Supplementary Material

1. Analyses Incorporating All Tasks Utilizing Core Executive Functions.

1.1 Overall effect. Across all effect sizes (m=30,k=260), the effect of cortisol administration on tasks utilizing a core executive function was nonsignificant, g^{+}=0.03, t(24.3)=0.77, p=.45, 95% CI [-0.051, 0.112]. See Figure S1 for a graphical depiction of this effect. While there was moderate heterogeneity across effect sizes, I^2=60.33, this heterogeneity largely reflected within-study variance, as the between-study variance was low, τ^2=0.05, illustrating that the overall null effect was largely consistent across studies (cf. Figure S1).

1.2 Covariate and moderator analyses. As Table S1 illustrates, no covariates emerged as significant at p<.05, with or without df>4 (df<4 increases Type I error rates). Similarly, the effect of cortisol administration on all tasks utilizing a core executive function was not significant after controlling for each covariate (Table S1). To separate genomic effects of cortisol from nongenomic effects, we controlled for the delay between cortisol administration and cognitive testing; however, this did not alter the results. In particular, controlling for the delay between administration and cognitive testing did not produce a significant effect of cortisol administration, g^{+}=0.06, t(14.6)=1.25, p=.23, 95% CI [-0.040, 0.153]. Similarly, the delay between cortisol administration and cognitive testing was not a significant covariate, B<-.001, t(1.3)=-1.28, p=.38, indicating that the effect size of cortisol administration relative to placebo did not differ as a function of the delay between cortisol administration and cognitive testing. In addition, cortisol dose did not significantly influence the effect size of cortisol administration relative to placebo, B=-.002, t(4.3)=-1.52, p=.20, indicating that the dose of cortisol administration had no effect when analyzing performance on all tasks that utilize a core executive function. Similarly, there was no evidence of a quadratic relationship between cortisol dose and the effect size of cortisol administration, B<-.001, t(10.7)=-1.35, p=.21, indicating that cortisol did not influence performance on all tasks utilizing a core executive function in a curvilinear fashion.

Moderator analyses indicated some differences among effect sizes (Table S2). In particular, cortisol administration improved scores on tasks employing an affective component marginally more than

tasks not employing an emotive component, $t(17.3)=1.94$, $p=.07$. However, neither of these effect sizes were significantly different from zero (Table S2). These effect sizes marginally differed from each other but each of them did not differ from zero because one of the effects was slightly negative while the other effect size was slightly positive; thus, the difference between effects was greater than the difference of each of the respective effect sizes from zero. Similarly, cortisol administration significantly improved reaction times in comparison to accuracy, $t(23.0)=2.92$, $p=.008$; again, however, neither the effect size of cortisol administration on reaction times or the effect size of cortisol administration on accuracy significantly differed from zero (Table S2).

