Supplemental Material

Flanker

Task. The arrowhead version of the Flanker Task (Eriksen & Eriksen, 1974) used in this study consisted of five blocks of 30 trials, for a total of 150 trials. Half of the trials consisted of compatible stimuli (“< < < < <” or “> > > > >”) and half of the trails consisted of incompatible stimuli (“< < > < <” or “> > < > >”) presented for 200 ms with an inter-trial interval that varied randomly between 2300 ms to 2800 ms; compatible and incompatible trials were presented in random order. Participants were instructed to identify the direction of the center arrow using the left or right mouse button and to ensure they understood the instructions participants completed a practice block of four trials during which they had to achieve at least 75% accuracy. Both speed and accuracy were emphasized while instructions were given and throughout the task. If participants’ accuracy was 75% or less in a block, the message “Please try to be more accurate” was presented; if accuracy was between 75% to 90%, the message “You’re doing a great job” was presented; and if accuracy was greater than 90%, the message “Please try to respond faster” was presented. In addition to the exclusions noted in the main body of the manuscript, participants were excluded if they did not commit at least six errors each time they completed the task (n_{stress} = 5, $n_{control}$ = 5; Olvet & Hajcak, 2009), if they did not adequately perform the task (i.e., committed ≥ ~50% errors; $n_{control}$ = 3), if they had bad EEG data (i.e., no usable trials; n_{stress} = 1), or if they did not complete both Flanker 1 and Flanker 2 (n_{stress} = 5, $n_{control}$ = 1). Analyses were conducted with the remaining 35 participants in the stress condition and 45 participants in the control condition.

Psychophysiological Recording, Data Reduction, and Analysis. Recording parameters were identical to those reported in the Method section. Using BrainVision Analyzer software

(Brain Products, Munich, Germany) for offline processing, data were band-pass filtered with low and high cutoffs of 0.01 Hz and 30 Hz (24 dB/oct), respectively, and were referenced to an average of TP9 and TP10 (left and right mastoids). Correction of ocular artifacts was conducted using a modification of the algorithm published in Gratton, Coles and Donchin (1983). Data were segmented into 1500 ms epochs, 500 ms before and 1000 ms after participant response. A semi-automatic artifact rejection procedure was again conducted in which artifacts were detected and rejected in individual channels when any of the following occurred: a voltage step greater than 50 µV/ms, a change of 175 µV within 400 ms, or activity of less than 0.5 µV within 100 ms. Remaining artifacts were then rejected via visual inspection of the data. The error-related negativity (ERN) and the correct-related negativity (CRN) were scored 0 – 100 ms at the frontocentral average FC_{avg} (average of activity at Fz, Cz, FC1, and FC2) following incorrect and correct responses, respectively. Activity in the 200 ms time window between 500 ms and 300 ms before participant response was used for baseline correction.

Analyses were conducted using SPSS Statistics Version 21 (IBM Corp., Armonk, NY). A mixed-design ANOVA was conducted to determine if there were differences in the ERN and CRN between Flanker 1 and Flanker 2 across conditions. Effect sizes for ANOVAs were calculated as partial η^2 (SS_{effect} / (SS_{effect} + SS_{error}). Post-hoc *t*-tests were conducted to determine the nature of significant interactions and are presented with 95% confidence intervals. All statistical tests had a significance level set at $p < .05$ and were conducted as two-tailed tests.

Results. Results demonstrated a main effect of response ($F(1, 78) = 159.20$, $p < .001$, partial $\eta^2 = .67$) such that the ERN was significantly larger (i.e., more negative, given that these are negative-going ERP components; $M = 0.57$, $SEM = 0.60$) than the CRN ($M = 8.23$, $SEM =$

0.61), and a main effect of time (F(1, 78) = 8.01, p = .01, partial η^2 = .09) such that neural responses during Flanker 1 were significantly larger (i.e., more negative; M = 3.82, SEM = 0.55) than during Flanker 2 (M = 4.99, SEM = 0.57). We did not find significant response by condition (F(1, 78) = 0.29, p = .59, partial η^2 = .004), time by condition (F(1, 78) = 1.00, p = .32, partial η^2 = .01), or response by time interactions (F(1, 78) = 3.37, p = .07, partial η^2 = .04); however, the main effects were qualified by a significant three-way response by time by condition interaction (F(1, 78) = 5.34, p = .02, partial η^2 = .06).

Post-hoc tests demonstrated that for the ERN, there was a small, though significant difference between Flanker 1 and Flanker 2 in the control condition (t(44) = -2.02, p = .049, 95% CI [-2.92, -0.005]) such that the ERN was larger (more negative) during Flanker 1 (M = 0.54, SEM = 0.91) as compared to Flanker 2 (M = 2.00, SEM = 0.68), but this difference did not reach significance in the stress condition (t(34) = -2.01, p = .052, 95% CI [-3.62, 0.02]; M_{Flanker1} = -1.03, SEM = 1.15; M_{Flanker2} = 0.78, SEM = 1.04).

For the CRN, there was a significant difference between Flanker 1 and Flanker 2 in the control condition (t(44) = -3.56, p = .001, 95% CI [-2.67, -0.74]), such that the CRN was larger (more negative) during Flanker 1 (M = 7.75, SEM = 0.75) than in Flanker 2 (M = 9.46, SEM = 0.93). This difference was not observed in the stress condition (t(34) = 0.48, p = .64, 95% CI [-0.94, 1.52]; M_{Flanker1} = 8.01, SEM =0.90; M_{Flanker2} = 7.72, SEM = 1.01). These data suggest that there may be a normative decrease in performance monitoring across multiple completions of the Flanker Task, but that under conditions of stress, participants may remain sensitized to their performance accuracy, particularly for adaptive (i.e., correct) responses.

Supplemental References

Gratton, G., Coles, M. G., & Donchin, E. (1983). A new method for off-line removal of ocular artifact. *Electroencephalography and Clinical Neurophysiology, 55*(4), 468-484. doi: 10.1016/0013-4694(83)90135-9

Olvet, D. M, & Hajcak, G. (2009). The stability of error-related brain activity with increasing trials. *Psychophysiology*, *46*(5), 957-961. doi: 10.1111/j.1469-8986.2009