
Incorrect Go	31	41	44	54	47	59	75	77	39	72
Total	424	383	406	387	434	440	394	407	421	421

SI Table 2. Each novice subject's experimental condition trial count and their sum after trial rejection.

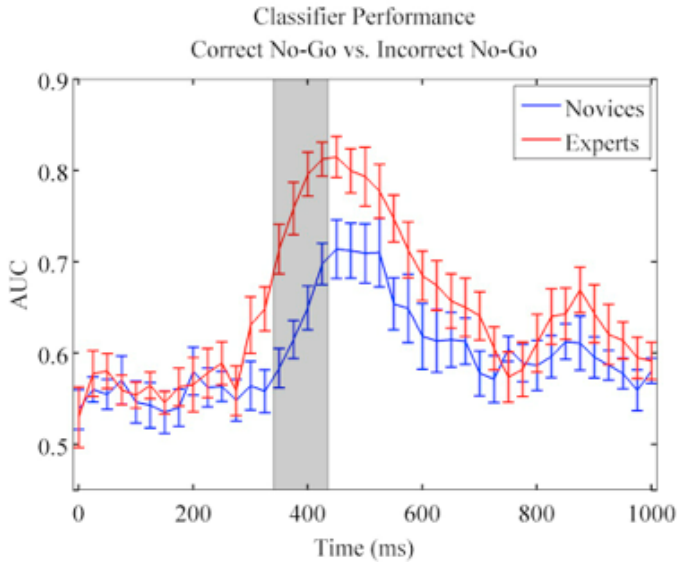
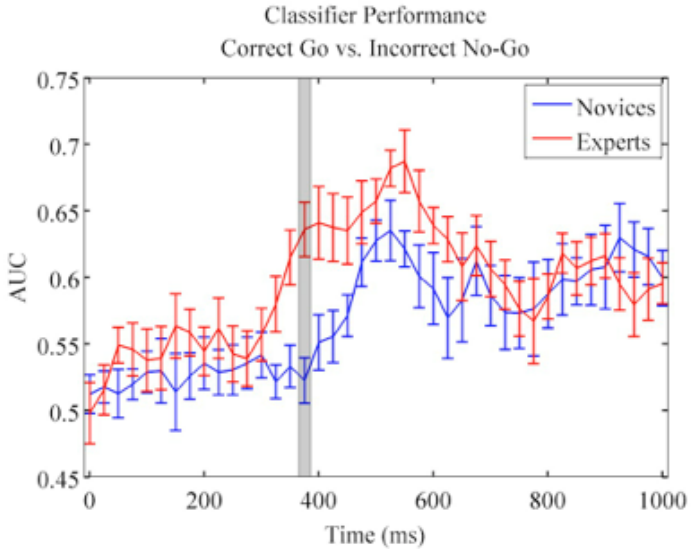


Figure S 1. Expert (red) and Novice (blue) mean classifier performance for discriminating Correct No-Go trials versus Incorrect No-Go trials. Shaded region indicates significant (P<0.05 FDR Corrected) windows of performance difference between experts and novices.



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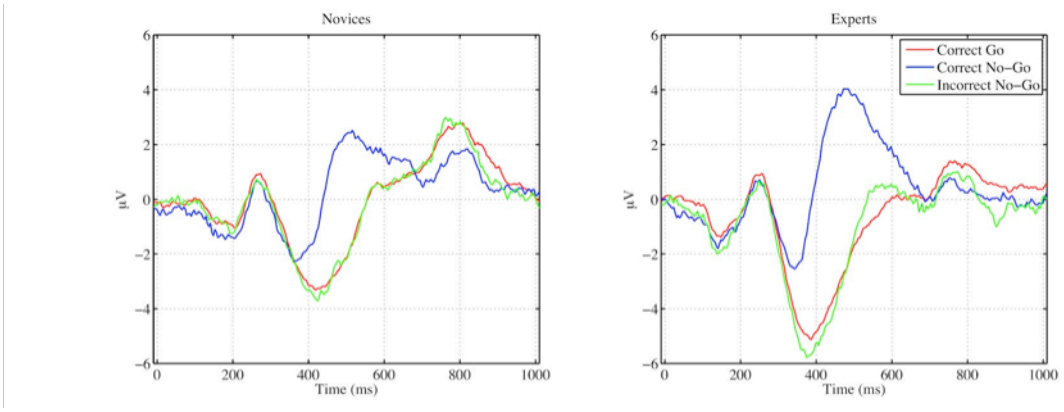

Figure S 3. Novice and Expert event related potentials (ERPs) at electrode Fz. Correct Go (red), Correct No-Go (blue) and Incorrect No-Go (green) trials are all plotted for both novices (left) and experts (right).