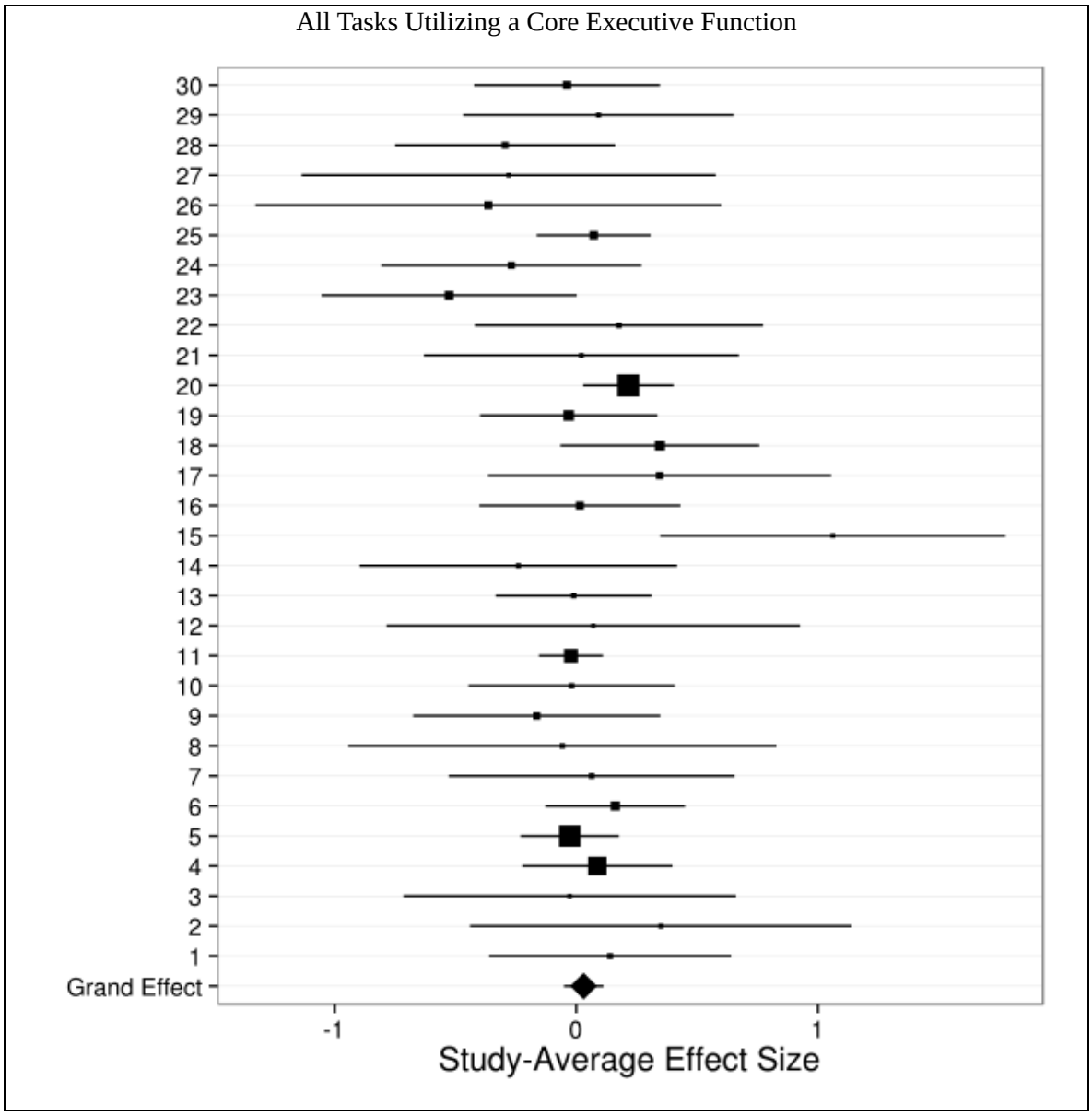

Figure S1. Forest plot of all study-average effect sizes by weight. The grand effect was nonsignificant, g^{+}=.03, p=.45. Numbers on the Y axis correspond to the studies listed below.

[1]Abercrombie et al. (2003)
[2]Bertsch et al. (2011)
[3]Breitberg et al. (2013)
[4]Buss et al. (2004)
[5]Entringer et al. (2009)
[6]Carvalho Fernando et al. (2013)
[7]Henckens et al. (2011; 2012)
[8]Hsu et al. (2003)
[9]Kuhlmann and Wolf (2005)
[10]Kuhlmann et al. (2005)
[11]Kumsta et al. (2010)
[12]Lupien et al. (1999)
[13]Monk and Nelson (2002)
[14]Newcomer et al. (1999)
[15]Oei et al. (2009)
[16]Porter et al. (2002)
[17]Putman & Berling (2011)
[18]Putman et al. (2007)
[19]Putman et al. (2010)
[20]Schlosser et al. (2013)
[21]Symonds et al. (2012)
[22]Taylor et al. (2011)
[23]Terfehr et al. (2011)
[24]Tollenaar et al. (2009)
[25]Tops et al. (2006)
[26]Vasa et al. (2009)
[27]Vaz et al. (2011)
[28]Wingenfeld et al. (2011)
[29]Wolf et al. (2001)
[30]Yehuda et al. (2007)

Table S1. Covariate effects on the relation between cortisol and all tasks utilizing a core executive function.