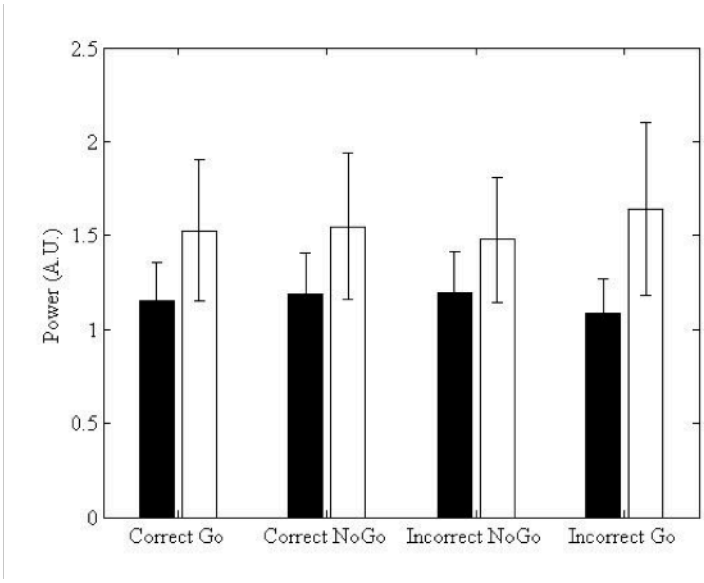

Figure S 4. Pre-Stimulus Alpha power results for both experts (black bars) and novices (white bars) show no significant differences across groups or trial types. Standard errors are computed across subjects.

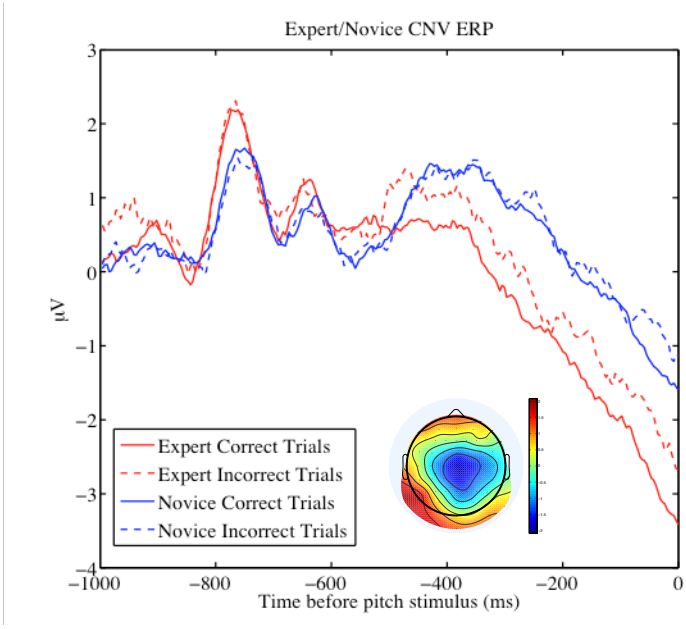

Figure S 5. Contingent Negative Variation (CNV) event related potential for experts and novices broken down by correct and incorrect trial types. A clear negative deflection is seen starting from -400ms from pitch onset. A clear CNV scalp topology (0ms) is also plotted.

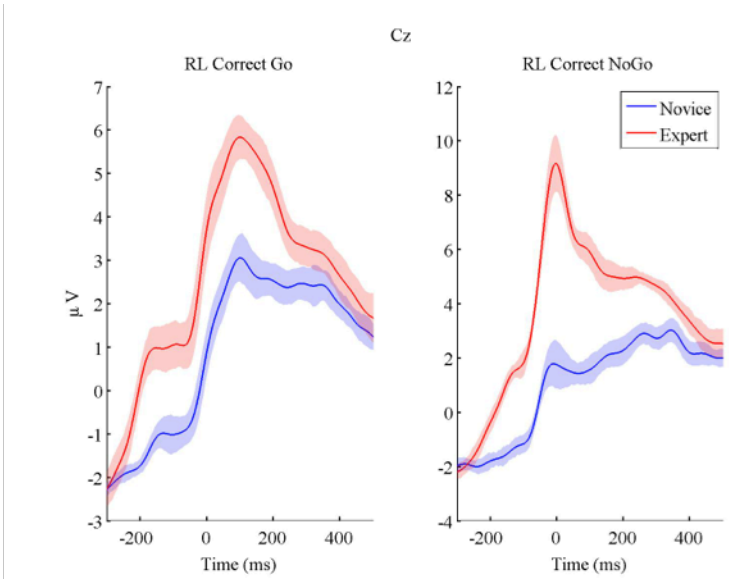

Figure S 6. Response-Locked event related potential for Correct Go and Correct NoGo trials at Cz electrode. Correct NoGo 'response times' were calculated by finding the maximum y-value for each Correct NoGo trial from the Correct Go versus Correct NoGo sliding window analysis.