Variable	*B*	β	g^{+} (*SE*) Controlling for Covariate	*t*	*df*	*p*
Percent Male Participants	.001	.05		1.29	16.8	.22
Range: 0–100			-.04 (.06)	-0.61	9.3	.56
Minutes Between Cortisol and Cognitive Test	< -.001	-.04		-1.28	1.3	.38
Range: 15–540			.06 (.05)	1.25	14.6	.23
Quadratic Minutes Between Cortisol and Test	< -.001	-.09		-0.47	4.4	.66
			.02 (.08)	0.29	8.0	.78
Cortisol Dose	-.002	-.05		-1.52	4.3	.20
Range: 3.567–120			.08 (.05)	1.59	15.6	.13
Quadratic Cortisol Dose	< -.001	-.16		-1.35	10.7	.21
			<.01 (.08)	0.04	11.2	.97
Participant Age	-.002	-.02		-0.90	2.8	.44
Range: 20.1–75.5			.08 (.08)	0.95	7.0	.37

Note: If $df < 4$, there is up to an approximate 10% Type I error rate. Linear associations are reported without controlling for quadratic effects.

Table S2. Moderator analyses of the effects of cortisol on all tasks utilizing a core executive function.

Variable	g^+	*SE*	*df*	*p*	*m*	*k*
Emotive Task[a]						
Nonemotive	.02	.04	19.0	.74	23	186
Emotive	.10	.09	11.5	.32	14	74
Reaction Time vs. Accuracy[b]						
Reaction Time	.12	.08	16.0	.14	20	142
Accuracy	-.08†	.04	17.6	.07	21	118
Study Design						
Repeated Measures	.04	.03	11.1	.27	18	131
Between Groups	.04	.12	10.9	.73	12	129
Mode of Administration						
Intravenous/Injection	-.02	.04	4.0	.69	6	127
Oral	.04	.05	19.9	.41	24	133
Time of Treatment						
Morning	.04	.03	2.3	.25	5	71
Mid-Afternoon	.05	.11	8.5	.66	10	95
Late Afternoon	.03	.05	11.1	.46	15	94

Note: $^\dagger p<.10$; g^+ = effect size; *SE* = standard error of the effect size; *df* = degrees of freedom for test determining whether the effect size differs from zero; *p* = *p* value testing whether the effect size in the given row is significantly different from zero; *m* = number of studies included in the analysis, *k* = number of effect sizes included in the analysis. If $df < 4$, there is up to an approximate 10% Type I error rate. Superscript a indicates that the two groups differ at $p = .07$. Superscript b indicates that the two groups differ at $p = .008$

Table S3. Description of studies included in the meta-analysis.

Study	Core E.F. Assessed	Measures Used to Assess Outcome	Time or Accuracy Outcome	Emotional Component to Task	Study Design	Mode	Cortisol Dose (mg)	Percent Male	Participant Age	Min. Btwn Cort. and Test	Time of Day
Abercrombie et al., 2003	Inhibition	Degraded stimulus continuous performance task	Accuracy	No	Between-subjects	Oral	20 or 40 (depending upon condition)	100	25.5	40	Late afternoon
Bertsch et al., 2011	Inhibition	Emotional Stroop task	Time	Yes	Between-subjects	Oral	20	50	22.6	60	Late afternoon
Breitberg et al., 2013	Working Memory	Spatial span	Accuracy	No	Repeated measures	IV/Injection	13.33 or 40	100 or 0	27, 29, 30.3, or 30.6	75	Mid-day
	Inhibition	Affective go/no-go (nonshift trials); Rapid visual information processing	Both	Yes and No							
	Set-Shifting	Affective go/no-go (shift trials)	Both	Yes							
Buss et al., 2004	Inhibition	d2	Accuracy	No	Repeated measures	Oral	10	100	26.27	65	Late afternoon
Entringer et al., 2009	Working memory	Sternberg item recognition test	Accuracy	No	Repeated measures	Oral	10	0	24.5	60	Late afternoon
Fernando et al., 2013	Inhibition	Affective go/no-go	Accuracy	Yes	Repeated measures	Oral	10	0	29.5	45	Late afternoon
Henckens et al., 2010/11	Working Memory	*n*-back	Both	No	Between-subjects	Oral	10	100	21	30, 60, 240, or 270	Late afternoon
	Inhibition	Emotional Stroop task	Both	Yes							
Hsu et al., 2003	Inhibition	Stroop task	Accuracy	No	Repeated measures	Oral	100	100	22	120	Mid-day
Kuhlmann et al., 2005	Working Memory	Digit span backward	Accuracy	No	Repeated measures	Oral	30	0	26.56	60	Mid-day
	Inhibition	d2; Digit span forward	Time	No							
Kuhlmann & Wolf (2005)	Working Memory	Digit span backward	Accuracy	No	Repeated measures	Oral	10	0	24.81	60	Late afternoon
	Inhibition	d2; Digit span forward	Accuracy	No							
Kumsta et	Working	Sternberg item	Both	No	Repeated	Oral	10	43.2	25.1	60	Mid-day

al., 2010	Memory	recognition test			measures						
Lupien et al., 1999	Working Memory	Sternberg item recognition test	Time	No	Between-subjects	IV/Injection	3.567, 26.67, or 53.33	100	24.35	45	Early
Monk & Nelson, 2002	Working Memory	*n*-back	Both	Yes and No	Repeated measures	Oral	30	50	26	45	Late afternoon
	Inhibition	Continuous performance task	Both	No							
Newcomer et al., 1999	Inhibition	Stroop task; Continuous performance task	Both	No	Between-subjects	Oral	25 or 100	48.5 or 50	22.2	540	Late afternoon
	Set-Shifting	Verbal Fluency	Accuracy	No							
Oei et al., 2009	Working Memory	Sternberg item recognition test	Both	Yes and No	Between-subjects	Oral	35	100	20.6	75	Mid-day
Porter et al., 2002	Working Memory	Digit span backward	Accuracy	No	Repeated measures	Oral	20	100	75.5	60	Early
	Inhibition	Digit span forward	Accuracy	No							
	Set-Shifting	Verbal Fluency	Accuracy	No							
Putman & Berling, 2011	Inhibition	Emotional Stroop task	Time	Yes	Between-subjects	Oral	40	100	22.4	75	Late afternoon
Putman et al., 2007	Inhibition	Stroop task	Time	Yes and No	Repeated measures	Oral	40	100	20.1	45	Mid-day
Putman et al., 2010	Inhibition	Gaze-cuing task	Time	Yes	Repeated measures	Oral	40	100	20.5	45	Mid-day
Schlosser et al., 2013	Inhibition	Go/no-go	Time	Yes	Repeated measures	Oral	10	35.2	31.46	45	Late afternoon
Symonds et al., 2012	Working Memory	*n*-back	Both	No	Repeated measures	IV/Injection	100	53.3	23.9	35	Mid-day
Taylor et al., 2011	Inhibition	Negative affective priming	Time	Yes	Between-subjects	Oral	10 or 40	21.9	31	60	Late afternoon
Terfehr et al., 2011	Working Memory	Word suppression test	Both	Yes and No (Depending upon task	Between-subjects	Oral	10	36.2	32.36	60	Late afternoon

				part)							
Tollenaar et al., 2011	Working Memory	Digit span backward	Accuracy	No	Between-subjects	Oral	35	100	20.43	75 or 110	Mid-day
	Inhibition	Sustained attention to response task; Digit span forward	Accuracy	No							
Tops et al., 2006	Working Memory	*n*-back	Time	No	Repeated measures	Oral	35	13.95	42	105	Early
	Inhibition	Dot-probe	Time	Yes							
Vasa et al., 2009	Inhibition	Dot-probe	Time	Yes	Repeated measures	Oral	44.44	50	26.63	30	Mid-day
Vaz et al., 2011	Working Memory	Paced auditory serial addition task; Zoo planning task; Digit span backwards; Random number generation (working memory indices)	Both	No	Between-subjects	Oral	30	100	26.5	60	Late afternoon
	Inhibition	Stroop task; Random number generation (inhibition indices); Digit span forward	Both	No							
	Set-Shifting	Trail-making test, part B	Time	No							
Wingenfeld et al., 2011	Working Memory	Working memory subtest of the Test for Attentional Performance	Both	No	Repeated measures	Oral	120	0	32.9	75	Late afternoon
	Set-Shifting	Cognitive flexibility subtest of the Test for Attentional Performance	Both	No							

Wolf et al., 2001	Working Memory	Digit span backward and forward (combined)	Accuracy	No	Repeated measures	IV/Injection	44.44	100	24 or 69	15	Early
	Inhibition	Stroop task; Timed cancellation	Both	No							
Yehuda et al., 2007	Working Memory	Digit span backward	Accuracy	No	Repeated measures	IV/Injection	17.5	100	64.6	75	Early
	Inhibition	Digit span forward	Accuracy	No							
	Set-Shifting	Letter-number sequencing	Accuracy	No							