To check how response times affected the discrimination curves, we ran several additional analyses. First, we correlated trial-to-trial response times with the trial-to-trial EEG discriminatory y-values for Correct Go trials (see Figure S7 below). We see that both experts and controls show a correlation with RT during the 300-425ms window. However, there is no difference in these correlations between the groups. If the RT variability was a main driver in the discrimination differences, then removing RT (regressing out) should dramatically affect the discrimination curves between experts and controls and we should see little difference between the two groups. Figure S8 shows the sliding window AUC results after regressing out the RT variability from each windows y-values and re-computing the AUC. The differences between the experts' and controls' discrimination curves remain even after removing variability related to RT. We also plotted peak AUC window time with RT (Figure S9). We found there to be an insignificant correlation (p=0.24). We also plotted peak AUC value versus RT (Figure S10). Finally, response-locked analyses show large differences between expert and novice before and after the response time (Figure S6). Response-locked analyses show that expert/novice discrimination can mostly be attributed to amplitude differences instead of timing differences. These analyses show evidence that the differences in discrimination height and timing is not specifically driven by response times.

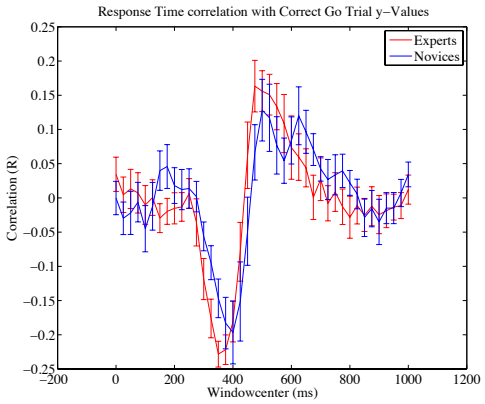

Figure S7. Response time correlations with Go trial y-Values across subjects and groups.

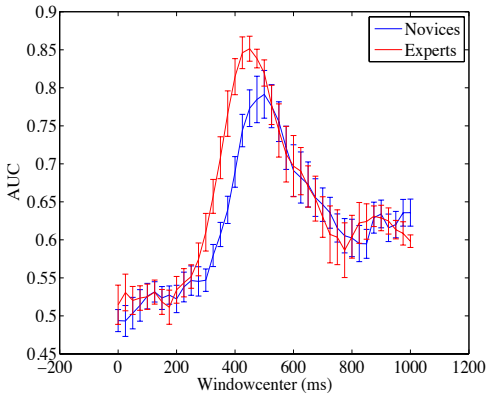

Figure S8. Expert and Novice Correct Go versus Correct NoGo sliding window logistic regression results after regressing out response times from Go trial y-values

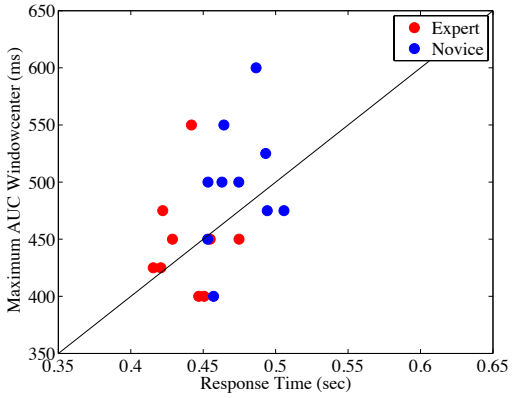

Figure S9. Scatter plot of mean correct response times and window center at maximum AUC for each subject. Values have a correlation, r, equal to ~.4 with a p-value>0.05. However, the partial correlation of RT and max AUC window, controlling for group, is r=0.23.

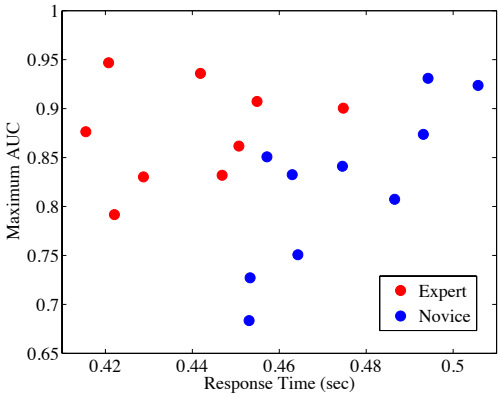

Figure S10. Scatter plot of mean correct response times and maximum AUC value for each subject.